



**ON-SITE
HYDROLOGY / HYDRAULIC STUDY**

for

**Mixed-Use Building
Humboldt Street & Jefferson Street
Yountville, CA 94599**

Prepared:

January 25th, 2024

by

**ams associates, inc.
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ams Project No. 22-2640**

Prepared By:



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TABLE OF CONTENTS

I. NARRATIVE

Introduction.....	1
Vicinity Map	1
Methodology	1
Existing Site Conditions	2
Proposed Conditions	2
Summary & Conclusion.....	2

II. EXHIBITS

- Exhibit A – NOAA Atlas 14, Precipitation Data
- Exhibit B – Pre-Development Hydrology Map
- Exhibit C – Post-Development Hydrology Map
- Exhibit D – Existing Condition HydroCAD Calculations
- Exhibit E – Proposed Condition HydroCAD Calculations
- Exhibit ‘F’ – Horizontal Control Plan
- Exhibit ‘G’ – Preliminary Grading Plan
- Exhibit ‘H’ – Preliminary Utility Plan

I. NARRATIVE

Introduction

The site is located at Humboldt Street & Jefferson Street in the City of Yountville, Napa County, State of California.

The proposed project consists of one Mixed-Use Building, Parking Lot and Sidewalks. Sidewalks will be constructed along Jefferson Street and Humboldt Street. This existing Site consists of approximately 0.249± acres of undeveloped land.

Vicinity Map

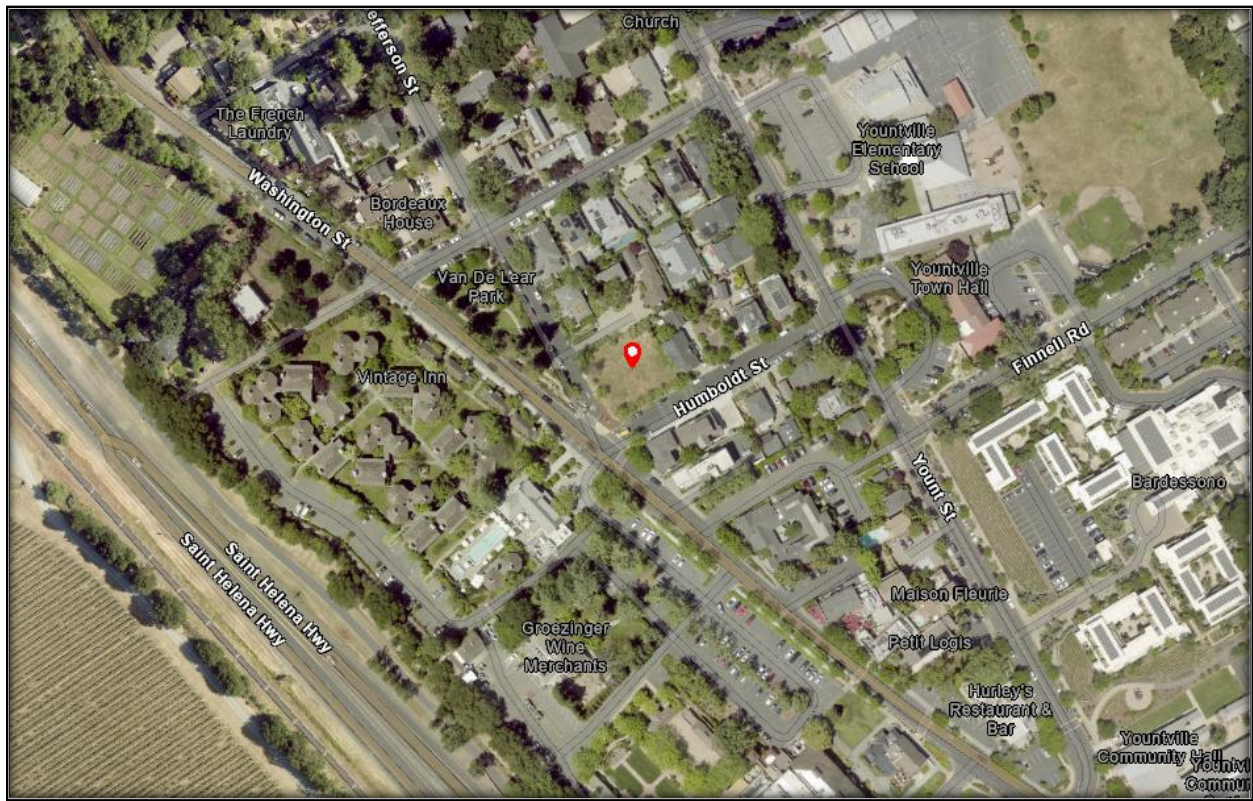


Figure 1 Vicinity Map

Methodology

The hydrological analysis is based on the Rational Method. Calculations were performed using HydroCAD 10.10. The precipitation data was obtained from NOAA atlas 14. Please refer to Exhibit 'A' for details.

Input values were used to generate peak flows for both the existing and proposed conditions. The peak runoff flowrate (Q) and storm volumes were calculated for the 100-yr. Results of post-project hydrology are used to address the on-site impacts of the Project.

Existing Site Conditions

The 0.249± acre undeveloped Parcel sloping 1.3% from west to East towards Humboldt Street. There are no Stormwater Drainage Structures or Municipal Storm Drain on Site. Soils are Coombs Gravelly Loam, Hydrologic Soil Group “C”.

Please refer to Exhibit ‘B’ for the existing Drainage Map.

Proposed Conditions

The Site only has one drainage area. There is a planned Bio-Retention Facility that will be built for the Property, located at East side of the Property. The Bio-Retention Facility has 881 cf available storage.

Please refer to Exhibit ‘C’ for the Post-Development Drainage Map.

Summary & Conclusion

Following is a summary of hydrologic results from this Report, see Exhibit ‘D’ and ‘E’ for the HydroCAD results including Stage-storage-discharge relationship for Bio-Retention Facilities and ‘B’ and ‘C’ for Hydrology Map.

Table 1: Hydrology Summary

<i>Storm Event</i>	<i>Pre-development Condition (cfs)</i>	<i>Pre-development Volume (cu-ft)</i>	<i>Storm Event</i>	<i>Post-Development Condition (cfs)</i>	<i>Post-Development Volume (cu-ft)</i>
100-yr	0.23	141	100-yr	0	395

While the proposed Project increases impervious surfaces. The increases in runoff will be detained by the proposed Bio-Retention Facility.

The Bio-Retention Basin capacity is 881 ft³ which is less than 395 ft³ of the Post-Development volume. Any Run-off beyond the 881 ft³ will drain to the City’s Right-of-Way via two 3” PVC Pipes through the Curb.

Please refer to Exhibit ‘E’ HydroCAD Report for Bio-Retention Facility Stage-Area-Storage.

II. Exhibits

- Exhibit 'A' – NOAA Atlas 14, Precipitation Data
- Exhibit 'B' – Pre-Development Hydrology Map
- Exhibit 'C' – Post-Development Hydrology Map
- Exhibit 'D' – Existing Condition HydroCAD Calculations
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Exhibit ‘A’

NOAA Atlas 14, Precipitation Data



NOAA Atlas 14, Volume 6, Version 2
Location name: Yountville, California, USA*
Latitude: 38.4033°, Longitude: -122.3633°
Elevation: 110 ft**

* source: ESRI Maps

** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps_&_aerials](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.138 (0.123-0.156)	0.169 (0.150-0.192)	0.210 (0.186-0.240)	0.244 (0.214-0.281)	0.291 (0.246-0.348)	0.327 (0.269-0.400)	0.364 (0.292-0.459)	0.402 (0.312-0.523)	0.455 (0.337-0.621)	0.496 (0.353-0.704)
10-min	0.197 (0.176-0.224)	0.242 (0.215-0.275)	0.302 (0.267-0.344)	0.350 (0.307-0.403)	0.417 (0.352-0.499)	0.468 (0.386-0.574)	0.522 (0.418-0.657)	0.577 (0.448-0.750)	0.652 (0.483-0.889)	0.711 (0.507-1.01)
15-min	0.239 (0.212-0.271)	0.293 (0.261-0.333)	0.365 (0.323-0.416)	0.423 (0.372-0.487)	0.504 (0.426-0.603)	0.567 (0.467-0.694)	0.631 (0.506-0.795)	0.697 (0.541-0.907)	0.789 (0.584-1.08)	0.860 (0.613-1.22)
30-min	0.342 (0.304-0.388)	0.419 (0.373-0.477)	0.522 (0.462-0.595)	0.606 (0.532-0.697)	0.721 (0.609-0.863)	0.811 (0.668-0.993)	0.902 (0.723-1.14)	0.998 (0.775-1.30)	1.13 (0.836-1.54)	1.23 (0.877-1.74)
60-min	0.496 (0.442-0.563)	0.609 (0.541-0.692)	0.758 (0.672-0.864)	0.880 (0.772-1.01)	1.05 (0.885-1.25)	1.18 (0.971-1.44)	1.31 (1.05-1.65)	1.45 (1.12-1.89)	1.64 (1.21-2.24)	1.79 (1.27-2.54)
2-hr	0.754 (0.671-0.855)	0.923 (0.820-1.05)	1.14 (1.01-1.30)	1.32 (1.16-1.52)	1.56 (1.32-1.87)	1.75 (1.44-2.14)	1.93 (1.55-2.43)	2.12 (1.65-2.76)	2.37 (1.76-3.24)	2.57 (1.83-3.64)
3-hr	0.966 (0.860-1.10)	1.18 (1.05-1.34)	1.46 (1.30-1.67)	1.69 (1.48-1.94)	1.99 (1.68-2.38)	2.22 (1.83-2.72)	2.45 (1.96-3.09)	2.69 (2.08-3.49)	3.00 (2.22-4.09)	3.23 (2.30-4.59)
6-hr	1.44 (1.28-1.64)	1.77 (1.58-2.01)	2.19 (1.94-2.50)	2.53 (2.22-2.91)	2.98 (2.52-3.57)	3.32 (2.74-4.07)	3.66 (2.93-4.61)	4.00 (3.10-5.20)	4.45 (3.29-6.06)	4.78 (3.41-6.78)
12-hr	2.00 (1.78-2.28)	2.51 (2.23-2.85)	3.15 (2.79-3.59)	3.66 (3.21-4.21)	4.34 (3.66-5.19)	4.84 (3.99-5.93)	5.34 (4.28-6.74)	5.85 (4.54-7.61)	6.52 (4.82-8.89)	7.01 (5.00-9.95)
24-hr	2.75 (2.47-3.12)	3.51 (3.15-3.99)	4.48 (4.02-5.10)	5.25 (4.68-6.02)	6.27 (5.43-7.38)	7.03 (5.99-8.42)	7.78 (6.50-9.51)	8.54 (6.96-10.7)	9.53 (7.51-12.3)	10.3 (7.86-13.7)
2-day	3.58 (3.22-4.07)	4.60 (4.13-5.22)	5.89 (5.28-6.70)	6.91 (6.16-7.92)	8.26 (7.16-9.73)	9.28 (7.90-11.1)	10.3 (8.58-12.6)	11.3 (9.20-14.1)	12.6 (9.94-16.3)	13.6 (10.4-18.2)
3-day	4.18 (3.76-4.74)	5.36 (4.82-6.08)	6.87 (6.16-7.82)	8.06 (7.18-9.24)	9.64 (8.36-11.4)	10.8 (9.22-13.0)	12.0 (10.0-14.7)	13.2 (10.7-16.5)	14.7 (11.6-19.1)	15.9 (12.2-21.2)
4-day	4.64 (4.18-5.27)	5.96 (5.36-6.77)	7.65 (6.86-8.70)	8.98 (8.00-10.3)	10.7 (9.30-12.6)	12.0 (10.2-14.4)	13.3 (11.1-16.3)	14.6 (11.9-18.3)	16.3 (12.8-21.1)	17.6 (13.4-23.4)
7-day	5.71 (5.14-6.48)	7.36 (6.61-8.36)	9.43 (8.45-10.7)	11.1 (9.84-12.7)	13.2 (11.4-15.5)	14.7 (12.5-17.6)	16.2 (13.6-19.8)	17.7 (14.5-22.2)	19.7 (15.5-25.5)	21.1 (16.2-28.2)
10-day	6.48 (5.83-7.35)	8.36 (7.51-9.49)	10.7 (9.60-12.2)	12.5 (11.2-14.4)	14.9 (12.9-17.5)	16.6 (14.2-19.9)	18.3 (15.3-22.4)	19.9 (16.2-24.9)	22.0 (17.4-28.5)	23.6 (18.0-31.4)
20-day	8.46 (7.61-9.60)	10.9 (9.84-12.4)	14.0 (12.6-15.9)	16.3 (14.6-18.7)	19.3 (16.8-22.8)	21.5 (18.3-25.7)	23.5 (19.6-28.8)	25.5 (20.8-31.9)	28.0 (22.1-36.3)	29.8 (22.8-39.8)
30-day	10.2 (9.16-11.6)	13.1 (11.8-14.9)	16.8 (15.0-19.1)	19.5 (17.4-22.3)	23.0 (19.9-27.0)	25.4 (21.7-30.5)	27.8 (23.2-34.0)	30.0 (24.5-37.6)	32.8 (25.9-42.5)	34.8 (26.6-46.4)
45-day	12.5 (11.2-14.1)	16.0 (14.3-18.1)	20.2 (18.1-23.0)	23.4 (20.9-26.8)	27.4 (23.8-32.3)	30.3 (25.8-36.3)	32.9 (27.5-40.3)	35.5 (28.9-44.4)	38.6 (30.4-50.0)	40.8 (31.2-54.5)
60-day	14.9 (13.4-16.9)	18.9 (17.0-21.5)	23.8 (21.3-27.0)	27.4 (24.4-31.4)	31.9 (27.6-37.6)	35.1 (29.9-42.0)	38.1 (31.8-46.5)	40.9 (33.3-51.2)	44.4 (34.9-57.5)	46.8 (35.8-62.4)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

