Tentative Tract Map No. 20793

Preliminary Drainage Study

City of Rialto

San Bernardino County

State of California

PREPARED BY:

Encompass Associates, Inc.
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Exp: 9-30-25
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STATE OF CALIFORNIA

Prepared for:

Lytle Development Company

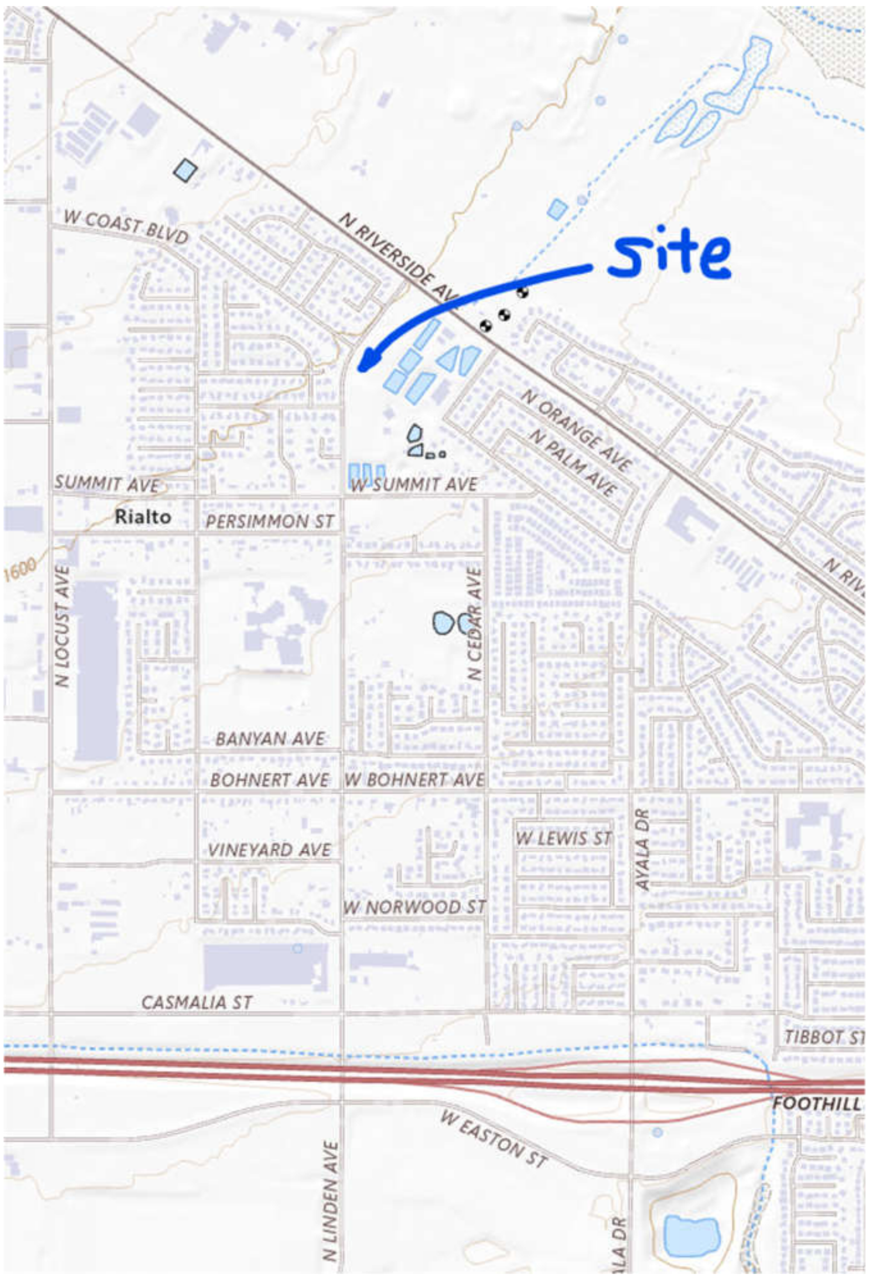
June 20, 2025

Contents

1. Introduction

The purpose of this Preliminary Drainage Study is to determine the extent of 100-year storm facilities required for the development of this project.

Tentative Tract Map No. 20793 is a detached condominium residential subdivision in the City of Rialto, San Bernardino County, California. The proposed site is located on approximately 7 acres in the northerly portion of the city, with 67 residences and common open space.



Vicinity Map

2. Methodology

The 100-year storm event was modeled in the rational method and synthetic unit hydrograph hydrology calculations in this study.

The rational method hydrologic model, as defined by Flood Control for San Bernardino County, was followed in the determination of storm runoff. CivilDesign's WSPGW hydraulic software program or spreadsheets using standard Manning's equations were used to validate inlet and pipe sizes.

3. Existing Condition

The subject property is currently undeveloped with native grass and brush cover on approximately 7 acres. There are no improvements on the existing site. The site is served by Linden Avenue, which will be widened to the ultimate width as part of this project.

The site is relatively flat, with existing drainage patterns generally conveying runoff to the San Gabriel Valley Water District (Fontana Water Company) facility. There is no runon from off-site areas onto the property.

4. Proposed Development

The proposed development project will consist of 67 detached condominium residential lots served by a new private street off Linden Avenue.

Developed pad areas will drain to the drives and then southerly toward the proposed infiltration basin in the southerly common area.

5. Proposed Drainage Improvements

The subject site is required to capture and treat nuisance water runoff and the “first flush” storm event as defined by San Bernardino County. Developed flows will be conveyed to the private street and then captured via a catch basins. The catch basins will connect to a proposed infiltration basin for stormwater quality treatment. Flows in excess of the required treatment volume will be metered out to the existing storm drain riser to the southeast on the SGVWC property. Discharged runoff will not exceed the existing condition.

See separate storm Water Quality Management Plan for details of the stormwater quality system.

6. Hydrologic Calculations Summary

Below is a table with a summary of the hydrologic calculations. Existing, Proposed and Routed peak flows are depicted. Calculations are included in Appendix C.

Hydrologic Summary Table					
Design Storm Frequency	Existing Condition Peak Flow		Proposed Condition Peak Flow	Routed Peak Flow	Notes
Year	cfs		cfs	cfs	
100	22.7		27.2	21.1	

7. Hydraulic Calculations Summary

Hydraulic calculations have been completed for the various conveyances proposed for this project, and are summarized below. See Appendix D for calculations.

