Time period

From: 12/22/2017, 12:00:00 AM

To: 12/23/2017, 12:00:00 AM

Thresholds

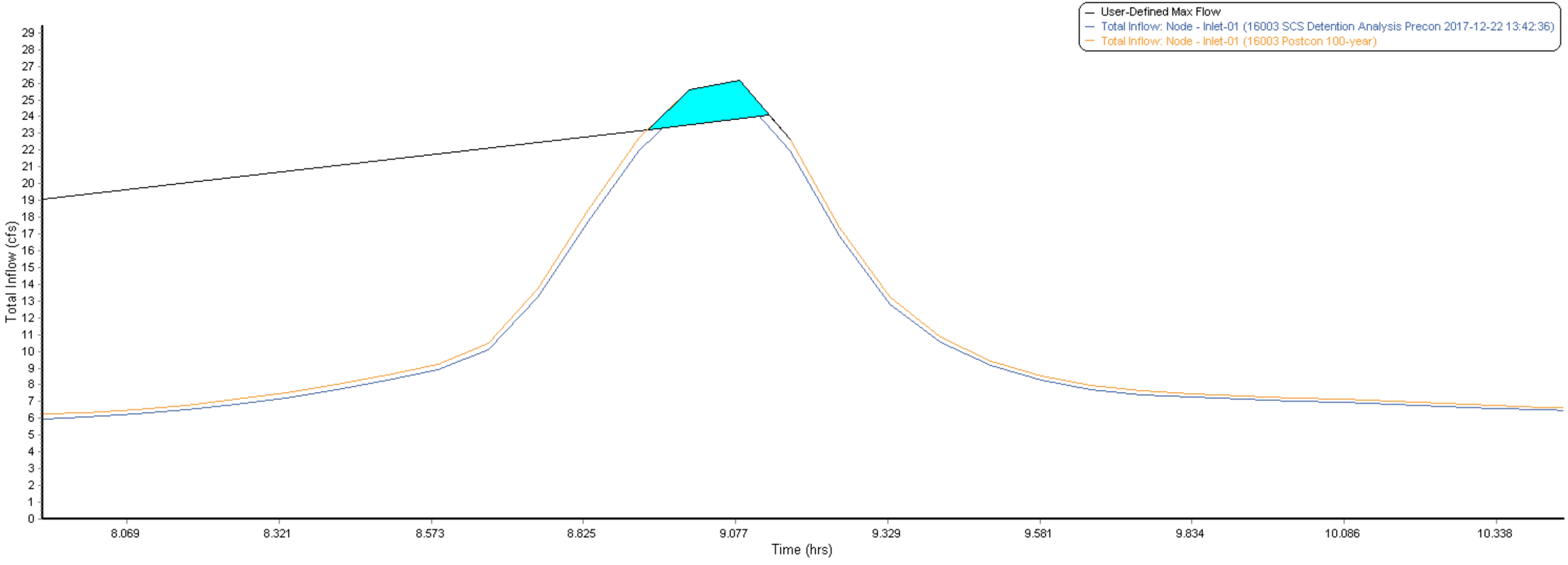
Exceedance: 0

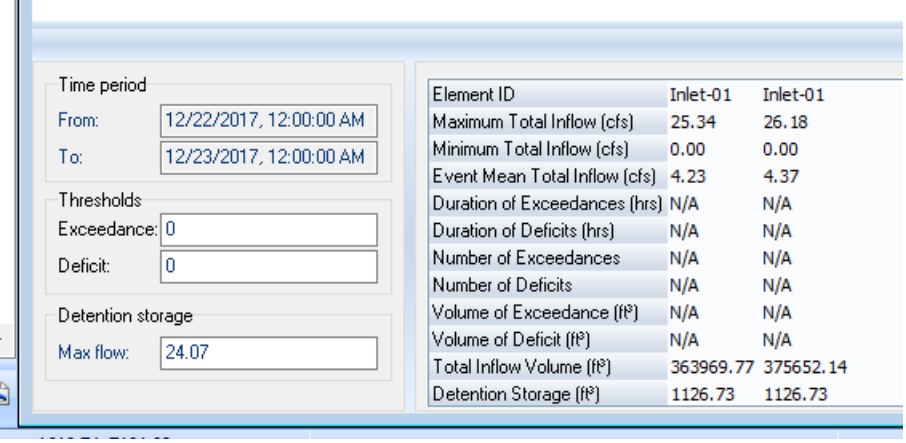
Deficit: 0

Detention storage

Max flow: 10.92

Element ID	Inlet-01	Inlet-01
Maximum Total Inflow (cfs)	11.50	12.14
Minimum Total Inflow (cfs)	0.00	0.00
Event Mean Total Inflow (cfs)	1.97	2.07
Duration of Exceedances (hrs)	N/A	N/A
Duration of Deficits (hrs)	N/A	N/A
Number of Exceedances	N/A	N/A
Number of Deficits	N/A	N/A
Volume of Exceedance (ft³)	N/A	N/A
Volume of Deficit (ft³)	N/A	N/A
Total Inflow Volume (ft³)	169592.62	177926.92
Detention Storage (ft³)	700.39	700.39


