

## Appendices

### Appendix L-b Hydrology and Hydraulic Report - Lot 2 Paseo Del Prado and Paseo Sonrisa

## Appendices

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# **HYDROLOGY AND HYDRAULIC REPORT**

## **FOR**

**Walnut Business Park – Lot 2**  
Paseo Del Prado and Paseo Sonrisa  
Walnut, CA 91789

### **Owner:**

**IDS Real Estate Group**  
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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 Southeast intersection of Paseo Del Prado and Paseo Sonrisa in the City of Walnut, Los Angeles County, CA. The total site area is 2.23 acres and the project is proposing a 37,080 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 two sub-basins. The northwest half (DA-1) drains to the west and sheet flows at 1.80% to multiple ribbon gutters which direct runoff over the driveways and into Paseo Sonrisa (public ROW). Runoff then flows south 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 northeast half (DA-2) drains to the east and sheet flows at 0.69% over the 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 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.

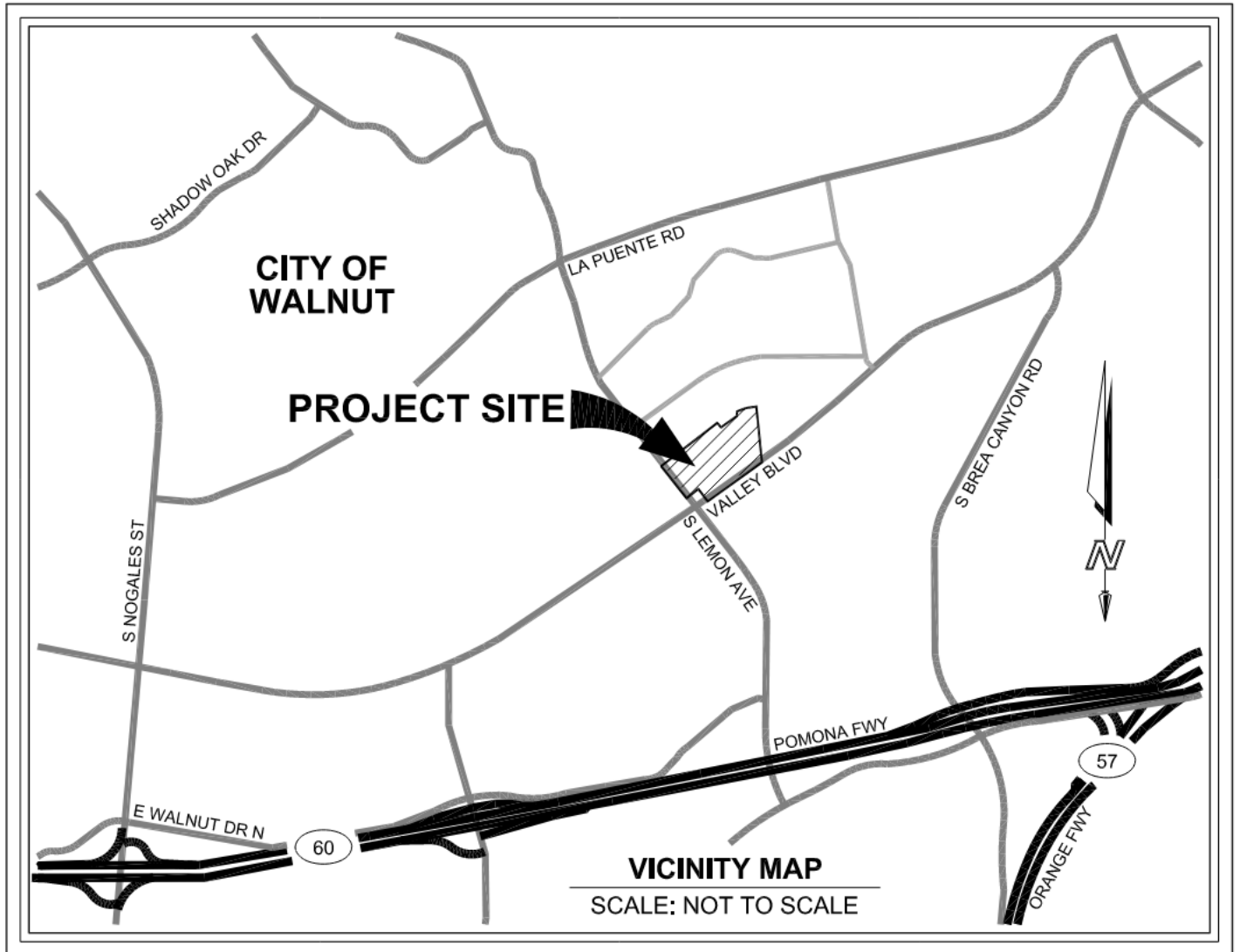
The runoff from the project site to San Jose Creek is shown in Figure-4.

### **Proposed Site Drainage**

In the proposed condition the site drains to the southeast and sheet flows to multiple ribbon gutters which direct runoff to ribbon gutters and then captured in 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

<b>Tributary Area</b>	<b>DA-1</b>
Acreage (acres)	1.20
Time of Concentration; Tc (min)	5.0
25 yr Pre- Dev Runoff; Q <sub>25</sub> (cfs)	3.68
50 yr Pre- Dev Runoff; Q <sub>50</sub> (cfs)	4.19

<b>Tributary Area</b>	<b>DA-2</b>
Acreage (acres)	1.03
Time of Concentration; Tc (min)	5.0
25 yr Pre- Dev Runoff; Q <sub>25</sub> (cfs)	3.16
50 yr Pre- Dev Runoff; Q <sub>50</sub> (cfs)	3.60

Post-Development Condition

<b>Tributary Area</b>	<b>DMA-2</b>
Acreage (acres)	2.23
Time of Concentration; Tc (min)	5.0
25 yr Post- Dev Runoff; Q <sub>25</sub> (cfs)	6.83
50 yr Post- Dev Runoff; Q <sub>50</sub> (cfs)	7.78



## Section VI    Runoff Volumes

Table 2: Estimated Storm Runoff Volumes

### Pre-Development Condition

<b>Tributary Area</b>	<b>DA-1</b>
Acreage (acre)	1.20
CN (Weighted)	0.90
25 year Pre-Develop. Volume $V_{25}$ (cu-ft)	20,456
50 year Pre-Develop. Volume $V_{50}$ (cu-ft)	23,369

<b>Tributary Area</b>	<b>DA-2</b>
Acreage (acre)	1.03
CN (Weighted)	0.90
25 year Pre-Develop. Volume $V_{25}$ (cu-ft)	17,710
50 year Pre-Develop. Volume $V_{50}$ (cu-ft)	20,225

### Post-Development Condition

<b>Tributary Area</b>	<b>DMA-2</b>
Acreage (acre)	2.23
CN (Weighted)	0.90
25 year Post-Develop. Volume $V_{25}$ (cu-ft)	38,700
50 year Post-Develop. Volume $V_{50}$ (cu-ft)	44,180

## **Section VII Conclusion**

The Post-development condition will decrease peak flow by 0.01 cfs for the 25-year Storm Event.  
The Post-development condition will decrease peak flow by 0.01 cfs for the 50-year Storm Event.

The Post-development condition will increase the runoff volume by 534 cf for the 25-year Storm Event.

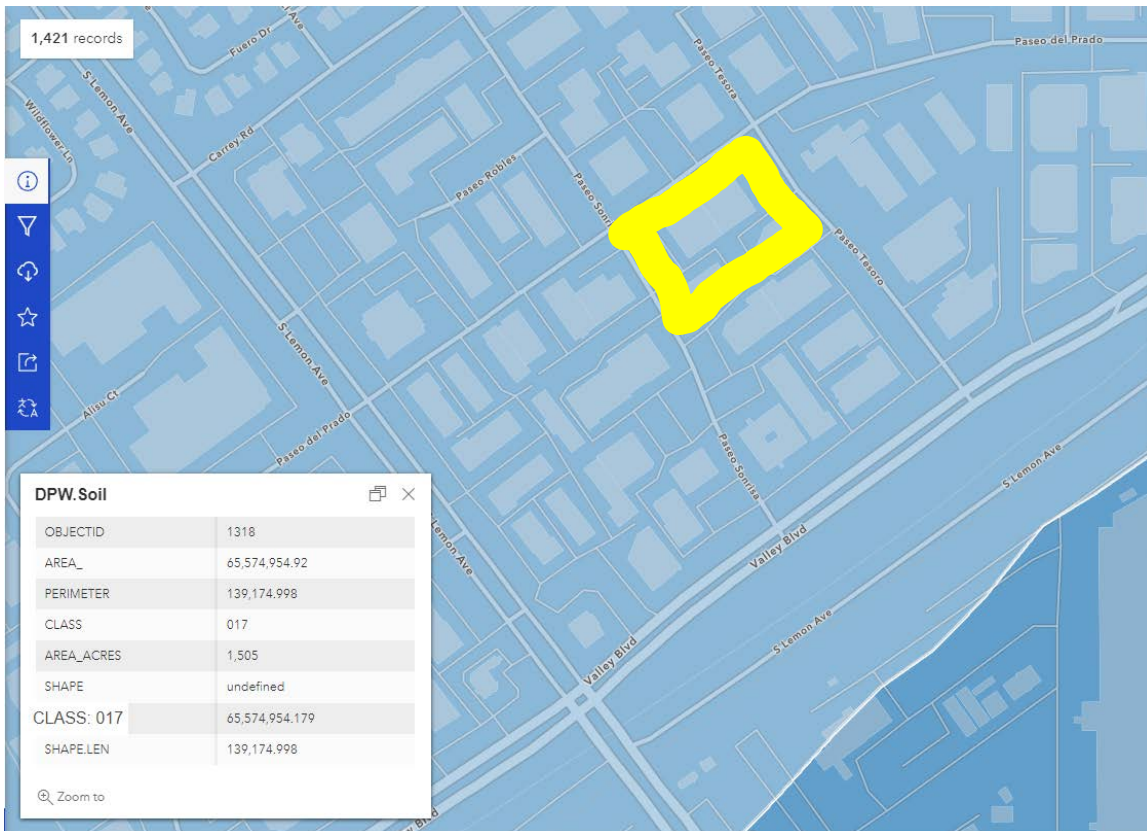
The Post-development condition will increase the runoff volume by 586 cf for the 50-year Storm Event.

