

PRELIMINARY HYDROLOGY STUDIES
PIONEERTOWN, SAN BERNARDINO,
CALIFORNIA

ASSESSOR'S MAP NO. 13

A.P.N. 0594-391-06

A.P.N. 0594-391-07

A.P.N. 0594-391-08

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1.0 INTRODUCTION (Source: Wikipedia)

Pioneertown is an unincorporated community of the Morongo Basin region of the High Desert in San Bernardino County, California, United States. It is an 1880s-themed town developed as a shooting location for actors working on Western films and TV series with businesses and residences. The Mane Street Historic District (in which the Project is located) is listed on the National Register of Historic Places. The winding, 4-mile (6.4 km) drive northwest to Pioneertown from Yucca Valley has been designated a California Scenic Drive and the area is now surrounded by privately and federally protected lands. The Sawtooths are a small mountain range to the south; Black Hill is to the north.

Actor Dick Curtis started up the town in 1946 as an 1880s themed live-in motion-picture set. The town was designed to provide a place for production companies to enjoy while also using their businesses and homes in movies. Pioneertown's founders intended the area to be a residential area with Mane Street acting as both a movie set and the town's commercial district. Hundreds of Westerns and early television shows were filmed in Pioneertown, including *The Cisco Kid* and Edgar Buchanan's *Judge Roy Bean*. Pioneertown's founders intended the area to be a residential area with Mane Street acting as both a movie set and the town's commercial district.

2.0 PROJECT SITE

Part 2.1 – Topography and Land use

The Project site is a parcel of land, about 1.84 acres in area, bounded to the north by Mane Street and to the south by Pioneertown Road. Its easterly boundary is about 1,000 ft to the west of Citrus Street. The land is generally sloping down to the northeast by about 3.5% and mostly, in its existing state, no vegetative cover with the exception of a few trees and seasonal grass. Located in its northeast corner is a building roughly 60x100 ft in footprint, an existing saloon. In the northwest corner is a smaller building about 21x42 ft. No other significant structure is located in the site as most of the area is taken by the existing parking lot.

Part 2.2 - Existing Hydrologic Features

The land topography is characterized by a terrain sloping to the northeast at about 3% to 3.5%. In determining the storm runoff affecting the project site, it is found out that offsite runoff coming from the south and southwest of the Project site are intercepted by Pioneertown Road. The road's grading, shown on the topographic map of the site, indicates deepened shoulders that gather the storm runoff. The hydrologic analyses of the site therefore, only considered the onsite runoff.

The Project site is found to be located at the following coordinates:

Latitude: 34.1566° North
Longitude: 116.4955° West

With the above coordinates, the hydrologic soil type in the area is determined to be Type "C". As defined in the San Bernardino County Hydrology Manual, Type "C" soil is characterized as "...having slow infiltration rates when thoroughly wetted and consisting chiefly of silty-loam soils with layer that impedes downward movement of water, or soils with moderately fine to fine texture. These soils have a slow rate of water transmission."

The corresponding 60-minute Point Precipitation Frequency Estimates for the Project site based on the above coordinates area as follows:

	Rainfall Frequency, years				
	2	5	10	25	100
Pt. Precip.	0.587	0.830	1.04	1.33	1.83

The point precipitations indicated were taken from NOAA Atlas 14, Volume 6, Version 2. (Please refer to a copy of the PF tabular shown at the end of this report)

The Project Site elevations range from 4044.0 feet to 4055.6 feet above mean sea level. This classifies site as mountainous. With this, the slope of the intensity-duration curve to be used in these analyses will be **0.7**.

Part 2.3 – Proposed Development

The development of the site is guided by the fact that the area is considered “historical heritage” and any improvement and/ or changes must be geared toward preservation of the existing theme and its purposes. The existing two building structures in the site are to be maintained and renovated. The existing saloon will be converted into a soundstage building resulting into a facility of about 6,223 square feet in floor area. The smaller building located at the northwest corner of the lot will likewise be renovated and converted into a coffee shop of about 831 sf floor area. The footprints of both buildings do not change compared to the existing condition.

The additional improvements to the site are as follows:

- New shade structure for outdoor dining, about 3,024 sf;
- Mobile kitchen trailer, 225 sf;
- Restroom trailer, 250sf;
- Parking area with compacted soil finish;
- Landscaping of various areas of the project site;
- Driveway entrance to the facility using compacted gravel; and
- Frontage sidewalk (fronting Mane Street) will be a boardwalk, 12 ft in width.

3.0 HYDROLOGIC ANALYSES

Part 3.1 Methodology

The project site (within the property boundary) has a total land area of about 1.84 acres. After determining the runoff flows, it is determined that the total drainage tributary area is 1.71 acres; this area is equal to both the existing and developed conditions of the Project. This total area includes a portion of the land located between the westerly boundary of the property and the street to the west of it, considered an offsite source of runoff. Because of the small area of the drainage study, the Rational Method is used.

The areas contributing to drainage runoff are divided into three distinct areas as well as drain points. The following are the drain points (nodes) of the project, existing condition, as well as its corresponding node points for the developed condition:

Existing Condition	72	63	81
Developed Cond.	22	13	31

The hydrologic analyses for the Project (Rational Method) were conducted using the parameters stated in the Hydrology Manual of San Bernardino County and the following input:

- Storm frequencies for 2-, 5-, 10-, 25-, and 100-year storm;
- AMC values of 1 (2- and 5-year); 2 (for 10- and 25-year); and 3 (for 100-year storm);
- Slope of intensity-duration curve = 0.7 (mountainous area); and
- 60-minute point precipitation per NOAA Atlas 14.

Part 3.2 Results

The peak runoff calculations made are in three (3) distinct sets corresponding to the three outlet points of the Project Site, please refer to table in Part 3.1, Methodology, above. The peak discharges are shown on Table 1 – Summary of Results, shown at the back of this Report.

On Table 1, Node 63 (existing condition) has 0.91 acre of tributary area compared to Node 13 (developed condition) with 1.14 acres; an increase of 0.23 acre. This change can be attributed to the improvement/ development in the tributary area wherein a portion of the area originally going to Node 31 was diverted to Node 13. Likewise, the same is happening between Nodes 81 (existing condition) and 63 (developed condition). The acreage that was lost in Nodes 81 and 31 is gained in Nodes 63 and 13. No changes in tributary area for Nodes 72 and 22.

Table 1 shows the various peak discharges at the node. In the case of Nodes 63 and 13, the increase in peak discharges can be attributed largely to increase in tributary area rather than the development itself. The area gained in Node 13 came from Node 31.

Part 3.3 Comparison of Peak Discharges

On Table 2, Comparison of Results, shown at the end of this Report, it is noted that the total acreage for the existing condition (nodes 63 and 81) is equal to 1.53 acres, the same as to the sum of areas for Nodes 13 and 31, in the developed condition. In this analysis, the total acreages are the same to have a proper comparison of outlet points. With the same tributary areas, it is noted that peak flows do not differ greatly and in lower storm frequencies, the existing condition has higher Q's.

The decrease in peak Q's mentioned above may be credited to some of the following:

- Flow paths increased resulting in longer Tc and lower rainfall intensity;
- The increase in impervious surface area is countered by the introduction of vegetative cover proposed for the project; and
- Introduction of gravel surface in the development increase the pervious factor.

When the peak discharges were combined, the time of concentration is not considered. It is due largely to the minimal differences in the Tc's as well as small tributary areas involved. This is just to facilitate the comparison of two similar items.

In conclusion, the proposed improvement in the area of concern do not increase the peak discharges and does not necessitate any attenuation of flows. It is also recommended that there is no need to do any improvements in the discharge points as peak flows remain virtually the same.

END

Table 1 - PIONEERTOWN PROJECT, HYDROLOGY CALCULATIONS*

SUMMARY OF RESULTS, PEAK FLOW RATES (cfs)

NODES		STORM FREQUENCIES, YEARS					Area (Ac)
		2-	5-	10-	25-	100-	
EXIST.	63	2.11	3.10	4.09	5.29	7.47	0.91
PROP.	13	2.18	3.28	4.34	5.65	8.07	1.14
% Change		3.32%	5.81%	6.11%	6.81%	8.03%	25.27%
EXIST.	81	1.13	1.63	2.06	2.66	3.76	0.62
PROP.	31	0.87	1.30	1.71	2.23	3.17	0.39
%Change		-23.01%	-20.25%	-16.99%	-16.17%	-15.69%	-37.10%
EXIST.	72	0.47	0.69	0.91	1.17	1.63	0.18
PROP.	22	0.42	0.64	0.86	1.12	1.61	0.18
% Change		-10.64%	-7.25%	-5.49%	-4.27%	-1.23%	0.00%

(*) - Rational Method

Table 2 - PIONEERTOWN PROJECT, HYDROLOGY CALCULATIONS*

COMPARISON OF RESULTS, PEAK FLOW RATES (cfs)

NODES		STORM FREQUENCIES, YEARS					Area (Ac)
		2-	5-	10-	25-	100-	
Exist. Condition, 1		3.24	4.73	6.15	7.95	11.23	1.53
Prop. Condition, 2		3.05	4.58	6.05	7.88	11.24	1.53
% Change		-5.86%	-3.17%	-1.63%	-0.88%	0.09%	0.00%

1 - Combined discharge for Nodes 63 and 81

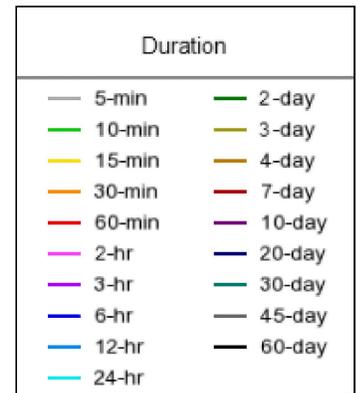
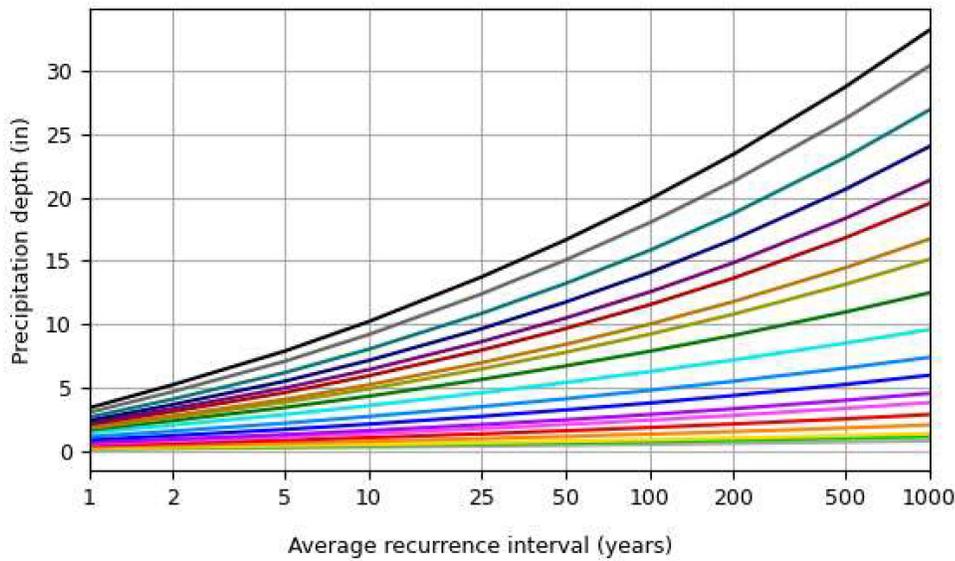
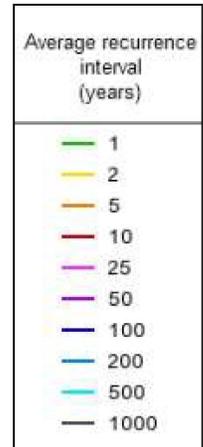
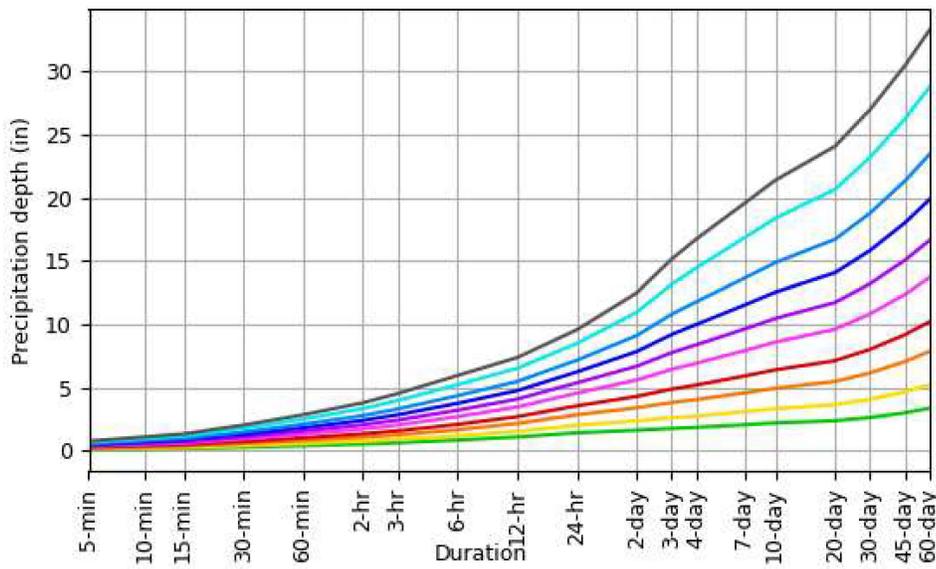
2 - Combined discharge for Nodes 13 and 31

**PIONEERTOWN PROJECT, HYDROLOGY CALCULATIONS, AREAC
COMPARISON OF RESULTS, PEAK FLOW RATES (cfs)
STORM FREQUENCIES, YEARS**

NODES		2	5	10	25	100	Area (Ac)
EXIST	72	0.47	0.69	0.91	1.17	1.63	0.18
PROP	22	0.42	0.64	0.86	1.12	1.61	0.18
		-0.05	-0.05	-0.05	-0.05	-0.02	0

