

Appendices

**Appendix L-d Hydrology and Hydraulic Report - Lot 4
Valley Boulevard and Paseo Tesoro**

Appendices

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HYDROLOGY AND HYDRAULIC REPORT

FOR

Walnut Business Park – Lot 4
Valley Boulevard and Paseo Tesoro
Walnut, CA 91789

Owner:

IDS Real Estate Group
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Prepared by:
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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 Northwest intersection of Valley Boulevard and Paseo Tesoro in the City of Walnut, Los Angeles County, CA.

The total site area is 5.17 acres and the project is proposing a 84,773 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 site contains 2 sub-basins. The northerly sub-basin drains to the west and sheet flows at 0.61% towards two driveways and into Paseo Tesoro (public ROW). Runoff then flows north in the curb and gutter 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.

The southerly sub-basin drains to the west and sheet flows at 0.76%. Runoff is captured by multiple catch basins in a ribbon gutter. Overflow runoff flows towards a driveway and into Paseo Tesoro (public ROW). Runoff then flows north in the curb and gutter until it is captured by existing curb inlets that are connected to the existing 90" RCP storm drain.

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.

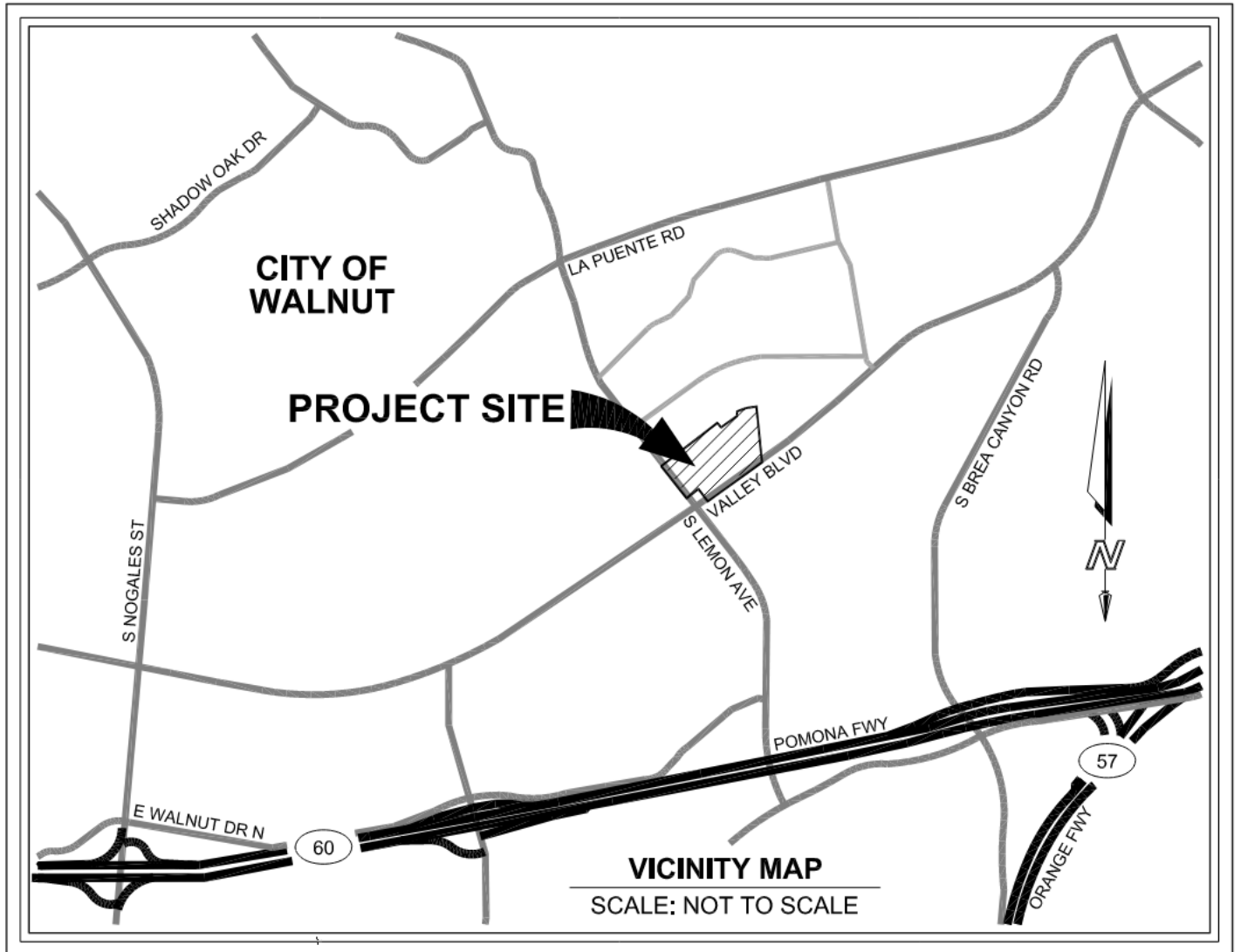
The runoff from the project site to San Jose Creek is shown in Figure-4.

Proposed Site Drainage

In the proposed condition the site drains to the south and sheet flows to multiple ribbon gutters which direct runoff to catch basins. This runoff is directed in pipes 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 curb and gutter in Paseo Tesoro. Runoff will flow north to the existing curb inlet 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 sump pump for discharge to Paseo Tesoro.

The existing 90" RCP storm drain is 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)	3.27
Time of Concentration; Tc (min)	10.0
25 yr Pre- Dev Runoff; Q ₂₅ (cfs)	7.21
50 yr Pre- Dev Runoff; Q ₅₀ (cfs)	8.65

Pre-Development Condition

Tributary Area	DA-2
Acreage (acres)	1.90
Time of Concentration; Tc (min)	6.0
25 yr Pre- Dev Runoff; Q ₂₅ (cfs)	5.34
50 yr Pre- Dev Runoff; Q ₅₀ (cfs)	6.09

Post-Development Condition

Tributary Area	DMA-4
Acreage (acres)	5.26
Time of Concentration; Tc (min)	5.0
25 yr Post- Dev Runoff; Q ₂₅ (cfs)	13.91
50 yr Post- Dev Runoff; Q ₅₀ (cfs)	18.04

Section VI Runoff Volumes

Table 2: Estimated Storm Runoff Volumes

Pre-Development Condition

Tributary Area	DA-1
Acreage (acre)	3.27
CN (Weighted)	0.90
25 year Pre-Develop. Volume V_{25} (cu-ft)	55,873
50 year Pre-Develop. Volume V_{50} (cu-ft)	63,827

Tributary Area	DA-2
Acreage (acre)	5.26
CN (Weighted)	0.90
25 year Pre-Develop. Volume V_{25} (cu-ft)	32,389
50 year Pre-Develop. Volume V_{50} (cu-ft)	37,002

Post-Development Condition

Tributary Area	DMA-4
Acreage (acre)	5.26
CN (Weighted)	0.90
25 year Post-Develop. Volume V_{25} (cu-ft)	77,216
50 year Post-Develop. Volume V_{50} (cu-ft)	100,681

Section VII Conclusion

The Post-development condition will increase peak flow by 1.36 cfs for the 25-year Storm Event.
The Post-development condition will increase peak flow by 3.30 cfs for the 50-year Storm Event.

The Post-development condition will decrease the runoff volume by 11,046 cf for the 25-year Storm Event.

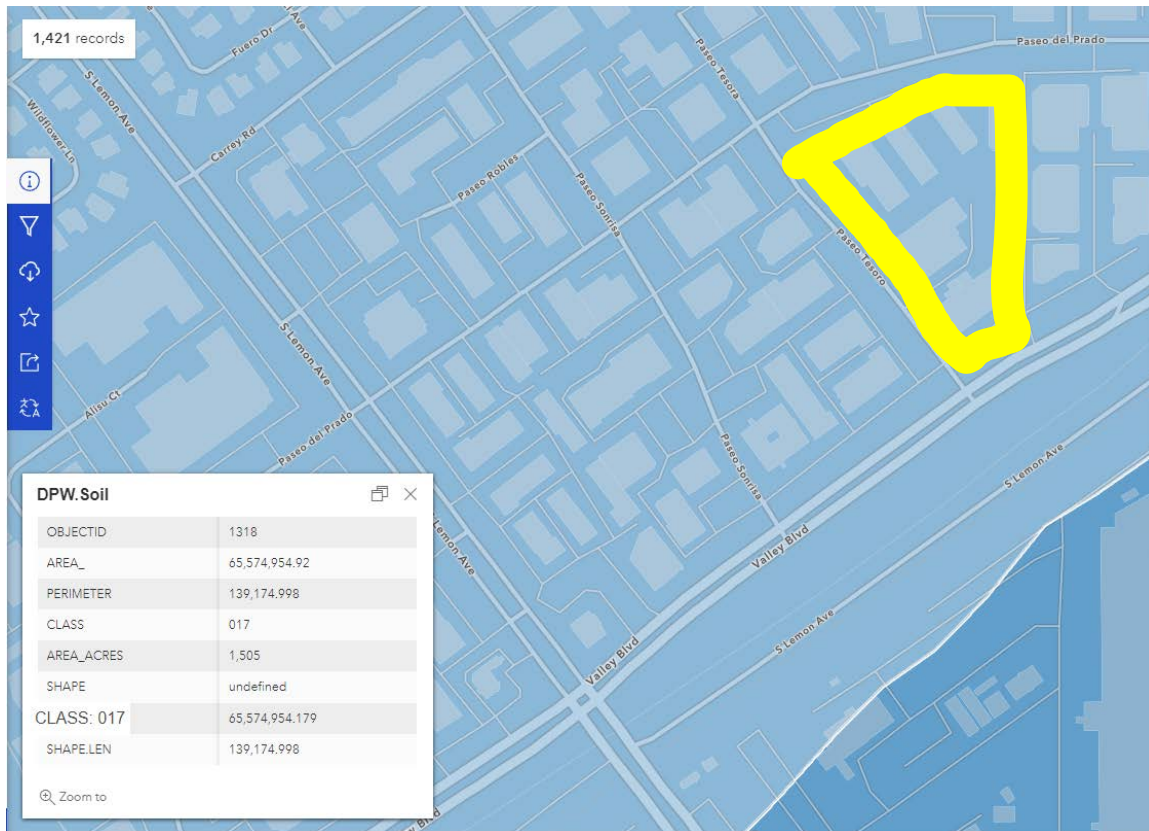
The Post-development condition will decrease the runoff volume by 148 cf for the 50-year Storm Event.

