Appendix G-4

Draft FEMA Conditional Letter of Map Revision Request

FEMA Conditional Letter of Map Revision Request

Lyons Canyon – Tract No. 83301

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Draft and to be approved prior to the storm drain plan approval.

PACE JN B714

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1 Introduction

This application is for a Conditional Letter of Map Revision (CLOMR) for the future Lyons Canyon residential development. The project is located on the west side of I-5, about one half of a mile south of Lyons Canyon Boulevard, in Stevenson Ranch, Los Angeles County, California. A vicinity map is shown on **Exhibit 1**. The project site is located on FEMA Flood Insurance Rate Map (FIRM) panels 1030F and 1031G in Los Angeles County (see **Appendix B**). The proposed development is shown alongside the effect FEMA floodplain on **Exhibit 2**. The Lyon Canyon Creek Floodplain is currently mapped as FEMA Zone A.

1.1 Project Description

The Lyons Canyon is a proposed residential development, which includes the development of 516 dwelling units with a mix of attached and detached dwelling units, and affordable senior housing within 40.05 acres, as well as a recreational center within a 1.2-acre lot, a future fire station within a 1.43-acre lot, and approximately 151 acres of natural open space. Project infrastructure includes internal roadways, trails and a new trailhead, a new water tank, and three Los Angeles County Flood Control District (LACFCD) lots with debris and desilting basins.

1.2 Design Overview

The Lyons Canyon regional flood control design consists of two large regional debris basins, five smaller offsite debris basins with elevated inlets, three landscaped watersheds, and an underground regional drainage system. The design intercepts regional flow from undeveloped offsite watersheds, captures the debris, and conveys the clear flow in three drainage lines along the perimeter road to the existing Caltrans culvert under I-5. **Exhibit 3** shows the regional drainage design concept, including the offsite watersheds tributary to the debris basins, and the regional drainage lines. These design elements are discussed in further detail in **Section 3.**

2 Hydrology and Debris Production

PACE completed hydrologic analyses of the existing conditions watersheds tributary to the box culvert under the I-5. For the proposed conditions, hydrologic analyses were completed for the offsite watersheds tributary to the two proposed regional debris basins, offsite watersheds tributary small debris basins with elevated inlets, landscaped offsite watersheds that do not produce debris, and onsite watersheds. The hydrologic analysis was completed using HEC-HMS version 4.11 and yielded 100-year clear hydrographs for each of the watersheds.

The debris production volume for each of the offsite watersheds in the proposed condition was used to evaluate the performance of the debris basins. Debris production for each of the offsite watersheds tributary to a debris basin was calculated following LA County Department of Public Works Sedimentation Manual (LACSM) procedures considering mapped Debris Production Zones.

2.1 Hydrologic Model Development

2.1.1 *Watershed Delineation*

The offsite watersheds tributary to Caltrans culvert in existing and proposed conditions were delineated using ArcGIS and LA County 2015-2016 LARIAC LiDAR topography of the area and the proposed site grading. In the existing conditions, the watershed tributary to the culvert was subdivided into three subareas tributary to the three reaches of the creek. In the proposed conditions, watersheds were tributary to each debris basins were delineated, as well as landscaped watersheds that drain to the main storm drains. The onsite watershed was delineated into subareas that drain to different connection points along the main storm drain lines. The proposed offsite, proposed onsite, and existing watersheds are included in **Exhibit 4**, **Exhibit 5** and **Exhibit 6**, respectively.

2.1.2 *Rainfall*

Rainfall was applied to the HEC-HMS models using the frequency storm option, in which HEC-HMS calculates a rainfall pattern given user-input rainfall depths for a range of durations. These rainfall depths were obtained from NOAA Atlas 14 at the centroid of the existing condition and proposed conditions watersheds, which yielded the same rainfall depths in both development conditions. These rainfall depths are summarized in **Table 2-1** and included in **Appendix C**.

Table 2-1: NOAA Atlas 14 Rainfall Depths

Duration	Rainfall Depth (in)
5 Minutes	0.436
10 Minutes	0.625
15 Minutes	0.756
1 Hour	1.05
2 Hours	1.62
3 Hours	2.44
6 Hours	4.42
12 Hours	6.00
1 Day	8.12

The program performs linear interpolation in log-log space to estimate incremental precipitation depths every 5 minutes of the 24-hour storm event using the user-input rainfall data. The alternating block method is then used to develop a hyetograph from the incremental precipitation depths, with the peak rainfall occurring at 67% of the total storm duration (16 hours into the 24-hour event).

2.1.3 Losses

HEC-HMS computed rainfall losses using the SCS Curve Number Method. A weighted average curve number and percent impervious was calculated for each subarea following guidance outlined in National Resources Conservation Service's (NRCS) TR-55 (1986). The percent pervious and curve number values were determined based on land use and soil type. Land uses were defined based on aerial imagery and the proposed site plan. Soil types were obtained from NRCS Web Soil Survey, and are mapped in **Exhibit 7**. Curve number and percent impervious calculations are included in **Appendix D**. Note that the pervious curve numbers were input into HEC-HMS, since HEC-HMS calculates a composite curve number based on the pervious curve number and percent impervious.

2.1.4 Transformation

Rainfall excess was transformed to runoff using synthetic distribution graphs (S-graphs) developed by T.V. Hmromadka and R.H. McCuen and presented in the Orange County Hydrology Manual (1986) and San Bernardino County Hydrology Manual (1986), among other publications. The Foothill S-graph was used for the undeveloped off-site watersheds, with the Valley Undeveloped S-graph used for the flatter watersheds near the Caltrans culvert. The onsite watersheds as well as the landscaped watersheds which feature drainage gutters were modeled using the Valley Developed S-graph. A list indicating the S-graph used for each watershed is included in **Appendix E**.

The lag time for the large, regional watersheds, including the existing watersheds, proposed Watershed A and proposed Watershed B, was calculated using the following empirical equation presented in the Orange County Hydrology Manual (1986), among other publications:

$$lag\ (hours) = C_t\left[(L\ \times L_{ca})/\sqrt{S}\,\right]^m$$

Where:

- $C_t = 24\bar{n}$; where $\bar{n}$ is a factor estimated based on the slope and ground cover of the watershed
- *L* = length of the longest watercourse (miles)
- L_{ca} = length along the longest watercourse, measured upstream to a point opposite center of area (miles)
- *S* = overall slope of drainage area (feet per mile)
- *m* = 0.38

The above empirical equation was developed for large watersheds, and is not applicable to the small offsite watershed or the developed watersheds. For these smaller watersheds, the lag times were taken as 80% of the time of concentration. Times of concentration were determined using guidance in NRCS TR-55, where travel times for a combination of sheet flow, shallow concentrated flow, and open channel or pipe flow is computed for each watershed. Travel time for sheet flow was computed using equation 3-3 of the TR-55, which is a simplified version of the manning's equation:

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5}s^{0.4}}$$

Where:

- T_t = travel time (hr)
- *n* = Manning's roughness coefficient, determined based on land use
- *L* = Flow length, determined using the topographic data and site plan
- P_2 = 2-year, 24-hour rainfall depth, 3.23 inches based on NOAA Atlas 14
- *s* = land slope (ft/ft)

The travel time for shallow concentrated flow was determined based on the length of the segment and the average velocity. The average velocity was determined using Figure 3-1 of the TR-55, which relates the watercourse slope to the average velocity for paved or unpaved segments. Finally, the open channel or pipe flow travel time was calculated based on the length of the channel / pipe and the velocity computed using the Manning's Equation.

The lag time calculations for each watershed are included in **Appendix E**. Note that the minimum lag times used in the HEC-HMS model were set to 5 minutes.

