Appendix F Hydrology Study, Del Amo Circle Residential Apartments, Torrance, California

Appendices

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FUSCOE ENGINEERING

HYDROLOGY STUDY

DEL AMO CIRCLE

RESIDENTIAL APARTMENTS
Torrance, California

PREPARED FOR
LEGACY PARTNERS
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DATE PREPARED: JUNE 14, 2022

PROJECT NUMBER: 424-026-02

full circle thinking®

Table of Contents

1.0 PROJECT OVERVIEW

1.1 PROJECT HYDROLOGIC OVERVIEW

The proposed project is located on the north side of West Carson Street and east of Del Amo Circle Way in Torrance, California. The total (gross) project area for the site is approximately 3.0 acres. The proposed development will include a 5-story, 200-unit apartment building and a 440 space multi-level parking garage with a roof top pool and amenity deck. The scope of the project includes demolition work on the existing Parcel 1 and 2 (as seen on Approved Tentative Parcel Map 83799) to develop the proposed Del Amo Circle Residential Apartments. The existing project site is currently developed as a surface parking lot with landscaping. The project site is bounded to the south by West Carson Street, to the west by Del Amo Circle Way, and to the north and east by an existing commercial development.

1.2 PROJECT SUMMARY

As evidence of the studies and materials included within, the proposed development will:

- Not need additional detention to reduce the pre and post development flows as seen in Table 3.4.3.
- Will provide flood protection in the form of a sump pump with emergency backup which will drain necessary high flows and bypass flows from the property to the public street system. This will also be accomplished wherever possible, by means of grading design, which will allow for overflow drainage to public street system or adjacent private properties via drainage inlets and gravity flow.

2.0 EXISTING HYDROLOGY

2.1 EXISTING CONDITIONS

The proposed project site is situated north of West Carson Street approximately 0.1-miles northwest from the intersection of West Carson Street and Hawthorne Boulevard in Torrance, California. An existing paved driveway and roadway currently runs along the north boundary of the site from a driveway on Del Amo Circle Way to another driveway located on Carson Street. The northeastern portion of the project site is adjacent to an existing commercial development. The majority of the existing project site consists of an existing at-grade parking lot.

Topographically, the site varies greatly from the southwest corner to the northeast. The southwest portion of the existing parking lot sits approximately 13 feet higher in elevation than the northeast portion of the site, with a landscaped slope separating the two levels of parking. Due to the developed nature of the parking lot, drainage sheet flows primarily in two distinct directions. This created two catchment areas which can be seen in Appendix A – Existing Condition Hydrology Map.

Based on this study and as depicted in Table 2.1.1, Subarea A flows in the northeast direction and consists of 2.84 acree, while Subarea B flows in the southwest direction and consists of 0.19 acres. The 50-year flow rate for these two areas are 8.25 cubic feet per second (cfs) and 0.56 cfs respectively. With the existing project site being primarily at-

grade parking and landscaping, approximately 90% of the site is considered impervious. See Table 2.1.2 for existing storm water discharges.

Table 2.1.1

DRAINAGE AREA	DRAINAGE AREA ACREAGE	IMPERVIOUS ACREAGE	IMPERVIOUS PERCENTAGE	RUNOFF COEFFICIENT, Cd
A	2.84	2.56	90%	0.83
B	0.19	0.17	90%	0.83
On-site Total	3.03	-	-	-

Table 2.1.2

EXISTING CONDITION DISCHARGES (CFS)						
DRAINAGE MANAGEMENT AREA	2 YEAR EVENT	5 YEAR EVENT	10 YEAR EVENT	25 YEAR EVENT	50 YEAR EVENT	OUTFALL LOCATION
A	2.60	4.70	5.80	7.20	8.25	On-site Storm Drain
B	0.20	0.31	0.39	0.48	0.56	Carson Street
On-site Total	2.80	5.01	6.19	7.68	8.81	-

3.0 PROPOSED HYDROLOGY

3.1 PROPOSED CONDITIONS

Per LA County's requirements the project is considered a Capital Flood level design due to the nature of the "sump style" condition on-site. Therefore, the design storm event for this project is the 50-year storm.

3.2 METHODOLOGY

This study was prepared using HydroCalc software in conformance with the Los Angeles County Hydrology Manual. Delta flow rates and volumes are provided for comparison purposes. See Appendix B & C for Hydrology Calculations.

3.3 EXISTING STORM DRAIN FEATURES

The project site contains an existing 12' wide on-site utility easement adjacent to the Carson Street property boundary. An existing 30" RCP storm drain is currently installed in this easement on-site. The existing 30" RCP storm drain flows in the east to west direction. As the 30" RCP travels west it continues south off-site where it connects to an existing 42" storm drain line on Carson Street. The existing 42" storm drain flows in the east to west direction. Additionally, there is an existing 54" storm drain line on Del Amo Circle Way

that flows in the north south direction. Based on existing available information there are various additional on-site storm drain lines that eventually connect to the existing 30" RCP on Carson Street via an 18" storm drain line just east of Parcel 2. Supplementary information on these lines is not currently available.

3.4 PROPOSED CONDITIONS

Based on the proposed site development layout and grading, the project site will generally flow in a northeast direction towards low spots in the fire access drive aisle where storm water will be collected and routed for discharge. As described in the existing hydrology condition, the proposed project in large will follow a similar drainage pattern.

All on-site drainage will be collected in a proposed private storm drain system and treated before discharging to the existing catch basin located on Del Amo Circle Way. Water quality treatment will be provided to meet LA County Low Impact Development (LID) requirements.

Based upon the proposed site plan, shown in the Appendix A - Proposed Condition Hydrology Map, the approximate onsite imperviousness is listed as 90%.

Using LA County's HydroCalc software, flow rates have been determined for the project site for 2, 5,10, 25, & 50-year storm events (see Table 3.4.2). The project site will be considered one distinct Drainage Management Area (DMA) for water quality design.

Table 3.4.1

PROPOSED CONDITION DRAINAGE MANAGEMENT AREAS (DMAs)				
DRAINAGE MANAGEMENT AREA	DMA ACREAGE	IMPERVIOUS ACREAGE	IMPERVIOUS PERCENTAGE	RUNOFF COEFFICIENT, Cd
A	3.03	2.73	90%	0.67
On-site Total	4.45	2.56	-	-

Based upon comparison of discharge rates for the tributary area described above, discharges have decreased in the post development condition. This decrease is due to the consolidated drainage pattern of the project site from two distinct drainage patterns to one. The decrease in discharges is shown in Table 3.4.3.

Table 3.4.2

DRAINAGE MANAGEMENT AREA	2 YEAR EVENT	5 YEAR EVENT	10 YEAR EVENT	25 YEAR EVENT	50 YEAR EVENT	OUTFALL LOCATION
A	1.72	3.03	4.03	5.46	6.60	Del Amo Way Circle connection at existing catch basin
On-site Total	1.72	3.03	4.03	5.46	6.60	-

Table 3.4.3

ON SITE PRE & POST DISCHARGE DIFFERENCES (CFS)					
DRAINAGE MANAGEMENT AREA	2 YEAR EVENT	5 YEAR EVENT	10 YEAR EVENT	25 YEAR EVENT	50 YEAR EVENT
EXISTING	2.80	5.01	6.19	7.68	8.81
PROPOSED	1.72	3.03	4.03	5.46	6.60
DIFFERENCE	-1.08	-1.98	-2.16	-2.22	-2.21

3.5 PROPOSED ON-SITE STORM DRAIN FEATURES

The proposed on-site storm drain facilities will consist of a private storm water drainage collection system and water quality treatment system. The water quality system will intercept low flows. High flows and bypass flows will flow to a proposed storm water lift station to be pumped out to the public street system on Del Amo Circle Way. All on-site storm drain facilities installed for the project will be privately owned and maintained by the future home owners association.

4.0 CONCLUSIONS

In conclusion, the proposed development's Hydrology site program meets the design requirements as specified by the Los Angeles County Hydrology Manual.

5.0 APPENDICES

APPENDIX A

Hydrology Maps

LEGEND AND ABBREVIATIONS

PROJECT WATERSHED AREA (3.03 AC)

PROJECT SUB–AREA BOUNDARY

X / X.XX — SUB–AREA NUMBER / ACREAGE

FLOW DIRECTION

FLOW DIRECTION OF DISCHARGE POINT

FLOOD HAZARD NOTES

1. FLOOD ZONE "X".
2. NOT WITHIN COUNTY ADOPTED FLOODWAY.

HYDROLOGIC RUN-OFF CALCULATIONS

PROPOSED IMPERVIOUS AREA: 132,106 SF (3.03 ACRES)

DESIGN STORM PARAMETERS:
50 YR ISOHYET = 5.6 IN
85TH PERCENTILE ISOHYET = 0.9 IN
SOIL CLASSIFICATION = 10

SUB-AREA	AREA (AC)	%IMP	Q2 (CFS)	Q5 (CFS)	Q10 (CFS)	Q25 (CFS)	Q50 (CFS)
A	2.84	90%	2.60	4.70	5.80	7.20	8.25
B	0.19	90%	0.20	0.31	0.39	0.48	0.56
TOTAL	**3.03**	-	**2.80**	**5.01**	**6.19**	**7.68**	**8.81**

20' 0' 10' 20'
SCALE: 1" = 20'