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 85<sup>th</sup> 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.

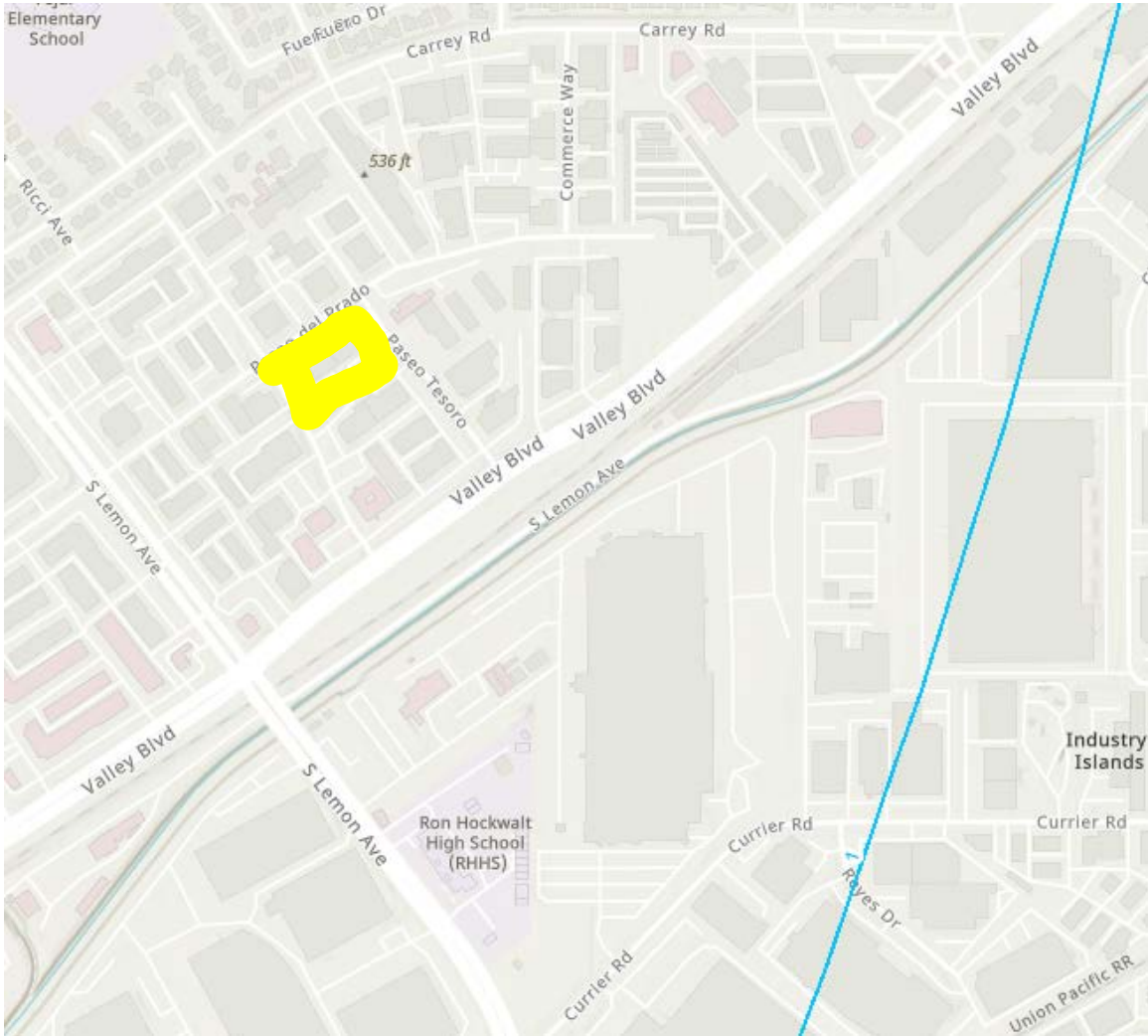
# Attachment A

## Figures

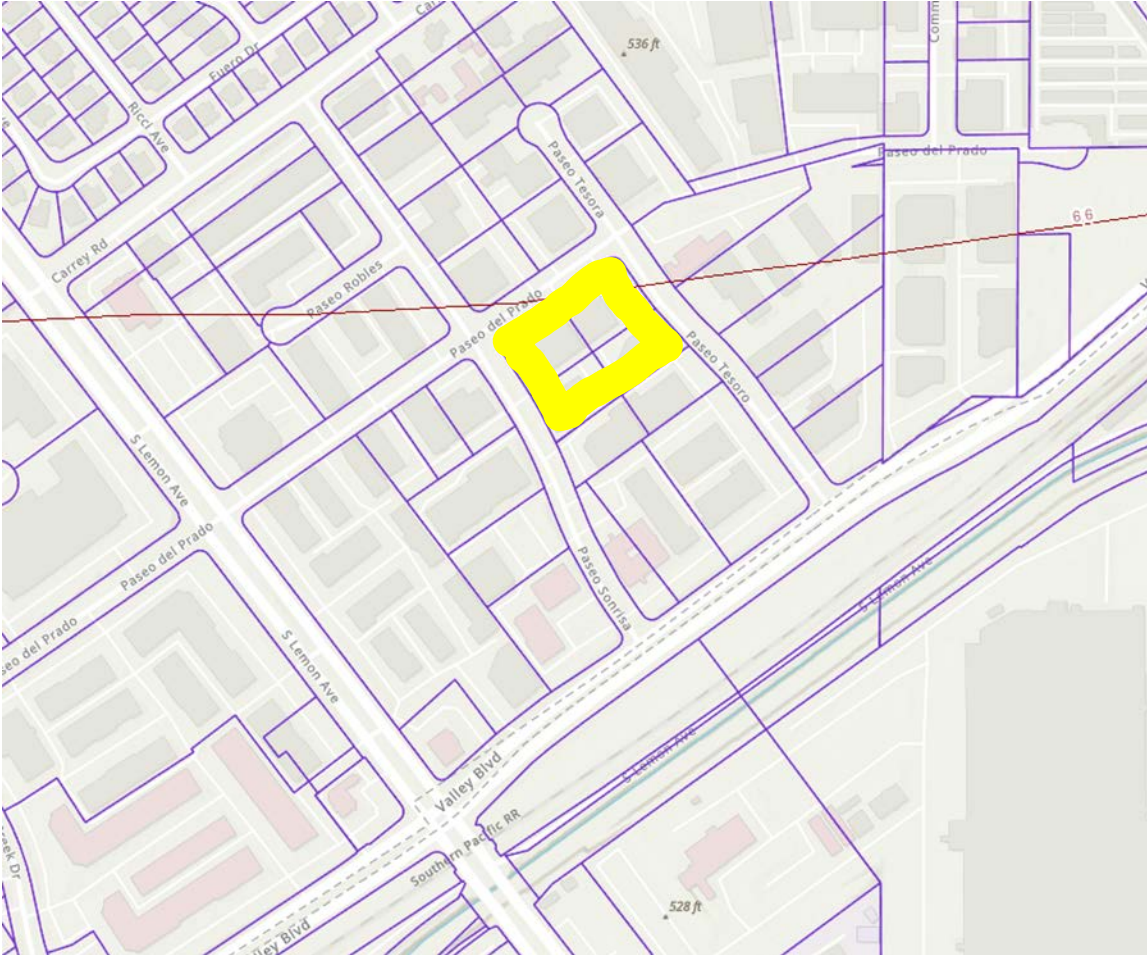