Hydraulic Summary Table

Conveyance	Purpose	Design Storm Frequency	Reach / ID	Peak Flow cfs	Parameters

Will be provided with final engineering

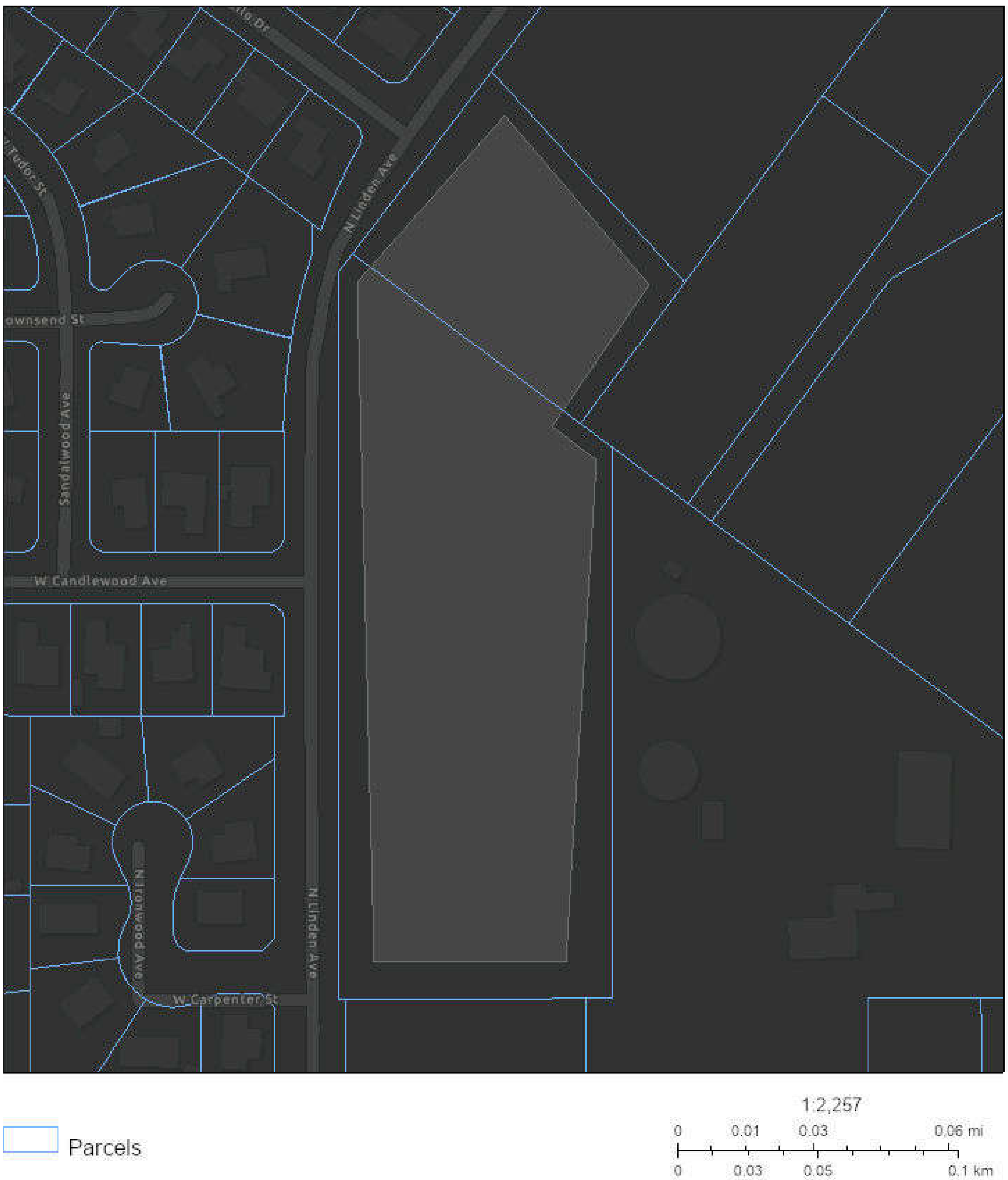
Appendix A. References

WQMP Project Report - San Bernardino Co. Stormwater Program

Area of Interest (AOI) Information

Area : 235,604.97 ft²

Jan 23 2025 15:46:11 Pacific Standard Time



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Project Site Parcel Numbers

#	ParcelNumber	Acreage	Area(ft²)
1	026401258	1.78	55,159.91
2	026401248	5.90	180,445.10

HCOC Exempt Area

#	Type	Status	Area(ft²)
1	HCOC Exempt Areas	Yes	235,604.97

Drainage Segment Details

#	System Number	Facility Name	Closest channel segment's susceptibility to Hydromodification	Highest downstream hydromodification susceptibility	Is this drainage segment subject to TMDLs?
1	2-205-5E	Riverside Groin #5, COE	EHM	High	No

#	Are there downstream drainage segments subject to TMDLs?	Is this drainage segment a 303d listed stream?	Are there 303d listed streams downstream?	Area(ft²)
1	No	No	Yes	235,604.97

Onsite Soil Groups

#	Onsite Soils Group	Soil Type	Soil Type Abbreviation	Area(ft²)
1	Soils - Hydro Group A	TvC TUJUNGA GRAVELLY LOAMY SAND, 0 TO 9 PERCENT S*	TUJUNGA GRAVELLY LOAMY SAND	235,604.97

Known Groundwater Contamination Plumes Within 1,000'

#	Name	Contaminant	Major Contaminant	Area(ft²)
1	North Rialto	Perchlorate	Perchlorate	235,283.27

Ground Water Contour

#	GW_Contour	Length(ft)
1	-450	315.08

Studies and Reports Related to Project Site

#	Report Link	Source	Date	Area(ft^2)
1	SBVMWD_High_Groundwater_/_Pressure_Zone_Area	USGS & San Bern Valley Municipal Water District	2005	235,604.97
2	CSDP_3_CALC_SHEET_FOR_HYDRO	San Bernardino County Flood Control District	April 1973	235,604.97
3	CSDP_3-3_Rialto_Channel_Drainage_Area_Volume_I	James M. Montgomery	April 1988	235,604.97
4	CSDP_3-3_Rialto_Channel_Drainage_Area_Volume_II	James M. Montgomery	April 1988	235,604.97
5	CSDP_3-3_Rialto_Channel_Drainage_Area_Volume_III	James M. Montgomery	April 1988	235,604.97
6	CSDP_3-3_Rialto_Channel_Drainage_Area_Volume_I	James M. Montgomery	April 1988	235,604.97
7	CSDP_3-3_Rialto_Channel_Drainage_Area_Volume_IV	James M. Montgomery	April 1988	235,604.97
8	CSDP_3-3_Rialto_Channel_Drainage_Area_Volume_V	James M. Montgomery	April 1988	235,604.97
9	Preliminary_Report_on_Proposed_North_SBFCP	San Bernardino County Flood Control District	December 1954	235,604.97
10	Rialto_MPD_Vol1	Hall & Foreman, Inc	February 2009	235,604.97
11	Rialto_MPD_Vol_II	Hall & Foreman, Inc	February 2009	235,604.97
12	RS-Rialto_Map_Book-FINAL_Layout2	Hall & Foreman, Inc	February 2009	235,604.97
13	CSDP_3-3_Rialto_Channel_Drain_Area_Draft	James M. Montgomery	January 1987	235,604.97
14	Revised_CSDP_3-3_Rialto_Channel_Drainage_Area	Associated Engineers	July 1988	235,604.97
15	Rialto_Channel_SD_Plan	San Bernardino County Flood Control District	July 1988	235,604.97
16	Cactus_Basin	San Bernardino County Flood Control District	October 1985	235,604.97