User-Defined Max Flow
Total Inflow: Node - Inlet-01 (16003 SCS Detention Analysis Precon 2017-12-22 13:42:36)
Total Inflow: Node - Inlet-01 (16003 Postcon 100-year)
Total Inflow (cfs)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
8.069
8.321
8.573
8.825
9.077
9.329
9.581
9.834
10.086
10.338
Time (hrs)



Element ID	Inlet-01	Inlet-01
Maximum Total Inflow (cfs)	25.34	26.18
Minimum Total Inflow (cfs)	0.00	0.00
Event Mean Total Inflow (cfs)	4.23	4.37
Duration of Exceedances (hrs)	N/A	N/A
Duration of Deficits (hrs)	N/A	N/A
Number of Exceedances	N/A	N/A
Number of Deficits	N/A	N/A
Volume of Exceedance (ft³)	N/A	N/A
Volume of Deficit (ft³)	N/A	N/A
Total Inflow Volume (ft³)	363969.77	375652.14
Detention Storage (ft³)	1126.73	1126.73

Pre-Construction Hydrology Report - 10-Year Storm

SN	Element ID	Area (acres)	Drainage Node ID	Weighted Curve Number	Rain Gage ID	Total Precipitation (inches)	Total Runoff (inches)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-01	24.92	Inlet-01	75.03	Rain Gage-01	4.30	1.90	11.56	0 00:20:57

Pre-Construction Hydrology Report 100=Year

SN	Element ID	Area (acres)	Drainage Node ID	Weighted Curve Number	Rain Gage ID	Total Precipitation (inches)	Total Runoff (inches)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-01	24.92	Inlet-01	75.03	Rain Gage-01	6.90	4.07	25.57	0 00:20:57

SCS TR-55 Time of Concentration Computations Report *(Pre-Construction 10-Year)*

==========

Sheet Flow Equation

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where:

Tc = Time of Concentration (hrs)
n = Manning's Roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n

R = Aq / Wp

Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)

Lf = Flow Length (ft)

R = Hydraulic Radius (ft)

Aq = Flow Area (ft²)

Wp = Wetted Perimeter (ft)

V = Velocity (ft/sec)

Sf = Slope (ft/ft)

n = Manning's Roughness

==========

Subbasin Sub-01

==========

Sheet Flow Computations

-	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.40	0.00	0.00
Flow Length (ft):	300	0.00	0.00
Slope (%):	28	0.00	0.00
2 yr, 24 hr Rainfall (in):	3.40	0.00	0.00
Velocity (ft/sec):	0.29	0.00	0.00
Computed Flow Time (minutes):	17.46	0.00	0.00

Shallow Concentrated Flow Computations

-	Subarea A	Subarea B	Subarea C
Flow Length (ft):	1375	0.00	0.00

Slope (%):	28	0.00	0.00
Surface Type:	Unpaved	Unpaved	Unpaved
Velocity (ft/sec):	8.54	0.00	0.00
Computed Flow Time (minutes):	2.68	0.00	0.00

Channel Flow Computations

-	Subarea A	Subarea B	Subarea C
Manning's Roughness:	.035	0.00	0.00
Flow Length (ft):	340	0.00	0.00
Channel Slope (%):	5	0.00	0.00
Cross Section Area (ft^2):	3	0.00	0.00
Wetted Perimeter (ft):	4.82	0.00	0.00
Velocity (ft/sec):	6.94	0.00	0.00
Computed Flow Time (minutes):	0.82	0.00	0.00

Total TOC (minutes):	20.96

SCS TR-55 Time of Concentration Computations Report *(Pre-Construction 100-Year)*

==========

Sheet Flow Equation

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where:

Tc = Time of Concentration (hrs)
n = Manning's Roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n

R = Aq / Wp

Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)

Lf = Flow Length (ft)

R = Hydraulic Radius (ft)

Aq = Flow Area (ft²)

Wp = Wetted Perimeter (ft)

V = Velocity (ft/sec)

