

Appendices

Appendix L-a Hydrology and Hydraulic Report - Lot 1 South Lemon Avenue and Paseo Del Prado

Appendices

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HYDROLOGY AND HYDRAULIC REPORT

FOR

Walnut Business Park – Lot 1
South Lemon Avenue and Paseo Del Prado
Walnut, CA 91789

Owner:

IDS Real Estate Group
515 South Figueroa Street, 16th Floor
Los Angeles, CA 90071
TEL: (213) 362-9300

Prepared by:
Atlas Civil Design
872 Higuera Street
San Luis Obispo, California
(213) 810-8470

Tyler H. Johnson, PE

This Drainage Report was prepared under my supervision:

By: _____

Date: _____

Atlas Job No. 22-136



Preliminary

06/29/2023

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Section I Project Description

The proposed project is a redevelopment of an existing industrial manufacturing park located at the Southeast intersection of South Lemon Avenue and Paseo Del Prado in the City of Walnut, Los Angeles County, CA. The total site area is 10.33 acres and the project is proposing a 192,729 sf warehouse with associated landscaping, paving and parking lots.

Existing Site Drainage Condition

The existing site is an industrial manufacturing park with associated buildings, landscaping, paving and parking lots. The northwest half of the site (DA-1) drains to the southeast and sheet flows at 0.65% to multiple ribbon gutters which direct runoff to an existing on-site catch basin near the south corner of the site. This existing catch basin is directly connected to an existing 90" RCP storm drain maintained by the Los Angeles County Flood Control District.

The northeast half of the site (DA-2) drains to the southeast and sheet flows at 0.89% to multiple ribbon gutters which direct runoff over the driveways and into Paseo Sonrisa (public ROW). Runoff then flows in the curb and gutter north until it is captured by existing curb inlets that are connected to the existing 90" RCP storm drain maintained by the Los Angeles County Flood Control District.

This LACFCD storm drain flows south across the site to the intersection of South Lemon Avenue and Valley Boulevard. The Storm drain becomes a 96" RCP and flows southeast into San Jose Creek. San Jose Creek flows west until it merges with the San Gabriel River which flows south until it reaches the Pacific Ocean near Seal Beach.

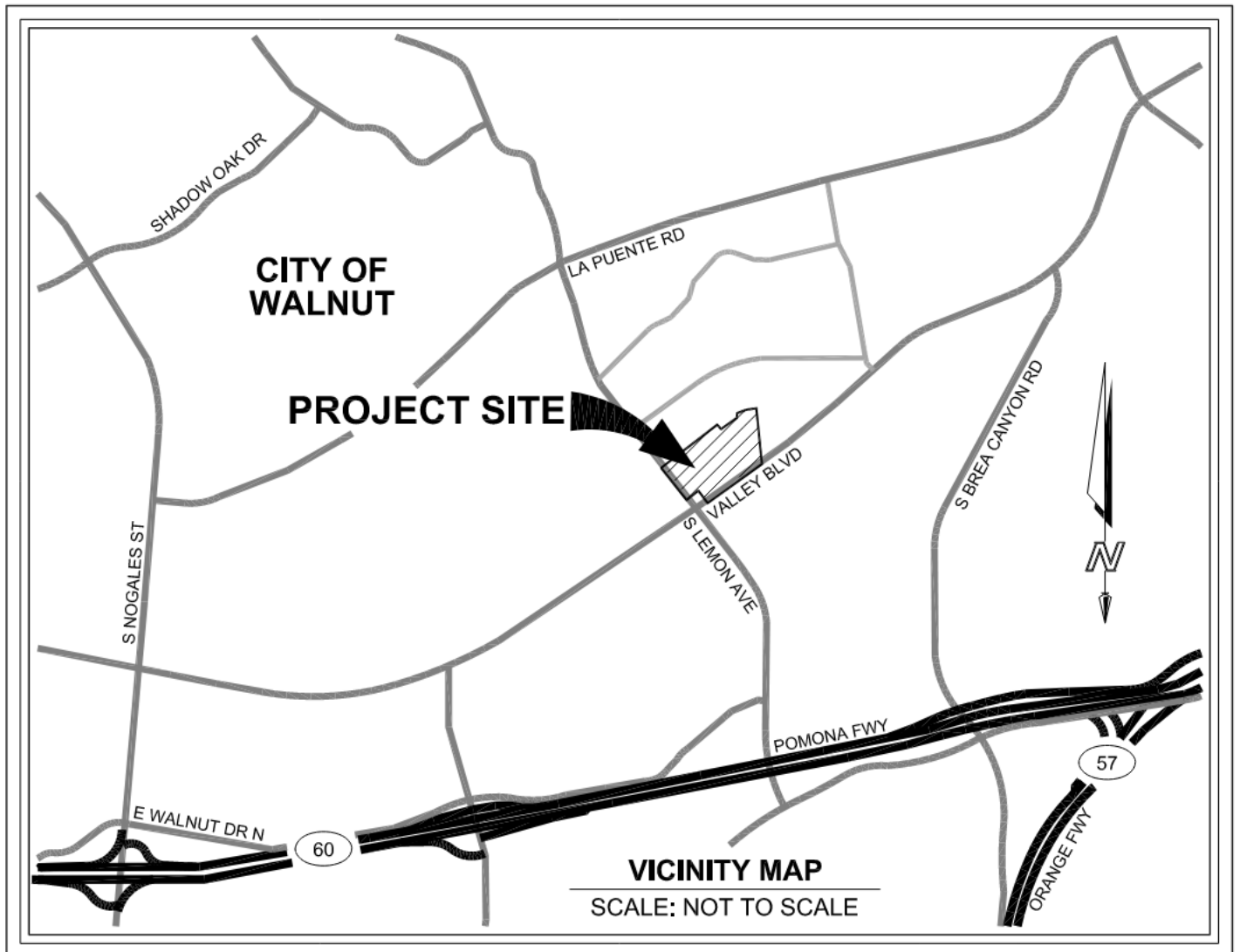
The runoff from the project site to San Jose Creek is shown in Figure-4.

Proposed Site Drainage

In the proposed condition the site drains to the southeast and sheet flows at 0.5% to multiple ribbon gutters which direct runoff to catch basins along the southeast property line. This runoff is directed to an underground detention system. The underground detention system has been sized to accommodate 150% of the 85th percentile storm event. After detention the runoff will enter a Modular Wetland BMP for Treatment. After treatment the runoff will flow to a sump pump and be pumped to the existing on-site catch basin which is connected to the existing 90" RCP storm drain. Larger storm events shall be directed around the BMP and detention system through an overflow bypass pipe and connected to the existing catch basin.

This existing catch basin is directly connected to an existing 90" RCP storm drain maintained by the Los Angeles County Flood Control District. This storm drain flows south across the site to the intersection of South Lemon Avenue and Valley Boulevard. The Storm drain becomes a 96" RCP and flows southeast into San Jose Creek. San Jose Creek flows west until it merges with the San Gabriel River which flows south until it reaches the Pacific Ocean near Seal Beach.

Section II Vicinty Map



Section III Hydology Analysis/ Methodolgy

Hydrologic calculations were performed in accordance with Los Angeles County HydroCalc Software. HydroCalc was used to determine the existing and proposed peak flows for the 25- and 50-year storm events as well as the runoff volumes.

Section IV Design Parameters

1. The drainage area is located in Soil Type 017.
2. The rainfall intensity varies for all of the storm events.
3. All flows are based on the complete future development of land and roads.
4. The Hydrology Maps attached to the back of this study are made a part of the study.
5. No pre-existing or post-development off-tract flow is being directed toward the proposed storm drain.
6. Per flood insurance rate map no. 06037c1725f project site lies in flood zone "x".
Flood "x" designation is defined as; "areas determined to be outside the 0.2% annual chance flood plain." Per the Fema web site.

Section V Runoff Peak Flows

Table 1:

Pre-Development Condition

Tributary Area	DA-1
Acreage (acres)	5.42
Time of Concentration; Tc (min)	11.0
25 yr Pre- Dev Runoff; Q ₂₅ (cfs)	11.42
50 yr Pre- Dev Runoff; Q ₅₀ (cfs)	13.64

Tributary Area	DA-2
Acreage (acres)	4.912
Time of Concentration; Tc (min)	7.0
25 yr Pre- Dev Runoff; Q ₂₅ (cfs)	12.84
50 yr Pre- Dev Runoff; Q ₅₀ (cfs)	14.64

Post-Development Condition

Tributary Area	DA-1
Acreage (acres)	10.33
Time of Concentration; Tc (min)	14.0
25 yr Post- Dev Runoff; Q ₂₅ (cfs)	17.00
50 yr Post- Dev Runoff; Q ₅₀ (cfs)	24.83

Section VI Runoff Volumes

Table 2: Estimated Storm Runoff Volumes

Pre-Development Condition

Tributary Area	DA-1
Acreage (acre)	5.42
CN (Weighted)	0.899
25 year Pre-Develop. Volume V_{25} (cu-ft)	93,333
50 year Pre-Develop. Volume V_{50} (cu-ft)	106,588

Pre-Development Condition

Tributary Area	DA-2
Acreage (acre)	4.912
CN (Weighted)	0.899
25 year Pre-Develop. Volume V_{25} (cu-ft)	84,521
50 year Pre-Develop. Volume V_{50} (cu-ft)	96,526

Post-Development Condition

Tributary Area	DA-1
Acreage (acre)	10.33
CN (Weighted)	0.893
25 year Post-Develop. Volume V_{25} (cu-ft)	155,147
50 year Post-Develop. Volume V_{50} (cu-ft)	202,237

Section VII Conclusion

The Post-development condition will decrease peak flow by 7.26 cfs for the 25-year Storm Event.
The Post-development condition will decrease peak flow by 3.45 cfs for the 50-year Storm Event.

The Post-development condition will decrease runoff volume by 22,707 cf for the 25-year Storm Event.