NOAA Atlas 14, Volume 6, Version 2
Location name: Rialto, California, USA*
Latitude: 34.1532°, Longitude: -117.4006°
Elevation: 1596 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	**0.137** (0.114-0.166)	**0.182** (0.151-0.221)	**0.241** (0.200-0.294)	**0.289** (0.237-0.355)	**0.354** (0.281-0.451)	**0.405** (0.315-0.527)	**0.457** (0.346-0.609)	**0.511** (0.376-0.701)	**0.584** (0.412-0.837)	**0.643** (0.438-0.953)
10-min	**0.196** (0.163-0.238)	**0.261** (0.217-0.317)	**0.345** (0.286-0.421)	**0.414** (0.340-0.509)	**0.508** (0.403-0.646)	**0.580** (0.451-0.755)	**0.655** (0.496-0.873)	**0.732** (0.539-1.00)	**0.838** (0.591-1.20)	**0.921** (0.627-1.37)
15-min	**0.237** (0.197-0.288)	**0.316** (0.262-0.384)	**0.418** (0.346-0.509)	**0.501** (0.412-0.616)	**0.614** (0.488-0.782)	**0.702** (0.545-0.913)	**0.792** (0.600-1.06)	**0.885** (0.652-1.21)	**1.01** (0.715-1.45)	**1.11** (0.759-1.65)
30-min	**0.358** (0.298-0.434)	**0.475** (0.395-0.578)	**0.629** (0.521-0.767)	**0.755** (0.620-0.928)	**0.925** (0.735-1.18)	**1.06** (0.822-1.38)	**1.19** (0.904-1.59)	**1.33** (0.982-1.83)	**1.53** (1.08-2.18)	**1.68** (1.14-2.49)
60-min	**0.543** (0.452-0.659)	**0.721** (0.599-0.877)	**0.955** (0.791-1.16)	**1.14** (0.941-1.41)	**1.40** (1.12-1.79)	**1.60** (1.25-2.09)	**1.81** (1.37-2.41)	**2.02** (1.49-2.78)	**2.32** (1.63-3.32)	**2.55** (1.73-3.78)
2-hr	**0.820** (0.682-0.996)	**1.07** (0.891-1.30)	**1.40** (1.16-1.70)	**1.66** (1.37-2.04)	**2.02** (1.60-2.57)	**2.29** (1.78-2.98)	**2.57** (1.94-3.42)	**2.85** (2.10-3.91)	**3.24** (2.28-4.63)	**3.54** (2.41-5.24)
3-hr	**1.05** (0.870-1.27)	**1.36** (1.13-1.65)	**1.76** (1.46-2.15)	**2.09** (1.71-2.56)	**2.52** (2.00-3.21)	**2.85** (2.22-3.71)	**3.19** (2.42-4.25)	**3.53** (2.60-4.85)	**3.99** (2.82-5.72)	**4.35** (2.96-6.45)
6-hr	**1.55** (1.29-1.88)	**2.00** (1.66-2.43)	**2.58** (2.14-3.14)	**3.04** (2.50-3.74)	**3.66** (2.90-4.65)	**4.12** (3.20-5.36)	**4.59** (3.48-6.11)	**5.06** (3.72-6.94)	**5.69** (4.01-8.14)	**6.17** (4.20-9.15)
12-hr	**2.11** (1.76-2.56)	**2.74** (2.27-3.32)	**3.53** (2.92-4.30)	**4.16** (3.41-5.11)	**4.98** (3.96-6.34)	**5.60** (4.35-7.28)	**6.21** (4.71-8.28)	**6.83** (5.03-9.37)	**7.64** (5.39-10.9)	**8.25** (5.62-12.2)
24-hr	**2.88** (2.55-3.32)	**3.77** (3.33-4.35)	**4.89** (4.32-5.66)	**5.78** (5.06-6.74)	**6.94** (5.88-8.36)	**7.80** (6.47-9.60)	**8.65** (7.01-10.9)	**9.51** (7.49-12.3)	**10.6** (8.04-14.3)	**11.5** (8.38-16.0)
2-day	**3.54** (3.13-4.07)	**4.73** (4.18-5.45)	**6.26** (5.52-7.24)	**7.48** (6.55-8.73)	**9.12** (7.73-11.0)	**10.4** (8.60-12.7)	**11.6** (9.40-14.6)	**12.9** (10.1-16.7)	**14.6** (11.0-19.6)	**15.9** (11.6-22.1)
3-day	**3.78** (3.35-4.36)	**5.15** (4.56-5.94)	**6.95** (6.13-8.04)	**8.42** (7.37-9.82)	**10.4** (8.84-12.6)	**12.0** (9.96-14.8)	**13.6** (11.0-17.1)	**15.3** (12.0-19.8)	**17.5** (13.3-23.6)	**19.3** (14.1-26.9)
4-day	**4.04** (3.57-4.65)	**5.56** (4.92-6.41)	**7.58** (6.69-8.77)	**9.26** (8.10-10.8)	**11.6** (9.81-14.0)	**13.4** (11.1-16.5)	**15.3** (12.4-19.3)	**17.3** (13.6-22.4)	**20.0** (15.1-27.0)	**22.2** (16.2-31.0)
7-day	**4.61** (4.08-5.31)	**6.42** (5.67-7.40)	**8.84** (7.80-10.2)	**10.9** (9.50-12.7)	**13.7** (11.6-16.5)	**15.9** (13.2-19.6)	**18.2** (14.8-23.0)	**20.7** (16.3-26.8)	**24.1** (18.2-32.5)	**26.8** (19.6-37.4)
10-day	**4.97** (4.40-5.73)	**6.97** (6.17-8.04)	**9.66** (8.52-11.2)	**11.9** (10.4-13.9)	**15.1** (12.8-18.2)	**17.6** (14.6-21.6)	**20.2** (16.4-25.5)	**23.0** (18.1-29.8)	**26.9** (20.3-36.3)	**30.0** (22.0-41.9)
20-day	**5.96** (5.28-6.87)	**8.44** (7.46-9.73)	**11.8** (10.4-13.7)	**14.7** (12.9-17.1)	**18.8** (15.9-22.6)	**22.0** (18.3-27.1)	**25.5** (20.6-32.1)	**29.2** (23.0-37.8)	**34.4** (26.0-46.4)	**38.6** (28.3-53.9)
30-day	**6.96** (6.16-8.02)	**9.87** (8.73-11.4)	**13.9** (12.2-16.1)	**17.3** (15.1-20.2)	**22.2** (18.8-26.7)	**26.2** (21.7-32.2)	**30.4** (24.6-38.2)	**34.9** (27.5-45.2)	**41.4** (31.3-55.8)	**46.7** (34.1-65.1)
45-day	**8.32** (7.37-9.59)	**11.7** (10.4-13.5)	**16.5** (14.5-19.1)	**20.6** (18.0-24.0)	**26.4** (22.4-31.9)	**31.2** (25.9-38.4)	**36.4** (29.5-45.8)	**41.9** (33.0-54.3)	**49.9** (37.8-67.4)	**56.5** (41.3-78.9)
60-day	**9.68** (8.58-11.2)	**13.5** (12.0-15.6)	**18.9** (16.7-21.9)	**23.6** (20.6-27.5)	**30.3** (25.7-36.5)	**35.8** (29.7-44.1)	**41.8** (33.8-52.6)	**48.2** (38.0-62.5)	**57.6** (43.6-77.7)	**65.3** (47.8-91.2)

[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.

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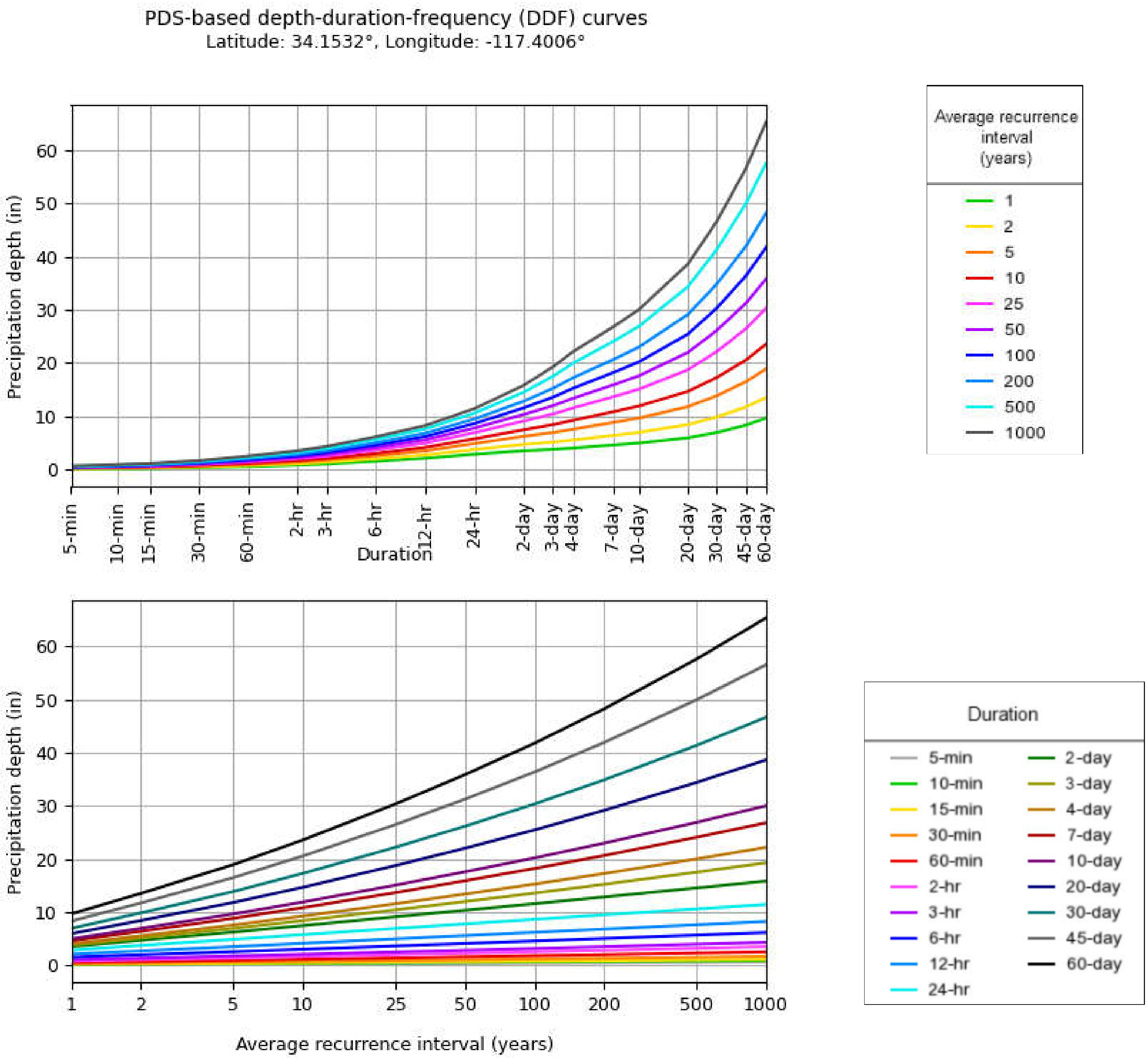
PF graphical



