DRAINAGE REPORT

Long Valley Road/Valley Circle Boulevard/US-101 On-Ramp Improvements Project

LACMTA Project ID# MR311.34

City of Hidden Hills
6165 Spring Valley Road
Hidden Hills, CA 91302

Prepared By:

WILLDAN Engineering

2401 East Katella Avenue, Suite 300
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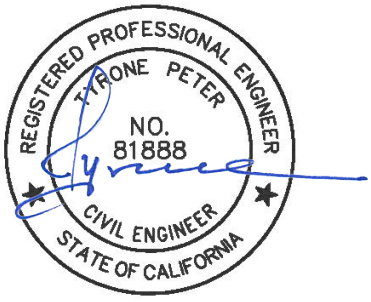
PREPARED UNDER THE SUPERVISION OF:



Tyrone Peter, P.E
R.C.E. No. 81888

January 2021

DRAINAGE REPORT
Long Valley Rd/Valley Circle Blvd/Us-101 On Ramp Improvements Project

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PROJECT DESCRIPTION

Willdan, has been retained by the City of Hidden Hills to provide professional engineering services related to improved traffic congestion and pedestrian access by designing sidewalks, paved public parking lot and staging area for vehicles entering the City, right turnout lane at the U.S. 101 on-ramp, and other amenities and safety improvements.

The purpose of the Drainage Report is to provide the hydrology and hydraulic calculations to support the design of the necessary drainage improvements for the above-referenced project.

The City of Hidden Hills proposes to add a turnout lane on Long Valley Road onto north bound West Long Valley Road, add sidewalks to Valley Center Blvd and Long Valley Road, a paved public parking lot on the north side of West Long Valley Road and a new private parking lot on the south side of West Long Valley Road.

A vicinity map showing the general project location is provided in ***Appendix "A".***

The calculations and methodologies contained herein have been prepared in accordance with the following guidelines:

- Runoff rates and volumes are performed with HydroCalc Calculator from Los Angeles County Department of Public Works
- Hydraulic calculations for the storm drain inlets were performed with Bentley FlowMaster V8i
- Hydraulic calculations for the storm drain pipes were performed with Autodesk AutoCAD Civil 3D 2018 Hydraflow Express Extension

HYDROLOGIC DISCUSSION

The project site has 7 drainage collection points. The drainage areas boundaries along Long Valley Road and Valley Center Blvd, Areas 1 through 4, are the same between both existing and proposed condition. The percent impervious was changed to account for the addition of the sidewalk. The drainage areas boundaries along North West Long Valley Road, Areas 5 and 6, have revised boundaries between existing condition and the proposed condition. Ultimately both the proposed and existing condition grading all drain to the Oakfield Drain. Area 5 has been broken up into two areas, 5A & 5B, in the proposed condition to better model the proposed grading. They both ultimately drain into the proposed 12-inch storm drain outfall of the parking lot which all grades to the proposed catch basin. The proposed grading of the parking lot has reduced the drainage area to the offsite drainage outlet and has increased the drainage area to the north side of West Long Valley Road inlet. These changes to drainage boundaries and the change in imperviousness has caused a decrease in flow to the northern offsite drainage outlet and an increase in flow to the existing inlet for north side of West Long Valley Road. The drainage area boundary for the south side of West Long Valley Road, Area 7, is the same between both the existing and proposed condition. The percent impervious was changed to account for the changed design of the parking lot.

The hydrology analysis for the proposed improvements results an increase in total overall flow of 0.24 cfs.

Area	Existing Q (CFS)	Proposed Q (CFS)	Delta
1	0.7905	0.7916	0.0011
2	1.4092	1.4455	0.0363
3	0.2749	0.2753	0.0004
4	0.7897	0.826	0.0363
5	2.7903	1.056	-1.4673
		0.267	
6	0.3097	1.892	1.5823
7	3.4851	3.5399	0.0548
Totals	9.8494	10.0336	0.2439

See ***Appendix "B"*** for the supporting Hydrology calculations**.**

HYDRAULIC DISCUSSION AND ANALYSIS

From the hydrology analysis it was determined that all the existing storm drain systems but 2 receive the same flow. The northern offsite drainage outlet from area 5 has a decrease in flow. This flow is now diverted into the proposed catch basin and conveyed through a 12-inch HP-Storm pipe and into the existing catch basin with a 24-inch outlet pipe. This is a desired improvement as the offsite flow is by overland flow on an unimproved dirt street. Area 6 has an increase in flow to the existing curb inlet.

No additional flow has been added to the Caltrans R/W. There is no impact to the Caltrans facilities.

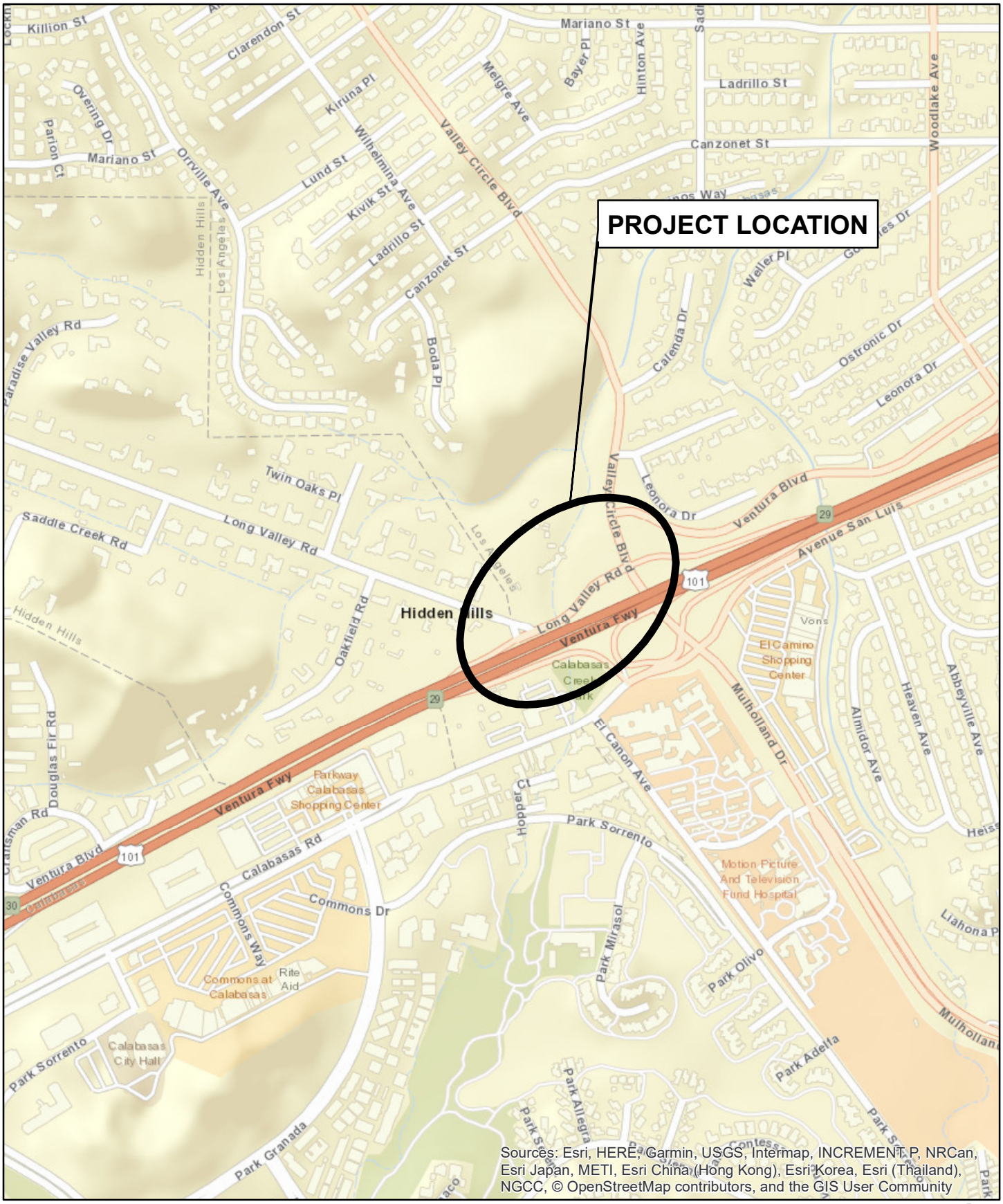
This inlet and 24-inch connector pipe were reviewed, and hydraulic calculations were performed. It was determined that the existing 5-foot curb opening inlet will be at capacity and will bypass 0.24 cfs to the downstream sump inlets. The existing 24-inch connector pipe does have the capacity to carry all the flow that is intercepted by the existing inlet.

See ***Appendix "C"*** for the supporting Hydraulic calculations.

A Low Impact Development Plan (LID) report was prepared by Willdan Engineering dated December 9, 2020.