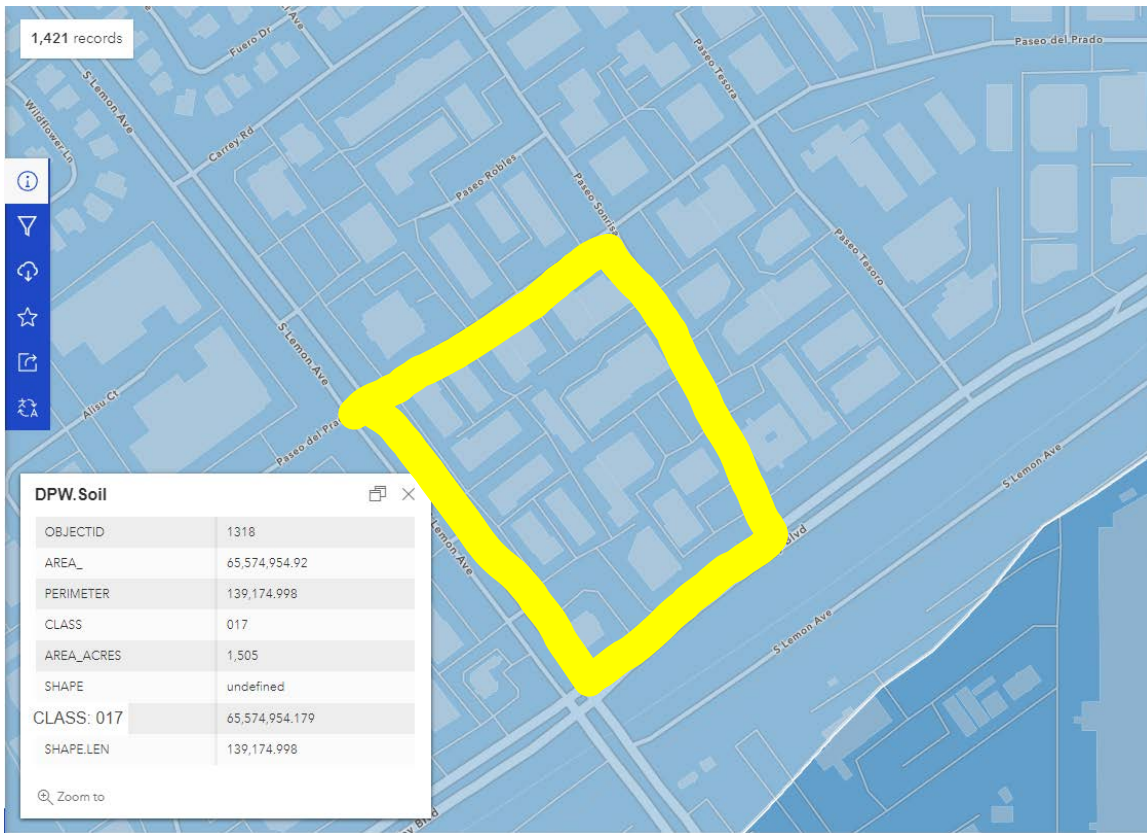
The Post-development condition will decrease runoff volume by 877 cf for the 50-year Storm Event.

Hydraulic analysis was performed for the 25yr storm event using the Hydraflow Express Extension for Civil 3D for each DA and associated outlet. In order to avoid flooding issues for storm events larger than the 85th Percentile storm event, pipe sizing calculations uses a 25-yr storm event to evaluate feasibility of the pipes capacity. The sizing calculation uses a 25-yr storm event for the 24" Grated drop inlets. The Following exhibits provide hydraulic analysis of each DMA outlet and the grated inlet capacity. According to the calculations, the pipes and grates are able to convey the 25-yr storm.