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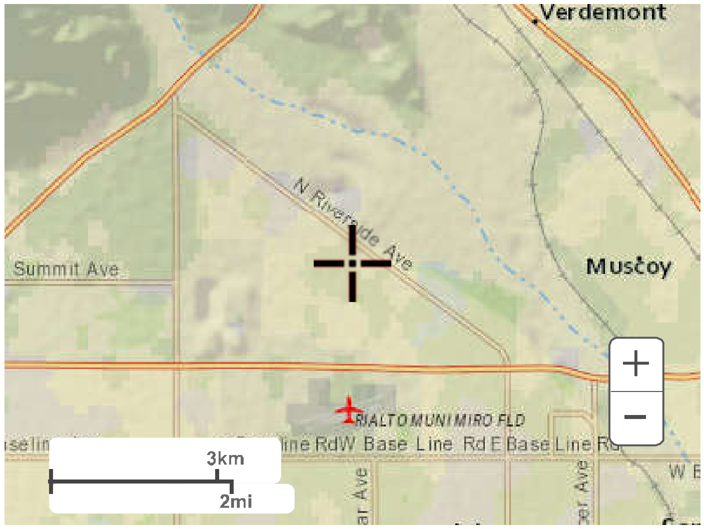
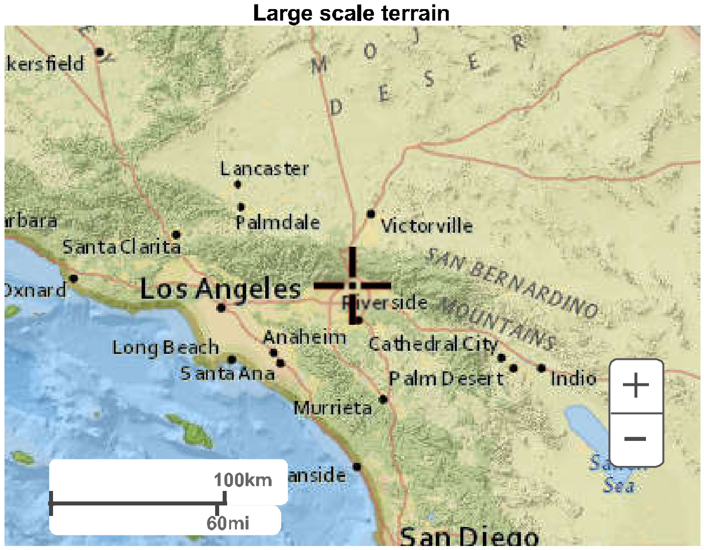
Maps & aerials

Small scale terrain



Large scale terrain



Large scale map

Large scale aerial

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National Oceanic and Atmospheric Administration
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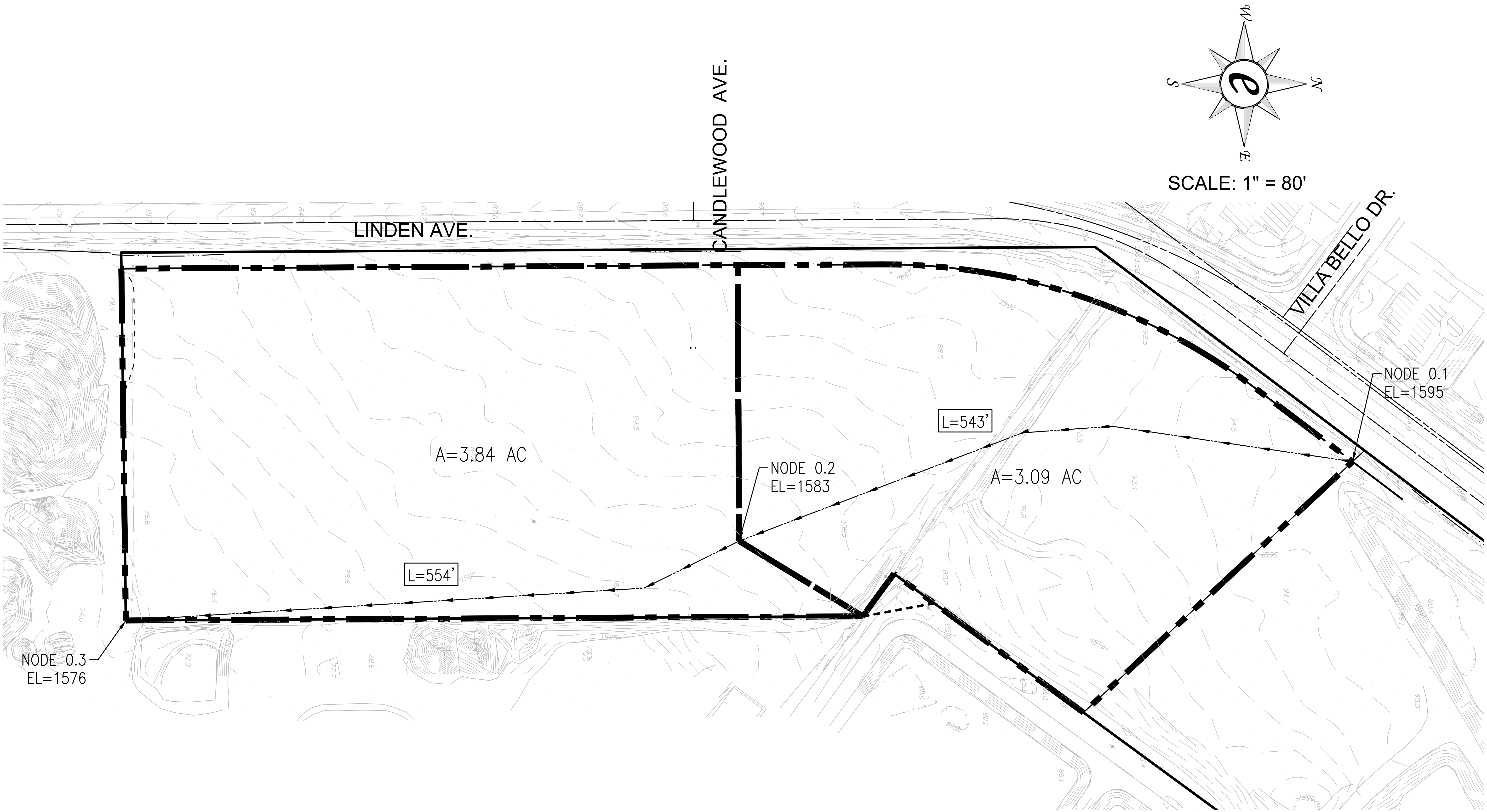
Disclaimer