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.

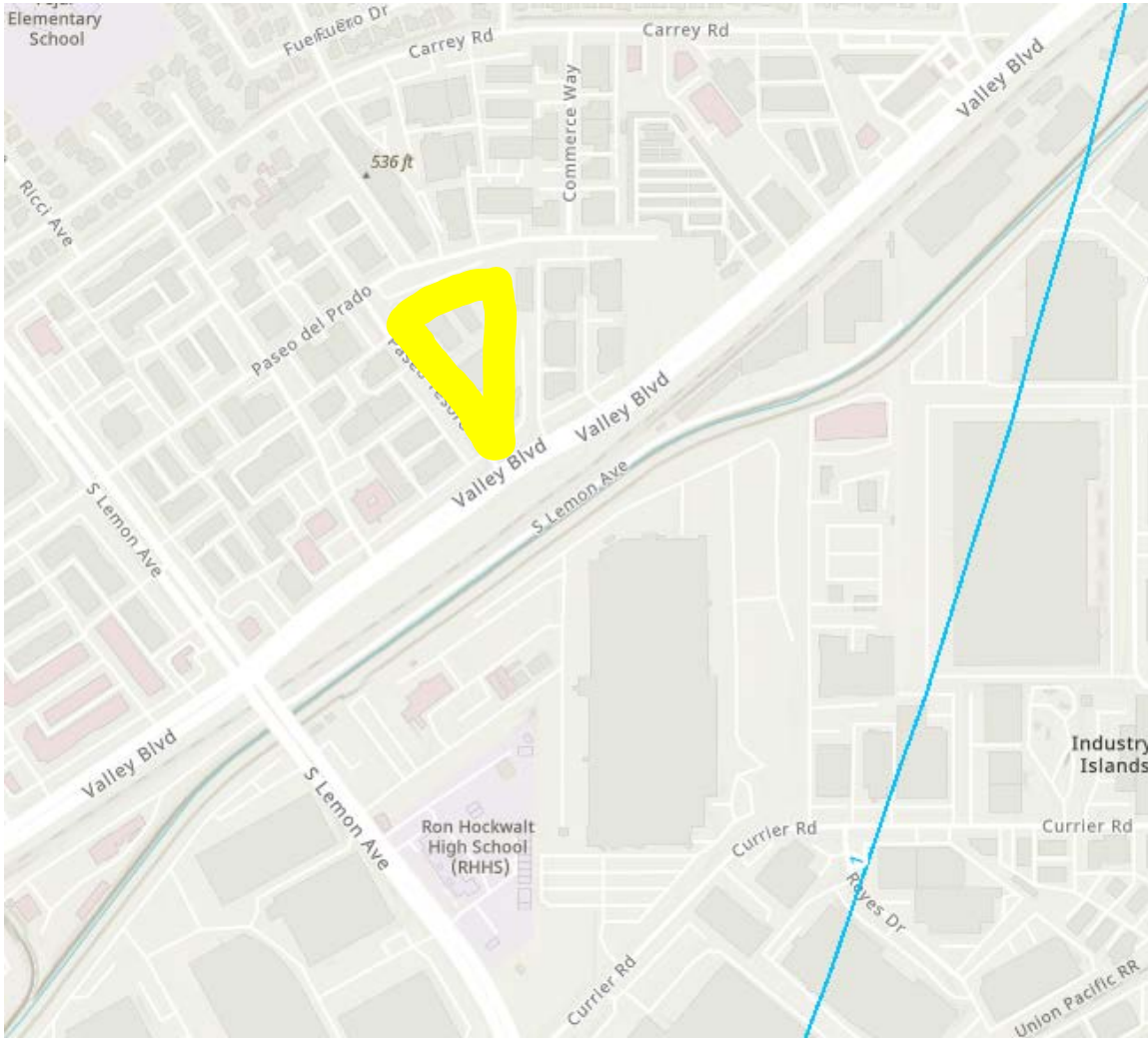
Attachment A

Figures

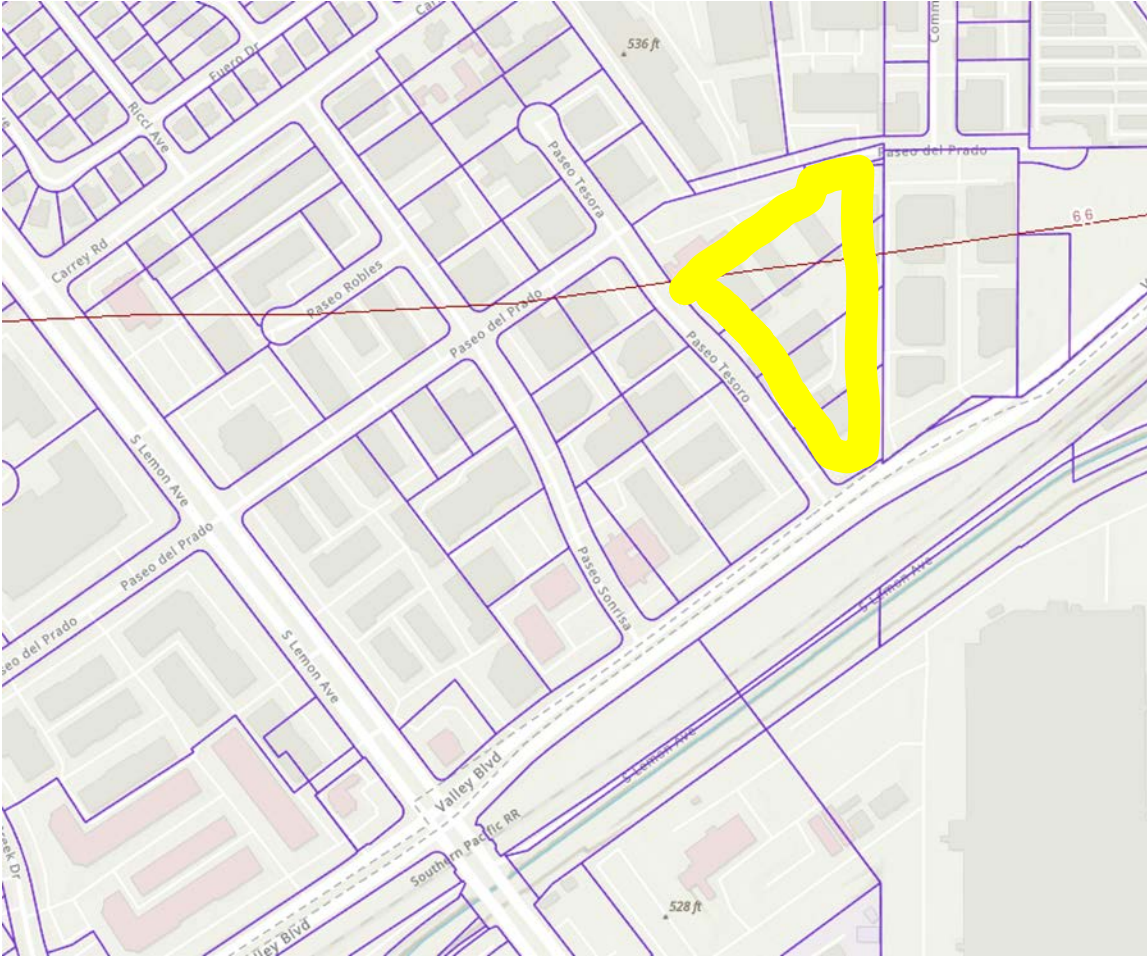
Soils Group Map



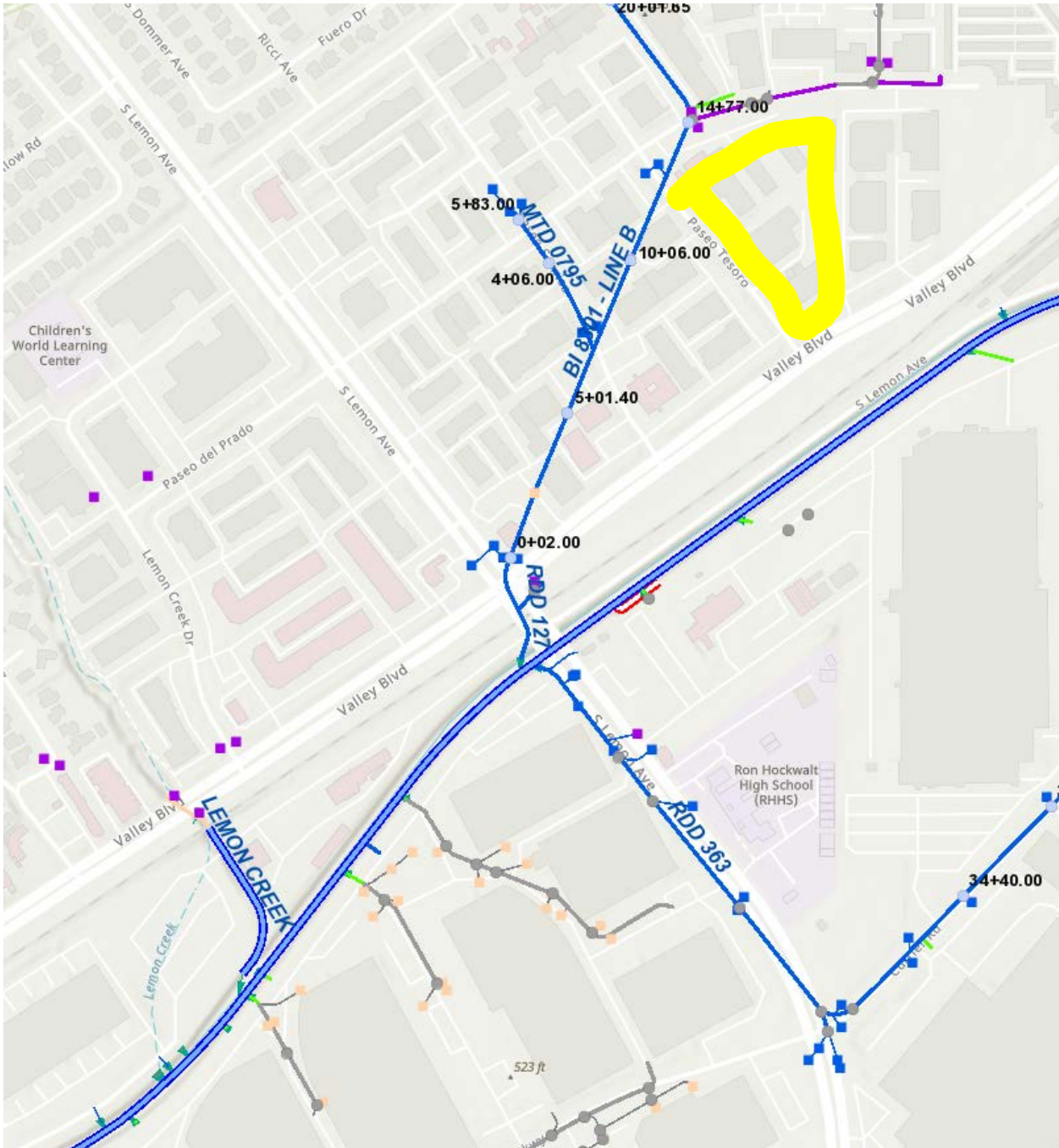
85th Percentile Storm Rainfall Map



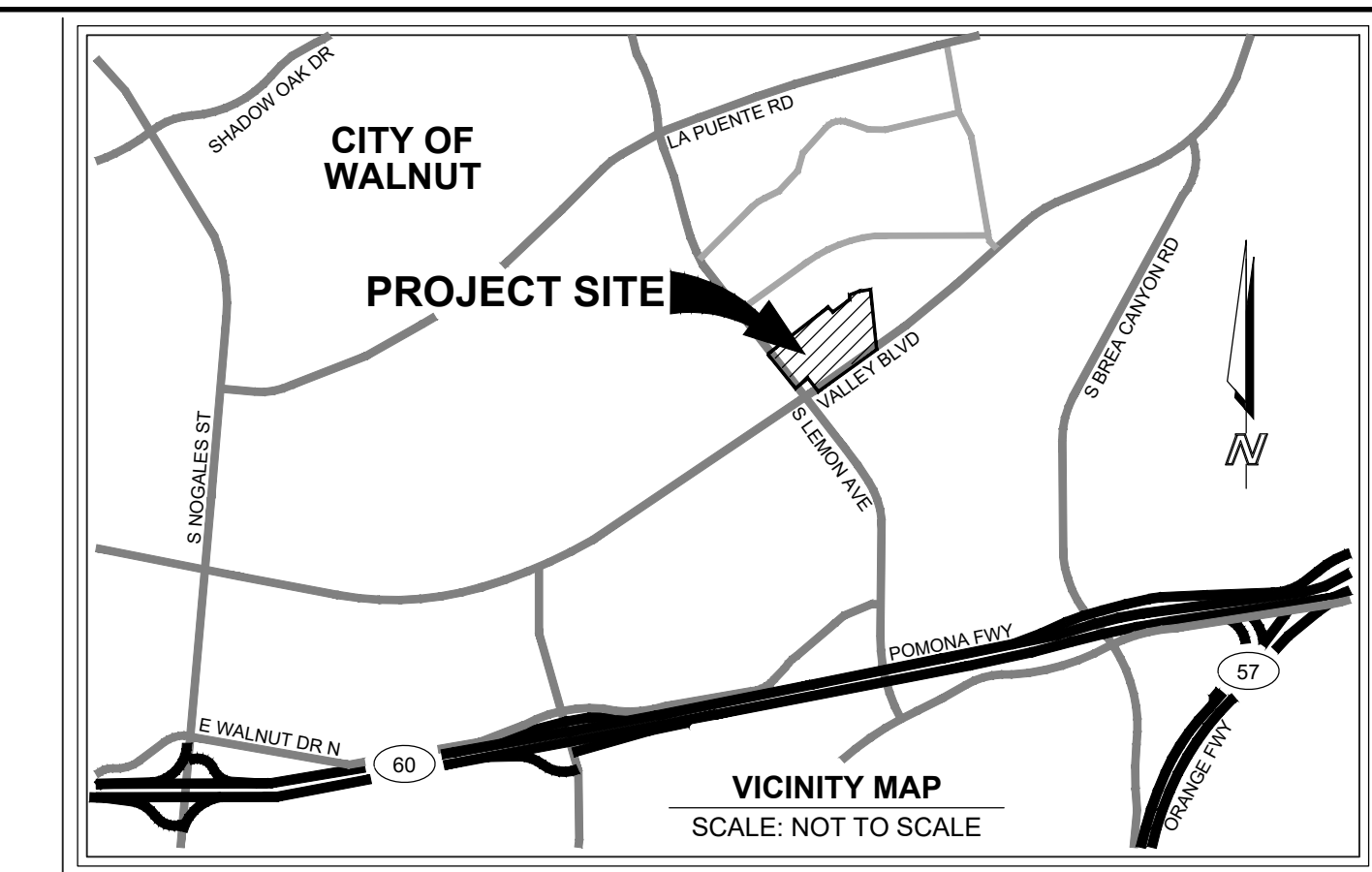
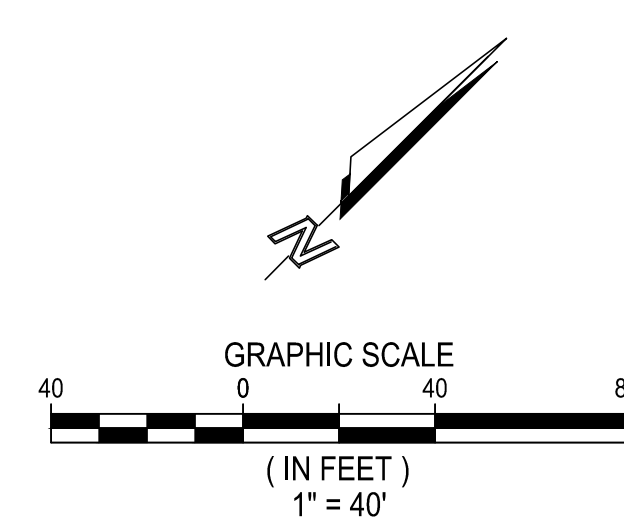
50 year Storm Rainfall Map



Regional Storm Drainage Outfall Map



S:\LOCAL_CLOUD\SHARES\2022\22-136 WALNUT BUSINESS PARK\CIVIL\REPORTS\HYDROLOGY\WORKING\22-136 PRE-DEV MAP.DWG - PLOT DATE: June 20, 2023



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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NOT FOR CONSTRUCTION

