PRELIMINARY HYDROLOGY STUDY
VESTING TENTATIVE TRACT MAP No. 83705
8601 Mission Drive
Rosemead, California

Project Address:

8601 Mission Drive
Rosemead, California 91770

Prepared For:

Mission Villas, LLC.
Attn: Mitch Gardner
11766 Wilshire Boulevard, Suite 820
Los Angeles, CA 90025
(310) 582-1991

Prepared By:

C&V Consulting Inc.
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Irvine, CA 92618
Ryan Bittner, P.E.
Contact: Marco Midence
Project Manager
(949) 916-3800

Prepared:
February 2022

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Preliminary Hydrology Study
for
Vesting Tentative Tract Map No. 83705
Mission Villas Rosemead

ACKNOWLEDGEMENT AND SIGNATURE PAGE

This Preliminary Hydrology Study was prepared by C&V Consulting, Inc. under the supervision of Ryan J. Bittner, P.E.

_____ _____

Ryan J. Bittner, R.C.E. 68167 Date
Principal, C&V Consulting, Inc.

1.0 SITE DESCRIPTION:

The proposed development encompasses three (3) parcels consisting of approximately 3.44 gross acres and 3.38 net acres. The site is bounded by existing residential lots to the north and the east, Mission Drive to the south, and power lines owned by Southern California Edison to the west.

2.0 PURPOSE OF STUDY:

The preliminary hydrology study will determine the amount of stormwater runoff generated from the project site in the existing and proposed conditions. This study will anticipate whether detention or other peak flow mitigation methods will be required by comparing the proposed and existing condition peak flow rates for the 25, 50 and 100-year storm events.

3.0 EXISTING CONDITIONS:

All three parcels are currently a vacant lot. Besides two small service roads in southern and eastern portions of the site the site is all pervious coverage. The site is surrounded by alternating masonry block wall, wooden fence, and chain link fence around the entire property. There is existing public sidewalk and driveway entrances along Mission Drive. There are no existing storm drain facilities located on the site and no storm drain facilities located in the adjacent portion of Mission Drive along the project frontage.

The existing drainage pattern of the site consists of one drainage area labeled XA1 on the Pre-Existing condition hydrology map located in Appendix A. The entire site sheet flows over the vacant land in a southerly direction. Stormwater appears to simply sheet flow over existing driveway entrances and enters Mission Road. Once stormwater enters Mission Rd. it flows in a southeasterly direction and enters a Los Angeles County Flood Control District (LACFCD) owned catch basin approximately 500' downstream of our site. This catch basin is connected to a LACFCD 30" RCP (LACFCD Project RDD 250) which flows into the Eaton Wash channel then into the Rio Hondo Channel. The Rio Hondo Channel then connects to the Los Angeles River then ultimately the Pacific Ocean. The existing area was determined to be 98.5% pervious based on the ALTA/Topographic Survey prepared by C&V Consulting, Inc. dated October 2021.

Since all the existing onsite stormwater runoff ultimately reaches one location, the existing site was analyzed as one drainage area (XA1) to approximately quantify the runoff based on the longest hydraulic path from the most remote high point to low point.

Refer to the "Existing Conditions Hydrology Map" located within Appendix A of this study for more information.

4.0 PROPOSED CONDITIONS:

The proposed project consists of 8 duplex units and 29 single family homes over approximately 3.38 acres. The proposed development includes drive aisles, parking, landscaping, walkways, patios, and common open space areas. The site will be graded to collect runoff at one low point to control the amount of imported fill during grading and maintaining the existing site drainage pattern. The proposed development will utilize onsite catch basins, infiltration systems, and a detention pipe system to capture and treat stormwater. Stormwater up to the design capture volume will be infiltrated by a proposed onsite drywell system.

Stormwater runoff will be conveyed via proposed onsite gutter and directed to one sump area equipped with a curb inlet catch basin. There will be two additional catch basins located along the site's main spine in flow by conditions to convey stormwater into the underground storm drain system. The sump catch basin will be located at the end of the drive aisle at the southern property line. All on-site catch basins will be connected by storm drain pipe to the drywell infiltration system for water quality treatment. During larger storm events, stormwater runoff will back up the drywell system which is connected to the underground detention system. Larger storm events will bypass the infiltration system and overflow into a proposed grate inlet catch basin which is attached to a parkway culvert. Once stormwater enters the parkway culvert it will drain into Mission Road and follow the existing drainage pattern. For emergency overflow, runoff will spill out of the proposed curb inlet catch basin, topple over the proposed driveway entrance, and sheet flow into Mission Road. Refer to separately prepared Preliminary Grading and Utility Plans for site design information.

In an event where the proposed onsite storm drain system is at its full capacity or clogged, stormwater will pond up at the lowest proposed onsite sump area and excess stormwater will top over the grade break at the site's entrance and continue to flow out through proposed driveway and into Mission Rd.

During final engineering, water surface elevation will be analyzed and provided to verify all habitable structures will have at least a 1 foot of freeboard during the 100-year storm event.

According to the Federal Emergency Management Agency (FEMA), FIRM rate map Number 06037C1675F, revised September 26, 2008, the site is located within the flood zone as follows: Zone X – *"Areas determined to be outside the 0.2% annual chance floodplain"*

The "Proposed Conditions Preliminary Hydrology Map" is included in Appendix A for reference.

5.0 METHODOLOGY:

The site was analyzed using the Los Angeles County Department of Public Works Hydrology Manual. The initial subarea was analyzed for acreage, land-use, soil type, peak flow rate and time of concentration according to the Rational Method described in the manual.

In this preliminary hydrology study, the proposed condition impervious area percentage values were conservative estimation from the LA County Hydrology Manual. During final engineering, impervious areas will be calculated in more detail to refine all peak flow rates.

In accordance with the Los Angeles County Department of Public Works Hydrology Manual all habitable structures must have a finished floor elevation to allow 1 ft of freeboard during the 100-year storm event. Catch basin, pipe sizing and 100-year water surface elevation calculations will be provided during final engineering.

6.0 RESULTS:

Hydrology Summary

Pre-Developed Hydrology Summary								
Area ID	**Total Area (AC)**	**Pervious Area (AC)**	**Pervious (%)**	**Impervious Area (AC)**	**Impervious (%)**	**Q25 (CFS)**	**Q50 (CFS)**	**Q100 (CFS)**
XA1	3.38	3.33	98.5%	0.05	1.5%	7.21	9.08	11.27

Post-Developed Hydrology Summary								
Area ID	**Total Area (AC)**	**Pervious Area (AC)**	**Pervious (%)**	**Impervious Area (AC)**	**Impervious (%)**	**Q25 (CFS)**	**Q50 (CFS)**	**Q100 (CFS)**
A1	3.38	0.47	14.0%	2.91	86.0%	7.97	9.65	10.87

Percent Decrease:
Δ25-year peak storm flow = 7.97/7.21 = increase of 10.5%
Δ50-year peak storm flow = 9.65/9.08 = increase of 6.3%
Δ100-year peak storm flow = 10.87/11.27 = decrease of 3.5%

Refer to Appendix A & B of this report for additional information shown in the LACDPW HydroCalc output data, as well as the pre-developed and post-developed hydrology maps.