Sf = Slope (ft/ft)

n = Manning's Roughness

==========

Subbasin Sub-01

==========

Sheet Flow Computations

-	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.40	0.00	0.00
Flow Length (ft):	300	0.00	0.00
Slope (%):	28	0.00	0.00
2 yr, 24 hr Rainfall (in):	3.40	0.00	0.00
Velocity (ft/sec):	0.29	0.00	0.00
Computed Flow Time (minutes):	17.46	0.00	0.00

Shallow Concentrated Flow Computations

-	Subarea A	Subarea B	Subarea C
Flow Length (ft):	1375	0.00	0.00

Slope (%):	28	0.00	0.00
Surface Type:	Unpaved	Unpaved	Unpaved
Velocity (ft/sec):	8.54	0.00	0.00
Computed Flow Time (minutes):	2.68	0.00	0.00

Channel Flow Computations

-	Subarea A	Subarea B	Subarea C
Manning's Roughness:	.035	0.00	0.00
Flow Length (ft):	340	0.00	0.00
Channel Slope (%):	5	0.00	0.00
Cross Section Area (ft^2):	3	0.00	0.00
Wetted Perimeter (ft):	4.82	0.00	0.00
Velocity (ft/sec):	6.94	0.00	0.00
Computed Flow Time (minutes):	0.82	0.00	0.00

Total TOC (minutes):	20.96

Post-Construction Hydrology Report 10-Year

SN	Element ID	Area (acres)	Drainage Node ID	Weighted Curve Number	Rain Gage ID	Total Precipitation (inches)	Total Runoff (inches)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-01	24.92	Inlet-01	76.24	Rain Gage-01	4.30	1.99	12.21	0 00:20:57

Post-Construction Hydrology Report 100-Year

SN	Element ID	Area (acres)	Drainage Node ID	Weighted Curve Number	Rain Gage ID	Total Precipitation (inches)	Total Runoff (inches)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-01	24.92	Inlet-01	76.24	Rain Gage-01	6.90	4.19	26.40	0 00:20:57

SCS TR-55 Time of Concentration Computations Report *(Post-Construction 10-Year)*

==========

Sheet Flow Equation

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where:

Tc = Time of Concentration (hrs)
n = Manning's Roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n

R = Aq / Wp

Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)

Lf = Flow Length (ft)

R = Hydraulic Radius (ft)

Aq = Flow Area (ft²)

Wp = Wetted Perimeter (ft)

V = Velocity (ft/sec)

Sf = Slope (ft/ft)

n = Manning's Roughness

==========

Subbasin Sub-01

==========

Sheet Flow Computations

-	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.40	0.00	0.00
Flow Length (ft):	300	0.00	0.00
Slope (%):	28	0.00	0.00
2 yr, 24 hr Rainfall (in):	3.40	0.00	0.00
Velocity (ft/sec):	0.29	0.00	0.00
Computed Flow Time (minutes):	17.46	0.00	0.00

Shallow Concentrated Flow Computations

-	Subarea A	Subarea B	Subarea C
Flow Length (ft):	1375	0.00	0.00

Slope (%):	28	0.00	0.00
Surface Type:	Unpaved	Unpaved	Unpaved
Velocity (ft/sec):	8.54	0.00	0.00
Computed Flow Time (minutes):	2.68	0.00	0.00

Channel Flow Computations

-	Subarea A	Subarea B	Subarea C
Manning's Roughness:	.035	0.00	0.00
Flow Length (ft):	340	0.00	0.00
Channel Slope (%):	5	0.00	0.00
Cross Section Area (ft^2):	3	0.00	0.00
Wetted Perimeter (ft):	4.82	0.00	0.00
Velocity (ft/sec):	6.94	0.00	0.00
Computed Flow Time (minutes):	0.82	0.00	0.00

Total TOC (minutes):	20.96

SCS TR-55 Time of Concentration Computations Report *(Post-Construction 100-Year)*

==========

Sheet Flow Equation

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where:

Tc = Time of Concentration (hrs)
n = Manning's Roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n

R = Aq / Wp

Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)

Lf = Flow Length (ft)

R = Hydraulic Radius (ft)

Aq = Flow Area (ft²)

Wp = Wetted Perimeter (ft)

V = Velocity (ft/sec)

Sf = Slope (ft/ft)

n = Manning's Roughness

==========

Subbasin Sub-01

==========

Sheet Flow Computations

-	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.40	0.00	0.00
Flow Length (ft):	300	0.00	0.00
Slope (%):	28	0.00	0.00
2 yr, 24 hr Rainfall (in):	3.40	0.00	0.00
Velocity (ft/sec):	0.29	0.00	0.00
Computed Flow Time (minutes):	17.46	0.00	0.00