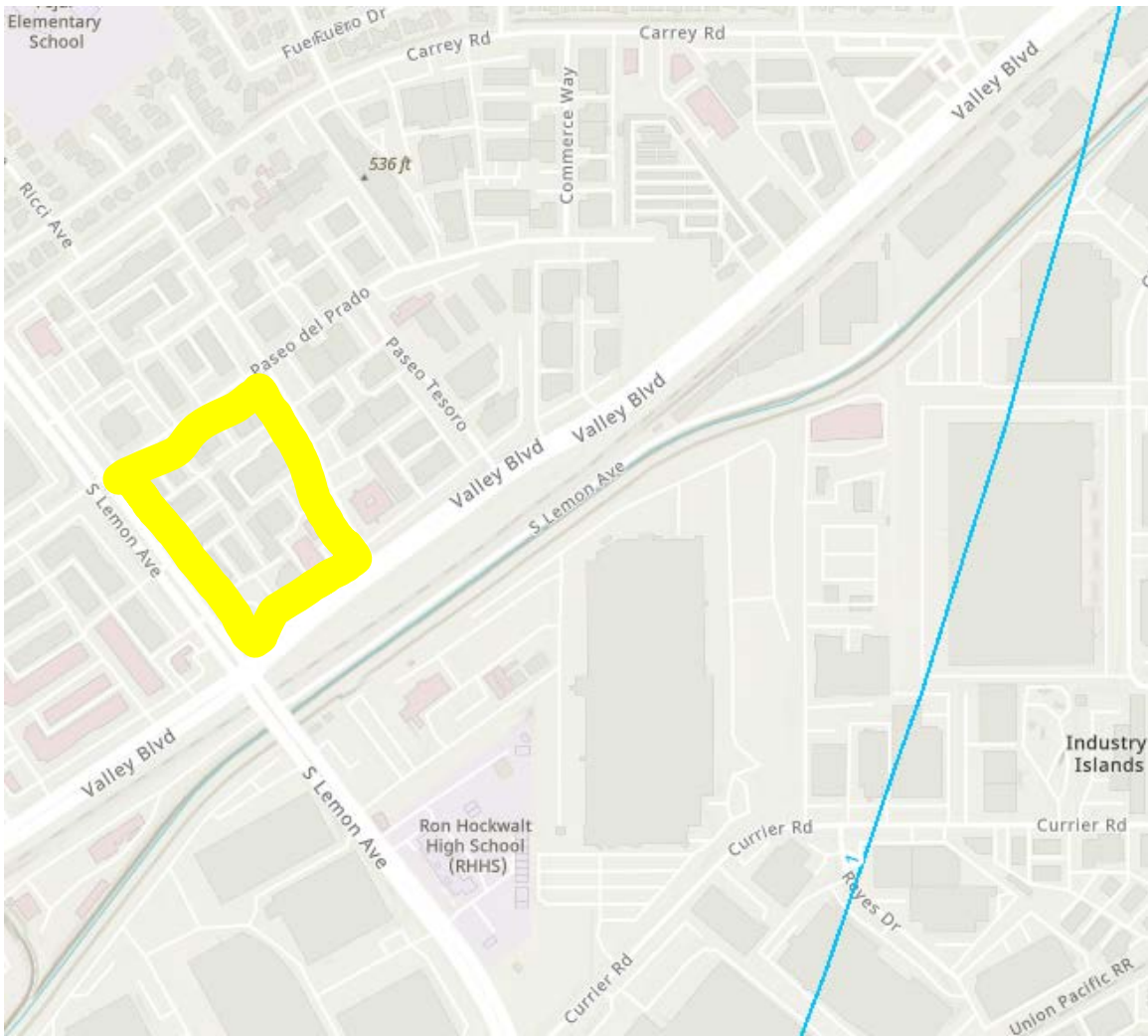
Attachment A

Figures

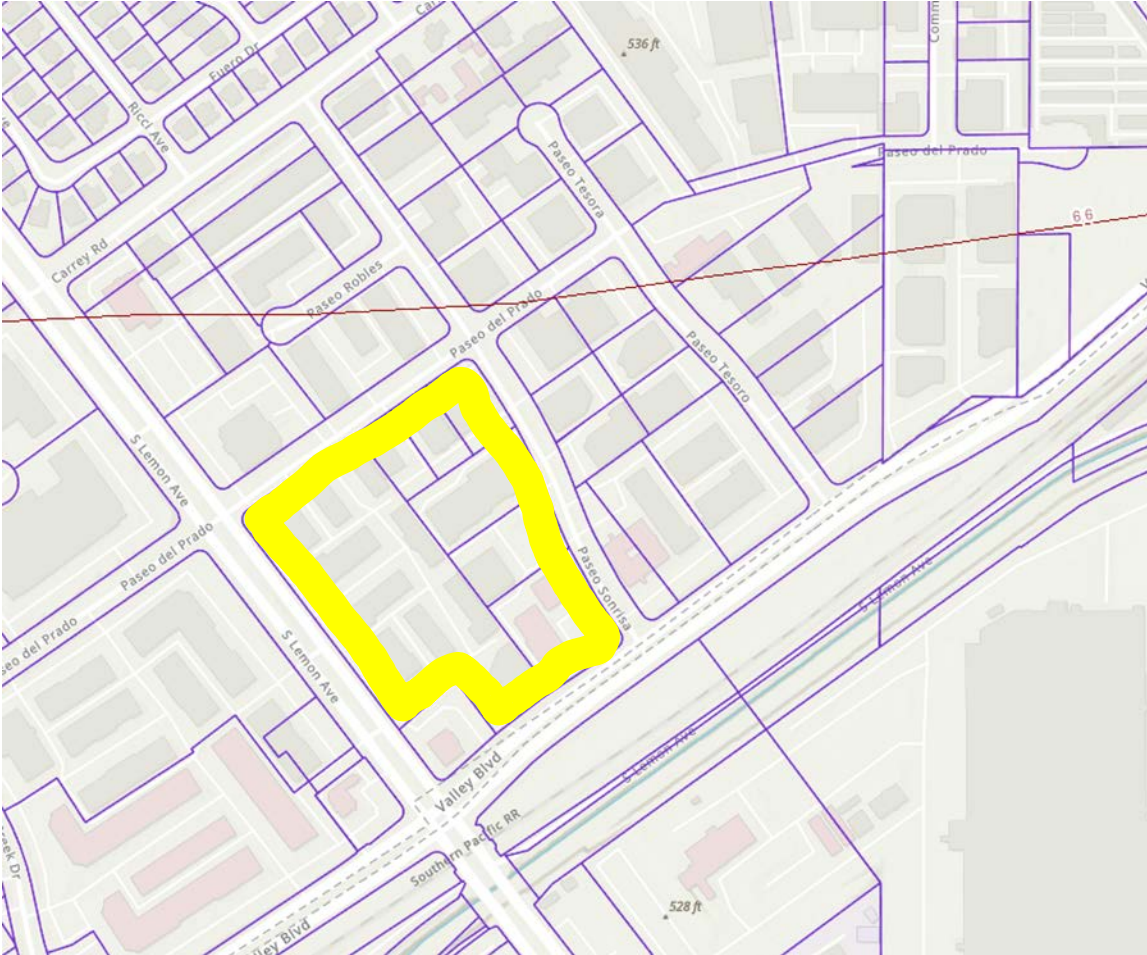
Soils Group Map



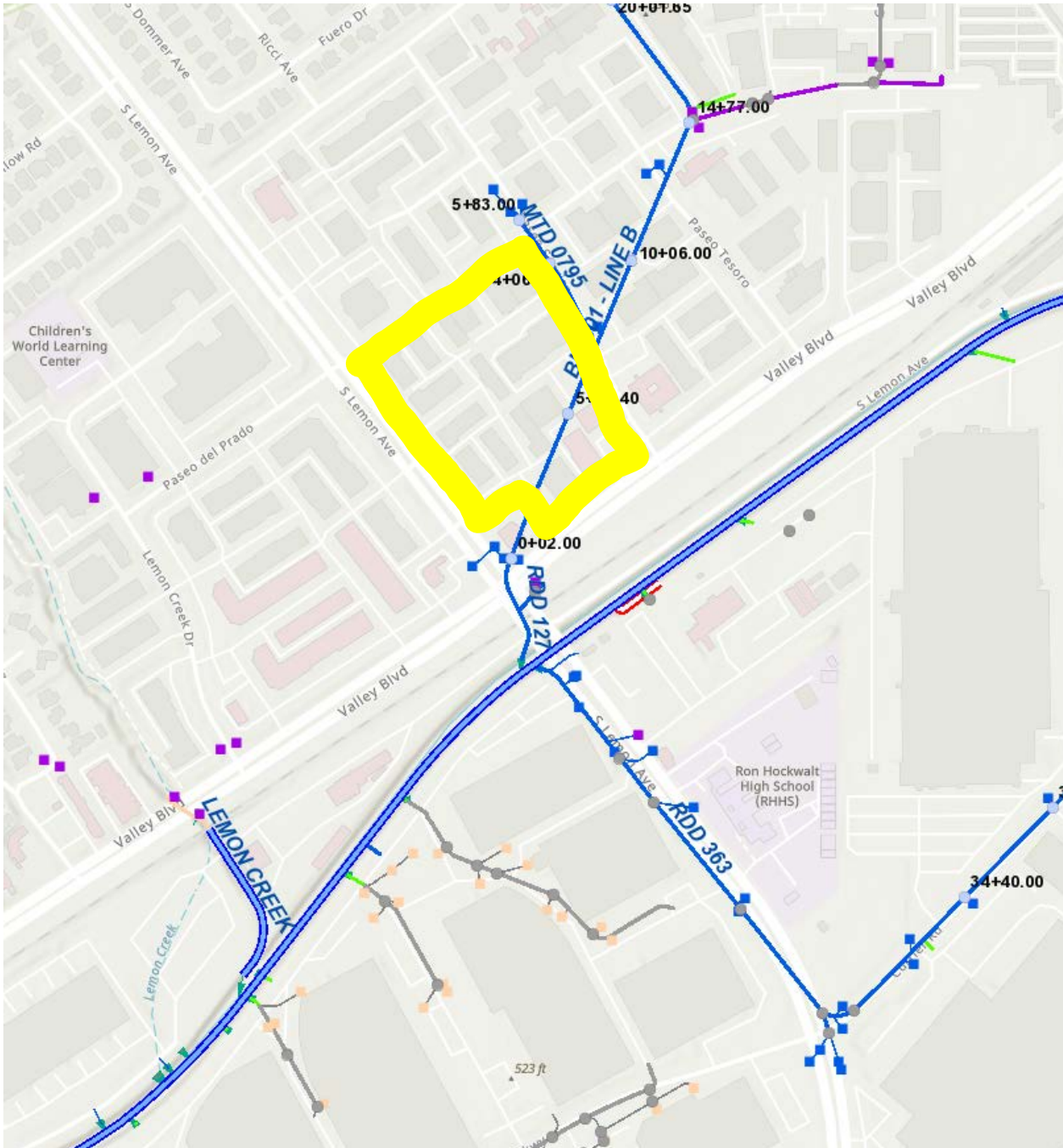
85th Percentile Storm Rainfall Map

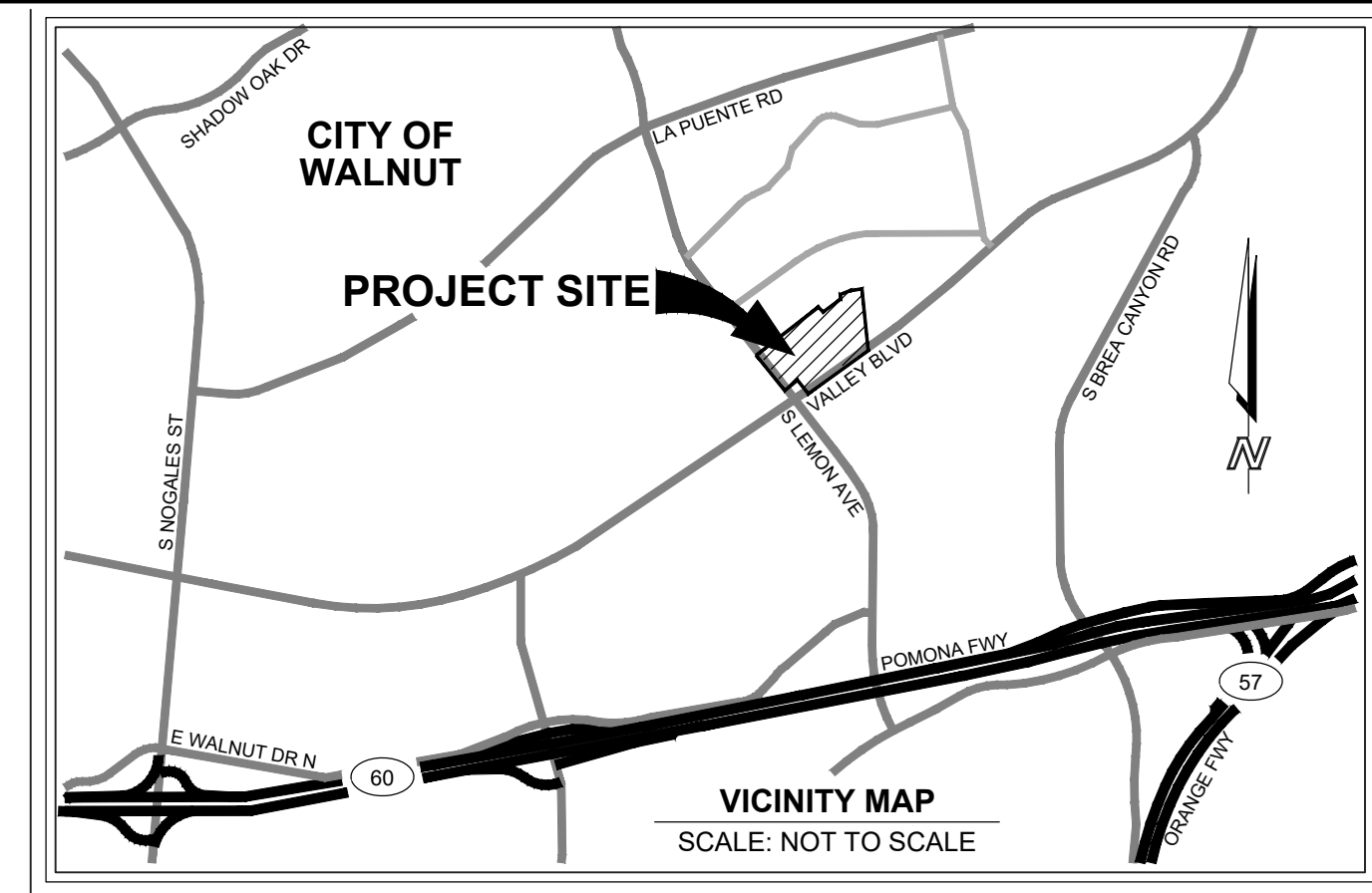


50 year Storm Rainfall Map



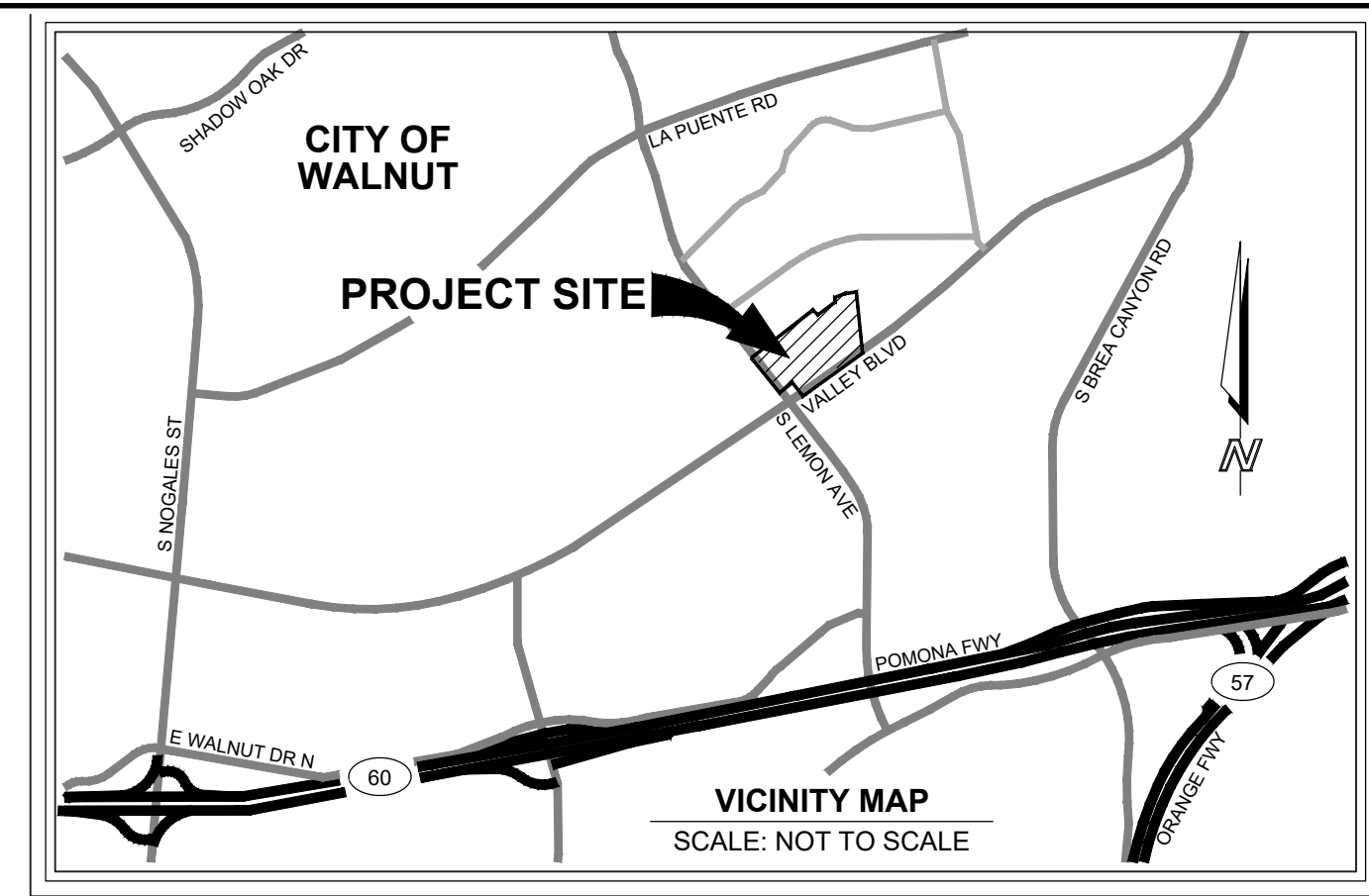
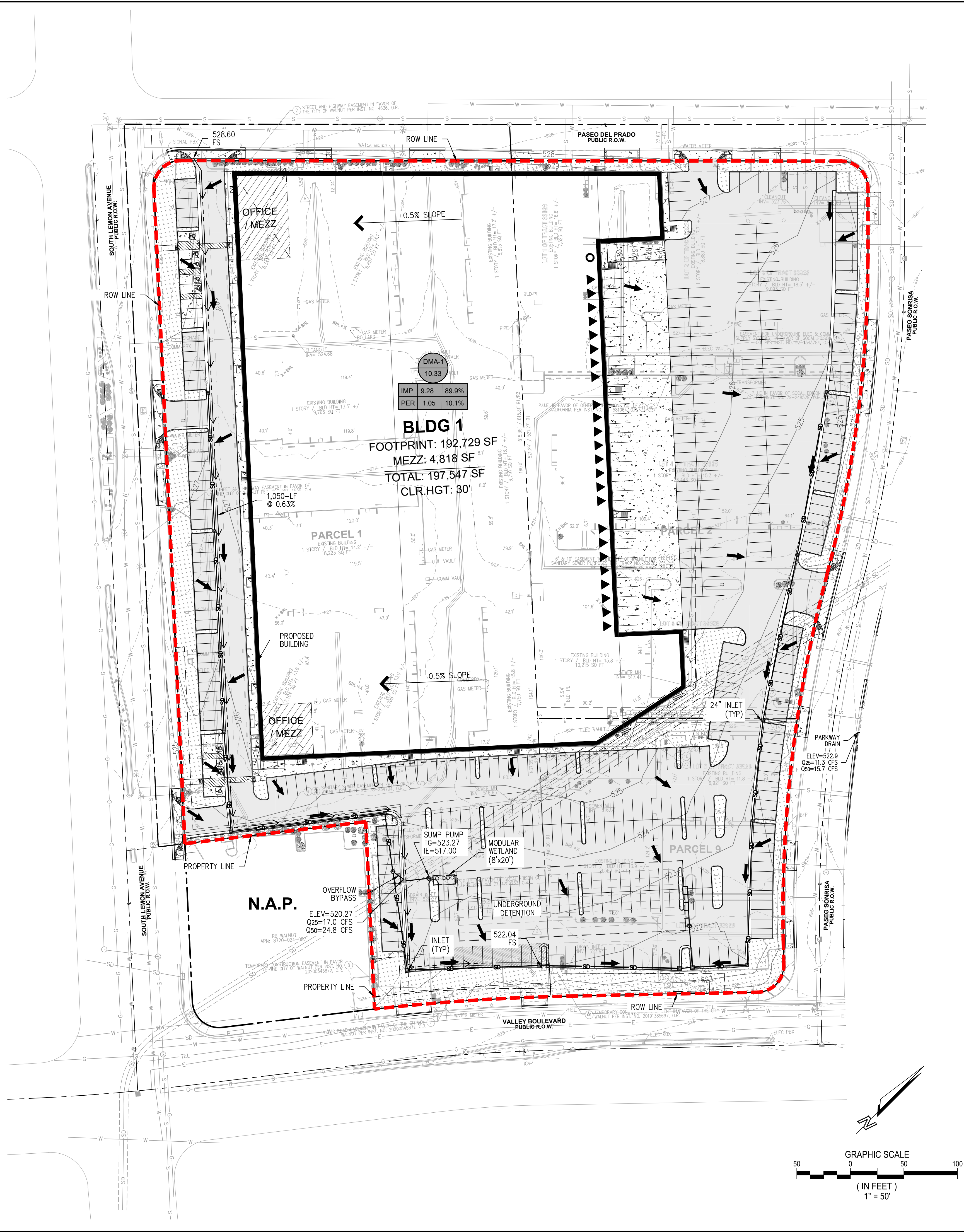
Regional Storm Drainage Outfall Map





LEGEND

-
- Legend:
- PROPERTY BOUNDARY LINE
 - CENTERLINE
 - EXISTING CONTOURS
 - PROPOSED CONTOURS
 - STORM DRAIN
 - PROPOSED CONCRETE
 - LIGHT DUTY AC PAVEMENT
 - PROPOSED LANDSCAPE
 - STORM DRAIN CATCH BASIN
 - STORM DRAIN MANHOLE
 - DMA# 0.52
 - DRAINAGE MANAGEMENT AREA
 - AREA IN ACRE
 - IMPERVIOUS AREA
 - PERVIOUS AREA
 - FLOW DIRECTION
 - DRAINAGE BASIN BOUNDARY



HYDROLOGIC DATA:

DMA-1	DETAILS
AREA (ACRES)	10.33
SOIL GROUP	017
DESIGN FREQUENCY	25-YEAR
50-YEAR RAINFALL DEPTH (IN)	6.5
PERCENT IMPERVIOUS	89.9%
Q ₂₅ (CFS)	17.00

LEGEND