Detention Sizing
Compared to the existing condition the proposed development will, on average, match the existing condition. As there is a net change in overall storm event volume, detention may be required to mitigate the proposed condition peak flow rates. However, detention is required for the on-site infiltration system. This system will be designed to allow the retention of the entire Stormwater Quality Design Volume (SWQDCv) of 8,630 CF. This retention volume will offset any increase in peak flow from the proposed development. The detention system will utilize Bioclean's Urbanpond Detention system and sizing calculations can be found in the separately prepared Preliminary LID Report.

Catch Basin Sizing
Catch basin Sizing will be analyzed for the 50-year storm event peak flow rates and will be provided during final engineering.

Pipe Sizing
Pipe Sizing will be analyzed using WSPG software to verify hydraulic grade line (HGL) based on the 100-year storm event peak flow rates and will be provided during final engineering for proposed onsite conveyance pipe.

100-Year Water Surface Elevations
Water surface elevations for the 100-year storm event peak flow rates will verify that the proposed finish floor elevations are set at least 1' above the water surface elevation and will be calculated and provided during final engineering.

7.0 CONCLUSIONS:

The results from this preliminary hydrology study utilizing Los Angeles County Department of Public Works Hydrology Manual demonstrate that the proposed condition peak flow rates compared to the existing condition peak flow will stay the same as indicated in the hydrology summary results in Section 6 of this report. This is mainly due to change in grading and elongation of the proposed condition's flow path. During final engineering, impervious area for proposed conditions will be calculated in more detail based on the finalized landscape plan. The proposed peak flow rates will be re-evaluated to reflect the actual proposed conditions. However, the proposed development is likely to generate lower peak flows.

The proposed development will be graded to allow for one low point on the site equipped with a curb inlet catch basin, this catch basin will be connected to the drywell infiltration system for treatment. The storm drain system will also have detention system to retain the entire SWQDCv. In the event the storm drain system becomes clogged, the proposed grading will facilitate emergency overflow by ponding at the grate inlet catch basin, toppling over the curb and sheet flow into the Mission Rd.

8.0 DESIGN ASSUMPTIONS:

1. The property is in the City of Rosemead, Los Angeles County rainfall region.

2. 100-year storm event flood level protection analysis required for habitable structures per the requirements of the Los Angeles County Department of Public Works Hydrology Manual

3. According to the Los Angeles County Department of Public Works Hydrology Manual 50-Year 24-Hour Isohyet Map 1-H1.20, the drainage area is in Soil Group 006, the site receives 6.7 inches of rainfall over a 24-Hr storm (Q_{50}).

4. The LACDPW HydroCalc was utilized to determine the time of concentration, run-off flow rate and run-off volume for site.

5. The site was analyzed for a 25, 50 and 100-year storm events per the requirements of the January 2006 Los Angeles County Department of Public Works Hydrology Manual. The Rational Method Analysis was performed, and the appropriate calculations are provided herein.

6. The existing project site is currently a vacant lot that is 98.5% pervious based on the aerial survey performed by C&V Consulting, Inc.

7. The proposed site was assumed to be approximately 86% based on the LACDPW Hydrology Manual for "Low-Rise Apartments, Condominiums, and Townhouses" land use type.

9.0 REFERENCES:

1. Los Angeles County Department of Public Works, "Hydrology Manual", January 2006.

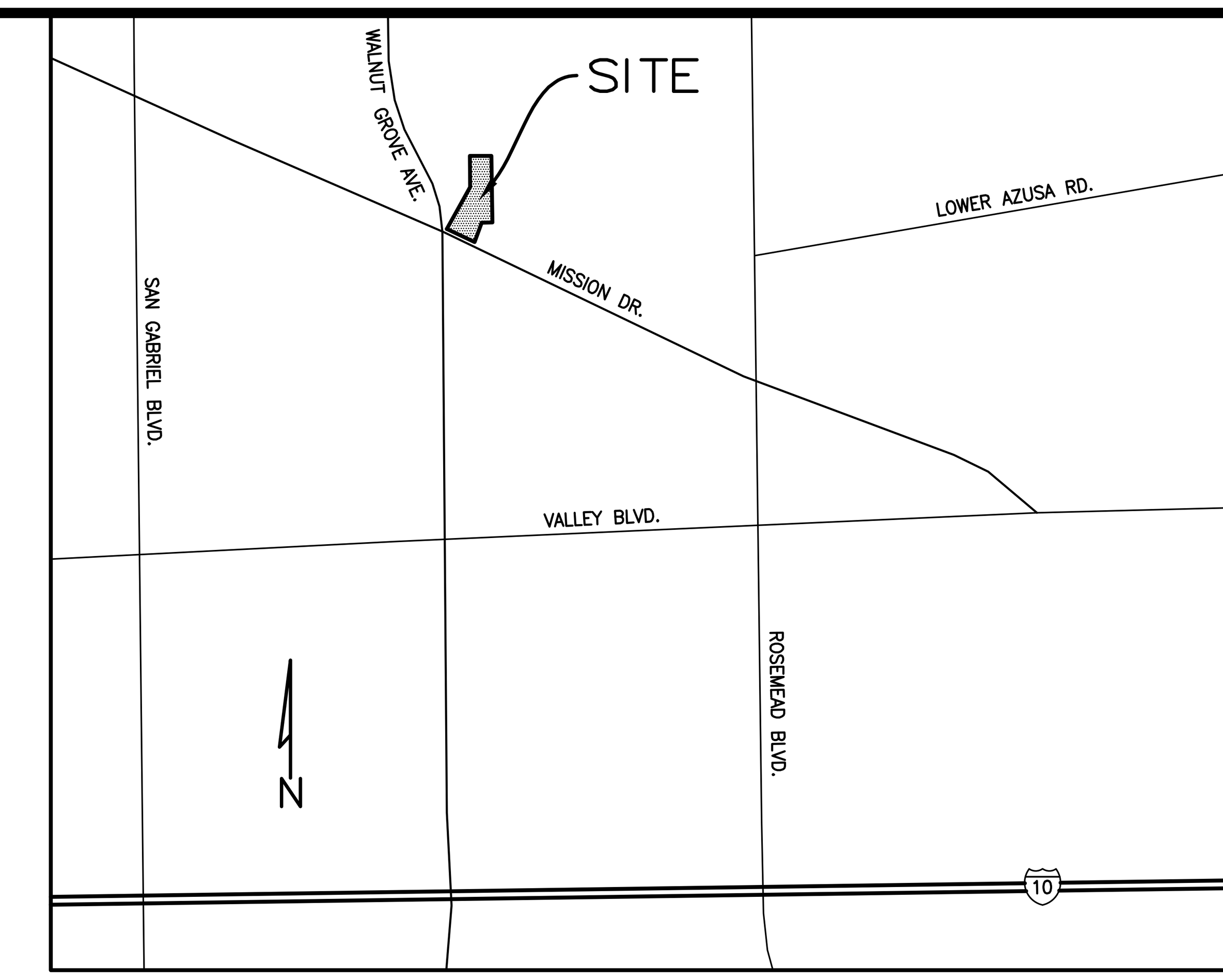
2. Los Angeles County Department of Public Works, "HydroCalc" Outputs and Data