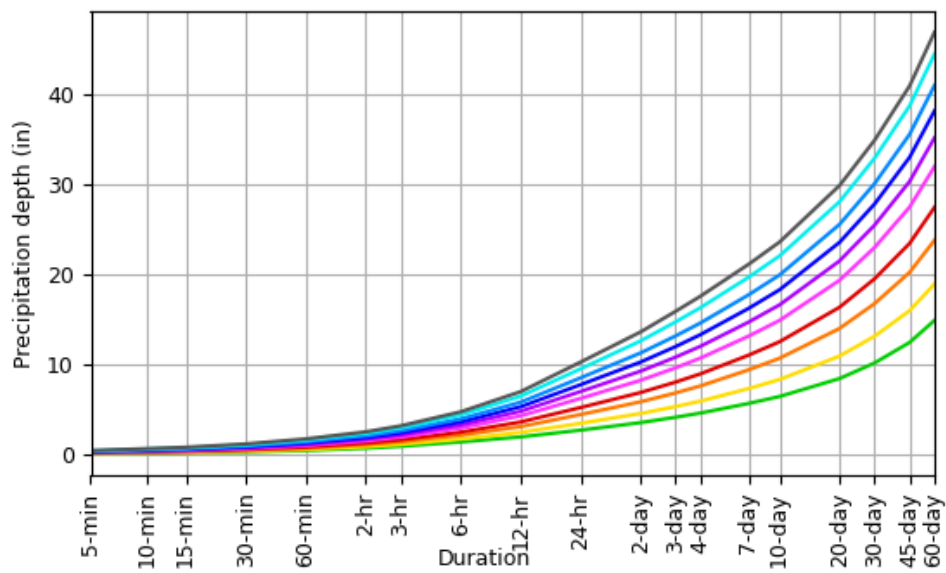
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

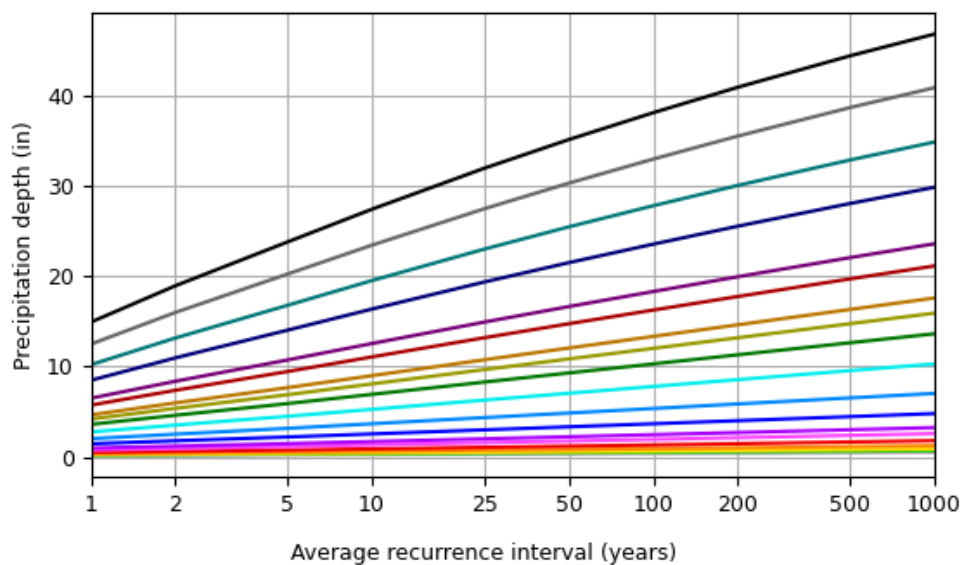
[Back to Top](#)

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 38.4033°, Longitude: -122.3633°



Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000

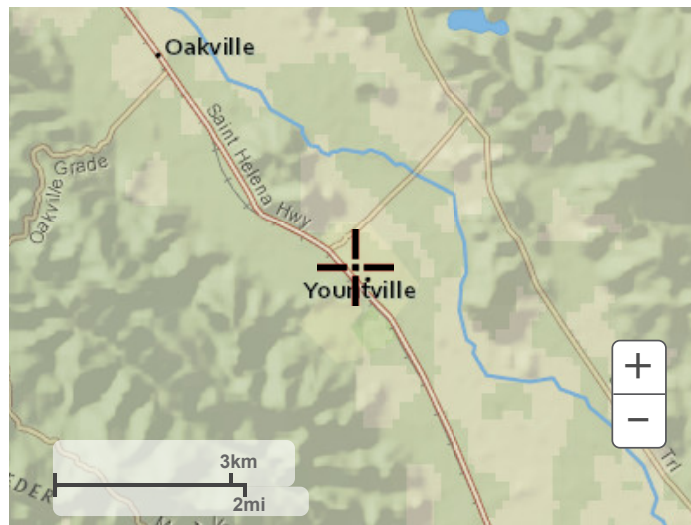


Duration	
5-min	2-day
10-min	3-day
15-min	4-day
30-min	7-day
60-min	10-day
2-hr	20-day
3-hr	30-day
6-hr	45-day
12-hr	60-day
24-hr	

[Back to Top](#)

Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



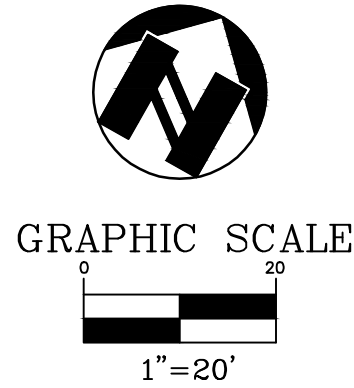
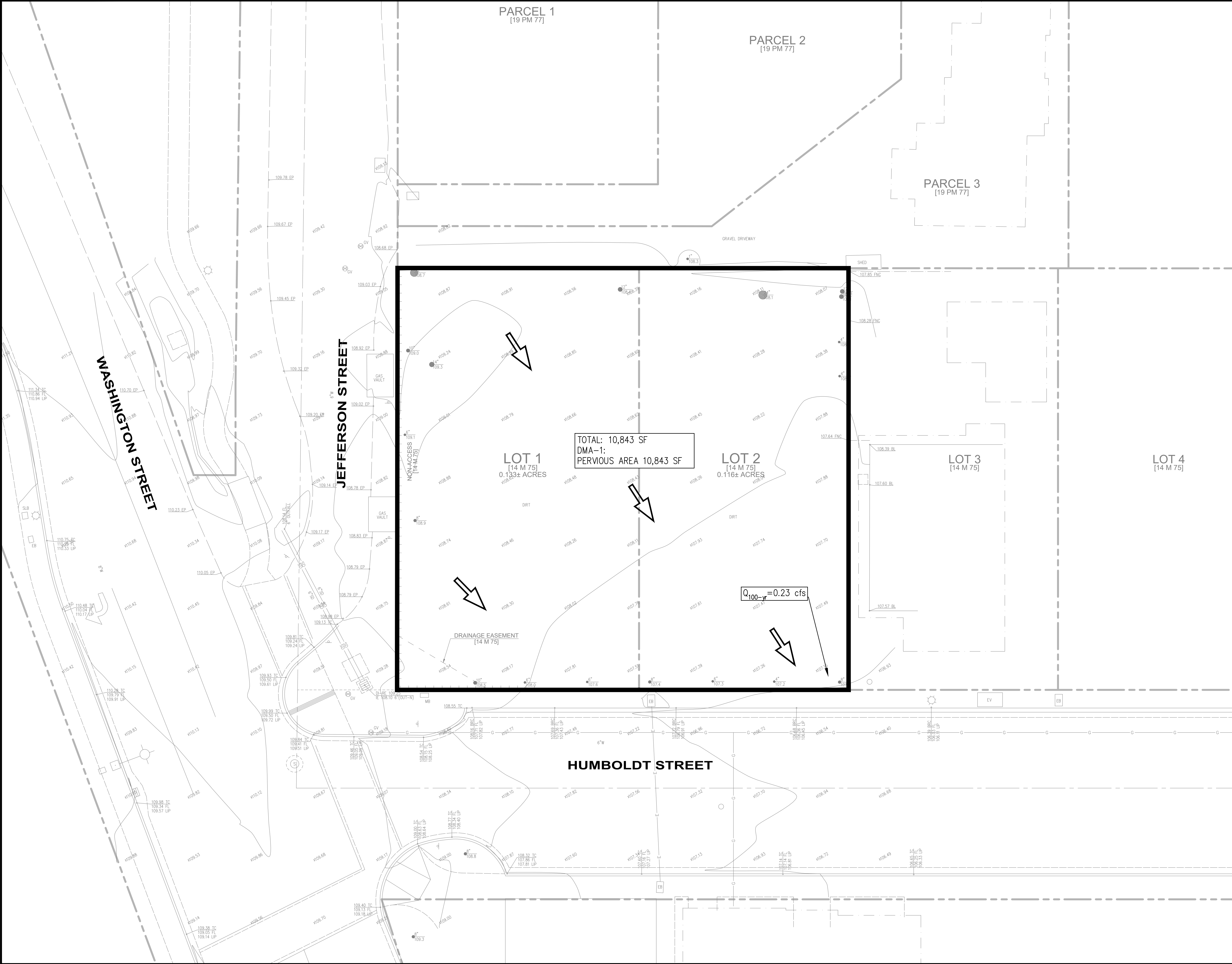
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[US Department of Commerce](#)
[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