- PROPERTY BOUNDARY LINE
- CENTERLINE
- EXISTING CONTOURS
- PROPOSED CONTOURS
- STORM DRAIN
- PROPOSED CONCRETE
- LIGHT DUTY AC PAVEMENT
- PROPOSED LANDSCAPE
- STORM DRAIN CATCH BASIN
- STORM DRAIN MANHOLE
- DRAINAGE MANAGEMENT AREA
- AREA IN ACRE
- IMPERVIOUS AREA
- PERVIOUS AREA
- FLOW DIRECTION
- DRAINAGE BASIN BOUNDARY

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STATE OF CALIFORNIA

NOT FOR CONSTRUCTION

WALNUT BUSINESS PARK
CITY OF WALNUT
COUNTY OF LOS ANGELES
POST-DEVELOPMENT HYDROLOGY MAP
LOT 1

PROJECT NUMBER: 22-136
PREPARED ON:
REVISED ON: 6/19/23
PREPARED BY: GMH
CHECKED BY: THJ
SHEET
1 OF 1

THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS. DO NOT SCALE THE DRAWING - ANY ERRORS OR OMISSIONS SHALL BE REPORTED TO ATLAS CIVIL DESIGN WITHOUT DELAY. THE COPYRIGHTS TO ALL DESIGNS AND DRAWINGS ARE THE PROPERTY OF ATLAS CIVIL DESIGN. REPRODUCTION OR USE FOR ANY PURPOSE OTHER THAN THAT AUTHORIZED BY ATLAS CIVIL DESIGN IS FORBIDDEN.