3. Hydraflow Express Extensions for Civil 3D 2021.

4. Preliminary Grading & Drainage Plan for this project by C&V Consulting, Inc. February 2022

APPENDIX A
HYDROLOGY MAPS

Existing Conditions Preliminary Hydrology Map



VICINITY MAP
SCALE: NTS

Pre-Developed Hydroligic Summary

Area ID	Total Area (AC)	Pervious Area (AC)	Pervious (%)	Impervious Area (AC)	Impervious (%)	Q25 (CFS)	Q50 (CFS)	Q100 (CFS)
XA1	3.38	3.33	98.48%	0.05	1.52%	7.21	9.08	11.27

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REGISTERED PROFESSIONAL ENGINEER
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No. 68167
CIVIL
STATE OF CALIFORNIA

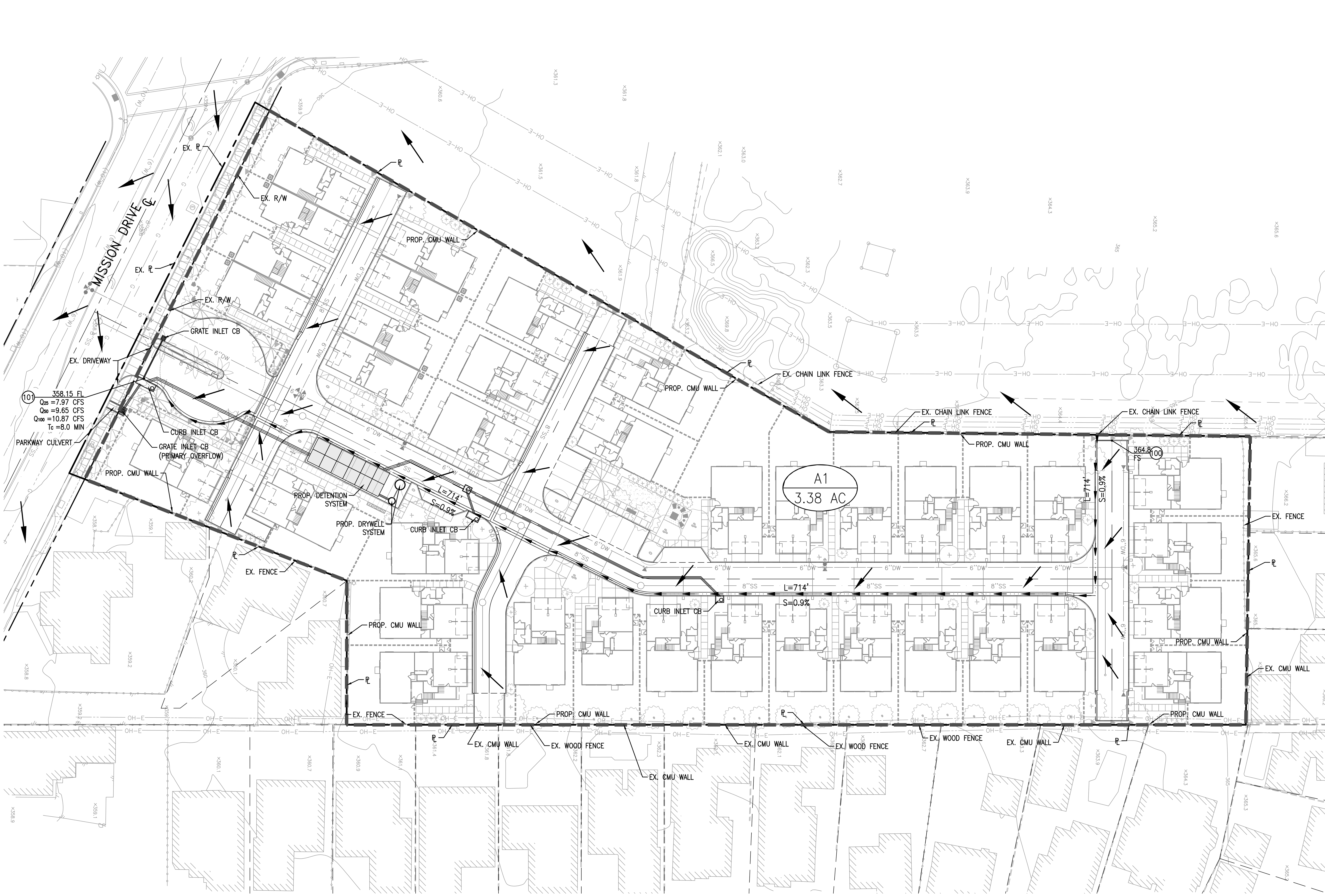
CITY OF ROSEMEAD

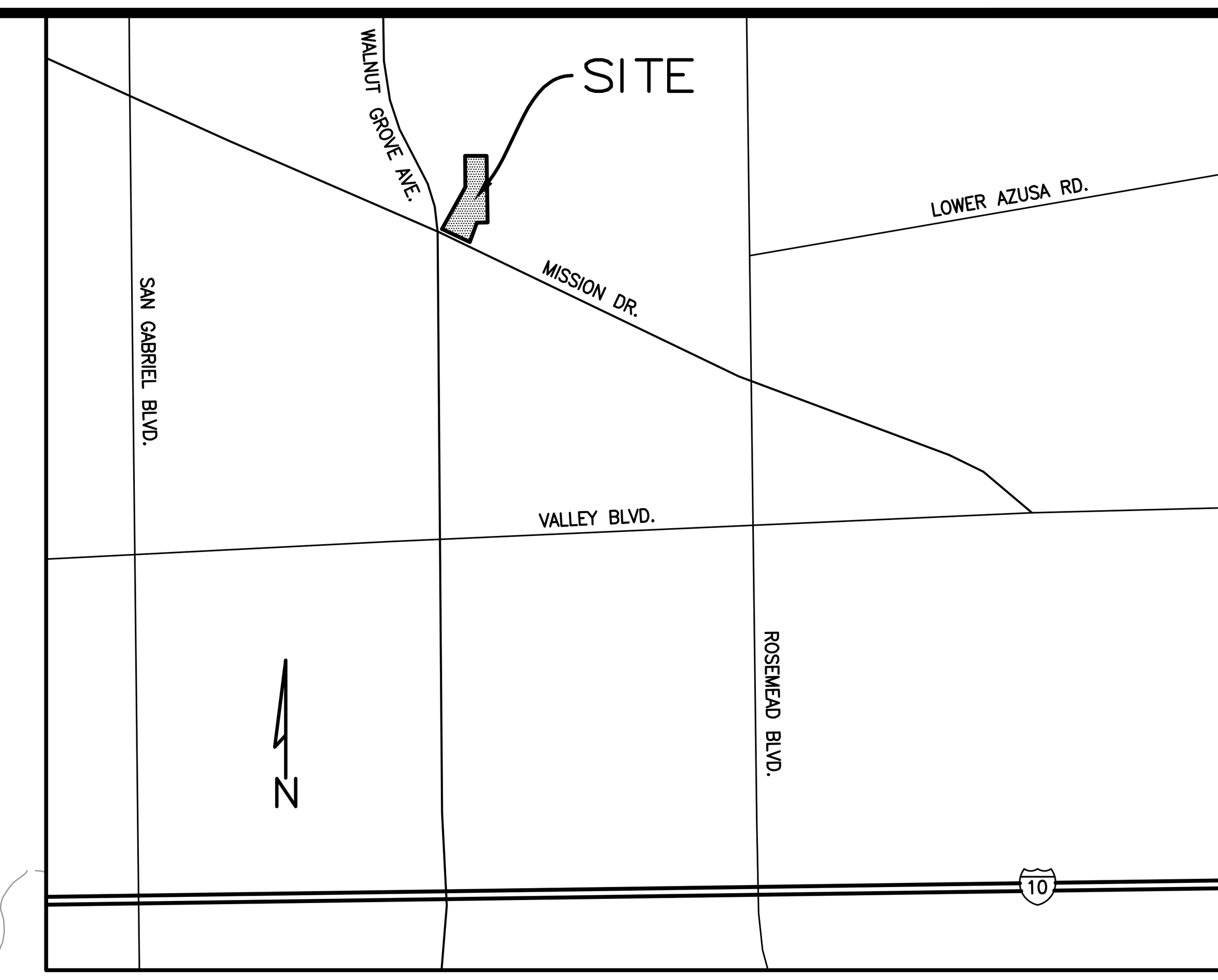
VESTING TENTATIVE TRACT MAP NO. 83705
8601 MISSION DRIVE
EXISTING CONDITIONS HYDROLOGY MAP

SHEET 1 OF 1

PLAN SET: PS01
DATE: 02/16/2022

Proposed Conditions Preliminary Hydrology Map





VICINITY MAP
SCALE: NTS

LEGEND:

AREA X1	SUB-AREA NUMBER
X.XX Ac	ACREAGE
L=XXX'	FLOW PATH LENGTH