2.1.5 Channel Routing

The proposed HEC-HMS models did not include any channel routing, as all routing was completed separately in the hydraulic models (see **Section 4**). The existing model included a single routing reach, shown on **Exhibit 6**, which was modeled in HEC-HMS using the Modified Puls routing method. The Modified Puls method is based on a finite difference approximation of the continuity equation coupled with an empirical representation of the momentum equation. The HEC-HMS software calculates the outflow in each reach given a user-input storage-discharge curve for each reach element. The alignment, length, and slope of the reach was determined using the LiDAR data. A storage-discharge curve was developed for the reach assuming normal depth conditions and using a representative cross-section using the 2015-2016 LiDAR data. The Manning's Equation was then used to calculate the cross-sectional flow area and discharge for a series of normal depths using a roughness coefficient of 0.04. The resulting cross-sectional areas were multiplied by the reach length to estimate the storage volume for each given depth. The result of these calculations is a storage vs. discharge curve for each channel reach. The storage vs. discharge curve and calculations are included in **Appendix F**.

2.2 Hydrologic Model Results

HEC-HMS model results, including peak 100-year, 24-hour flow rates and runoff volumes, are included in **Table 2-2** for both the proposed and existing conditions watershed. Hydrographs are included in **Appendix G**.

Table 2-2: Summary of HEC-HMS Results for the 100-Year, 24-Hour Storm Event

Watershed	Area (ac.)	Peak Flow (cfs)	Runoff Volume (AF)
Existing Watersheds			
EX-1A	710.7	1,153	317.2
EX-2A	117.1	210	42.2
EX-4A	40.4	88	14.4
Proposed Offsite Watersheds			
A	109.1	206	40.4
B	671.3	1,044	294.9
C	12.6	33	4.8
D	1.2	3	0.4
E	2.6	6	0.9
F	7.2	18	2.6
G	3.7	9	1.3
H	1.5	3	0.4
I	2.5	5	0.7
J	8.8	17	3.0
K	2.8	6	0.9
Proposed Onsite Watersheds			
O1A	9.0	31	5.5
O2B	8.8	30	5.6
O7D	9.0	30	5.4
O12E	1.1	4	0.8
O14D	0.4	1	0.3
O15G	7.3	25	4.4
O18D	1.4	5	1.0
O20H	6.5	23	4.0
O22I	1.3	5	0.8
O24J	3.9	15	2.6
O28K	0.9	3	0.5
O38R	1.3	5	0.9

2.3 Debris Production

The debris production for the offsite watersheds tributary to the proposed debris basins was calculated following LACSM procedures, considering mapped debris production (DPA) zones. Debris production calculations are included in **Appendix H** and described below. Additionally, **Exhibit 8** shows the debris production zones for the proposed watersheds. Proposed conditions watersheds C through G are entirely within DPA zone 3, while proposed conditions watersheds A, B, and J span both DPA zones 3 and 5. Different equations were utilized to calculate debris production and bulking factor in these two scenarios. Debris production rates and bulking factors were determined using nomographs in Appendix B-2 of the LACSM for the Santa Clara Basin.

2.3.1 *Single DPA Zone Equations*

Watersheds C, E, F, and G are entirely within debris production zone 3, and contain both undeveloped and developed areas. Accordingly, debris production for these watersheds were calculated using Equation 3.3.3 for partially developed watersheds in the LACSM:

$$DP = DPR_{(A)} \times A_u \left(\frac{A_u}{A}\right) + DPR_{(A_u)} \times A_u \left(\frac{A_d}{A}\right)$$

Where:
DP = Debris production in yd^3
DPR$_{(A)}$ = Debris production rate based on total drainage area, A, in yd^3/mi^2
DPR$_{(Au)}$ = Debris production rate based on total undeveloped drainage area, A$_u$, in yd^3/mi^2
A = Total drainage area in mi^2
A$_u$ = Total undeveloped area in mi^2
A$_d$ = Total developed area in mi^2

2.3.2 *Multiple DPA Zone Equations*

The existing c proposed watersheds A, B, and J are partially developed and within both debris production zones 3 and 5. Accordingly, debris production for these watersheds were calculated using Equation 3.3.5 in the LACSM.

$$\begin{aligned} DP = DPR_{3(A_3+A_5)} \times (A_3 - A_{d_3})\left(\frac{A_3 - A_{d_3}}{A_3 + A_5}\right) + DPR_{3(A_3-A_{d_3})} \times (A_3 - A_{d_3})\left(\frac{A_5 + A_{d_3}}{A_3 + A_5}\right) + DPR_{5(A_3+A_5)} \\ \times (A_5 - A_{d_5})\left(\frac{A_5 - A_{d_5}}{A_3 + A_5}\right) + DPR_{5\left(A_5-A_{d_5}\right)} \times (A_5 - A_{d_5})\left(\frac{A_3 + A_{d_5}}{A_3 + A_5}\right) \end{aligned}$$

Where:
DPR$_{i(Ai)}$ = Debris production rate for drainage area A$_i$ in DPA Zone i in yd^3/mi^2
A$_i$ = Total drainage area in DPA Zone i
A$_{di}$ = Developed area in area A$_i$ in mi^2

2.3.3 *Debris Production and Bulking Factor Results*

The results of the debris production calculations are included in **Table 2-3**. These debris production results were considered in the hydraulic model, as discussed in **Section 4.**

Table 2-3: Debris Production and Bulking Factor Results

Watershed	Debris Production (CY)	Debris Production (AF)
A	17,358	10.8
B	63,860	39.6
C	2,416	1.5
E	402	0.2
F	1,407	0.9
G	579	0.4
J	864	0.5

3 Drainage System Design

3.1 Debris Basins

The two regional debris Basins, Basins A and B, were designed to contain the calculated debris load (see **Section 2.3**), with 2 ft of freeboard between the debris elevation at the downstream end of the basin and the spillway elevation. The debris extents and elevations for these basins were determined assuming a sloped debris cone, with the slope equal to half of the incoming slope of the watershed (1.9% and 1.3% for Basins A and B respectively). The smaller debris basins with elevated inlets, Basins C through J, were designed with 1 ft of freeboard between the spillway and the top of debris elevation, assuming a flat debris cone. Each basin's spillway leads to a 36-inch or larger outlet pipe. **Table 3-1** summarizes the design of each debris basin, including volumes and key elevations. Basin contours are shown on United Civil plans in **Appendix I**.

Table 3-1: Debris Basin Design Summary

Basin	Basin Invert Elevation (ft)	Basin Top Elevation (ft)	Basin Volume[1] (AF)	Debris Load (AF)	Debris Elevation (ft)	Spillway Elevation (ft)	Spillway Crest Length (ft)
A	1350.0	1365.0	34.1	10.8	1353.45[2]	1355.45	18.4
B	1350.0	1375.0	76.9	39.6	1365.40[2]	1367.40	115.3
C	1340.0	1355.0	11.4	1.5	1345.00	1346.00	16.0
E	1370.0	1375.5	01.0	0.2	1371.94	1372.94	16.0
F	1357.5	1365.5	2.1	0.9	1361.90	1362.90	16.0
G	1365.5	1370.0	1.3	0.4	1366.01	1367.01	16.0
J	1336.0	1336.0	1.9	0.5	1332.09	1333.09	16.0

Notes:

1. *Volume to top of basin.*
2. *Debris cone elevation at basin's spillway.*

In addition to the basin spillways, regional debris Basins A and B include outlet towers. The outlet towers are reinforced concrete structures with rectangular openings surrounding the tower. Following the LACFCD Debris Dams and Basins manual, 18 openings surround the circumference of the tower, with each opening 24-inches long by 4-inches wide. The openings at the base of the tower, also referred to as the first row of openings, are only 12-inches long by 4-inches wide. Each row of openings are 6-inches apart. The height of the outlet towers was designed so that the openings extend at least 1 ft above the debris elevation. These outlet towers feature circular orifices at the base of the tower, which were designed to control the flow through the outlet. **Table 3-2** summarizes the design of the outlet towers. A standard detail for these towers, taken from the LACFCD Debris Dams and Basins manual is included in **Appendix J**.