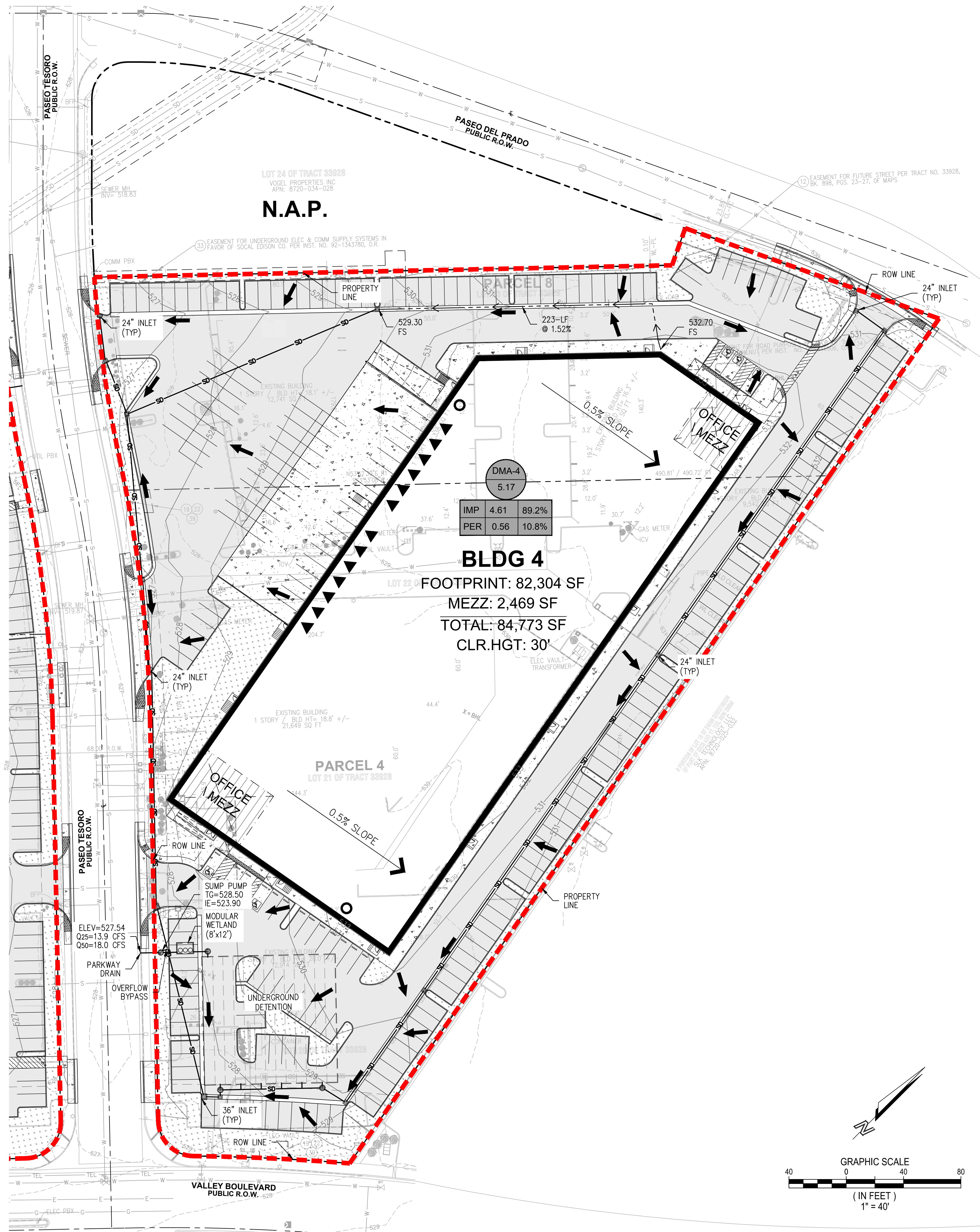
DATE	REVISIONS	BY

WALNUT BUSINESS PARK
 CITY OF WALNUT
 COUNTY OF LOS ANGELES
 PRE-DEVELOPMENT HYDROLOGY MAP
 LOT 4

PROJECT NUMBER: 22-136
PREPARED ON:
REVISED ON: 6/20/23
PREPARED BY: GMH
CHECKED BY: THJ
SHEET
1 OF 1

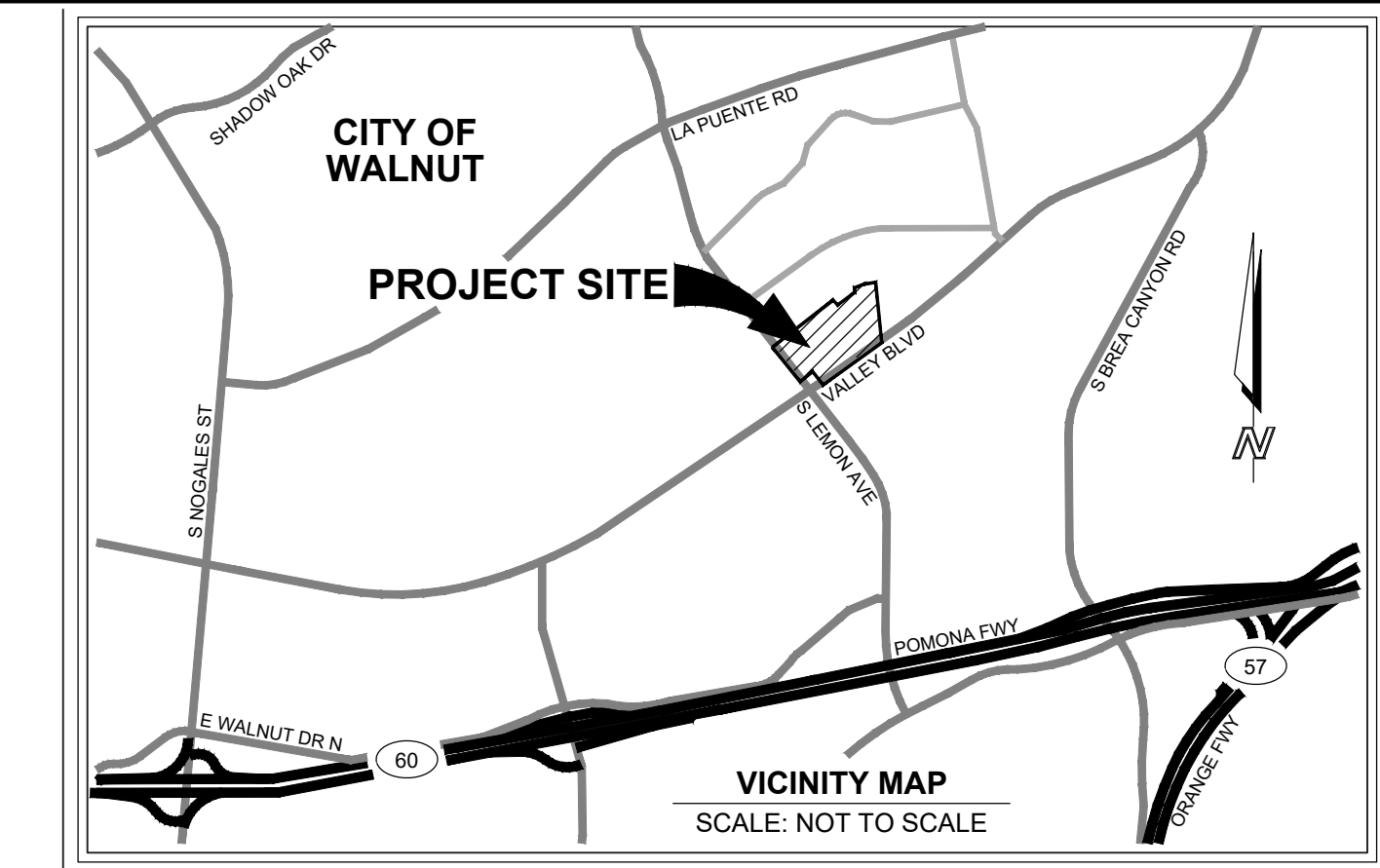
THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS. DO NOT SCALE THE DRAWING - ANY ERRORS OR OMISSIONS SHALL BE REPORTED TO ATLAS CIVIL DESIGN WITHOUT DELAY. THE COPYRIGHTS TO ALL DESIGNS AND DRAWINGS ARE THE PROPERTY OF ATLAS CIVIL DESIGN. REPRODUCTION OR USE FOR ANY PURPOSE OTHER THAN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

S:\LOCAL CLOUD\SHARES\2023\22-136 WALNUT BUSINESS PARK\CIVIL\REPORTS\HYDROLOGY\WORKING\22-136 POST-DEV MAP.DWG - PLOT DATE: June 20, 2023



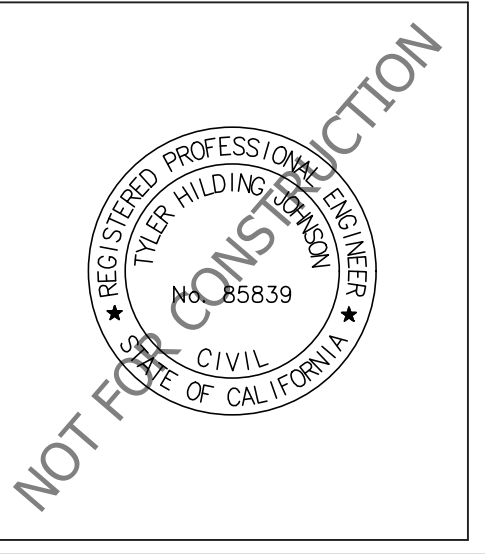
DMA-4	
IMP	4.61 89.2%
PER	0.56 10.8%

BLDG 4
 FOOTPRINT: 82,304 SF
 MEZZ: 2,469 SF
 TOTAL: 84,773 SF
 CLR.HGT: 30'



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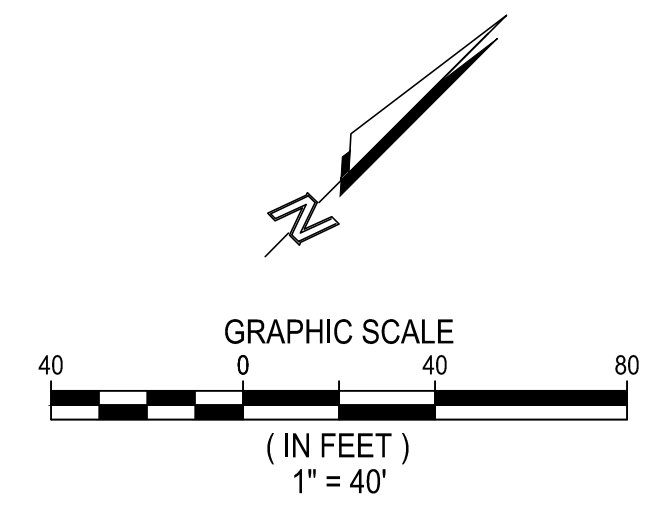
DATE	REVISIONS	BY

HYDROLOGIC DATA:

DMA-4	DETAILS
AREA (ACRES)	5.17
SOIL GROUP	017
DESIGN FREQUENCY	25-YEAR
50-YEAR RAINFALL DEPTH (IN)	6.5
PERCENT IMPERVIOUS	89.2%
Q ₂₅ (CFS)	13.91

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



WALNUT BUSINESS PARK
 CITY OF WALNUT
 COUNTY OF LOS ANGELES
 POST-DEVELOPMENT HYDROLOGY MAP
 LOT 4

PROJECT NUMBER:	22-136
PREPARED ON:	
REVISED ON:	6/20/23
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