PDS-based depth-duration-frequency (DDF) curves

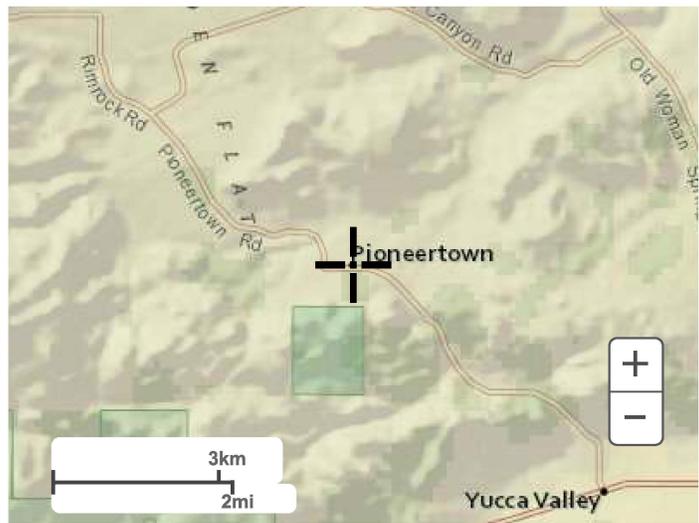
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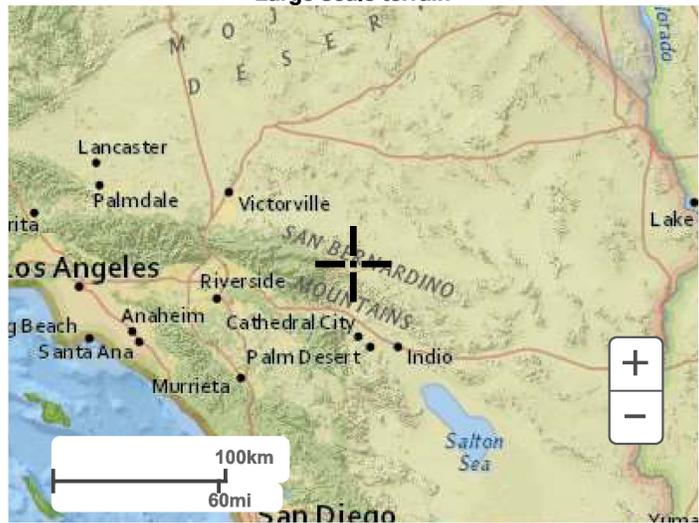
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Maps & aeriels

Small scale terrain



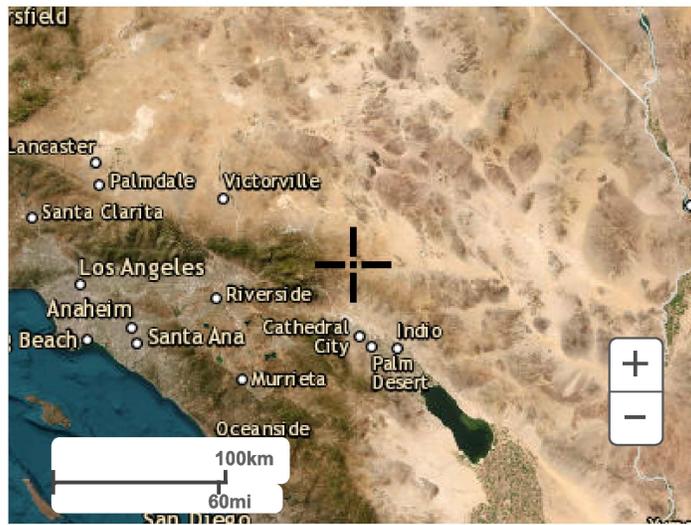
Large scale terrain



Large scale map



Large scale aerial



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NOAA Atlas 14, Volume 6, Version 2
Location name: Pioneertown, California, USA*
Latitude: 34.1566°, Longitude: -116.4955°
Elevation: 4049 ft**
 * source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps_&_aerials](#)

PF tabular

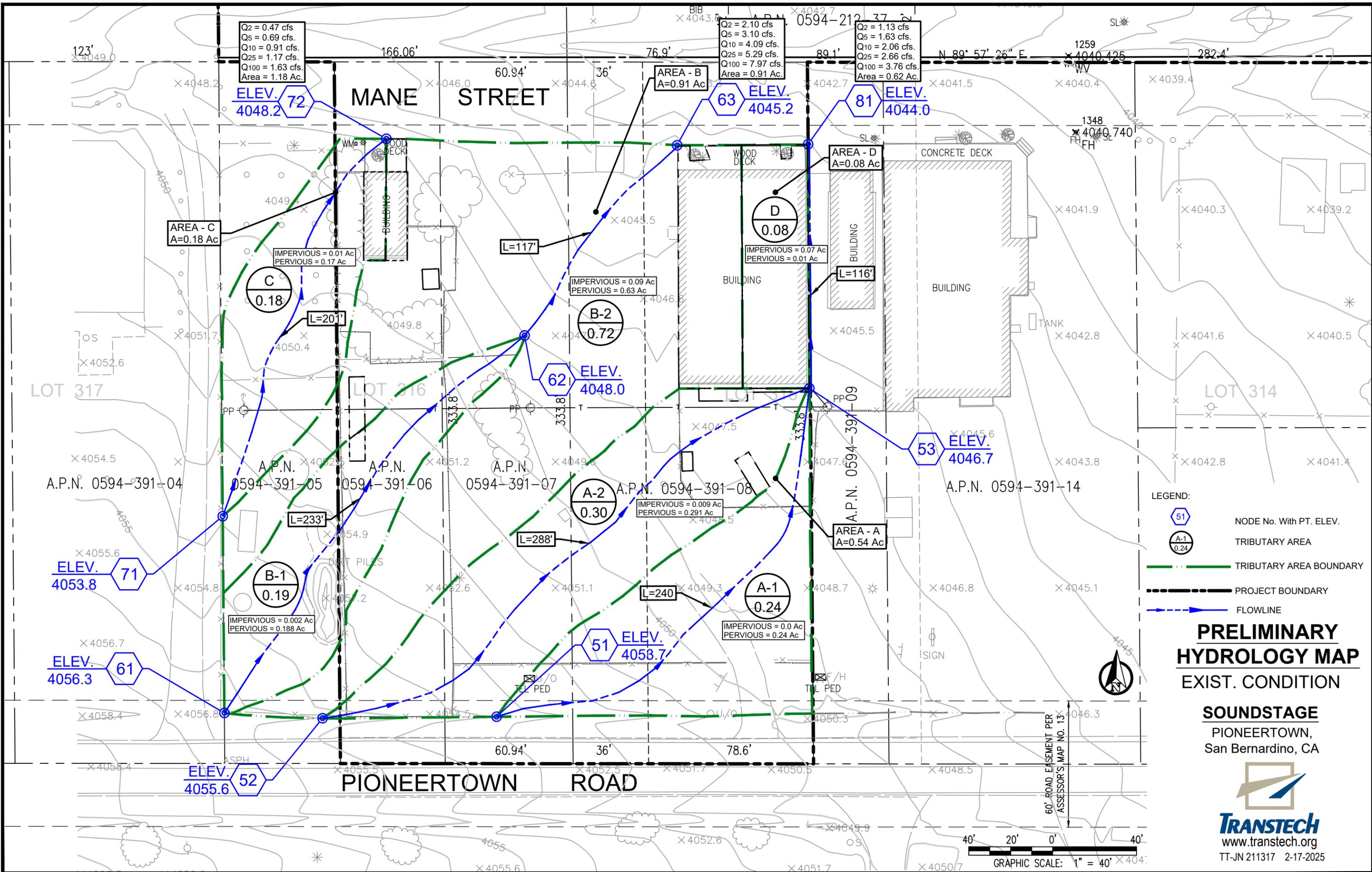
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.112 (0.093-0.137)	0.160 (0.132-0.195)	0.226 (0.186-0.277)	0.282 (0.231-0.349)	0.363 (0.288-0.464)	0.429 (0.333-0.559)	0.500 (0.378-0.667)	0.576 (0.424-0.791)	0.687 (0.485-0.983)	0.780 (0.532-1.15)
10-min	0.161 (0.133-0.196)	0.229 (0.190-0.280)	0.324 (0.267-0.397)	0.405 (0.331-0.500)	0.521 (0.412-0.665)	0.615 (0.477-0.802)	0.716 (0.542-0.956)	0.826 (0.607-1.13)	0.984 (0.695-1.41)	1.12 (0.762-1.66)
15-min	0.194 (0.161-0.237)	0.277 (0.229-0.339)	0.392 (0.323-0.480)	0.489 (0.400-0.604)	0.630 (0.498-0.804)	0.744 (0.577-0.970)	0.866 (0.655-1.16)	0.999 (0.735-1.37)	1.19 (0.840-1.70)	1.35 (0.922-2.00)
30-min	0.293 (0.243-0.358)	0.419 (0.346-0.512)	0.592 (0.488-0.725)	0.740 (0.605-0.914)	0.952 (0.753-1.22)	1.12 (0.872-1.47)	1.31 (0.990-1.75)	1.51 (1.11-2.07)	1.80 (1.27-2.57)	2.04 (1.39-3.02)
60-min	0.411 (0.340-0.502)	0.587 (0.486-0.717)	0.830 (0.684-1.02)	1.04 (0.848-1.28)	1.33 (1.06-1.70)	1.58 (1.22-2.05)	1.83 (1.39-2.45)	2.12 (1.56-2.90)	2.52 (1.78-3.61)	2.86 (1.95-4.24)
2-hr	0.549 (0.454-0.670)	0.772 (0.638-0.943)	1.08 (0.894-1.33)	1.35 (1.11-1.67)	1.75 (1.38-2.23)	2.07 (1.60-2.70)	2.42 (1.83-3.23)	2.80 (2.06-3.84)	3.35 (2.36-4.79)	3.81 (2.60-5.64)
3-hr	0.649 (0.537-0.792)	0.908 (0.751-1.11)	1.27 (1.05-1.56)	1.59 (1.30-1.97)	2.06 (1.63-2.63)	2.44 (1.89-3.18)	2.86 (2.16-3.82)	3.32 (2.44-4.55)	3.98 (2.81-5.70)	4.54 (3.10-6.72)
6-hr	0.858 (0.711-1.05)	1.20 (0.992-1.47)	1.68 (1.39-2.06)	2.10 (1.72-2.60)	2.71 (2.15-3.46)	3.22 (2.50-4.20)	3.77 (2.85-5.03)	4.36 (3.21-5.99)	5.24 (3.70-7.49)	5.96 (4.07-8.83)
12-hr	1.11 (0.915-1.35)	1.55 (1.28-1.90)	2.17 (1.79-2.66)	2.71 (2.22-3.34)	3.48 (2.75-4.44)	4.10 (3.18-5.34)	4.77 (3.61-6.37)	5.49 (4.04-7.54)	6.53 (4.61-9.34)	7.38 (5.04-10.9)
24-hr	1.43 (1.27-1.65)	2.03 (1.80-2.34)	2.86 (2.52-3.31)	3.57 (3.12-4.16)	4.57 (3.88-5.50)	5.39 (4.47-6.62)	6.25 (5.07-7.86)	7.18 (5.66-9.28)	8.50 (6.44-11.4)	9.58 (7.02-13.3)
2-day	1.64 (1.45-1.88)	2.38 (2.10-2.74)	3.41 (3.01-3.94)	4.31 (3.78-5.02)	5.62 (4.76-6.76)	6.69 (5.56-8.23)	7.85 (6.37-9.88)	9.12 (7.19-11.8)	11.0 (8.30-14.8)	12.5 (9.14-17.4)
3-day	1.78 (1.58-2.05)	2.62 (2.32-3.02)	3.82 (3.38-4.42)	4.88 (4.28-5.69)	6.45 (5.47-7.77)	7.76 (6.45-9.54)	9.20 (7.46-11.6)	10.8 (8.52-14.0)	13.1 (9.96-17.7)	15.1 (11.1-21.1)
4-day	1.86 (1.65-2.14)	2.76 (2.44-3.18)	4.06 (3.58-4.69)	5.21 (4.56-6.08)	6.94 (5.88-8.35)	8.39 (6.97-10.3)	10.0 (8.10-12.6)	11.8 (9.30-15.2)	14.5 (11.0-19.5)	16.7 (12.3-23.3)
7-day	2.07 (1.84-2.39)	3.10 (2.74-3.58)	4.59 (4.05-5.31)	5.92 (5.19-6.90)	7.93 (6.72-9.55)	9.64 (8.00-11.8)	11.5 (9.34-14.5)	13.6 (10.8-17.7)	16.8 (12.7-22.7)	19.6 (14.3-27.2)
10-day	2.22 (1.96-2.55)	3.33 (2.95-3.84)	4.96 (4.37-5.73)	6.41 (5.61-7.47)	8.60 (7.29-10.4)	10.5 (8.69-12.9)	12.5 (10.2-15.8)	14.9 (11.7-19.2)	18.4 (13.9-24.7)	21.4 (15.6-29.8)
20-day	2.39 (2.12-2.75)	3.65 (3.23-4.21)	5.49 (4.85-6.35)	7.14 (6.25-8.32)	9.62 (8.15-11.6)	11.7 (9.74-14.4)	14.1 (11.4-17.7)	16.7 (13.2-21.6)	20.7 (15.6-27.8)	24.0 (17.6-33.5)
30-day	2.64 (2.34-3.05)	4.08 (3.61-4.71)	6.17 (5.44-7.13)	8.03 (7.03-9.36)	10.8 (9.17-13.0)	13.2 (11.0-16.2)	15.8 (12.8-19.9)	18.8 (14.8-24.3)	23.2 (17.6-31.2)	26.9 (19.7-37.5)
45-day	3.02 (2.67-3.47)	4.67 (4.14-5.39)	7.06 (6.24-8.17)	9.19 (8.04-10.7)	12.4 (10.5-14.9)	15.0 (12.5-18.5)	18.0 (14.6-22.7)	21.3 (16.8-27.6)	26.2 (19.9-35.3)	30.4 (22.3-42.4)
60-day	3.37 (2.99-3.88)	5.22 (4.62-6.02)	7.87 (6.94-9.10)	10.2 (8.94-11.9)	13.7 (11.6-16.5)	16.6 (13.8-20.4)	19.9 (16.1-25.0)	23.4 (18.5-30.3)	28.7 (21.8-38.7)	33.3 (24.4-46.3)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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PF graphical