[Disclaimer](#)

Exhibit 'B'

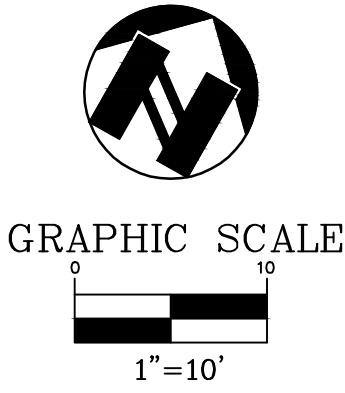
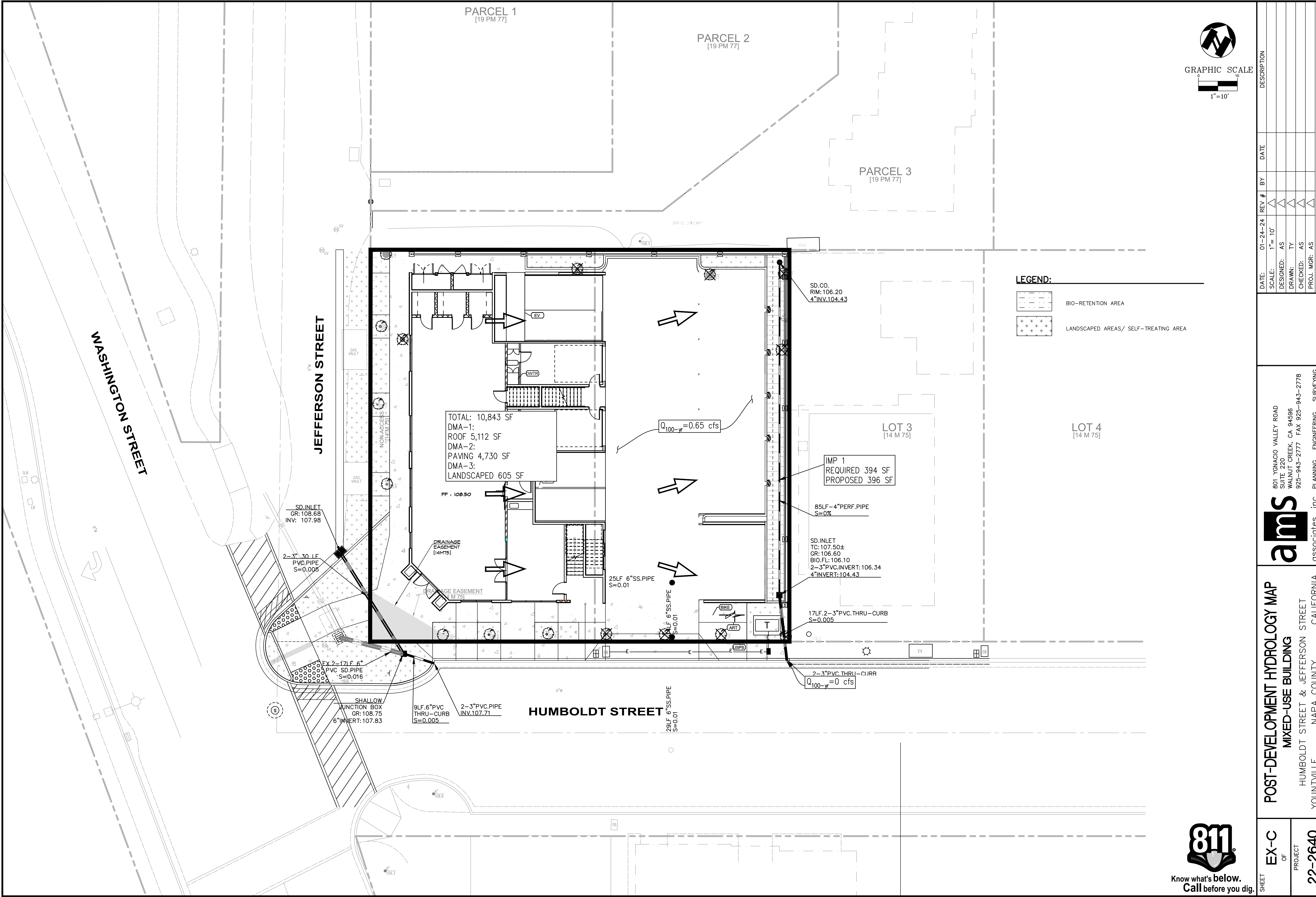
Pre-Development Hydrology Map



SHEET		PROJECT		DESCRIPTION	
EX-B		OF			
22-2640					
PRE-DEVELOPMENT HYDROLOGY MAP					
MIXED-USE BUILDING					
HUMBOLDT STREET & JEFFERSON STREET					
YOUNTVILLE NAPA COUNTY CALIFORNIA					
ams					
associates, inc. PLANNING ENGINEERING SURVEYING					
801 YGNACIO VALLEY ROAD					
SUITE 220					
WALNUT CREEK, CA 94596					
925-943-2777 FAX 925-943-2778					
DATE: 01-24-24				REV #	BY
SCALE: 1"= 10'					
DESIGNED: AS				△	
DRAWN: TY				△	
CHECKED: AS				△	
PROJ. MGR: AS				△	

Exhibit ‘C’

Post-Development Hydrology Map



LEGEND:

BIO-RETENTION AREA

LANDSCAPED AREAS/ SELF-TREATING AREA

DATE:	01-24-24	REV #	BY	DATE	DESCRIPTION
SCALE:	1"= 10'				
DESIGNED:	AS				
DRAWN:	TY				
CHECKED:	AS				
PROJ. MGR:	AS				

associates, inc. PLANNING ENGINEERING SURVEYING

801 YGNACIO VALLEY ROAD
SUITE 220
WALNUT CREEK, CA 94596
925-943-2777 FAX 925-943-2778

POST-DEVELOPMENT HYDROLOGY MAP

MIXED-USE BUILDING

HUMBOLDT STREET & JEFFERSON STREET

YOUNTVILLE NAPA COUNTY CALIFORNIA

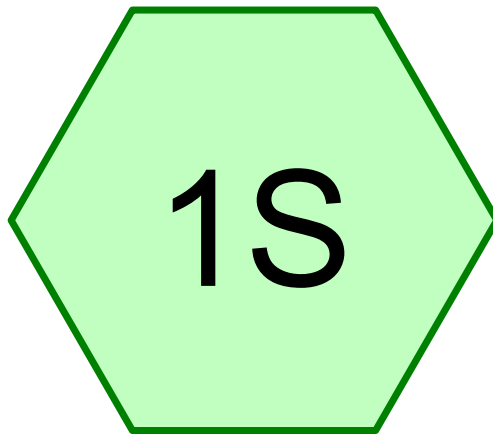
SHEET EX-C OF PROJECT

22-2640

Know what's below.
Call before you dig.

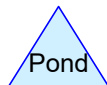
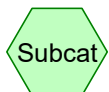
Exhibit 'D'

Existing Condition HydroCAD Calculations



DA-1

PRE_DEVELOPMENT



Routing Diagram for 2640 Pre-development
Prepared by ams associates, inc, Printed 1/24/2024
HydroCAD® 10.10-5a s/n 11794 © 2020 HydroCAD Software Solutions LLC

2640 Pre-development

Prepared by ams associates, inc

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Page 2

Area Listing (all nodes)

Area (sq-ft)	C	Description (subcatchment-numbers)
10,843	0.30	(1S)
10,843	0.30	TOTAL AREA

2640 Pre-development

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Page 3

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
0	HSG C	
0	HSG D	
10,843	Other	1S
10,843		TOTAL AREA

2640 Pre-development

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Page 4

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchment Numbers
0	0	0	0	10,843	10,843		1S
0	0	0	0	10,843	10,843	TOTAL AREA	

2640 Pre-development

CA-Yountville 2640 100-yr Duration=10 min, Inten=3.13 in/hr

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Page 5

Time span=0.00-1.00 hrs, dt=0.01 hrs, 101 points

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: DA-1 PRE_DEVELOPMENT

Runoff Area=10,843 sf 0.00% Impervious Runoff Depth=0.16"

Tc=10.0 min C=0.30 Runoff=0.23 cfs 141 cf

Total Runoff Area = 10,843 sf Runoff Volume = 141 cf Average Runoff Depth = 0.16"
100.00% Pervious = 10,843 sf 0.00% Impervious = 0 sf

2640 Pre-development

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CA-Yountville 2640 100-yr Duration=10 min, Inten=3.13 in/hr

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Page 6

Summary for Subcatchment 1S: DA-1 PRE_DEVELOPMENT

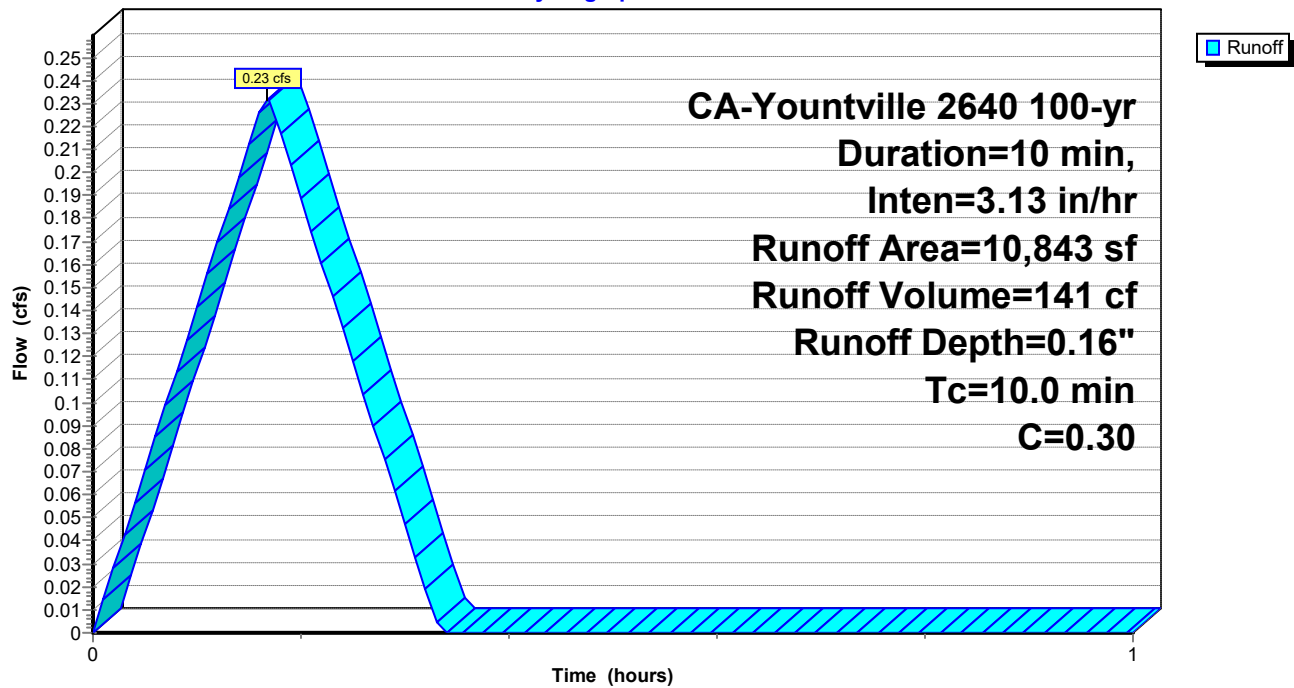
Runoff = 0.23 cfs @ 0.17 hrs, Volume= 141 cf, Depth= 0.16"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs

CA-Yountville 2640 100-yr Duration=10 min, Inten=3.13 in/hr

Area (sf)	C	Description
10,843	0.30	
10,843		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 1S: DA-1 PRE_DEVELOPMENT**Hydrograph**

2640 Pre-development

Prepared by ams associates, inc

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CA-Yountville 2640 100-yr Duration=10 min, Inten=3.13 in/hr

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Page 7

Hydrograph for Subcatchment 1S: DA-1 PRE_DEVELOPMENT

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	0.66	0.00
0.01	0.01	0.67	0.00
0.02	0.03	0.68	0.00
0.03	0.04	0.69	0.00
0.04	0.06	0.70	0.00
0.05	0.07	0.71	0.00
0.06	0.08	0.72	0.00
0.07	0.10	0.73	0.00
0.08	0.11	0.74	0.00
0.09	0.13	0.75	0.00
0.10	0.14	0.76	0.00
0.11	0.16	0.77	0.00
0.12	0.17	0.78	0.00
0.13	0.18	0.79	0.00
0.14	0.20	0.80	0.00
0.15	0.21	0.81	0.00
0.16	0.23	0.82	0.00
0.17	0.23	0.83	0.00
0.18	0.22	0.84	0.00
0.19	0.20	0.85	0.00
0.20	0.19	0.86	0.00
0.21	0.17	0.87	0.00
0.22	0.16	0.88	0.00
0.23	0.15	0.89	0.00
0.24	0.13	0.90	0.00
0.25	0.12	0.91	0.00
0.26	0.10	0.92	0.00
0.27	0.09	0.93	0.00
0.28	0.08	0.94	0.00
0.29	0.06	0.95	0.00
0.30	0.05	0.96	0.00
0.31	0.03	0.97	0.00
0.32	0.02	0.98	0.00
0.33	0.00	0.99	0.00
0.34	0.00	1.00	0.00
0.35	0.00		
0.36	0.00		
0.37	0.00		
0.38	0.00		
0.39	0.00		
0.40	0.00		
0.41	0.00		
0.42	0.00		
0.43	0.00		
0.44	0.00		
0.45	0.00		
0.46	0.00		
0.47	0.00		
0.48	0.00		
0.49	0.00		
0.50	0.00		
0.51	0.00		
0.52	0.00		
0.53	0.00		
0.54	0.00		
0.55	0.00		
0.56	0.00		
0.57	0.00		
0.58	0.00		
0.59	0.00		
0.60	0.00		
0.61	0.00		
0.62	0.00		
0.63	0.00		
0.64	0.00		
0.65	0.00		

2640 Pre-development

Prepared by ams associates, inc

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Table of Contents

Printed 1/24/2024

TABLE OF CONTENTS

Project Reports

- 1 Routing Diagram
- 2 Area Listing (all nodes)
- 3 Soil Listing (all nodes)
- 4 Ground Covers (all nodes)

100-yr Event

- 5 Node Listing
- 6 Subcat 1S: DA-1 PRE_DEVELOPMENT

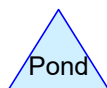
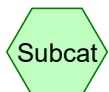
Exhibit ‘E’

Proposed Condition HydroCAD Calculations



DA-1
POST-DEVELOPMENT

BIO-RETENTION



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Page 2

Area Listing (all nodes)

Area (sq-ft)	C	Description (subcatchment-numbers)
9,842	0.90	(1S)
605	0.30	(1S)
10,447	0.87	TOTAL AREA

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Page 3

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
0	HSG C	
0	HSG D	
10,447	Other	1S
10,447		TOTAL AREA

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Page 4

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchment Numbers
0	0	0	0	10,447	10,447		1S
0	0	0	0	10,447	10,447	TOTAL AREA	

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Page 5

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	2P	106.62	106.25	17.0	0.0218	0.013	0.0	3.0	0.0

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Page 6

Time span=0.00-1.00 hrs, dt=0.01 hrs, 101 points

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: DA-1 POST-DEVELOPMENT

Runoff Area=10,447 sf 0.00% Impervious Runoff Depth=0.45"

Tc=10.0 min C=0.87 Runoff=0.65 cfs 395 cf

Pond 2P: BIO-RETENTION

Peak Elev=106.29' Storage=395 cf Inflow=0.65 cfs 395 cf

Outflow=0.00 cfs 0 cf

Total Runoff Area = 10,447 sf Runoff Volume = 395 cf Average Runoff Depth = 0.45"**100.00% Pervious = 10,447 sf 0.00% Impervious = 0 sf**

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CA-Yountville 2640 100-yr Duration=10 min, Inten=3.13 in/hr

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Page 7

Summary for Subcatchment 1S: DA-1 POST-DEVELOPMENT

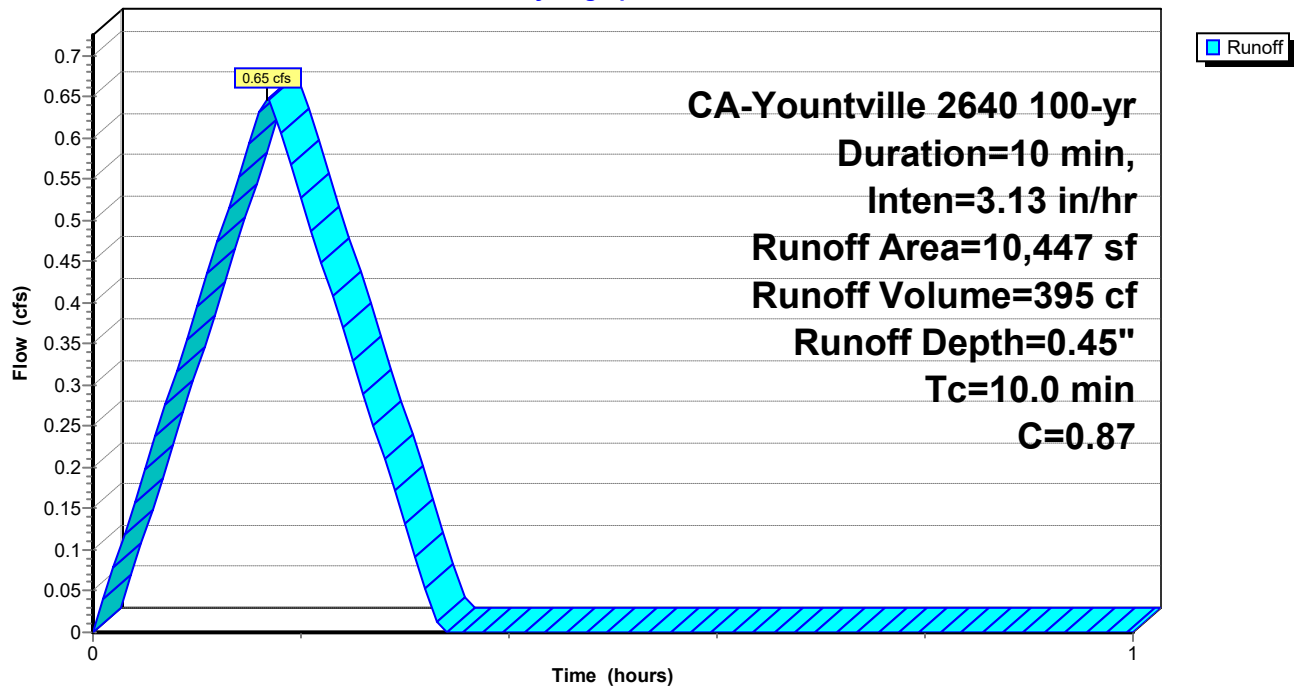
Runoff = 0.65 cfs @ 0.17 hrs, Volume= 395 cf, Depth= 0.45"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs

CA-Yountville 2640 100-yr Duration=10 min, Inten=3.13 in/hr

Area (sf)	C	Description
9,842	0.90	
605	0.30	
10,447	0.87	Weighted Average
10,447		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 1S: DA-1 POST-DEVELOPMENT**Hydrograph**

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CA-Yountville 2640 100-yr Duration=10 min, Inten=3.13 in/hr

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Page 8

Hydrograph for Subcatchment 1S: DA-1 POST-DEVELOPMENT

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	0.66	0.00
0.01	0.04	0.67	0.00
0.02	0.08	0.68	0.00
0.03	0.12	0.69	0.00
0.04	0.16	0.70	0.00
0.05	0.20	0.71	0.00
0.06	0.24	0.72	0.00
0.07	0.28	0.73	0.00
0.08	0.32	0.74	0.00
0.09	0.36	0.75	0.00
0.10	0.40	0.76	0.00
0.11	0.43	0.77	0.00
0.12	0.47	0.78	0.00
0.13	0.51	0.79	0.00
0.14	0.55	0.80	0.00
0.15	0.59	0.81	0.00
0.16	0.63	0.82	0.00
0.17	0.65	0.83	0.00
0.18	0.61	0.84	0.00
0.19	0.57	0.85	0.00
0.20	0.53	0.86	0.00
0.21	0.49	0.87	0.00
0.22	0.45	0.88	0.00
0.23	0.41	0.89	0.00
0.24	0.37	0.90	0.00
0.25	0.33	0.91	0.00
0.26	0.29	0.92	0.00
0.27	0.25	0.93	0.00
0.28	0.21	0.94	0.00
0.29	0.17	0.95	0.00
0.30	0.13	0.96	0.00
0.31	0.09	0.97	0.00
0.32	0.05	0.98	0.00
0.33	0.01	0.99	0.00
0.34	0.00	1.00	0.00
0.35	0.00		
0.36	0.00		
0.37	0.00		
0.38	0.00		
0.39	0.00		
0.40	0.00		
0.41	0.00		
0.42	0.00		
0.43	0.00		
0.44	0.00		
0.45	0.00		
0.46	0.00		
0.47	0.00		
0.48	0.00		
0.49	0.00		
0.50	0.00		
0.51	0.00		
0.52	0.00		
0.53	0.00		
0.54	0.00		
0.55	0.00		
0.56	0.00		
0.57	0.00		
0.58	0.00		
0.59	0.00		
0.60	0.00		
0.61	0.00		
0.62	0.00		
0.63	0.00		
0.64	0.00		
0.65	0.00		

2640 Post-development

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CA-Yountville 2640 100-yr Duration=10 min, Inten=3.13 in/hr