Appendix A - Vicinity Map

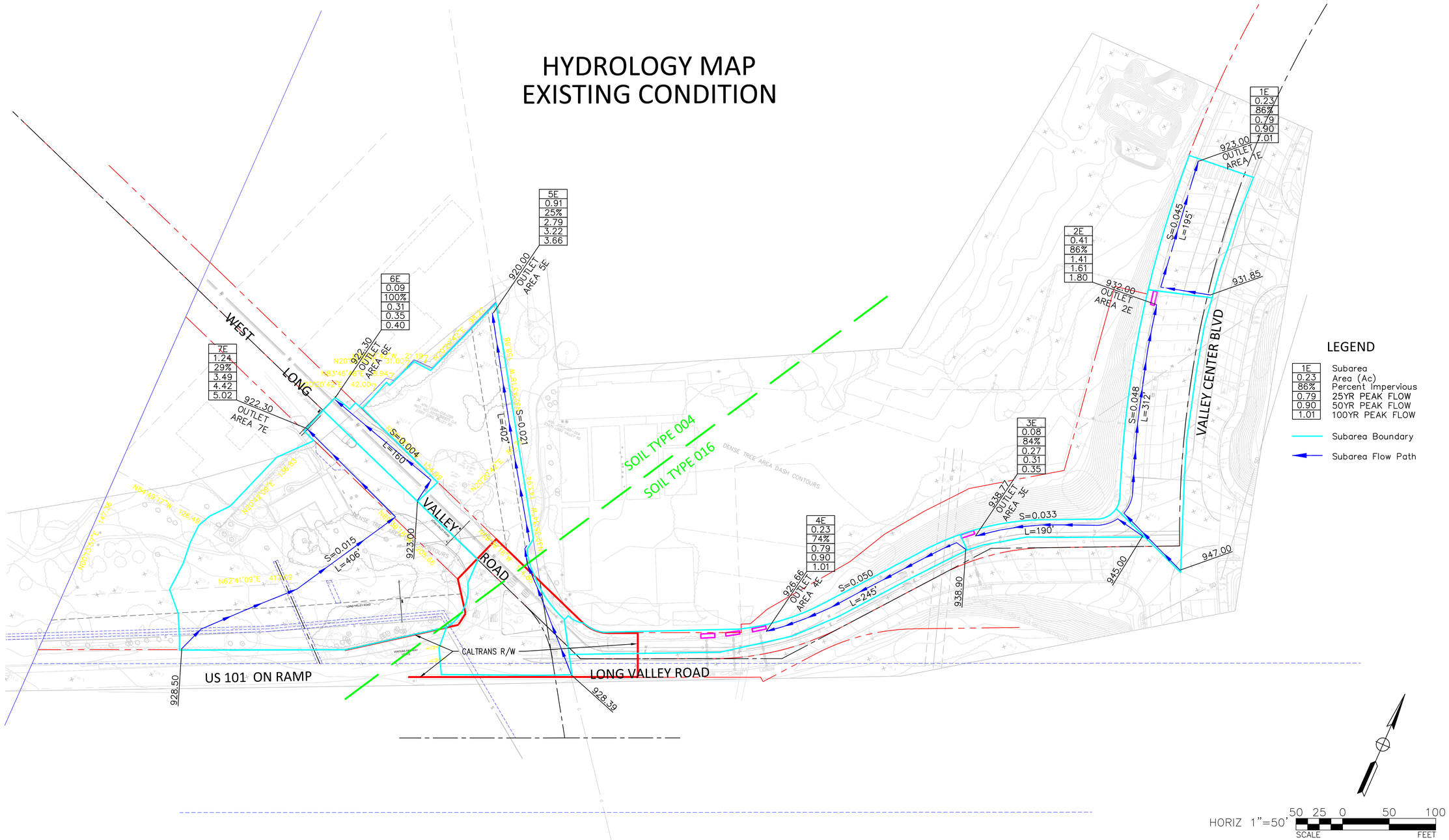
FIGURE 1 - VICINITY MAP



Hidden Hills

Appendix B – Hydrology calculations

HYDROLOGY MAP
EXISTING CONDITION



PLANS PREPARED BY:
WILLDAN
2401 East Katella Ave, Suite 300, Anaheim, California 92806
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UNDER THE SUPERVISION OF
TYRONE PETER, P.E. 81888

REGISTERED PROFESSIONAL ENGINEER
TYRONE PETER
NO. 81888
CIVIL ENGINEER
STATE OF CALIFORNIA

CITY OF HIDDEN HILLS, CALIFORNIA
PUBLIC WORKS DEPARTMENT

PROJECT TITLE:
LONG VALLEY ROAD/
VALLEY CIRCLE BOULEVARD
US 101 ON-RAMP IMPROVEMENTS

PLAN SCALE:
PROFILE SCALE: VERTICAL
HORIZONTAL

DESIGNED BY: MG
DRAWN BY: SM
CHECKED BY: TP/RS

SUBMITTED BY:
CITY ENGINEER
APPROVED BY:
PUBLIC WORKS DIRECTOR DATE

PLAN NO.
SHEET NO. 4 OF

ENGINEERING
CITY OF LOS ANGELES

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DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING

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VERTICAL CONTROL:
HORIZONTAL CONTROL:

SHEET TITLE: LONG VALLEY ROAD EXISTING HYDROLOGY MAP

PROJECT: LONG VALLEY ROAD/VALLEY CIRCLE BOULEVARD/ US 101 ON-RAMP IMROVEMENTS

ADDRESS: HIDDEN HILLS, CA

CITY OF LOS ANGELES
GARY LEE MOORE, P.E.
CITY ENGINEER

ENGINEER:	DESIGNED BY:	DRAWN BY:	CHECKED BY:	APPROVED BY:
DESIGN GROUP				
DATE:				

CIP NO.

INDEX NO.

WORK ORDER NO.

SHEET NAME

SHEET OF SHEETS

Know what's below. Call before you dig.

REVISION DATES (DESIGN STAGE ONLY)

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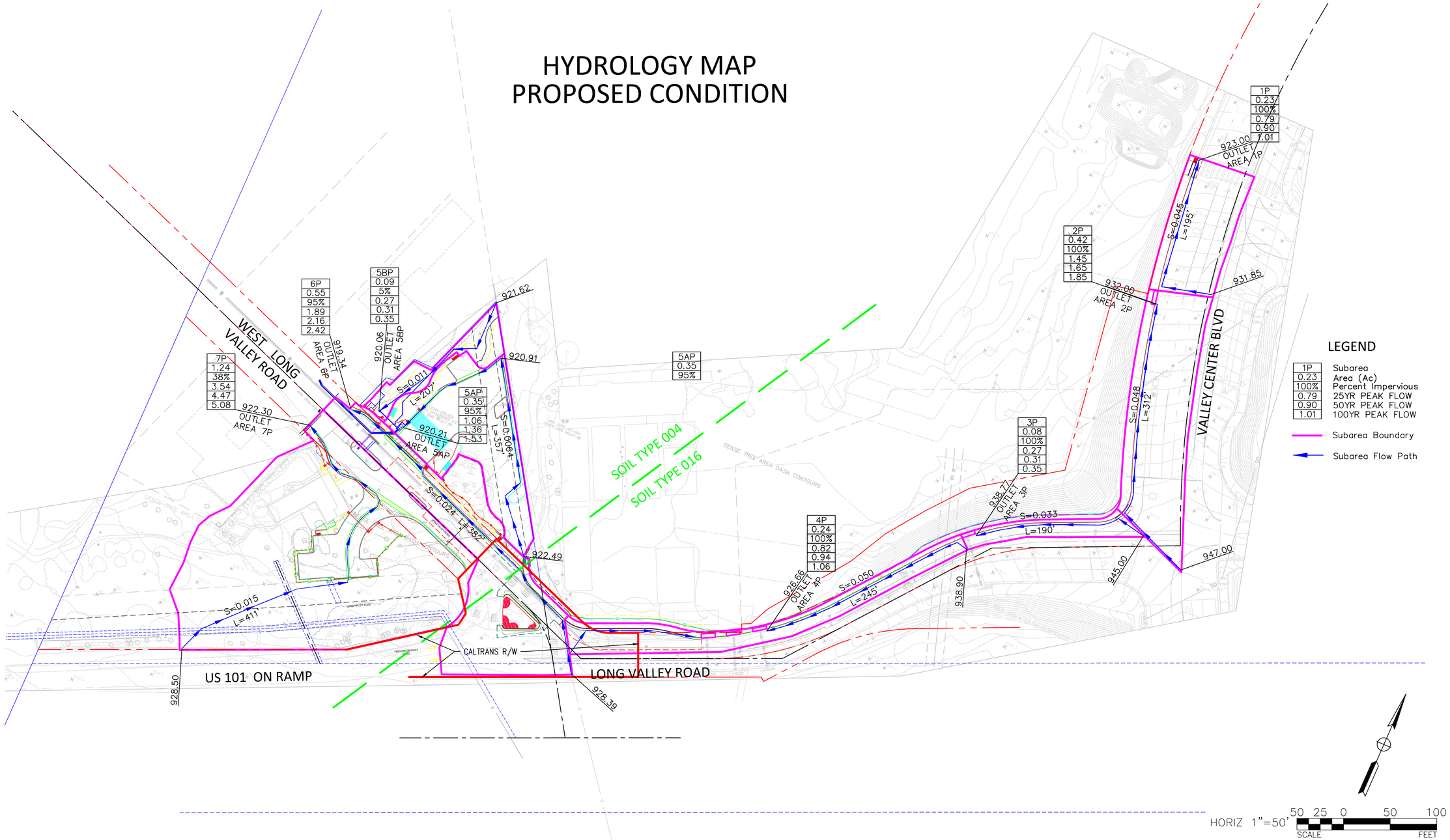
U:\108760 HIDDEN HILLS - LONG VALLEY RD\900-PS&E\901 PLANS\HYDROLOGY MAP EXISTING.DWG 2/3/2021 11:23 AM

HYDROLOGY MAP
PROPOSED CONDITION



LEGEND

1P	Subarea
0.23	Area (Ac)
100%	Percent Impervious
0.79	25YR PEAK FLOW
0.90	50YR PEAK FLOW
1.01	100YR PEAK FLOW

Subarea Boundary

Subarea Flow Path

HORIZ 1"=50' SCALE 50 25 0 50 100 FEET

REVISION DATES (DESIGN STAGE ONLY)

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HORIZONTAL

DESIGNED BY: MG
DRAWN BY: SM
CHECKED BY: TP/RS

SUBMITTED BY:
CITY ENGINEER
APPROVED BY:
PUBLIC WORKS DIRECTOR DATE

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BUREAU OF ENGINEERING
GARY LEE MOORE, P.E.
CITY ENGINEER

NO.	REVISIONS:	DATE:	BY:

VERTICAL CONTROL:
HORIZONTAL CONTROL:

SHEET TITLE: LONG VALLEY ROAD PROPOSED HYDROLOGY MAP

PROJECT: LONG VALLEY ROAD/VALLEY CIRCLE BOULEVARD/ US 101 ON-RAMP IMROVEMENTS

ADDRESS: HIDDEN HILLS, CA

DESIGN GROUP | ENGINEER: | DESIGNED BY: | DRAWN BY: | CHECKED BY: | APPROVED BY: | CITY ENGINEER | DATE:

CIP NO.

INDEX NO.

WORK ORDER NO.