Attachment B

Peak Flow Hydrologic Analysis

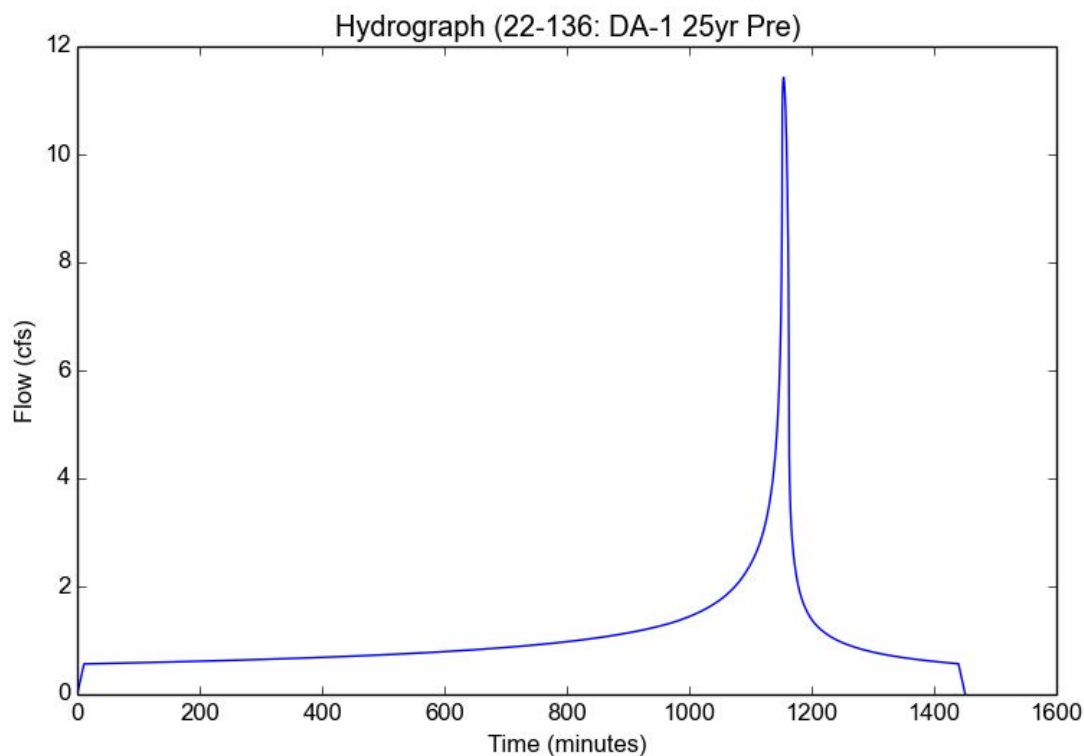
File location: C:/Local Cloud/Shared/2022/22-136 Walnut Business Park/Civil/reports/Hydrology/Working/Lot 1/22-136 - DA-1 25yr Pre.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	22-136
Subarea ID	DA-1 25yr Pre
Area (ac)	5.42
Flow Path Length (ft)	833.0
Flow Path Slope (vft/hft)	0.0065
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.905
Soil Type	17
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.707
Peak Intensity (in/hr)	2.3506
Undeveloped Runoff Coefficient (Cu)	0.8638
Developed Runoff Coefficient (Cd)	0.8966
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	11.4223
Burned Peak Flow Rate (cfs)	11.4223
24-Hr Clear Runoff Volume (ac-ft)	2.1426
24-Hr Clear Runoff Volume (cu-ft)	93333.3745



Peak Flow Hydrologic Analysis

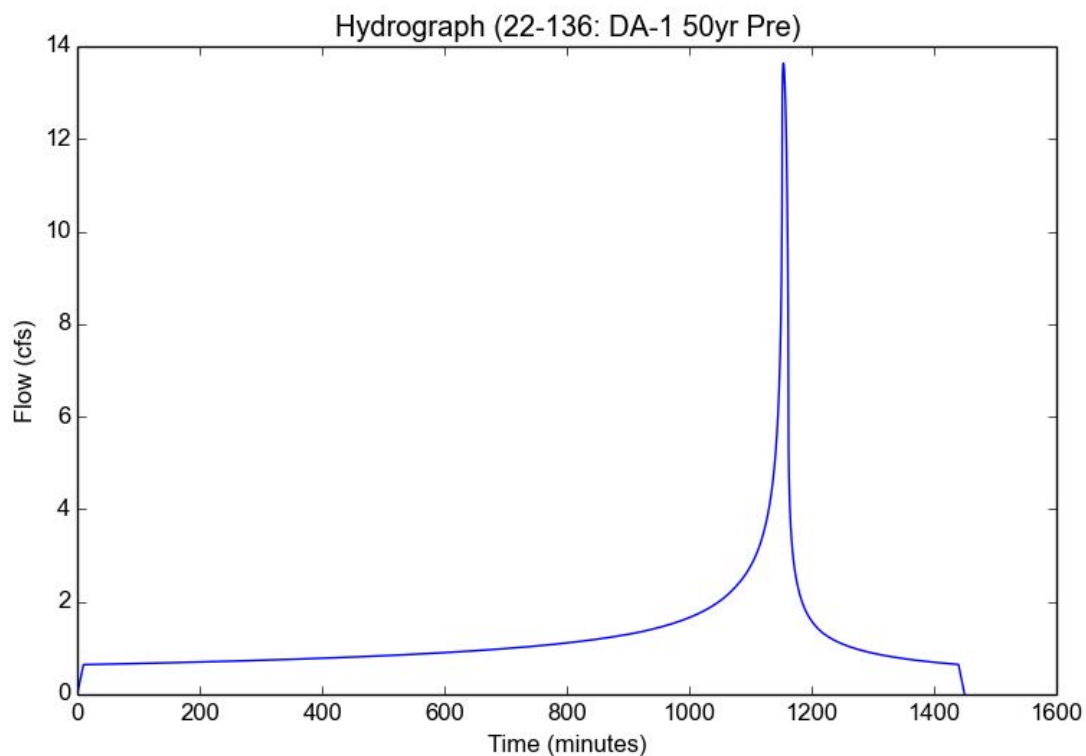
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Input Parameters

Project Name	22-136
Subarea ID	DA-1 50yr Pre
Area (ac)	5.42
Flow Path Length (ft)	833.0
Flow Path Slope (vft/hft)	0.0065
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.905
Soil Type	17
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.5
Peak Intensity (in/hr)	2.7998
Undeveloped Runoff Coefficient (Cu)	0.8849
Developed Runoff Coefficient (Cd)	0.8986
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	13.6358
Burned Peak Flow Rate (cfs)	13.6358
24-Hr Clear Runoff Volume (ac-ft)	2.4469
24-Hr Clear Runoff Volume (cu-ft)	106588.2785



Peak Flow Hydrologic Analysis

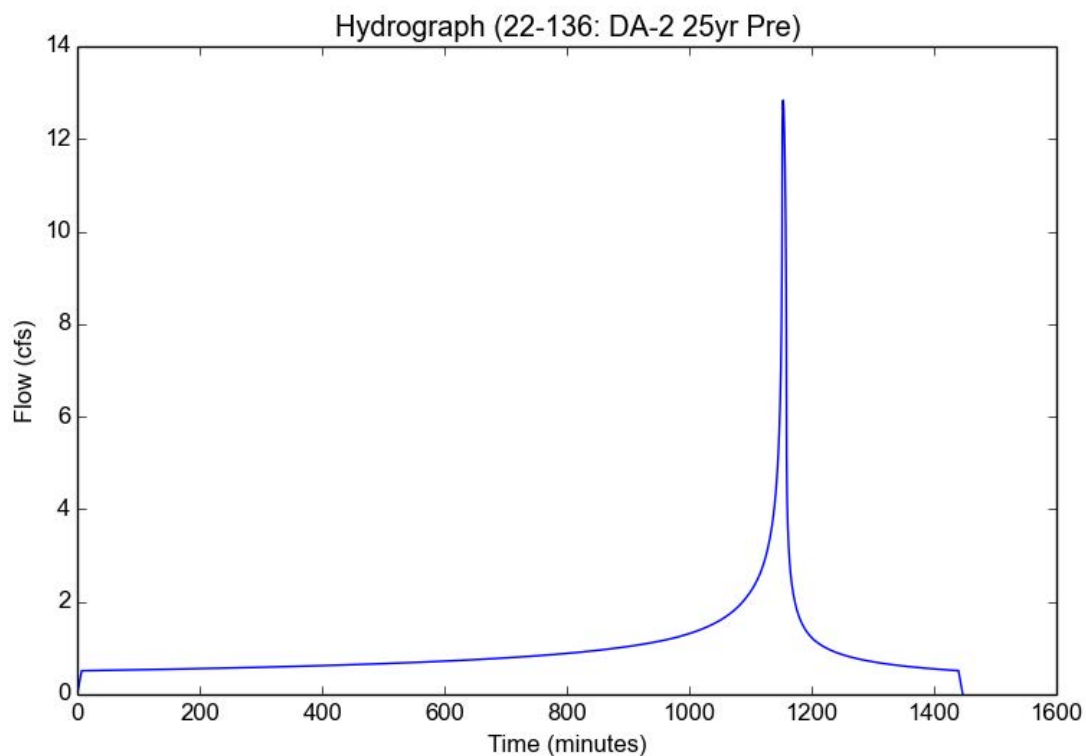
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	22-136
Subarea ID	DA-2 25yr Pre
Area (ac)	4.912
Flow Path Length (ft)	496.0
Flow Path Slope (vft/hft)	0.0089
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.904
Soil Type	17
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.707
Peak Intensity (in/hr)	2.9069
Undeveloped Runoff Coefficient (Cu)	0.889
Developed Runoff Coefficient (Cd)	0.8989
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	12.8357
Burned Peak Flow Rate (cfs)	12.8357
24-Hr Clear Runoff Volume (ac-ft)	1.9403
24-Hr Clear Runoff Volume (cu-ft)	84521.4449