Table 3-2: Summary of Basin Outlet Tower Design

Basin	Tower Invert Elevation (ft)	Debris Elevation at Tower (ft)	Tower Top Elevation (ft)	No. of Rows of Openings[1] (cfs)	Orifice Diameter (in)
A	1350.0	1354.0	1356.5	3	44
B	1350.0	1366.5	1369.0	8	35

Notes:

1. *The first row of openings are 12-inches tall, whereas all other openings are 24-inches tall. Each row of openings is separated by 6-inches.*

The smaller debris basins also include low flow towers, with standard details shown in **Appendix J**. These low-flow towers are excluded from the hydraulic analysis to be conservative.

3.2 Storm Drain Lines

The design consists of four main storm drains that convey flow from the offsite watersheds, as well as onsite flow, to the Caltrans culvert beneath the I-5. Storm Drains M, N, and S are situated along the perimeter road, which runs along the west and north boundary of the project site. Storm Drain O conveys flow through the project site, until it outlets to Storm Drain M, approximately 434-ft upstream of the Caltrans culvert. These storm drain lines are summarized in **Table 3-3**.

Table 3-3: Summary of Proposed Storm Drain Lines

Storm Drain	Diameter (in)	Length (ft)	Slope	Sources of Inflow[1]
M	96	2,998	2.2% to 3.2%	• Basins A, B, G, and F spillways • Offsite watersheds D, H, and I • Onsite subareas 2B, 3C, 5B, 6B, 35O, 37Q, and 38R • Flow from Storm Drain O
N	42	1,714	2.9% to 3.7%	• Basin A outlet tower • Basin J spillway
S	48	3,130	1.6 % to 2.9%	• Basin B outlet tower • Onsite subareas 1A, 24J, 25J, 26J, 28K, and 36P
O	48	1,454	2.2%	• Basins C and E • Onsite subareas 7D, 8D, 12E, 14D, 15G, 16G, 18D, 20H, 22I

3.3 Junction with Caltrans Culvert

The proposed storm drains M, N, and S, described above, terminate at a proposed junction with the existing Caltrans culvert beneath the I-5. The existing Caltrans culvert is a double 8' x 8' RCB, with as-built plans included in **Appendix K**. The proposed junction structure is shown on the United Civil, Inc. plans in **Appendix I** and on **Figure 3-1** below. The proposed storm drain lines tie into the Caltrans culvert at a 44-degree angle, approximately 57-ft to 87-ft downstream of the culvert entrance. The location of the junction was selected to minimize the angle of the junction, while avoiding modifications to the culvert beneath the I-5 freeway. At the proposed storm drain outlets, the invert of the proposed storm drains is set equal the invert of the Caltrans culvert. The Caltrans culvert will be modified to include an opening between the two 8'x8' barrels at the location of the junction, to allow flow to equalize between both barrels.

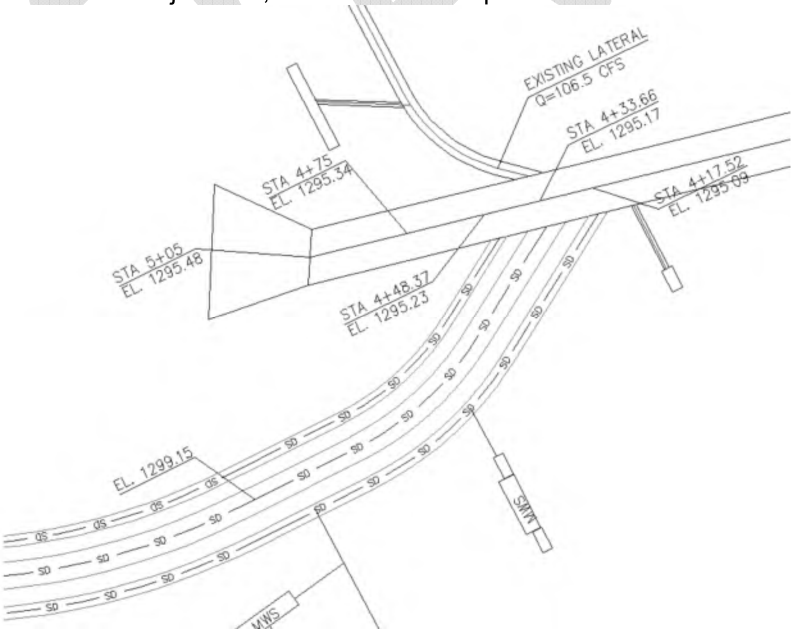

Figure 3-1: Schematic of Junction with Caltrans Culvert

4 Hydraulic Modeling

PACE completed hydraulic modeling of both the existing conditions within Lyons Canyon Creek and the proposed regional drainage system for floodplain mapping and water surface elevation determination. Since the area is mapped as Zone A, there is no effective model for Lyons Canyon Creek. The XPSWMM modeling software was utilized for hydraulic modeling, because it can model both natural reaches, as well as structures, including basins and storm drains. The following sections describe the XPSWMM model set up. The XPSWMM models extend to the upstream ends of the proposed debris basins to approximately 100 ft downstream of the existing culvert beneath the I-5.

4.1 Existing Conditions XPSWMM Model

4.1.1 River Geometry

The existing conditions floodplain within the project site was modeled using three river reaches: Lyons Canyon tributary reach and Lyons Canyon Creek upstream and downstream of the junction with the tributary. The model extents approximately 3,400-ft along Lyons Canyon Creek upstream of the junction with the Caltrans Culvert, and approximately 1,300 ft of the tributary reach is modeled.

XPSWMM model software uses a node-link scheme for hydraulic modeling, and river nodes/links were used to define geometry. River links model the creek using constant cross-section geometry along each link, sloped using specified upstream invert elevations, downstream invert elevations, and reach lengths. Cross-section geometry was obtained at the upstream end of each link, as shown in **Exhibit 9**. Cross-section geometry was cut from LA County 2015-2016 LiDAR data, which has a 1.5-ft resolution, a vertical datum of NAVD88 ft, and is in NAD83 California Zone 5 (ft US).

Manning’s roughness values were determined based on aerial imagery of the channel. A roughness value of 0.04 was set within the channel, which is primarily earthen with some grass/weeds. A roughness value of 0.06 was used to model the overbanks, which feature shrubs and weeds.

4.1.2 Caltrans Culvert

The XPSWMM model extends downstream of the Caltrans culvert beneath the I-5. The Caltrans culvert is a double 8’x8’ reinforced concrete box (RCB). The culvert geometry, including length and invert elevation was obtained from as-built drawings provided in **Appendix K**. Note that the as-built drawings are in the National Geodetic Vertical Datum of 1929 (NGVD29). These elevations were converted to NAVD88 using a conversion factor of 3.05 ft. This shift in elevations was obtained at the culvert location from the National Oceanic and Atmospheric Administration (NOAA) National Geodetic Survey Coordination Conversion and Transformation Tool (NCAT). The culvert was modeled with a manning’s roughness of 0.015, and an entrance loss of 0.04, reflecting the inlet with wingwalls. The culvert was modeled with multiple links, with nodes at junctions and grade breaks within the culvert.

The culvert outlet, and a 94-ft reach of the Lyon Canyon Channel downstream of the culvert were also modeled in XPSWMM. Geometry for the outlet and tailwater channel was obtained from the culvert as-built drawings. The culvert outlet is a concrete trapezoidal channel with a 20-ft bottom width and 1.5:1 side slopes and was modeled with a manning’s roughness of 0.015. The Lyon Canyon channel is a trapezoidal channel with a 20-ft bottom width and 2:1 side slopes. While the channel is concrete, aerial imagery showed some soil and vegetation within the channel, thus a roughness of 0.040 was used to represent the channel.

4.1.3 Model Inflow

100-year inflow hydrographs, discussed in **Section 2**, were used as model inflow. Flow from Watersheds EX-1A and EX-2A were input at the upstream ends of the Lyons Canyon Creek upstream reach and the Lyons Canyon tributary reach, respectively. Flow from Watersheds EX-3A, which is tributary to the Caltrans culvert, was input at the cross-section immediately upstream of the culvert, “Node_1000”.