## Soils Group Map



## 85<sup>th</sup> Percentile Storm Rainfall Map

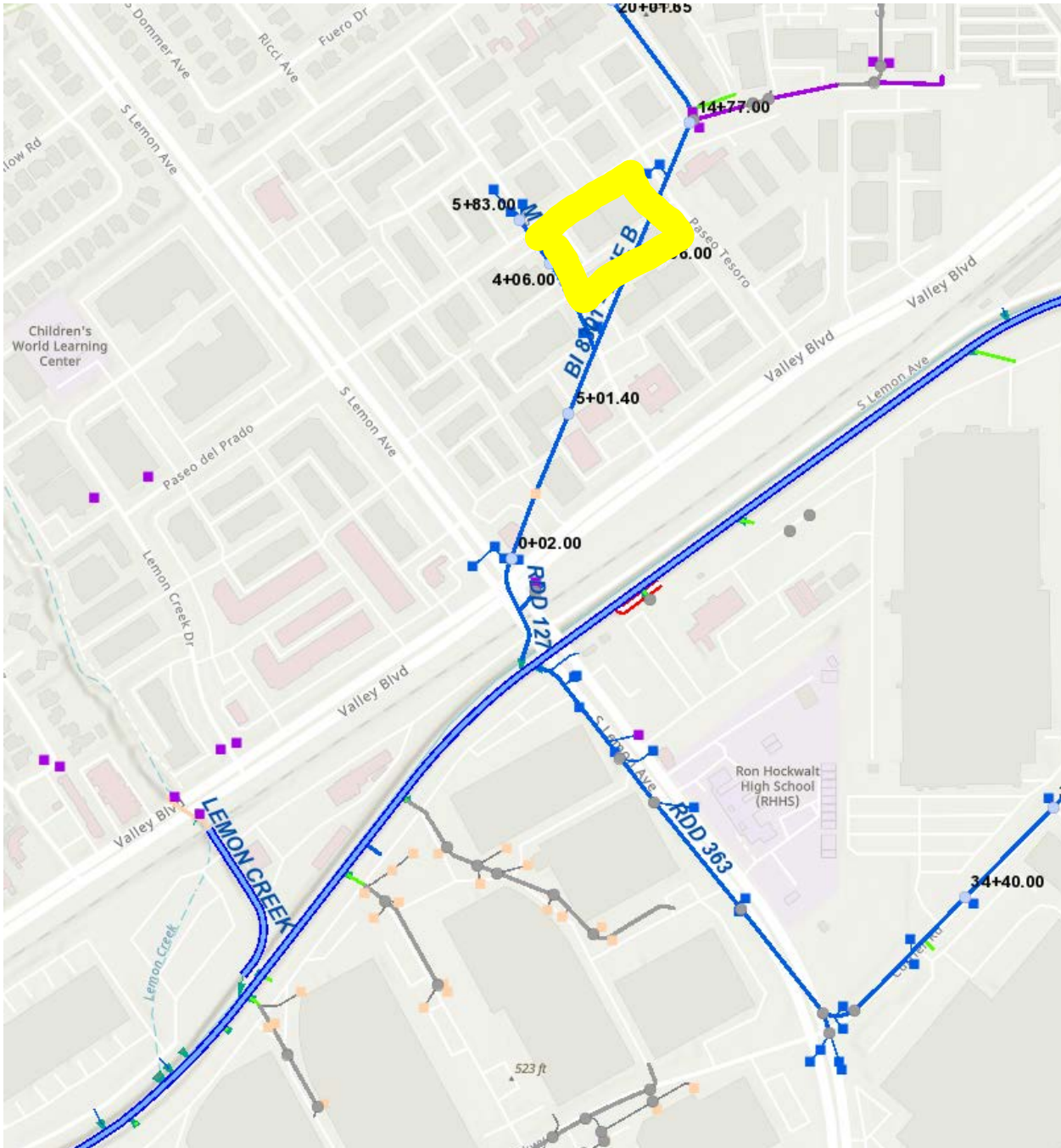


## 50 year Storm Rainfall Map



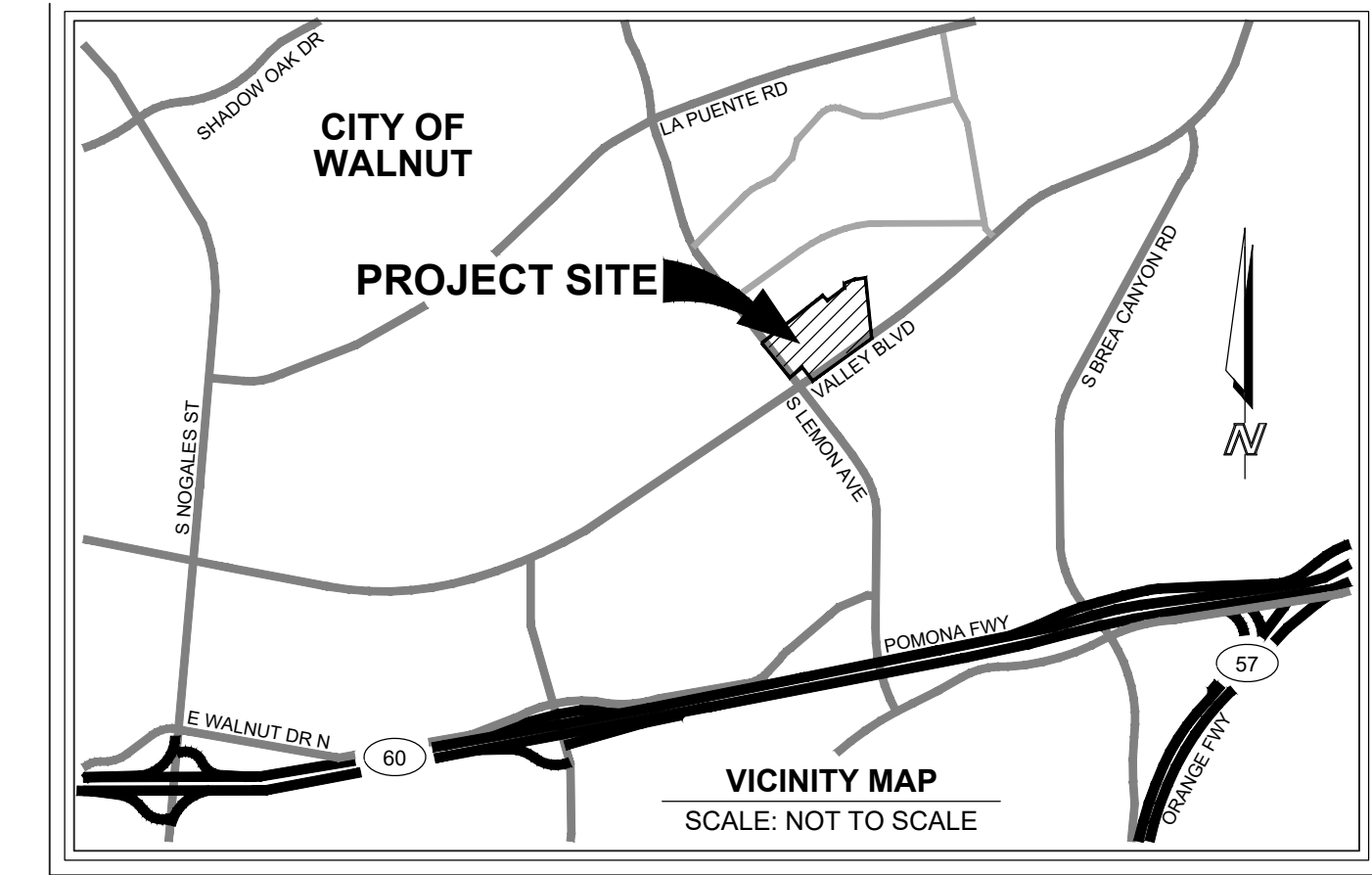
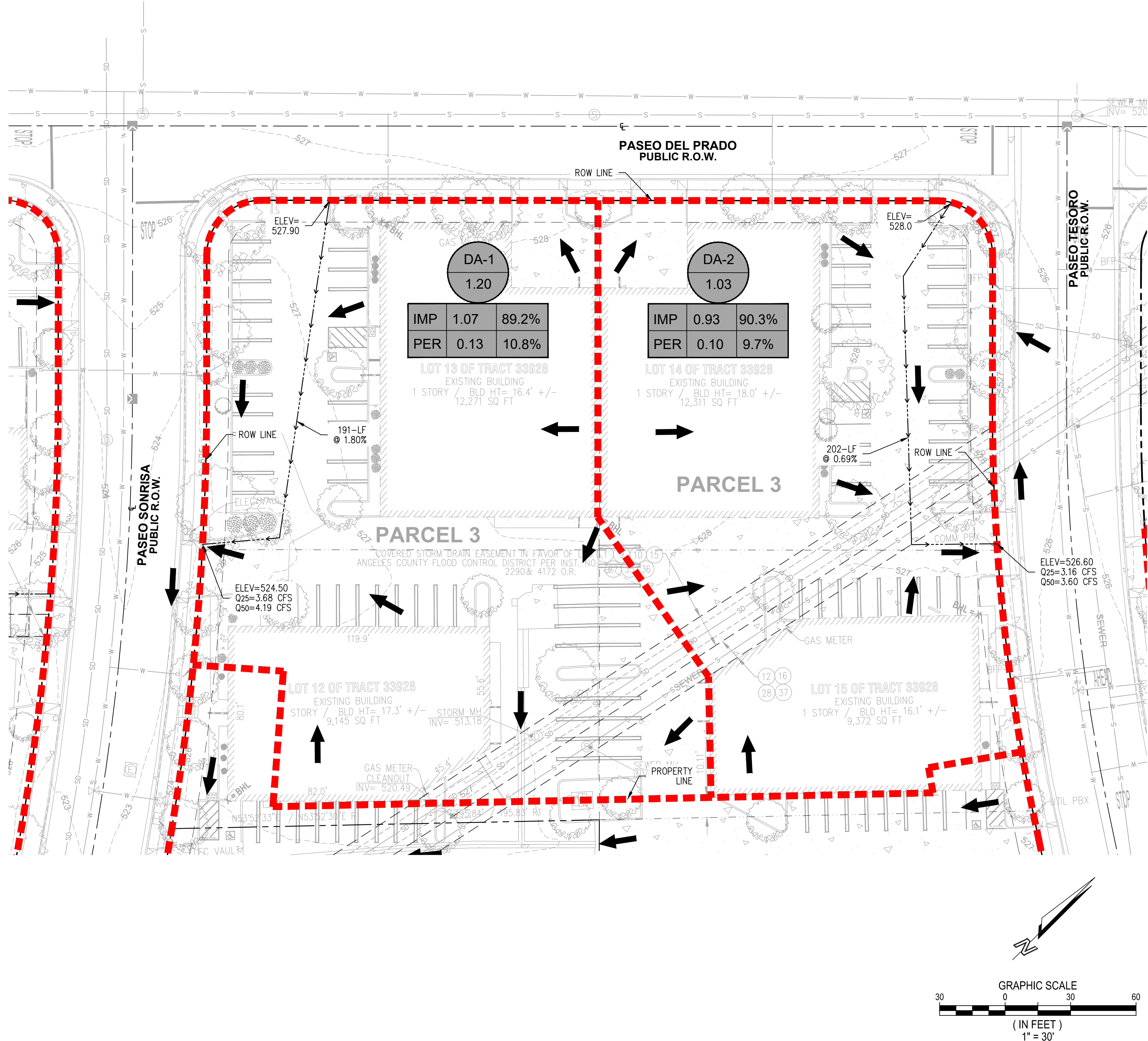