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SHEET OF SHEETS

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Peak Flow Hydrologic Analysis

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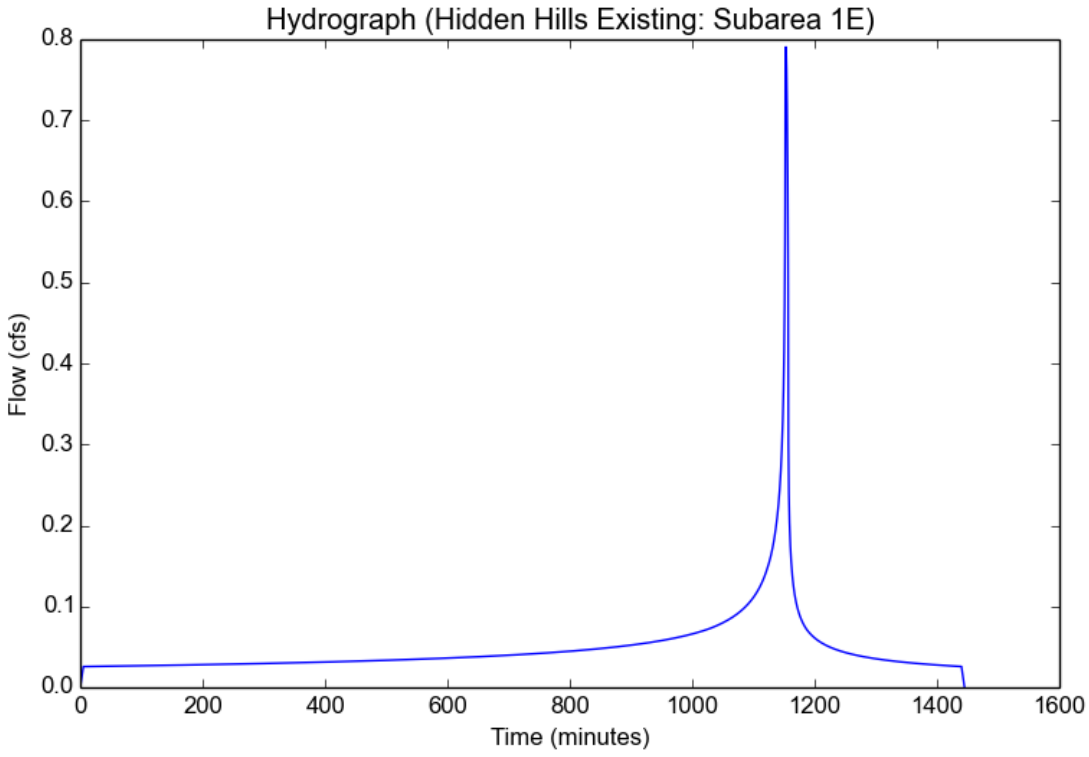
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Hidden Hills Existing
Subarea ID	Subarea 1E
Area (ac)	0.23
Flow Path Length (ft)	195.0
Flow Path Slope (vft/hft)	0.045
50-yr Rainfall Depth (in)	7.3
Percent Impervious	0.86
Soil Type	16
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.4094
Peak Intensity (in/hr)	3.824
Undeveloped Runoff Coefficient (Cu)	0.8916
Developed Runoff Coefficient (Cd)	0.8988
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.7905
Burned Peak Flow Rate (cfs)	0.7905
24-Hr Clear Runoff Volume (ac-ft)	0.0978
24-Hr Clear Runoff Volume (cu-ft)	4261.3191



Peak Flow Hydrologic Analysis

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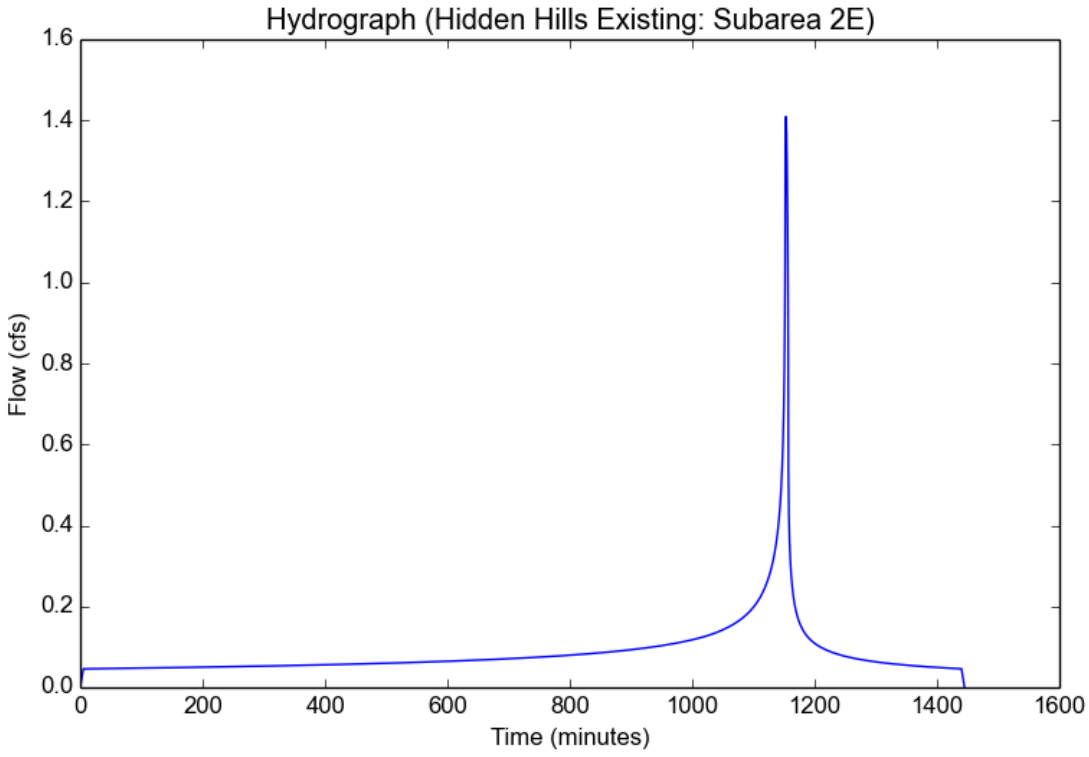
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Hidden Hills Existing
Subarea ID	Subarea 2E
Area (ac)	0.41
Flow Path Length (ft)	312.0
Flow Path Slope (vft/hft)	0.048
50-yr Rainfall Depth (in)	7.3
Percent Impervious	0.86
Soil Type	16
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.4094
Peak Intensity (in/hr)	3.824
Undeveloped Runoff Coefficient (Cu)	0.8916
Developed Runoff Coefficient (Cd)	0.8988
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.4092
Burned Peak Flow Rate (cfs)	1.4092
24-Hr Clear Runoff Volume (ac-ft)	0.1744
24-Hr Clear Runoff Volume (cu-ft)	7596.2646



Peak Flow Hydrologic Analysis

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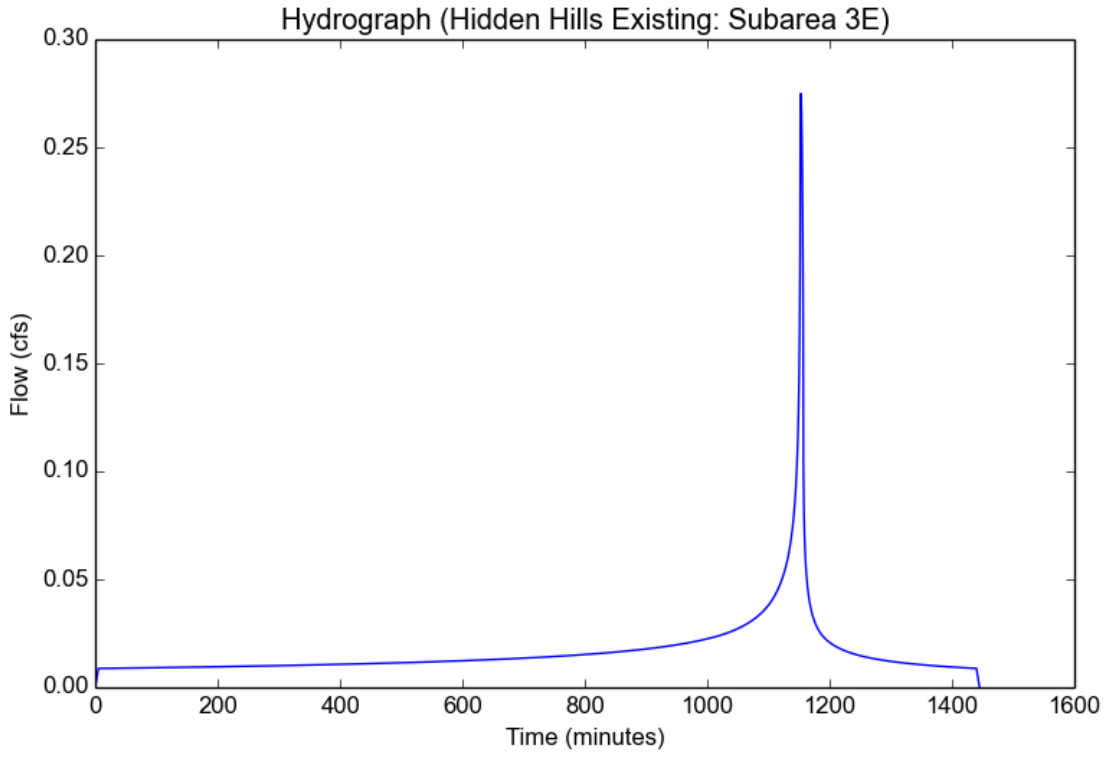
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Hidden Hills Existing
Subarea ID	Subarea 3E
Area (ac)	0.08
Flow Path Length (ft)	190.0
Flow Path Slope (vft/hft)	0.033
50-yr Rainfall Depth (in)	7.3
Percent Impervious	0.84
Soil Type	16
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.4094
Peak Intensity (in/hr)	3.824
Undeveloped Runoff Coefficient (Cu)	0.8916
Developed Runoff Coefficient (Cd)	0.8987
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.2749
Burned Peak Flow Rate (cfs)	0.2749
24-Hr Clear Runoff Volume (ac-ft)	0.0334
24-Hr Clear Runoff Volume (cu-ft)	1456.6095