S=X.X'	CHANGE IN ELEVATION ALONG FLOW PATH
▬ ▬ ▬	SUB-AREA BOUNDARY
—·—▸	FLOW PATH
XXX.X	ELEVATION AT NODE
→	SURFACE FLOW DIRECTION
Q=X.XX CFS	STORM EVENT PEAK FLOW RATE
⬚	PERVIOUS LANDSCAPE

Post-Developed Hydroligic Summary

Area ID	Total Area (AC)	Pervious Area (AC)	Pervious (%)	Impervious Area (AC)	Impervious (%)	Q25 (CFS)	Q50 (CFS)	Q100 (CFS)
A1	3.38	0.47	14.00%	2.91	86.00%	7.97	9.65	10.87

SCALE: 1" = 30'
0 15 60 60

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REGISTERED PROFESSIONAL ENGINEER
RYAN J. BITTNER
No. 68167
CIVIL
STATE OF CALIFORNIA

CITY OF ROSEMEAD

VESTING TENTATIVE TRACT MAP NO. 83705
8601 MISSION DRIVE
PROPOSED CONDITIONS HYDROLOGY MAP

SHEET
1
OF
1

APPENDIX B
HYDROLOGY CALCULATIONS

Existing Conditions Hydrology Calculations (25, 50, & 100-year Storm Events)

Peak Flow Hydrologic Analysis

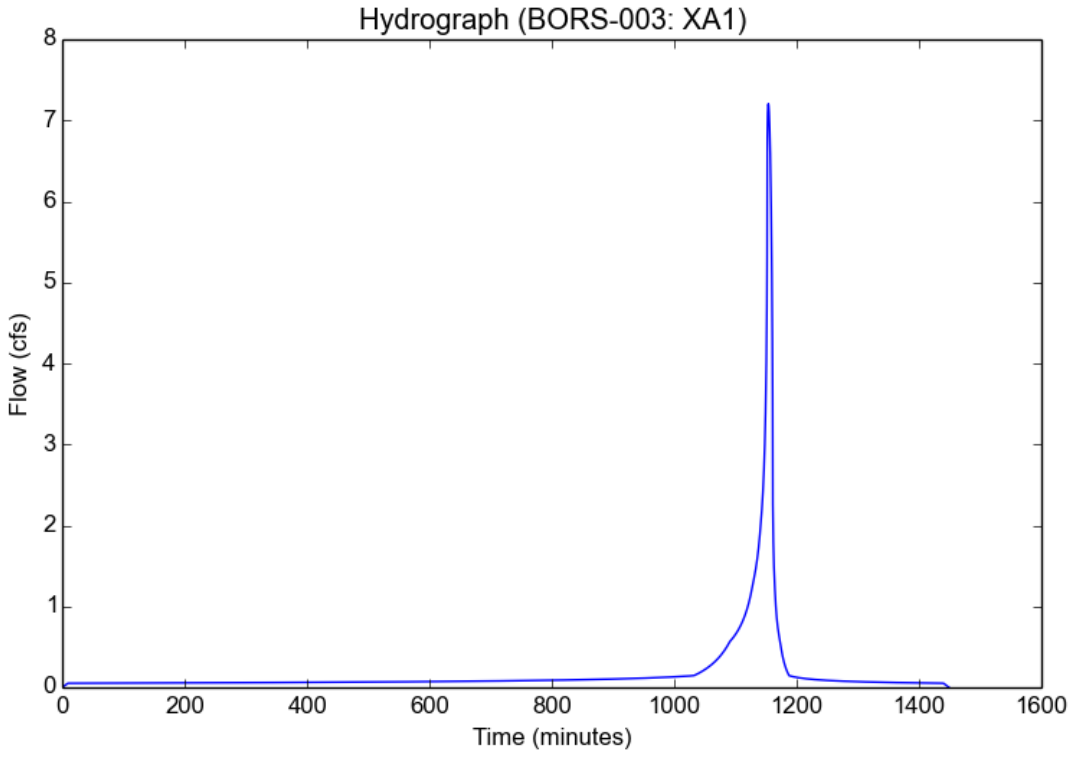
File location: P:/B/BORS-003/Admin/Reports/Hydrology/Hydrology/Preliminary/Appendix B - Hydrology Calculations (Hydro Calc)/BORS-003 - XA1 - 25y
Version: HydroCalc 1.0.3