ATTACHMENTS



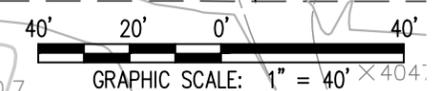
- LEGEND:**
- NODE No. With PT. ELEV.
 - TRIBUTARY AREA
 - TRIBUTARY AREA BOUNDARY
 - PROJECT BOUNDARY
 - FLOWLINE

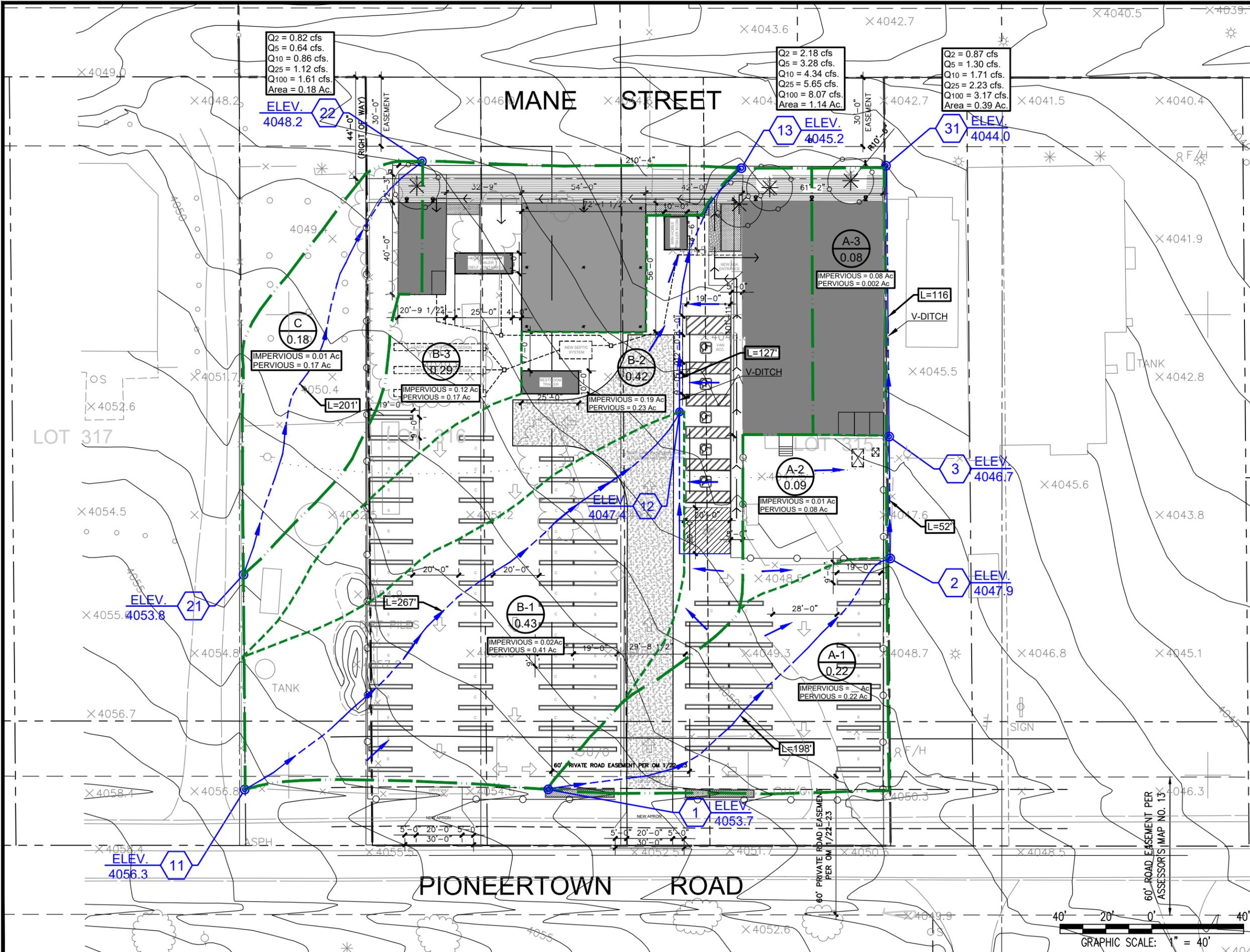
**PRELIMINARY
HYDROLOGY MAP
EXIST. CONDITION**

**SOUNDSTAGE
PIONEERTOWN,
San Bernardino, CA**



TRANSTECH
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TT-JN 211317 2-17-2025





Q2 = 0.82 cfs.
 Q5 = 0.64 cfs.
 Q10 = 0.86 cfs.
 Q25 = 1.12 cfs.
 Q100 = 1.61 cfs.
 Area = 0.18 Ac.

Q2 = 2.18 cfs.
 Q5 = 3.28 cfs.
 Q10 = 4.34 cfs.
 Q25 = 5.65 cfs.
 Q100 = 8.07 cfs.
 Area = 1.14 Ac.

Q2 = 0.87 cfs.
 Q5 = 1.30 cfs.
 Q10 = 1.71 cfs.
 Q25 = 2.23 cfs.
 Q100 = 3.17 cfs.
 Area = 0.39 Ac.

ELEV. 4048.2

ELEV. 4045.2

ELEV. 4044.0

0.18
 IMPERVIOUS = 0.01 Ac
 PERVIOUS = 0.17 Ac

0.29
 IMPERVIOUS = 0.12 Ac
 PERVIOUS = 0.17 Ac

0.42
 IMPERVIOUS = 0.19 Ac
 PERVIOUS = 0.23 Ac

0.09
 IMPERVIOUS = 0.01 Ac
 PERVIOUS = 0.08 Ac

0.43
 IMPERVIOUS = 0.02 Ac
 PERVIOUS = 0.41 Ac

0.22
 IMPERVIOUS = 0.01 Ac
 PERVIOUS = 0.22 Ac

ELEV. 4053.8

ELEV. 4047.4

ELEV. 4046.7

ELEV. 4047.9

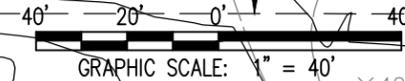
ELEV. 4056.3

ELEV. 4053.7

- LEGEND:**
- NODE No. With PT. ELEV.
 - TRIBUTARY AREA
 - TRIBUTARY AREA BOUNDARY
 - TRIBUTARY SUB-AREA BOUNDARY
 - PROJECT BOUNDARY
 - FLOWLINE
 - BUILDING ROOF
 - PAVED AREA

**PRELIMINARY
 HYDROLOGY MAP**
 PROP. CONDITION
SOUNDSTAGE
 PIONEERTOWN,
 San Bernardino, CA

TRANSTECH
 www.transtech.org
 TT-JN 211317 2-17-2025

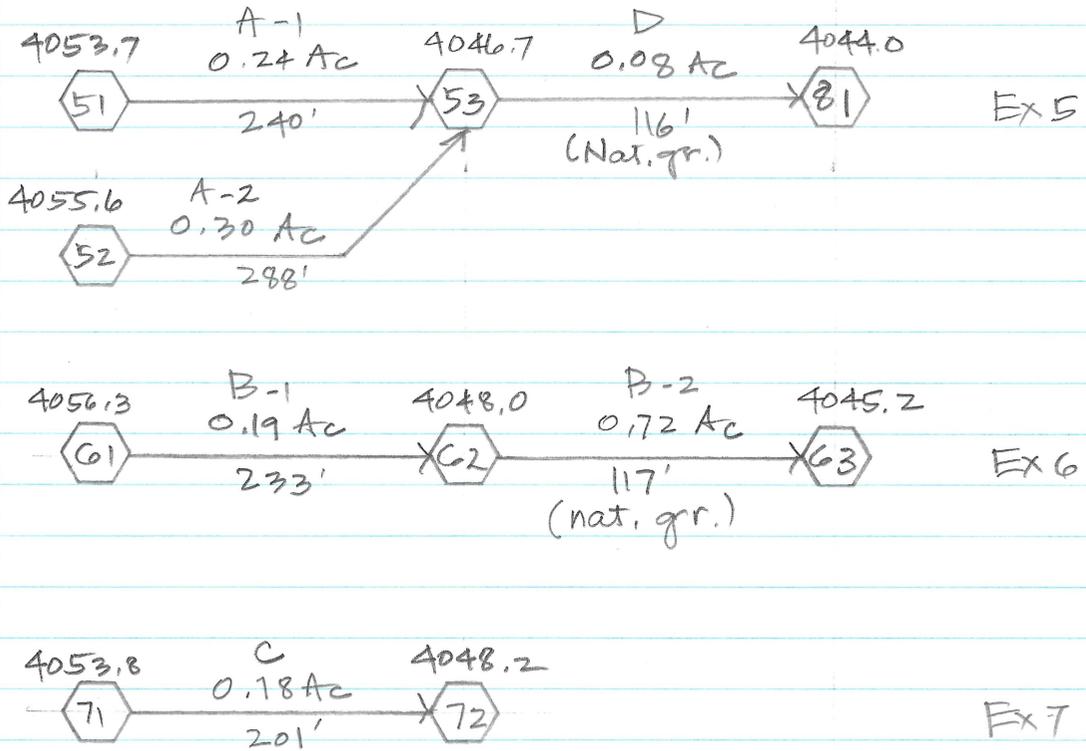


1-30-2025

PIONEERTOWN PROJECT

1 of 4

EXISTING CONDITION



1-31-2025

PIONEERTOWN PROJ. (EXISTING CONDITION)

2 OF 4

Tributary Area Definition / Breakdown

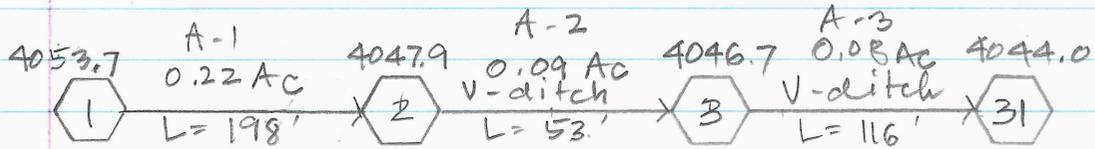
A-1	0.24 Ac	Nat'l ground	Poor Cover
A-2	0.29 Ac	Nat'l ground	poor cover
	0.01 Ac	Bldg	- Impervious
B-1	0.002 Ac	Bldg	- Impervious
	0.188 Ac	Nat'l ground	- poor cover
B-2	0.10 Ac	Bldg	- Impervious
	0.62 Ac	Nat'l ground	- poor cover
C	0.01 Ac	Bldg	- Impervious
	0.17 Ac	Nat'l Grd	- poor cover
D	0.01 Ac	Nat'l grd	- poor cover
	0.07 Ac	Bldg	- Impervious
<hr/>			
Total	= 1.71 Ac		

1-27-2025

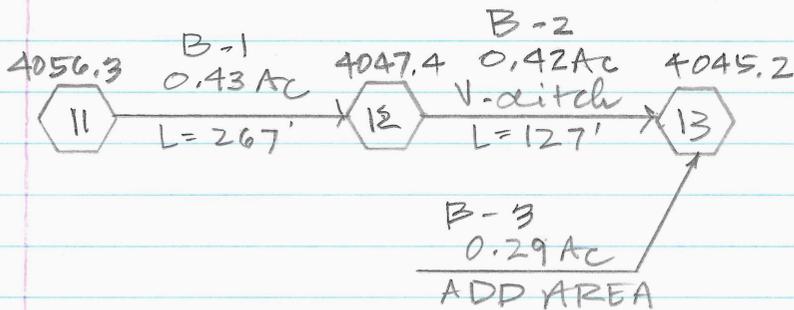
3. OF 4

PIONEER TOWN PROJECT

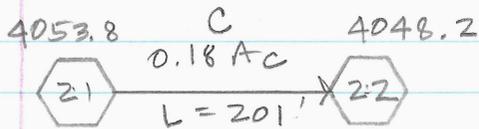
PROPOSED/DEVELOPED CONDITION



PR1



PR11



PR2

1.31.2025

4 of 4

Proposed Condition

Tributary Area Definitions

- A-1
- Bldg - 0.01 Ac Imp.
 - Dwy - 0.02 Ac 50% PerV - gravel
 - Comp. Gard - 0.18 Ac 30% PerV
 - Landscape - 0.01 Ac 85% PerV
 - 0.22 Ac
- A-2
- Nat Gard - 0.08 Ac Poor Cover
 - Parking - 0.01 Ac (Comp Gard) 30% PerV
 - 0.09 Ac
- A-3
- Bldg - 0.07 Ac Imp.
 - Walkway - 0.01 Ac (Bd walk) 50% perV
 - 0.08 Ac
- B-1
- Driveway - 0.06 Ac (Gravel) 50% perV
 - Parking - 0.37 Ac (Comp Gard) 30% perV
 - 0.43 Ac
- B-2
- Bldg - 0.11 Ac Imp.
 - Parking - 0.10 Ac (comp. gard) 30% perV
 - Nat. Gard - 0.21 Ac Poor Cover
 - 0.42 Ac
- C
- Bldg - 0.01 Ac Imp.
 - Nat'l gard - 0.17 Ac Poor Cover
 - 0.18 Ac
- B-3
- Bldg - 0.12 Ac Imp.
 - Parking - 0.03 Ac 30% PerV
 - Natl gard - 0.14 Ac Landscape
 - 0.29 Ac

SOUNDSTAGE

PIONEERTOWN, San Bernardino, CA

AREA - A

AREA - A-1

0.22 Ac

BUILDING AREA:

BLDG. FOOTPRINT, SHED
CONTAINER

235.5 SF = 0.01 Ac

MAIN DWAY AREA:

GRAVEL

1084.0 SF = 0.02 Ac

PARKING/DRIVE AREA:

COMPACTED GROUND

7,840.0 SF = 0.18 Ac

LANDSCAPE/ NAT. AREA:

NAT. GROUND & LSCAPE

3,355.0 SF = 0.01 Ac

AREA - A-2

0.09 Ac

PARKING/ YARD AREA:

COMPACTED GROUND

3,522.0 SF = 0.08 Ac

LANDSCAPE/ NAT. AREA:

NAT. GROUND & LSCAPE

398.0 SF = 0.01 Ac

AREA - A-3

=0.082 Ac

BUILDING AREA:

BLDG. FOOTPRINT/ROOF,
BOARDWALK

3,564.0 SF = 0.080 Ac

LANDSCAPE/ NAT. AREA:

NAT. GROUND & LSCAPE

104.0 SF = 0.002 Ac

AREA - B

AREA - B-1

0.43 Ac

MAIN DWAY AREA:

GRAVEL

2,506.0 SF = 0.06 Ac

PARKING/DRIVE AREA:

COMPACTED GROUND

16,225 SF = 0.37 Ac

AREA - B-2

0.42 Ac

BUILDING AREA:

BLDG. FOOTPRINT, SHED
BOARDWALK

4,849.0 SF = 0.11 Ac

PARKING/DRIVE AREA:

COMPACTED GROUND

4,342 SF = 0.10 Ac

LANDSCAPE/ NAT. AREA:

NAT. GROUND/ LANDSCAPE

9,104.0 SF = 0.21 Ac

AREA - B-3

0.29 Ac

BUILDING AREA:

BLDG. FOOTPRINT, SHED
BOARDWALK

5,239.0 SF = 0.12 Ac

PARKING/DRIVE AREA:

COMPACTED GROUND

1,209.0 SF = 0.03 Ac

LANDSCAPE/ NAT. AREA:

NAT. GROUND/ LANDSCAPE

6,184.0 SF = 0.14 Ac

AREA - C

7898.0 SF = 0.18 Ac

BUILDING AREA:

BLDG. FOOTPRINT/ROOF,
BOARDWALK

543.0 SF = 0.01 Ac

PARKING/DRIVE AREA:

COMPACTED GROUND

47.0 SF = 0.001 Ac

LANDSCAPE/ NAT. AREA:

NAT. GROUND/ LANDSCAPE

7,306.0 SF = 0.17 Ac

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Analysis prepared by:
TRANSTECH Engineers

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

- * PIONEERTOWN PROJECT
- * 2-YEAR STORM FREQUENCY ANALYSIS, NODE 81
- * EXISTING/ UNDEVELOPED CONDITION

FILE NAME: EX5-2.DAT
TIME/DATE OF STUDY: 11:50 01/31/2025

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5870

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

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

NO.	HALF-WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL IN- / OUT- / SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER WIDTH (FT)	GEOMETRIES LIP (FT)	MANNING HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 51.00 TO NODE 53.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 240.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.70 DOWNSTREAM(FEET) = 4046.70

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.534
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 2.127
SUBAREA Tc AND LOSS RATE DATA(AMC II):

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1.13 Tc(MIN.) = 5.870
EFFECTIVE AREA(ACRES) = 0.45 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.18 AREA-AVERAGED Ap = 0.98
TOTAL AREA(ACRES) = 0.5
LONGEST FLOWPATH FROM NODE 52.00 TO NODE 53.00 = 288.00 FEET.

FLOW PROCESS FROM NODE 53.00 TO NODE 81.00 IS CODE = 53

>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 4046.70 DOWNSTREAM(FEET) = 4044.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.0233
SLOPE ADJUSTMENT CURVE USED:
EFFECTIVE SLOPE = .0233 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
CHANNEL FLOW THRU SUBAREA(CFS) = 1.13
FLOW VELOCITY(FEET/SEC) = 0.89 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 2.17 Tc(MIN.) = 8.04
LONGEST FLOWPATH FROM NODE 52.00 TO NODE 81.00 = 404.00 FEET.

FLOW PROCESS FROM NODE 81.00 TO NODE 81.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.04
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 2.397
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 0.07 0.57 0.100 69
NATURAL POOR COVER
"BARREN" C 0.01 0.18 1.000 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.34
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.213
SUBAREA AREA(ACRES) = 0.08 SUBAREA RUNOFF(CFS) = 0.17
EFFECTIVE AREA(ACRES) = 0.53 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.19 AREA-AVERAGED Ap = 0.86
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 1.13
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 0.6 TC(MIN.) = 8.04
EFFECTIVE AREA(ACRES) = 0.53 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.19 AREA-AVERAGED Ap = 0.864
PEAK FLOW RATE(CFS) = 1.13

** PEAK FLOW RATE TABLE **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. It lists two stream entries with their respective flow characteristics.

END OF RATIONAL METHOD ANALYSIS

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Ver. 23.0 Release Date: 07/01/2016 License ID 1542

Analysis prepared by:
TRANSTECH Engineers

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 5-YEAR STORM ANALYSIS, NODE 81 *
* EXISTING/ UNDEVELOPED CONDITION *

FILE NAME: EX5-5.DAT
TIME/DATE OF STUDY: 12:20 01/31/2025

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8300

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

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

NO.	WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER WIDTH (FT)	GEOMETRIES: LIP (FT)	MANNING HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 51.00 TO NODE 53.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 240.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.70 DOWNSTREAM(FEET) = 4046.70

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.534
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 3.008
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc

```

      LAND USE          GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
NATURAL POOR COVER
"BARREN"              C         0.24     0.18     1.000     91   9.53
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.18
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.61
TOTAL AREA(ACRES) = 0.24   PEAK FLOW RATE(CFS) = 0.61

*****
FLOW PROCESS FROM NODE 53.00 TO NODE 53.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====
*****
FLOW PROCESS FROM NODE 52.00 TO NODE 53.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 288.00
ELEVATION DATA: UPSTREAM(FEET) = 4055.60  DOWNSTREAM(FEET) = 4046.70

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.870
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 4.224
SUBAREA Tc AND LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp          Ap      SCS  Tc
    LAND USE          GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL              C         0.01     0.57     0.100     69   5.87
NATURAL POOR COVER
"BARREN"              C         0.29     0.18     1.000     91  10.14
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.18
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970
SUBAREA RUNOFF(CFS) = 1.09
TOTAL AREA(ACRES) = 0.30   PEAK FLOW RATE(CFS) = 1.09

*****
FLOW PROCESS FROM NODE 53.00 TO NODE 53.00 IS CODE = 11
-----
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<
=====

** MAIN STREAM CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)      Ap      Ae      HEADWATER
NUMBER     (CFS) (MIN.) (INCH/HR) (INCH/HR)  (ACRES)  (ACRES)  NODE
  1         1.09  5.87  4.224  0.18( 0.18)  0.97     0.3     52.00
LONGEST FLOWPATH FROM NODE 52.00 TO NODE 53.00 = 288.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)      Ap      Ae      HEADWATER
NUMBER     (CFS) (MIN.) (INCH/HR) (INCH/HR)  (ACRES)  (ACRES)  NODE
  1         0.61  9.53  3.008  0.18( 0.18)  1.00     0.2     51.00
LONGEST FLOWPATH FROM NODE 51.00 TO NODE 53.00 = 240.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)      Ap      Ae      HEADWATER
NUMBER     (CFS) (MIN.) (INCH/HR) (INCH/HR)  (ACRES)  (ACRES)  NODE
  1         1.63  5.87  4.224  0.18( 0.18)  0.98     0.4     52.00
  2         1.38  9.53  3.008  0.18( 0.18)  0.98     0.5     51.00
TOTAL AREA(ACRES) = 0.5

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1.63 Tc(MIN.) = 5.870
 EFFECTIVE AREA(ACRES) = 0.45 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 0.18 AREA-AVERAGED Ap = 0.98
 TOTAL AREA(ACRES) = 0.5
 LONGEST FLOWPATH FROM NODE 52.00 TO NODE 53.00 = 288.00 FEET.

 FLOW PROCESS FROM NODE 53.00 TO NODE 81.00 IS CODE = 53

>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 4046.70 DOWNSTREAM(FEET) = 4044.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.0233
 SLOPE ADJUSTMENT CURVE USED:
 EFFECTIVE SLOPE = .0233 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.63
 FLOW VELOCITY(FEET/SEC) = 1.01 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) = 1.92 Tc(MIN.) = 7.79
 LONGEST FLOWPATH FROM NODE 52.00 TO NODE 81.00 = 404.00 FEET.

 FLOW PROCESS FROM NODE 81.00 TO NODE 81.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 7.79
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 3.464
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.07	0.57	0.100	69
NATURAL POOR COVER "BARREN"	C	0.01	0.18	1.000	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.34
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.213
 SUBAREA AREA(ACRES) = 0.08 SUBAREA RUNOFF(CFS) = 0.24
 EFFECTIVE AREA(ACRES) = 0.53 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.19 AREA-AVERAGED Ap = 0.86
 TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 1.63
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.6 TC(MIN.) = 7.79
 EFFECTIVE AREA(ACRES) = 0.53 AREA-AVERAGED Fm(INCH/HR)= 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.19 AREA-AVERAGED Ap = 0.864
 PEAK FLOW RATE(CFS) = 1.63

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1.63	7.79	3.464	0.19(0.16)	0.86	0.5	52.00
2	1.38	11.57	2.627	0.19(0.16)	0.88	0.6	51.00

=====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Analysis prepared by:
TRANSTECH Engineers

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 10-YEAR STORM ANALYSIS, NODE 81 *
* EXISTING/ UNDEVELOPED CONDITION *

FILE NAME: EX5-2.DAT
TIME/DATE OF STUDY: 12:34 01/31/2025

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0400

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 51.00 TO NODE 53.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 240.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.70 DOWNSTREAM(FEET) = 4046.70

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.534
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.769

SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc

```

      LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
NATURAL POOR COVER
"BARREN"              C          0.24    0.18     1.000     91   9.53
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.18
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.78
TOTAL AREA(ACRES) = 0.24 PEAK FLOW RATE(CFS) = 0.78

*****
FLOW PROCESS FROM NODE 53.00 TO NODE 53.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====
*****
FLOW PROCESS FROM NODE 52.00 TO NODE 53.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 288.00
ELEVATION DATA: UPSTREAM(FEET) = 4055.60 DOWNSTREAM(FEET) = 4046.70

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.870
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 5.293
SUBAREA Tc AND LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp          Ap      SCS  Tc
    LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL              C          0.01    0.57     0.100     69   5.87
NATURAL POOR COVER
"BARREN"              C          0.29    0.18     1.000     91  10.14
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.18
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970
SUBAREA RUNOFF(CFS) = 1.38
TOTAL AREA(ACRES) = 0.30 PEAK FLOW RATE(CFS) = 1.38

*****
FLOW PROCESS FROM NODE 53.00 TO NODE 53.00 IS CODE = 11
-----
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<
=====

** MAIN STREAM CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)      Ap      Ae      HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR)  (ACRES)  NODE
1          1.38  5.87  5.293  0.18( 0.18)  0.97    0.3    52.00
LONGEST FLOWPATH FROM NODE 52.00 TO NODE 53.00 = 288.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)      Ap      Ae      HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR)  (ACRES)  NODE
1          0.78  9.53  3.769  0.18( 0.18)  1.00    0.2    51.00
LONGEST FLOWPATH FROM NODE 51.00 TO NODE 53.00 = 240.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)      Ap      Ae      HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR)  (ACRES)  NODE
1          2.06  5.87  5.293  0.18( 0.18)  0.98    0.4    52.00
2          1.75  9.53  3.769  0.18( 0.18)  0.98    0.5    51.00
TOTAL AREA(ACRES) = 0.5

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 2.06 Tc(MIN.) = 5.870
EFFECTIVE AREA(ACRES) = 0.45 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.18 AREA-AVERAGED Ap = 0.98
TOTAL AREA(ACRES) = 0.5
LONGEST FLOWPATH FROM NODE 52.00 TO NODE 53.00 = 288.00 FEET.

FLOW PROCESS FROM NODE 53.00 TO NODE 81.00 IS CODE = 53

>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 4046.70 DOWNSTREAM(FEET) = 4044.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.0233
SLOPE ADJUSTMENT CURVE USED:
EFFECTIVE SLOPE = .0233 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
CHANNEL FLOW THRU SUBAREA(CFS) = 2.06
FLOW VELOCITY(FEET/SEC) = 1.09 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 1.78 Tc(MIN.) = 7.65
LONGEST FLOWPATH FROM NODE 52.00 TO NODE 81.00 = 404.00 FEET.

FLOW PROCESS FROM NODE 81.00 TO NODE 81.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 7.65
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.398
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 0.07 0.57 0.100 69
NATURAL POOR COVER
"BARREN" C 0.01 0.18 1.000 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.34
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.213
SUBAREA AREA(ACRES) = 0.08 SUBAREA RUNOFF(CFS) = 0.31
EFFECTIVE AREA(ACRES) = 0.53 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.19 AREA-AVERAGED Ap = 0.86
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 2.06
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 0.6 TC(MIN.) = 7.65
EFFECTIVE AREA(ACRES) = 0.53 AREA-AVERAGED Fm(INCH/HR)= 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.19 AREA-AVERAGED Ap = 0.864
PEAK FLOW RATE(CFS) = 2.06

** PEAK FLOW RATE TABLE **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. It lists two stream entries with their respective flow characteristics.