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Page 9

Summary for Pond 2P: BIO-RETENTION

Inflow Area = 10,447 sf, 0.00% Impervious, Inflow Depth = 0.45" for 100-yr event
 Inflow = 0.65 cfs @ 0.17 hrs, Volume= 395 cf
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
 Peak Elev= 106.29' @ 0.34 hrs Surf.Area= 1,202 sf Storage= 395 cf

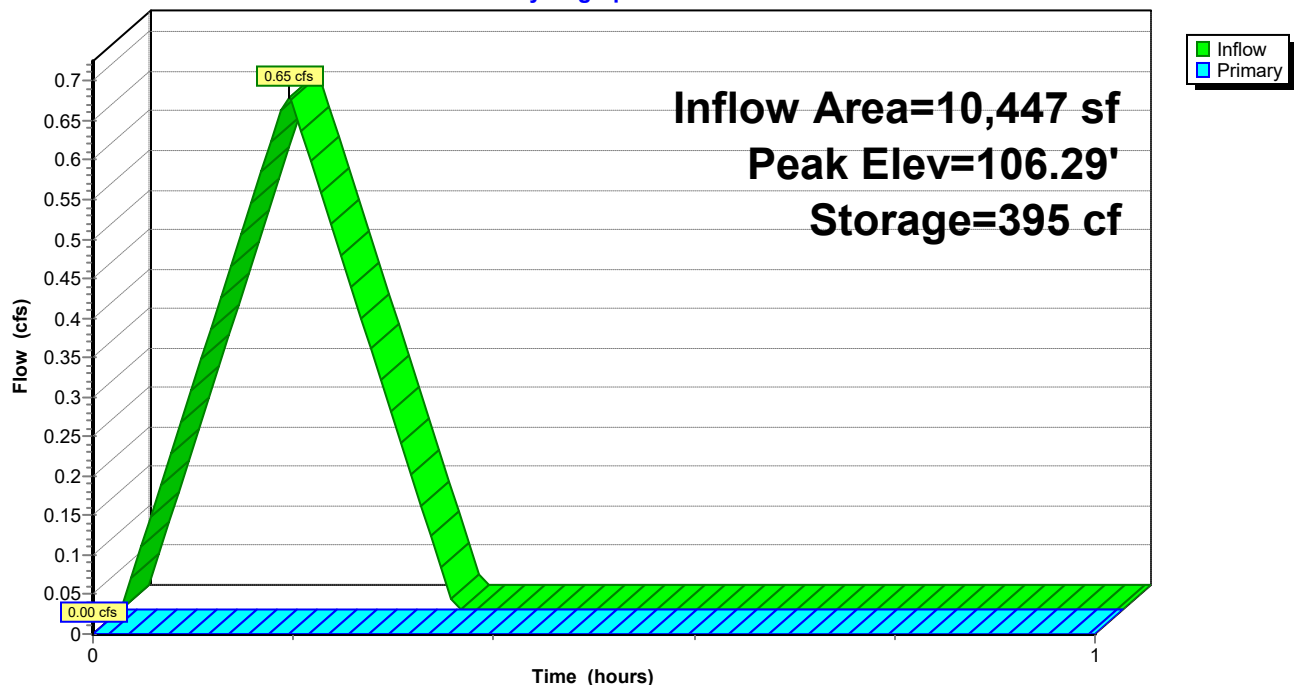
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	103.60'	140 cf	4.50'W x 89.00'L x 1.00'H Prisma 401 cf Overall x 35.0% Voids
#2	104.60'	180 cf	4.50'W x 89.00'L x 1.50'H Prisma 601 cf Overall x 30.0% Voids
#3	106.10'	561 cf	4.50'W x 89.00'L x 1.40'H Prisma
		881 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Device 2	106.60'	36.0" W x 36.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	106.62'	3.0" Round Culvert X 2.00 L= 17.0' Ke= 0.500 Inlet / Outlet Invert= 106.62' / 106.25' S= 0.0218 '/ Cc= 0.900 n= 0.013, Flow Area= 0.05 sf
#3	Device 2	104.43'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=103.60' (Free Discharge)

↑ **2=Culvert** (Controls 0.00 cfs)
 ↑ **1=Orifice/Grate** (Controls 0.00 cfs)
 ↑ **3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: BIO-RETENTION**Hydrograph**

2640 Post-development

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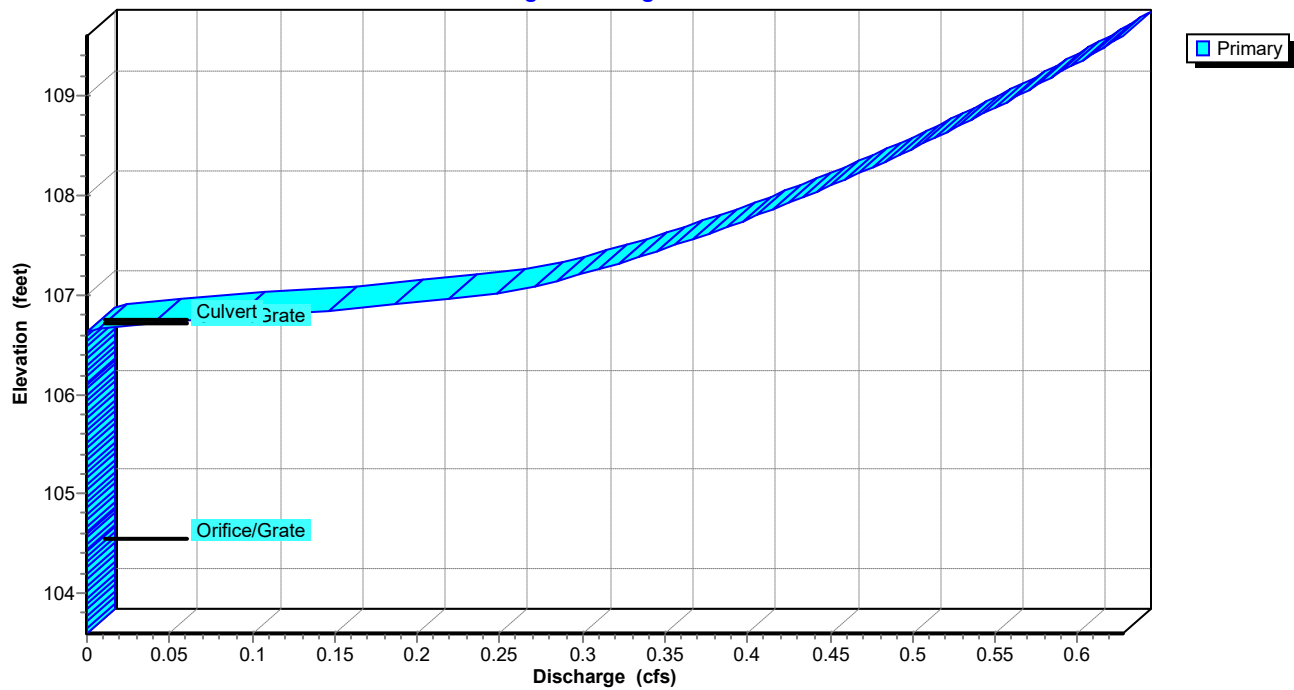
CA-Yountville 2640 100-yr Duration=10 min, Inten=3.13 in/hr

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Page 10

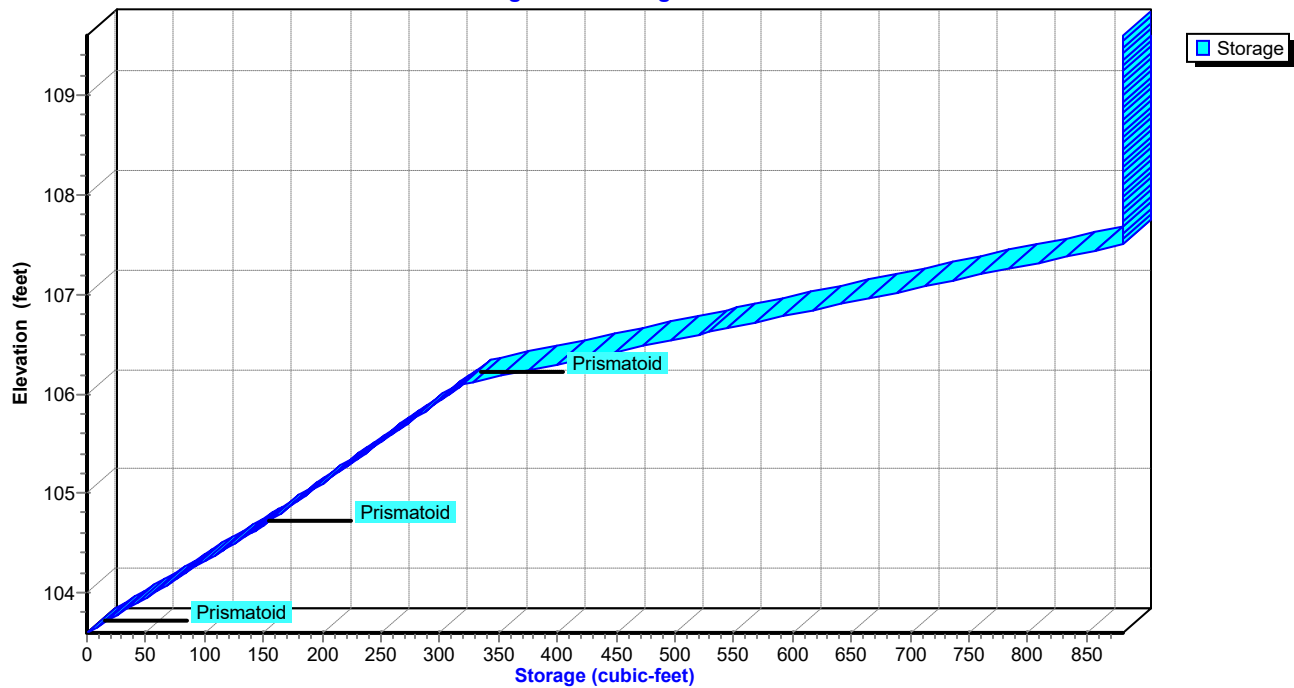
Pond 2P: BIO-RETENTION

Stage-Discharge



Pond 2P: BIO-RETENTION

Stage-Area-Storage



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CA-Yountville 2640 100-yr Duration=10 min, Inten=3.13 in/hr