In addition to the hydrographs calculated in **Section 2**, the Caltrans culvert receives flow from a lateral that runs along Sagecrest Circle and ties in with the culvert along the Old Road. According to as-built drawings for this lateral, included in **Appendix K**, the peak flow rate is 106.5 cfs at the junction with the culvert. Thus, a constant inflow of 106.5 cfs was input to the Caltrans culvert at the M_Outlet node, which is approximated located at the junction with the lateral.

4.1.4 Model Outfall

The model terminates within the Lyon Canyon Channel downstream of the Caltrans culvert beneath the I-5, with a free outfall with a normal depth boundary condition.

4.2 Proposed Conditions XPSWMM Model

PACE created an XPSWMM hydraulic model of the two regional debris basins, basin overflow weirs, basin outlet towers, pipe network, existing Caltrans culvert beneath the I-5, and proposed junction with the culvert. This model was used to analyze the performance of the debris basins and the pipe network during the 100-year flood event. A workmap showing the model elements is included in **Exhibit 10**. A copy of this XPSWMM model is included with this application.

4.2.1 Debris Basins

The XPSWMM model consists of links and nodes. Debris basins were modeled as storage nodes, with user-input stage-area curves. Stage-area curves were obtained from basin grading plans developed by United Civil, Inc. The stage-area curves were then adjusted to remove storage area taken up by the debris load. For Basins C through J, the debris cone was assumed to be flat, so the storage area below the debris elevation was set to 0 in XPSWMM. For Basins A and B, sloped debris cones were used to determine the available storage area above the debris. Please see **Section 3.1**Error! Reference source not found. for further discussion of debris extents.

Stage-area curves for the basins are included in **Table 4-1**, where depth is the depth above the basin invert, total area is the basin area when empty of debris, and area considering debris is the available storage area above the debris load. The depth vs. area considering debris values were input into XPSWMM as the stage-area curves for flood routing. XPSWMM uses these stage-area curves to calculate storage volume for each water surface elevation within the basin. Stage-area and volume curves are also included in **Appendix L**.

Table 4-1: Basin Stage-Area Curves

Elevation (ft)	Depth[1] (ft)	Total Area (ac)	Area Considering Debris[2] (ac)
		Basin A	
1350.00	0.00	0.670	0.000
1353.45	3.45	1.368	0.000
1354.00	4.00	1.479	0.133
1355.00	5.00	1.681	0.514
1360.00	10.00	2.731	2.213
1365.00	15.00	4.125	4.068
		Basin B	
1350.00	0.00	0.826	0.000
1355.00	5.00	1.292	0.000
1360.00	10.00	1.843	0.000
1365.00	15.00	3.070	0.000
1365.40	15.40	3.286	0.000
1366.00	16.00	3.609	0.484
1367.00	17.00	4.147	1.307
1368.00	18.00	4.685	2.131
1370.00	20.00	5.437	3.848
1372.00	22.00	6.019	5.646
1375.00	25.00	6.700	6.700
		Basin C	
1340.00	0.00	0.052	0.000

Elevation (ft)	Depth[1] (ft)	Total Area (ac)	Area Considering Debris[2] (ac)
1344.99	4.99	0.548	0.000
1345.00	5.00	0.548	0.547
1350.00	10.00	0.966	0.966
1355.00	15.00	1.463	1.463
Basin E			
1370.00	0.00	0.103	0.000
1371.93	1.93	0.154	0.000
1371.94	1.94	0.154	0.154
1375.00	5.00	0.234	0.234
1375.50	5.50	0.248	0.248
Basin F			
1357.50	0.00	0.137	0.000
1358.00	0.50	0.149	0.000
1360.00	2.50	0.202	0.000
1361.89	4.39	0.269	0.000
1361.90	4.40	0.269	0.269
1365.00	7.50	0.379	0.379
1365.50	8.00	0.409	0.409
Basin G			
1363.00	0.00	0.082	0.000
1365.00	2.00	0.130	0.000
1366.00	3.00	0.163	0.000
1366.01	3.01	0.163	0.163
1370.00	7.00	0.295	0.295
Basin J			
1325.50	0.00	0.000	0.000
1330.00	4.50	0.105	0.000
1332.00	6.50	0.182	0.000
1332.08	6.58	0.188	0.000
1332.09	6.59	0.188	0.188
1335.00	9.50	0.403	0.403
1336.00	10.50	0.491	0.491

Notes:

1. *Depth above basin invert, which is the x-variable in XPSWMM user-input stage-area curves for storage nodes.*
2. *Available area for flood storage, which is the y-variable in the XPSWMM user-input stage-area curves for storage nodes. This available area does not include area within the basin that is taken up by debris.*

4.2.2 Basin Outlets

Basin spillways were modeled as weirs with multi-links, which connect the basins to the storm drains. Weir coefficients were set to 2.8, following LACFCD Debris Dams and Basin Design Manual. A summary of the elevation and widths of the basin spillways modeled in XPSWMM is included in **Table 3-1** in **Section 3**.

In addition to the spillways, Basins A and B also feature outlet towers, as discussed in **Section 3**. Flow through these towers is governed by an orifice at its base, thus, the towers are represented within the model with circular orifices at the basin invert elevations. The orifice elevations and diameters input into XPSWMM are summarized in **Table 3-2** in **Section 3.**

Basins C through J also feature low flow outlets (towers) to drain residual water and to pass clear small event runoff that enters the basins. These low flow outlets are not modelled in XPSWMM. Disregarding these low flow outlets provides more conservative estimates of water surface elevations within the basins.

4.2.3 Storm Drain Network

The storm drain network, which conveys outflow from the basins to the existing culvert under I-5 was modeled in XPSWMM using links with circular conduits. Each pipe segment with a constant slope and diameter was modeled as a link. Nodes are used to connect links, and are located at grade breaks, at transitions in diameter, and at junctions.

The storm drain network modeled in XPSWMM consists of four main lines:

- Storm Drain M: 96-inch main line down the center of the perimeter road, which receives inflow from Basins A, B, G, and F spillways, several onsite subareas, and the small, offsite Watersheds D, H, and I.
- Storm Drain N: 42-inch storm drain that runs along the perimeter road, north of Storm Drain M. This storm drain receives inflow from the Basin A outlet tower and Basin J spillway.
- Storm Drain S: 48-inch storm drain that runs along the perimeter road, south of Storm Drain M. This storm drain receives inflow from the Basin B outlet tower, onsite subarea 1A, onsite subarea 28K, and onsite subarea 36P.
- Storm Drain O: 48-inch storm drain that runs through the proposed development, conveying flow from Basins C and E to Storm Drain M. This storm drain also receives inflow from several onsite subareas.

The proposed storm drains were modeled with a Manning's roughness of 0.013. Entrance loss coefficients of 0.5 were applied at the upstream end of each storm drain, which are connected to the basin spillways or outlet towers. The remaining pipe segments were modeled with entrance loss coefficients of 0.05 to represent manhole losses.

4.2.4 Caltrans Culvert

Similar to the existing XPSWMM model, the proposed model extends downstream of the Caltrans culvert beneath the I-5. The Caltrans culvert, culvert outlet, and downstream Lyons Canyon Channel were modeled using the same geometry as in the existing conditions model, discussed in **Section 4.1**. In the proposed condition, proposed storm drains M, N, and S tie into the culvert, as discussed in **Section 3.3**. These storm drains are modeled to tie in at nodes along the culvert, which represent the junctions. The elevations of the nodes and storm drains were set to match the culvert elevation at the junction. The culvert elevations at the junction were linearly interpolated using upstream and downstream culvert elevations from the culvert as-built drawings. Additionally, a storage node was input at the upstream end of the culvert to model ponding in the area upstream of the culvert, due to backwater. The stage-area curve for this storage node was obtained from the 2015-2016 LiDAR data.