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Ver. 23.0 Release Date: 07/01/2016 License ID 1542

Analysis prepared by:
TRANSTECH Engineers

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 25-YEAR STORM ANALYSIS, NODE 81 *
* EXISTING/ UNDEVELOPED CONDITION *

FILE NAME: EX5-2.DAT
TIME/DATE OF STUDY: 13:29 01/31/2025

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.3300

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER WIDTH (FT)	GEOMETRIES: LIP (FT)	MANNING HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 51.00 TO NODE 53.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 240.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.70 DOWNSTREAM(FEET) = 4046.70

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.534
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.820
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL POOR COVER "BARREN"	C	0.24	0.18	1.000	91	9.53

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.18
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.00
TOTAL AREA(ACRES) = 0.24 PEAK FLOW RATE(CFS) = 1.00

FLOW PROCESS FROM NODE 53.00 TO NODE 53.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 52.00 TO NODE 53.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 288.00
ELEVATION DATA: UPSTREAM(FEET) = 4055.60 DOWNSTREAM(FEET) = 4046.70

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.870

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 6.769

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.01	0.57	0.100	69	5.87
NATURAL POOR COVER "BARREN"	C	0.29	0.18	1.000	91	10.14

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.18
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970
SUBAREA RUNOFF(CFS) = 1.78
TOTAL AREA(ACRES) = 0.30 PEAK FLOW RATE(CFS) = 1.78

FLOW PROCESS FROM NODE 53.00 TO NODE 53.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1.78	5.87	6.769	0.18(0.18)	0.97	0.3	52.00

LONGEST FLOWPATH FROM NODE 52.00 TO NODE 53.00 = 288.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1.00	9.53	4.820	0.18(0.18)	1.00	0.2	51.00

LONGEST FLOWPATH FROM NODE 51.00 TO NODE 53.00 = 240.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2.66	5.87	6.769	0.18(0.18)	0.98	0.4	52.00
2	2.26	9.53	4.820	0.18(0.18)	0.98	0.5	51.00

TOTAL AREA(ACRES) = 0.5

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 2.66 Tc(MIN.) = 5.870
EFFECTIVE AREA(ACRES) = 0.45 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.18 AREA-AVERAGED Ap = 0.98
TOTAL AREA(ACRES) = 0.5
LONGEST FLOWPATH FROM NODE 52.00 TO NODE 53.00 = 288.00 FEET.

FLOW PROCESS FROM NODE 53.00 TO NODE 81.00 IS CODE = 53

>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 4046.70 DOWNSTREAM(FEET) = 4044.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.0233
SLOPE ADJUSTMENT CURVE USED:
EFFECTIVE SLOPE = .0233 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
CHANNEL FLOW THRU SUBAREA(CFS) = 2.66
FLOW VELOCITY(FEET/SEC) = 1.18 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 1.63 Tc(MIN.) = 7.50
LONGEST FLOWPATH FROM NODE 52.00 TO NODE 81.00 = 404.00 FEET.

FLOW PROCESS FROM NODE 81.00 TO NODE 81.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 7.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 5.700
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 0.07 0.57 0.100 69
NATURAL POOR COVER
"BARREN" C 0.01 0.18 1.000 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.34
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.213
SUBAREA AREA(ACRES) = 0.08 SUBAREA RUNOFF(CFS) = 0.41
EFFECTIVE AREA(ACRES) = 0.53 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.19 AREA-AVERAGED Ap = 0.86
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 2.66
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 0.6 TC(MIN.) = 7.50
EFFECTIVE AREA(ACRES) = 0.53 AREA-AVERAGED Fm(INCH/HR)= 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.19 AREA-AVERAGED Ap = 0.864
PEAK FLOW RATE(CFS) = 2.66

** PEAK FLOW RATE TABLE **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Ver. 23.0 Release Date: 07/01/2016 License ID 1542

Analysis prepared by:
TRANSTECH Engineers

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 100-YEAR STORM ANALYSIS, NODE 81 *
* EXISTING/ UNDEVELOPED CONDITION *

FILE NAME: EX5-2.DAT
TIME/DATE OF STUDY: 13:43 01/31/2025

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.8300

ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD

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

NO.	WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER WIDTH (FT)	GEOMETRIES: LIP (FT)	MANNING HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 51.00 TO NODE 53.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 240.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.70 DOWNSTREAM(FEET) = 4046.70

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.534
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 6.632
SUBAREA Tc AND LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc

```

LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
NATURAL POOR COVER
"BARREN"          C      0.24    0.06    1.000    98   9.53
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.06
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.42
TOTAL AREA(ACRES) = 0.24  PEAK FLOW RATE(CFS) = 1.42

*****
FLOW PROCESS FROM NODE 53.00 TO NODE 53.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====
*****
FLOW PROCESS FROM NODE 52.00 TO NODE 53.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 288.00
ELEVATION DATA: UPSTREAM(FEET) = 4055.60  DOWNSTREAM(FEET) = 4046.70

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.870
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 9.314
SUBAREA Tc AND LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp          Ap      SCS  Tc
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL            C      0.01    0.27    0.100    86   5.87
NATURAL POOR COVER
"BARREN"              C      0.29    0.06    1.000    98  10.14
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.06
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970
SUBAREA RUNOFF(CFS) = 2.50
TOTAL AREA(ACRES) = 0.30  PEAK FLOW RATE(CFS) = 2.50

*****
FLOW PROCESS FROM NODE 53.00 TO NODE 53.00 IS CODE = 11
-----
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<
=====

** MAIN STREAM CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)      Ap      Ae      HEADWATER
NUMBER      (CFS)  (MIN.) (INCH/HR) (INCH/HR)      (ACRES)  NODE
1           2.50  5.87  9.314  0.06( 0.06)  0.97    0.3    52.00
LONGEST FLOWPATH FROM NODE 52.00 TO NODE 53.00 = 288.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)      Ap      Ae      HEADWATER
NUMBER      (CFS)  (MIN.) (INCH/HR) (INCH/HR)      (ACRES)  NODE
1           1.42  9.53  6.632  0.06( 0.06)  1.00    0.2    51.00
LONGEST FLOWPATH FROM NODE 51.00 TO NODE 53.00 = 240.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)      Ap      Ae      HEADWATER
NUMBER      (CFS)  (MIN.) (INCH/HR) (INCH/HR)      (ACRES)  NODE
1           3.73  5.87  9.314  0.06( 0.06)  0.98    0.4    52.00
2           3.19  9.53  6.632  0.06( 0.06)  0.98    0.5    51.00
TOTAL AREA(ACRES) = 0.5

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 3.73 Tc(MIN.) = 5.870
EFFECTIVE AREA(ACRES) = 0.45 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.06 AREA-AVERAGED Ap = 0.98
TOTAL AREA(ACRES) = 0.5
LONGEST FLOWPATH FROM NODE 52.00 TO NODE 53.00 = 288.00 FEET.

FLOW PROCESS FROM NODE 53.00 TO NODE 81.00 IS CODE = 53

>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 4046.70 DOWNSTREAM(FEET) = 4044.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.0233
SLOPE ADJUSTMENT CURVE USED:
EFFECTIVE SLOPE = .0233 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
CHANNEL FLOW THRU SUBAREA(CFS) = 3.73
FLOW VELOCITY(FEET/SEC) = 1.32 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 7.33
LONGEST FLOWPATH FROM NODE 52.00 TO NODE 81.00 = 404.00 FEET.

FLOW PROCESS FROM NODE 81.00 TO NODE 81.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 7.33
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 7.972
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 0.07 0.27 0.100 86
NATURAL POOR COVER
"BARREN" C 0.01 0.06 1.000 98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.15
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.213
SUBAREA AREA(ACRES) = 0.08 SUBAREA RUNOFF(CFS) = 0.57
EFFECTIVE AREA(ACRES) = 0.53 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.07 AREA-AVERAGED Ap = 0.86
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 3.76

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.6 TC(MIN.) = 7.33
EFFECTIVE AREA(ACRES) = 0.53 AREA-AVERAGED Fm(INCH/HR)= 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.07 AREA-AVERAGED Ap = 0.864
PEAK FLOW RATE(CFS) = 3.76

** PEAK FLOW RATE TABLE **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Analysis prepared by:
TRANSTECH Engineers

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 2-YEAR STORM ANALYSIS *
* EXISTING/ UNDEVELOPED CONDITION *

FILE NAME: EX6.DAT
TIME/DATE OF STUDY: 14:00 01/31/2025

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5870

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

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

NO.	WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER WIDTH (FT)	GEOMETRIES: LIP (FT)	MANNING HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 61.00 TO NODE 62.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 233.00
ELEVATION DATA: UPSTREAM(FEET) = 4056.30 DOWNSTREAM(FEET) = 4048.00

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.242

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 3.234

SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS	Tc
-------------------	----------	------	----	----	-----	----

```

      LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL              C         0.01      0.81      0.100      50   5.24
NATURAL POOR COVER
"BARREN"                C         0.18      0.37      1.000      80   9.05
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.37
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.953
SUBAREA RUNOFF(CFS) = 0.49
TOTAL AREA(ACRES) = 0.19 PEAK FLOW RATE(CFS) = 0.49

*****
FLOW PROCESS FROM NODE 62.00 TO NODE 63.00 IS CODE = 52
-----
>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 4048.00 DOWNSTREAM(FEET) = 4045.20
CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.0239
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 0.49
FLOW VELOCITY(FEET/SEC) = 2.32 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 6.08
LONGEST FLOWPATH FROM NODE 61.00 TO NODE 63.00 = 350.00 FEET.

*****
FLOW PROCESS FROM NODE 63.00 TO NODE 63.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 6.08
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 2.914
SUBAREA LOSS RATE DATA(AMC I ):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 0.10 0.81 0.100 50
NATURAL POOR COVER
"BARREN" C 0.62 0.37 1.000 80
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.38
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875
SUBAREA AREA(ACRES) = 0.72 SUBAREA RUNOFF(CFS) = 1.67
EFFECTIVE AREA(ACRES) = 0.91 AREA-AVERAGED Fm(INCH/HR) = 0.34
AREA-AVERAGED Fp(INCH/HR) = 0.38 AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 2.11
=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 0.9 TC(MIN.) = 6.08
EFFECTIVE AREA(ACRES) = 0.91 AREA-AVERAGED Fm(INCH/HR)= 0.34
AREA-AVERAGED Fp(INCH/HR) = 0.38 AREA-AVERAGED Ap = 0.891
PEAK FLOW RATE(CFS) = 2.11
=====
END OF RATIONAL METHOD ANALYSIS

```

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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 5-YEAR STORM ANALYSIS *
* EXISTING/ UNDEVELOPED CONDITION *

FILE NAME: EX6.DAT
TIME/DATE OF STUDY: 14:11 01/31/2025

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8300

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB GUTTER-GEOMETRIES: HEIGHT (FT)	WIDT (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 61.00 TO NODE 62.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 233.00
ELEVATION DATA: UPSTREAM(FEET) = 4056.30 DOWNSTREAM(FEET) = 4048.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.242

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 4.573
 SUBAREA Tc AND LOSS RATE DATA(AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL C 0.01 0.81 0.100 50 5.24
 NATURAL POOR COVER
 "BARREN" C 0.18 0.37 1.000 80 9.05
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.37
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.953
 SUBAREA RUNOFF(CFS) = 0.72
 TOTAL AREA(ACRES) = 0.19 PEAK FLOW RATE(CFS) = 0.72

 FLOW PROCESS FROM NODE 62.00 TO NODE 63.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====
 ELEVATION DATA: UPSTREAM(FEET) = 4048.00 DOWNSTREAM(FEET) = 4045.20
 CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.0239
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) = 0.72
 FLOW VELOCITY(FEET/SEC) = 2.32 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 6.08
 LONGEST FLOWPATH FROM NODE 61.00 TO NODE 63.00 = 350.00 FEET.

 FLOW PROCESS FROM NODE 63.00 TO NODE 63.00 IS CODE = 81

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

=====
 MAINLINE Tc(MIN.) = 6.08
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 4.121
 SUBAREA LOSS RATE DATA(AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL C 0.10 0.81 0.100 50
 NATURAL POOR COVER
 "BARREN" C 0.62 0.37 1.000 80
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.38
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875
 SUBAREA AREA(ACRES) = 0.72 SUBAREA RUNOFF(CFS) = 2.46
 EFFECTIVE AREA(ACRES) = 0.91 AREA-AVERAGED Fm(INCH/HR) = 0.34
 AREA-AVERAGED Fp(INCH/HR) = 0.38 AREA-AVERAGED Ap = 0.89
 TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 3.10

=====
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES) = 0.9 TC(MIN.) = 6.08
 EFFECTIVE AREA(ACRES) = 0.91 AREA-AVERAGED Fm(INCH/HR) = 0.34
 AREA-AVERAGED Fp(INCH/HR) = 0.38 AREA-AVERAGED Ap = 0.891
 PEAK FLOW RATE(CFS) = 3.10
 =====

END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:
 TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
 * PIONEERTOWN PROJECT *
 * 10-YEAR STORM ANALYSIS *
 * EXISTING/ UNDEVELOPED CONDITION *

FILE NAME: EX6.DAT
 TIME/DATE OF STUDY: 14:19 01/31/2025

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 10.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
 USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
 USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0400

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
 1. Relative Flow-Depth = 0.00 FEET
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
 *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

 FLOW PROCESS FROM NODE 61.00 TO NODE 62.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 233.00
 ELEVATION DATA: UPSTREAM(FEET) = 4056.30 DOWNSTREAM(FEET) = 4048.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.242
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 5.729

SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc

```

      LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL             C         0.01      0.57      0.100     69   5.24
NATURAL POOR COVER
"BARREN"              C         0.18      0.18      1.000     91   9.05
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.18
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.953
SUBAREA RUNOFF(CFS) = 0.95
TOTAL AREA(ACRES) = 0.19 PEAK FLOW RATE(CFS) = 0.95

*****
FLOW PROCESS FROM NODE 62.00 TO NODE 63.00 IS CODE = 52
-----
>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 4048.00 DOWNSTREAM(FEET) = 4045.20
CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.0239
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 0.95
FLOW VELOCITY(FEET/SEC) = 2.32 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 6.08
LONGEST FLOWPATH FROM NODE 61.00 TO NODE 63.00 = 350.00 FEET.