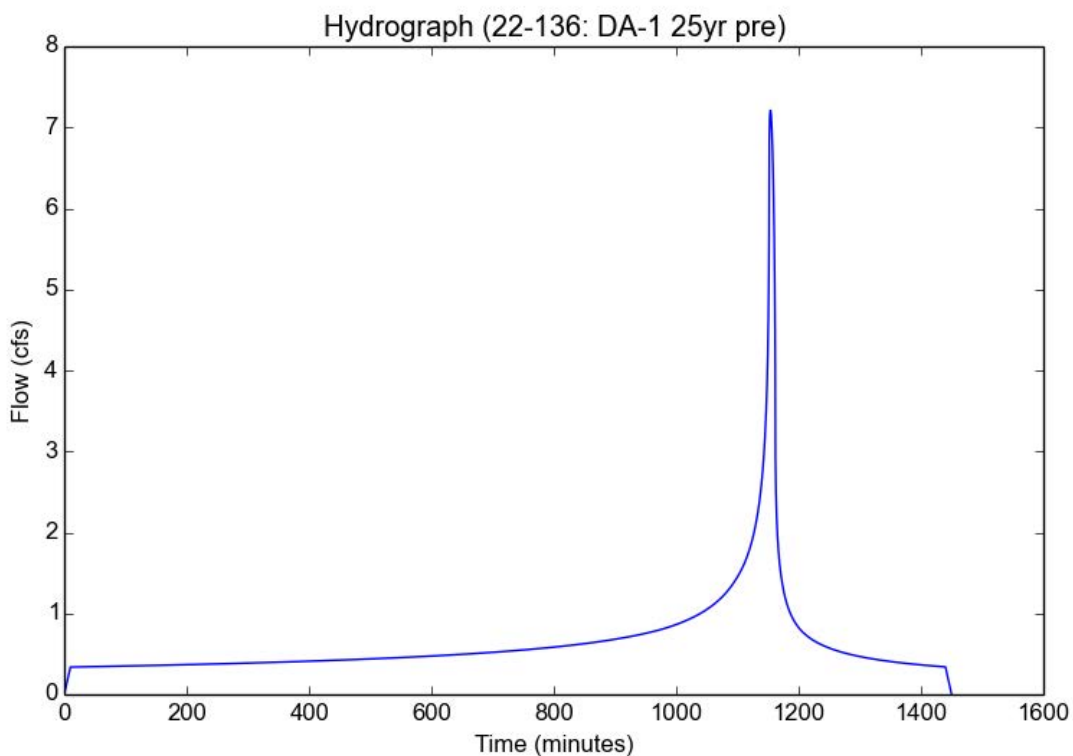
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	22-136
Subarea ID	DA-1 25yr pre
Area (ac)	3.27
Flow Path Length (ft)	756.0
Flow Path Slope (vft/hft)	0.0061
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.895
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)	2.4583
Undeveloped Runoff Coefficient (Cu)	0.8707
Developed Runoff Coefficient (Cd)	0.8969
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	7.2099
Burned Peak Flow Rate (cfs)	7.2099
24-Hr Clear Runoff Volume (ac-ft)	1.2827
24-Hr Clear Runoff Volume (cu-ft)	55873.1852



Peak Flow Hydrologic Analysis

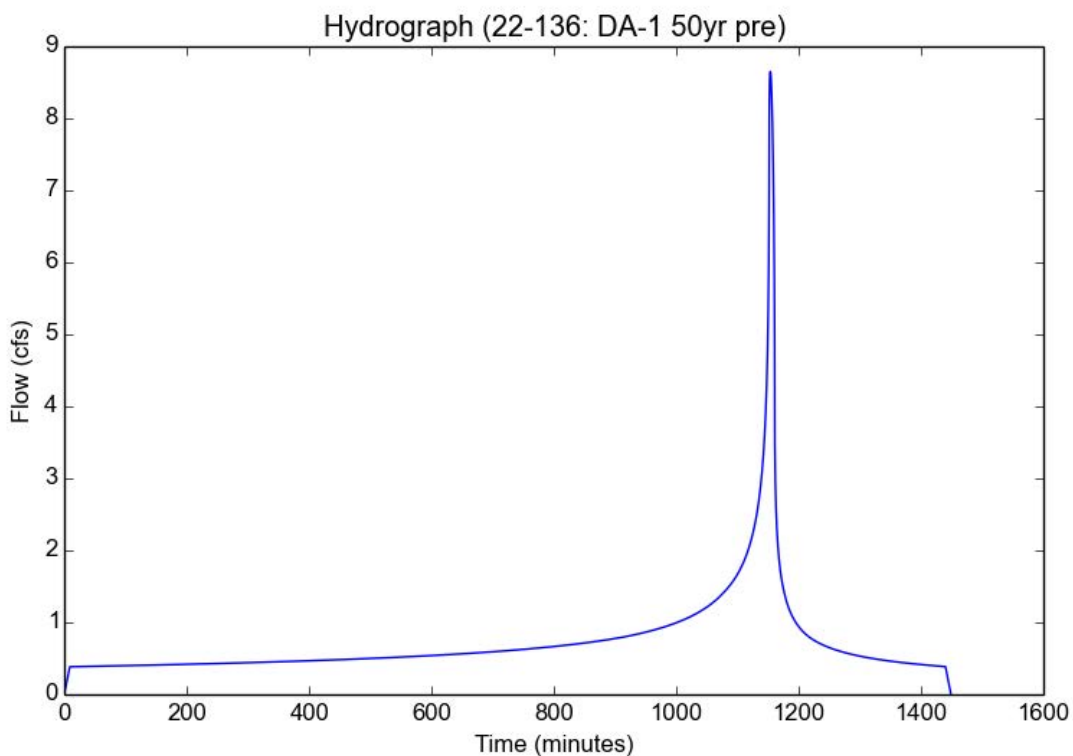
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	22-136
Subarea ID	DA-1 50yr pre
Area (ac)	3.27
Flow Path Length (ft)	756.0
Flow Path Slope (vft/hft)	0.0061
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.895
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)	2.942
Undeveloped Runoff Coefficient (Cu)	0.8903
Developed Runoff Coefficient (Cd)	0.899
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	8.6484
Burned Peak Flow Rate (cfs)	8.6484
24-Hr Clear Runoff Volume (ac-ft)	1.4653
24-Hr Clear Runoff Volume (cu-ft)	63827.1624



Peak Flow Hydrologic Analysis

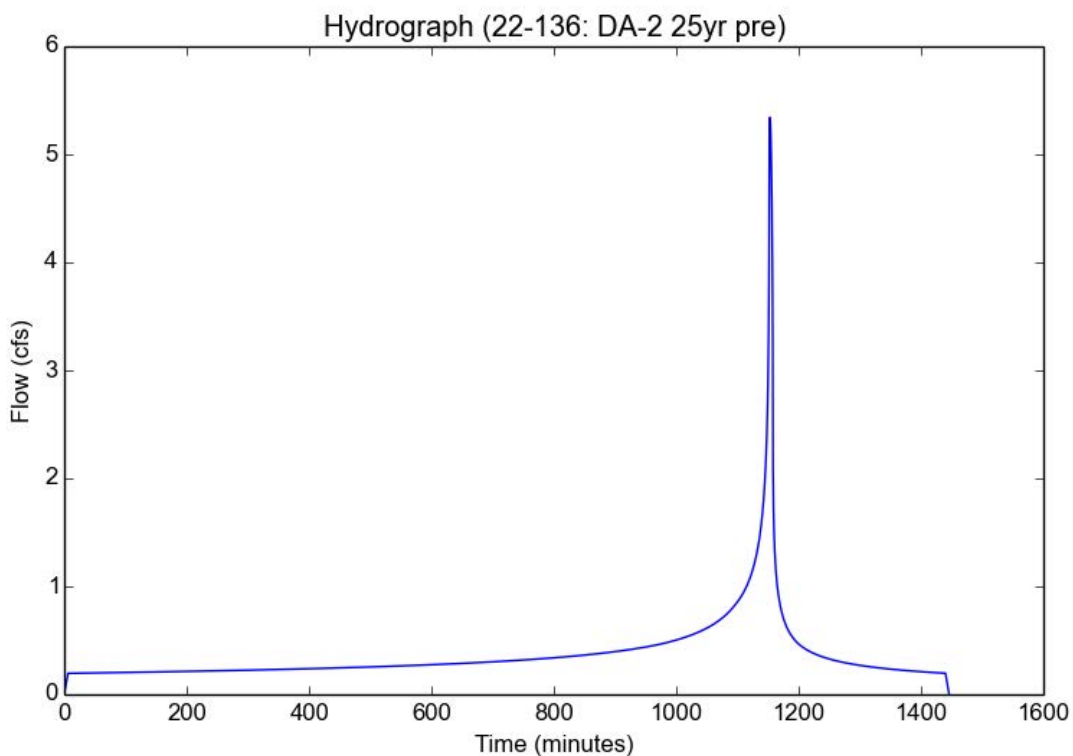
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	22-136
Subarea ID	DA-2 25yr pre
Area (ac)	1.9
Flow Path Length (ft)	391.0
Flow Path Slope (vft/hft)	0.0076
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.892
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)	3.1253
Undeveloped Runoff Coefficient (Cu)	0.8973
Developed Runoff Coefficient (Cd)	0.8997
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	5.3426
Burned Peak Flow Rate (cfs)	5.3426
24-Hr Clear Runoff Volume (ac-ft)	0.7435
24-Hr Clear Runoff Volume (cu-ft)	32388.8839



Peak Flow Hydrologic Analysis

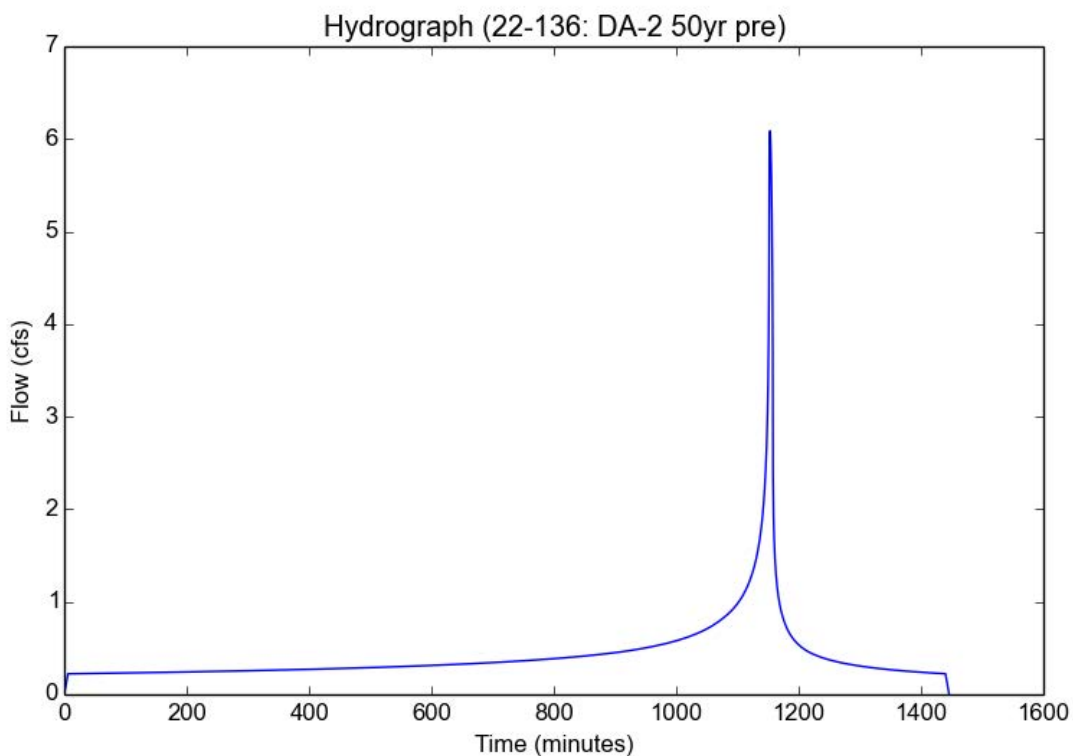
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	22-136
Subarea ID	DA-2 50yr pre
Area (ac)	1.9
Flow Path Length (ft)	391.0
Flow Path Slope (vft/hft)	0.0076
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.892
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)	3.5596
Undeveloped Runoff Coefficient (Cu)	0.9
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	6.0869
Burned Peak Flow Rate (cfs)	6.0869
24-Hr Clear Runoff Volume (ac-ft)	0.8494
24-Hr Clear Runoff Volume (cu-ft)	37001.8021