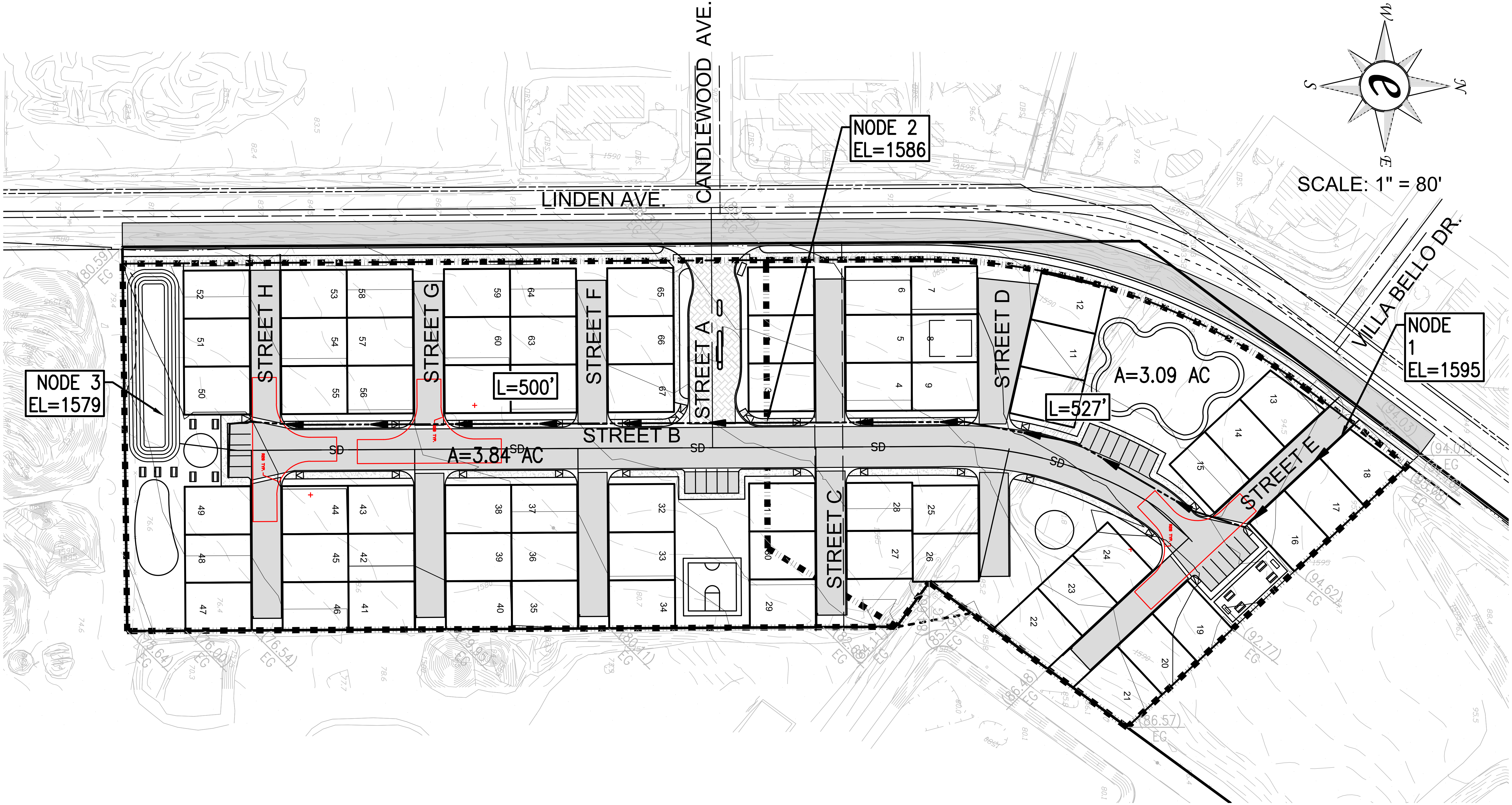
Appendix B. Hydrology Maps



ENCOMPASS ASSOCIATES, INC.

EXISTING CONDITIONS HYDROLOGY MAP

TTM20793



ENCOMPASS ASSOCIATES, INC.

DEVELOPED CONDITIONS HYDROLOGY MAP
TTM20793

Appendix C. Hydrologic Calculations

Tract 20793 Date: 5/23/2025

100 -year storm runoff

Antecedent Moisture Condition Used: AMC III

1-hour point rainfall from Isohyet Map is 1.81 inches per hour.

Slope of Intensity-Duration Curve is 0.6.

0.1	To	0.2	Initial flow through Subarea

Initial Flow through Subarea 1
Upstream Elevation at Node 0.1 is 1595 ft.
Downstream Elevation at Node 0.2 is 1583 ft. | Delta H = 12 ft.
Flow length is 543 ft. | Slope = 0.022 ft/ft.

Land Use	Soil Type	Area (AC)	Ap (%)	Fp (in/hr)
grass poor	A	3.09	1	0.308

Time of Concentration = Tc = K * (length^3 / Delta_EL)^0.2 = 0.525 * (543^3 / 12)^0.2 = 13.97 minutes.
Rainfall Intensity = e^(-Slope*Log(design T)+Log(reference I)+Slope*Log(reference T))
= e^(-0.6*Log(13.97)+Log(1.81)+0.6*Log(60)) = 4.34 in/hr.
Peak Runoff (Rational Equation) = 0.9*(I-Ap*Fp)*Area = 0.9*(4.34 - 1 * 0.308) * 3.09 = 11.21 cfs.

Peak Flow (cfs): 11.21 TC (min): 13.97

0.2	To	0.3	Streetflow through Subarea

Street Flow through Subarea 2
Upstream Elevation at Node 0.2 is 1583 ft.
Downstream Elevation at Node 0.3 is 1576 ft. | Delta H = 7 ft.
Flow length is 554 ft. | Slope = 0.013 ft/ft.
Using Defined Section A1.

Land Use	Soil Type	Area (AC)	Ap (%)	Fp (in/hr)
grass poor	A	3.84	1	0.308

Estimate Flow Travel Time using 11.21/3.09 = 3.63 cfs/ac (Average Runoff per Acre)
Estimated Average Flow Through Subarea = 11.21 + 3.63 cfs/ac * 3.84 ac / 2 = 18.18 cfs.
At 1st Half Street Flow Depth = 0.51 ft., Flow Area = 4.11 sf, Velocity (Q/A) = 3.93 ft/sec., Travel Time (V/L) = 2.35 m
2nd Half Street Flow Depth = 0.29 ft., Flow Area = 0.91 sf, Velocity (Q/A) = 2.4 ft/sec., Split Flow = 2.18 cfs.
Time of Concentration = 13.97 + 2.35 = 16.32 minutes.
Rainfall Intensity = 3.95 in/hr.
Subarea Peak Runoff (Rational Equation) = 0.9*(I-Ap*Fp)*Area = 0.9*(3.95 - 1 * 0.308) * 3.84 = 12.58 cfs.
Area-Averaged Ap = 1, Area-Averaged Fp = 0.31 in/hr, Total Area = 6.93 ac, Effective Area = 6.93 ac
Total Peak Runoff (Rational Equation) = 0.9*(I-Ap*Fp)*Area = 0.9*(3.95 - 1 * 0.31) * 6.93 = 22.7 cfs.

Peak Flow (cfs): 22.7 TC (min): 16.32

1	To	2	Initial flow through Subarea

Initial Flow through Subarea 3
Upstream Elevation at Node 1 is 1595 ft.
Downstream Elevation at Node 2 is 1586 ft. | Delta H = 9 ft.

Flow length is 527 ft. | Slope = 0.017 ft/ft.

Land Use	Soil Type	Area (AC)	Ap (%)	Fp (in/hr)
8-10du/ac	A	3.09	0.4	0.74

Time of Concentration = Tc = K * (length^3 / Delta_EL)^0.2 = 0.3738 * (527^3 / 9)^0.2 = 10.348 minutes.

Rainfall Intensity = e^(-Slope*Log(design T)+Log(reference I)+Slope*Log(reference T))

= e^(-0.6*Log(10.348)+Log(1.81)+0.6*Log(60)) = 5.196 in/hr.

Peak Runoff (Rational Equation) = 0.9*(I-Ap*Fp)*Area = 0.9*(5.196 - 0.4 * 0.74) * 3.09 = 13.64 cfs.

Peak Flow (cfs): 13.64 TC (min): 10.35

2	To	3	Streetflow through Subarea

Street Flow through Subarea 4

Upstream Elevation at Node 2 is 1586 ft.

Downstream Elevation at Node 3 is 1579 ft. | Delta H = 7 ft.

Flow length is 500 ft. | Slope = 0.014 ft/ft.

Using Defined Section A1.

Land Use	Soil Type	Area (AC)	Ap (%)	Fp (in/hr)
8-10du/ac	A	3.84	0.4	0.74

Estimate Flow Travel Time using 13.64/3.09 = 4.41 cfs/ac (Average Runoff per Acre)

Estimated Average Flow Through Subarea = 13.64 + 4.41 cfs/ac * 3.84 ac / 2 = 22.12 cfs.

At 1st Half Street Flow Depth = 0.51 ft., Flow Area = 4.11 sf, Velocity (Q/A) = 4.08 ft/sec., Travel Time (V/L) = 2.04 m

2nd Half Street Flow Depth = 0.37 ft., Flow Area = 1.78 sf, Velocity (Q/A) = 3.07 ft/sec., Split Flow = 5.46 cfs.

Time of Concentration = 10.35 + 2.04 = 12.39 minutes.

Rainfall Intensity = 4.66 in/hr.

Subarea Peak Runoff (Rational Equation) = 0.9*(I-Ap*Fp)*Area = 0.9*(4.66 - 0.4 * 0.74) * 3.84 = 15.08 cfs.