Q'S SHOWN HEREON ARE Q50 STORM EVENTS

EXISTING CONDITION HYDROLOGY MAP

DEL AMO CIRCLE - RESIDENTIAL APARTMENTS
INTERSECTION OF W. CARSON STREET AND DEL AMO CIRCLE WAY

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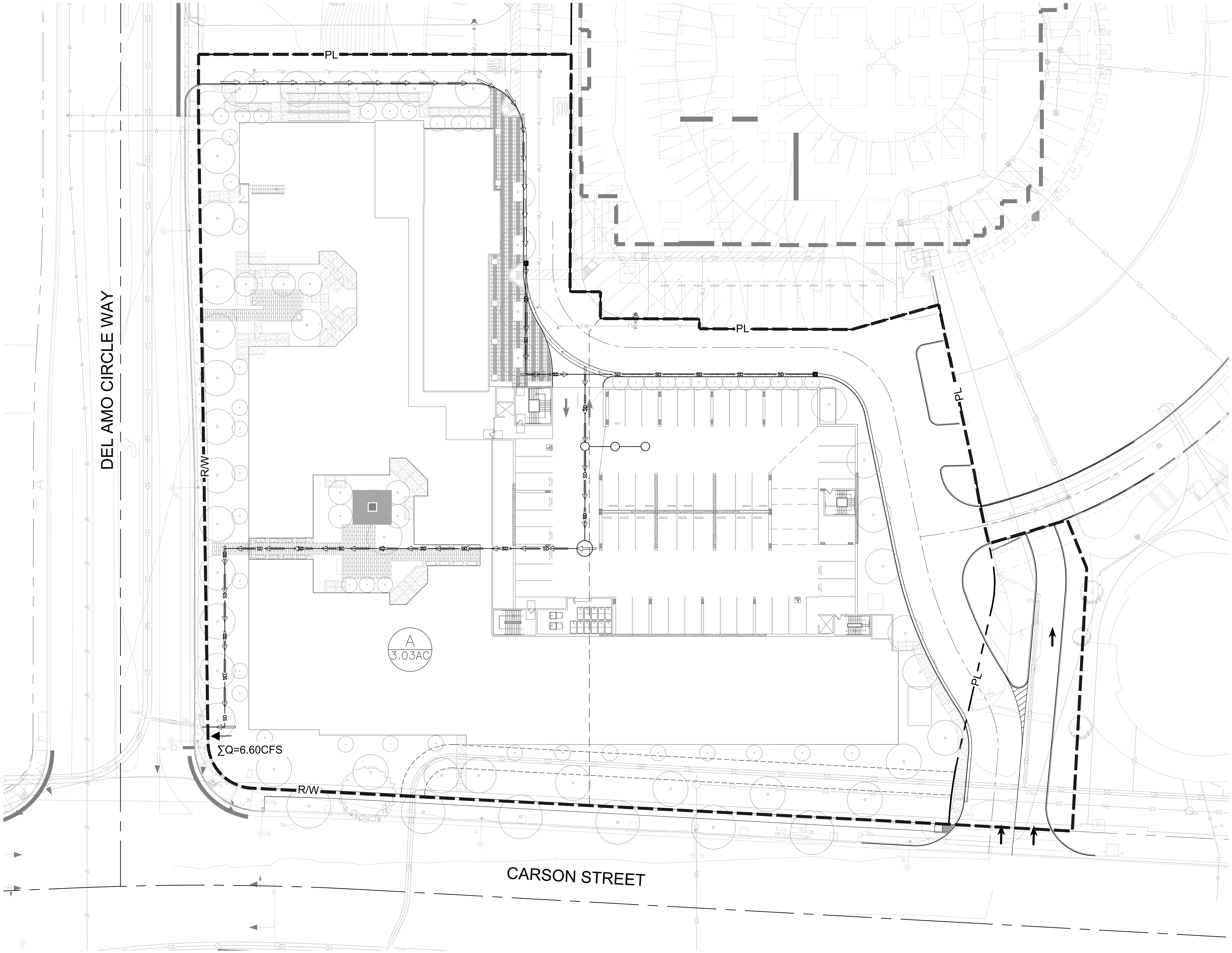

LEGEND AND ABBREVIATIONS

(long dash line)	PROJECT WATERSHED AREA (3.03 AC)
(short dash line)	PROJECT SUB-AREA BOUNDARY
X / X.XX	SUB-AREA NUMBER / ACREAGE
(open arrow)	FLOW DIRECTION
(solid arrow)	FLOW DIRECTION OF DISCHARGE POINT

FLOOD HAZARD NOTES

1. FLOOD ZONE "X".
2. NOT WITHIN COUNTY ADOPTED FLOODWAY.

HYDROLOGIC RUN-OFF CALCULATIONS

PROPOSED IMPERVIOUS AREA: 132,106 SF (3.03 ACRES)

DESIGN STORM PARAMETERS:
50 YR ISOHYET = 5.6 IN
85TH PERCENTILE ISOHYET = 0.9 IN
SOIL CLASSIFICATION = 10

SUB-AREA	AREA (AC)	%IMP	Q2 (CFS)	Q5 (CFS)	Q10 (CFS)	Q25 (CFS)	Q50 (CFS)
A	3.03	90%	1.72	3.03	4.03	5.46	6.60
TOTAL	**3.03**	90%	**1.72**	**3.03**	**4.03**	**5.46**	**6.60**

20' 0' 10' 20'
SCALE: 1" = 20'

Q'S SHOWN HEREON ARE Q50 STORM EVENTS

PROPOSED CONDITION HYDROLOGY MAP

DEL AMO CIRCLE - RESIDENTIAL APARTMENTS
INTERSECTION OF W. CARSON STREET AND DEL AMO CIRCLE WAY

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APPENDIX B

Pre-Development Hydrology Calculations

Peak Flow Hydrologic Analysis

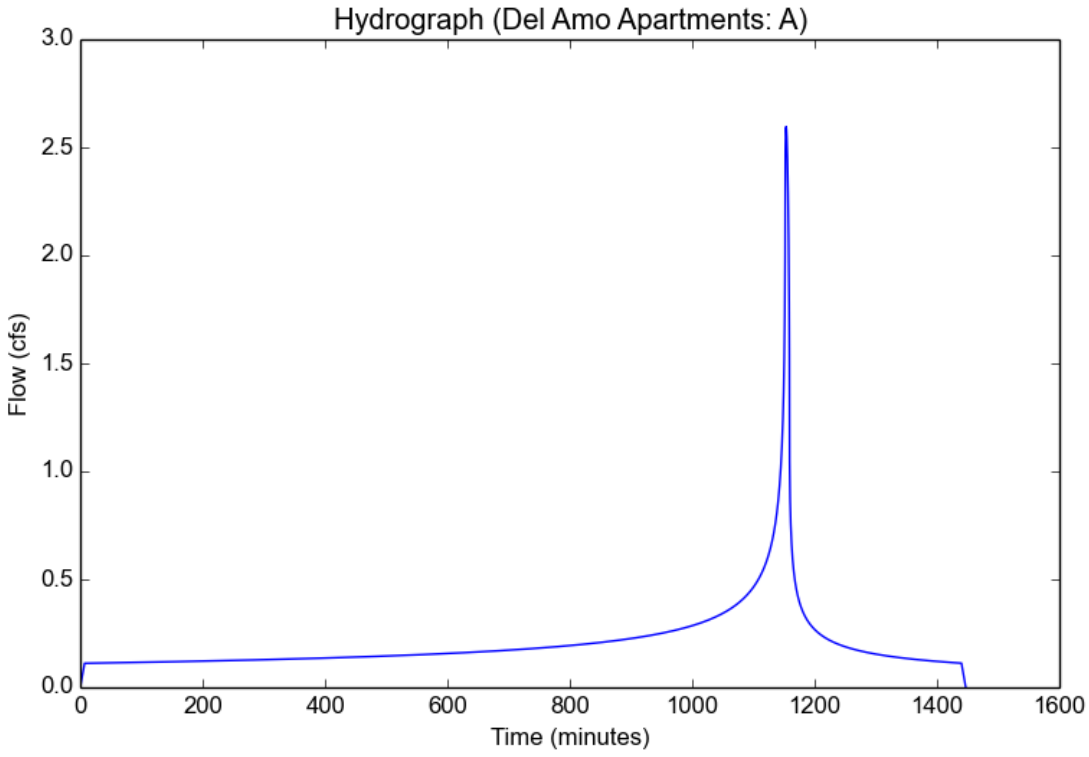
File location: C:/Users/Eduardo Cruz/Desktop/Hydro Calc/Del Amo/Existing/DMA A/01_Del Amo Apartments EX_A-2.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Del Amo Apartments
Subarea ID	A
Area (ac)	2.84
Flow Path Length (ft)	254.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	5.6
Percent Impervious	0.9
Soil Type	10
Design Storm Frequency	2-yr
Fire Factor	0
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.1672
Peak Intensity (in/hr)	1.1039
Undeveloped Runoff Coefficient (Cu)	0.1805
Developed Runoff Coefficient (Cd)	0.8281
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	2.596
Burned Peak Flow Rate (cfs)	2.596
24-Hr Clear Runoff Volume (ac-ft)	0.4173
24-Hr Clear Runoff Volume (cu-ft)	18175.7101