*****
FLOW PROCESS FROM NODE 63.00 TO NODE 63.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 6.08
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 5.163
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 0.10 0.57 0.100 69
NATURAL POOR COVER
"BARREN" C 0.62 0.18 1.000 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.19
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875
SUBAREA AREA(ACRES) = 0.72 SUBAREA RUNOFF(CFS) = 3.24
EFFECTIVE AREA(ACRES) = 0.91 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.19 AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 4.09
=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 0.9 TC(MIN.) = 6.08
EFFECTIVE AREA(ACRES) = 0.91 AREA-AVERAGED Fm(INCH/HR)= 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.19 AREA-AVERAGED Ap = 0.891
PEAK FLOW RATE(CFS) = 4.09
=====
END OF RATIONAL METHOD ANALYSIS

```

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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 25-YEAR STORM ANALYSIS *
* EXISTING/ UNDEVELOPED CONDITION *

FILE NAME: EX6.DAT
TIME/DATE OF STUDY: 14:25 01/31/2025

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.3300

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 61.00 TO NODE 62.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 233.00
ELEVATION DATA: UPSTREAM(FEET) = 4056.30 DOWNSTREAM(FEET) = 4048.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.242
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 7.327
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.01	0.57	0.100	69	5.24
NATURAL POOR COVER "BARREN"	C	0.18	0.18	1.000	91	9.05

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.18
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.953
SUBAREA RUNOFF(CFS) = 1.22
TOTAL AREA(ACRES) = 0.19 PEAK FLOW RATE(CFS) = 1.22

FLOW PROCESS FROM NODE 62.00 TO NODE 63.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 4048.00 DOWNSTREAM(FEET) = 4045.20
CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.0239
CHANNEL FLOW THRU SUBAREA(CFS) = 1.22
FLOW VELOCITY(FEET/SEC) = 2.41 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 6.05
LONGEST FLOWPATH FROM NODE 61.00 TO NODE 63.00 = 350.00 FEET.

FLOW PROCESS FROM NODE 63.00 TO NODE 63.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 6.05
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 6.627
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN

COMMERCIAL	C	0.10	0.57	0.100	69
NATURAL POOR COVER "BARREN"	C	0.62	0.18	1.000	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.19
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875
SUBAREA AREA(ACRES) = 0.72 SUBAREA RUNOFF(CFS) = 4.19
EFFECTIVE AREA(ACRES) = 0.91 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.19 AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 5.29

=====

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 0.9 TC(MIN.) = 6.05
EFFECTIVE AREA(ACRES) = 0.91 AREA-AVERAGED Fm(INCH/HR)= 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.19 AREA-AVERAGED Ap = 0.891
PEAK FLOW RATE(CFS) = 5.29

=====

END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 100-YEAR STORM ANALYSIS *
* EXISTING/ UNDEVELOPED CONDITION *

FILE NAME: EX6.DAT
TIME/DATE OF STUDY: 14:31 01/31/2025

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.8300

ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 61.00 TO NODE 62.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 233.00
ELEVATION DATA: UPSTREAM(FEET) = 4056.30 DOWNSTREAM(FEET) = 4048.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.242
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 10.082
SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.01	0.27	0.100	86	5.24
NATURAL POOR COVER "BARREN"	C	0.18	0.06	1.000	98	9.05

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.06
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.953
SUBAREA RUNOFF(CFS) = 1.71
TOTAL AREA(ACRES) = 0.19 PEAK FLOW RATE(CFS) = 1.71

FLOW PROCESS FROM NODE 62.00 TO NODE 63.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 4048.00 DOWNSTREAM(FEET) = 4045.20
CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.0239
CHANNEL FLOW THRU SUBAREA(CFS) = 1.71
FLOW VELOCITY(FEET/SEC) = 2.58 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 6.00
LONGEST FLOWPATH FROM NODE 61.00 TO NODE 63.00 = 350.00 FEET.

FLOW PROCESS FROM NODE 63.00 TO NODE 63.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 6.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 9.174
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN

COMMERCIAL	C	0.10	0.27	0.100	86
NATURAL POOR COVER "BARREN"	C	0.62	0.06	1.000	98

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.07
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875
SUBAREA AREA(ACRES) = 0.72 SUBAREA RUNOFF(CFS) = 5.91
EFFECTIVE AREA(ACRES) = 0.91 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.06 AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 7.47

=====

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 0.9 TC(MIN.) = 6.00
EFFECTIVE AREA(ACRES) = 0.91 AREA-AVERAGED Fm(INCH/HR)= 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.06 AREA-AVERAGED Ap = 0.891
PEAK FLOW RATE(CFS) = 7.47

=====

END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 2-YEAR STORM ANALYSIS *
* EXISTING/ UNDEVELOPED CONDITION *

FILE NAME: EX7.DAT
TIME/DATE OF STUDY: 10:36 02/02/2025

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5870

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 71.00 TO NODE 72.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 201.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.80 DOWNSTREAM(FEET) = 4048.20

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.190
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 3.256
SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.01	0.81	0.100	50	5.19
NATURAL POOR COVER "BARREN"	C	0.17	0.37	1.000	80	8.96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.37						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950						
SUBAREA RUNOFF(CFS) = 0.47						
TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 0.47						

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.2 TC(MIN.) = 5.19
EFFECTIVE AREA(ACRES) = 0.18 AREA-AVERAGED Fm(INCH/HR)= 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.37 AREA-AVERAGED Ap = 0.950
PEAK FLOW RATE(CFS) = 0.47

=====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 5-YEAR STORM ANALYSIS *
* EXISTING/ UNDEVELOPED CONDITION *

FILE NAME: EX7.DAT
TIME/DATE OF STUDY: 10:47 02/02/2025

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8300

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 71.00 TO NODE 72.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 201.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.80 DOWNSTREAM(FEET) = 4048.20

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.190
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 4.604
SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.01	0.81	0.100	50	5.19
NATURAL POOR COVER "BARREN"	C	0.17	0.37	1.000	80	8.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.37
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950
 SUBAREA RUNOFF(CFS) = 0.69
 TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 0.69

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.2 TC(MIN.) = 5.19
 EFFECTIVE AREA(ACRES) = 0.18 AREA-AVERAGED Fm(INCH/HR)= 0.35
 AREA-AVERAGED Fp(INCH/HR) = 0.37 AREA-AVERAGED Ap = 0.950
 PEAK FLOW RATE(CFS) = 0.69

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END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 10-YEAR STORM ANALYSIS *
* EXISTING/ UNDEVELOPED CONDITION *

FILE NAME: EX7.DAT
TIME/DATE OF STUDY: 10:54 02/02/2025

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0400

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF-	CROWN TO	STREET-CROSSFALL:			CURB	GUTTER-GEOMETRIES:			MANNING	
	WIDTH	CROSSFALL	IN-	/	OUT-/PARK-		HEIGHT	WIDTH	LIP		HIKE
====	(FT)	(FT)	SIDE	/	SIDE/	WAY	(FT)	(FT)	(FT)	(FT)	(n)
1	30.0	20.0	0.018/0.018/0.020			0.67	2.00	0.0312	0.167	0.0150	

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 71.00 TO NODE 72.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 201.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.80 DOWNSTREAM(FEET) = 4048.20

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.190
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 5.769
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.01	0.57	0.100	69	5.19
NATURAL POOR COVER "BARREN"	C	0.17	0.18	1.000	91	8.96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.18						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950						
SUBAREA RUNOFF(CFS) = 0.91						
TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 0.91						

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.2 TC(MIN.) = 5.19
EFFECTIVE AREA(ACRES) = 0.18 AREA-AVERAGED Fm(INCH/HR)= 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.18 AREA-AVERAGED Ap = 0.950
PEAK FLOW RATE(CFS) = 0.91

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END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 25-YEAR STORM ANALYSIS *
* EXISTING/ UNDEVELOPED CONDITION *

FILE NAME: EX7.DAT
TIME/DATE OF STUDY: 10:59 02/02/2025

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.3300

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 71.00 TO NODE 72.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 201.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.80 DOWNSTREAM(FEET) = 4048.20

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.190
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 7.378
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.01	0.57	0.100	69	5.19
NATURAL POOR COVER "BARREN"	C	0.17	0.18	1.000	91	8.96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.18						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950						
SUBAREA RUNOFF(CFS) = 1.17						
TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 1.17						

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END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.2 TC(MIN.) = 5.19
EFFECTIVE AREA(ACRES) = 0.18 AREA-AVERAGED Fm(INCH/HR)= 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.18 AREA-AVERAGED Ap = 0.950
PEAK FLOW RATE(CFS) = 1.17

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END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 100-YEAR STORM ANALYSIS *
* EXISTING/ UNDEVELOPED CONDITION *

FILE NAME: EX7.DAT
TIME/DATE OF STUDY: 10:30 02/02/2025

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.8300

ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 71.00 TO NODE 72.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 201.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.80 DOWNSTREAM(FEET) = 4048.20

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.190
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 10.152
SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.01	0.27	0.100	86	5.19
NATURAL POOR COVER "BARREN"	C	0.17	0.06	1.000	98	8.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.06
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950
 SUBAREA RUNOFF(CFS) = 1.63
 TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 1.63

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.2 TC(MIN.) = 5.19
 EFFECTIVE AREA(ACRES) = 0.18 AREA-AVERAGED Fm(INCH/HR)= 0.06
 AREA-AVERAGED Fp(INCH/HR) = 0.06 AREA-AVERAGED Ap = 0.950
 PEAK FLOW RATE(CFS) = 1.63

=====

END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 2-YEAR STORM ANALYSIS *
* DEVELOPED CONDITION (NODES 1-31) *

FILE NAME: PR1.DAT
TIME/DATE OF STUDY: 16:22 01/31/2025

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5870

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 198.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.70 DOWNSTREAM(FEET) = 4047.90

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.107
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 3.293
SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.01	0.81	0.100	50	5.11
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	C	0.02	0.81	0.500	50	6.54
CONDOMINIUMS	C	0.18	0.81	0.350	50	6.05
PUBLIC PARK	C	0.01	0.81	0.850	50	8.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.81
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.375
 SUBAREA RUNOFF(CFS) = 0.59
 TOTAL AREA(ACRES) = 0.22 PEAK FLOW RATE(CFS) = 0.59

 FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 4047.90 DOWNSTREAM(FEET) = 4046.70
 CHANNEL LENGTH THRU SUBAREA(FEET) = 53.00 CHANNEL SLOPE = 0.0226
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 0.60
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 3.122
 SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	C	0.08	0.81	0.850	50
CONDOMINIUMS	C	0.01	0.81	0.350	50

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.81
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.794
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.69
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.18
 AVERAGE FLOW DEPTH(FEET) = 0.33 TRAVEL TIME(MIN.) = 0.40
 Tc(MIN.) = 5.51
 SUBAREA AREA(ACRES) = 0.09 SUBAREA RUNOFF(CFS) = 0.20
 EFFECTIVE AREA(ACRES) = 0.31 AREA-AVERAGED Fm(INCH/HR) = 0.40
 AREA-AVERAGED Fp(INCH/HR) = 0.81 AREA-AVERAGED Ap = 0.50
 TOTAL AREA(ACRES) = 0.3 PEAK FLOW RATE(CFS) = 0.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34 FLOW VELOCITY(FEET/SEC.) = 2.21
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 251.00 FEET.

 FLOW PROCESS FROM NODE 3.00 TO NODE 31.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 4046.70 DOWNSTREAM(FEET) = 4044.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.0233
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 2.825
 SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.07	0.81	0.100	50
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	0.01	0.81	0.500	50

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.81
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.159

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.86
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.28
AVERAGE FLOW DEPTH(FEET) = 0.35 TRAVEL TIME(MIN.) = 0.85
Tc(MIN.) = 6.36
SUBAREA AREA(ACRES) = 0.08 SUBAREA RUNOFF(CFS) = 0.20
EFFECTIVE AREA(ACRES) = 0.39 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.81 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 0.4 PEAK FLOW RATE(CFS) = 0.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 FLOW VELOCITY(FEET/SEC.) = 2.30
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 4.00 = 367.00 FEET.

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.4 TC(MIN.) = 6.36
EFFECTIVE AREA(ACRES) = 0.39 AREA-AVERAGED Fm(INCH/HR)= 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.81 AREA-AVERAGED Ap = 0.426
PEAK FLOW RATE(CFS) = 0.87

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END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Ver. 23.0 Release Date: 07/01/2016 License ID 1542

Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 5-YEAR STORM ANALYSIS *
* DEVELOPED CONDITION (NODES 1-31) *

FILE NAME: PR1.DAT
TIME/DATE OF STUDY: 16:36 01/31/2025

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8300

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 198.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.70 DOWNSTREAM(FEET) = 4047.90

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.107
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 4.656
SUBAREA Tc AND LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN	(MIN.)
COMMERCIAL	C	0.01	0.81	0.100	50	5.11
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	C	0.02	0.81	0.500	50	6.54
CONDOMINIUMS	C	0.18	0.81	0.350	50	6.05
PUBLIC PARK	C	0.01	0.81	0.850	50	8.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.81
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.375
 SUBAREA RUNOFF(CFS) = 0.86
 TOTAL AREA(ACRES) = 0.22 PEAK FLOW RATE(CFS) = 0.86

 FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 4047.90 DOWNSTREAM(FEET) = 4046.70
 CHANNEL LENGTH THRU SUBAREA(FEET) = 53.00 CHANNEL SLOPE = 0.0226
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 0.60
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 4.432
 SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
PUBLIC PARK	C	0.08	0.81	0.850	50
CONDOMINIUMS	C	0.01	0.81	0.350	50

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.81
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.794
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.02
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.36
 AVERAGE FLOW DEPTH(FEET) = 0.38 TRAVEL TIME(MIN.) = 0.37
 T_c (MIN.) = 5.48
 SUBAREA AREA(ACRES) = 0.09 SUBAREA RUNOFF(CFS) = 0.31
 EFFECTIVE AREA(ACRES) = 0.31 AREA-AVERAGED F_m (INCH/HR) = 0.40