Shallow Concentrated Flow Computations

-	Subarea A	Subarea B	Subarea C
Flow Length (ft):	1375	0.00	0.00

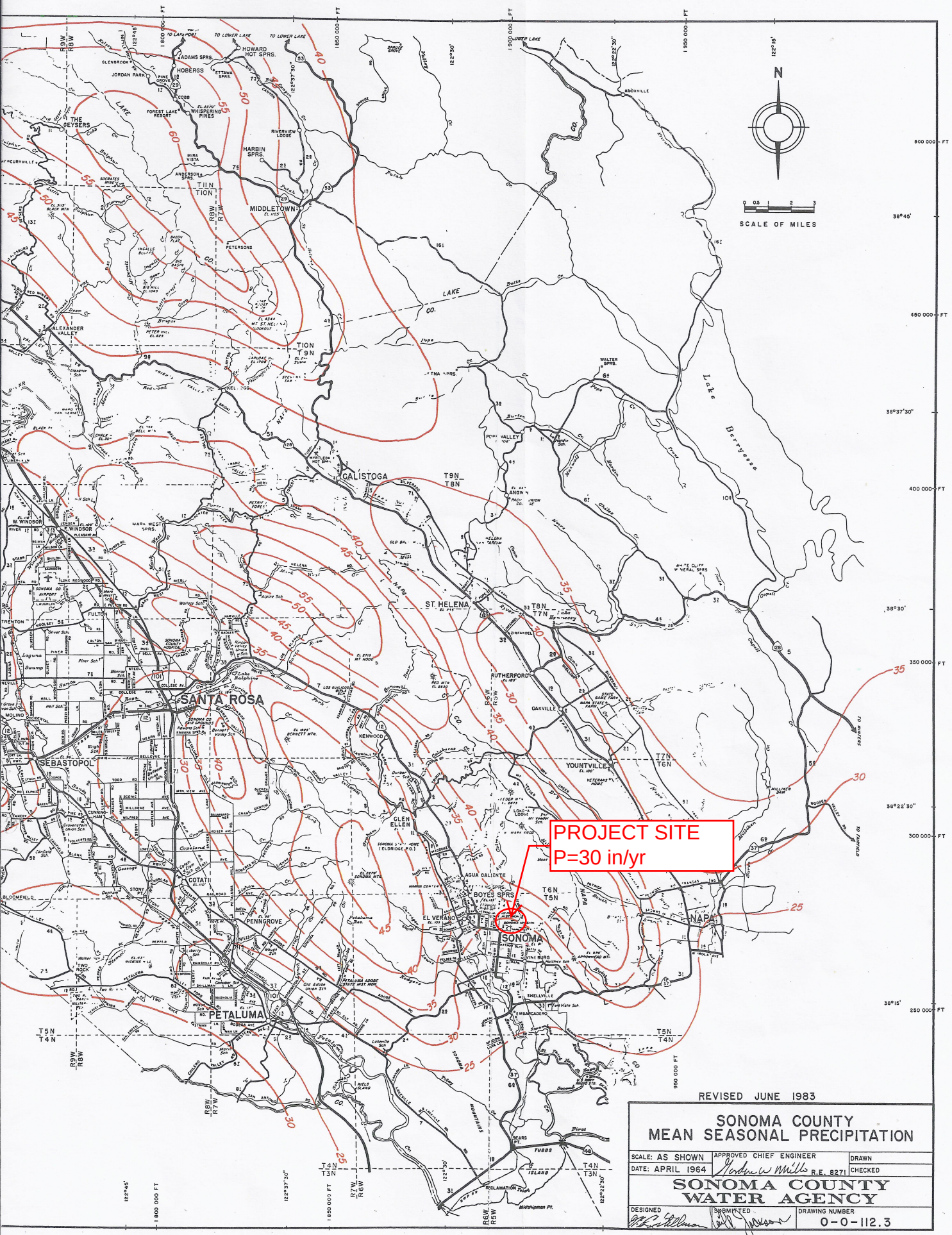
Slope (%):	28	0.00	0.00
Surface Type:	Unpaved	Unpaved	Unpaved
Velocity (ft/sec):	8.54	0.00	0.00
Computed Flow Time (minutes):	2.68	0.00	0.00

Channel Flow Computations

-	Subarea A	Subarea B	Subarea C
Manning's Roughness:	.035	0.00	0.00
Flow Length (ft):	340	0.00	0.00
Channel Slope (%):	5	0.00	0.00
Cross Section Area (ft^2):	3	0.00	0.00
Wetted Perimeter (ft):	4.82	0.00	0.00
Velocity (ft/sec):	6.94	0.00	0.00
Computed Flow Time (minutes):	0.82	0.00	0.00