Peak Flow Hydrologic Analysis

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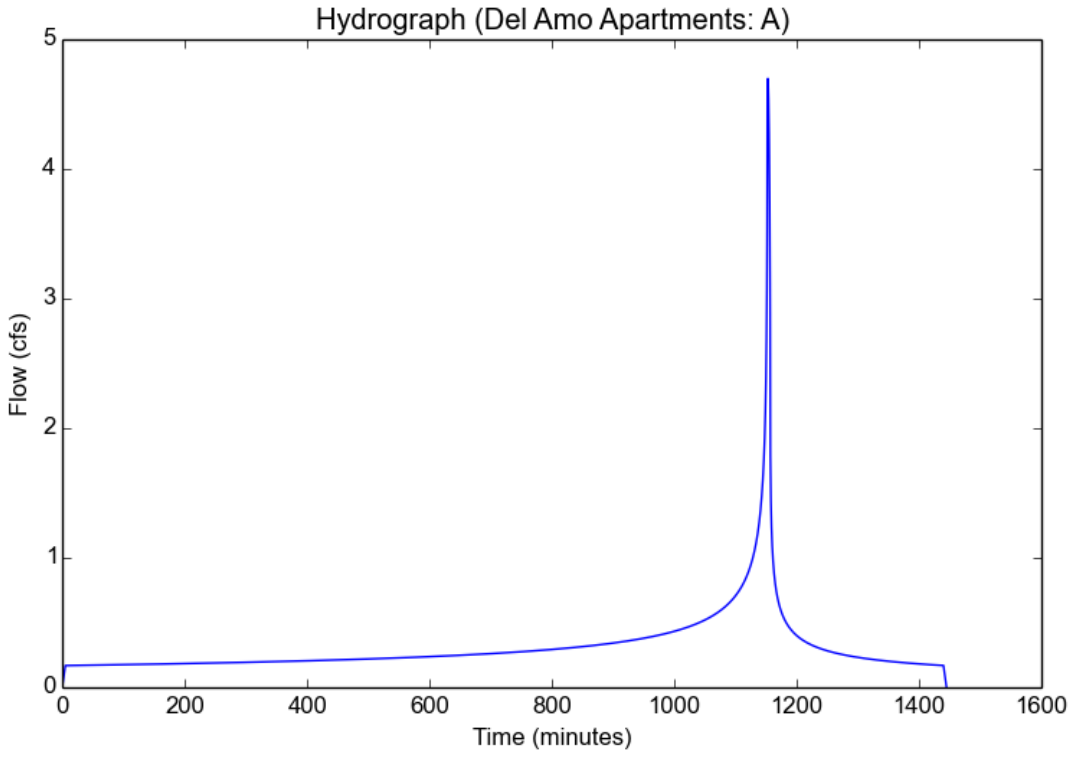
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Del Amo Apartments
Subarea ID	A
Area (ac)	2.84
Flow Path Length (ft)	254.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	5.6
Percent Impervious	0.9
Soil Type	10
Design Storm Frequency	5-yr
Fire Factor	0
LID	False

Output Results

Modeled (5-yr) Rainfall Depth (in)	3.2704
Peak Intensity (in/hr)	1.9512
Undeveloped Runoff Coefficient (Cu)	0.3786
Developed Runoff Coefficient (Cd)	0.8479
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.6984
Burned Peak Flow Rate (cfs)	4.6984
24-Hr Clear Runoff Volume (ac-ft)	0.6304
24-Hr Clear Runoff Volume (cu-ft)	27460.2236



Peak Flow Hydrologic Analysis

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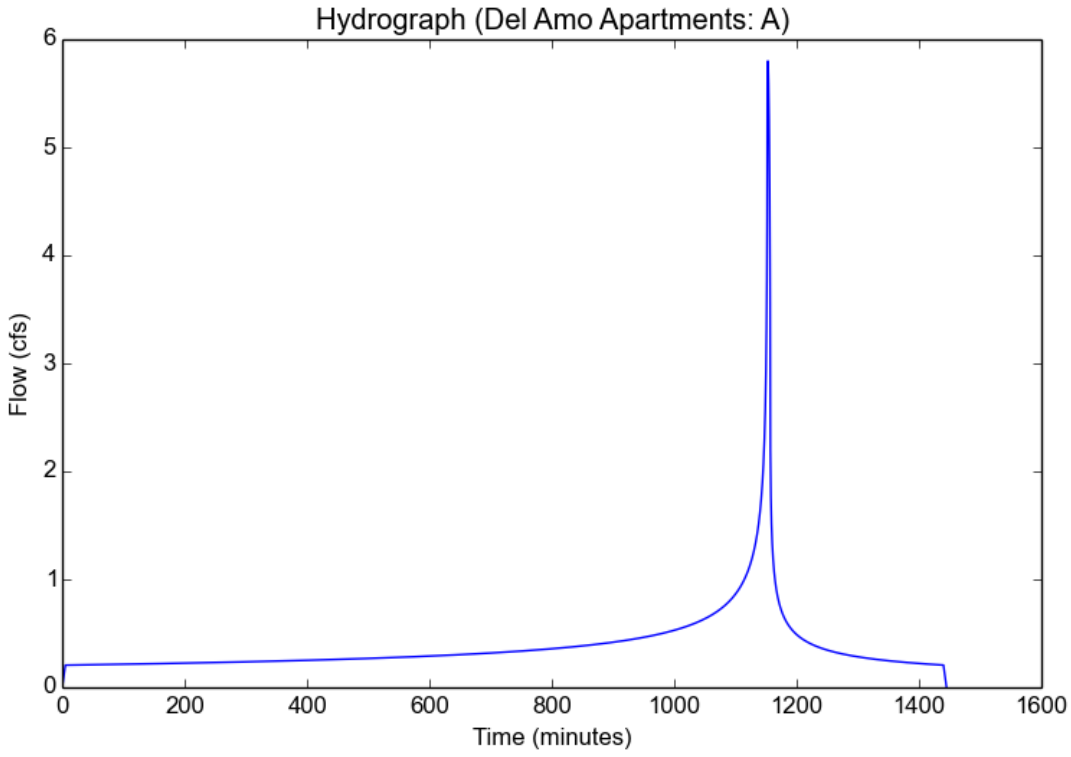
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Del Amo Apartments
Subarea ID	A
Area (ac)	2.84
Flow Path Length (ft)	254.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	5.6
Percent Impervious	0.9
Soil Type	10
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.9984
Peak Intensity (in/hr)	2.3856
Undeveloped Runoff Coefficient (Cu)	0.4611
Developed Runoff Coefficient (Cd)	0.8561
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.8001
Burned Peak Flow Rate (cfs)	5.8001
24-Hr Clear Runoff Volume (ac-ft)	0.7712
24-Hr Clear Runoff Volume (cu-ft)	33594.51



Peak Flow Hydrologic Analysis

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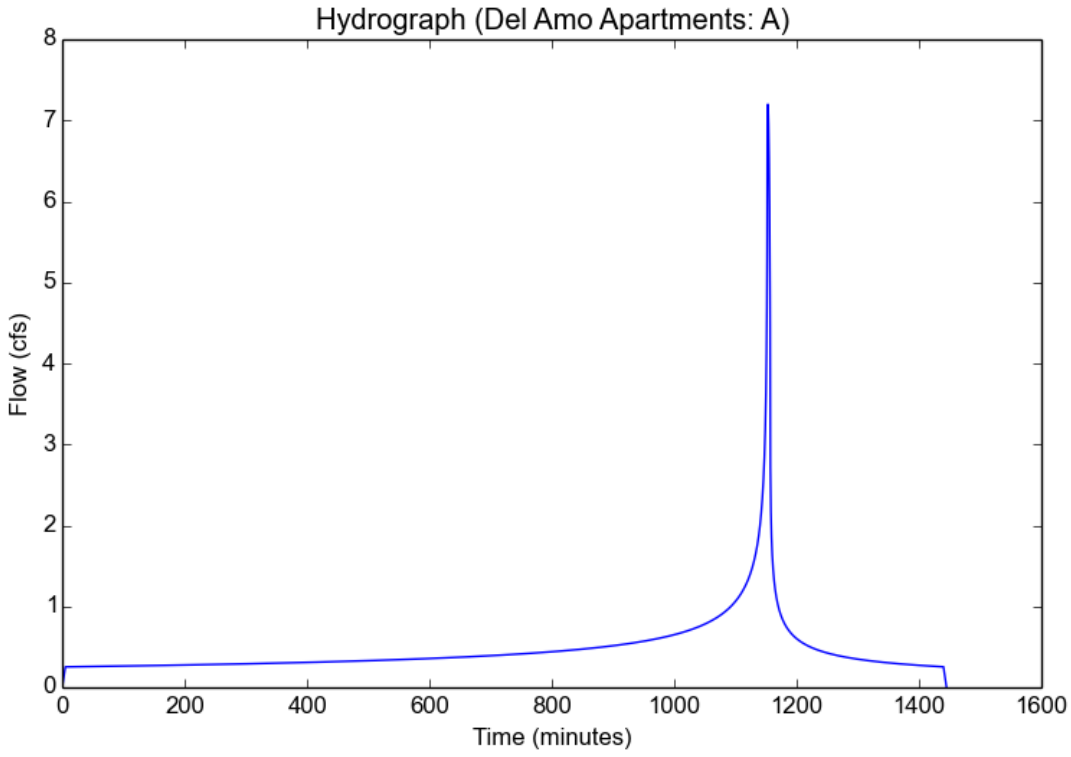
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Del Amo Apartments
Subarea ID	A
Area (ac)	2.84
Flow Path Length (ft)	254.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	5.6
Percent Impervious	0.9
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	4.9168
Peak Intensity (in/hr)	2.9335
Undeveloped Runoff Coefficient (Cu)	0.5414
Developed Runoff Coefficient (Cd)	0.8641
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	7.1993
Burned Peak Flow Rate (cfs)	7.1993
24-Hr Clear Runoff Volume (ac-ft)	0.9491
24-Hr Clear Runoff Volume (cu-ft)	41344.6859