 AREA-AVERAGED F_p (INCH/HR) = 0.81 AREA-AVERAGED A_p = 0.50
 TOTAL AREA(ACRES) = 0.3 PEAK FLOW RATE(CFS) = 1.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 2.44
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 251.00 FEET.

 FLOW PROCESS FROM NODE 3.00 TO NODE 31.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 4046.70 DOWNSTREAM(FEET) = 4044.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.0233
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 4.043
 SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	C	0.07	0.81	0.100	50
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	0.01	0.81	0.500	50

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.81
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.150
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.27

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.52
AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 0.77
Tc(MIN.) = 6.25
SUBAREA AREA(ACRES) = 0.08 SUBAREA RUNOFF(CFS) = 0.28
EFFECTIVE AREA(ACRES) = 0.39 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.81 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 0.4 PEAK FLOW RATE(CFS) = 1.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 FLOW VELOCITY(FEET/SEC.) = 2.51
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 31.00 = 367.00 FEET.

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END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.4 TC(MIN.) = 6.25
EFFECTIVE AREA(ACRES) = 0.39 AREA-AVERAGED Fm(INCH/HR)= 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.81 AREA-AVERAGED Ap = 0.426
PEAK FLOW RATE(CFS) = 1.30

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END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 10-YEAR STORM ANALYSIS *
* DEVELOPED CONDITION (NODES 1-31) *

FILE NAME: PR1.DAT
TIME/DATE OF STUDY: 16:45 01/31/2025

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0400

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER WIDTH (FT)	GEOMETRIES: LIP (FT)	MANNING HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 198.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.70 DOWNSTREAM(FEET) = 4047.90

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.107
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 5.835
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.01	0.57	0.100	69	5.11
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	C	0.02	0.57	0.500	69	6.54
CONDOMINIUMS	C	0.18	0.57	0.350	69	6.05
PUBLIC PARK	C	0.01	0.57	0.850	69	8.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.375
 SUBAREA RUNOFF(CFS) = 1.11
 TOTAL AREA(ACRES) = 0.22 PEAK FLOW RATE(CFS) = 1.11

 FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 4047.90 DOWNSTREAM(FEET) = 4046.70
 CHANNEL LENGTH THRU SUBAREA(FEET) = 53.00 CHANNEL SLOPE = 0.0226
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 0.60
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 5.571
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	C	0.08	0.57	0.850	69
CONDOMINIUMS	C	0.01	0.57	0.350	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.794
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.32
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.53
 AVERAGE FLOW DEPTH(FEET) = 0.42 TRAVEL TIME(MIN.) = 0.35
 Tc(MIN.) = 5.46
 SUBAREA AREA(ACRES) = 0.09 SUBAREA RUNOFF(CFS) = 0.41
 EFFECTIVE AREA(ACRES) = 0.31 AREA-AVERAGED Fm(INCH/HR) = 0.28
 AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.50
 TOTAL AREA(ACRES) = 0.3 PEAK FLOW RATE(CFS) = 1.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43 FLOW VELOCITY(FEET/SEC.) = 2.64
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 251.00 FEET.

 FLOW PROCESS FROM NODE 3.00 TO NODE 31.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 4046.70 DOWNSTREAM(FEET) = 4044.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.0233
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 5.109
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.07	0.57	0.100	69
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	0.01	0.57	0.500	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.150

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.66
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.69
AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.72
Tc(MIN.) = 6.17
SUBAREA AREA(ACRES) = 0.08 SUBAREA RUNOFF(CFS) = 0.36
EFFECTIVE AREA(ACRES) = 0.39 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 0.4 PEAK FLOW RATE(CFS) = 1.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 2.75
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 31.00 = 367.00 FEET.

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.4 TC(MIN.) = 6.17
EFFECTIVE AREA(ACRES) = 0.39 AREA-AVERAGED Fm(INCH/HR)= 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.426
PEAK FLOW RATE(CFS) = 1.71

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END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 25-YEAR STORM ANALYSIS *
* DEVELOPED CONDITION (NODES 1-31) *

FILE NAME: PR1.DAT
TIME/DATE OF STUDY: 16:51 01/31/2025

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.3300

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 198.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.70 DOWNSTREAM(FEET) = 4047.90

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.107
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 7.462
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.01	0.57	0.100	69	5.11
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	C	0.02	0.57	0.500	69	6.54
CONDOMINIUMS	C	0.18	0.57	0.350	69	6.05
PUBLIC PARK	C	0.01	0.57	0.850	69	8.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.375
 SUBAREA RUNOFF(CFS) = 1.44
 TOTAL AREA(ACRES) = 0.22 PEAK FLOW RATE(CFS) = 1.44

 FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 4047.90 DOWNSTREAM(FEET) = 4046.70
 CHANNEL LENGTH THRU SUBAREA(FEET) = 53.00 CHANNEL SLOPE = 0.0226
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 0.60
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 7.142

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	C	0.08	0.57	0.850	69
CONDOMINIUMS	C	0.01	0.57	0.350	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.794
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.71
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.68
 AVERAGE FLOW DEPTH(FEET) = 0.46 TRAVEL TIME(MIN.) = 0.33
 Tc(MIN.) = 5.44
 SUBAREA AREA(ACRES) = 0.09 SUBAREA RUNOFF(CFS) = 0.54
 EFFECTIVE AREA(ACRES) = 0.31 AREA-AVERAGED Fm(INCH/HR) = 0.28
 AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.50
 TOTAL AREA(ACRES) = 0.3 PEAK FLOW RATE(CFS) = 1.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.48 FLOW VELOCITY(FEET/SEC.) = 2.80
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 251.00 FEET.

 FLOW PROCESS FROM NODE 3.00 TO NODE 31.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 4046.70 DOWNSTREAM(FEET) = 4044.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.0233
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 6.583

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.07	0.57	0.100	69
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	0.01	0.57	0.500	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.150

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.15
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.88
AVERAGE FLOW DEPTH(FEET) = 0.50 TRAVEL TIME(MIN.) = 0.67
Tc(MIN.) = 6.11
SUBAREA AREA(ACRES) = 0.08 SUBAREA RUNOFF(CFS) = 0.47
EFFECTIVE AREA(ACRES) = 0.39 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 0.4 PEAK FLOW RATE(CFS) = 2.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.51 FLOW VELOCITY(FEET/SEC.) = 2.89
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 31.00 = 367.00 FEET.

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END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.4 TC(MIN.) = 6.11
EFFECTIVE AREA(ACRES) = 0.39 AREA-AVERAGED Fm(INCH/HR)= 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.426
PEAK FLOW RATE(CFS) = 2.23

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END OF RATIONAL METHOD ANALYSIS

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Ver. 23.0 Release Date: 07/01/2016 License ID 1542

Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 100-YEAR STORM ANALYSIS *
* DEVELOPED CONDITION (NODES 1-31) *

FILE NAME: PR1.DAT
TIME/DATE OF STUDY: 16:57 01/31/2025

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.8300

ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 198.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.70 DOWNSTREAM(FEET) = 4047.90

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.107
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 10.267

SUBAREA Tc AND LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN	(MIN.)
COMMERCIAL	C	0.01	0.27	0.100	86	5.11
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	C	0.02	0.27	0.500	86	6.54
CONDOMINIUMS	C	0.18	0.27	0.350	86	6.05
PUBLIC PARK	C	0.01	0.27	0.850	86	8.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.375
 SUBAREA RUNOFF(CFS) = 2.01
 TOTAL AREA(ACRES) = 0.22 PEAK FLOW RATE(CFS) = 2.01

 FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 4047.90 DOWNSTREAM(FEET) = 4046.70
 CHANNEL LENGTH THRU SUBAREA(FEET) = 53.00 CHANNEL SLOPE = 0.0226
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 0.60
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 9.864
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
PUBLIC PARK	C	0.08	0.27	0.850	86
CONDOMINIUMS	C	0.01	0.27	0.350	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.794
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.40
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.94
 AVERAGE FLOW DEPTH(FEET) = 0.52 TRAVEL TIME(MIN.) = 0.30
 T_c (MIN.) = 5.41
 SUBAREA AREA(ACRES) = 0.09 SUBAREA RUNOFF(CFS) = 0.78
 EFFECTIVE AREA(ACRES) = 0.31 AREA-AVERAGED F_m (INCH/HR) = 0.14
 AREA-AVERAGED F_p (INCH/HR) = 0.27 AREA-AVERAGED A_p = 0.50
 TOTAL AREA(ACRES) = 0.3 PEAK FLOW RATE(CFS) = 2.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.55 FLOW VELOCITY(FEET/SEC.) = 3.03
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 251.00 FEET.

 FLOW PROCESS FROM NODE 3.00 TO NODE 31.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 4046.70 DOWNSTREAM(FEET) = 4044.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.0233
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 9.149
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	C	0.07	0.27	0.100	86
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	0.01	0.27	0.500	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.150
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.04

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.15
AVERAGE FLOW DEPTH(FEET) = 0.57 TRAVEL TIME(MIN.) = 0.61
Tc(MIN.) = 6.02
SUBAREA AREA(ACRES) = 0.08 SUBAREA RUNOFF(CFS) = 0.66
EFFECTIVE AREA(ACRES) = 0.39 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 0.4 PEAK FLOW RATE(CFS) = 3.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.58 FLOW VELOCITY(FEET/SEC.) = 3.17
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 31.00 = 367.00 FEET.

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END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.4 TC(MIN.) = 6.02
EFFECTIVE AREA(ACRES) = 0.39 AREA-AVERAGED Fm(INCH/HR)= 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.426
PEAK FLOW RATE(CFS) = 3.17

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END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 2-YEAR STORM ANALYSIS *
* DEVELOPED CONDITION (NODES 11 TO 13) *

FILE NAME: PR11.DAT
TIME/DATE OF STUDY: 17:22 01/31/2025

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5870

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 267.00
ELEVATION DATA: UPSTREAM(FEET) = 4056.30 DOWNSTREAM(FEET) = 4047.40

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.642
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 2.740
SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	C	0.06	0.81	0.500	50	7.18
CONDOMINIUMS	C	0.37	0.81	0.350	50	6.64
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.81						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.371						
SUBAREA RUNOFF(CFS) = 0.94						
TOTAL AREA(ACRES) = 0.43 PEAK FLOW RATE(CFS) = 0.94						

FLOW PROCESS FROM NODE 12.00 TO NODE 13.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 4047.40 DOWNSTREAM(FEET) = 4045.20
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.0173
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 2.502

SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	
COMMERCIAL	C	0.11	0.81	0.100	50	
CONDOMINIUMS	C	0.10	0.81	0.350	50	
PUBLIC PARK	C	0.21	0.81	0.850	50	
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.81						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.535						
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.34						
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.30						
AVERAGE FLOW DEPTH(FEET) = 0.44 TRAVEL TIME(MIN.) = 0.92						
Tc(MIN.) = 7.56						
SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 0.78						
EFFECTIVE AREA(ACRES) = 0.85 AREA-AVERAGED Fm(INCH/HR) = 0.37						
AREA-AVERAGED Fp(INCH/HR) = 0.81 AREA-AVERAGED Ap = 0.45						
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 1.63						

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.48 FLOW VELOCITY(FEET/SEC.) = 2.40
LONGEST FLOWPATH FROM NODE 11.00 TO NODE 13.00 = 394.00 FEET.

FLOW PROCESS FROM NODE 13.00 TO NODE 13.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 7.56
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 2.502
SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	
COMMERCIAL	C	0.12	0.81	0.100	50	
CONDOMINIUMS	C	0.03	0.81	0.350	50	
PUBLIC PARK	C	0.14	0.81	0.850	50	
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.81						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.488						
SUBAREA AREA(ACRES) = 0.29 SUBAREA RUNOFF(CFS) = 0.55						
EFFECTIVE AREA(ACRES) = 1.14 AREA-AVERAGED Fm(INCH/HR) = 0.37						
AREA-AVERAGED Fp(INCH/HR) = 0.81 AREA-AVERAGED Ap = 0.46						
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 2.18						

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END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1.1 TC(MIN.) = 7.56
EFFECTIVE AREA(ACRES) = 1.14 AREA-AVERAGED Fm(INCH/HR)= 0.37
AREA-AVERAGED Fp(INCH/HR) = 0.81 AREA-AVERAGED Ap = 0.461
PEAK FLOW RATE(CFS) = 2.18

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END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 5-YEAR STORM ANALYSIS *
* DEVELOPED CONDITION (NODES 11 TO 13) *

FILE NAME: PR11.DAT
TIME/DATE OF STUDY: 17:38 01/31/2025

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8300

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

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

NO.	WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER WIDTH (FT)	GEOMETRIES: LIP (FT)	MANNING HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 267.00
ELEVATION DATA: UPSTREAM(FEET) = 4056.30 DOWNSTREAM(FEET) = 4047.40

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.642

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 3.874

SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS	Tc
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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" C 0.06 0.81 0.500 50 7.18
 CONDOMINIUMS C 0.37 0.81 0.350 50 6.64
 SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.81
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.371
 SUBAREA RUNOFF(CFS) = 1.38
 TOTAL AREA(ACRES) = 0.43 PEAK FLOW RATE(CFS) = 1.38

 FLOW PROCESS FROM NODE 12.00 TO NODE 13.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 4047.40 DOWNSTREAM(FEET) = 4045.20
 CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.0173
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 3.567

SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	C	0.11	0.81	0.100	50
CONDOMINIUMS	C	0.10	0.81	0.350	50
PUBLIC PARK	C	0.21	0.81	0.850	50

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.81
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.535
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.98
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.55
 AVERAGE FLOW DEPTH(FEET) = 0.51 TRAVEL TIME(MIN.) = 0.83
 T_c (MIN.) = 7.47
 SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 1.18
 EFFECTIVE AREA(ACRES) = 0.85 AREA-AVERAGED F_m (INCH/HR) = 0.37
 AREA-AVERAGED F_p (INCH/HR) = 0.81 AREA-AVERAGED A_p = 0.45
 TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 2.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.55 FLOW VELOCITY(FEET/SEC.) = 2.68
 LONGEST FLOWPATH FROM NODE 11.00 TO NODE 13.00 = 394.00 FEET.