Input Parameters

Project Name	BORS-003
Subarea ID	XA1
Area (ac)	3.38
Flow Path Length (ft)	705.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.02
Soil Type	6
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.8826
Peak Intensity (in/hr)	2.6625
Undeveloped Runoff Coefficient (Cu)	0.7986
Developed Runoff Coefficient (Cd)	0.8006
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	7.205
Burned Peak Flow Rate (cfs)	7.205
24-Hr Clear Runoff Volume (ac-ft)	0.3725
24-Hr Clear Runoff Volume (cu-ft)	16223.9942



Peak Flow Hydrologic Analysis

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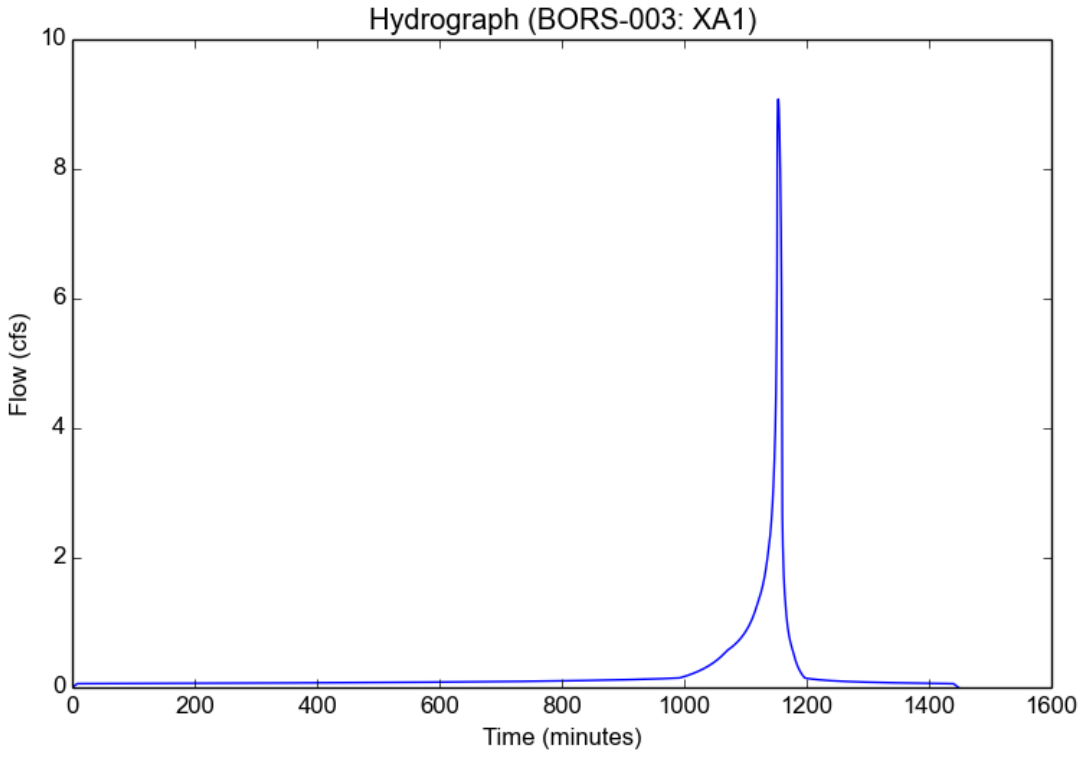
Version: HydroCalc 1.0.3

Input Parameters

Project Name	BORS-003
Subarea ID	XA1
Area (ac)	3.38
Flow Path Length (ft)	705.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.02
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.7
Peak Intensity (in/hr)	3.2051
Undeveloped Runoff Coefficient (Cu)	0.8367
Developed Runoff Coefficient (Cd)	0.8379
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	9.0777
Burned Peak Flow Rate (cfs)	9.0777
24-Hr Clear Runoff Volume (ac-ft)	0.4585
24-Hr Clear Runoff Volume (cu-ft)	19970.4404



Peak Flow Hydrologic Analysis

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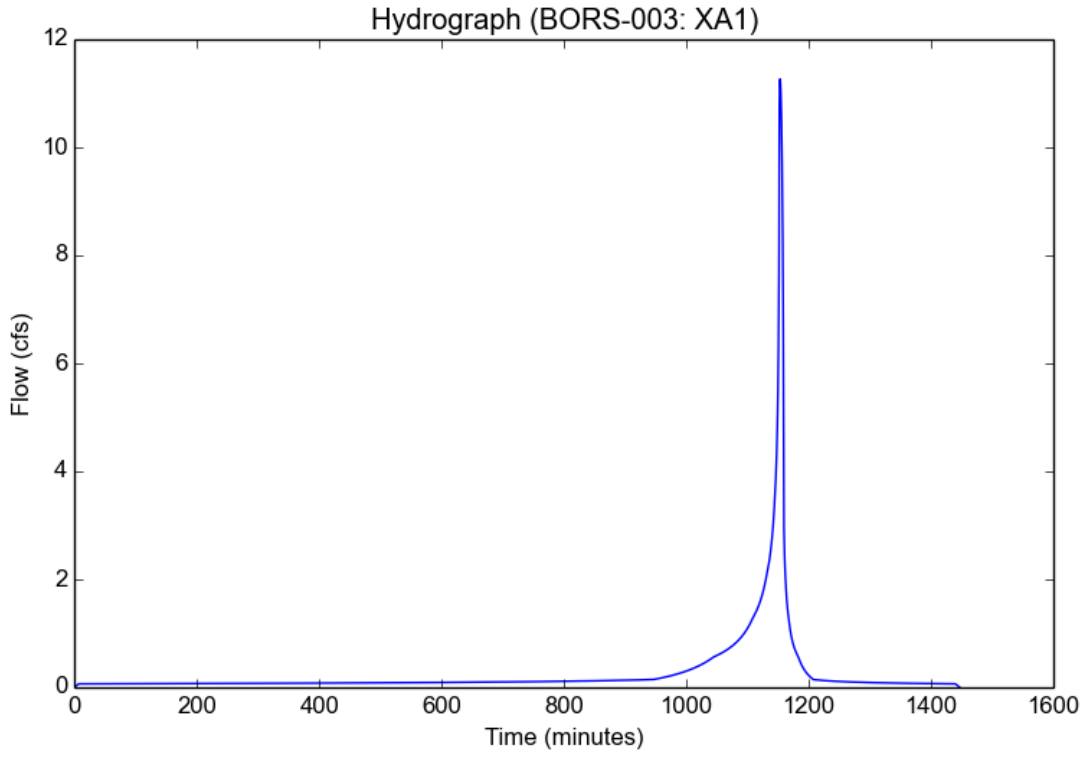
Version: HydroCalc 1.0.3