Area-Averaged Ap = 0.4, Area-Averaged Fp = 0.75 in/hr, Total Area = 6.93 ac, Effective Area = 6.93 ac

Total Peak Runoff (Rational Equation) = 0.9*(I-Ap*Fp)*Area = 0.9*(4.66 - 0.4 * 0.75) * 6.93 = 27.19 cfs.

Peak Flow (cfs): 27.19 TC (min): 12.39

Encompass Associates, Inc.
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Rancho Cucamonga, CA 91737
909-684-0093

Tr 20793 Linden — 900-900.142
Rialto — 5/23/25

AMC Type: iii (I,II or III)

Maximum Loss Rate — **Dev** — Set # 1

Cover	Area	%	Soil type	Area	%	CN-II	CN-III	Ap	%	S	Fp (F.C-6)	Fm	Fm (wt)
8-10du/ac	6.93	1.00	A	6.93	1.00	32	52	0.4	0.40	9.23	0.74	0.3	0.30
(AutoCalc: Impervious)				(4.2)	(0.61)		98	0	0.60	0.2			
	6.9			6.93								Fm=	0.30

Low Loss Fraction

Return Period	2	3.77 in		10	5.78 in		25	6.94 in		100	8.65 in	
Cover	Ia	Y	Y (wt)	Ia	Y	Y (wt)	Ia	Y	Y (wt)	Ia	Y	Y (wt)
8-10du/ac	1.85	0.09	0.04	1.85	0.2	0.08	1.85	0.26	0.10	1.85	0.33	0.13
(AutoCalc: Impervious)	0.04	0.94	0.56	0.04	0.96	0.58	0.04	0.97	0.58	0.04	0.97	0.58
		Y=	0.60		Y=	0.66		Y=	0.69		Y=	0.71
Low Loss Fraction,Y-bar =			0.40			0.34			0.31			0.29
Est Vol (ac-ft)=			1			2			3			4

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Rancho Cucamonga, CA 91737
909-684-0093

Tr 20793 Linden
Rialto

900-900.142
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1	Design Storm		yr	2	10	25	100
2	Catchment Lag time		hrs	0.17	0.17	0.17	0.17
			Tc (min)	12.8	12.5	12.4	12.4
3	Catchment Area	acres 6.93					
4	Base flow	cfs/sq mi 0					
5	S-graph	n/a					
6	Maximum loss rate, Fm	in/hr 0.30					
7	Low loss fraction, Y-bar			0.40	0.34	0.31	0.29
8	Watershed area-averaged 5-minute point rainfall		inches	0.27	0.42	0.52	0.67
	Watershed area-averaged 30-minute point rainfall		inches	0.55	0.86	1.06	1.37
	Watershed area-averaged 1-hour point rainfall		inches	0.72	1.14	1.40	1.81
	Watershed area-averaged 3-hour point rainfall		inches	1.36	2.08	2.52	3.20
	Watershed area-averaged 6-hour point rainfall		inches	2.00	3.04	3.66	4.59
	Watershed area-averaged 24-hour point rainfall		inches	3.77	5.78	6.94	8.65
9	24-hour storm unit interval (use TC for Small UH)		minutes	5			

Tr 20793 Linden
900-900.142
5/23/25

Subarea	1	
(sheet)	Losses1	
Storm	100	year
I-60min	1.81	
I-6hr	4.59	
Slope	0.6	
Ac	6.93	ac
TC	12.4	min
Calibration	1.03	
fm	0.30	in/hr
	0.005	in/min
Y-bar	0.29	
	Peak	Total
	27.94	3.7963

T (hrs)	Q (cfs)	V (ac-ft)
0	0	0
	1.22	0
0.04	0.96	0.0036
0.25	0.96	0.0203
0.46	1.22	0.0392
0.67	0.96	0.0581
0.88	1.22	0.077
1.09	0.96	0.0959
1.3	1.22	0.1148
1.51	1.22	0.136
1.72	0.96	0.1549
1.93	1.22	0.1738
2.14	0.96	0.1927
2.35	1.22	0.2116
2.56	0.96	0.2305
2.77	0.96	0.2472
2.98	1.22	0.2661
3.19	0.96	0.285

T	Q	V
(hrs)	(cfs)	(ac-ft)
3.4	1.22	0.3039
3.61	1.22	0.3251
3.82	1.22	0.3463
4.03	1.22	0.3675
4.24	1.22	0.3887
4.45	1.22	0.4099
4.66	1.22	0.4311
4.87	1.22	0.4523
5.08	1.22	0.4735
5.29	1.22	0.4947
5.5	1.22	0.5159
5.71	1.22	0.5371
5.92	1.22	0.5583
6.13	1.22	0.5795
6.34	1.22	0.6007
6.55	1.22	0.6219
6.76	1.22	0.6431
6.97	1.22	0.6643
7.18	1.22	0.6855
7.39	1.22	0.7067
7.6	1.22	0.7279
7.81	1.22	0.7491
8.02	1.22	0.7703
8.23	1.22	0.7915
8.44	1.22	0.8127
8.65	1.54	0.8367
8.86	1.22	0.8607
9.07	1.22	0.8819
9.28	1.54	0.9059
9.49	1.54	0.9326
9.7	1.22	0.9566
9.91	1.22	0.9778
10.12	1.54	1.0018
10.33	1.54	1.0285
10.54	1.54	1.0552
10.75	1.54	1.0819
10.96	1.54	1.1086
11.17	1.54	1.1353
11.38	1.86	1.1648
11.59	1.86	1.1971

T	Q	V
(hrs)	(cfs)	(ac-ft)
11.8	1.86	1.2294
12.01	1.86	1.2617
12.22	1.86	1.294
12.43	1.86	1.3263
12.64	1.86	1.3586
12.85	1.86	1.3909
13.06	2.18	1.426
13.27	2.18	1.4638
13.48	2.18	1.5016
13.69	2.18	1.5394
13.9	2.51	1.5801
14.11	2.83	1.6264
14.32	2.83	1.6755
14.53	2.83	1.7246
14.74	2.83	1.7737
14.95	3.4	1.8278
15.16	3.4	1.8868
15.37	4.05	1.9514
15.58	3.4	2.016
15.79	4.95	2.0885
16	7.77	2.1989
16.21	27.94	2.5088
16.42	4.37	2.7892
16.63	3.73	2.8595
16.84	3.08	2.9186
17.05	2.83	2.9699
17.26	2.51	3.0162
17.47	2.18	3.0569
17.68	1.86	3.092
17.89	1.86	3.1243
18.1	1.86	3.1566
18.31	1.86	3.1889
18.52	1.54	3.2184
18.73	1.86	3.2479
18.94	1.54	3.2774
19.15	1.54	3.3041
19.36	1.54	3.3308
19.57	1.22	3.3548
19.78	1.22	3.376
19.99	1.22	3.3972

T	Q	V
(hrs)	(cfs)	(ac-ft)
20.2	1.22	3.4184
20.41	1.22	3.4396
20.62	1.22	3.4608
20.83	1.22	3.482
21.04	1.22	3.5032
21.25	1.22	3.5244
21.46	1.22	3.5456
21.67	1.22	3.5668
21.88	1.22	3.588
22.09	1.22	3.6092
22.3	0.96	3.6281
22.51	1.22	3.647
22.72	1.22	3.6682
22.93	1.22	3.6894
23.14	1.22	3.7106
23.35	0.96	3.7295
23.56	0.96	3.7462
23.77	0.96	3.7629
23.98	0.96	3.7796
24.19	0.96	3.7963

Encompass Associates, Inc.