Total TOC (minutes):	20.96

APPENDIX



REVISED JUNE 1983

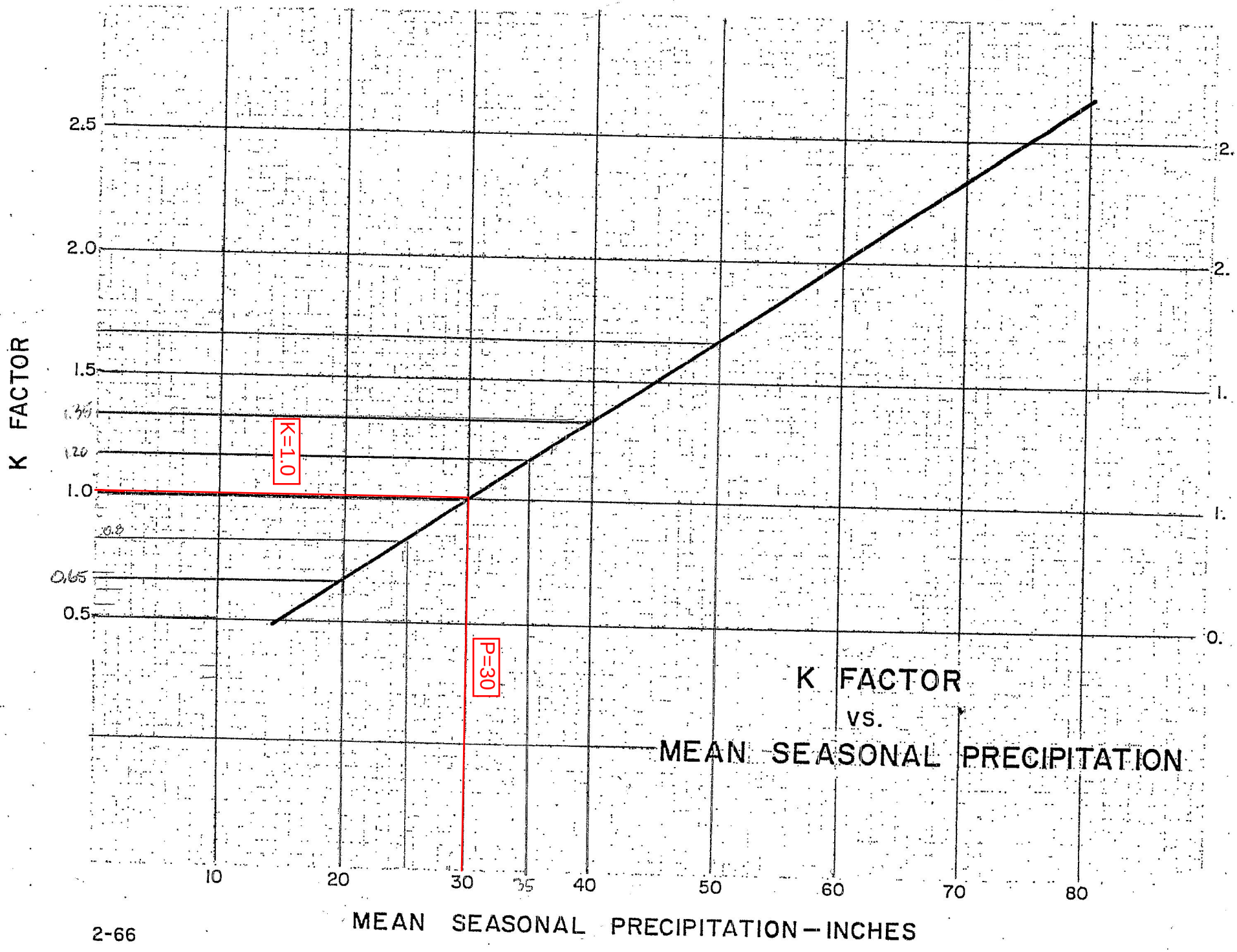
SONOMA COUNTY MEAN SEASONAL PRECIPITATION