4.2.5 Model Inflow

Model inflow includes inflow from offsite and onsite watersheds, discussed in **Section 2.** 100-year inflow to the proposed XPSWMM model is summarized below:

- Hydrographs from Watersheds A, B, C, E, F, and G were input into their respective basins
- Hydrographs from watersheds D, H, and I were input at the upstream inlet along Storm Drain M within each watershed. XPSWMM nodes were named accordingly (i.e. WS_D_Jn, WS_H_Jn, and WS_I_Jn).
- Inflow hydrograph from Watershed K was input at the upstream end of the I-5 culvert.
- Inflow hydrographs from onsite watersheds were input into the main storm drain lines (M, S, O) at each watershed's outlet. XPSWMM nodes were named after the onsite subareas.
- Similar to the existing model, a constant inflow of 106.5 cfs was input into the Caltrans culvert at the M_Outlet node, representing flow from a lateral that runs along Sagecrest Circle.

4.2.6 Model Outfall

The model terminates within the Lyon Canyon Channel downstream of the Caltrans culvert beneath the I-5. The XPSWMM model uses same downstream boundary condition as the existing model: a free outfall with a normal depth boundary condition.

5 Hydraulic Modeling Results

5.1 Existing Conditions Hydraulic Results

The existing conditions hydraulic results for Lyons Canyon Creek and Lyons Canyon tributary are included in **Table 5-1** and **Table 5-2**, respectively. The results indicate that water surface elevations range from approximately 1307.7 ft to 1367.4 ft within Lyons Canyon Creek. Within Lyons Canyon tributary, water surface elevations range from 1335.5 ft to 1364.4 ft. These water surface elevations are mapped along with the existing conditions floodplain in **Exhibit 11**.

Table 5-1: Lyons Canyon Creek Existing Conditions Results

River Station	Water Surface Elevation (ft)	Peak Flow (cfs)	Peak Velocity (ft/s)
4314	1367.4	1145.3	5.6
4313	1370.6	1148.9	4.7
3965	1359.0	1139.8	13.1
3800	1353.3	1139.3	10.7
3600	1347.0	1136.7	4.2
3400	1343.7	1132.7	5.8
3200	1340.8	1127.2	3.7
3000	1336.7	1126.4	3.4
2877	1334.8	1125.2	6.8
2646	1330.5	1099.6	2.7
2389	1329.5	1193.5	4.7
2200	1326.9	1191.5	4.3
2000	1324.6	1189.1	4.9
1800	1322.3	1188.2	6.5
1600	1319.6	1187.2	8.9
1362	1316.6	1186.9	9.7
1200	1311.2	1186.9	9.0
1000	1307.7	1215.6	12.9

Table 5-2: Lyons Canyon Tributary Existing Conditions Results

River Station	Water Surface Elevation (ft)	Peak Flow (cfs)	Peak Velocity (ft/s)
2015	1364.4	208.3	8.4
1826	1358.5	206.4	7.1
1614	1352.6	205.4	6.6
1445	1346.7	205.3	7.0
1205	1339.4	200.6	3.1
1051	1335.5	209.4	6.2

5.1.1 *Floodplain Mapping*

The existing conditions floodplain is shown in **Exhibit 11** and on the floodplain comparison map in **Exhibit 13**. The existing conditions floodplain is generally narrower than the effective Zone A floodplain, except upstream of the junction between Lyons Canyon Creek and the Tributary.

5.2 Proposed Conditions Hydraulic Results

5.2.1 *Basin Results*

The proposed condition basin results are summarized in **Table 5-3**, including peak inflow, peak outflows, and peak water surface elevations. The results indicate that the 100-year flow is contained within the basins, and all basins have at least 2 ft of freeboard during the peak of the storm event.

Table 5-3: Proposed Basin XPSWMM Results

	Basin A	Basin B	Basin C	Basin E	Basin F	Basin G	Basin J
Peak Inflow (cfs)	206.4	1044.5	40	7.8	21.8	11.8	17.4
Peak Spillway Flow (cfs)	45.6	835.5	21.7	5.1	13.8	7.4	14.1
Peak Tower Flow (cfs)	114.4	130.6	N/A	N/A	N/A	N/A	N/A
Peak WSE (ft)	1356.4	1369.3	1346.6	1373.2	1363.4	1367.3	1333.6
Basin Top Elevation (ft)	1365	1375	1355	1375.5	1365.5	1370	1336
Freeboard (ft)	8.6	5.7	8.4	2.3	2.1	2.7	2.4

5.2.2 *Storm Drain Results*

Table 5-5 includes results for the proposed storm drains, including upstream (U/S) and downstream (D/S) invert elevations, hydraulic grade line (HGL), peak flow, and maximum velocity. It is important to note that the HGL is below the ground surface along the entire storm drain network (see **Table 5-4**).

Table 5-4: Proposed HGL vs Ground Surface Elevation Comparison

Node Name	Ground Elevation (ft)	Hydraulic Grade Line [HGL] (ft)	Difference [Ground – HGL] (ft)
U/S Pipe A	1365.0	1352.7	12.3
Pipe_A_Jn	1348.2	1335.5	12.7
Onsite_38R	1315.2	1309.8	5.4
U/S Pipe F	1365.0	1358.5	6.5
Pipe_F_Jn	1353.7	1346.3	7.4
WS_I_Jn	1346.3	1331.4	14.9
U/S Basin B	1374.0	1367.7	6.3
Onsite_2B	1345.6	1329.6	15.9
WS_D_Jn	1359.3	1354.8	4.5
U/S Basin C	1355.0	1341.0	14.0
Main_Jn	1325.7	1313.0	12.7
U/S Basin E	1375.0	1370.4	4.6
Pipe_G_Jn	1363.1	1359.7	3.4
U/S Pipe G	1370.0	1363.3	6.7
Onsite_12E	1353.5	1339.0	14.5
Onsite_7D	1352.7	1336.2	16.5
Onsite_20H	1339.5	1313.1	26.4
Onsite_22I	1326.1	1313.0	13.1
Onsite_15G	1349.6	1329.3	20.4
U/S Pipe J	1335.0	1325.9	9.1
D/S_A_Tower	1365.0	1347.7	17.3
N_GradeBreak	1315.2	1307.2	8.0
D/S_B_Tower	1370.0	1348.7	21.3
Onsite_24J	1315.2	1306.9	8.3
Pipe_J_Jn	1337.3	1322.5	14.8
Onsite_1A	1358.8	1337.6	21.2
WS_H_Jn	1352.2	1343.7	8.5
Onsite_14D	1350.1	1329.9	20.2
Onsite_18D	1340.0	1317.7	22.2
Onsite_28K	1315.0	1306.2	8.8
U/S_RCB	1312.0	1303.5	8.5
RCB_GradeBreak	1310.0	1303.5	6.5
N_Outlet	1310.6	1303.5	7.1
M_Outlet	1310.8	1303.5	7.3
S_Outlet	1311.0	1303.4	7.6

Node Name	Ground Elevation (ft)	Hydraulic Grade Line [HGL] (ft)	Difference [Ground – HGL] (ft)
D/S_RCB	1305.0	1299.4	5.6
U/S_Channel	1305.0	1299.5	5.5
Outfall	1301.2	1298.9	2.3

The hydraulic grade line in 96-inch Storm Drain M, which runs along the center of the perimeter road, varies from approximately 1367.7 ft downstream of the Basin B spillway to 1303.4 ft at the junction with the Caltrans culvert. The peak flow rates in Storm Drain M vary from 836 cfs to 896 cfs. Results are also included for the 42-inch Storm Drain N and the 48-inch Storm Drain S, which also run along the perimeter road, as well as the 48-inch onsite Storm Drain O. These storm drains exhibit lower peak flow rates and velocities than Storm Drain M. The XPSWMM model is included with this application, which contains additional pipe results and information.