Peak Flow Hydrologic Analysis

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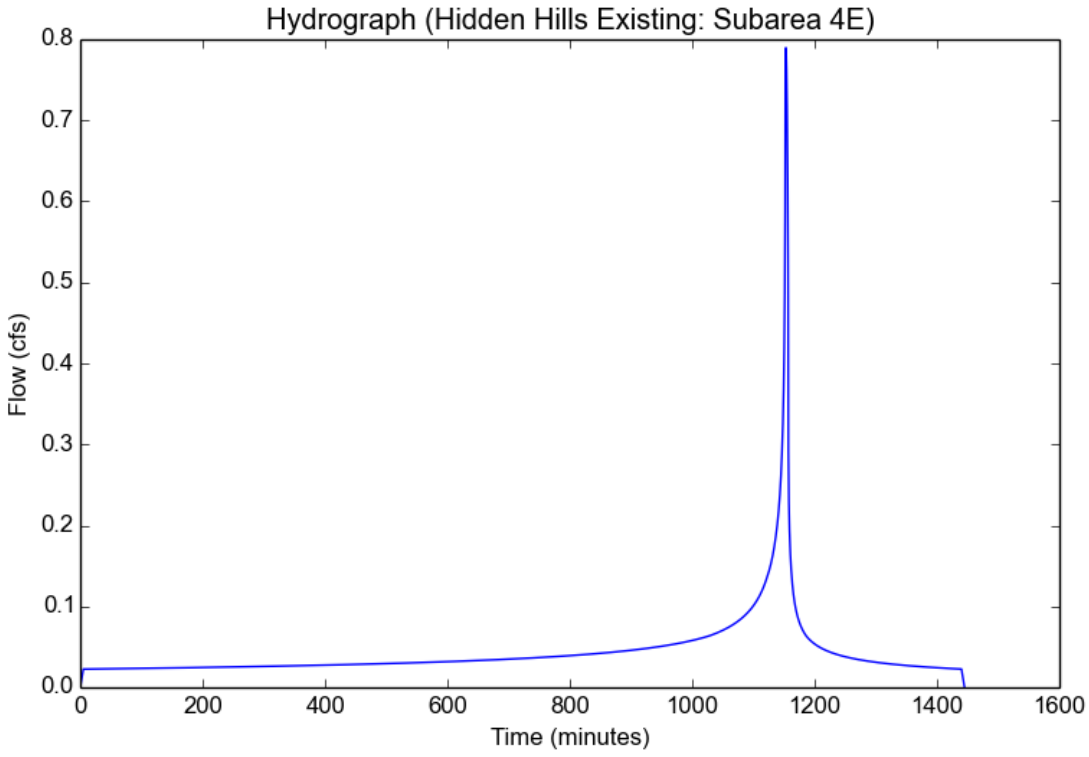
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Hidden Hills Existing
Subarea ID	Subarea 4E
Area (ac)	0.23
Flow Path Length (ft)	245.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	7.3
Percent Impervious	0.74
Soil Type	16
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.4094
Peak Intensity (in/hr)	3.824
Undeveloped Runoff Coefficient (Cu)	0.8916
Developed Runoff Coefficient (Cd)	0.8978
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.7897
Burned Peak Flow Rate (cfs)	0.7897
24-Hr Clear Runoff Volume (ac-ft)	0.0877
24-Hr Clear Runoff Volume (cu-ft)	3819.9187



Peak Flow Hydrologic Analysis

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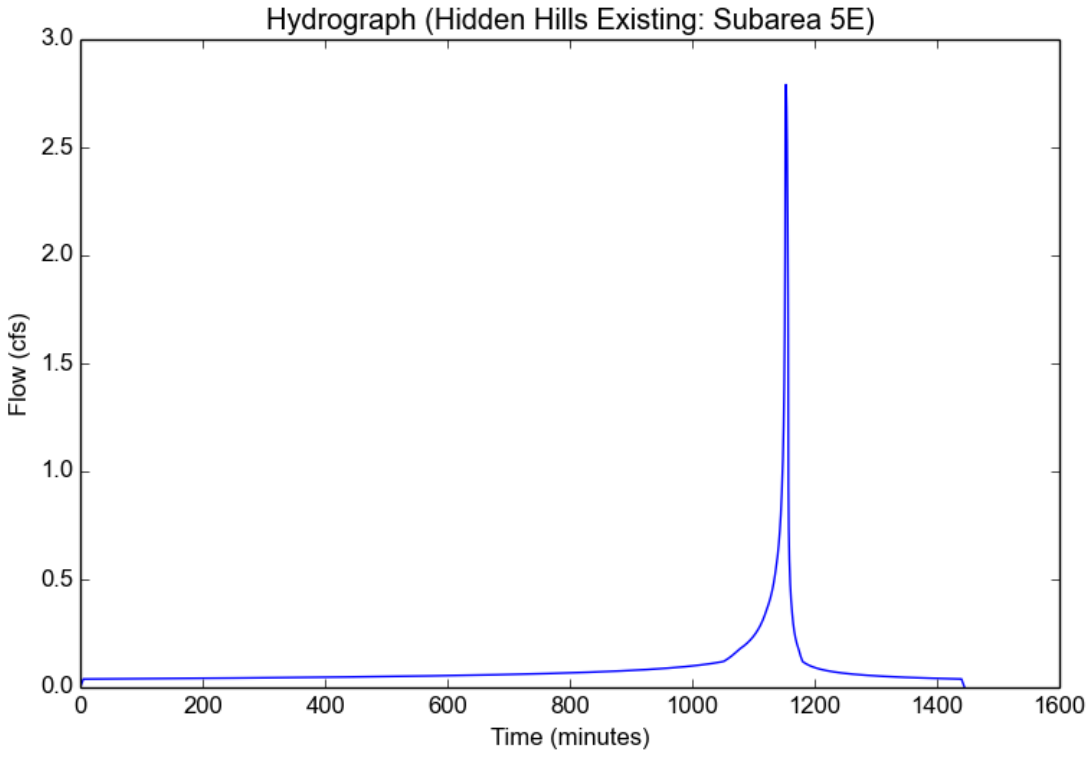
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Hidden Hills Existing
Subarea ID	Subarea 5E
Area (ac)	0.91
Flow Path Length (ft)	402.0
Flow Path Slope (vft/hft)	0.021
50-yr Rainfall Depth (in)	7.3
Percent Impervious	0.25
Soil Type	4
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.4094
Peak Intensity (in/hr)	3.824
Undeveloped Runoff Coefficient (Cu)	0.7691
Developed Runoff Coefficient (Cd)	0.8018
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.7903
Burned Peak Flow Rate (cfs)	2.7903
24-Hr Clear Runoff Volume (ac-ft)	0.179
24-Hr Clear Runoff Volume (cu-ft)	7797.0909



Peak Flow Hydrologic Analysis

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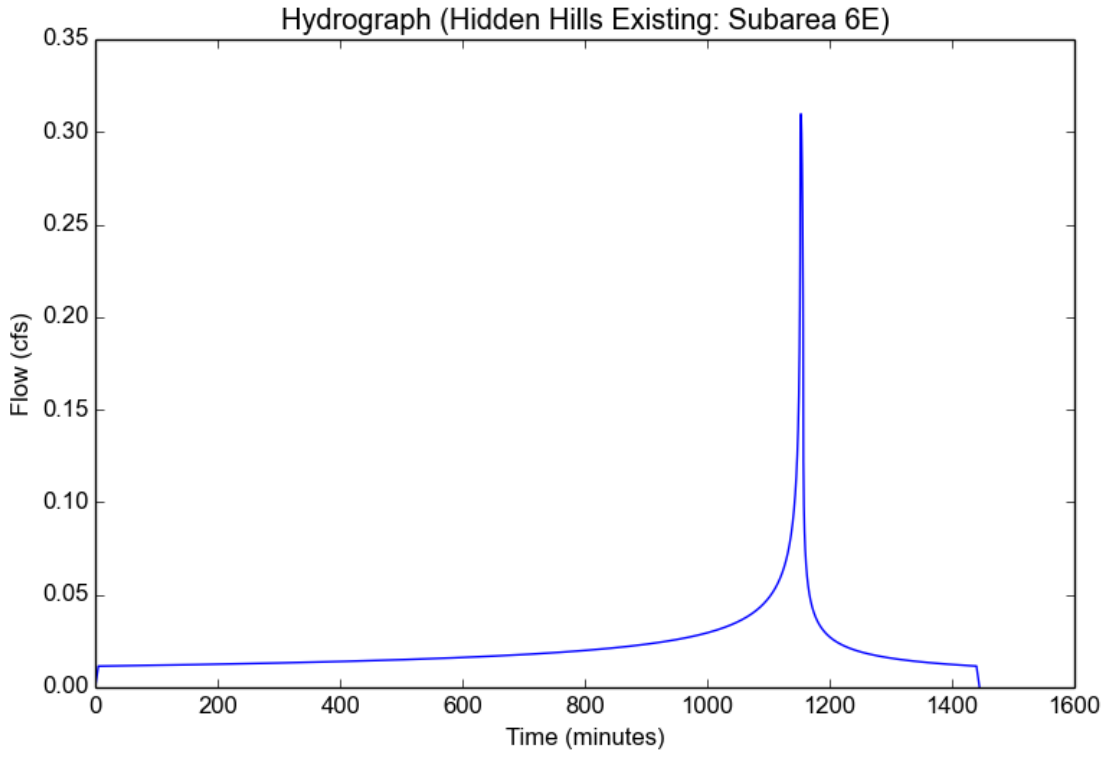
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Hidden Hills Existing
Subarea ID	Subarea 6E
Area (ac)	0.09
Flow Path Length (ft)	160.0
Flow Path Slope (vft/hft)	0.004
50-yr Rainfall Depth (in)	7.3
Percent Impervious	1.0
Soil Type	4
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.4094
Peak Intensity (in/hr)	3.824
Undeveloped Runoff Coefficient (Cu)	0.7691
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.3097
Burned Peak Flow Rate (cfs)	0.3097
24-Hr Clear Runoff Volume (ac-ft)	0.0429
24-Hr Clear Runoff Volume (cu-ft)	1868.9816