SCALE: AS SHOWN	APPROVED CHIEF ENGINEER	DRAWN
DATE: APRIL 1964	Andrew W. Mills R.E. 8271	CHECKED

SONOMA COUNTY WATER AGENCY

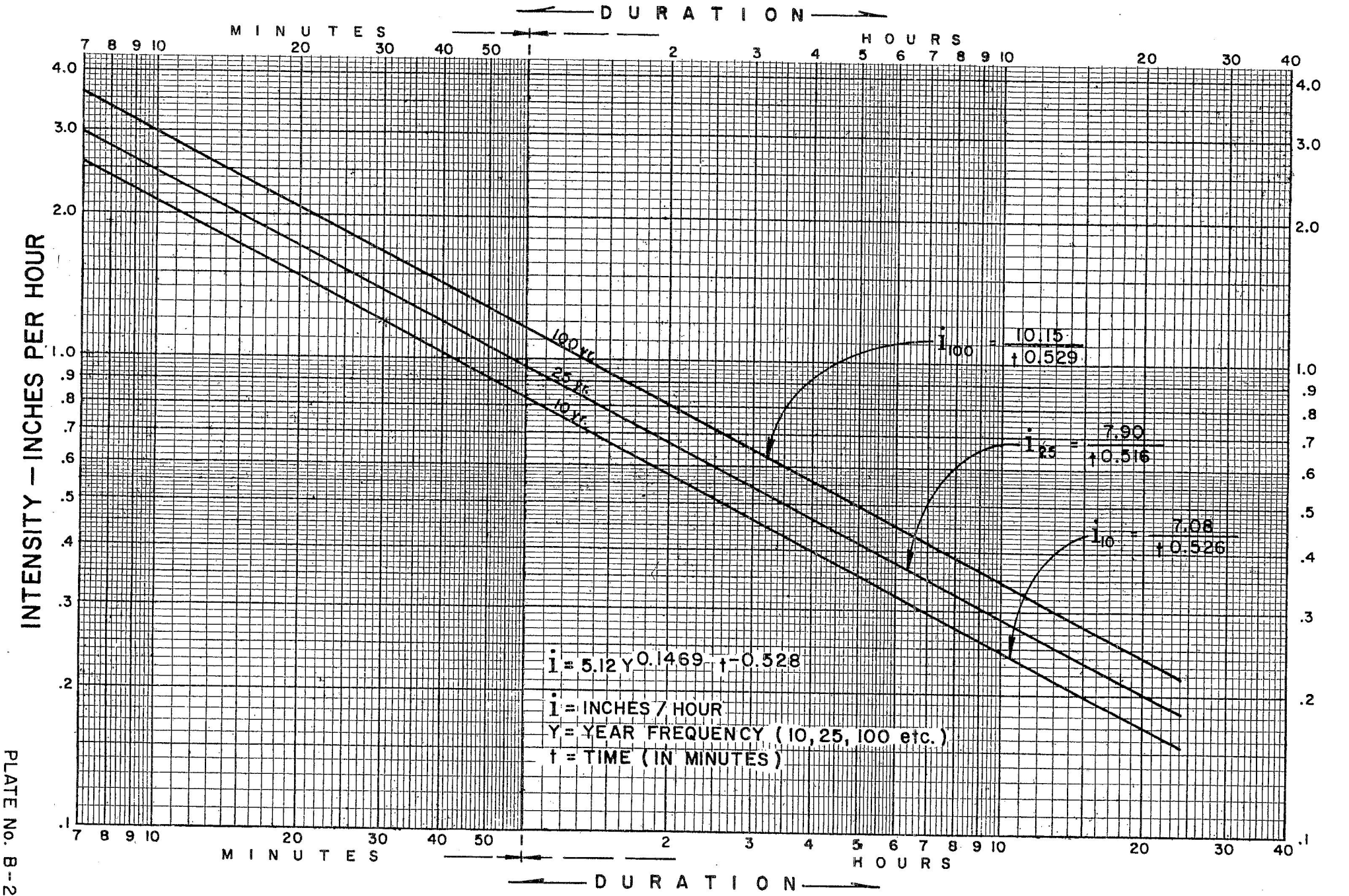
DESIGNED	SUBMITTED	DRAWING NUMBER
		0-0-112.3