Table 5-5: Proposed Storm Drain XPSWMM Results

Link	Invert Elevations (ft)		HGL (ft)		Peak Flow (cfs)	Max Velocity (fps)
	U/S	D/S	U/S	D/S		
Pipe_M1	1362.0	1355.0	1367.7	1359.7	836	22.1
Pipe_M2	1355.0	1350.1	1359.7	1354.8	840	27.0
Pipe_M3	1350.1	1341.4	1354.8	1346.3	841	27.3
Pipe_M4	1341.4	1339.0	1346.3	1343.7	846	26.4
Pipe_M5	1339.0	1330.7	1343.7	1335.5	847	27.4
Pipe_M6	1330.7	1326.5	1335.5	1331.4	850	26.5
Pipe_M7	1326.5	1324.9	1331.4	1329.6	851	26.0
Pipe_M8	1324.9	1306.0	1329.6	1313.0	860	26.7
Pipe_M9	1306.0	1299.2	1313.0	1309.8	895	21.7
Pipe_M10	1299.2	1295.2	1309.8	1303.5	896	17.8
Pipe_N1	1345.5	1320.1	1347.7	1322.5	114	18.1
Pipe_N2	1320.1	1299.2	1322.5	1307.2	127	17.2
Pipe_N3	1299.2	1295.2	1307.2	1303.5	127	13.1
Pipe_S1	1346.0	1334.6	1348.7	1337.6	130	14.9
Pipe_S2	1334.6	1299.2	1337.6	1306.9	155	15.4
Pipe_S3	1299.2	1297.1	1306.9	1306.2	167	14.5
Pipe_S4	1297.1	1295.1	1306.2	1303.4	170	13.4
Pipe_O1	1338.0	1334.7	1339.0	1336.2	30.0	11.3
Pipe_O2	1334.7	1328.2	1336.2	1329.9	60.1	14.3
Pipe_O3	1328.2	1327.5	1329.9	1329.3	61.4	12.7
Pipe_O4	1327.5	1315.9	1329.3	1317.7	83.1	15.8
Pipe_O5	1315.9	1308.4	1317.7	1313.1	87.6	15.4
Pipe_O6	1308.4	1306.7	1313.1	1313.0	108	13.1
Pipe_O7	1306.7	1306.0	1313.0	1313.0	111	10.4

5.2.3 *Caltrans Culvert Results*

XPSWMM results for the Caltrans culvert are shown in **Table 5-6**. These results indicate a proposed peak flow rate of 1262 cfs at the downstream end of the culvert, which is less than the existing peak flow rate, 1336.8 cfs. Note that these peak flow rates include the 106.5 cfs from the lateral that runs along Sagecrest circle, north of the project site. The results of the XPSWMM model also indicate that flow is contained within the Caltrans culvert, as the peak HGL values are below the ground surface.

Table 5-6: Caltrans RCB XPSWMM Results

Link	Invert Elevations (ft)		HGL (ft)		Peak Flow (cfs)	Max Velocity (fps)
	U/S	D/S	U/S	D/S		
RCB_01	1295.5	1295.3	1303.5	1303.5	6.7	0.1
RCB_02	1295.3	1295.2	1303.5	1303.5	7.7	0.1

Link	Invert Elevations (ft)		HGL (ft)		Peak Flow (cfs)	Max Velocity (fps)
	U/S	D/S	U/S	D/S		
RCB_03	1295.2	1295.2	1303.5	1303.5	130	1.2
RCB_04	1295.2	1295.1	1303.5	1303.4	1120	10.2
RCB_05	1295.1	1293.9	1303.4	1299.4	1262	10.2

5.2.4 Floodplain Mapping

The proposed conditions model indicates that all flooding within the project site is contained within the proposed debris basins and storm drains. As such, the proposed floodplain is limited to the basin ponding areas, as shown on **Exhibit 12**. **Exhibit 13** compares the proposed floodplain to the existing floodplain and effective Zone A floodplain. The proposed improvements greatly reduce flooding within the project site. **Exhibit 14** is an Annotated FIRM that shows the proposed floodplain. The upstream revision limits are the upstream ends of ponding within Basins A and B. The downstream revision limit is located at the I-5, where flooding is contained within the culvert. The proposed floodplain ties in graphically with the effective Zone A floodplain.

6 Conclusion

This report documents the concept design, hydrologic analysis, and hydraulic analysis of the Lyons Canyon regional drainage system. The design consists of two regional debris basins and five smaller debris basins (with elevated inlets) that result in new mapped limits of the floodplain. The floodplain will change from mapped as Zone A to Zone AE as a result of the detailed analysis, with base flood elevations shown.

The effective map shows a wide, semi-defined floodplain that flows through the project. In the existing condition, the floodplain is more well defined, with narrow flow paths from tributary areas joining to produce a wide floodplain in the project site that narrows as it flows to the CalTrans Culvert under the 5 Freeway. Finally, the proposed condition modeling shows that the floodplain will be contained within the 7 flood control/ debris basins, which results in a fragmented floodplain. The proposed floodplain revision limits are the upstream ends of ponding within Basins A and B, and the downstream revision limit is located at the I-5, where flooding is contained within the culvert. The proposed floodplain ties in graphically with the effective Zone A floodplain.

Based on the present application and enclosed analyses, we are requesting that FEMA provide a Conditional Letter of Map Revision for the proposed Lyons Canyon development, affecting FIRM panels 1030F and 1031G in Los Angeles County. The proposed condition 100-yr floodplain is shown on the Annotated FIRM in **Exhibit 14**.

References

Hromadka II, T. V. (1986). “Orange County Hydrology Manual.”

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United Civil, Inc. (2023). “Hydrology Report for Tract No. 83301.”

Exhibits

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Map data © OpenStreetMap contributors, Map layer by Esri

LYONS CANYON

VICINITY MAP

0 1,500 3,000 6,000
Feet

Date:
3/23/2021

Job Number:
B714

Exhibit 1

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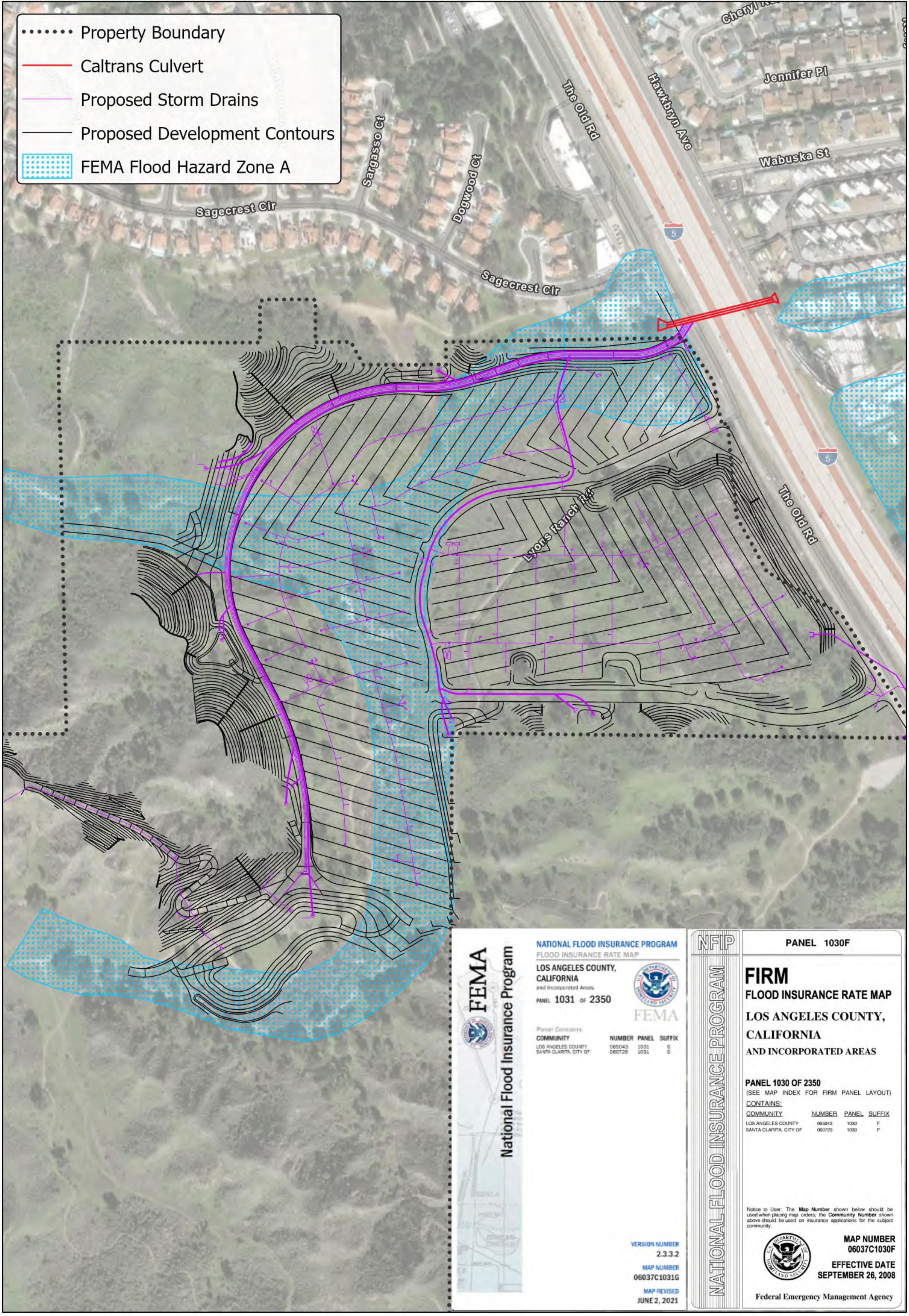