 FLOW PROCESS FROM NODE 13.00 TO NODE 13.00 IS CODE = 81

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

MAINLINE T_c (MIN.) = 7.47
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 3.567
 SUBAREA LOSS RATE DATA(AMC I):
 DEVELOPMENT TYPE/
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL C 0.12 0.81 0.100 50
 CONDOMINIUMS C 0.03 0.81 0.350 50
 PUBLIC PARK C 0.14 0.81 0.850 50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.81
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.488
 SUBAREA AREA(ACRES) = 0.29 SUBAREA RUNOFF(CFS) = 0.83
 EFFECTIVE AREA(ACRES) = 1.14 AREA-AVERAGED F_m (INCH/HR) = 0.37
 AREA-AVERAGED F_p (INCH/HR) = 0.81 AREA-AVERAGED A_p = 0.46
 TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 3.28

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1.1 TC(MIN.) = 7.47
EFFECTIVE AREA(ACRES) = 1.14 AREA-AVERAGED Fm(INCH/HR)= 0.37
AREA-AVERAGED Fp(INCH/HR) = 0.81 AREA-AVERAGED Ap = 0.461
PEAK FLOW RATE(CFS) = 3.28

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END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 10-YEAR STORM ANALYSIS *
* DEVELOPED CONDITION (NODES 11 TO 13) *

FILE NAME: PR11.DAT
TIME/DATE OF STUDY: 17:56 01/31/2025

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0400

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 267.00
ELEVATION DATA: UPSTREAM(FEET) = 4056.30 DOWNSTREAM(FEET) = 4047.40

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.642
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.854
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	C	0.06	0.57	0.500	69	7.18
CONDOMINIUMS	C	0.37	0.57	0.350	69	6.64
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.57						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.371						
SUBAREA RUNOFF(CFS) = 1.80						
TOTAL AREA(ACRES) = 0.43 PEAK FLOW RATE(CFS) = 1.80						

FLOW PROCESS FROM NODE 12.00 TO NODE 13.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 4047.40 DOWNSTREAM(FEET) = 4045.20
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.0173
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.494

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	
COMMERCIAL	C	0.11	0.57	0.100	69	
CONDOMINIUMS	C	0.10	0.57	0.350	69	
PUBLIC PARK	C	0.21	0.57	0.850	69	
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.57						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.535						
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.59						
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.74						
AVERAGE FLOW DEPTH(FEET) = 0.56 TRAVEL TIME(MIN.) = 0.77						
Tc(MIN.) = 7.42						
SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 1.58						
EFFECTIVE AREA(ACRES) = 0.85 AREA-AVERAGED Fm(INCH/HR) = 0.26						
AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.45						
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 3.24						

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 2.86
LONGEST FLOWPATH FROM NODE 11.00 TO NODE 13.00 = 394.00 FEET.

FLOW PROCESS FROM NODE 13.00 TO NODE 13.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 7.42
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.494
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	
COMMERCIAL	C	0.12	0.57	0.100	69	
CONDOMINIUMS	C	0.03	0.57	0.350	69	
PUBLIC PARK	C	0.14	0.57	0.850	69	
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.57						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.488						
SUBAREA AREA(ACRES) = 0.29 SUBAREA RUNOFF(CFS) = 1.10						
EFFECTIVE AREA(ACRES) = 1.14 AREA-AVERAGED Fm(INCH/HR) = 0.26						
AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.46						
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 4.34						

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1.1 TC(MIN.) = 7.42
EFFECTIVE AREA(ACRES) = 1.14 AREA-AVERAGED Fm(INCH/HR)= 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.461
PEAK FLOW RATE(CFS) = 4.34

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END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Ver. 23.0 Release Date: 07/01/2016 License ID 1542

Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 25-STORM ANALYSIS *
* DEVELOPED CONDITION (NODES 11 TO 13) *

FILE NAME: PR11.DAT
TIME/DATE OF STUDY: 18:05 01/31/2025

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.3300

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 267.00
ELEVATION DATA: UPSTREAM(FEET) = 4056.30 DOWNSTREAM(FEET) = 4047.40

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.642
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 6.208
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	C	0.06	0.57	0.500	69	7.18
CONDOMINIUMS	C	0.37	0.57	0.350	69	6.64
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.57						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.371						
SUBAREA RUNOFF(CFS) = 2.32						
TOTAL AREA(ACRES) = 0.43 PEAK FLOW RATE(CFS) = 2.32						

FLOW PROCESS FROM NODE 12.00 TO NODE 13.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 4047.40 DOWNSTREAM(FEET) = 4045.20
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.0173
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 5.768

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	
COMMERCIAL	C	0.11	0.57	0.100	69	
CONDOMINIUMS	C	0.10	0.57	0.350	69	
PUBLIC PARK	C	0.21	0.57	0.850	69	
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.57						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.535						
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.36						
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.88						
AVERAGE FLOW DEPTH(FEET) = 0.62 TRAVEL TIME(MIN.) = 0.73						
Tc(MIN.) = 7.38						
SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 2.07						
EFFECTIVE AREA(ACRES) = 0.85 AREA-AVERAGED Fm(INCH/HR) = 0.26						
AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.45						
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 4.22						

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.68 FLOW VELOCITY(FEET/SEC.) = 3.07
LONGEST FLOWPATH FROM NODE 11.00 TO NODE 13.00 = 394.00 FEET.

FLOW PROCESS FROM NODE 13.00 TO NODE 13.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 7.38
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 5.768
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	
COMMERCIAL	C	0.12	0.57	0.100	69	
CONDOMINIUMS	C	0.03	0.57	0.350	69	
PUBLIC PARK	C	0.14	0.57	0.850	69	
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.57						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.488						
SUBAREA AREA(ACRES) = 0.29 SUBAREA RUNOFF(CFS) = 1.43						
EFFECTIVE AREA(ACRES) = 1.14 AREA-AVERAGED Fm(INCH/HR) = 0.26						
AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.46						
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 5.65						

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1.1 TC(MIN.) = 7.38
EFFECTIVE AREA(ACRES) = 1.14 AREA-AVERAGED Fm(INCH/HR)= 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.461
PEAK FLOW RATE(CFS) = 5.65

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END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 100-YEAR STORM ANALYSIS *
* DEVELOPED CONDITION (NODES 11 TO 13) *

FILE NAME: PR11.DAT
TIME/DATE OF STUDY: 18:55 01/31/2025

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = **100.00**
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = **0.7000**
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = **1.8300**

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

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 267.00
ELEVATION DATA: UPSTREAM(FEET) = 4056.30 DOWNSTREAM(FEET) = 4047.40

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.642
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 8.541
SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	C	0.06	0.27	0.500	86	7.18
CONDOMINIUMS	C	0.37	0.27	0.350	86	6.64
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.371						
SUBAREA RUNOFF(CFS) = 3.27						
TOTAL AREA(ACRES) = 0.43 PEAK FLOW RATE(CFS) = 3.27						

FLOW PROCESS FROM NODE 12.00 TO NODE 13.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 4047.40 DOWNSTREAM(FEET) = 4045.20
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.0173
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 7.987

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.11	0.27	0.100	86
CONDOMINIUMS	C	0.10	0.27	0.350	86
PUBLIC PARK	C	0.21	0.27	0.850	86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.535					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.75					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.17					
AVERAGE FLOW DEPTH(FEET) = 0.71 TRAVEL TIME(MIN.) = 0.67					
Tc(MIN.) = 7.31					
SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 2.96					
EFFECTIVE AREA(ACRES) = 0.85 AREA-AVERAGED Fm(INCH/HR) = 0.12					
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.45					
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 6.02					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.78 FLOW VELOCITY(FEET/SEC.) = 3.34
LONGEST FLOWPATH FROM NODE 11.00 TO NODE 13.00 = 394.00 FEET.

FLOW PROCESS FROM NODE 13.00 TO NODE 13.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 7.31
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 7.987
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.12	0.27	0.100	86
CONDOMINIUMS	C	0.03	0.27	0.350	86
PUBLIC PARK	C	0.14	0.27	0.850	86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.488					
SUBAREA AREA(ACRES) = 0.29 SUBAREA RUNOFF(CFS) = 2.05					
EFFECTIVE AREA(ACRES) = 1.14 AREA-AVERAGED Fm(INCH/HR) = 0.13					
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.46					
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 8.07					

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1.1 TC(MIN.) = 7.31
EFFECTIVE AREA(ACRES) = 1.14 AREA-AVERAGED Fm(INCH/HR)= 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.461
PEAK FLOW RATE(CFS) = 8.07

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END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 2-YEAR STORM ANALYSIS *
* DEVELOPED CONDITION (NODES 21-22) *

FILE NAME: PR21.DAT
TIME/DATE OF STUDY: 19:06 01/31/2025

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5870

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 201.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.80 DOWNSTREAM(FEET) = 4048.20

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.190
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 3.256
SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.01	0.81	0.100	50	5.19
PUBLIC PARK	C	0.17	0.81	0.850	50	8.25

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.81
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.808
 SUBAREA RUNOFF(CFS) = 0.42
 TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 0.42

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.2 TC(MIN.) = 5.19
 EFFECTIVE AREA(ACRES) = 0.18 AREA-AVERAGED Fm(INCH/HR)= 0.66
 AREA-AVERAGED Fp(INCH/HR) = 0.81 AREA-AVERAGED Ap = 0.808
 PEAK FLOW RATE(CFS) = 0.42

=====

END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 5-YEAR STORM ANALYSIS *
* DEVELOPED CONDITION (NODES 21-22) *

FILE NAME: PR21.DAT
TIME/DATE OF STUDY: 19:11 01/31/2025

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8300

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB GUTTER-GEOMETRIES: HEIGHT (FT)	WIDT (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 201.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.80 DOWNSTREAM(FEET) = 4048.20

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.190
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 4.604

SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.01	0.81	0.100	50	5.19
PUBLIC PARK	C	0.17	0.81	0.850	50	8.25

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.81
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.808
SUBAREA RUNOFF(CFS) = 0.64
TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 0.64

=====
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.2 TC(MIN.) = 5.19
EFFECTIVE AREA(ACRES) = 0.18 AREA-AVERAGED Fm(INCH/HR)= 0.66
AREA-AVERAGED Fp(INCH/HR) = 0.81 AREA-AVERAGED Ap = 0.808
PEAK FLOW RATE(CFS) = 0.64
=====

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END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Ver. 23.0 Release Date: 07/01/2016 License ID 1542

Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 10-YEAR STORM ANALYSIS *
* DEVELOPED CONDITION (NODES 21-22) *

FILE NAME: PR21.DAT
TIME/DATE OF STUDY: 19:29 01/31/2025

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0400

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 201.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.80 DOWNSTREAM(FEET) = 4048.20

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.190
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 5.769
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.01	0.57	0.100	69	5.19
PUBLIC PARK	C	0.17	0.57	0.850	69	8.25

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.808
 SUBAREA RUNOFF(CFS) = 0.86
 TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 0.86

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.2 TC(MIN.) = 5.19
 EFFECTIVE AREA(ACRES) = 0.18 AREA-AVERAGED Fm(INCH/HR)= 0.46
 AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.808
 PEAK FLOW RATE(CFS) = 0.86

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END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 25-YEAR STORM ANALYSIS *
* DEVELOPED CONDITION (NODES 21-22) *

FILE NAME: PR21.DAT
TIME/DATE OF STUDY: 19:41 01/31/2025

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.3300

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 201.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.80 DOWNSTREAM(FEET) = 4048.20

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.190
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 7.378
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.01	0.57	0.100	69	5.19
PUBLIC PARK	C	0.17	0.57	0.850	69	8.25

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.808
 SUBAREA RUNOFF(CFS) = 1.12
 TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 1.12

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.2 TC(MIN.) = 5.19
 EFFECTIVE AREA(ACRES) = 0.18 AREA-AVERAGED Fm(INCH/HR)= 0.46
 AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.808
 PEAK FLOW RATE(CFS) = 1.12

=====

END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:
TRANSTECH ENGINEERS

***** DESCRIPTION OF STUDY *****
* PIONEERTOWN PROJECT *
* 100-YEAR STORM ANALYSIS *
* DEVELOPED CONDITION (NODES 21-22) *

FILE NAME: PR21.DAT
TIME/DATE OF STUDY: 19:46 01/31/2025

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.8300

ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 201.00
ELEVATION DATA: UPSTREAM(FEET) = 4053.80 DOWNSTREAM(FEET) = 4048.20

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.190
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 10.152
SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.01	0.27	0.100	86	5.19
PUBLIC PARK	C	0.17	0.27	0.850	86	8.25

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.808
 SUBAREA RUNOFF(CFS) = 1.61
 TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 1.61

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.2 TC(MIN.) = 5.19
 EFFECTIVE AREA(ACRES) = 0.18 AREA-AVERAGED Fm(INCH/HR)= 0.22
 AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.808
 PEAK FLOW RATE(CFS) = 1.61

=====

=====

END OF RATIONAL METHOD ANALYSIS

Table 1 - PIONEERTOWN PROJECT, HYDROLOGY CALCULATIONS*

SUMMARY OF RESULTS, PEAK FLOW RATES (cfs)

NODES		STORM FREQUENCIES, YEARS					Area (Ac)
		2-	5-	10-	25-	100-	
EXIST.	63	2.11	3.10	4.09	5.29	7.47	0.91
PROP.	13	2.18	3.28	4.34	5.65	8.07	1.14
% Change		3.32%	5.81%	6.11%	6.81%	8.03%	25.27%
EXIST.	81	1.13	1.63	2.06	2.66	3.76	0.62
PROP.	31	0.87	1.30	1.71	2.23	3.17	0.39
%Change		-23.01%	-20.25%	-16.99%	-16.17%	-15.69%	-37.10%
EXIST.	72	0.47	0.69	0.91	1.17	1.63	0.18
PROP.	22	0.42	0.64	0.86	1.12	1.61	0.18
% Change		-10.64%	-7.25%	-5.49%	-4.27%	-1.23%	0.00%

(*) - Rational Method

Table 2 - PIONEERTOWN PROJECT, HYDROLOGY CALCULATIONS*

COMPARISON OF RESULTS, PEAK FLOW RATES (cfs)

NODES		STORM FREQUENCIES, YEARS					Area (Ac)
		2-	5-	10-	25-	100-	
Exist. Condition, 1		3.24	4.73	6.15	7.95	11.23	1.53
Prop. Condition, 2		3.05	4.58	6.05	7.88	11.24	1.53
% Change		-5.86%	-3.17%	-1.63%	-0.88%	0.09%	0.00%

1 - Combined discharge for Nodes 63 and 81

2 - Combined discharge for Nodes 13 and 31

**PIONEERTOWN PROJECT, HYDROLOGY CALCULATIONS, AREAC
COMPARISON OF RESULTS, PEAK FLOW RATES (cfs)
STORM FREQUENCIES, YEARS**

NODES		2	5	10	25	100	Area (Ac)
EXIST	72	0.47	0.69	0.91	1.17	1.63	0.18
PROP	22	0.42	0.64	0.86	1.12	1.61	0.18
		-0.05	-0.05	-0.05	-0.05	-0.02	0