Peak Flow Hydrologic Analysis

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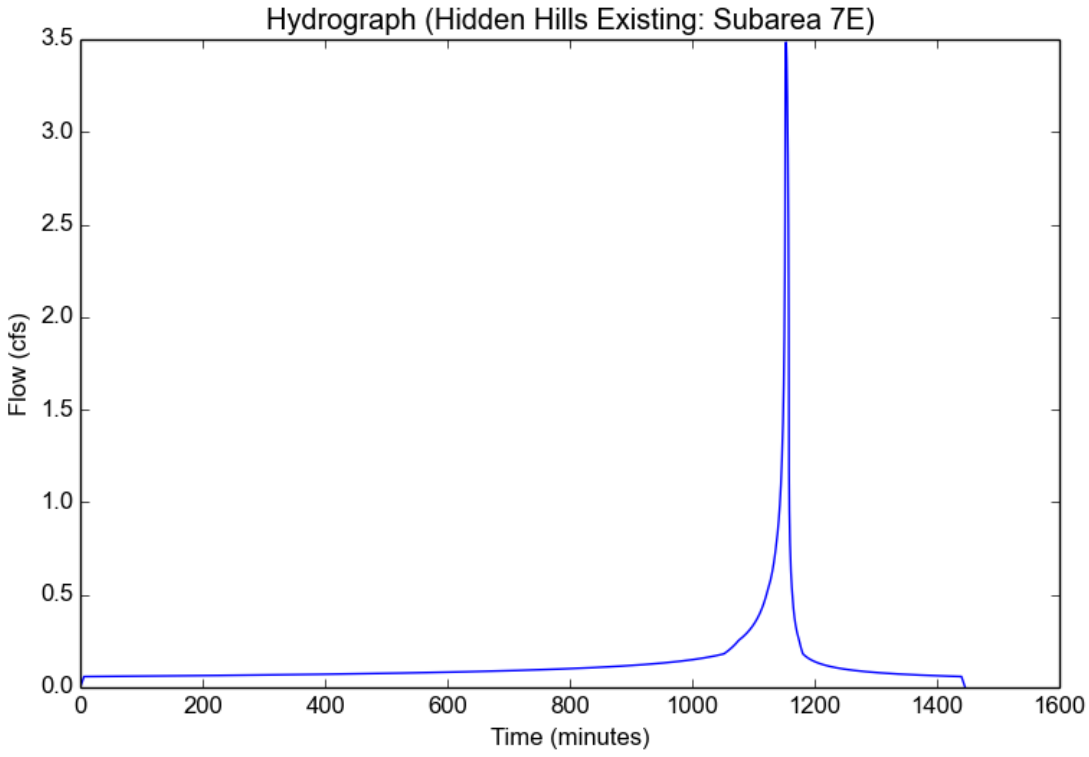
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Hidden Hills Existing
Subarea ID	Subarea 7E
Area (ac)	1.24
Flow Path Length (ft)	406.0
Flow Path Slope (vft/hft)	0.015
50-yr Rainfall Depth (in)	7.3
Percent Impervious	0.29
Soil Type	4
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.4094
Peak Intensity (in/hr)	3.51
Undeveloped Runoff Coefficient (Cu)	0.7602
Developed Runoff Coefficient (Cd)	0.8007
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	3.4851
Burned Peak Flow Rate (cfs)	3.4851
24-Hr Clear Runoff Volume (ac-ft)	0.2624
24-Hr Clear Runoff Volume (cu-ft)	11429.6971



Peak Flow Hydrologic Analysis

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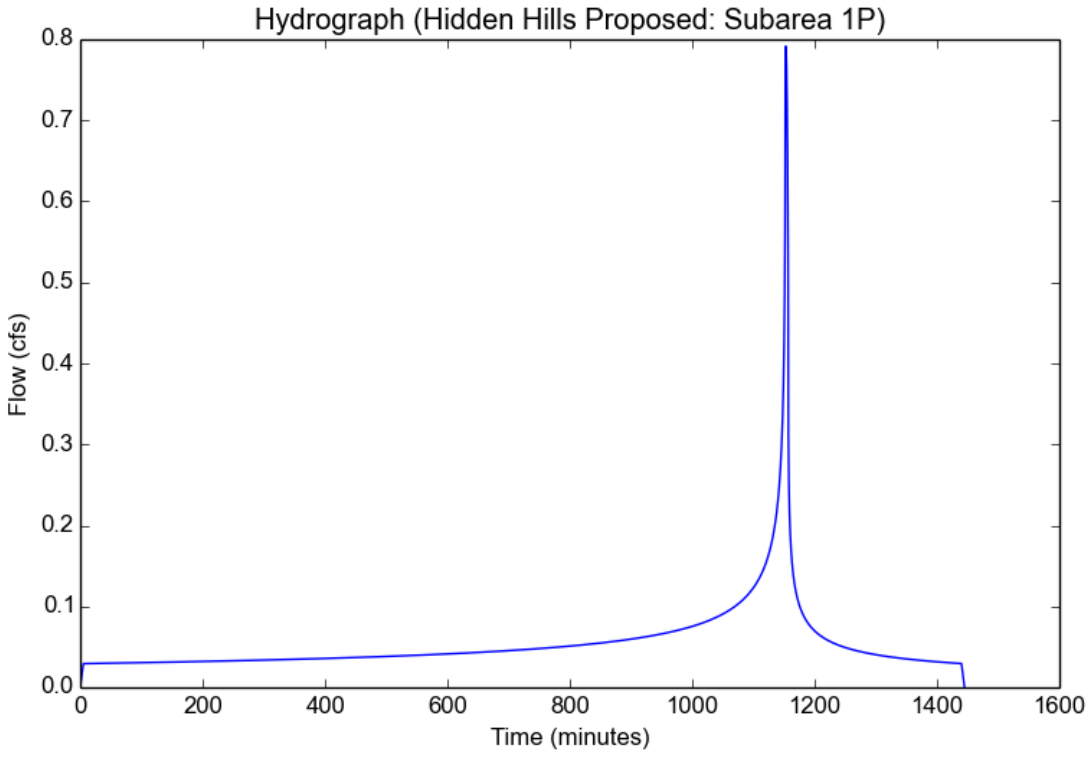
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Hidden Hills Proposed
Subarea ID	Subarea 1P
Area (ac)	0.23
Flow Path Length (ft)	195.0
Flow Path Slope (vft/hft)	0.045
50-yr Rainfall Depth (in)	7.3
Percent Impervious	1.0
Soil Type	16
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.4094
Peak Intensity (in/hr)	3.824
Undeveloped Runoff Coefficient (Cu)	0.8916
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.7916
Burned Peak Flow Rate (cfs)	0.7916
24-Hr Clear Runoff Volume (ac-ft)	0.1096
24-Hr Clear Runoff Volume (cu-ft)	4776.2864



Peak Flow Hydrologic Analysis

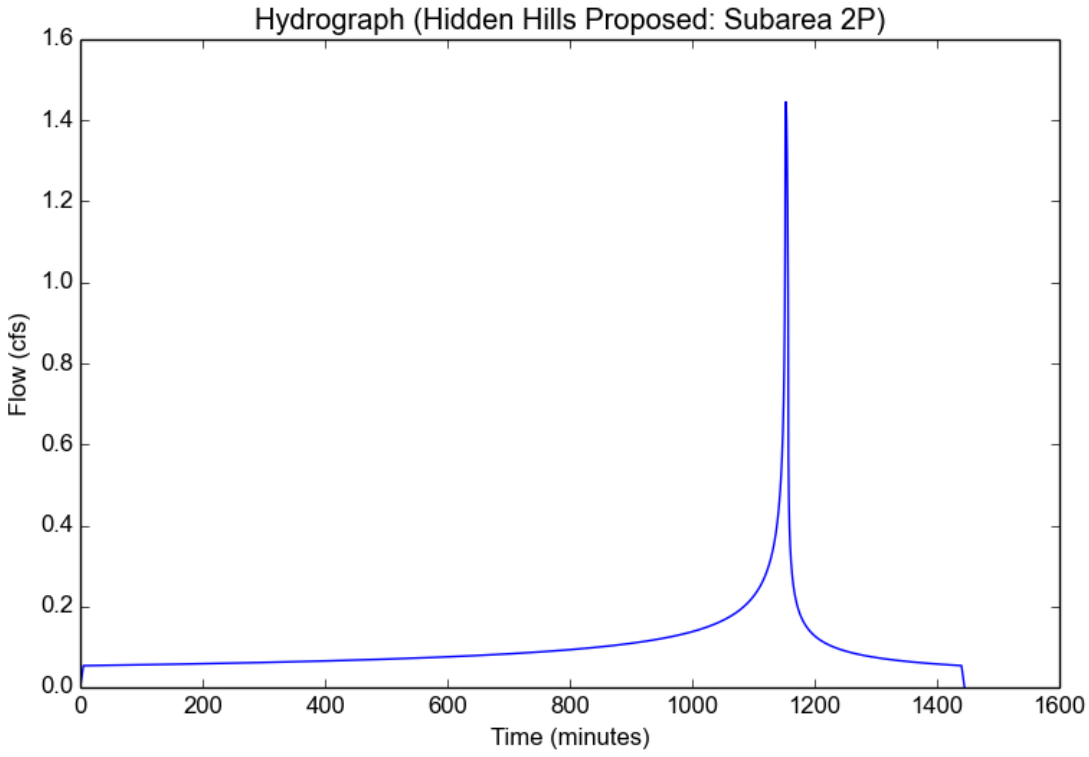
File location: C:/Users/rstein/Desktop/TEMP-Meeting/Hidden Hills/Hydrology/Hidden Hills Proposed - Subarea 2P.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Hidden Hills Proposed
Subarea ID	Subarea 2P
Area (ac)	0.42
Flow Path Length (ft)	312.0
Flow Path Slope (vft/hft)	0.045
50-yr Rainfall Depth (in)	7.3
Percent Impervious	1.0
Soil Type	16
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.4094
Peak Intensity (in/hr)	3.824
Undeveloped Runoff Coefficient (Cu)	0.8916
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.4455
Burned Peak Flow Rate (cfs)	1.4455
24-Hr Clear Runoff Volume (ac-ft)	0.2002
24-Hr Clear Runoff Volume (cu-ft)	8721.9143