Peak Flow Hydrologic Analysis

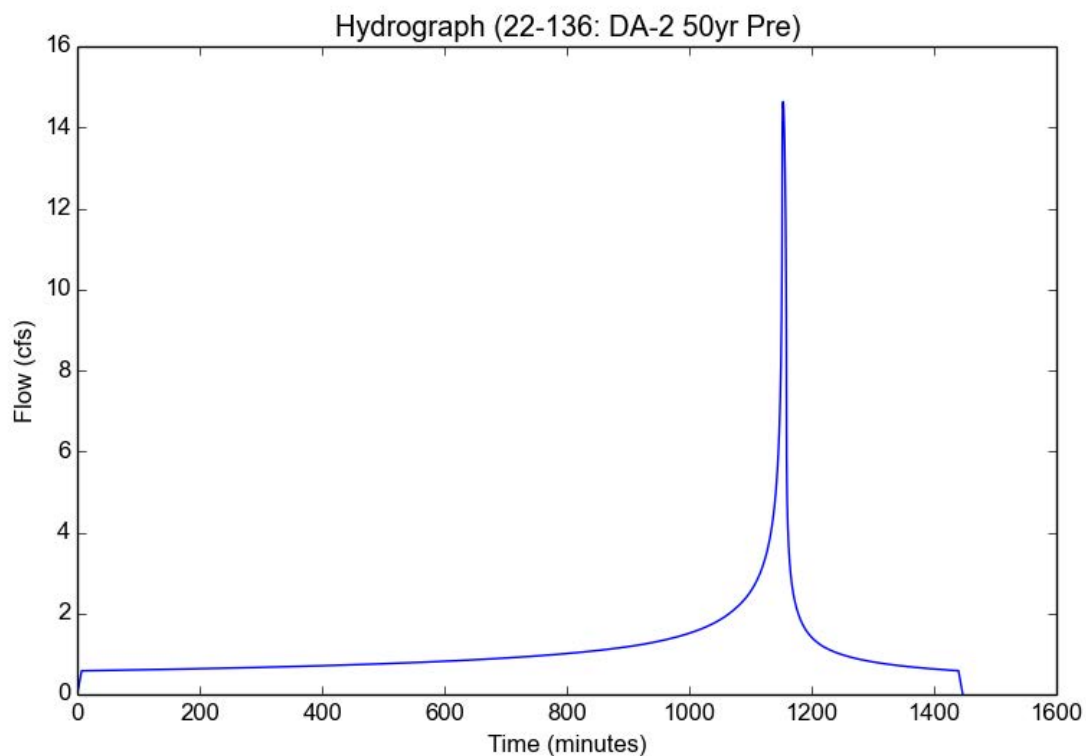
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	22-136
Subarea ID	DA-2 50yr Pre
Area (ac)	4.912
Flow Path Length (ft)	496.0
Flow Path Slope (vft/hft)	0.0089
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.904
Soil Type	17
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.5
Peak Intensity (in/hr)	3.3108
Undeveloped Runoff Coefficient (Cu)	0.9
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	14.6365
Burned Peak Flow Rate (cfs)	14.6365
24-Hr Clear Runoff Volume (ac-ft)	2.2159
24-Hr Clear Runoff Volume (cu-ft)	96526.4726



Peak Flow Hydrologic Analysis

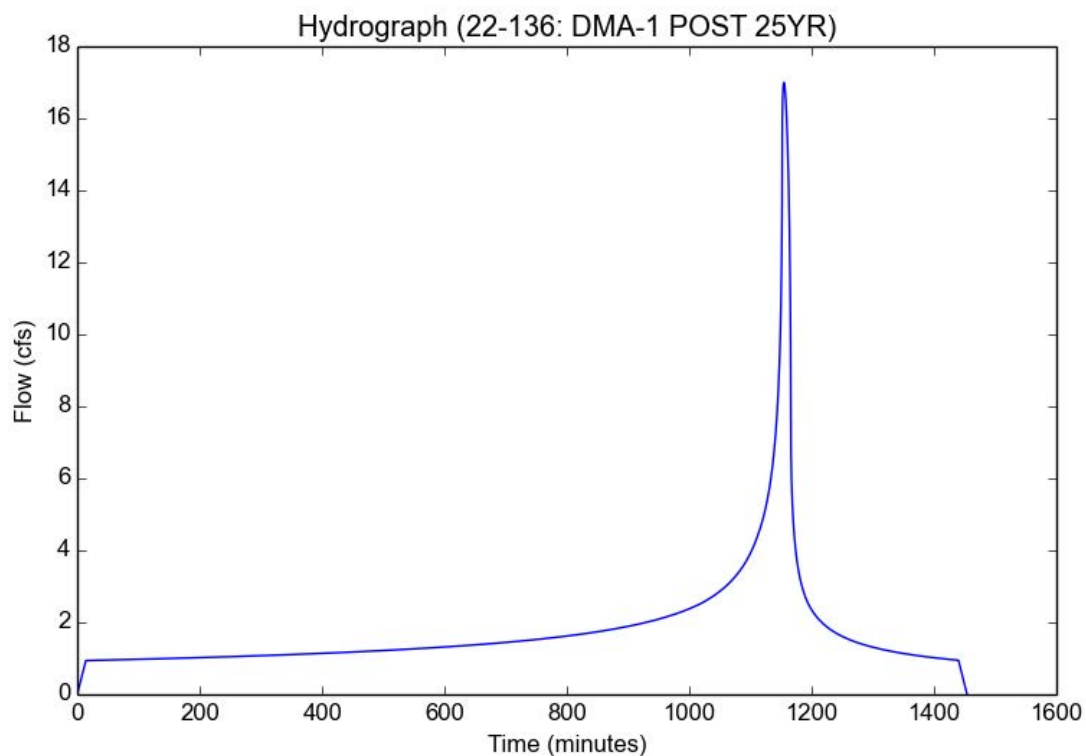
File location: C:/Local Cloud/Shared/2022/22-136 Walnut Business Park/Civil/reports/Hydrology/Working/22-136 - DMA-1 POST 25yr.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	22-136
Subarea ID	DMA-1 POST 25YR
Area (ac)	10.33
Flow Path Length (ft)	1050.0
Flow Path Slope (vft/hft)	0.0063
50-yr Rainfall Depth (in)	5.71
Percent Impervious	0.899
Soil Type	17
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.0134
Peak Intensity (in/hr)	1.8436
Undeveloped Runoff Coefficient (Cu)	0.8257
Developed Runoff Coefficient (Cd)	0.8925
Time of Concentration (min)	14.0
Clear Peak Flow Rate (cfs)	16.9972
Burned Peak Flow Rate (cfs)	16.9972
24-Hr Clear Runoff Volume (ac-ft)	3.5617
24-Hr Clear Runoff Volume (cu-ft)	155146.7392



Peak Flow Hydrologic Analysis

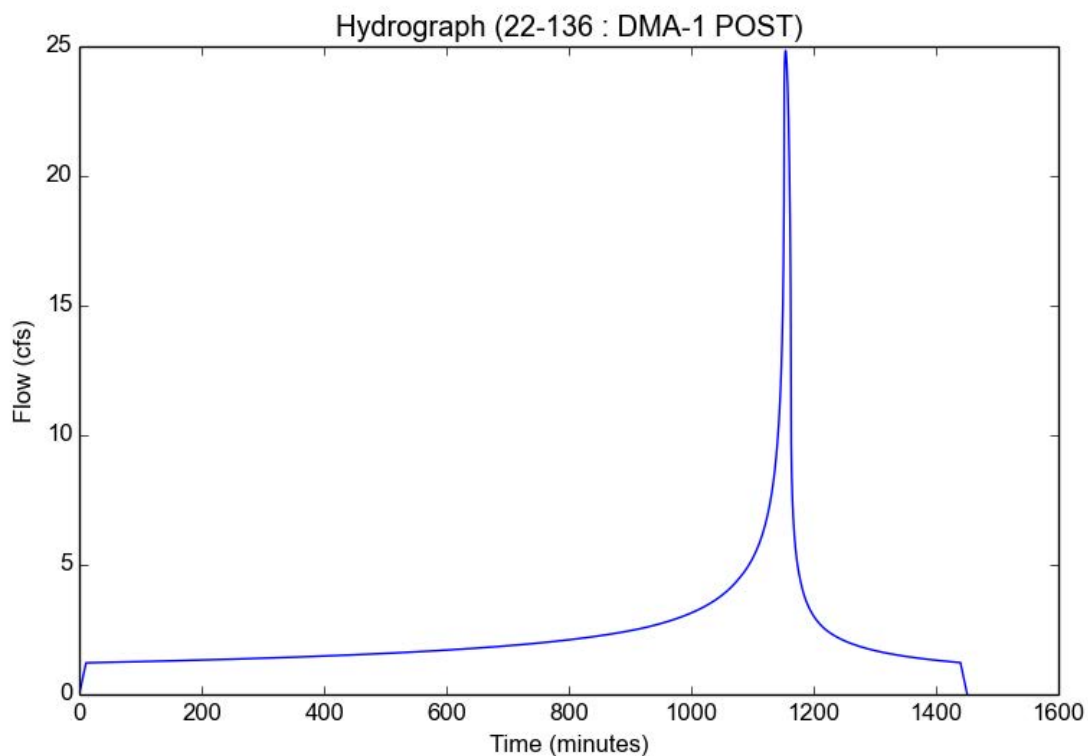
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	22-136
Subarea ID	DMA-1 POST
Area (ac)	10.33
Flow Path Length (ft)	1050.0
Flow Path Slope (vft/hft)	0.0063
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.899
Soil Type	17
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.5
Peak Intensity (in/hr)	2.6772
Undeveloped Runoff Coefficient (Cu)	0.8802
Developed Runoff Coefficient (Cd)	0.898
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	24.8344
Burned Peak Flow Rate (cfs)	24.8344
24-Hr Clear Runoff Volume (ac-ft)	4.6427
24-Hr Clear Runoff Volume (cu-ft)	202237.1016



Attachment C

Inlet Report

24in grate inlet curb

Drop Grate Inlet

Location	= Sag
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= 4.00
Grate Width (ft)	= 2.00
Grate Length (ft)	= 2.00

Gutter

Slope, Sw (ft/ft)	= 0.020
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 3.00
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