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

LOS ANGELES COUNTY,
CALIFORNIA
and Incorporated Areas

PANEL **1031** OF **2350**

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
LOS ANGELES COUNTY	065043	1031	G
SANTA CLARITA, CITY OF	060729	1031	G

VERSION NUMBER
2.3.3.2

MAP NUMBER
06037C1031G

MAP REVISED
JUNE 2, 2021

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1030F

FIRM
FLOOD INSURANCE RATE MAP

LOS ANGELES COUNTY,
CALIFORNIA
AND INCORPORATED AREAS

PANEL 1030 OF 2350
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LOS ANGELES COUNTY	065043	1030	F
SANTA CLARITA, CITY OF	060729	1030	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06037C1030F

EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency

LYONS CANYON

EFFECTIVE FIRM
WITH PROPOSED DEVELOPMENT

PACE
Advanced Water Engineering

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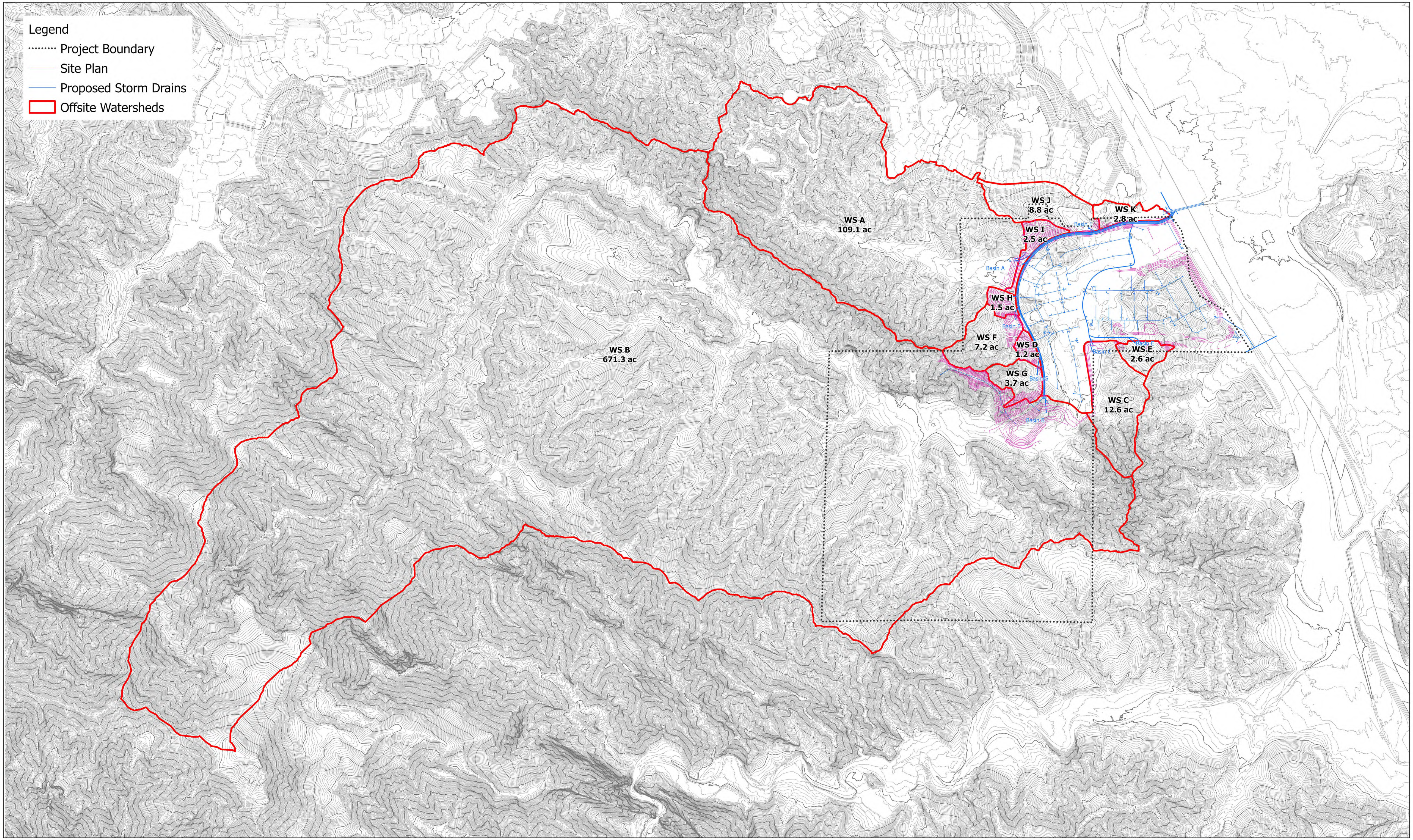
Feet