Peak Flow Hydrologic Analysis

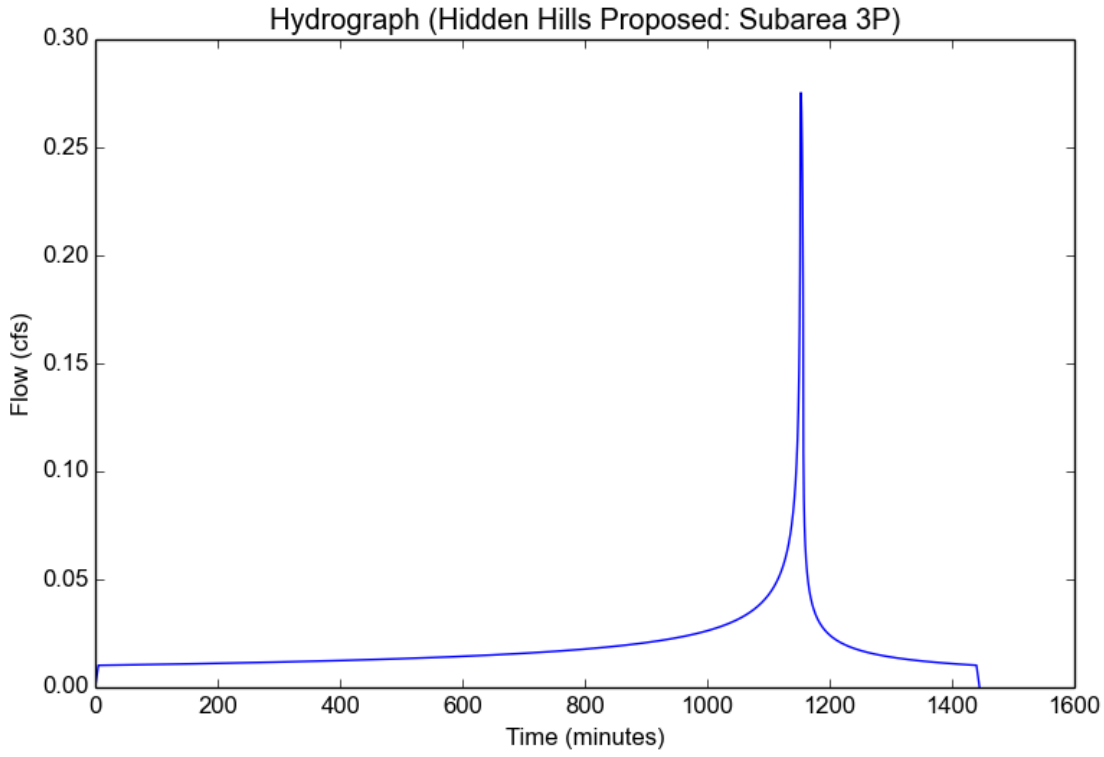
File location: //wgi-anheng-nas.wgc.com/Engineering/108760 Hidden Hills - Long Valley Rd/600-Hydraulics and Hydrology/602- Hydrology/602.3-Calcs/H
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Hidden Hills Proposed
Subarea ID	Subarea 3P
Area (ac)	0.08
Flow Path Length (ft)	190.0
Flow Path Slope (vft/hft)	0.033
50-yr Rainfall Depth (in)	7.3
Percent Impervious	1.0
Soil Type	16
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.4094
Peak Intensity (in/hr)	3.824
Undeveloped Runoff Coefficient (Cu)	0.8916
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.2753
Burned Peak Flow Rate (cfs)	0.2753
24-Hr Clear Runoff Volume (ac-ft)	0.0381
24-Hr Clear Runoff Volume (cu-ft)	1661.317



Peak Flow Hydrologic Analysis

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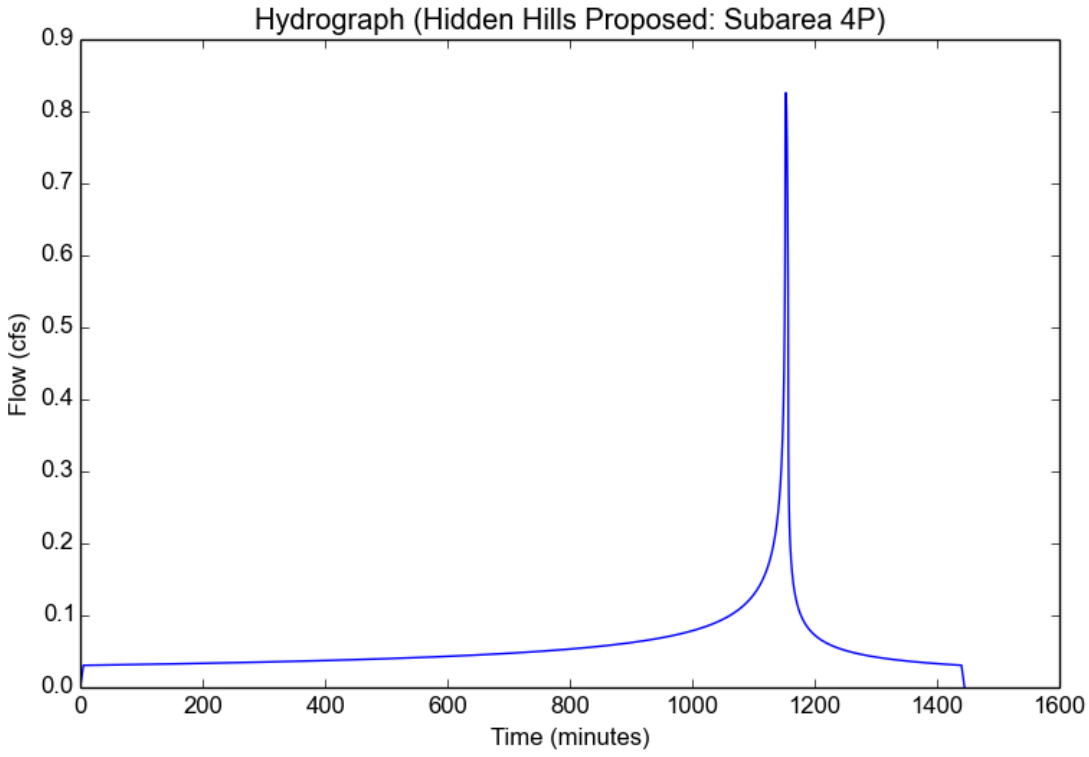
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Hidden Hills Proposed
Subarea ID	Subarea 4P
Area (ac)	0.24
Flow Path Length (ft)	245.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	7.3
Percent Impervious	1.0
Soil Type	16
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.4094
Peak Intensity (in/hr)	3.824
Undeveloped Runoff Coefficient (Cu)	0.8916
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.826
Burned Peak Flow Rate (cfs)	0.826
24-Hr Clear Runoff Volume (ac-ft)	0.1144
24-Hr Clear Runoff Volume (cu-ft)	4983.951



Peak Flow Hydrologic Analysis

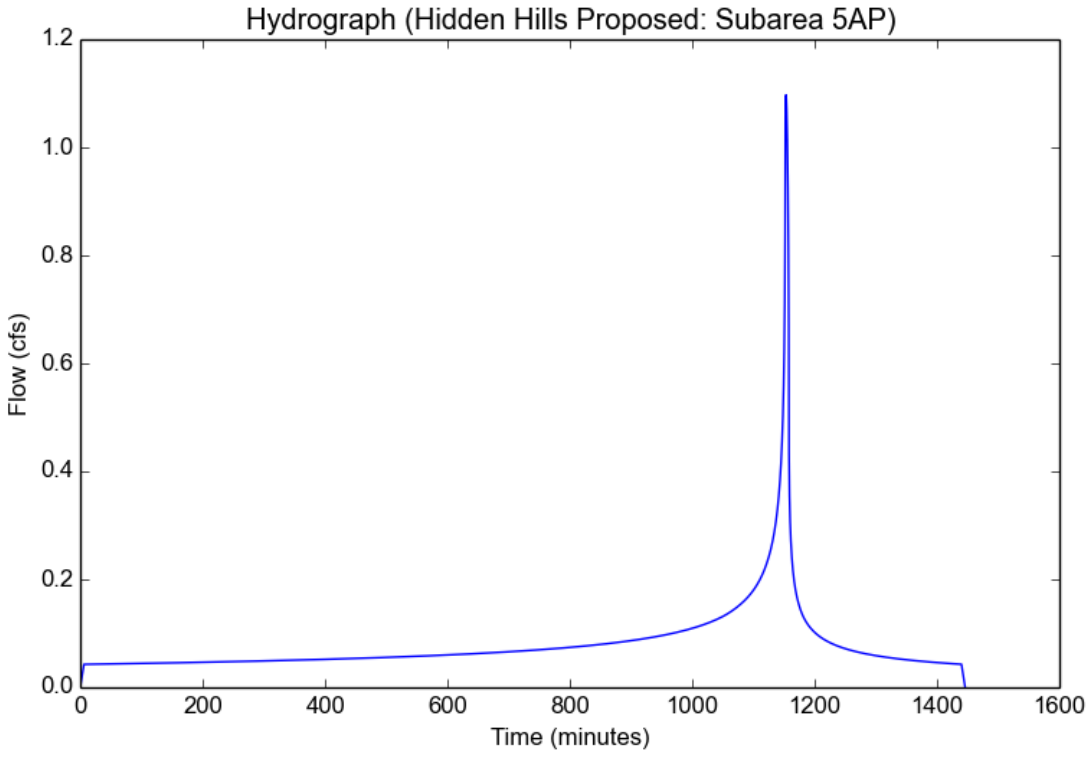
File location: U:/108760 Hidden Hills - Long Valley Rd/600-Hydraulics and Hydrology/602- Hydrology/602.3-Calcs/Hidden Hills Proposed - Subarea 5AP.
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Hidden Hills Proposed
Subarea ID	Subarea 5AP
Area (ac)	0.35
Flow Path Length (ft)	357.0
Flow Path Slope (vft/hft)	0.0064
50-yr Rainfall Depth (in)	7.3
Percent Impervious	0.95
Soil Type	4
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.4094
Peak Intensity (in/hr)	3.51
Undeveloped Runoff Coefficient (Cu)	0.7602
Developed Runoff Coefficient (Cd)	0.893
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	1.0971
Burned Peak Flow Rate (cfs)	1.0971
24-Hr Clear Runoff Volume (ac-ft)	0.1603
24-Hr Clear Runoff Volume (cu-ft)	6983.6052