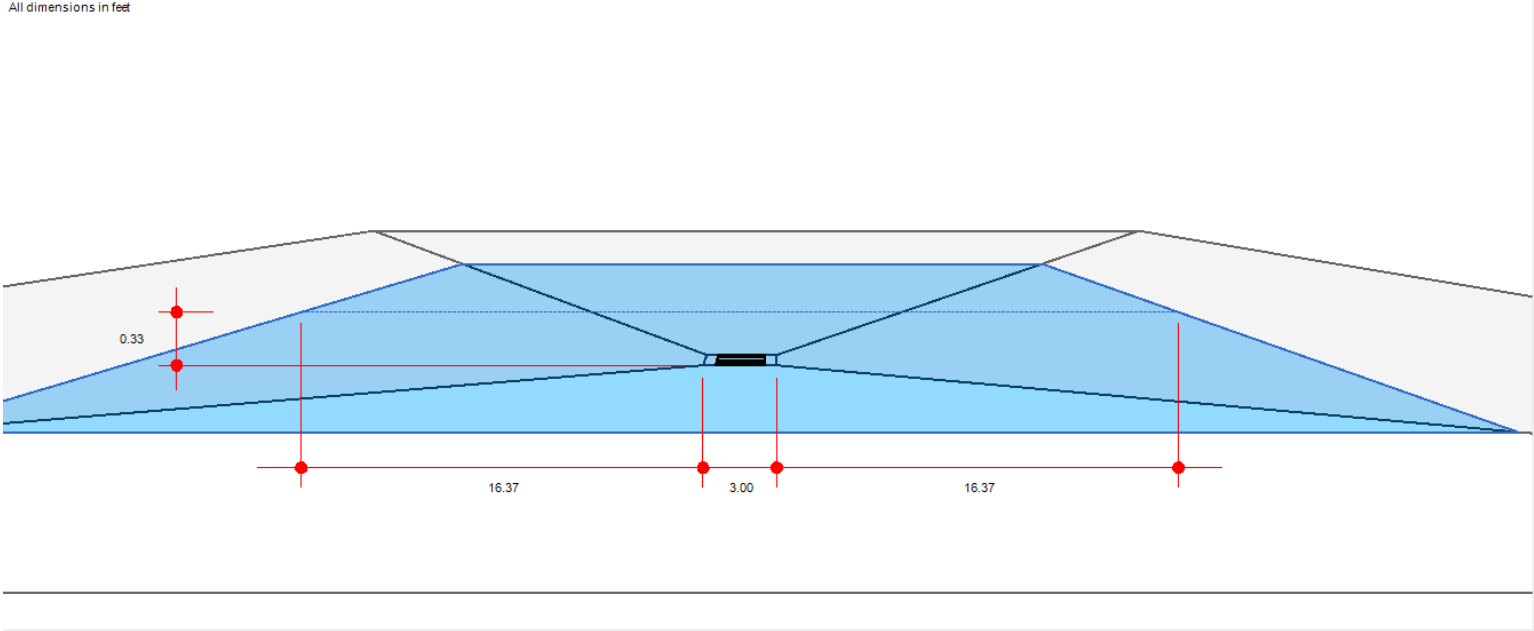
Calculations

Compute by:	Q vs Depth
Max Depth (in)	= 6

Highlighted

Q Total (cfs)	= 4.50
Q Capt (cfs)	= 4.50
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 3.93
Efficiency (%)	= 100
Gutter Spread (ft)	= 35.74
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-

All dimensions in feet



Inlet Report

24in grate inlet curb

Grate Inlet

Location	= Sag
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= 4.00
Grate Width (ft)	= 2.00
Grate Length (ft)	= 2.00

Gutter

Slope, Sw (ft/ft)	= 0.080
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 2.00
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

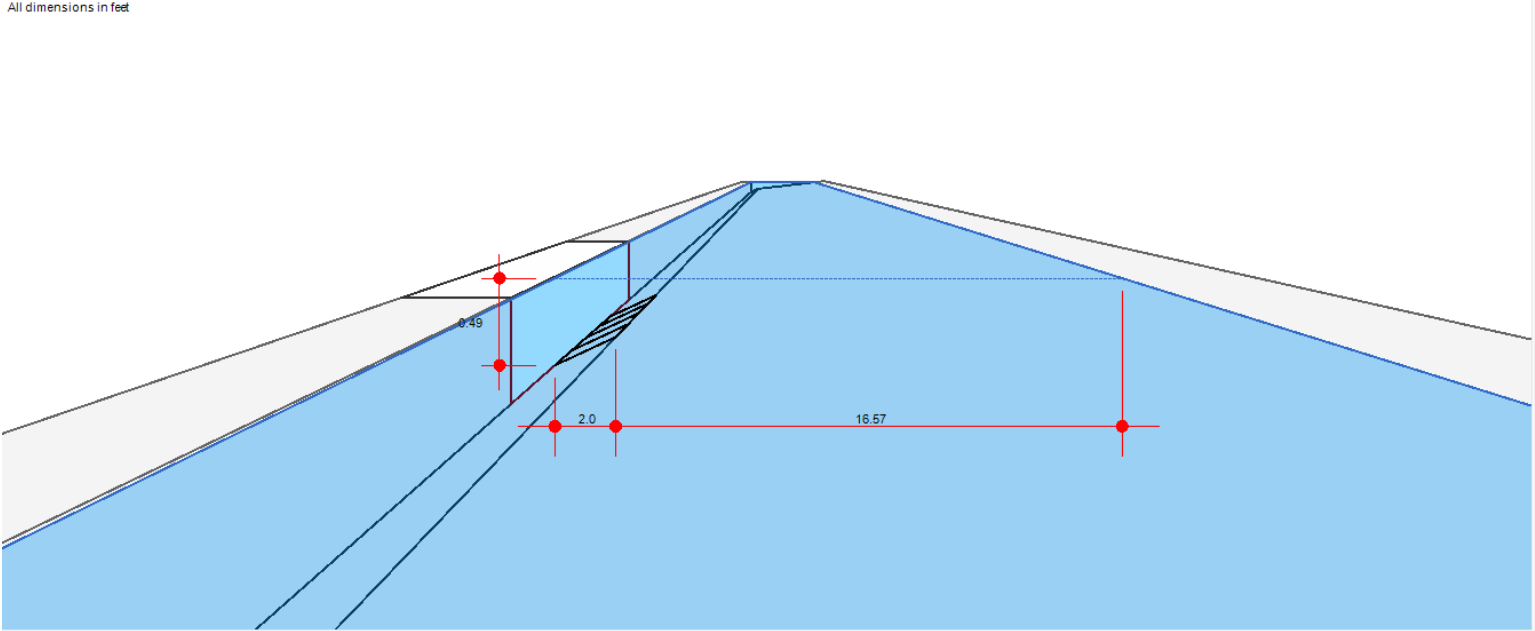
Calculations

Compute by:	Q vs Depth
Max Depth (in)	= 6

Highlighted

Q Total (cfs)	= 4.75
Q Capt (cfs)	= 4.75
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 5.90
Efficiency (%)	= 100
Gutter Spread (ft)	= 18.57
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-

All dimensions in feet



Inlet Report

36in grate inlet

Grate Inlet

Location	= Sag
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= 9.00
Grate Width (ft)	= 3.00
Grate Length (ft)	= 3.00

Gutter

Slope, Sw (ft/ft)	= 0.080
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 2.00
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

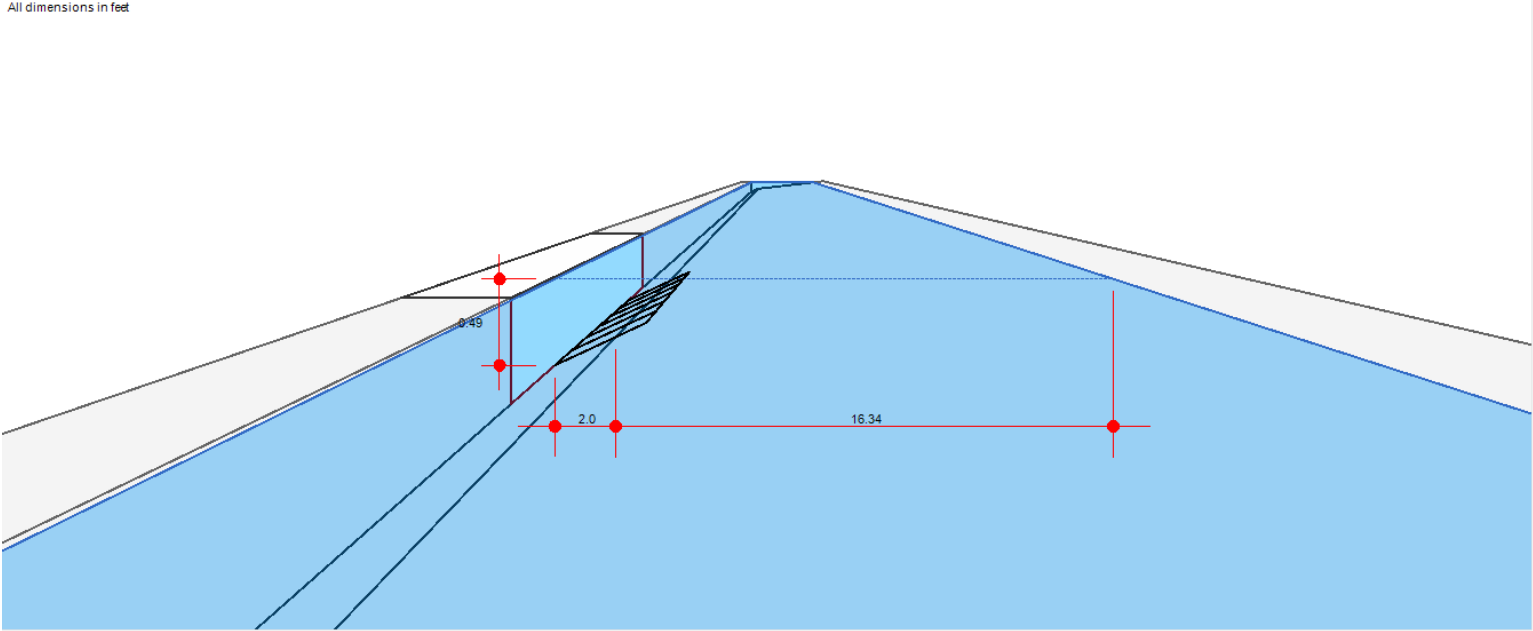
Calculations

Compute by:	Q vs Depth
Max Depth (in)	= 6

Highlighted

Q Total (cfs)	= 6.00
Q Capt (cfs)	= 6.00
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 5.84
Efficiency (%)	= 100
Gutter Spread (ft)	= 18.34
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-