## Regional Storm Drainage Outfall Map





Z:\LOCAL CLOUD\SHARED\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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REGISTERED PROFESSIONAL ENGINEER  
TYLER HILDEN  
No. 55839  
STATE OF CALIFORNIA

DATE

BY

REVISIONS

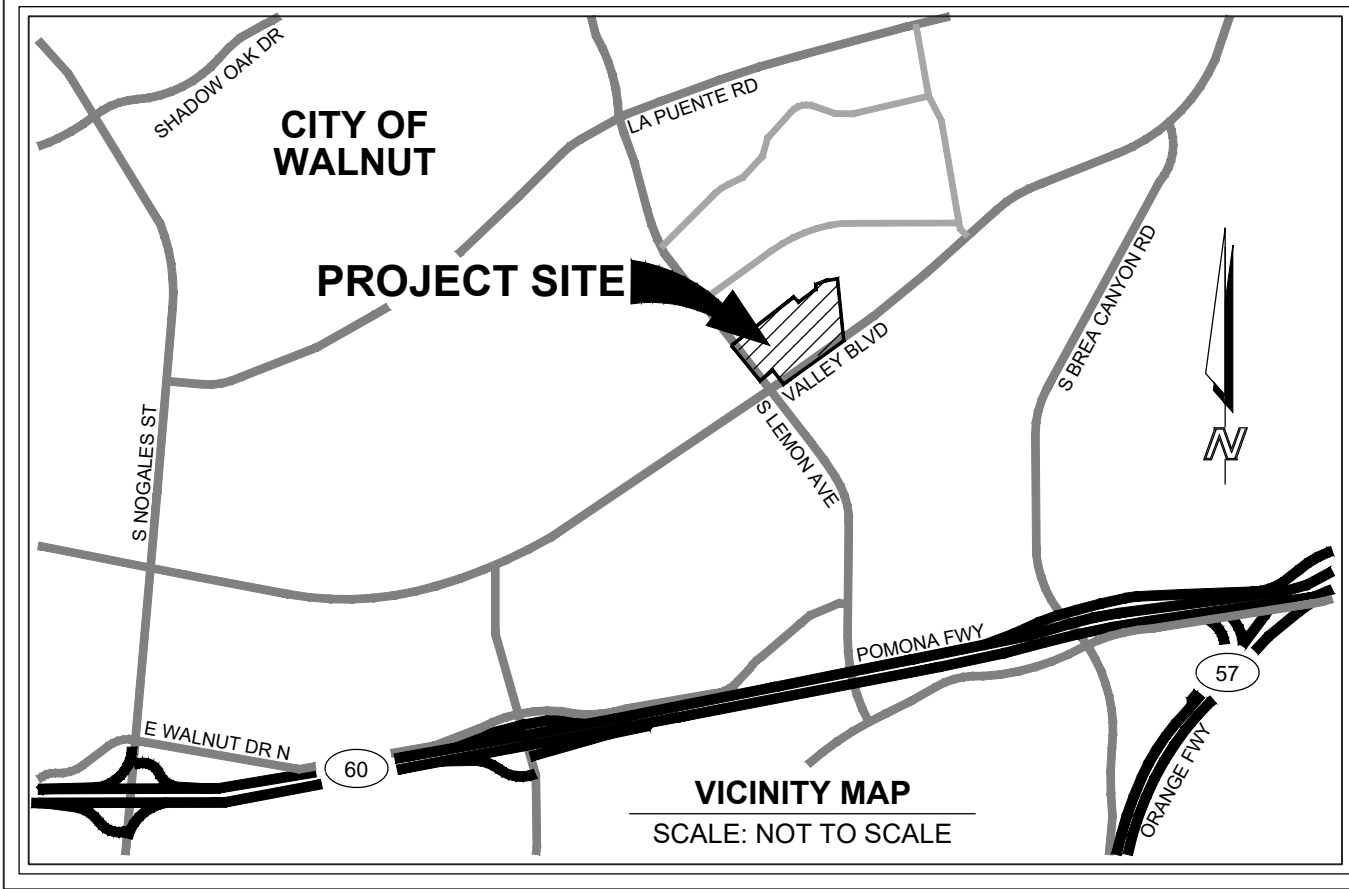
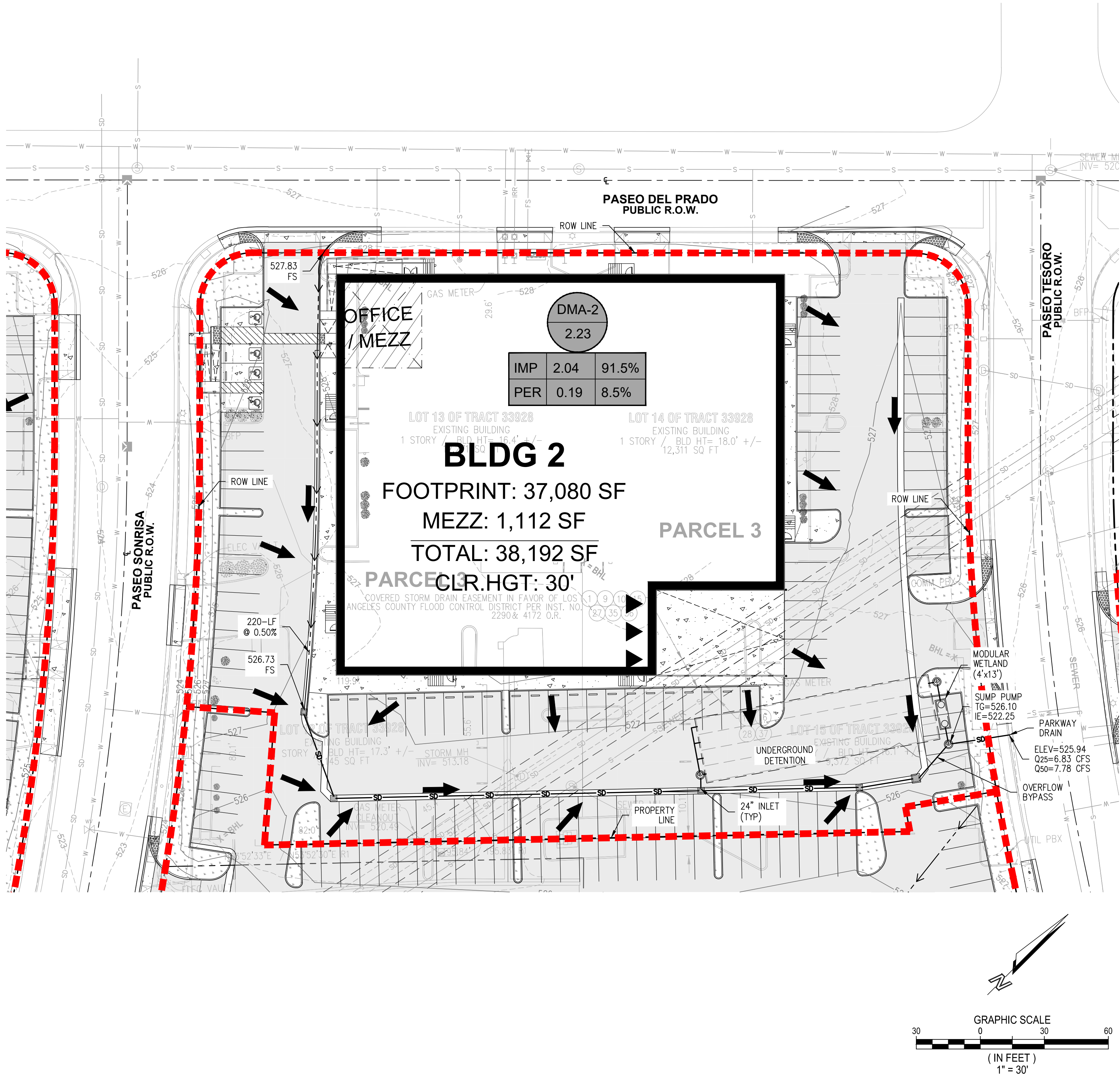
WALNUT BUSINESS PARK  
CITY OF WALNUT  
COUNTY OF LOS ANGELES  
PRE-DEVELOPMENT HYDROLOGY MAP  
LOT 2