Peak Flow Hydrologic Analysis

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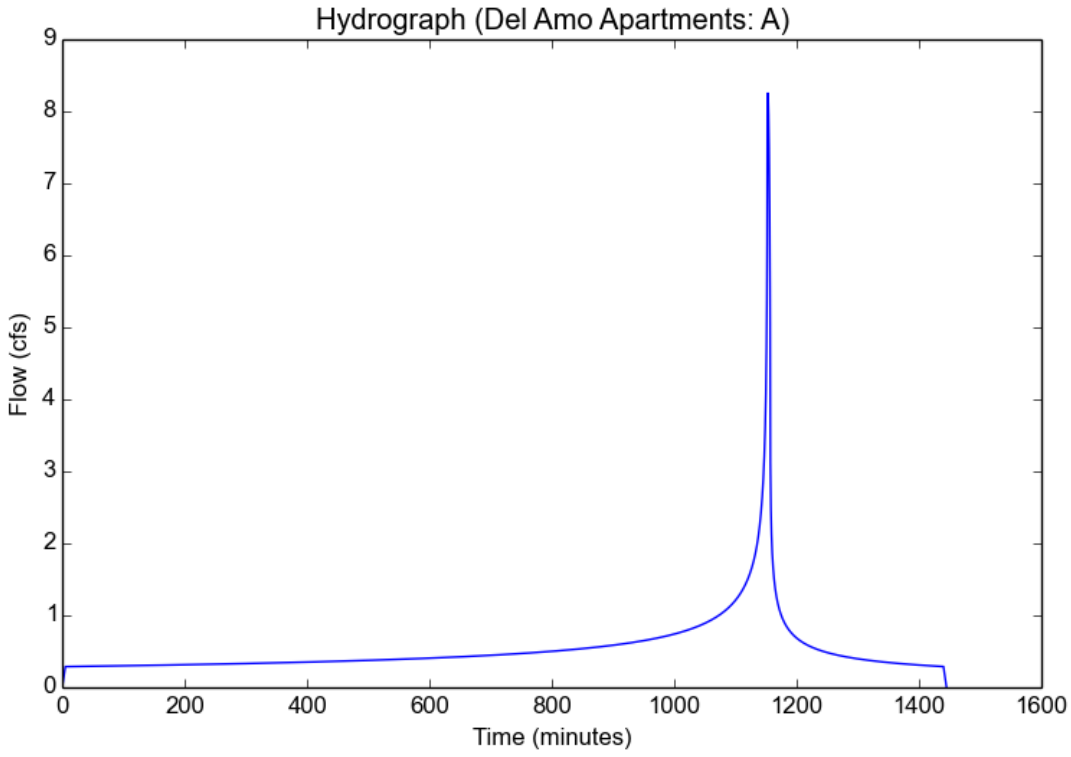
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Del Amo Apartments
Subarea ID	A
Area (ac)	2.84
Flow Path Length (ft)	254.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	5.6
Percent Impervious	0.9
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.6
Peak Intensity (in/hr)	3.3411
Undeveloped Runoff Coefficient (Cu)	0.5965
Developed Runoff Coefficient (Cd)	0.8697
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	8.2519
Burned Peak Flow Rate (cfs)	8.2519
24-Hr Clear Runoff Volume (ac-ft)	1.0817
24-Hr Clear Runoff Volume (cu-ft)	47118.7367



Peak Flow Hydrologic Analysis

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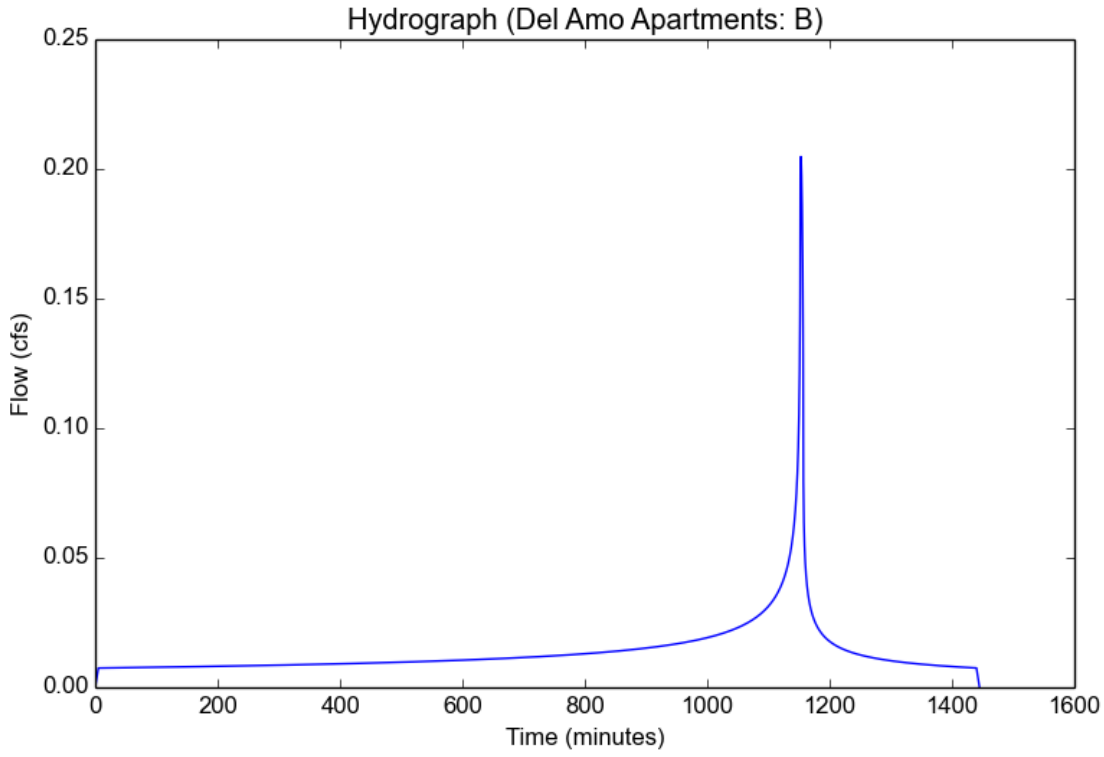
Input Parameters

Project Name	Del Amo Apartments
Subarea ID	B
Area (ac)	0.19
Flow Path Length (ft)	66.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	5.6
Percent Impervious	0.9
Soil Type	10
Design Storm Frequency	2-yr
Fire Factor	0
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.1672
Peak Intensity (in/hr)	1.293
Undeveloped Runoff Coefficient (Cu)	0.2342
Developed Runoff Coefficient (Cd)	0.8334
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.2047
Burned Peak Flow Rate (cfs)	0.2047
24-Hr Clear Runoff Volume (ac-ft)	0.0279
24-Hr Clear Runoff Volume (cu-ft)	1216.2405



Peak Flow Hydrologic Analysis

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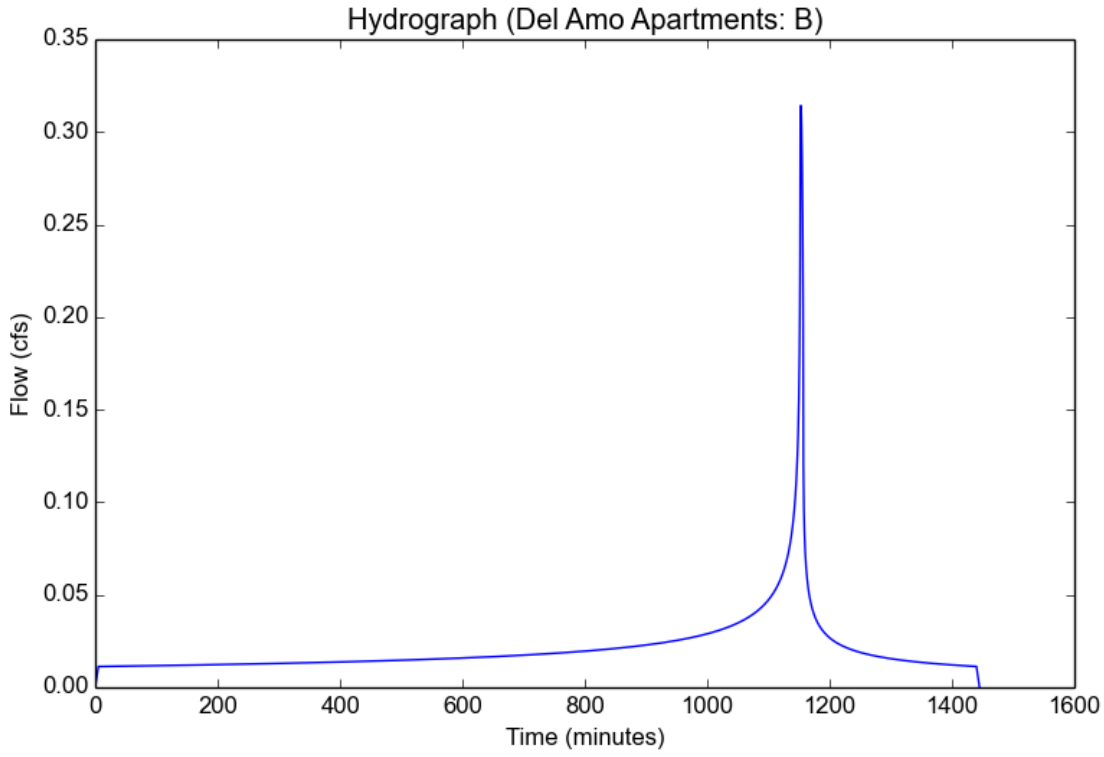
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Del Amo Apartments
Subarea ID	B
Area (ac)	0.19
Flow Path Length (ft)	66.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	5.6
Percent Impervious	0.9
Soil Type	10
Design Storm Frequency	5-yr
Fire Factor	0
LID	False

Output Results

Modeled (5-yr) Rainfall Depth (in)	3.2704
Peak Intensity (in/hr)	1.9512
Undeveloped Runoff Coefficient (Cu)	0.3786
Developed Runoff Coefficient (Cd)	0.8479
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.3143
Burned Peak Flow Rate (cfs)	0.3143
24-Hr Clear Runoff Volume (ac-ft)	0.0422
24-Hr Clear Runoff Volume (cu-ft)	1837.1276