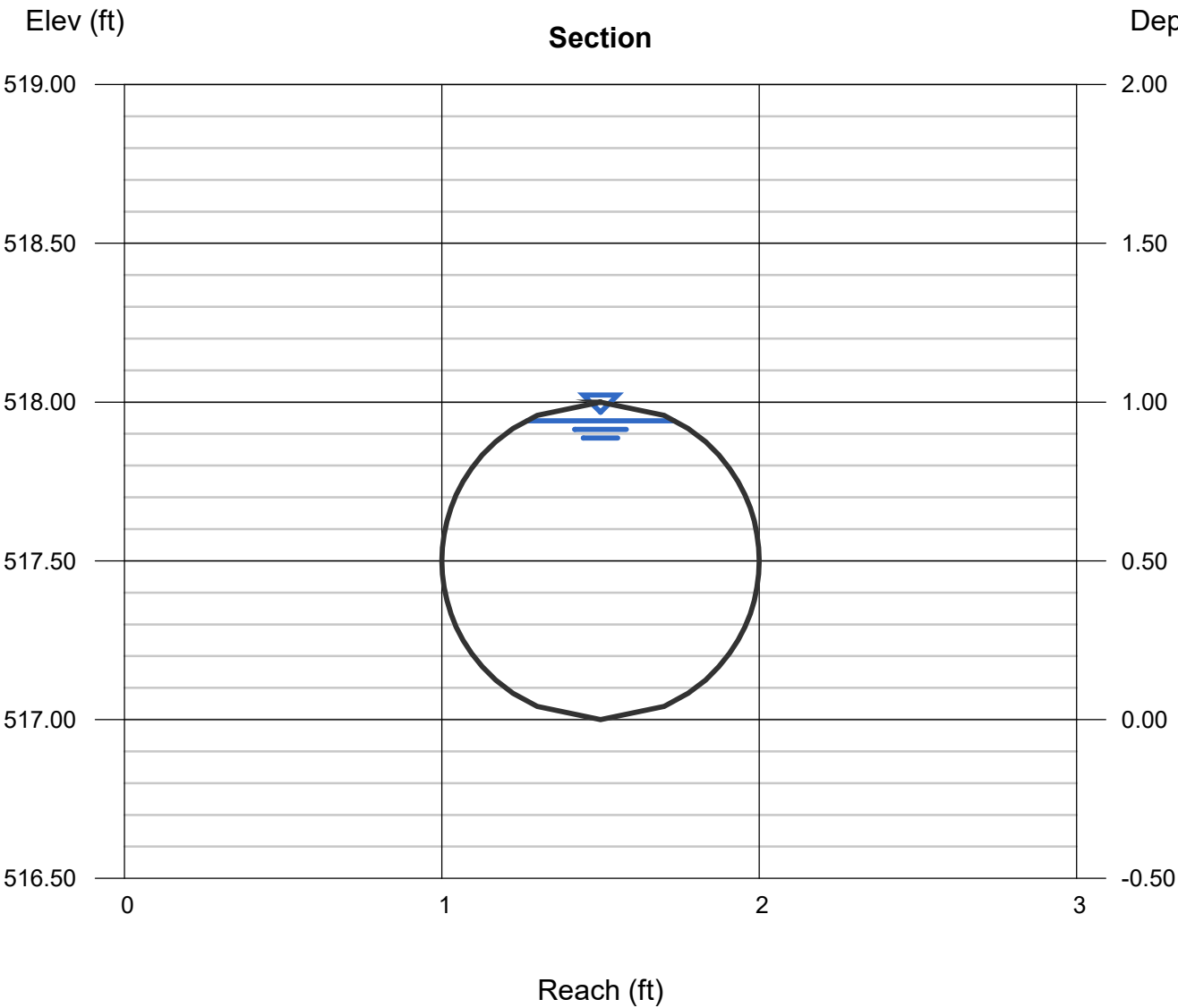
All dimensions in feet



Channel Report

DMA-1 12in 25yr

Circular		Highlighted	
Diameter (ft)	= 1.00	Depth (ft)	= 0.94
		Q (cfs)	= 2.934
		Area (sqft)	= 0.77
Invert Elev (ft)	= 517.00	Velocity (ft/s)	= 3.83
Slope (%)	= 0.50	Wetted Perim (ft)	= 2.66
N-Value	= 0.012	Crit Depth, Yc (ft)	= 0.74
		Top Width (ft)	= 0.47
		EGL (ft)	= 1.17
Calculations			
Compute by:	Q vs Depth		
No. Increments	= 17		



Channel Report

DMA-1 18in 25yr

Circular

Diameter (ft) = 1.50

Invert Elev (ft) = 517.00

Slope (%) = 0.50

N-Value = 0.012

Calculations

Compute by: Q vs Depth

No. Increments = 17

Highlighted

Depth (ft) = 1.41

Q (cfs) = 8.652

Area (sqft) = 1.73

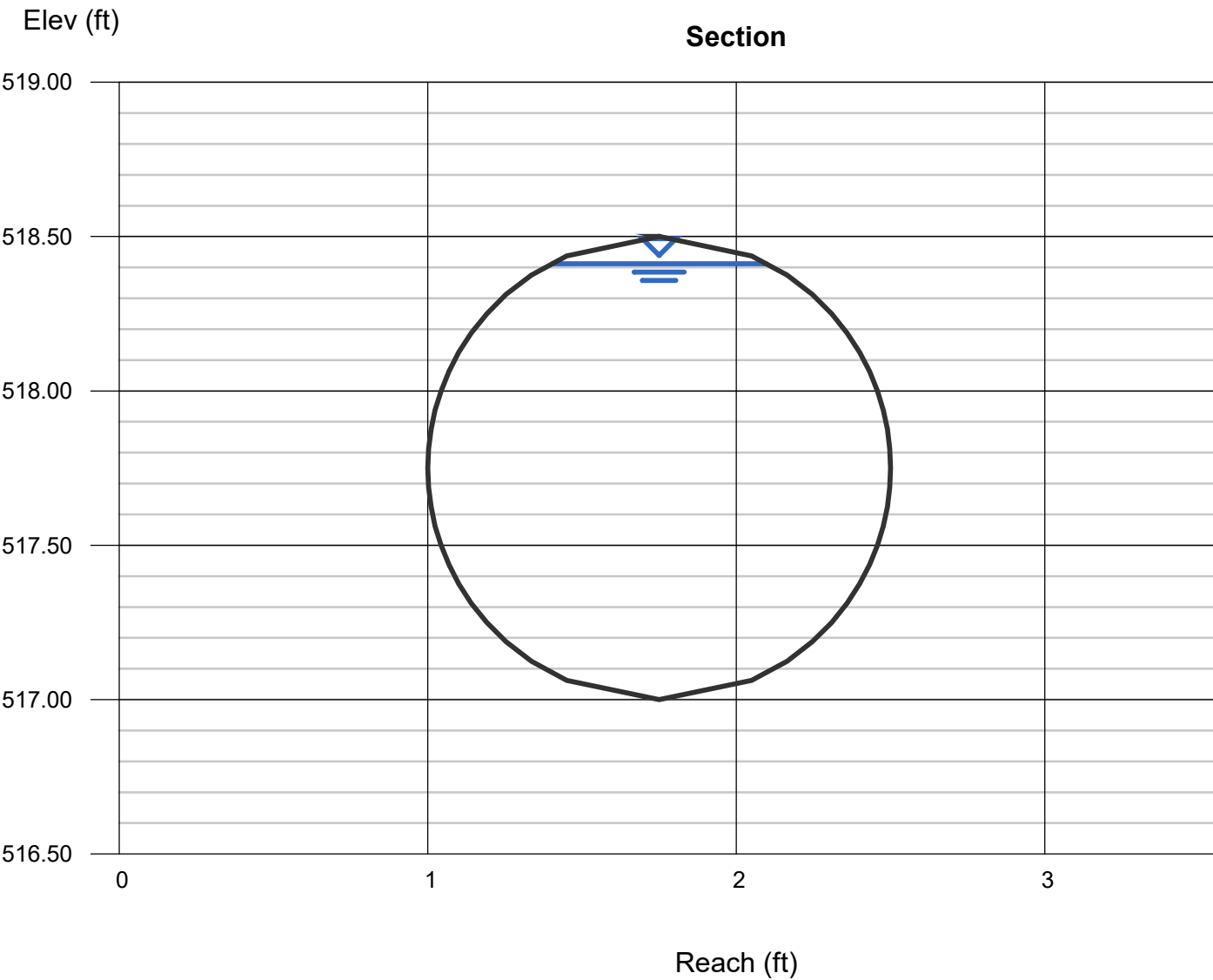
Velocity (ft/s) = 5.01

Wetted Perim (ft) = 3.98

Crit Depth, Yc (ft) = 1.14

Top Width (ft) = 0.70

EGL (ft) = 1.80



Channel Report

DMA-1 24in outlet

Circular		Highlighted	
Diameter (ft)	= 2.00	Depth (ft)	= 1.61
		Q (cfs)	= 17.00
		Area (sqft)	= 2.71
Invert Elev (ft)	= 517.00	Velocity (ft/s)	= 6.26
Slope (%)	= 0.50	Wetted Perim (ft)	= 4.46
N-Value	= 0.012	Crit Depth, Yc (ft)	= 1.49
		Top Width (ft)	= 1.58
		EGL (ft)	= 2.22
Calculations			
Compute by:	Known Q		
Known Q (cfs)	= 17.00		