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Job	Tr 20793 Linden		900-900.142
Sheet No.		of	
Calculated by:	ATS	Date	5/23/25
Checked by:		Date	
		Scale	nts

Tr 20793 Linden
Rialto

Table 1: Basin Geometries
Dev

Depth	Elevation	Area*	Dvol*	Total V			
ft	ft	sq ft	cf	cf	ac-ft		
Basin 1							
0	74.83	2,450.0	0.0	4,900.0	0.112	**Gravel D**	5
1	75.83	3,387.0	2906	7806	0.179	**Gravel V**	4900
2	76.83	4,382.0	3874	11680	0.268		
3	77.83	5,500.0	4930	16610	0.381	**Pipe D**	0
4	78.83	6,600.0	6042	22652	0.520	**Pipe L**	0
5	79.83	8,000.0	7289	29941	0.687	**Pipe V**	0

Detention Basin Outlet Hydraulics

900-900.142
Tr 20793 Linden
5/23/2025

Outlet Structure		
C	3.3	weir
C	0.62	(orifice)
L (eff)	10	ft
H (eff)	1.00	ft
Bottom EL	3.98	ft

Infiltration		
rate	1.2	in/hr
FS	2	
Net rate	0.6	in/hr
SA	2450	sf
I	0.03	cfs

	Outlet Structure			Summary				
Elevation	Head	Orifice	Weir	Elevation	Infiltration	Outlet Outflow	Total Outflow	Volume
ft	ft	cfs	cfs	ft	cfs	cfs		ac-ft
0	0	0.00	0.00	0	0.03	0.00	0.03	0.11
1	0	0.00	0.00	1	0.03	0.00	0.03	0.18
2	0	0.00	0.00	2	0.03	0.00	0.03	0.27
3	0	0.00	0.00	3	0.03	0.00	0.03	0.38
4	0.02	0.10	0.09	4	0.03	0.09	0.13	0.52
5	1.02	35.88	33.99	5	0.03	33.99	34.03	0.69

Tr 20793 Linden
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Basin: 1

d	Q	S	S-O	S+O
0	0.03	0.11	0	0
1	0.03	0.18	0.18	0.18
2	0.03	0.27	0.27	0.27
3	0.03	0.38	0.38	0.38
4	0.13	0.52	0.52	0.52
5	34.03	0.69	0.4	0.98

Time	Inflow	d	Qout	S	S-out
Hrs	cfs	ft	cfs	ac-ft	ac-ft
37.63	27.94	5.0	21.1	0.69	3.31
0	0	0	0	0	0
0.21	1.22	0.1	0.03	0.120	0.00
0.04	0.96	0.0	0.03	0.115	0.00
0.25	0.96	0.1	0.03	0.121	0.00
0.46	1.22	0.3	0.03	0.129	0.00
0.67	0.96	0.3	0.03	0.135	0.00
0.88	1.22	0.5	0.03	0.143	0.00
1.09	0.96	0.6	0.03	0.149	0.00
1.3	1.22	0.7	0.03	0.157	0.00
1.51	1.22	0.8	0.03	0.165	0.00
1.72	0.96	0.9	0.03	0.171	0.00
1.93	1.22	1.0	0.03	0.178	0.00
2.14	0.96	1.2	0.03	0.193	0.00
2.35	1.22	1.4	0.03	0.214	0.00
2.56	0.96	1.6	0.03	0.230	0.00
2.77	0.96	1.8	0.03	0.246	0.00
2.98	1.22	2.0	0.03	0.267	0.00
3.19	0.96	2.1	0.03	0.283	0.00
3.4	1.22	2.3	0.03	0.303	0.00
3.61	1.22	2.5	0.03	0.324	0.00

Time	Inflow	d	Qout	S	S-out
Hrs	cfs	ft	cfs	ac-ft	ac-ft
3.82	1.22	2.7	0.03	0.344	0.00
4.03	1.22	2.9	0.03	0.365	0.00
4.24	1.22	3.0	0.04	0.386	0.00
4.45	1.22	3.2	0.04	0.406	0.00
4.66	1.22	3.3	0.06	0.426	0.00
4.87	1.22	3.5	0.07	0.446	0.00
5.08	1.22	3.6	0.08	0.466	0.00
5.29	1.22	3.8	0.10	0.485	0.00
5.5	1.22	3.9	0.11	0.505	0.00
5.71	1.22	4.0	0.26	0.521	0.00
5.92	1.22	4.0	0.93	0.527	0.02
6.13	1.22	4.0	1.32	0.525	0.02
6.34	1.22	4.0	1.22	0.526	0.02
6.55	1.22	4.0	1.25	0.525	0.02
6.76	1.22	4.0	1.24	0.526	0.02
6.97	1.22	4.0	1.24	0.526	0.02
7.18	1.22	4.0	1.24	0.526	0.02
7.39	1.22	4.0	1.24	0.526	0.02
7.6	1.22	4.0	1.24	0.526	0.02
7.81	1.22	4.0	1.24	0.526	0.02
8.02	1.22	4.0	1.24	0.526	0.02
8.23	1.22	4.0	1.24	0.526	0.02
8.44	1.22	4.0	1.24	0.526	0.02
8.65	1.54	4.0	1.45	0.528	0.02
8.86	1.22	4.0	1.39	0.525	0.02
9.07	1.22	4.0	1.20	0.526	0.02
9.28	1.54	4.0	1.46	0.527	0.02
9.49	1.54	4.0	1.59	0.527	0.03
9.7	1.22	4.0	1.35	0.525	0.02
9.91	1.22	4.0	1.21	0.526	0.02
10.12	1.54	4.0	1.45	0.528	0.02
10.33	1.54	4.0	1.59	0.527	0.03
10.54	1.54	4.0	1.56	0.527	0.03
10.75	1.54	4.0	1.57	0.527	0.03
10.96	1.54	4.0	1.56	0.527	0.03
11.17	1.54	4.0	1.56	0.527	0.03
11.38	1.86	4.1	1.77	0.529	0.03
11.59	1.86	4.1	1.92	0.529	0.03
11.8	1.86	4.1	1.88	0.529	0.03
12.01	1.86	4.1	1.89	0.529	0.03
12.22	1.86	4.1	1.89	0.529	0.03
12.43	1.86	4.1	1.89	0.529	0.03

Time	Inflow	d	Qout	S	S-out
Hrs	cfs	ft	cfs	ac-ft	ac-ft
12.64	1.86	4.1	1.89	0.529	0.03
12.85	1.86	4.1	1.89	0.529	0.03
13.06	2.18	4.1	2.10	0.531	0.04
13.27	2.18	4.1	2.25	0.530	0.04
13.48	2.18	4.1	2.21	0.530	0.04
13.69	2.18	4.1	2.22	0.530	0.04
13.9	2.51	4.1	2.43	0.532	0.04
14.11	2.83	4.1	2.79	0.534	0.05
14.32	2.83	4.1	2.90	0.533	0.05
14.53	2.83	4.1	2.87	0.534	0.05
14.74	2.83	4.1	2.88	0.534	0.05
14.95	3.4	4.1	3.24	0.537	0.06
15.16	3.4	4.1	3.51	0.536	0.06
15.37	4.05	4.1	3.86	0.541	0.07
15.58	3.4	4.1	3.77	0.535	0.06
15.79	4.95	4.2	4.37	0.547	0.08
16	7.77	4.2	7.02	0.562	0.12
16.21	27.94	5.0	21.12	0.686	0.37
16.42	4.37	3.7	16.90	0.473	0.29
16.63	3.73	4.0	0.70	0.526	0.01
16.84	3.08	4.1	2.46	0.537	0.04
17.05	2.83	4.1	3.15	0.533	0.05
17.26	2.51	4.1	2.60	0.532	0.04
17.47	2.18	4.1	2.33	0.530	0.04
17.68	1.86	4.1	1.98	0.528	0.03
17.89	1.86	4.1	1.87	0.529	0.03
18.1	1.86	4.1	1.90	0.529	0.03
18.31	1.86	4.1	1.89	0.529	0.03
18.52	1.54	4.0	1.68	0.527	0.03
18.73	1.86	4.1	1.74	0.529	0.03
18.94	1.54	4.0	1.72	0.527	0.03
19.15	1.54	4.0	1.52	0.527	0.03
19.36	1.54	4.0	1.58	0.527	0.03
19.57	1.22	4.0	1.36	0.525	0.02
19.78	1.22	4.0	1.21	0.526	0.02
19.99	1.22	4.0	1.25	0.525	0.02
20.2	1.22	4.0	1.24	0.526	0.02
20.41	1.22	4.0	1.24	0.526	0.02
20.62	1.22	4.0	1.24	0.526	0.02
20.83	1.22	4.0	1.24	0.526	0.02
21.04	1.22	4.0	1.24	0.526	0.02
21.25	1.22	4.0	1.24	0.526	0.02