Peak Flow Hydrologic Analysis

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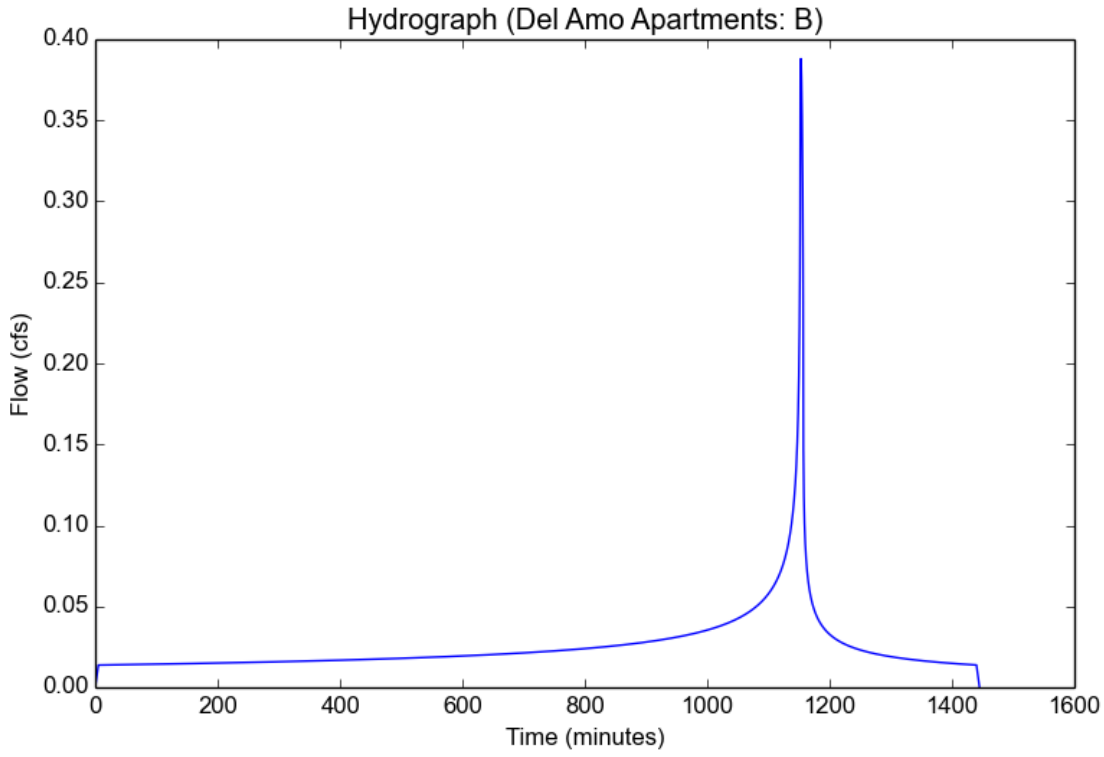
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Del Amo Apartments
Subarea ID	B
Area (ac)	0.19
Flow Path Length (ft)	66.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	5.6
Percent Impervious	0.9
Soil Type	10
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.9984
Peak Intensity (in/hr)	2.3856
Undeveloped Runoff Coefficient (Cu)	0.4611
Developed Runoff Coefficient (Cd)	0.8561
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.388
Burned Peak Flow Rate (cfs)	0.388
24-Hr Clear Runoff Volume (ac-ft)	0.0516
24-Hr Clear Runoff Volume (cu-ft)	2247.52



Peak Flow Hydrologic Analysis

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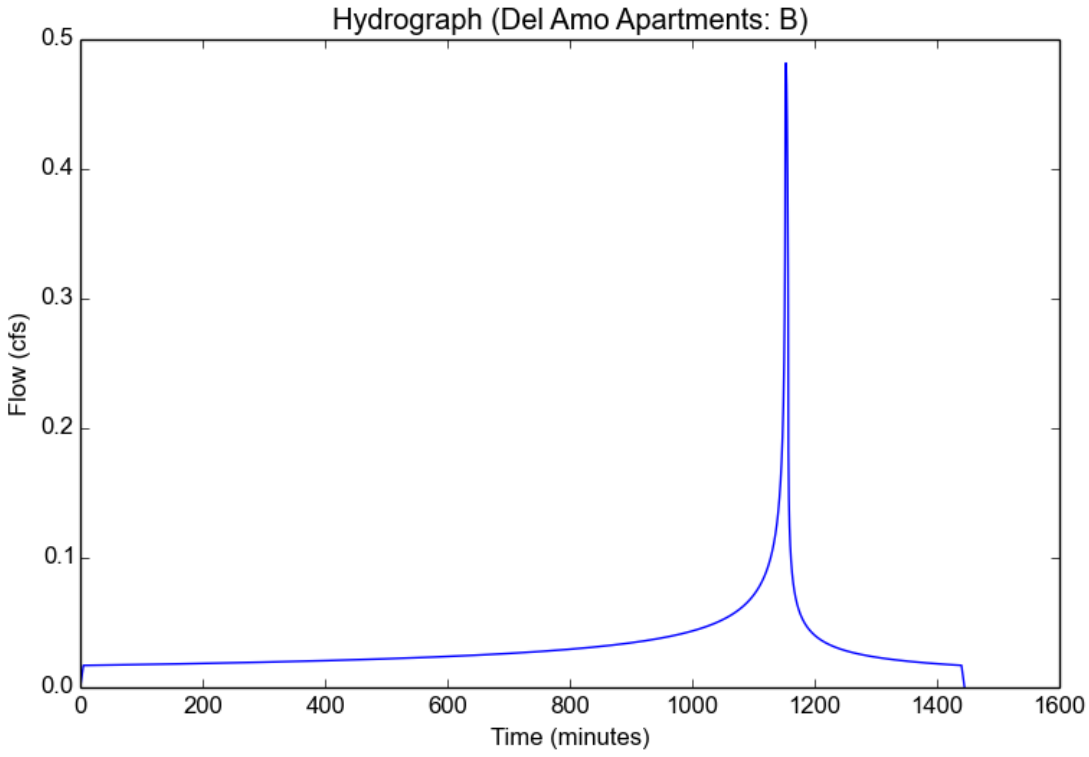
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Del Amo Apartments
Subarea ID	B
Area (ac)	0.19
Flow Path Length (ft)	66.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	5.6
Percent Impervious	0.9
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	4.9168
Peak Intensity (in/hr)	2.9335
Undeveloped Runoff Coefficient (Cu)	0.5414
Developed Runoff Coefficient (Cd)	0.8641
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.4816
Burned Peak Flow Rate (cfs)	0.4816
24-Hr Clear Runoff Volume (ac-ft)	0.0635
24-Hr Clear Runoff Volume (cu-ft)	2766.0177



Peak Flow Hydrologic Analysis

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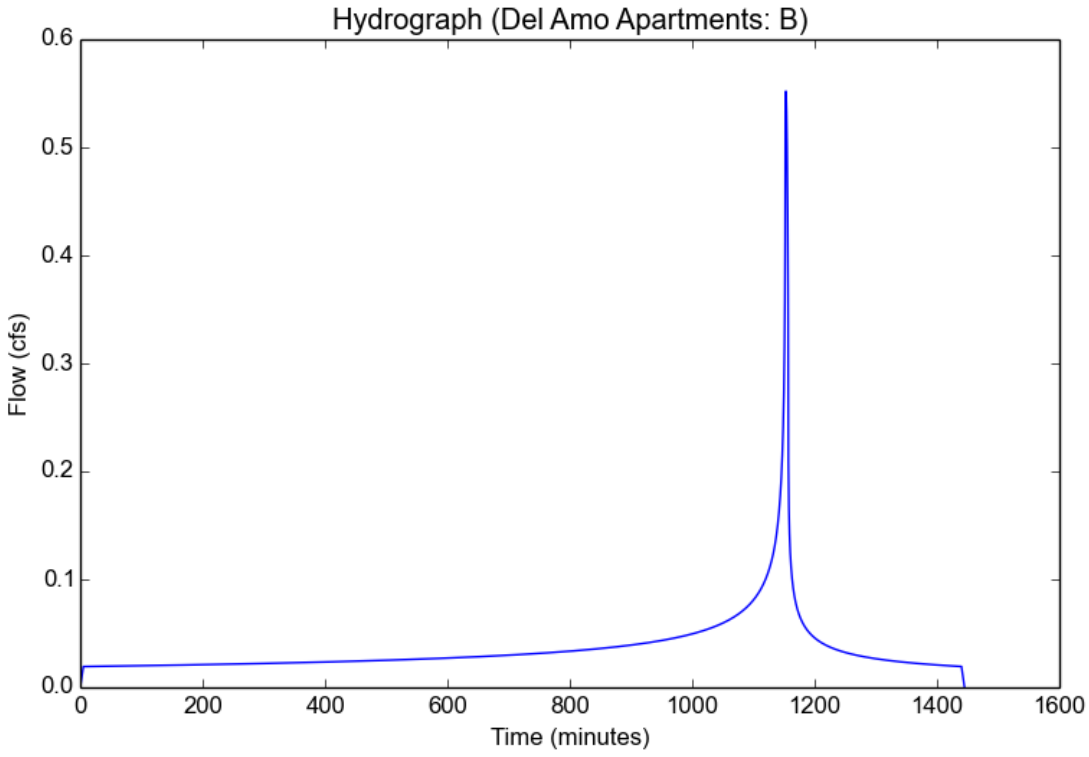
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Del Amo Apartments
Subarea ID	B
Area (ac)	0.19
Flow Path Length (ft)	66.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	5.6
Percent Impervious	0.9
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.6
Peak Intensity (in/hr)	3.3411
Undeveloped Runoff Coefficient (Cu)	0.5965
Developed Runoff Coefficient (Cd)	0.8697
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.5521
Burned Peak Flow Rate (cfs)	0.5521
24-Hr Clear Runoff Volume (ac-ft)	0.0724
24-Hr Clear Runoff Volume (cu-ft)	3152.3098