Input Parameters

Project Name	BORS-003
Subarea ID	XA1
Area (ac)	3.38
Flow Path Length (ft)	705.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.02
Soil Type	6
Design Storm Frequency	100-yr
Fire Factor	0
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	7.5174
Peak Intensity (in/hr)	3.829
Undeveloped Runoff Coefficient (Cu)	0.87
Developed Runoff Coefficient (Cd)	0.8706
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	11.2669
Burned Peak Flow Rate (cfs)	11.2669
24-Hr Clear Runoff Volume (ac-ft)	0.5535
24-Hr Clear Runoff Volume (cu-ft)	24109.2086



Proposed Conditions Hydrology Calculations (25, 50, & 100-year Storm Events)

Peak Flow Hydrologic Analysis

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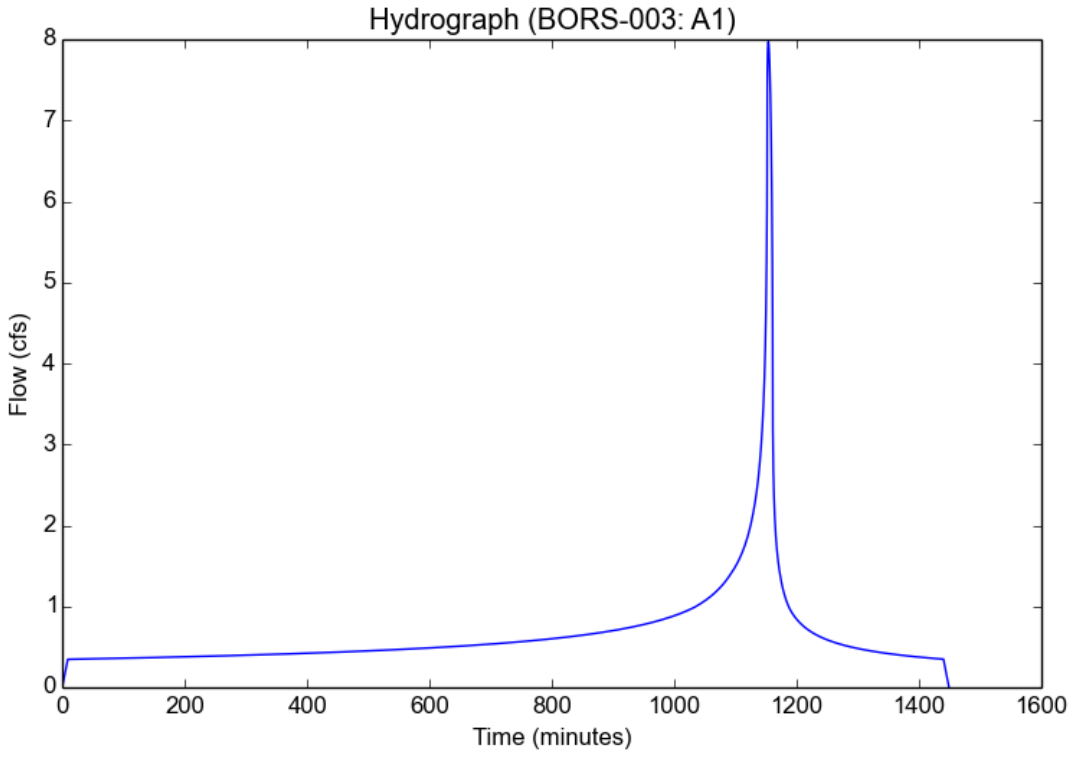
Version: HydroCalc 1.0.3

Input Parameters

Project Name	BORS-003
Subarea ID	A1
Area (ac)	3.38
Flow Path Length (ft)	714.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.86
Soil Type	6
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.8826
Peak Intensity (in/hr)	2.6625
Undeveloped Runoff Coefficient (Cu)	0.7986
Developed Runoff Coefficient (Cd)	0.8858
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	7.9716
Burned Peak Flow Rate (cfs)	7.9716
24-Hr Clear Runoff Volume (ac-ft)	1.3208
24-Hr Clear Runoff Volume (cu-ft)	57536.2233