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

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HYDROLOGIC DATA:

DMA-2	DETAILS
AREA (ACRES)	2.23
SOIL GROUP	017
DESIGN FREQUENCY	25-YEAR
50-YEAR RAINFALL DEPTH (IN)	6.5
PERCENT IMPERVIOUS	91.5%
Q <sub>25</sub> (CFS)	6.83

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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DATE	BY	REVISIONS

**WALNUT BUSINESS PARK**  
**CITY OF WALNUT**  
**COUNTY OF LOS ANGELES**  
**POST-DEVELOPMENT HYDROLOGY MAP**  
**LOT 2**

PROJECT NUMBER: 22-136  
PREPARED ON: 6/20/23  
REVISID ON: 6/20/23  
PREPARED BY: GMH  
CHECKED BY: THJ

SHEET  
1 OF 1

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## Attachment B

## Peak Flow Hydrologic Analysis

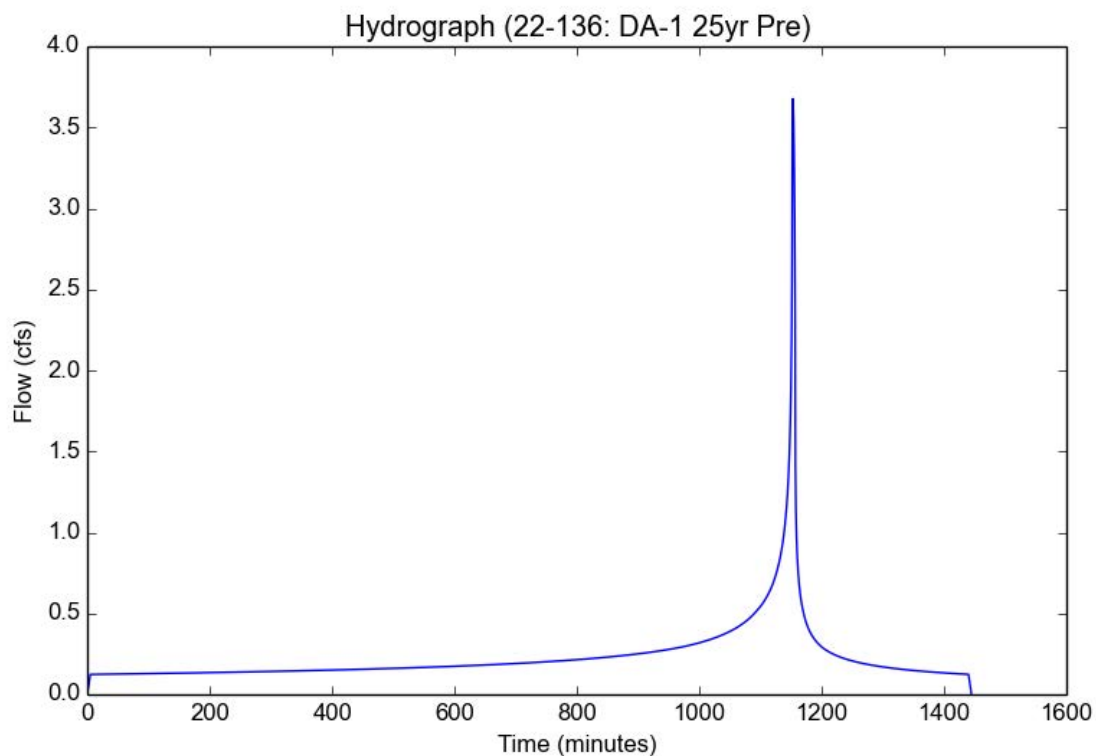
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Version: HydroCalc 1.0.3

### Input Parameters

Project Name	22-136
Subarea ID	DA-1 25yr Pre
Area (ac)	1.2
Flow Path Length (ft)	191.0
Flow Path Slope (vft/hft)	0.018
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)	3.405
Undeveloped Runoff Coefficient (Cu)	0.9
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.6773
Burned Peak Flow Rate (cfs)	3.6773
24-Hr Clear Runoff Volume (ac-ft)	0.4696
24-Hr Clear Runoff Volume (cu-ft)	20455.9689



## Peak Flow Hydrologic Analysis

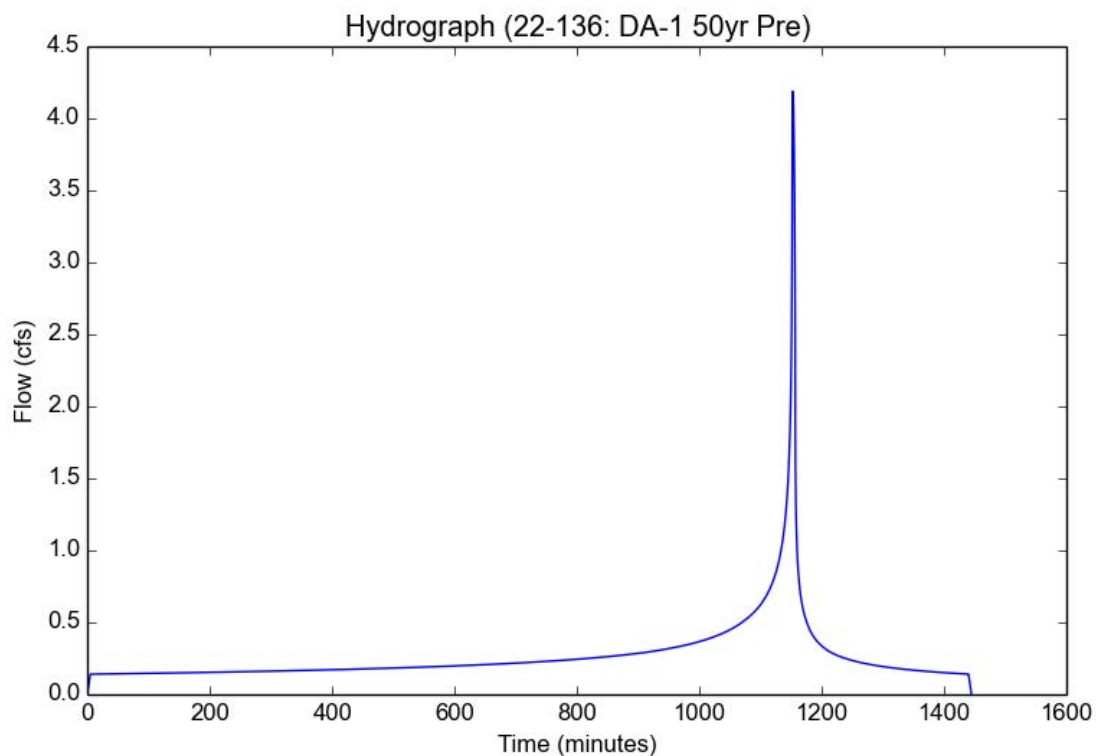
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Version: HydroCalc 1.0.3