Peak Flow Hydrologic Analysis

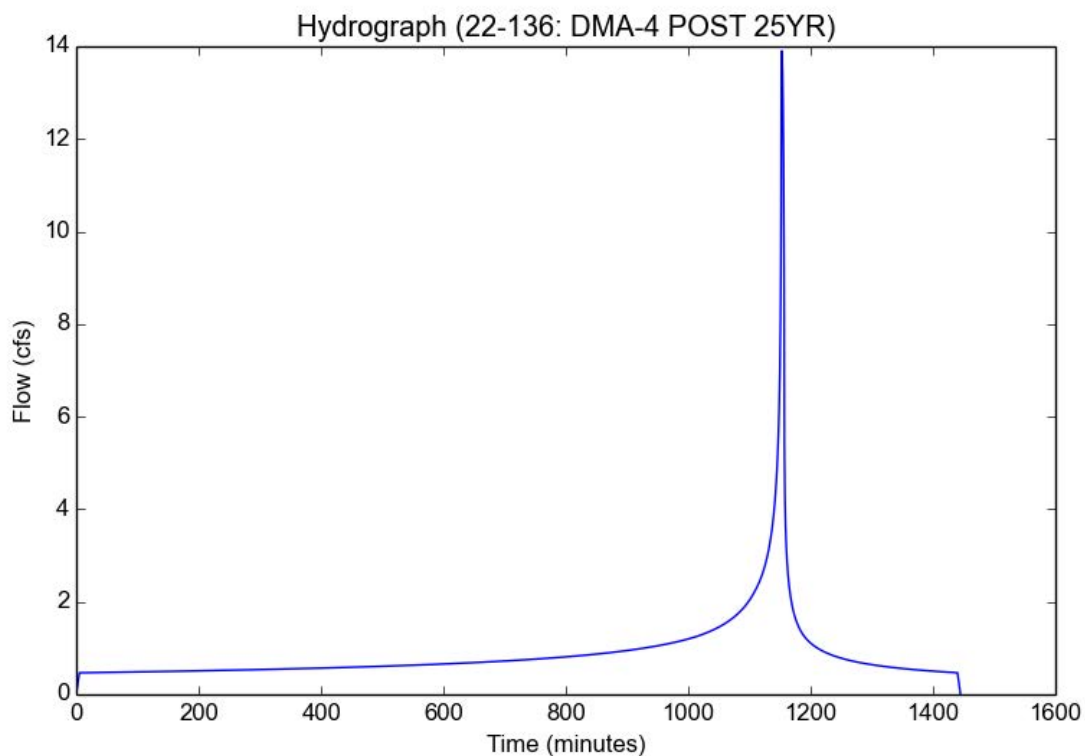
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	22-136
Subarea ID	DMA-4 POST 25YR
Area (ac)	5.17
Flow Path Length (ft)	223.0
Flow Path Slope (vft/hft)	0.152
50-yr Rainfall Depth (in)	5.71
Percent Impervious	0.892
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)	2.9911
Undeveloped Runoff Coefficient (Cu)	0.8922
Developed Runoff Coefficient (Cd)	0.8992
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	13.9047
Burned Peak Flow Rate (cfs)	13.9047
24-Hr Clear Runoff Volume (ac-ft)	1.7726
24-Hr Clear Runoff Volume (cu-ft)	77215.6884



Peak Flow Hydrologic Analysis

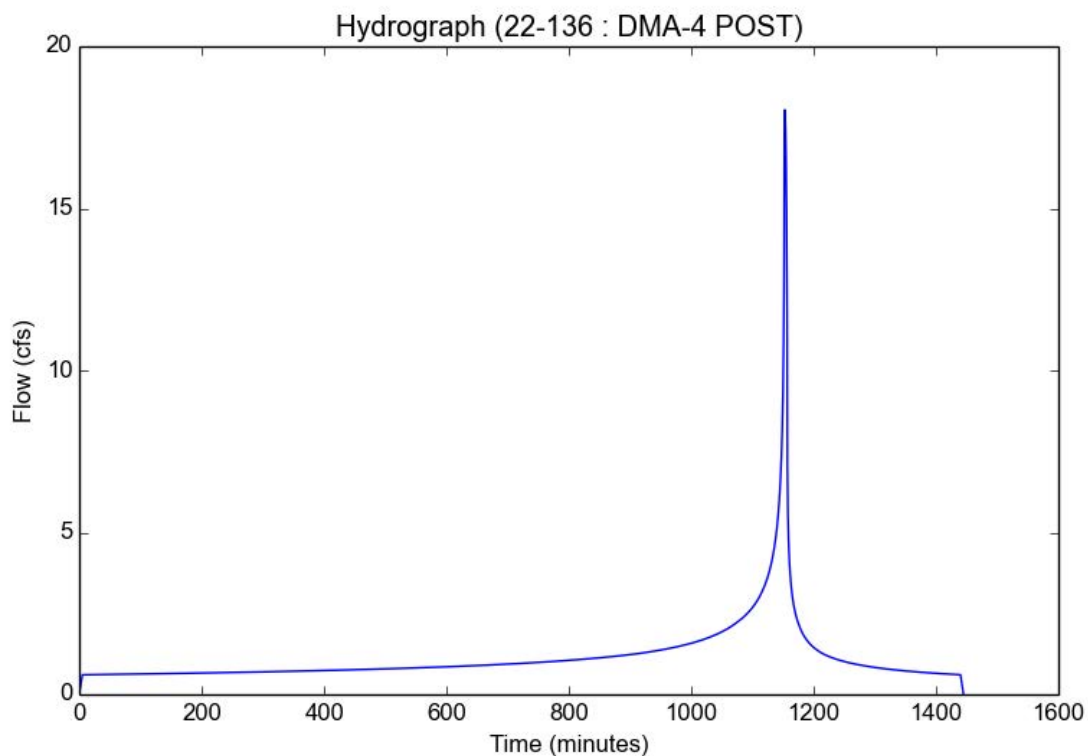
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	22-136
Subarea ID	DMA-4 POST
Area (ac)	5.17
Flow Path Length (ft)	223.0
Flow Path Slope (vft/hft)	0.152
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.892
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)	3.8781
Undeveloped Runoff Coefficient (Cu)	0.9
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	18.0447
Burned Peak Flow Rate (cfs)	18.0447
24-Hr Clear Runoff Volume (ac-ft)	2.3113
24-Hr Clear Runoff Volume (cu-ft)	100680.9779