Peak Flow Hydrologic Analysis

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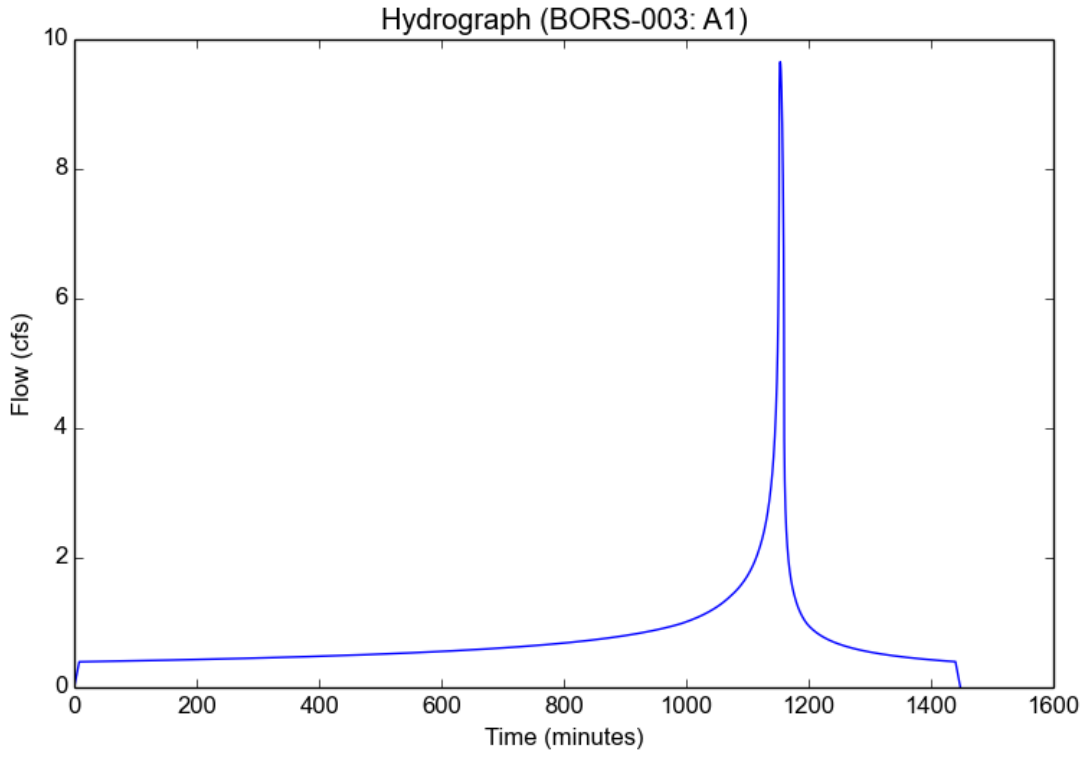
Version: HydroCalc 1.0.3

Input Parameters

Project Name	BORS-003
Subarea ID	A1
Area (ac)	3.38
Flow Path Length (ft)	714.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.86
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.7
Peak Intensity (in/hr)	3.2051
Undeveloped Runoff Coefficient (Cu)	0.8367
Developed Runoff Coefficient (Cd)	0.8911
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	9.6539
Burned Peak Flow Rate (cfs)	9.6539
24-Hr Clear Runoff Volume (ac-ft)	1.5093
24-Hr Clear Runoff Volume (cu-ft)	65744.1478



Peak Flow Hydrologic Analysis

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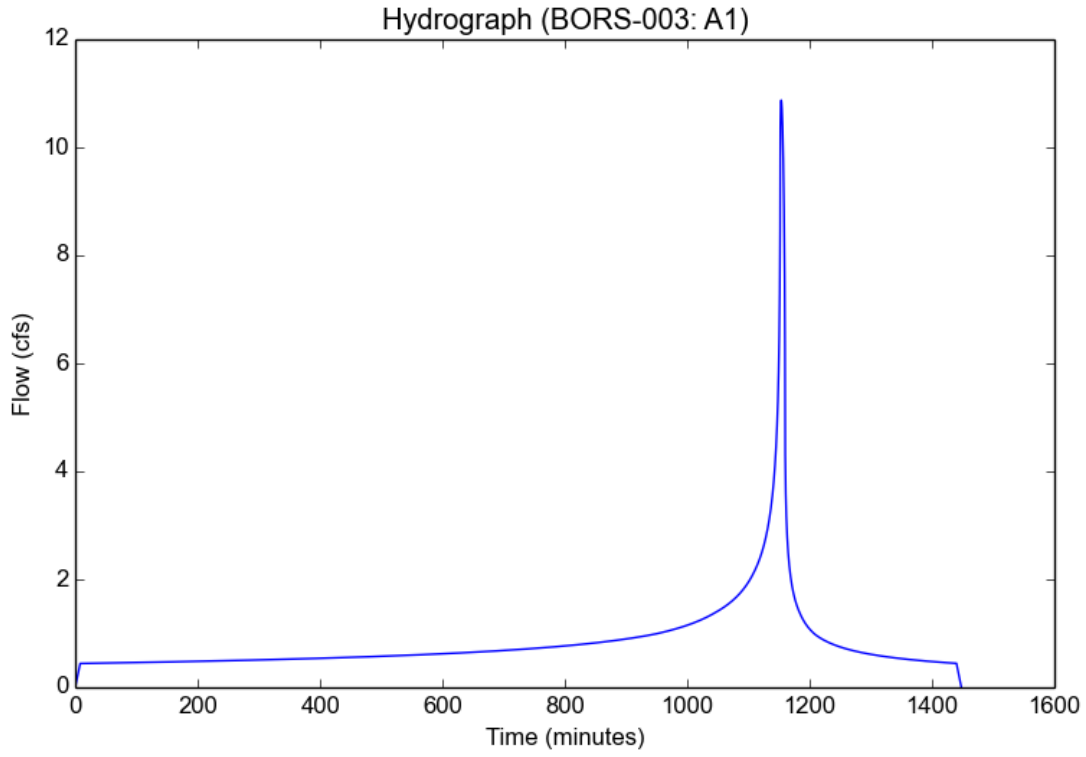
Version: HydroCalc 1.0.3