### Input Parameters

Project Name	22-136
Subarea ID	DA-1 50yr Pre
Area (ac)	1.2
Flow Path Length (ft)	191.0
Flow Path Slope (vft/hft)	0.018
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)	4.1883
Burned Peak Flow Rate (cfs)	4.1883
24-Hr Clear Runoff Volume (ac-ft)	0.5365
24-Hr Clear Runoff Volume (cu-ft)	23368.8924





## Peak Flow Hydrologic Analysis

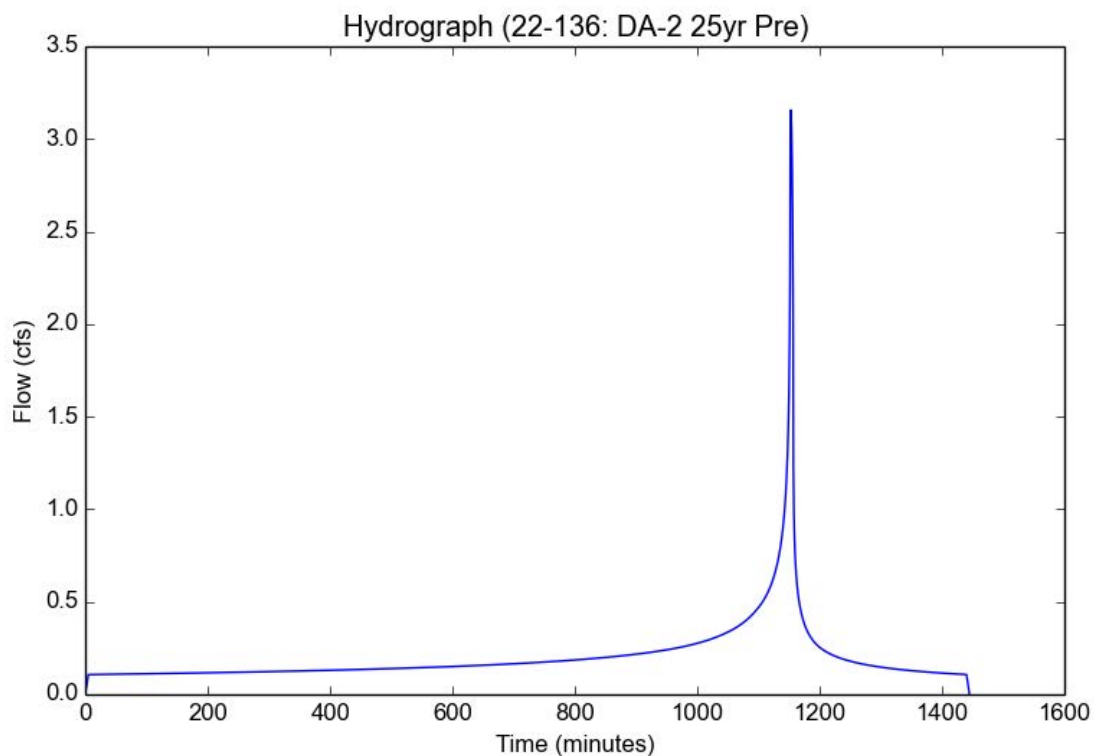
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Version: HydroCalc 1.0.3

### Input Parameters

Project Name	22-136
Subarea ID	DA-2 25yr Pre
Area (ac)	1.03
Flow Path Length (ft)	202.0
Flow Path Slope (vft/hft)	0.0069
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.903
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)	3.405
Undeveloped Runoff Coefficient (Cu)	0.9
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.1564
Burned Peak Flow Rate (cfs)	3.1564
24-Hr Clear Runoff Volume (ac-ft)	0.4066
24-Hr Clear Runoff Volume (cu-ft)	17709.531



## Peak Flow Hydrologic Analysis

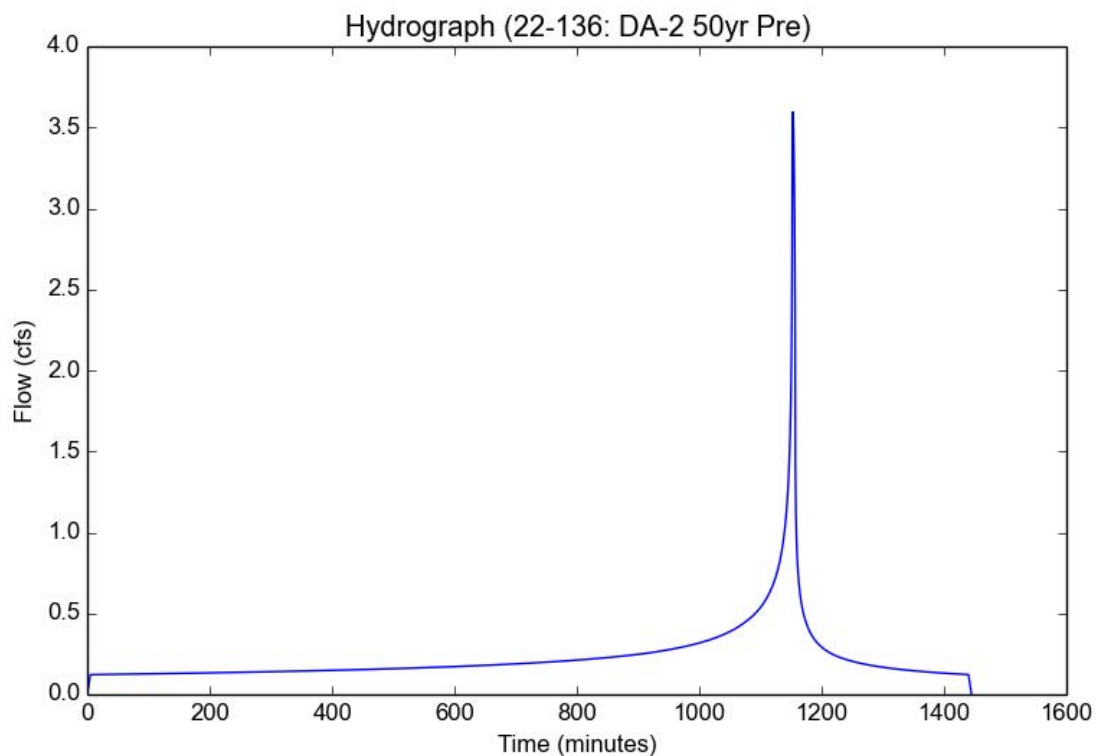
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Version: HydroCalc 1.0.3

### Input Parameters

Project Name	22-136
Subarea ID	DA-2 50yr Pre
Area (ac)	1.03
Flow Path Length (ft)	202.0
Flow Path Slope (vft/hft)	0.0069
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.903
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)	3.595
Burned Peak Flow Rate (cfs)	3.595
24-Hr Clear Runoff Volume (ac-ft)	0.4643
24-Hr Clear Runoff Volume (cu-ft)	20224.675



## Peak Flow Hydrologic Analysis

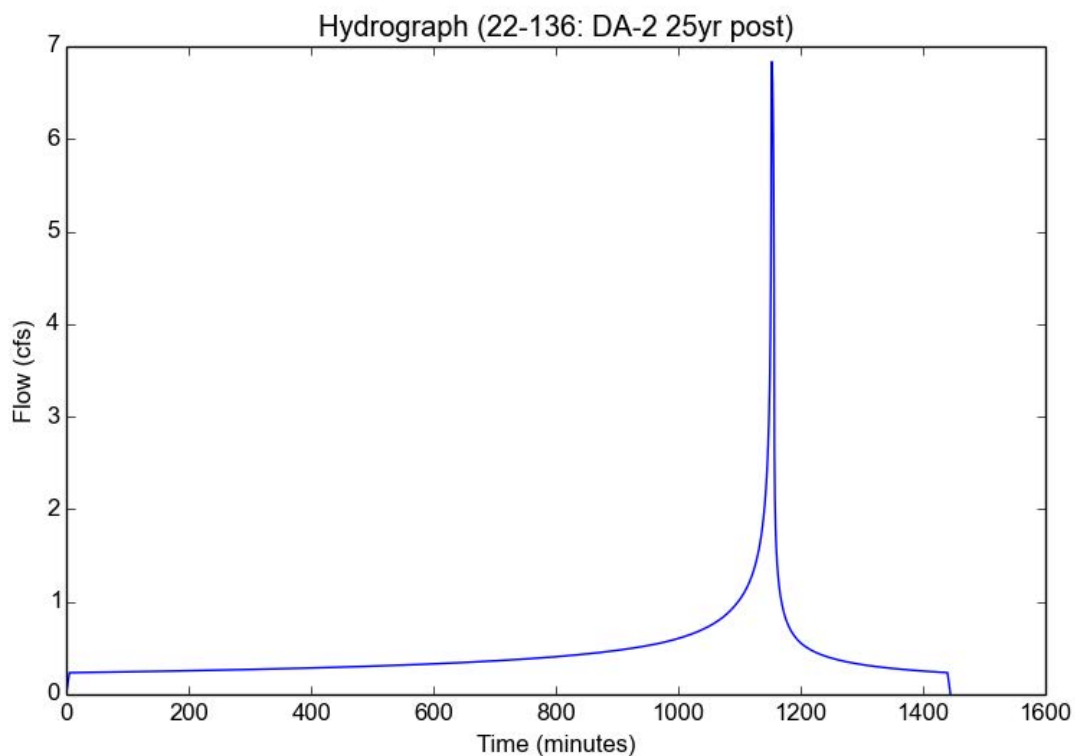
File location: C:/Local Cloud/Shared/2022/22-136 Walnut Business Park/Civil/reports/Hydrology/Working/Lot 2/22-136 - DMA-2 POST 25YR.pdf  
Version: HydroCalc 1.0.3