Peak Flow Hydrologic Analysis

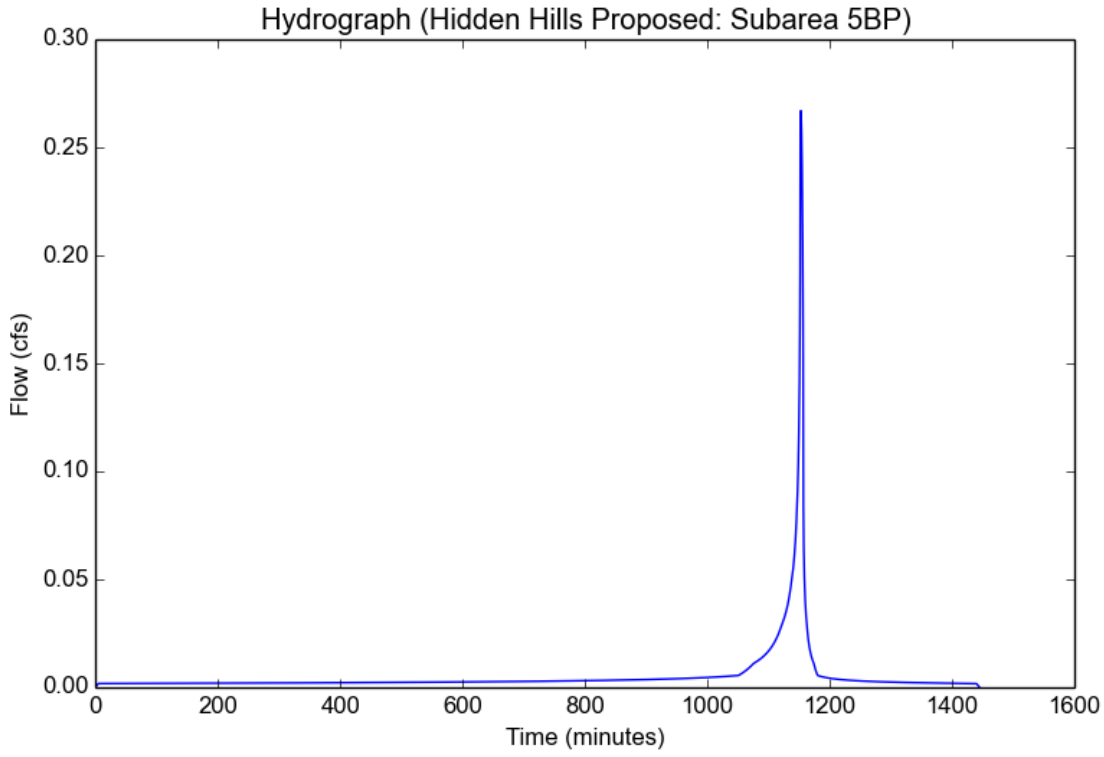
File location: U:/108760 Hidden Hills - Long Valley Rd/600-Hydraulics and Hydrology/602- Hydrology/602.3-Calcs/Hidden Hills Proposed - Subarea 5BP.
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Hidden Hills Proposed
Subarea ID	Subarea 5BP
Area (ac)	0.09
Flow Path Length (ft)	207.0
Flow Path Slope (vft/hft)	0.0075
50-yr Rainfall Depth (in)	7.3
Percent Impervious	0.05
Soil Type	4
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.4094
Peak Intensity (in/hr)	3.824
Undeveloped Runoff Coefficient (Cu)	0.7691
Developed Runoff Coefficient (Cd)	0.7757
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.267
Burned Peak Flow Rate (cfs)	0.267
24-Hr Clear Runoff Volume (ac-ft)	0.011
24-Hr Clear Runoff Volume (cu-ft)	478.3833



Peak Flow Hydrologic Analysis

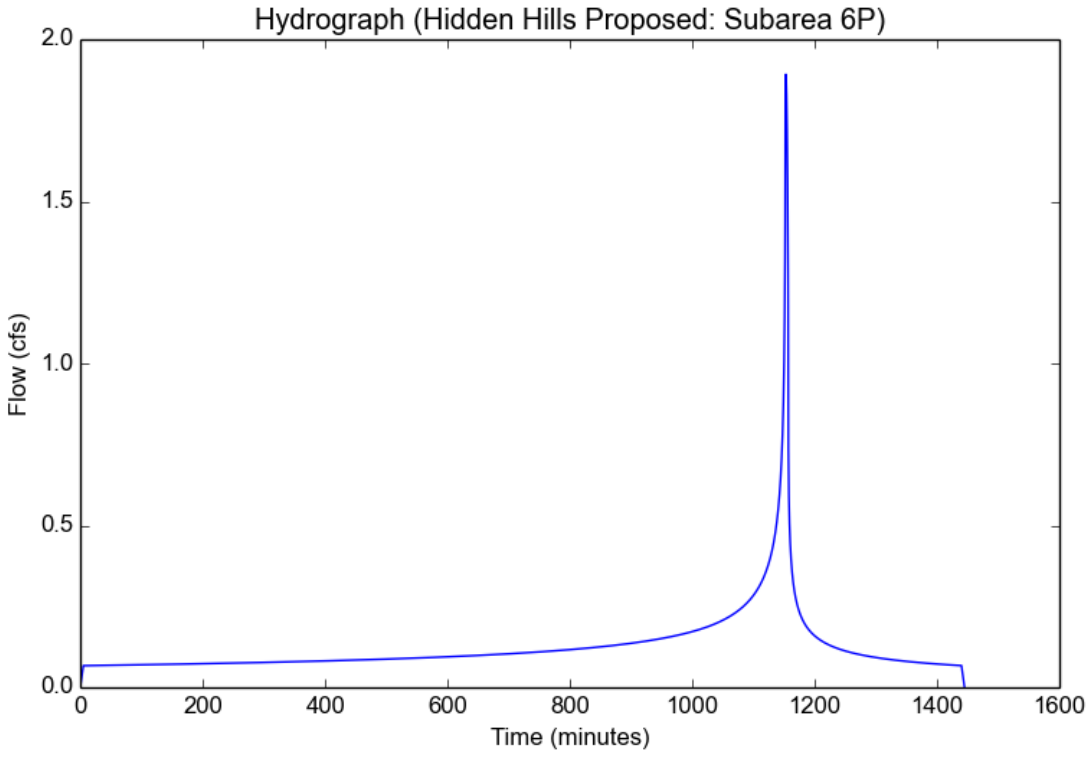
File location: C:/Users/rstein/Desktop/TEMP-Meeting/Hidden Hills/Hydrology/Hidden Hills Proposed - Subarea 6P.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Hidden Hills Proposed
Subarea ID	Subarea 6P
Area (ac)	0.55
Flow Path Length (ft)	382.0
Flow Path Slope (vft/hft)	0.024
50-yr Rainfall Depth (in)	7.3
Percent Impervious	0.95
Soil Type	16
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.4094
Peak Intensity (in/hr)	3.824
Undeveloped Runoff Coefficient (Cu)	0.8916
Developed Runoff Coefficient (Cd)	0.8996
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.892
Burned Peak Flow Rate (cfs)	1.892
24-Hr Clear Runoff Volume (ac-ft)	0.2521
24-Hr Clear Runoff Volume (cu-ft)	10981.7532



Peak Flow Hydrologic Analysis

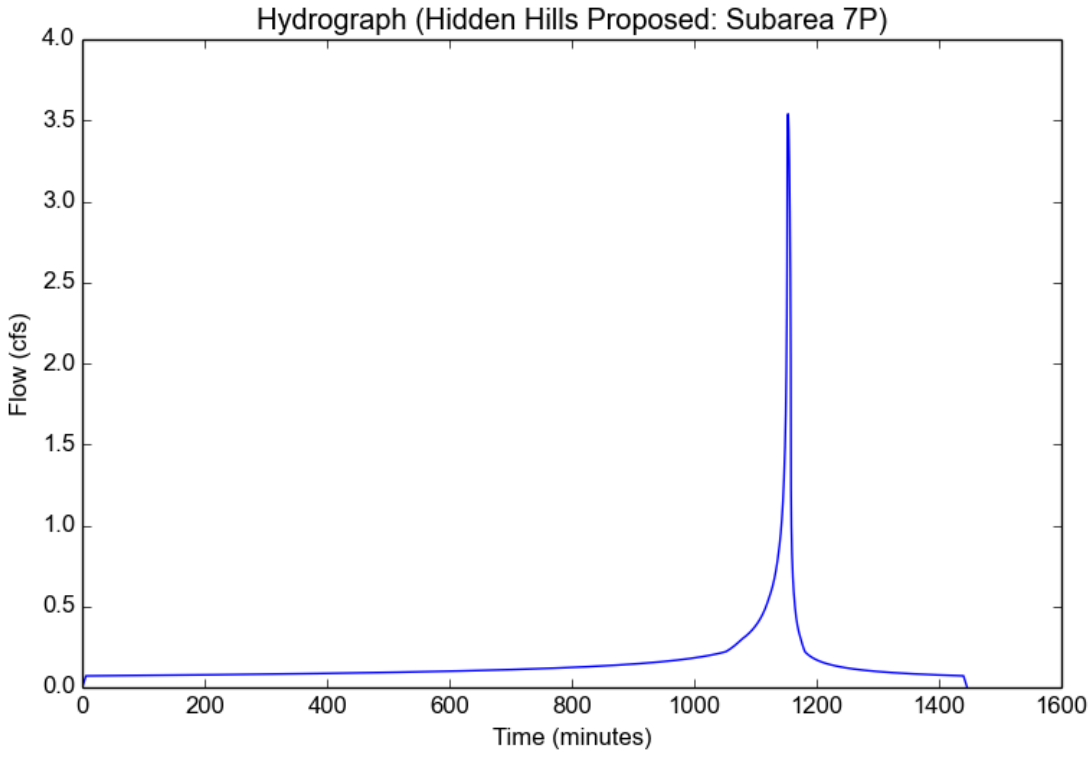
File location: //wgi-anheng-nas.wgc.com/Engineering/108760 Hidden Hills - Long Valley Rd/600-Hydraulics and Hydrology/602- Hydrology/602.3-Calcs/H
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Hidden Hills Proposed
Subarea ID	Subarea 7P
Area (ac)	1.24
Flow Path Length (ft)	411.0
Flow Path Slope (vft/hft)	0.015
50-yr Rainfall Depth (in)	7.3
Percent Impervious	0.38
Soil Type	4
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.4094
Peak Intensity (in/hr)	3.51
Undeveloped Runoff Coefficient (Cu)	0.7602
Developed Runoff Coefficient (Cd)	0.8133
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	3.5399
Burned Peak Flow Rate (cfs)	3.5399
24-Hr Clear Runoff Volume (ac-ft)	0.3041
24-Hr Clear Runoff Volume (cu-ft)	13244.9997