Input Parameters

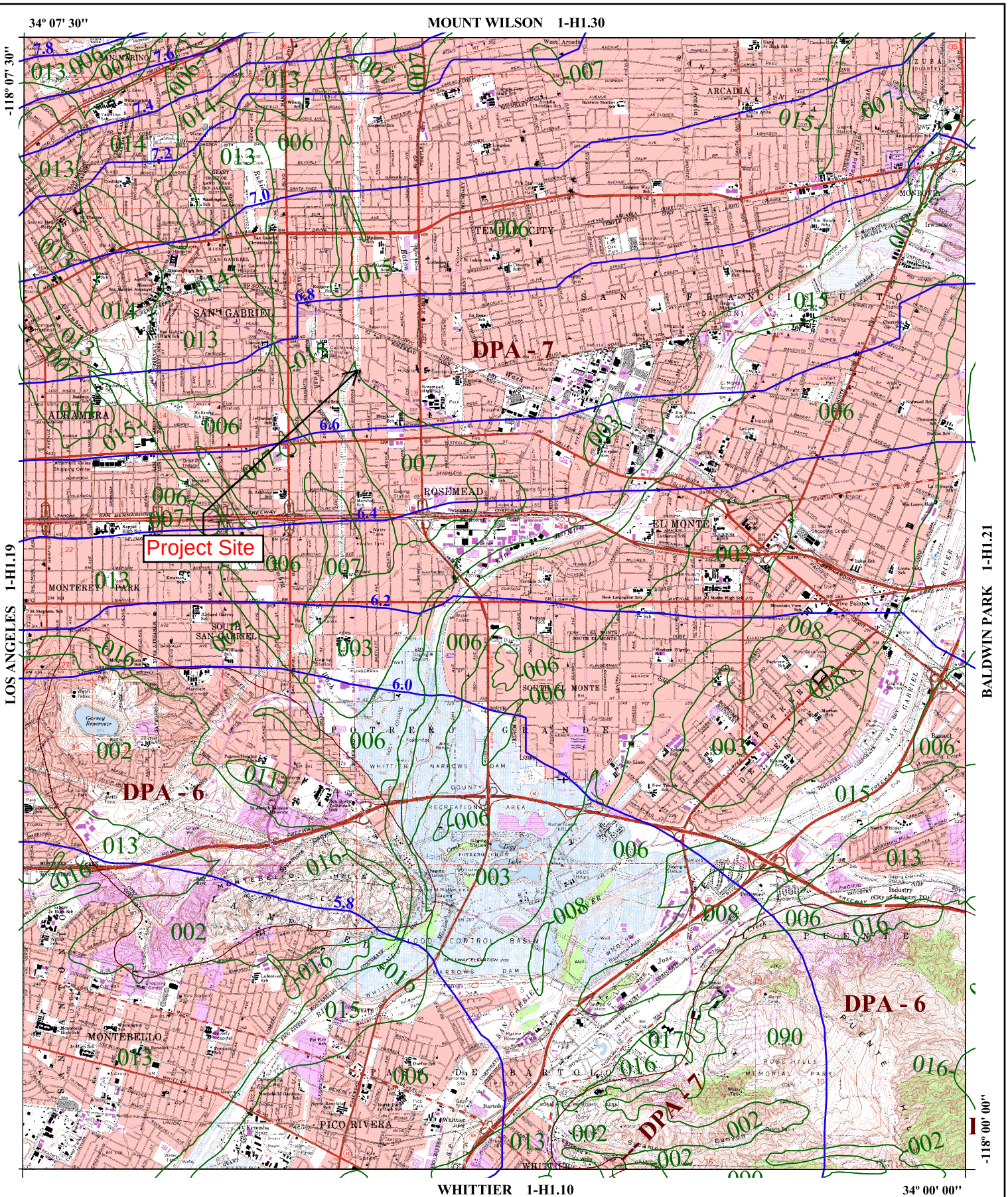
Project Name	BORS-003
Subarea ID	A1
Area (ac)	3.38
Flow Path Length (ft)	714.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.86
Soil Type	6
Design Storm Frequency	100-yr
Fire Factor	0
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	7.5174
Peak Intensity (in/hr)	3.5961
Undeveloped Runoff Coefficient (Cu)	0.8611
Developed Runoff Coefficient (Cd)	0.8945
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	10.8731
Burned Peak Flow Rate (cfs)	10.8731
24-Hr Clear Runoff Volume (ac-ft)	1.6989
24-Hr Clear Runoff Volume (cu-ft)	74006.0329



APPENDIX C
Isohyet


34° 07' 30"
MOUNT WILSON 1-H1.30
-118° 07' 30"
LOS ANGELES 1-H1.19
BALDWIN PARK 1-H1.21
-118° 00' 00"
WHITTIER 1-H1.10
34° 00' 00"
Project Site
DPA - 7
DPA - 6
DPA - 6
DPA - 7
SAN MARINO
ARCADIA
TEMPLE CITY
SAN GABRIEL
ALHAMBRA
ROSEMEAD
EL MONTE
SOUTH EL MONTE
MONTEREY PARK
SOUTH SAN GABRIEL
MONTEBELLO
PICO RIVERA
WHITTIER
POTRERO GRANDE
WHITTIER NARROWS DAM
RECREATIONAL AREA
FLOOD CONTROL BASIN
ROSE HILLS MEMORIAL PARK
7.8
7.6
7.4
7.2
7.0
6.8
6.6
6.4
6.2
6.0
5.8
N
S
E
W
016
SOIL CLASSIFICATION AREA
7.2
INCHES OF RAINFALL
DPA - 6
DEBRIS POTENTIAL AREA
1 0 1 2 Miles
25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714
EL MONTE
50-YEAR 24-HOUR ISOHYET
1-H1.20
LOS ANGELES COUNTY
PUBLIC WORKS
Public Service That Works

APPENDIX D
Hydraulic Calculations
To be provided during Final Engineering

APPENDIX E
As-builts & References

REVIEWED Kenneth L Wilcox 3-13-73
DESIGN SECTION DATE

CURVE DATA							
CURVE	RADIUS Ft.	CENTRAL ANGLE Deg.	Min.	Sec.	LENGTH Ft.	TANGENT Ft.	B.W.R. Ft.
ⓐ	90	18	51	22	29.62	14.94	
ⓑ	45	63	23	25	49.79	27.79	

GENERAL DRAINAGE NOTES

1. ALL DRAINAGE STRUCTURES SHALL BE CONSTRUCTED PER L.A.CO. F.C.D. STANDARD DRAWINGS UNLESS OTHERWISE NOTED.
2. ALL CATCH BASIN CURB AND GUTTER SHALL BE CONSTRUCTED PER L.A.CO.R.D. STANDARD PLAN 66-03 UNLESS OTHERWISE NOTED.
3. SHAFTS FOR M.H. NO. 1 SHALL BE CONSTRUCTED PER NOTE M OF L.A.CO.F.C.D. STANDARD DRAWING NO. 2-D102 WHEN H IS GIVEN ON PLAN.
4. A.C. PIPE WITH A D-LOAD 1.5 TIMES THE INDICATED R.C.P. D-LOAD IS AN ACCEPTABLE ALTERNATE FOR R.C.P. 42" OR LESS IN DIAMETER (SEE SPECIAL PROVISIONS).
5. THE CONTRACTOR SHALL NOTIFY THE L.A.CO. F.C.D. AREA INSPECTOR AT 223-2111 EXT. 7421 24 HOURS PRIOR TO COMMENCING CONSTRUCTION.

HYDRAULIC DATA 50 YEAR STORM FREQUENCY	
△ TO △	Q (cfs)
1 3	46.5
3 4	39
4 5	29
5 6	12
4 7	10
△ △	

AS BUILT R.D.D. 250

7-19-74	V.S.L.	Move S.D. to 18' R.C.P.	
4-19-73	G.M.	Move S.D. to 17' M.P.	
DATE	BY	REVISIONS	

LOS ANGELES COUNTY ROAD DEPARTMENT
HIGHWAY DIVISION
JOB NAME MISSION DRIVE
LIMITS RUBIO WASH TO IVAR AVENUE
SCALE HORIZ. 1"=40 VERT. 1"=4
JOB NO. 4123
SHEET 7 OF 7 SHTS.
DWG. NO. #13007

PROJECT ENGINEER C.E. No. DESIGNER CHECKER REFERENCED