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Page 11

Hydrograph for Pond 2P: BIO-RETENTION

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	103.60	0.00	0.66	0.00	395	106.29	0.00
0.01	0.04	1	103.61	0.00	0.67	0.00	395	106.29	0.00
0.02	0.08	3	103.62	0.00	0.68	0.00	395	106.29	0.00
0.03	0.12	6	103.65	0.00	0.69	0.00	395	106.29	0.00
0.04	0.16	11	103.68	0.00	0.70	0.00	395	106.29	0.00
0.05	0.20	18	103.73	0.00	0.71	0.00	395	106.29	0.00
0.06	0.24	26	103.78	0.00	0.72	0.00	395	106.29	0.00
0.07	0.28	35	103.85	0.00	0.73	0.00	395	106.29	0.00
0.08	0.32	46	103.92	0.00	0.74	0.00	395	106.29	0.00
0.09	0.36	58	104.01	0.00	0.75	0.00	395	106.29	0.00
0.10	0.40	71	104.11	0.00	0.76	0.00	395	106.29	0.00
0.11	0.43	86	104.21	0.00	0.77	0.00	395	106.29	0.00
0.12	0.47	102	104.33	0.00	0.78	0.00	395	106.29	0.00
0.13	0.51	120	104.46	0.00	0.79	0.00	395	106.29	0.00
0.14	0.55	139	104.60	0.00	0.80	0.00	395	106.29	0.00
0.15	0.59	160	104.77	0.00	0.81	0.00	395	106.29	0.00
0.16	0.63	182	104.95	0.00	0.82	0.00	395	106.29	0.00
0.17	0.65	205	105.14	0.00	0.83	0.00	395	106.29	0.00
0.18	0.61	228	105.33	0.00	0.84	0.00	395	106.29	0.00
0.19	0.57	249	105.50	0.00	0.85	0.00	395	106.29	0.00
0.20	0.53	269	105.67	0.00	0.86	0.00	395	106.29	0.00
0.21	0.49	287	105.82	0.00	0.87	0.00	395	106.29	0.00
0.22	0.45	304	105.96	0.00	0.88	0.00	395	106.29	0.00
0.23	0.41	319	106.09	0.00	0.89	0.00	395	106.29	0.00
0.24	0.37	333	106.13	0.00	0.90	0.00	395	106.29	0.00
0.25	0.33	346	106.16	0.00	0.91	0.00	395	106.29	0.00
0.26	0.29	357	106.19	0.00	0.92	0.00	395	106.29	0.00
0.27	0.25	367	106.22	0.00	0.93	0.00	395	106.29	0.00
0.28	0.21	375	106.24	0.00	0.94	0.00	395	106.29	0.00
0.29	0.17	382	106.25	0.00	0.95	0.00	395	106.29	0.00
0.30	0.13	387	106.27	0.00	0.96	0.00	395	106.29	0.00
0.31	0.09	391	106.28	0.00	0.97	0.00	395	106.29	0.00
0.32	0.05	394	106.28	0.00	0.98	0.00	395	106.29	0.00
0.33	0.01	395	106.29	0.00	0.99	0.00	395	106.29	0.00
0.34	0.00	395	106.29	0.00	1.00	0.00	395	106.29	0.00
0.35	0.00	395	106.29	0.00					
0.36	0.00	395	106.29	0.00					
0.37	0.00	395	106.29	0.00					
0.38	0.00	395	106.29	0.00					
0.39	0.00	395	106.29	0.00					
0.40	0.00	395	106.29	0.00					
0.41	0.00	395	106.29	0.00					
0.42	0.00	395	106.29	0.00					
0.43	0.00	395	106.29	0.00					
0.44	0.00	395	106.29	0.00					
0.45	0.00	395	106.29	0.00					
0.46	0.00	395	106.29	0.00					
0.47	0.00	395	106.29	0.00					
0.48	0.00	395	106.29	0.00					
0.49	0.00	395	106.29	0.00					
0.50	0.00	395	106.29	0.00					
0.51	0.00	395	106.29	0.00					
0.52	0.00	395	106.29	0.00					
0.53	0.00	395	106.29	0.00					
0.54	0.00	395	106.29	0.00					
0.55	0.00	395	106.29	0.00					
0.56	0.00	395	106.29	0.00					
0.57	0.00	395	106.29	0.00					
0.58	0.00	395	106.29	0.00					
0.59	0.00	395	106.29	0.00					
0.60	0.00	395	106.29	0.00					
0.61	0.00	395	106.29	0.00					
0.62	0.00	395	106.29	0.00					
0.63	0.00	395	106.29	0.00					
0.64	0.00	395	106.29	0.00					
0.65	0.00	395	106.29	0.00					

2640 Post-development

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Page 12

Stage-Discharge for Pond 2P: BIO-RETENTION

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
103.60	0.00	104.92	0.00	106.24	0.00	107.56	0.37	108.88	0.55
103.62	0.00	104.94	0.00	106.26	0.00	107.58	0.37	108.90	0.55
103.64	0.00	104.96	0.00	106.28	0.00	107.60	0.37	108.92	0.55
103.66	0.00	104.98	0.00	106.30	0.00	107.62	0.38	108.94	0.56
103.68	0.00	105.00	0.00	106.32	0.00	107.64	0.38	108.96	0.56
103.70	0.00	105.02	0.00	106.34	0.00	107.66	0.38	108.98	0.56
103.72	0.00	105.04	0.00	106.36	0.00	107.68	0.39	109.00	0.56
103.74	0.00	105.06	0.00	106.38	0.00	107.70	0.39	109.02	0.57
103.76	0.00	105.08	0.00	106.40	0.00	107.72	0.39	109.04	0.57
103.78	0.00	105.10	0.00	106.42	0.00	107.74	0.40	109.06	0.57
103.80	0.00	105.12	0.00	106.44	0.00	107.76	0.40	109.08	0.57
103.82	0.00	105.14	0.00	106.46	0.00	107.78	0.40	109.10	0.57
103.84	0.00	105.16	0.00	106.48	0.00	107.80	0.41	109.12	0.58
103.86	0.00	105.18	0.00	106.50	0.00	107.82	0.41	109.14	0.58
103.88	0.00	105.20	0.00	106.52	0.00	107.84	0.41	109.16	0.58
103.90	0.00	105.22	0.00	106.54	0.00	107.86	0.42	109.18	0.58
103.92	0.00	105.24	0.00	106.56	0.00	107.88	0.42	109.20	0.59
103.94	0.00	105.26	0.00	106.58	0.00	107.90	0.42	109.22	0.59
103.96	0.00	105.28	0.00	106.60	0.00	107.92	0.42	109.24	0.59
103.98	0.00	105.30	0.00	106.62	0.00	107.94	0.43	109.26	0.59
104.00	0.00	105.32	0.00	106.64	0.00	107.96	0.43	109.28	0.59
104.02	0.00	105.34	0.00	106.66	0.01	107.98	0.43	109.30	0.60
104.04	0.00	105.36	0.00	106.68	0.02	108.00	0.44	109.32	0.60
104.06	0.00	105.38	0.00	106.70	0.03	108.02	0.44	109.34	0.60
104.08	0.00	105.40	0.00	106.72	0.04	108.04	0.44	109.36	0.60
104.10	0.00	105.42	0.00	106.74	0.05	108.06	0.45	109.38	0.60
104.12	0.00	105.44	0.00	106.76	0.07	108.08	0.45	109.40	0.61
104.14	0.00	105.46	0.00	106.78	0.09	108.10	0.45	109.42	0.61
104.16	0.00	105.48	0.00	106.80	0.11	108.12	0.45	109.44	0.61
104.18	0.00	105.50	0.00	106.82	0.13	108.14	0.46	109.46	0.61
104.20	0.00	105.52	0.00	106.84	0.15	108.16	0.46	109.48	0.62
104.22	0.00	105.54	0.00	106.86	0.16	108.18	0.46	109.50	0.62
104.24	0.00	105.56	0.00	106.88	0.17	108.20	0.46	109.52	0.62
104.26	0.00	105.58	0.00	106.90	0.19	108.22	0.47	109.54	0.62
104.28	0.00	105.60	0.00	106.92	0.20	108.24	0.47	109.56	0.62
104.30	0.00	105.62	0.00	106.94	0.21	108.26	0.47	109.58	0.63
104.32	0.00	105.64	0.00	106.96	0.22	108.28	0.48	109.60	0.63
104.34	0.00	105.66	0.00	106.98	0.23	108.30	0.48		
104.36	0.00	105.68	0.00	107.00	0.24	108.32	0.48		
104.38	0.00	105.70	0.00	107.02	0.25	108.34	0.48		
104.40	0.00	105.72	0.00	107.04	0.26	108.36	0.49		
104.42	0.00	105.74	0.00	107.06	0.27	108.38	0.49		
104.44	0.00	105.76	0.00	107.08	0.27	108.40	0.49		
104.46	0.00	105.78	0.00	107.10	0.28	108.42	0.49		
104.48	0.00	105.80	0.00	107.12	0.28	108.44	0.50		
104.50	0.00	105.82	0.00	107.14	0.29	108.46	0.50		
104.52	0.00	105.84	0.00	107.16	0.29	108.48	0.50		
104.54	0.00	105.86	0.00	107.18	0.29	108.50	0.50		
104.56	0.00	105.88	0.00	107.20	0.30	108.52	0.51		
104.58	0.00	105.90	0.00	107.22	0.30	108.54	0.51		
104.60	0.00	105.92	0.00	107.24	0.31	108.56	0.51		
104.62	0.00	105.94	0.00	107.26	0.31	108.58	0.51		
104.64	0.00	105.96	0.00	107.28	0.31	108.60	0.52		
104.66	0.00	105.98	0.00	107.30	0.32	108.62	0.52		
104.68	0.00	106.00	0.00	107.32	0.32	108.64	0.52		
104.70	0.00	106.02	0.00	107.34	0.33	108.66	0.52		
104.72	0.00	106.04	0.00	107.36	0.33	108.68	0.53		
104.74	0.00	106.06	0.00	107.38	0.33	108.70	0.53		
104.76	0.00	106.08	0.00	107.40	0.34	108.72	0.53		
104.78	0.00	106.10	0.00	107.42	0.34	108.74	0.53		
104.80	0.00	106.12	0.00	107.44	0.35	108.76	0.54		
104.82	0.00	106.14	0.00	107.46	0.35	108.78	0.54		
104.84	0.00	106.16	0.00	107.48	0.35	108.80	0.54		
104.86	0.00	106.18	0.00	107.50	0.36	108.82	0.54		
104.88	0.00	106.20	0.00	107.52	0.36	108.84	0.55		
104.90	0.00	106.22	0.00	107.54	0.36	108.86	0.55		

2640 Post-development

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CA-Yountville 2640 100-yr Duration=10 min, Inten=3.13 in/hr

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Page 13

Stage-Area-Storage for Pond 2P: BIO-RETENTION

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
103.60	0	106.90	641
103.65	7	106.95	661
103.70	14	107.00	681
103.75	21	107.05	701
103.80	28	107.10	721
103.85	35	107.15	741
103.90	42	107.20	761
103.95	49	107.25	781
104.00	56	107.30	801
104.05	63	107.35	821
104.10	70	107.40	841
104.15	77	107.45	861
104.20	84	107.50	881
104.25	91	107.55	881
104.30	98	107.60	881
104.35	105	107.65	881
104.40	112	107.70	881
104.45	119	107.75	881
104.50	126	107.80	881
104.55	133	107.85	881
104.60	140	107.90	881
104.65	146	107.95	881
104.70	152	108.00	881
104.75	158	108.05	881
104.80	164	108.10	881
104.85	170	108.15	881
104.90	176	108.20	881
104.95	182	108.25	881
105.00	188	108.30	881
105.05	194	108.35	881
105.10	200	108.40	881
105.15	206	108.45	881
105.20	212	108.50	881
105.25	218	108.55	881
105.30	224	108.60	881
105.35	230	108.65	881
105.40	236	108.70	881
105.45	242	108.75	881
105.50	248	108.80	881
105.55	254	108.85	881
105.60	260	108.90	881
105.65	266	108.95	881
105.70	272	109.00	881
105.75	278	109.05	881
105.80	284	109.10	881
105.85	290	109.15	881
105.90	296	109.20	881
105.95	302	109.25	881
106.00	308	109.30	881
106.05	314	109.35	881
106.10	320	109.40	881
106.15	340	109.45	881
106.20	360	109.50	881
106.25	380	109.55	881
106.30	401	109.60	881
106.35	421		
106.40	441		
106.45	461		
106.50	481		
106.55	501		
106.60	521		
106.65	541		
106.70	561		
106.75	581		
106.80	601		
106.85	621		