Appendix C – Hydraulic calculations

Worksheet for Existing North Side inlet Existing Q=0.34cfs

Project Description

Solve For	Efficiency

Input Data

Discharge	0.34	ft³/s
Slope	0.00500	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.08	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Curb Opening Length	5.00	ft
Local Depression	2.00	in
Local Depression Width	2.00	ft

Results

Efficiency	100.00	%
Intercepted Flow	0.34	ft³/s
Bypass Flow	0.00	ft³/s
Spread	2.36	ft
Depth	0.17	ft
Flow Area	0.18	ft²
Gutter Depression	0.13	ft
Total Depression	0.29	ft
Velocity	1.87	ft/s
Equivalent Cross Slope	0.16621	ft/ft
Length Factor	1.62	
Total Interception Length	3.09	ft

Worksheet for North Inlet 24" pipe 1.59cfs

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Diameter	2.00	ft
Discharge	1.59	ft³/s

Results

Normal Depth	0.43	ft
Flow Area	0.49	ft²
Wetted Perimeter	1.92	ft
Hydraulic Radius	0.25	ft
Top Width	1.64	ft
Critical Depth	0.44	ft
Percent Full	21.3	%
Critical Slope	0.00453	ft/ft
Velocity	3.25	ft/s
Velocity Head	0.16	ft
Specific Energy	0.59	ft
Froude Number	1.05	
Maximum Discharge	17.21	ft³/s
Discharge Full	16.00	ft³/s
Slope Full	0.00005	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	21.29	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.43	ft
Critical Depth	0.44	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00453	ft/ft

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, May 14 2020

6-INCH PVC

Circular

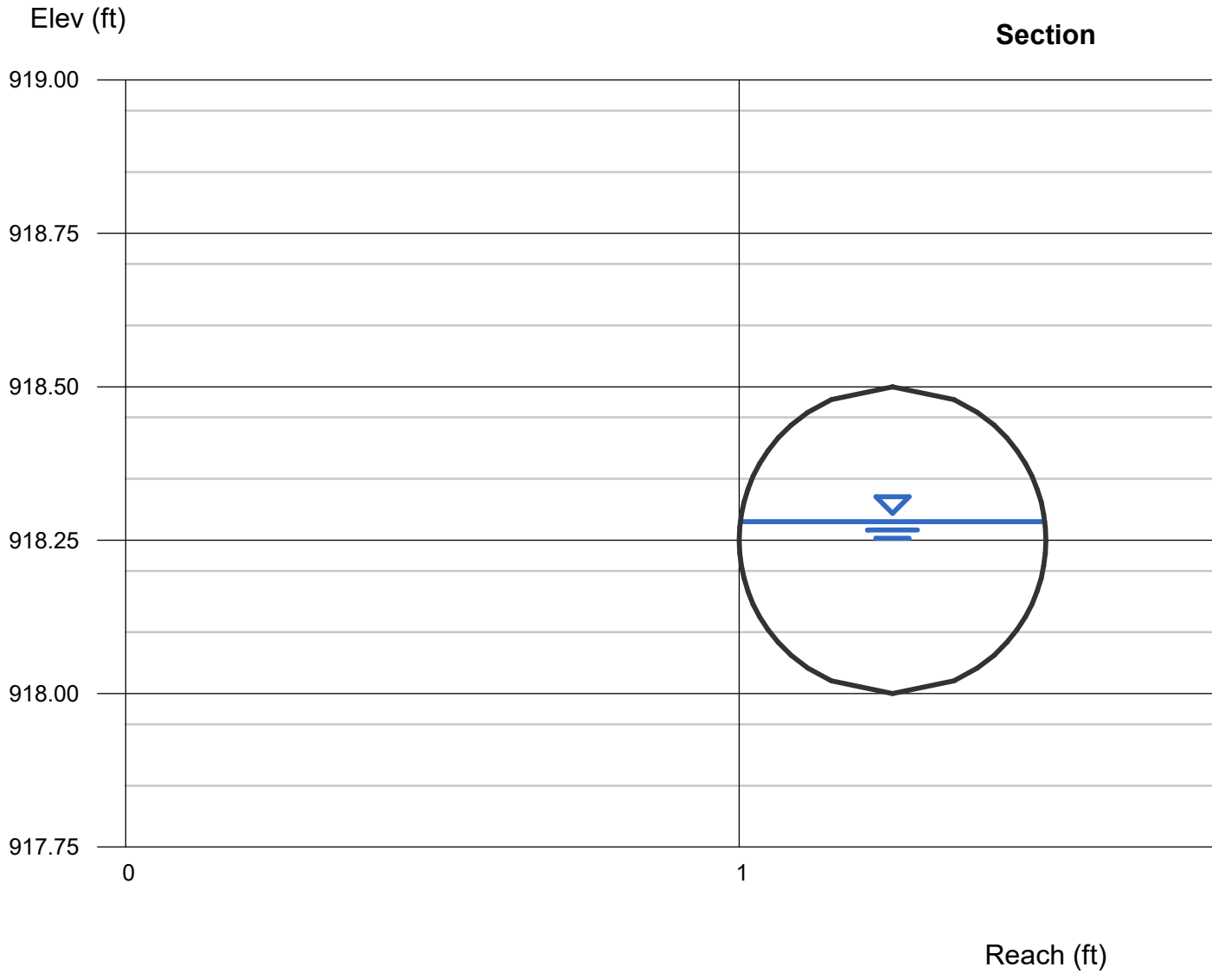
Diameter (ft)	= 0.50
Invert Elev (ft)	= 918.00
Slope (%)	= 0.50
N-Value	= 0.011

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.27

Highlighted

Depth (ft)	= 0.28
Q (cfs)	= 0.270
Area (sqft)	= 0.11
Velocity (ft/s)	= 2.38
Wetted Perim (ft)	= 0.85
Crit Depth, Yc (ft)	= 0.27
Top Width (ft)	= 0.50
EGL (ft)	= 0.37



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, May 14 2020

12-INCH HP STORM

Circular

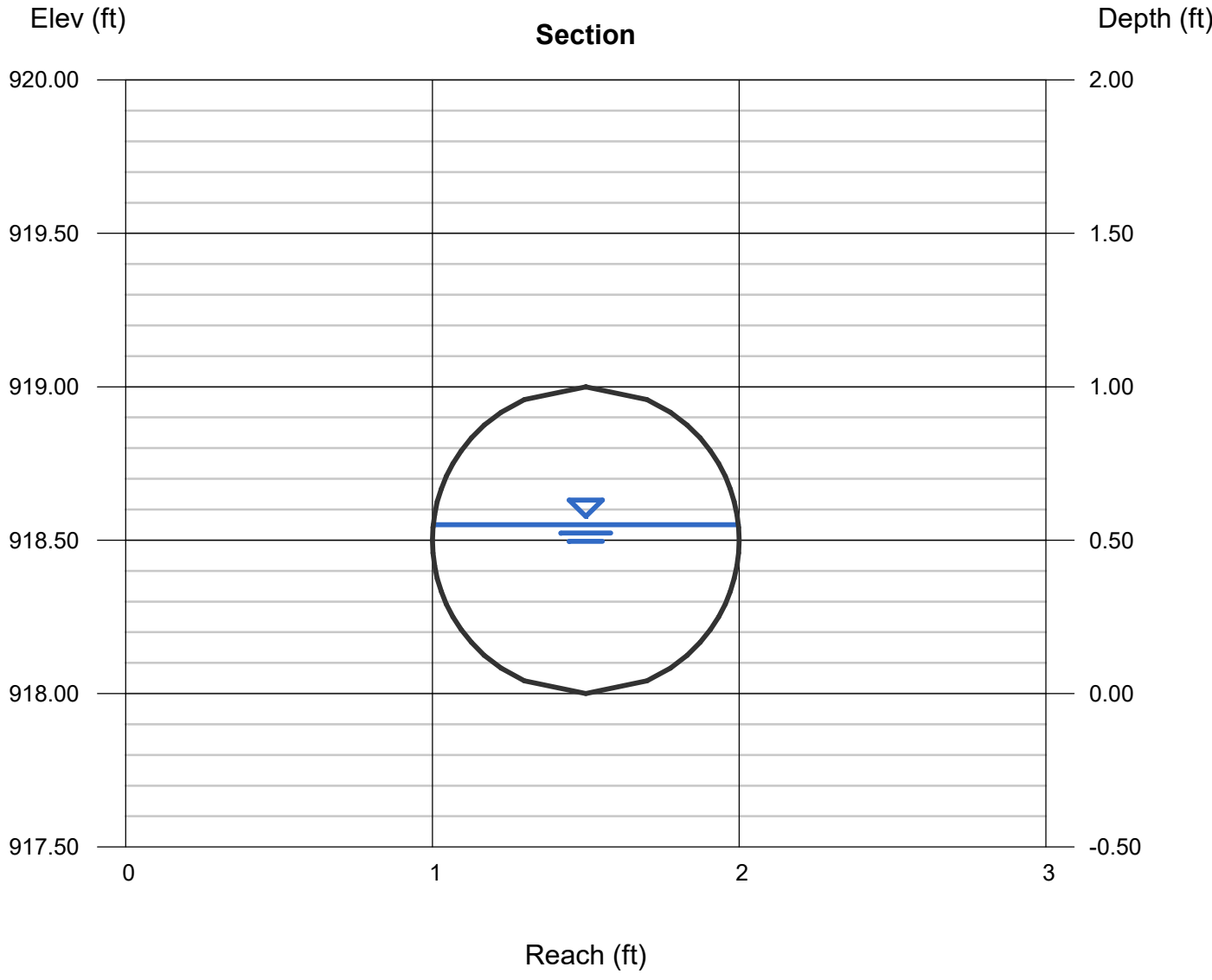
Diameter (ft)	= 1.00
Invert Elev (ft)	= 918.00
Slope (%)	= 0.49
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.43

Highlighted

Depth (ft)	= 0.55
Q (cfs)	= 1.430
Area (sqft)	= 0.44
Velocity (ft/s)	= 3.22
Wetted Perim (ft)	= 1.67
Crit Depth, Yc (ft)	= 0.51
Top Width (ft)	= 0.99
EGL (ft)	= 0.71



Appendix D – Proposed Plans