PLATE No. B-3



2-66

PLATE No. B-4

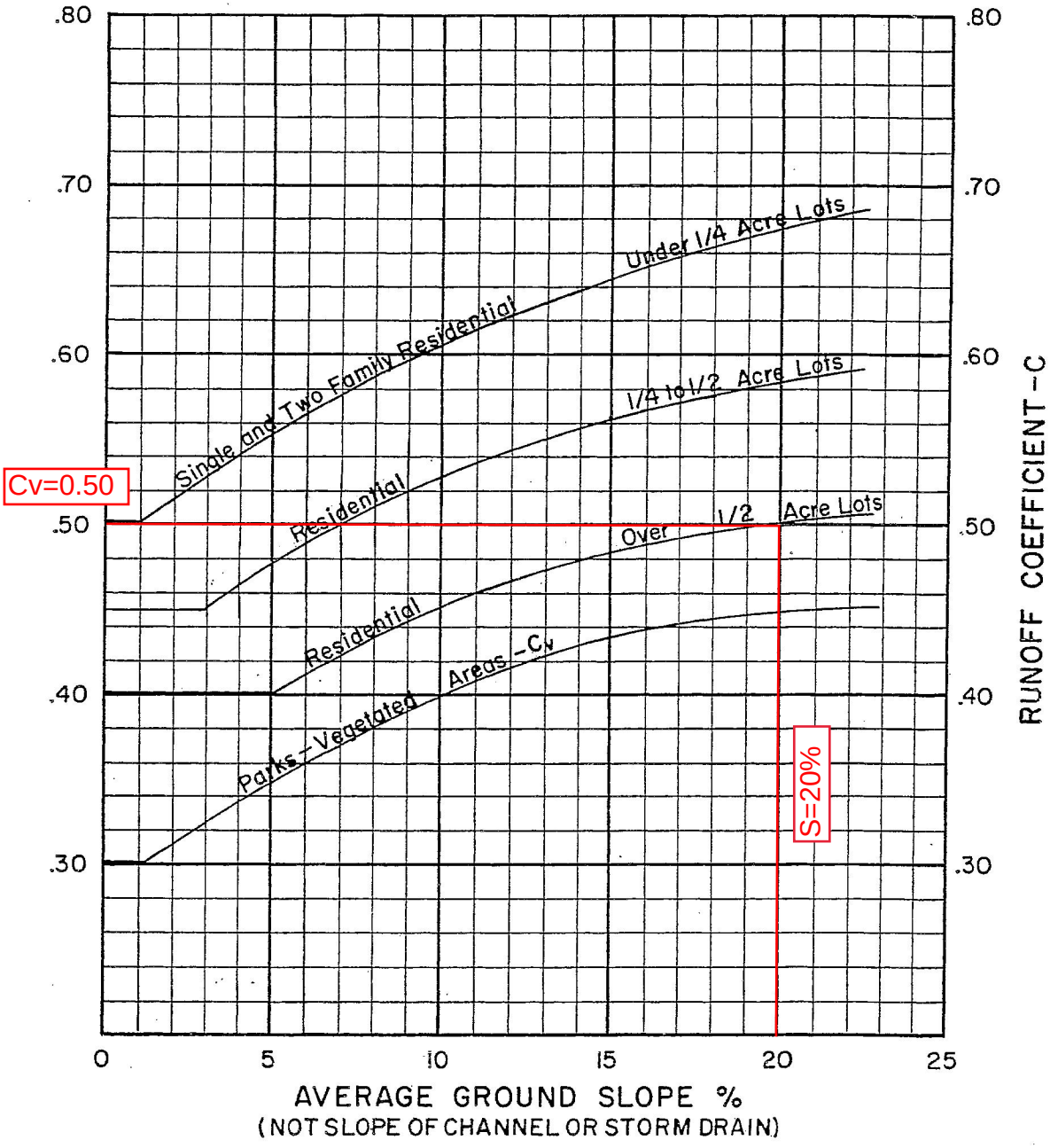


NOTE: THE INFORMATION SHOWN IS SUBJECT TO ANNUAL REVISION AS ADDITIONAL RAINFALL DATA BECOMES AVAILABLE.

RAINFALL
INTENSITY vs DURATION

PLATE No. B-2

RUNOFF COEFFICIENTS FOR RATIONAL FORMULA



NOTE: Commercial, Industrial & Multiple Residential Areas

$C_P = 0.9$ (Based on paving, roofs, etc.)

When vegetated area exceeds 20% of total, C_V from vegetated curve may be used to reduce above C_P as follows:

$$C_T = C_V \frac{A_V}{A_T} + C_P \frac{A_P}{A_T}$$

SONOMA COUNTY WATER AGENCY

118-2
7/64

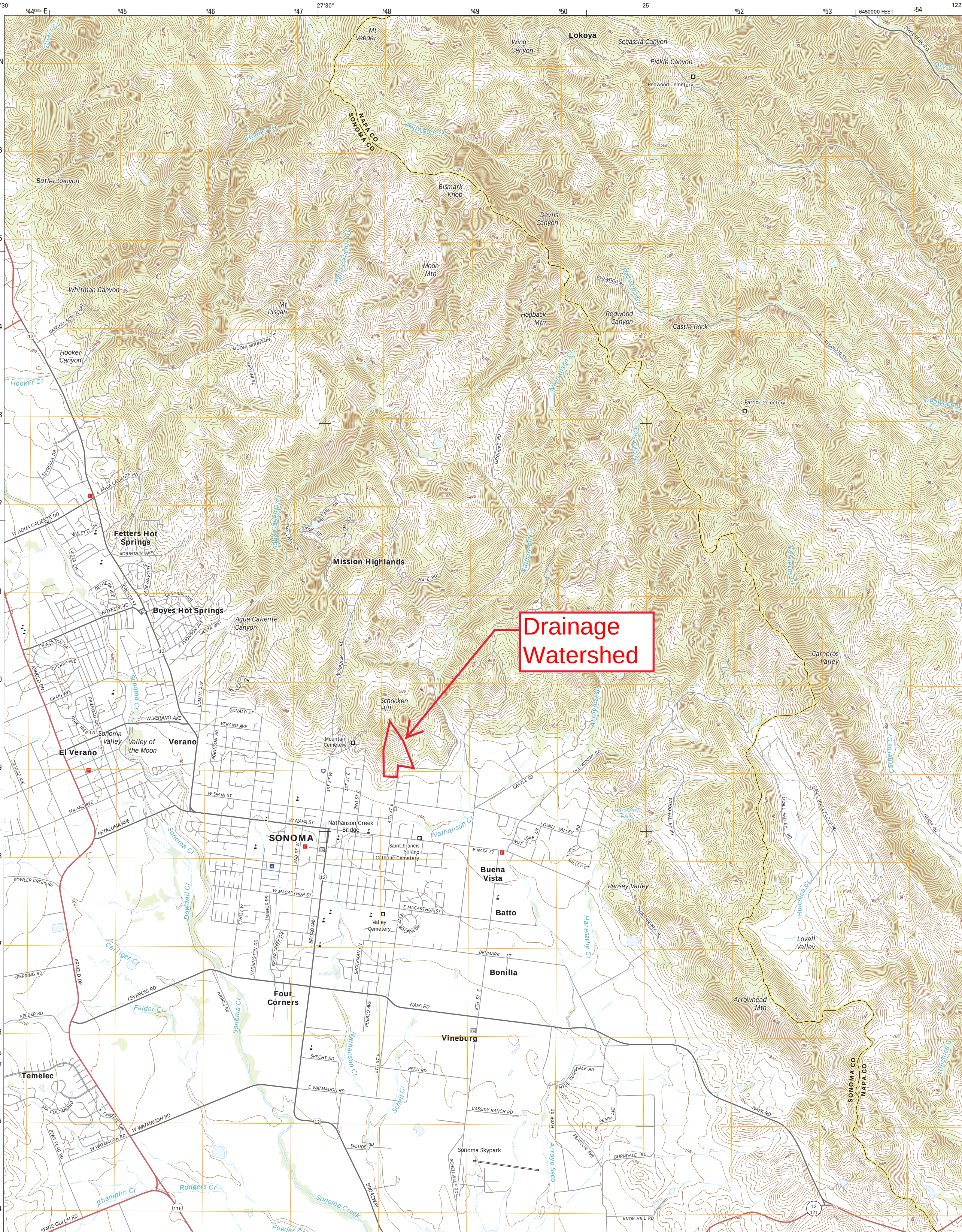
PLATE No. B-1

USGS
science for a changing world

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map
US Topo

SONOMA QUADRANGLE
CALIFORNIA
7.5-MINUTE SERIES



Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid: Universal Transverse Mercator, Zone 10S
10 000-foot ticks: California Coordinate System of 1983 (zone 2)

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery....................NAIP, May 2012
Roads....................HERE, ©2013 - 2014
Names....................GNIS, 2015
Hydrography....................National Hydrography Dataset, 2012
Contours....................National Elevation Dataset, 1999
Boundaries............Multiple sources; see metadata file 1972 - 2015
Public Land Survey System....................BLM, 2011

UTM GRID AND 2015 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
MN 13° 55´ 247 MILS
GN 0° 21´ 6 MILS

U.S. National Grid
100,000-m Square ID
EH
Grid Zone Designation
10S

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.18

QUADRANGLE LOCATION

ROAD CLASSIFICATION
Expressway — Local Connector
Secondary Hwy — Local Road
Ramp — 4WD
Interstate Route — US Route — State Route

1	2	3
4		5
6	7	8

ADJOINING QUADRANGLES
1 Kenwood
2 Rutherford
3 Yountville
4 Glen Ellen
5 Napa
6 Petaluma River
7 Sears Point
8 Cuttings Wharf

SONOMA, CA
2015

NSN. 7643016357848
NGA REF NO. USGSX24K42078