Attachment C

Channel Report

DMA-1 12in 25yr

Circular

Diameter (ft) = 1.00

Invert Elev (ft) = 517.00

Slope (%) = 0.50

N-Value = 0.012

Calculations

Compute by: Q vs Depth

No. Increments = 17

Highlighted

Depth (ft) = 0.94

Q (cfs) = 2.934

Area (sqft) = 0.77

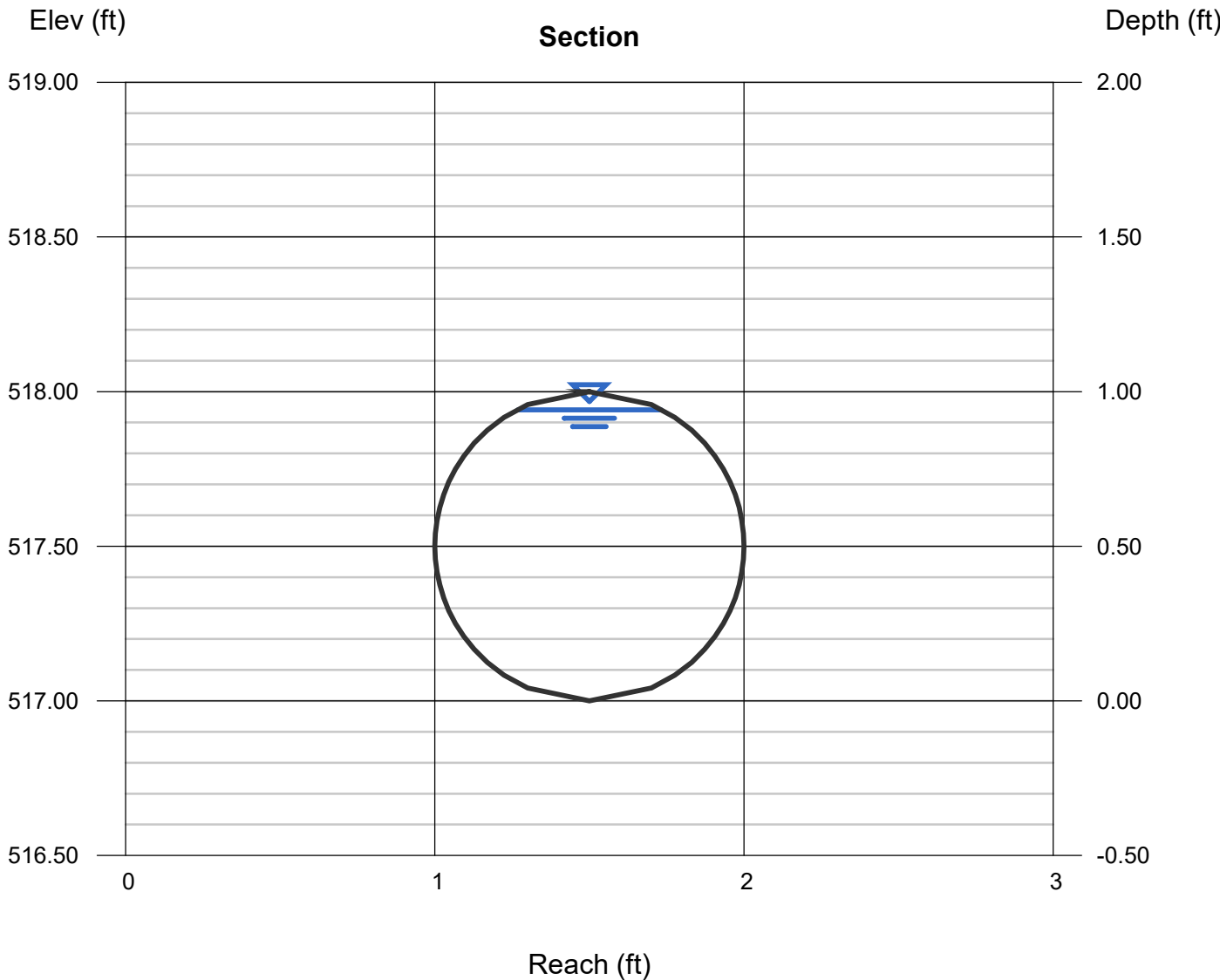
Velocity (ft/s) = 3.83

Wetted Perim (ft) = 2.66

Crit Depth, Yc (ft) = 0.74

Top Width (ft) = 0.47

EGL (ft) = 1.17



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

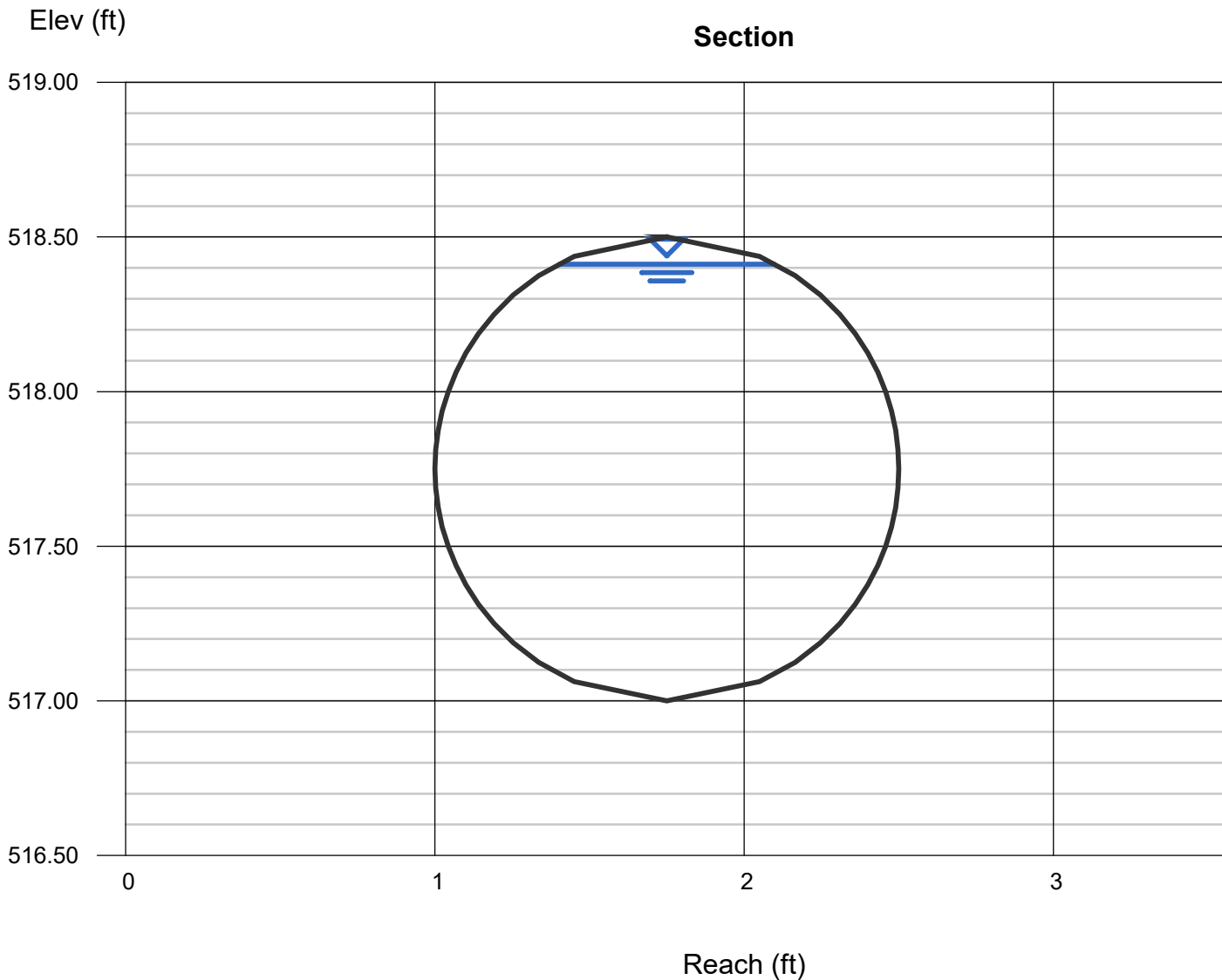
Velocity (ft/s) = 5.01

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

Diameter (ft) = 2.00

Invert Elev (ft) = 517.00

Slope (%) = 0.50

N-Value = 0.012

Calculations

Compute by: Known Q

Known Q (cfs) = 17.00

Highlighted

Depth (ft) = 1.61

Q (cfs) = 17.00

Area (sqft) = 2.71

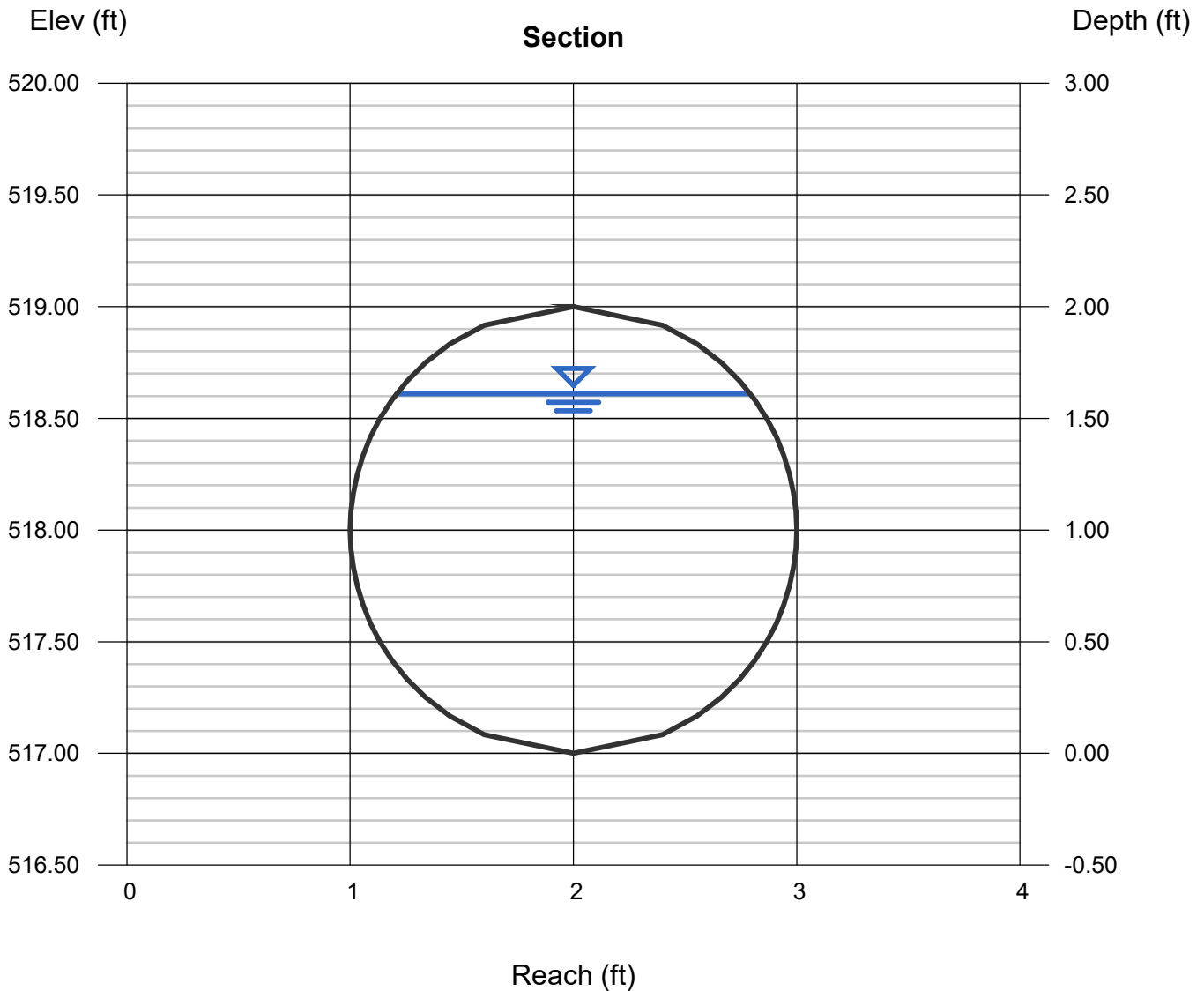
Velocity (ft/s) = 6.26

Wetted Perim (ft) = 4.46

Crit Depth, Y_c (ft) = 1.49