### Input Parameters

Project Name	22-136
Subarea ID	DA-2 25yr post
Area (ac)	2.23
Flow Path Length (ft)	220.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.915
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)	3.405
Undeveloped Runoff Coefficient (Cu)	0.9
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	6.8337
Burned Peak Flow Rate (cfs)	6.8337
24-Hr Clear Runoff Volume (ac-ft)	0.8884
24-Hr Clear Runoff Volume (cu-ft)	38699.7965



## Peak Flow Hydrologic Analysis

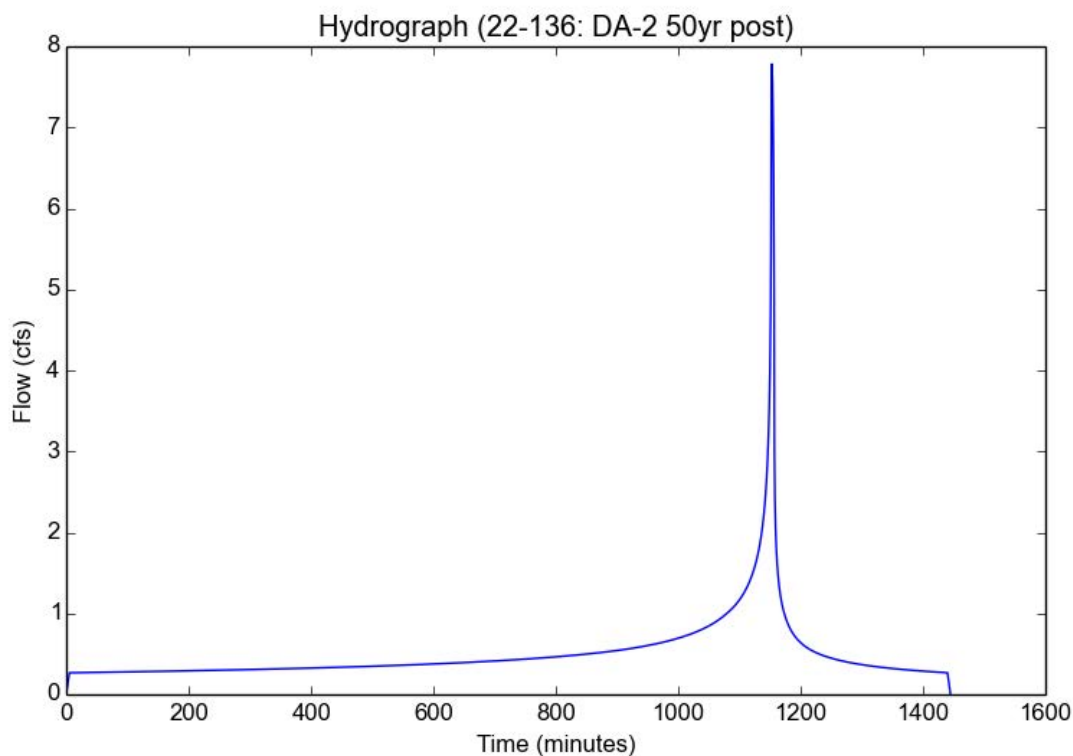
File location: C:/Local Cloud/Shared/2022/22-136 Walnut Business Park/Civil/reports/Hydrology/Working/Lot 2/22-136 - DMA-2 POST 50yr.pdf  
Version: HydroCalc 1.0.3

### Input Parameters

Project Name	22-136
Subarea ID	DA-2 50yr post
Area (ac)	2.23
Flow Path Length (ft)	220.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.915
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)	7.7833
Burned Peak Flow Rate (cfs)	7.7833
24-Hr Clear Runoff Volume (ac-ft)	1.0142
24-Hr Clear Runoff Volume (cu-ft)	44180.3614



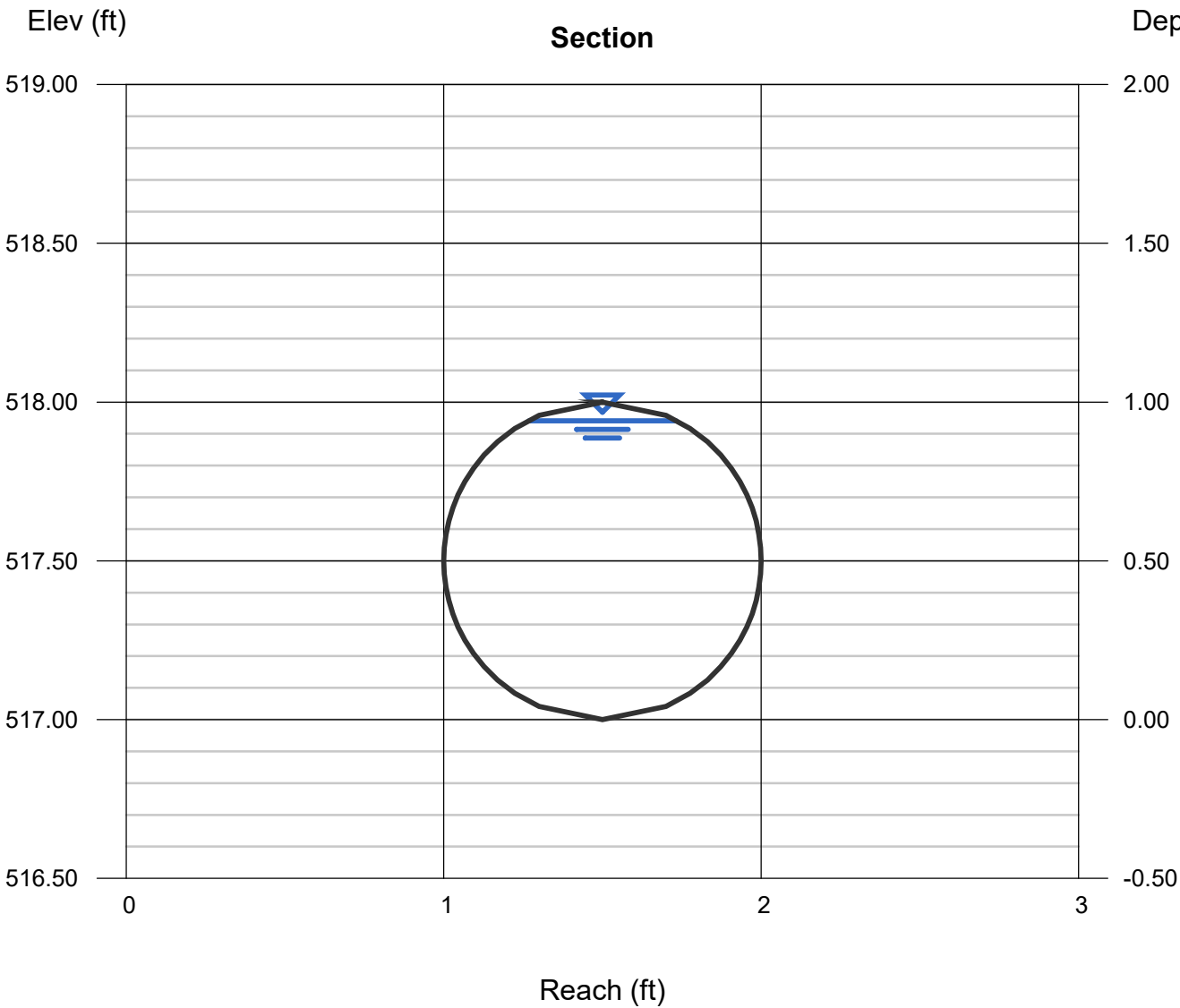


## **Attachment C**

# Channel Report

## DMA-1 12in 25yr

<b>Circular</b>		<b>Highlighted</b>	
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
<b>Calculations</b>			
Compute by:	Q vs Depth		
No. Increments	= 17		