2640 Post-development

Prepared by ams associates, inc

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Table of Contents

Printed 1/24/2024

TABLE OF CONTENTS

Project Reports

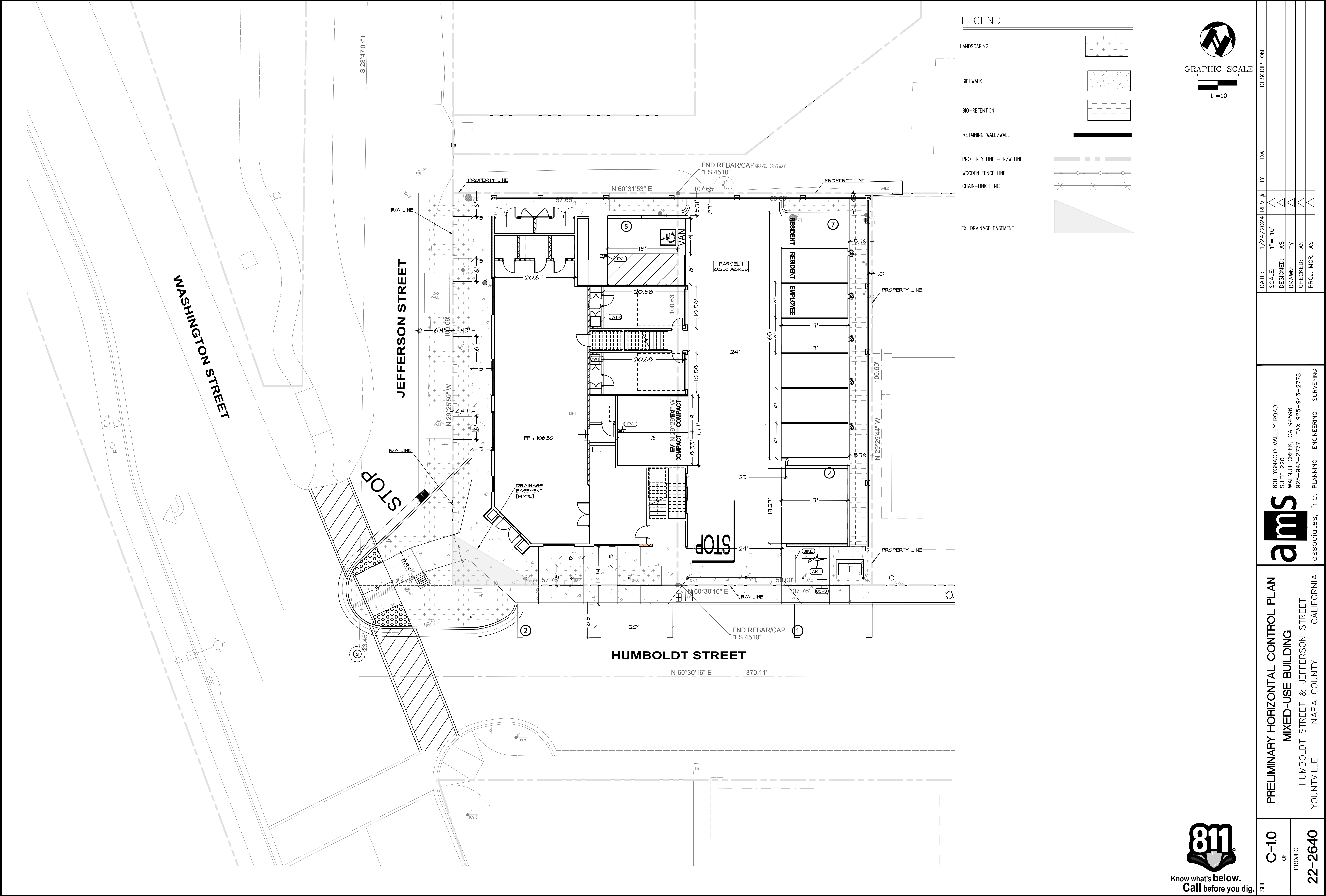
- 1 Routing Diagram
- 2 Area Listing (all nodes)
- 3 Soil Listing (all nodes)
- 4 Ground Covers (all nodes)
- 5 Pipe Listing (all nodes)

100-yr Event

- 6 Node Listing
- 7 Subcat 1S: DA-1 POST-DEVELOPMENT
- 9 Pond 2P: BIO-RETENTION

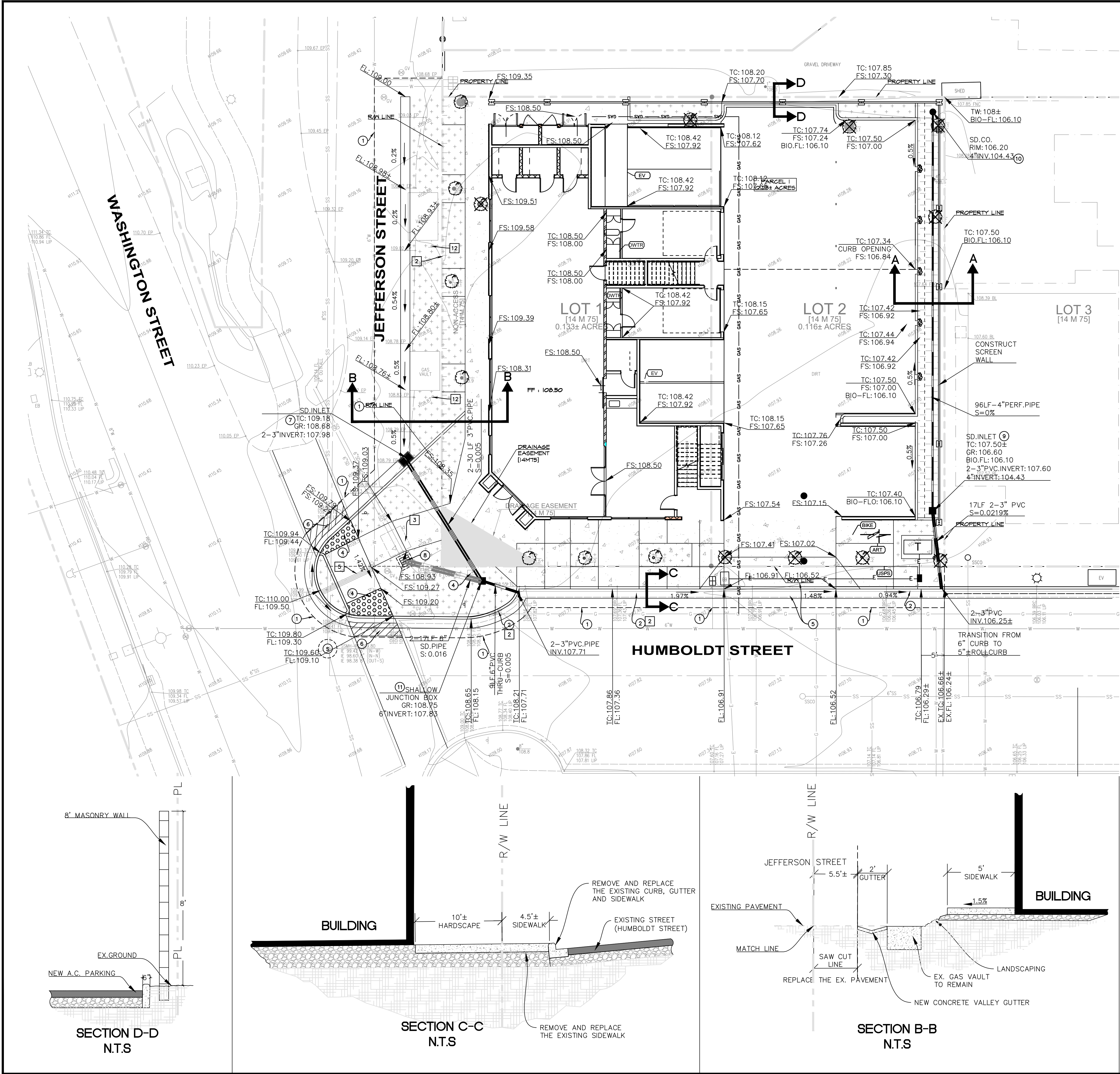
Exhibit ‘F’

Horizontal Control Plan

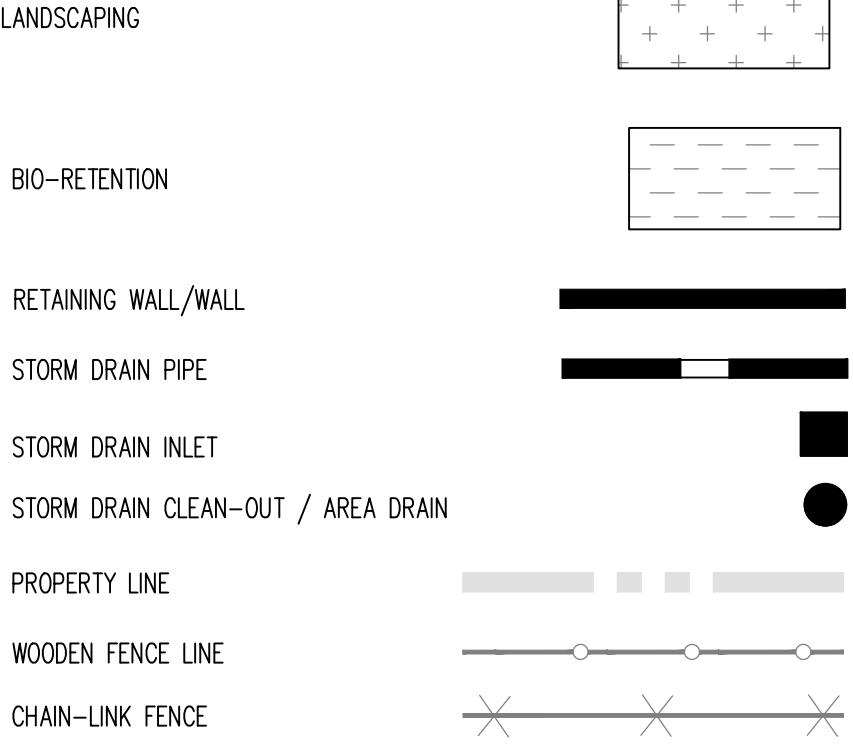


SHEET C-10 OF PROJECT 22-2640	PRELIMINARY HORIZONTAL CONTROL PLAN MIXED-USE BUILDING HUMBOLDT STREET & JEFFERSON STREET YOUNTVILLE NAPA COUNTY CALIFORNIA			ams associates, inc. PLANNING ENGINEERING SURVEYING 801 YGNACIO VALLEY ROAD SUITE 220 WALNUT CREEK, CA 94596 925-943-2777 FAX 925-943-2778		
	DATE: 1/24/2024	REV #	BY	DATE	DESCRIPTION	
SCALE: 1" = 10'	DESIGNED: AS	△				
DRAWN: TY	△					
CHECKED: AS	△					
PROJ. MGR: AS	△					