APPENDIX C

Post-Development Hydrology Calculations

Peak Flow Hydrologic Analysis

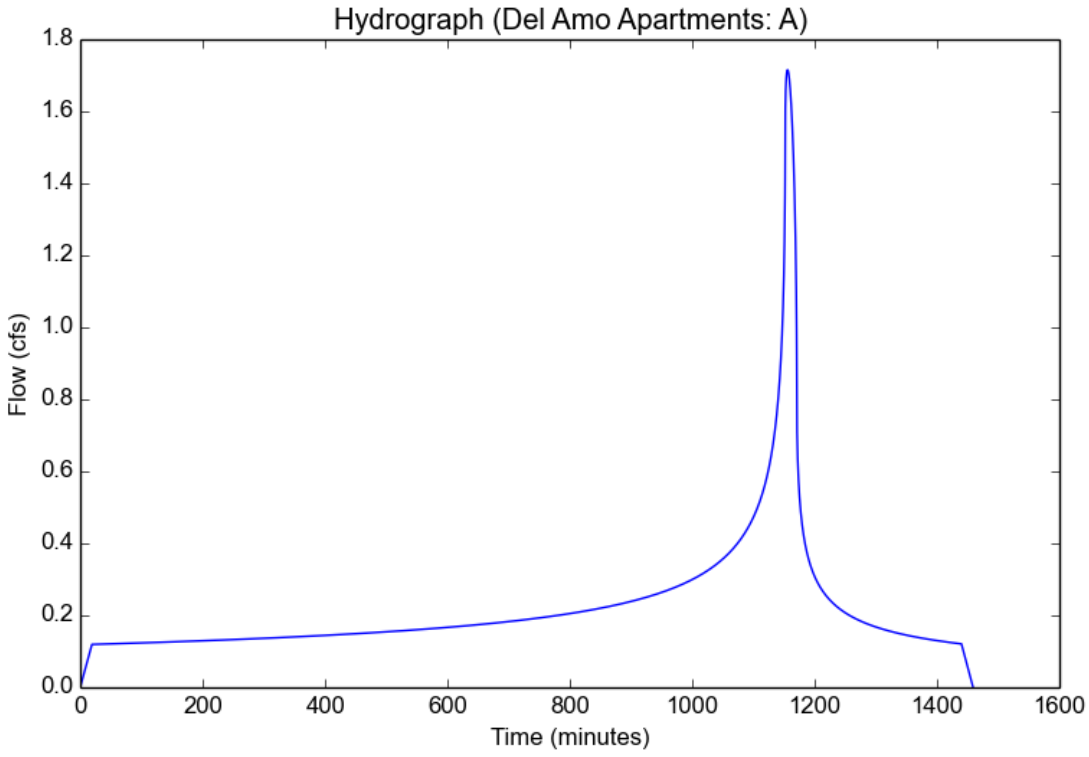
File location: C:/Users/Eduardo Cruz/Desktop/Hydro Calc/Del Amo/Proposed/01_Del Amo Apartments PR_A-2.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Del Amo Apartments
Subarea ID	A
Area (ac)	3.03
Flow Path Length (ft)	714.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	5.6
Percent Impervious	0.9
Soil Type	10
Design Storm Frequency	2-yr
Fire Factor	0
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.1672
Peak Intensity (in/hr)	0.6904
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.82
Time of Concentration (min)	19.0
Clear Peak Flow Rate (cfs)	1.7154
Burned Peak Flow Rate (cfs)	1.7154
24-Hr Clear Runoff Volume (ac-ft)	0.445
24-Hr Clear Runoff Volume (cu-ft)	19384.7391



Peak Flow Hydrologic Analysis

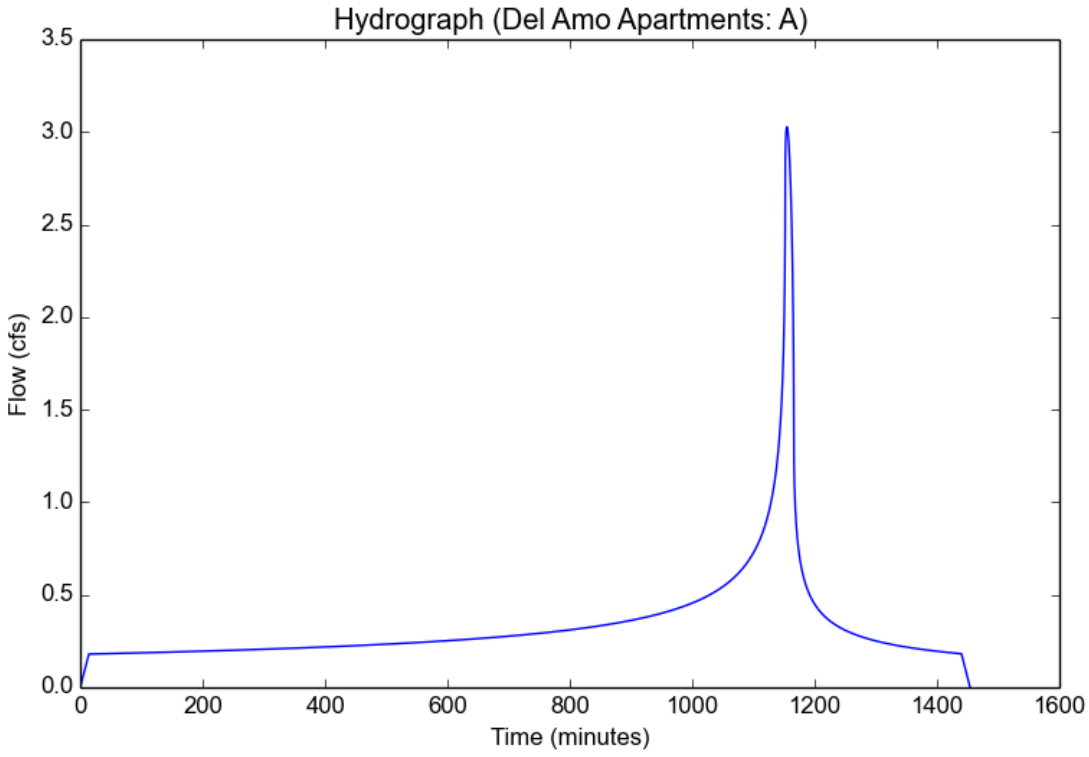
File location: C:/Users/Eduardo Cruz/Desktop/Hydro Calc/Del Amo/Proposed/02_Del Amo Apartments PR_A-5.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Del Amo Apartments
Subarea ID	A
Area (ac)	3.03
Flow Path Length (ft)	714.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	5.6
Percent Impervious	0.9
Soil Type	10
Design Storm Frequency	5-yr
Fire Factor	0
LID	False

Output Results

Modeled (5-yr) Rainfall Depth (in)	3.2704
Peak Intensity (in/hr)	1.2027
Undeveloped Runoff Coefficient (Cu)	0.2085
Developed Runoff Coefficient (Cd)	0.8309
Time of Concentration (min)	14.0
Clear Peak Flow Rate (cfs)	3.0277
Burned Peak Flow Rate (cfs)	3.0277
24-Hr Clear Runoff Volume (ac-ft)	0.6721
24-Hr Clear Runoff Volume (cu-ft)	29274.6579



Peak Flow Hydrologic Analysis

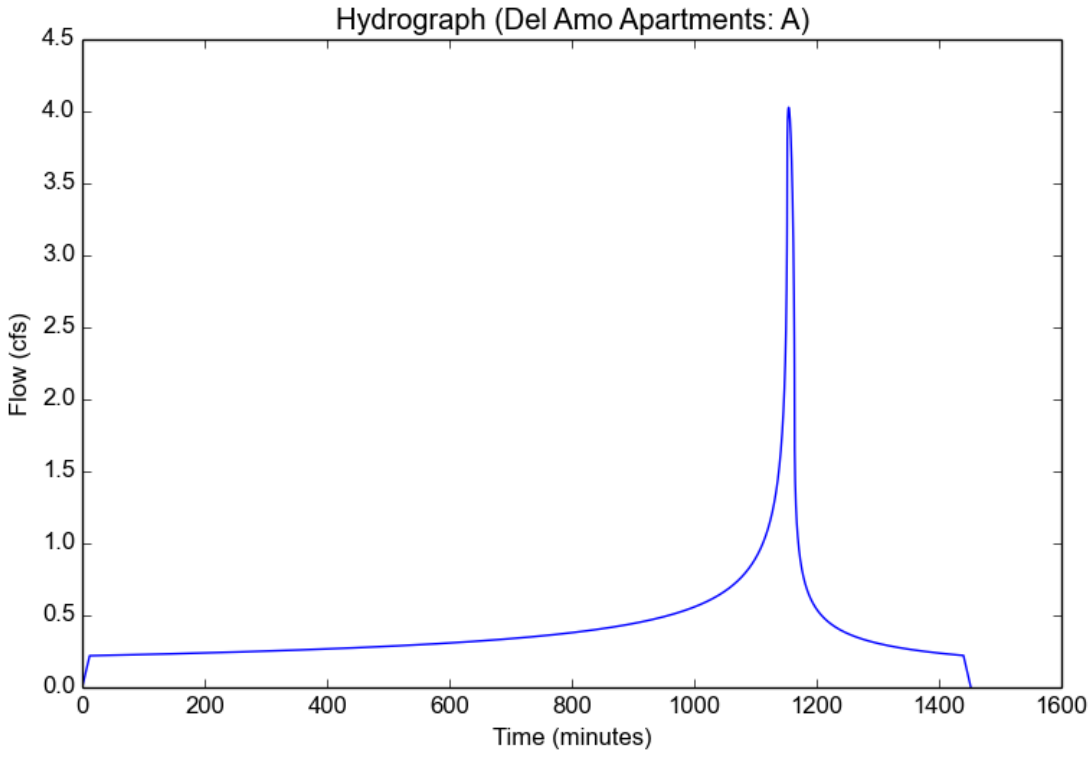
File location: C:/Users/Eduardo Cruz/Desktop/Hydro Calc/Del Amo/Proposed/03_Del Amo Apartments PR_A-10.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Del Amo Apartments
Subarea ID	A
Area (ac)	3.03
Flow Path Length (ft)	714.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	5.6
Percent Impervious	0.9
Soil Type	10
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.9984
Peak Intensity (in/hr)	1.5808
Undeveloped Runoff Coefficient (Cu)	0.3082
Developed Runoff Coefficient (Cd)	0.8408
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	4.0275
Burned Peak Flow Rate (cfs)	4.0275
24-Hr Clear Runoff Volume (ac-ft)	0.8224
24-Hr Clear Runoff Volume (cu-ft)	35822.1537