# Channel Report

## DMA-1 18in 25yr

### Circular

Diameter (ft) = 1.50

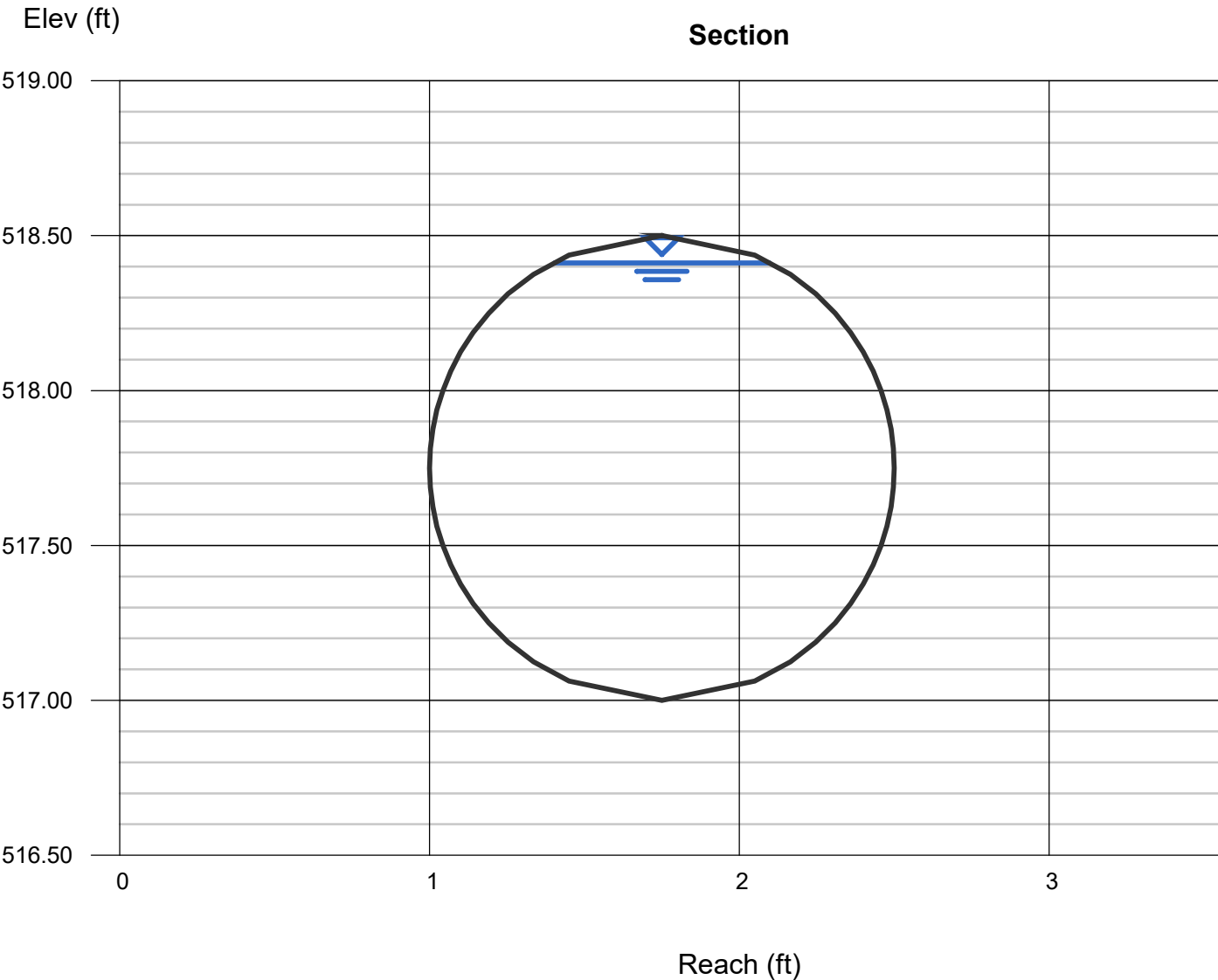
Invert Elev (ft) = 517.00  
Slope (%) = 0.50  
N-Value = 0.012

### 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



# 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-

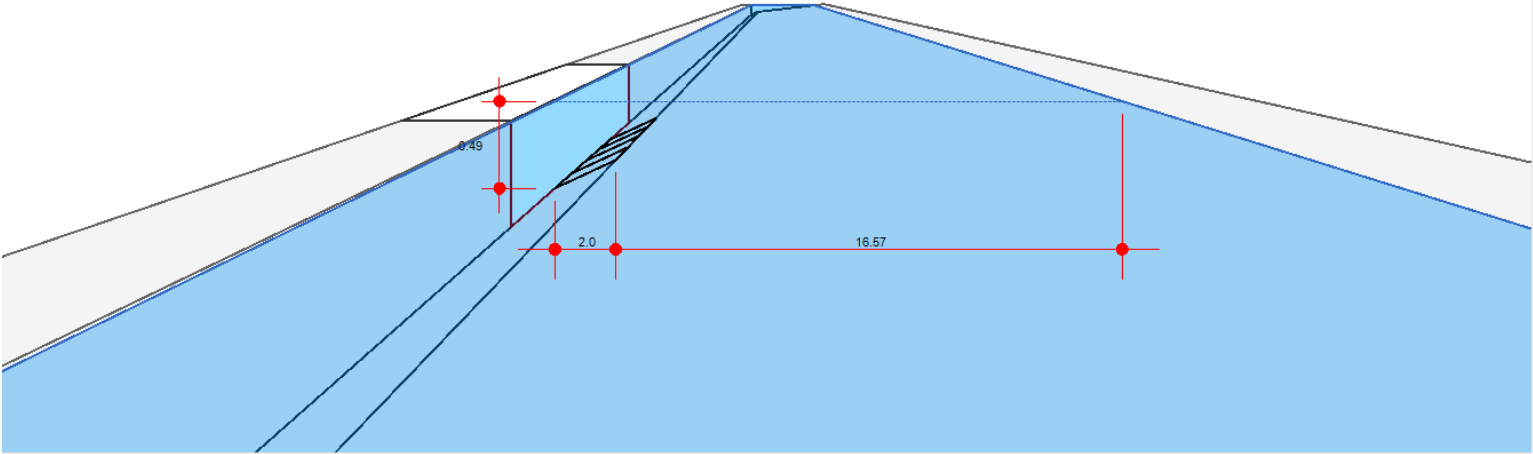
### Calculations

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

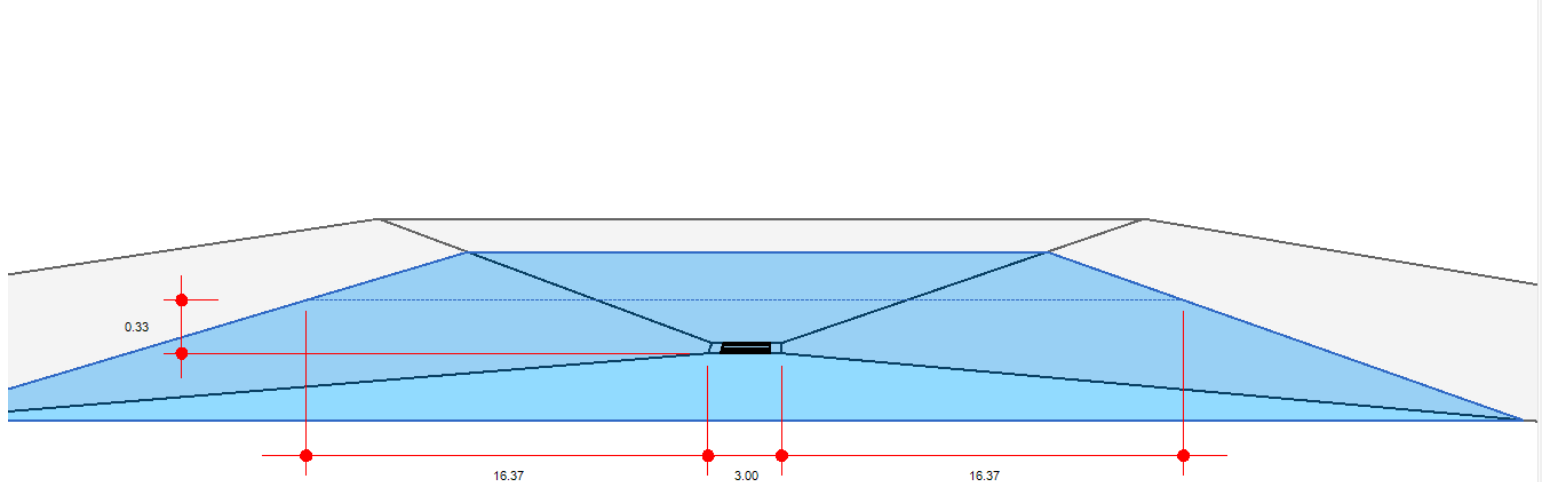
### Highlighted

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



Monday, Jun 19 2023



# 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