Exhibit 'G'
Preliminary Grading Plan



LEGEND



SECTION DETAILS

REMOVE TREES

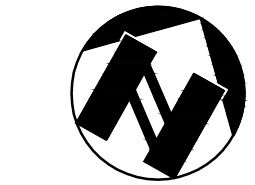
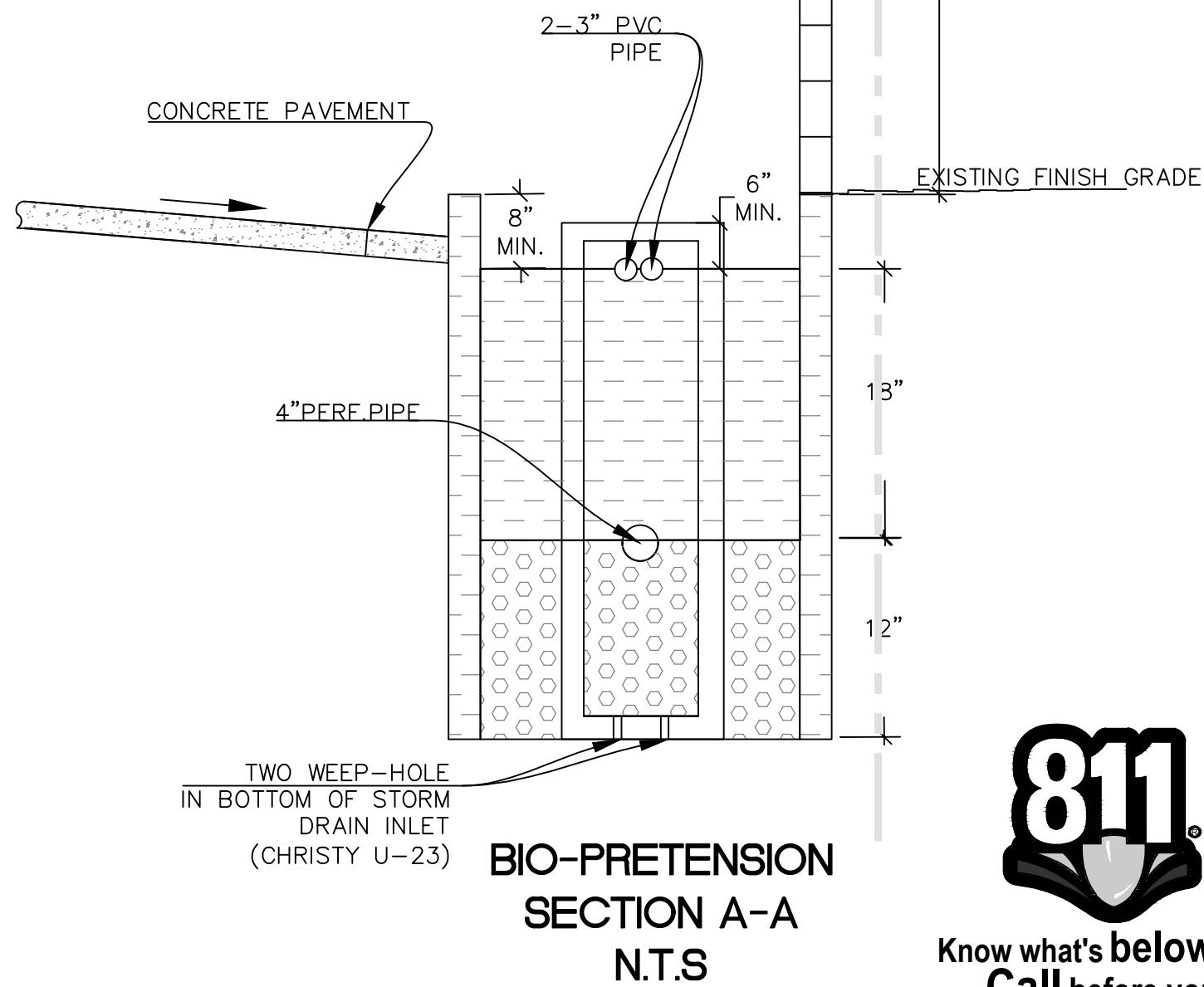
PROTECT TREES

CONSTRUCTION NOTES

- 1 SAW CUT (2' MIN.). REMOVE AND REPLACE THE EXISTING PAVEMENT WITH FULL DEPTH A.C., MATCH EXISTING.
- 2 CONSTRUCT CONCRETE CURB AND GUTTER PER THE CITY OF NAPA'S STANDARD & SPECIFICATIONS, STD. DRW. #S-1A.
- 3 CONSTRUCT CONCRETE SIDEWALK PER CITY OF NAPA'S STANDARDS & SPECIFICATIONS, STD. DRW. #S-4.
- 4 CONSTRUCT NEW ADA RAMP WITH TRUNCATED DOMES (YELLOW) PER THE CITY OF NAPA'S STANDARDS AND SPECIFICATIONS.
- 5 CONSTRUCT CONCRETE DRIVEWAY PER THE CITY OF NAPA'S STD. DRW. #S-5.
- 6 REMOVE AND REPLACE THE EXISTING PAVERS (3' MIN.). THE COLOR, PATTERN AND SECTIONS SHALL MATCH THE EXISTING PAVERS.
- 7 CONSTRUCT SHALLOW STORM DRAIN INLET PER THE CITY OF NAPA'S STD. DRW. #D-2A.
- 8 ADJUST THE EXISTING STORM DRAIN INLET & REPLACE THE EX.GRATE W./SOLID LID.
- 9 CONSTRUCT STORM DRAIN INLET CHRISTY U-23.
- 10 CONSTRUCT STORM DRAIN CLEANOUT.
- 11 CONSTRUCT SHALLOW JUNCTION BOX.
- 12 THE EXISTING GAS POLES REMAIN AND PROTECTED DURING THE CONSTRUCTION.

DEMOLITION NOTES

- 1 REMOVE THE EXISTING STORM DRAIN INLET AND PIPES.
- 2 REMOVE THE EXISTING CURB.
- 3 RELOCATE THE EXISTING ARTWORK AND REMOVE THE CONCRETE PAD.
- 4 RELOCATE THE EXISTING MAIL BOXES.
- 5 REMOVE THE EXISTING ADA RAMP.



GRAPHIC SCALE

1"=10'

DESCRIPTION		DATE	BY	REV #
DATE:	1/24/2024			
SCALE:	1"= 10'			
DESIGNED:	AS			
DRAWN:	TY			
CHECKED:	AS			
PROJ. MGR:	AS			

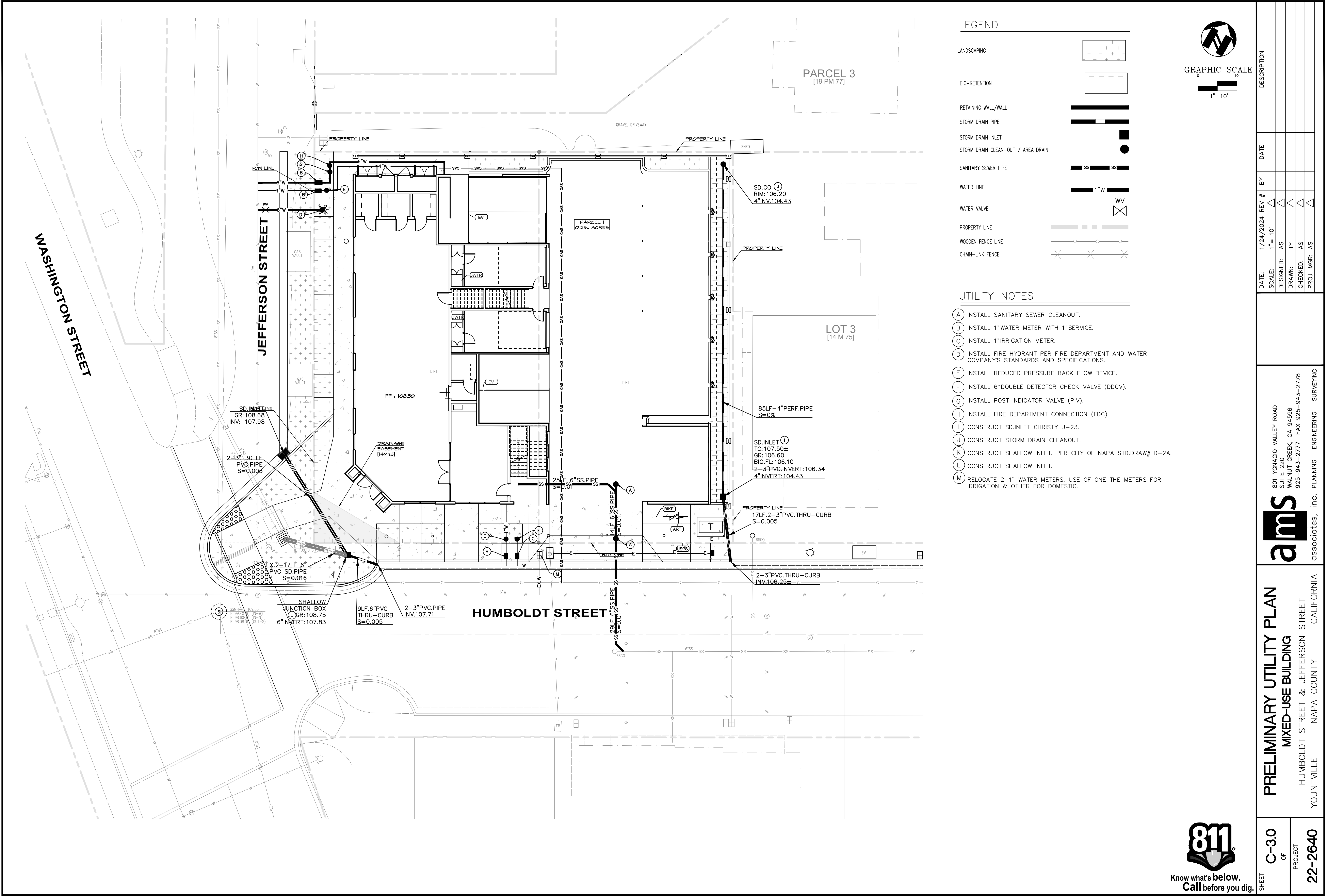
801 YGNACIO VALLEY ROAD SUITE 220 WALNUT CREEK, CA 94596 925-943-2777 FAX 925-943-2778		associates, inc.	PLANNING	ENGINEERING	SURVEYING
PRELIMINARY GRADING PLAN MIXED-USE BUILDING		HUMBOLDT STREET & JEFFERSON STREET	CALIFORNIA		
YOUNTVILLE		NAPA COUNTY			

SHEET	C-2.0	OF	PROJECT
22-2640			

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Exhibit 'H'
Preliminary Utility Plan



SHEET C-3.0 OF PROJECT 22-2640	PRELIMINARY UTILITY PLAN MIXED-USE BUILDING HUMBOLDT STREET & JEFFERSON STREET YOUNTVILLE NAPA COUNTY CALIFORNIA			ams associates, inc. PLANNING ENGINEERING SURVEYING 801 YGNACIO VALLEY ROAD SUITE 220 WALNUT CREEK, CA 94596 925-943-2777 FAX 925-943-2778		
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