Top Width (ft) = 1.58

EGL (ft) = 2.22



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-

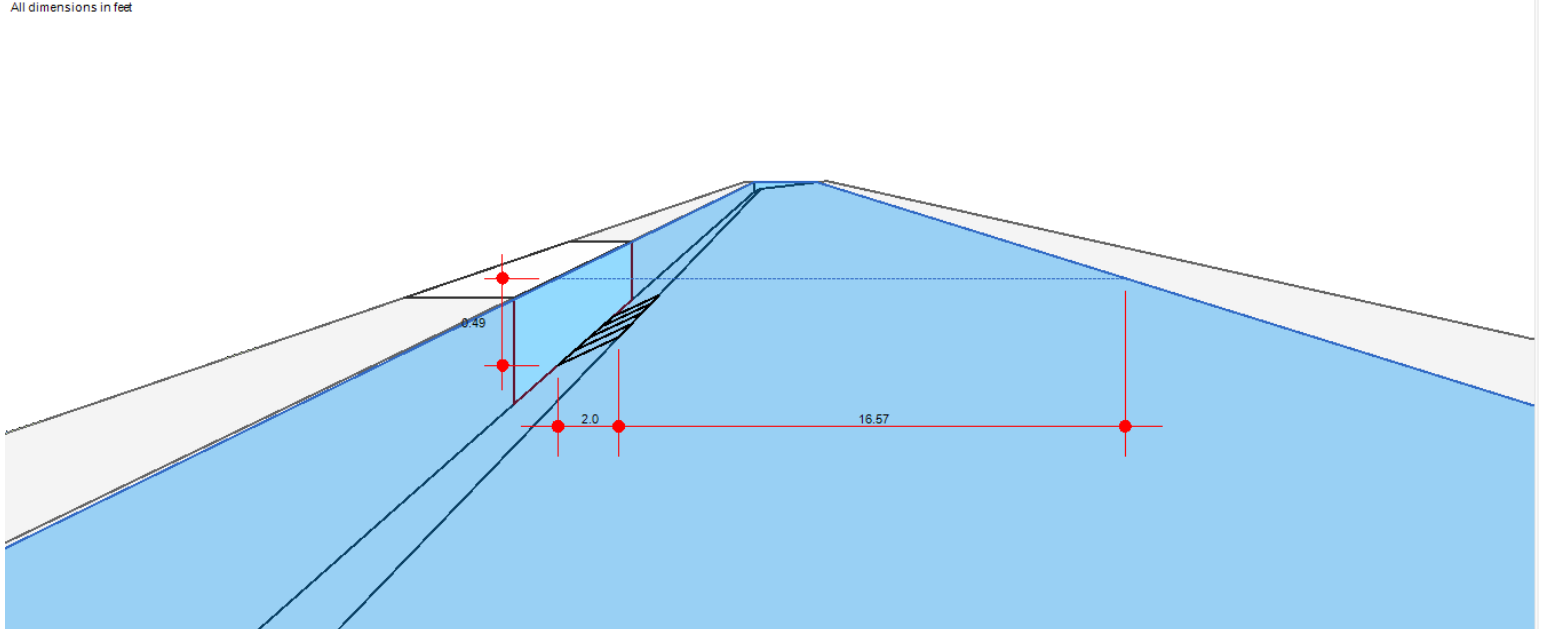
Calculations

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

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-

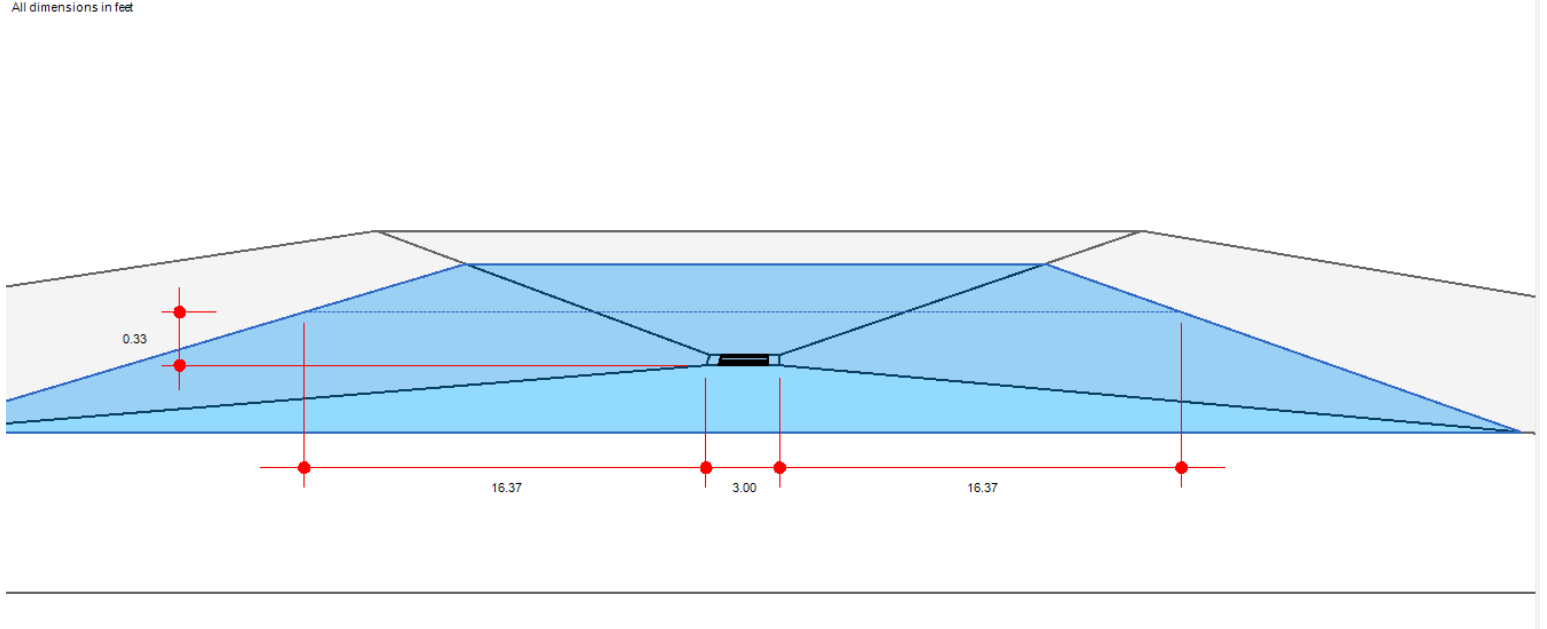
Calculations

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

36in grate inlet gutter

Drop Grate Inlet

Location	= Sag
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= 4.00
Grate Width (ft)	= 3.00
Grate Length (ft)	= 3.00

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-

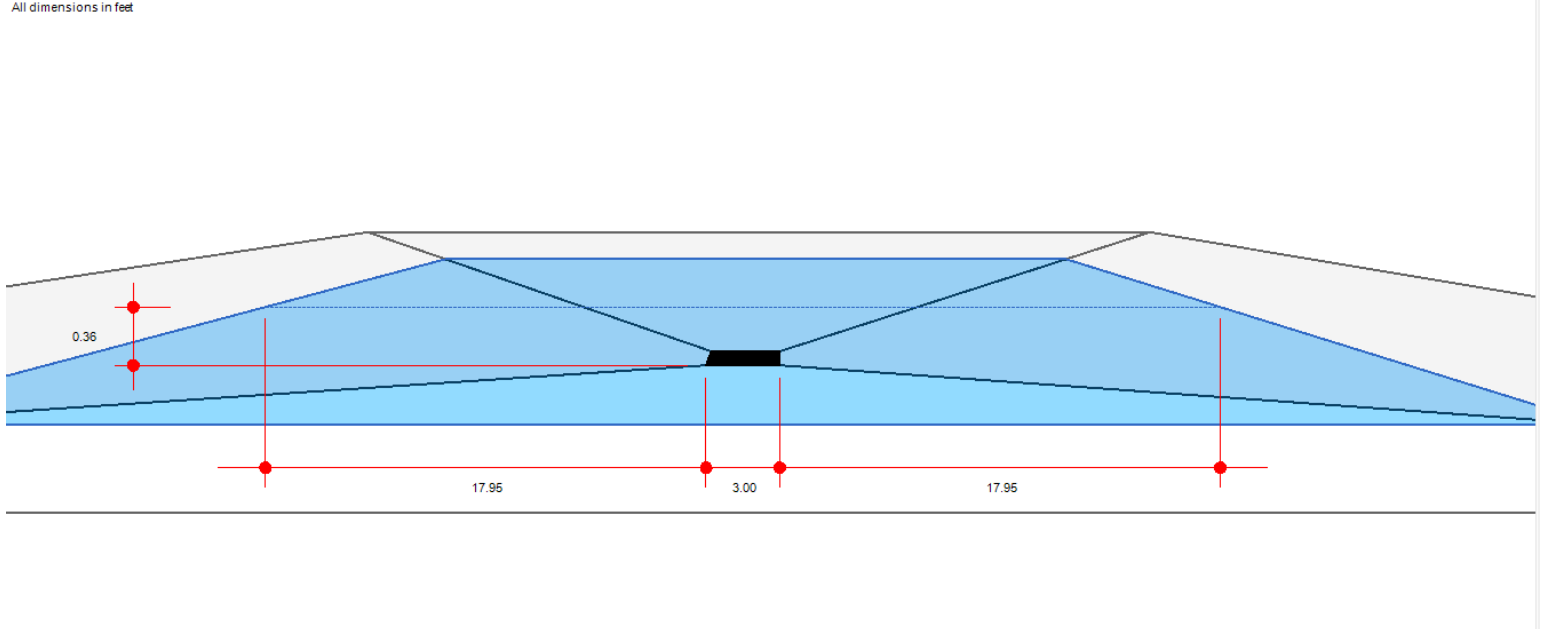
Calculations

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

Highlighted

Q Total (cfs)	= 7.75
Q Capt (cfs)	= 7.75
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 4.31
Efficiency (%)	= 100
Gutter Spread (ft)	= 38.90
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