Peak Flow Hydrologic Analysis

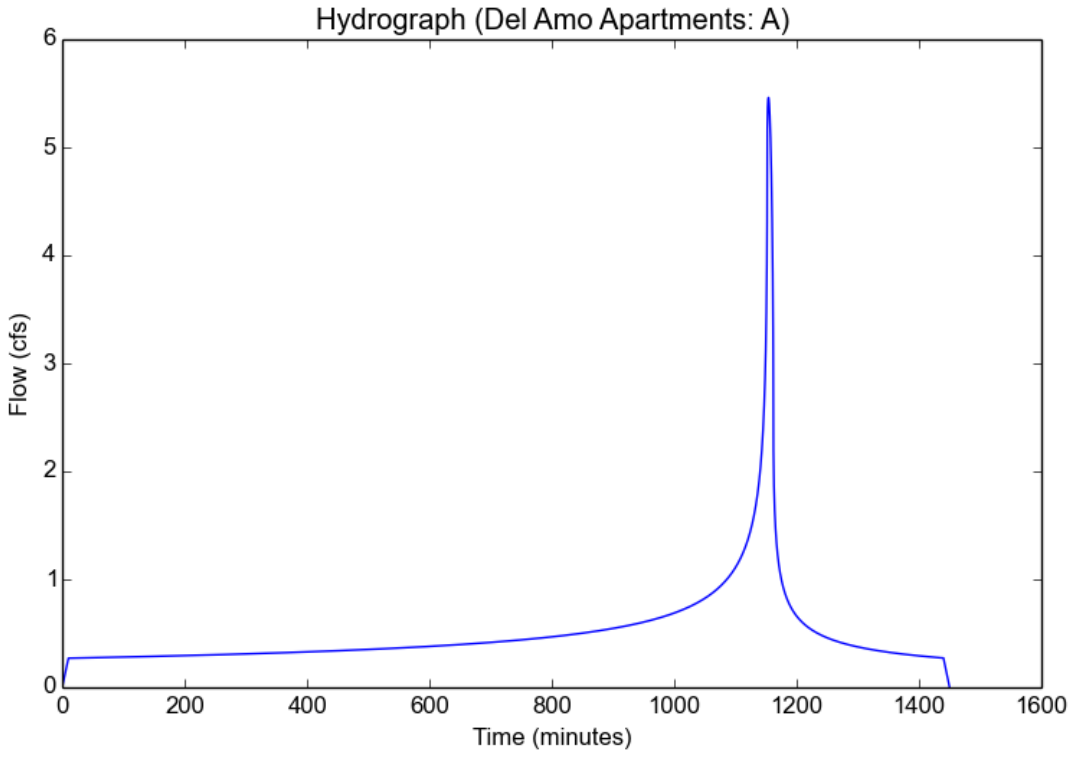
File location: C:/Users/Eduardo Cruz/Desktop/Hydro Calc/Del Amo/Proposed/04_Del Amo Apartments PR_A-25.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Del Amo Apartments
Subarea ID	A
Area (ac)	3.03
Flow Path Length (ft)	714.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	5.6
Percent Impervious	0.9
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	4.9168
Peak Intensity (in/hr)	2.1179
Undeveloped Runoff Coefficient (Cu)	0.4103
Developed Runoff Coefficient (Cd)	0.851
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	5.4612
Burned Peak Flow Rate (cfs)	5.4612
24-Hr Clear Runoff Volume (ac-ft)	1.0122
24-Hr Clear Runoff Volume (cu-ft)	44091.7078



Peak Flow Hydrologic Analysis

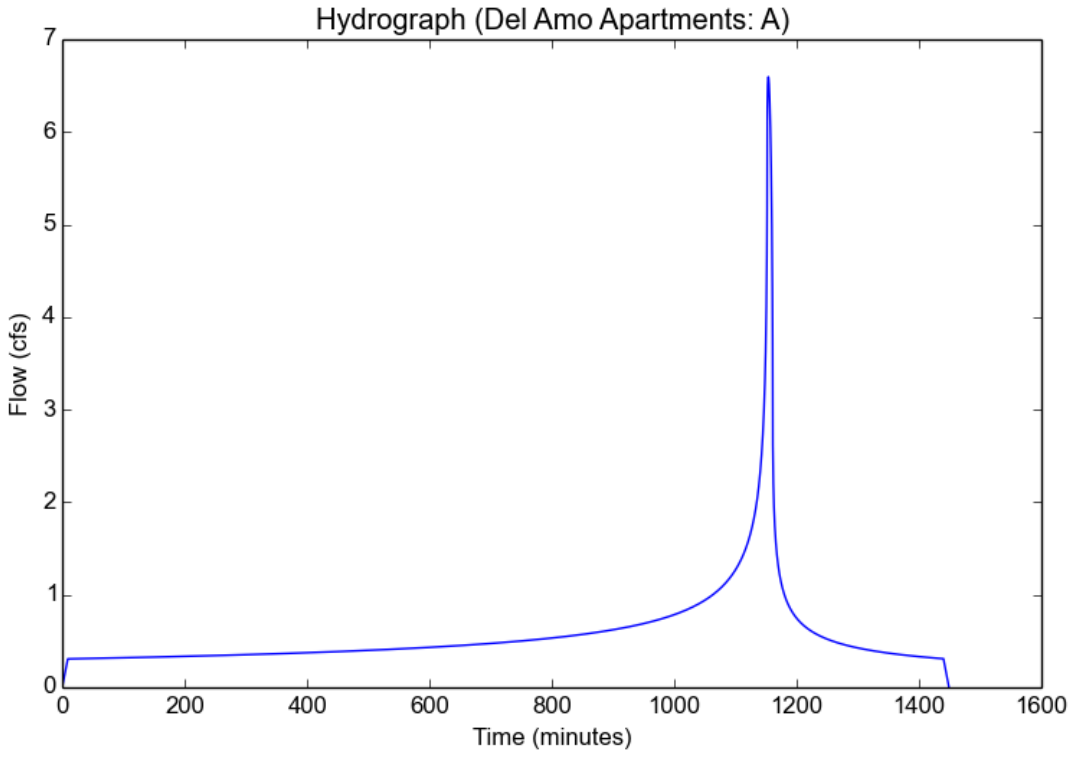
File location: C:/Users/Eduardo Cruz/Desktop/Hydro Calc/Del Amo/Proposed/05_Del Amo Apartments PR_A-50.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Del Amo Apartments
Subarea ID	A
Area (ac)	3.03
Flow Path Length (ft)	714.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	5.6
Percent Impervious	0.9
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

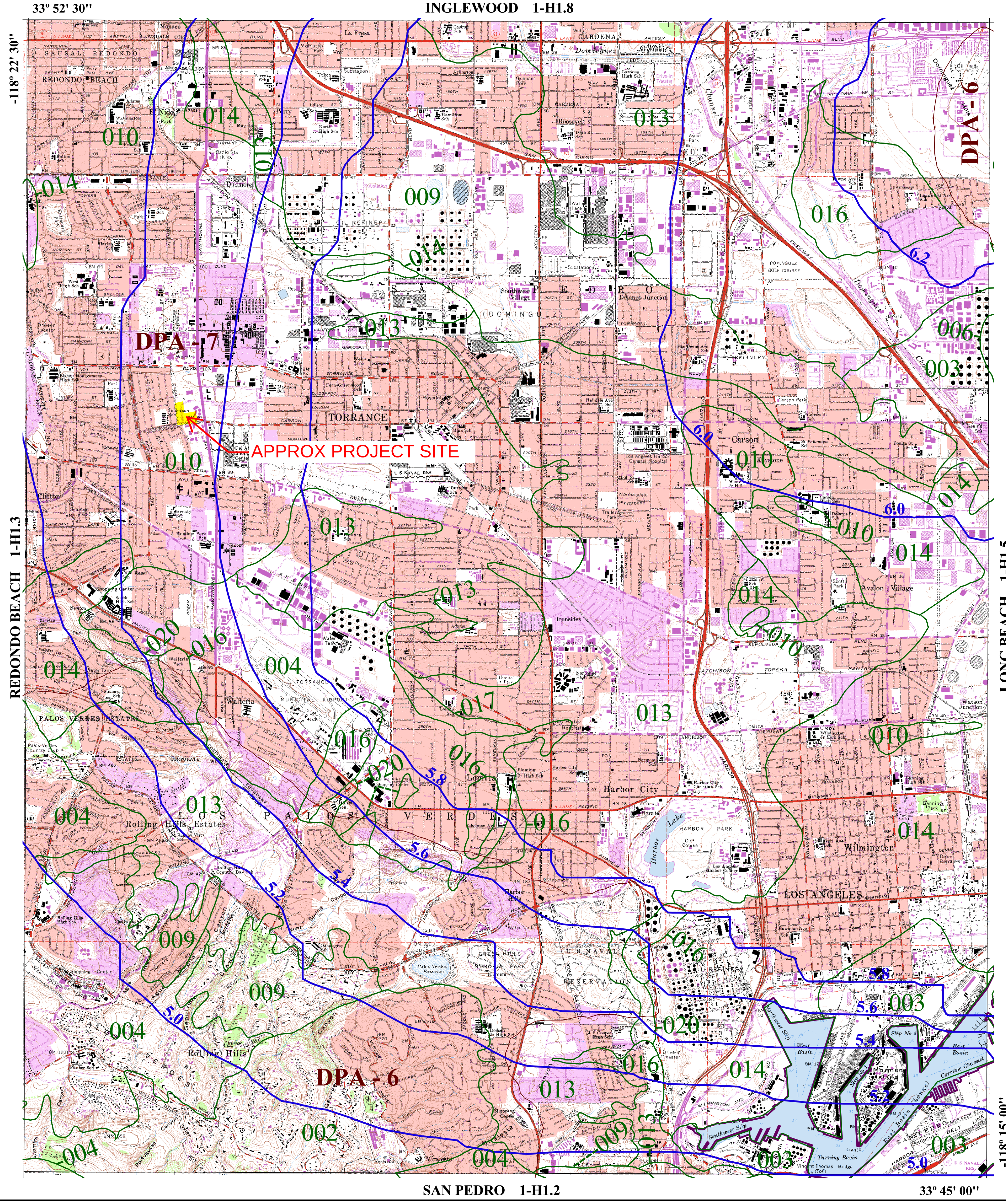
Output Results

Modeled (50-yr) Rainfall Depth (in)	5.6
Peak Intensity (in/hr)	2.5346
Undeveloped Runoff Coefficient (Cu)	0.4875
Developed Runoff Coefficient (Cd)	0.8588
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	6.5951
Burned Peak Flow Rate (cfs)	6.5951
24-Hr Clear Runoff Volume (ac-ft)	1.1537
24-Hr Clear Runoff Volume (cu-ft)	50254.7673