Time	Inflow	d	Qout	S	S-out
Hrs	cfs	ft	cfs	ac-ft	ac-ft
21.46	1.22	4.0	1.24	0.526	0.02
21.67	1.22	4.0	1.24	0.526	0.02
21.88	1.22	4.0	1.24	0.526	0.02
22.09	1.22	4.0	1.24	0.526	0.02
22.3	0.96	4.0	1.07	0.524	0.02
22.51	1.22	4.0	1.12	0.526	0.02
22.72	1.22	4.0	1.27	0.525	0.02
22.93	1.22	4.0	1.23	0.526	0.02
23.14	1.22	4.0	1.24	0.525	0.02
23.35	0.96	4.0	1.07	0.524	0.02
23.56	0.96	4.0	0.95	0.524	0.02
23.77	0.96	4.0	0.98	0.524	0.02
23.98	0.96	4.0	0.97	0.524	0.02
24.19	0.96	4.0	0.98	0.524	0.02
24.4	0	4.0	0.55	0.515	0.01
24.61	0	3.9	0.12	0.513	0.00
24.82	0	3.9	0.12	0.511	0.00
25.03	0	3.9	0.12	0.509	0.00
25.24	0	3.9	0.12	0.507	0.00
25.45	0	3.9	0.12	0.505	0.00
25.66	0	3.9	0.12	0.503	0.00
25.87	0	3.9	0.11	0.501	0.00
26.08	0	3.8	0.11	0.499	0.00
26.29	0	3.8	0.11	0.497	0.00
26.5	0	3.8	0.11	0.495	0.00
26.71	0	3.8	0.11	0.493	0.00
26.92	0	3.8	0.11	0.491	0.00
27.13	0	3.8	0.11	0.489	0.00
27.34	0	3.8	0.11	0.487	0.00
27.55	0	3.8	0.10	0.486	0.00
27.76	0	3.7	0.10	0.484	0.00
27.97	0	3.7	0.10	0.482	0.00
28.18	0	3.7	0.10	0.480	0.00
28.39	0	3.7	0.10	0.479	0.00
28.6	0	3.7	0.10	0.477	0.00
28.81	0	3.7	0.10	0.475	0.00
29.02	0	3.7	0.10	0.474	0.00
29.23	0	3.7	0.10	0.472	0.00
29.44	0	3.6	0.09	0.470	0.00
29.65	0	3.6	0.09	0.469	0.00
29.86	0	3.6	0.09	0.467	0.00
30.07	0	3.6	0.09	0.466	0.00

Time	Inflow	d	Qout	S	S-out
Hrs	cfs	ft	cfs	ac-ft	ac-ft
30.28	0	3.6	0.09	0.464	0.00
30.49	0	3.6	0.09	0.463	0.00
30.7	0	3.6	0.09	0.461	0.00
30.91	0	3.6	0.09	0.460	0.00
31.12	0	3.6	0.09	0.458	0.00
31.33	0	3.5	0.09	0.457	0.00
31.54	0	3.5	0.08	0.455	0.00
31.75	0	3.5	0.08	0.454	0.00
31.96	0	3.5	0.08	0.452	0.00
32.17	0	3.5	0.08	0.451	0.00
32.38	0	3.5	0.08	0.450	0.00
32.59	0	3.5	0.08	0.448	0.00
32.8	0	3.5	0.08	0.447	0.00
33.01	0	3.5	0.08	0.446	0.00
33.22	0	3.5	0.08	0.444	0.00
33.43	0	3.4	0.08	0.443	0.00
33.64	0	3.4	0.08	0.442	0.00
33.85	0	3.4	0.07	0.440	0.00
34.06	0	3.4	0.07	0.439	0.00
34.27	0	3.4	0.07	0.438	0.00
34.48	0	3.4	0.07	0.437	0.00
34.69	0	3.4	0.07	0.436	0.00
34.9	0	3.4	0.07	0.434	0.00
35.11	0	3.4	0.07	0.433	0.00
35.32	0	3.4	0.07	0.432	0.00
35.53	0	3.4	0.07	0.431	0.00
35.74	0	3.3	0.07	0.430	0.00
35.95	0	3.3	0.07	0.429	0.00
36.16	0	3.3	0.07	0.427	0.00
36.37	0	3.3	0.06	0.426	0.00
36.58	0	3.3	0.06	0.425	0.00
36.79	0	3.3	0.06	0.424	0.00
37	0	3.3	0.06	0.423	0.00
37.21	0	3.3	0.06	0.422	0.00
37.42	0	3.3	0.06	0.421	0.00
37.63	0	3.3	0.06	0.420	0.00
37.84	0	3.3	0.06	0.419	0.00
38.05	0	3.3	0.06	0.418	0.00
38.26	0	3.3	0.06	0.417	0.00
38.47	0	3.2	0.06	0.416	0.00
38.68	0	3.2	0.06	0.415	0.00
38.89	0	3.2	0.06	0.414	0.00

Time	Inflow	d	Qout	S	S-out
Hrs	cfs	ft	cfs	ac-ft	ac-ft
39.1	0	3.2	0.06	0.413	0.00
39.31	0	3.2	0.06	0.412	0.00
39.52	0	3.2	0.05	0.411	0.00
39.73	0	3.2	0.05	0.410	0.00
39.94	0	3.2	0.05	0.409	0.00
40.15	0	3.2	0.05	0.408	0.00
40.36	0	3.2	0.05	0.408	0.00
40.57	0	3.2	0.05	0.407	0.00
40.78	0	3.2	0.05	0.406	0.00
40.99	0	3.2	0.05	0.405	0.00
41.2	0	3.2	0.05	0.404	0.00
41.41	0	3.2	0.05	0.403	0.00
41.62	0	3.2	0.05	0.402	0.00
41.83	0	3.1	0.05	0.402	0.00
42.04	0	3.1	0.05	0.401	0.00
42.25	0	3.1	0.05	0.400	0.00
42.46	0	3.1	0.05	0.399	0.00
42.67	0	3.1	0.05	0.398	0.00
42.88	0	3.1	0.05	0.398	0.00
43.09	0	3.1	0.04	0.397	0.00
43.3	0	3.1	0.04	0.396	0.00
43.51	0	3.1	0.04	0.395	0.00
43.72	0	3.1	0.04	0.395	0.00
43.93	0	3.1	0.04	0.394	0.00
44.14	0	3.1	0.04	0.393	0.00
44.35	0	3.1	0.04	0.393	0.00
44.56	0	3.1	0.04	0.392	0.00
44.77	0	3.1	0.04	0.391	0.00
44.98	0	3.1	0.04	0.390	0.00
45.19	0	3.1	0.04	0.390	0.00
45.4	0	3.1	0.04	0.389	0.00
45.61	0	3.1	0.04	0.388	0.00
45.82	0	3.0	0.04	0.388	0.00
46.03	0	3.0	0.04	0.387	0.00
46.24	0	3.0	0.04	0.386	0.00
46.45	0	3.0	0.04	0.386	0.00
46.66	0	3.0	0.04	0.385	0.00
46.87	0	3.0	0.04	0.385	0.00
47.08	0	3.0	0.04	0.384	0.00
47.29	0	3.0	0.04	0.383	0.00
47.5	0	3.0	0.04	0.383	0.00
47.71	0	3.0	0.03	0.382	0.00

Time	Inflow	d	Qout	S	S-out
Hrs	cfs	ft	cfs	ac-ft	ac-ft
47.92	0	3.0	0.03	0.382	0.00
48.13	0	3.0	0.03	0.381	0.00
48.34	0	3.0	0.03	0.380	0.00
48.55	0	3.0	0.03	0.380	0.00
48.76	0	3.0	0.03	0.379	0.00
48.97	0	3.0	0.03	0.379	0.00
49.18	0	3.0	0.03	0.378	0.00
49.39	0	3.0	0.03	0.377	0.00
49.6	0	3.0	0.03	0.377	0.00
49.81	0	3.0	0.03	0.376	0.00
50.02	0	3.0	0.03	0.376	0.00
50.23	0	2.9	0.03	0.375	0.00
50.44	0	2.9	0.03	0.375	0.00
50.65	0	2.9	0.03	0.374	0.00
50.86	0	2.9	0.03	0.373	0.00
51.07	0	2.9	0.03	0.373	0.00
51.28	0	2.9	0.03	0.372	0.00
51.49	0	2.9	0.03	0.372	0.00
51.7	0	2.9	0.03	0.371	0.00
51.91	0	2.9	0.03	0.371	0.00
52.12	0	2.9	0.03	0.370	0.00
52.33	0	2.9	0.03	0.369	0.00
52.54	0	2.9	0.03	0.369	0.00

Appendix D. Hydraulic Calculations

Will be provided with final engineering