APPENDIX D

Site Characteristics



016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

1 0 1 2 Miles

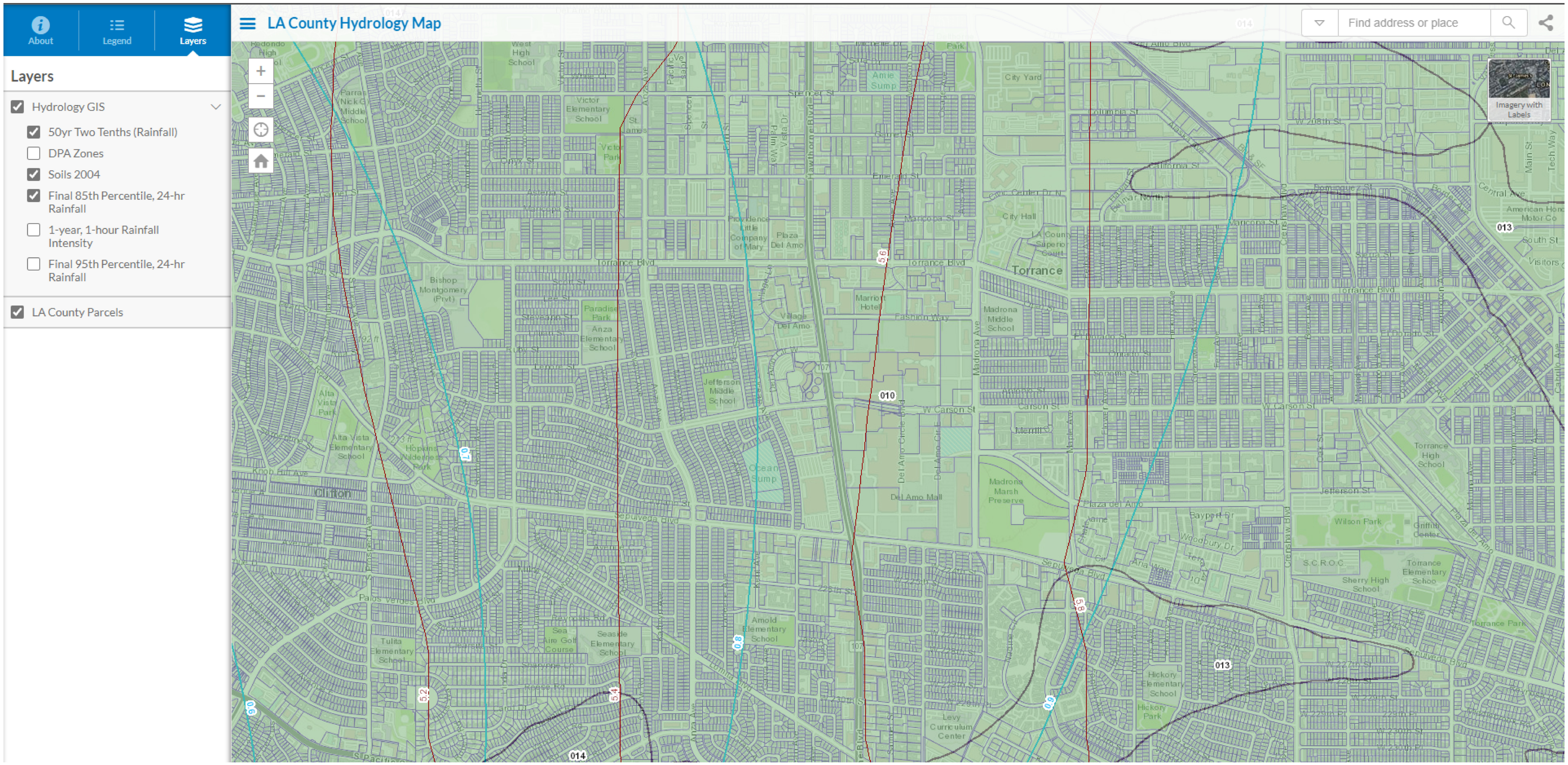
25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878

10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

TORRANCE

50-YEAR 24-HOUR ISOHYET

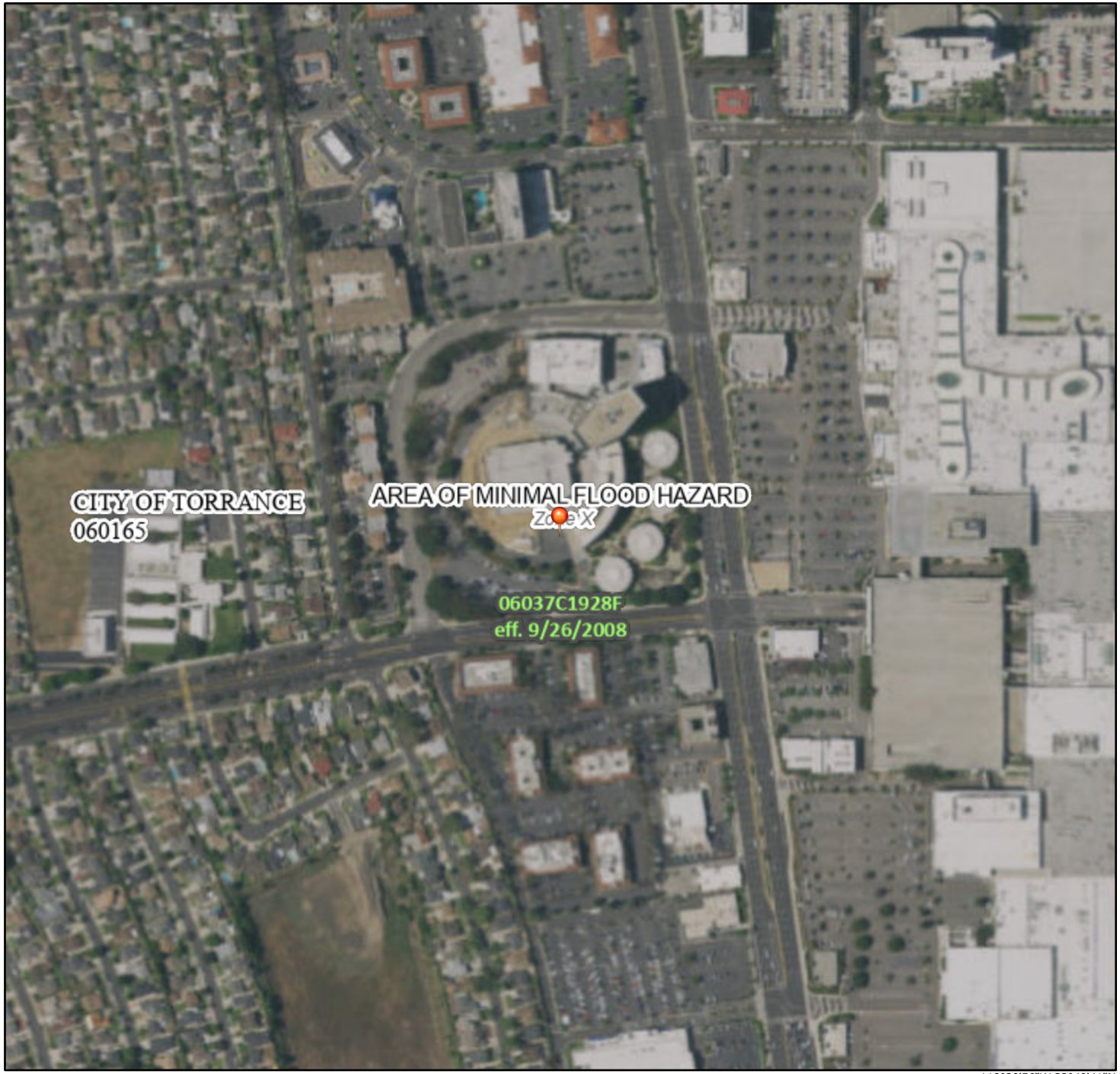
1-H1.4


About
Legend
Layers
LA County Hydrology Map
Find address or place
Layers
Hydrology GIS
50yr Two Tenths (Rainfall)
DPA Zones
Soils 2004
Final 85th Percentile, 24-hr Rainfall
1-year, 1-hour Rainfall Intensity
Final 95th Percentile, 24-hr Rainfall
LA County Parcels
Imagery with Labels
Torrance
Torrance Blvd
W Carson St
Del Amo Mall
Sepulveda Blvd
Hawthorne Blvd
City Hall
City Yard
Madrona Marsh Preserve
Torrance High School
Wilson Park
010
013
014

National Flood Hazard Layer FIRMette

FEMA

118°21'34"W 33°50'10"N



118°20'56"W 33°49'41"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/13/2022 at 3:00 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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