Date:
9/11/2024

Job Number:
B714

Exhibit 2



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LYONS CANYON

LYONS CANYON REGIONAL DRAINAGE SYSTEM

PACE
Advanced Water Engineering

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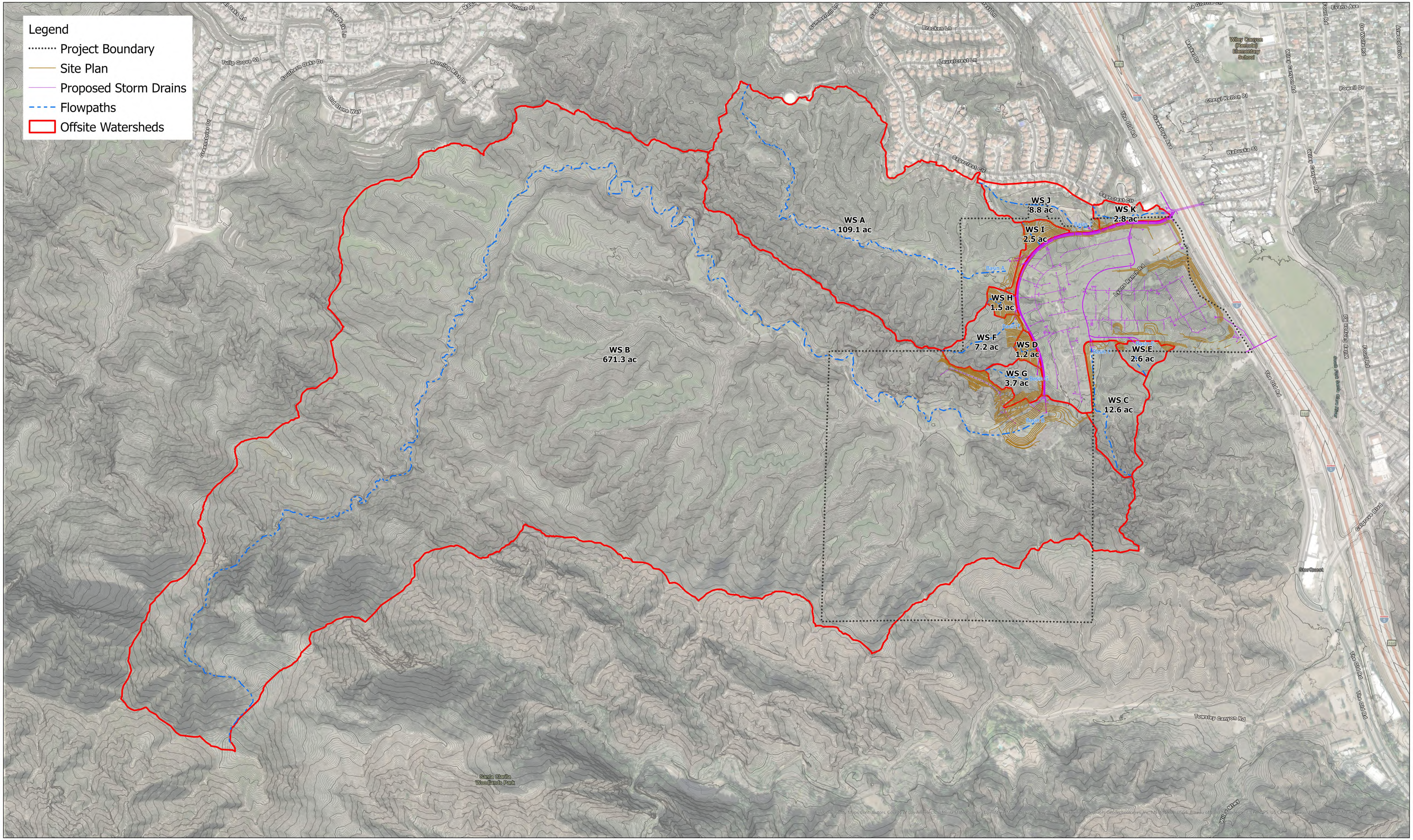
Feet

Date:
1/2/2024

Job Number:
B714

Exhibit 3



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LYONS CANYON

PROPOSED OFFSITE HYDROLOGY WORKMAP

PACE
Advanced Water Engineering

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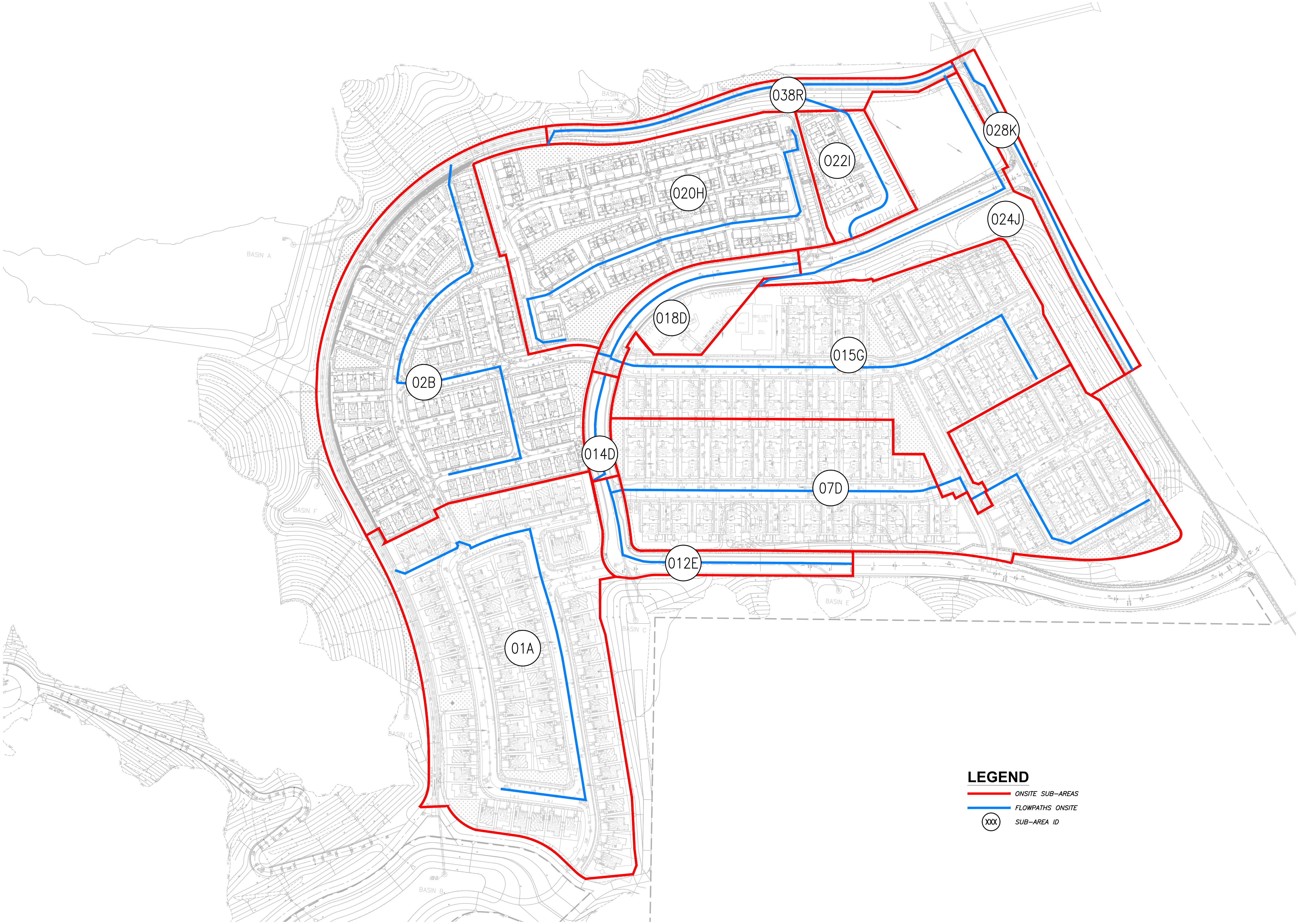
Date:
4/12/2024

Job Number:
B714

Exhibit 4



Xrefs: 2038_RG BASE UCI STUDY BASINS LATEST.dwg; Lyons SD BASE UCI.dwg; 2038_PA_1&6.dwg; 2038_PA_2.dwg; 2038_PA_3-5.dwg; 2038_RG BASE UCI STUDY BASINS LATEST.dwg; 2038_RG BASE UCI STUDY BASINS LATEST.dwg; 2038_TOPO_COMPOSITE.dwg; 2038_OAK TREE BASE.dwg; 2038_PA_3-5 Oak Redesign.dwg; Tract Map Lot Line and Boundary Block.dwg
Dimscale = 24; LTscale = 1; PSltscale = 1; ACAD Ver. = 23.0s (LMS Tech); Visretain = 1

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PREPARED BY
M.H.
PROJECT ENGINEER
R.C.E. NO. -- # XXXX
EXP. x/xx/xx

DRAWN M.T.
SCALE 1" = 100'
DESIGNED M.H.
CHECKED M.H.
DATE 04/19/2024

TITLE

PROPOSED ONSITE HYDROLOGY WORKMAP
EXHIBIT 5

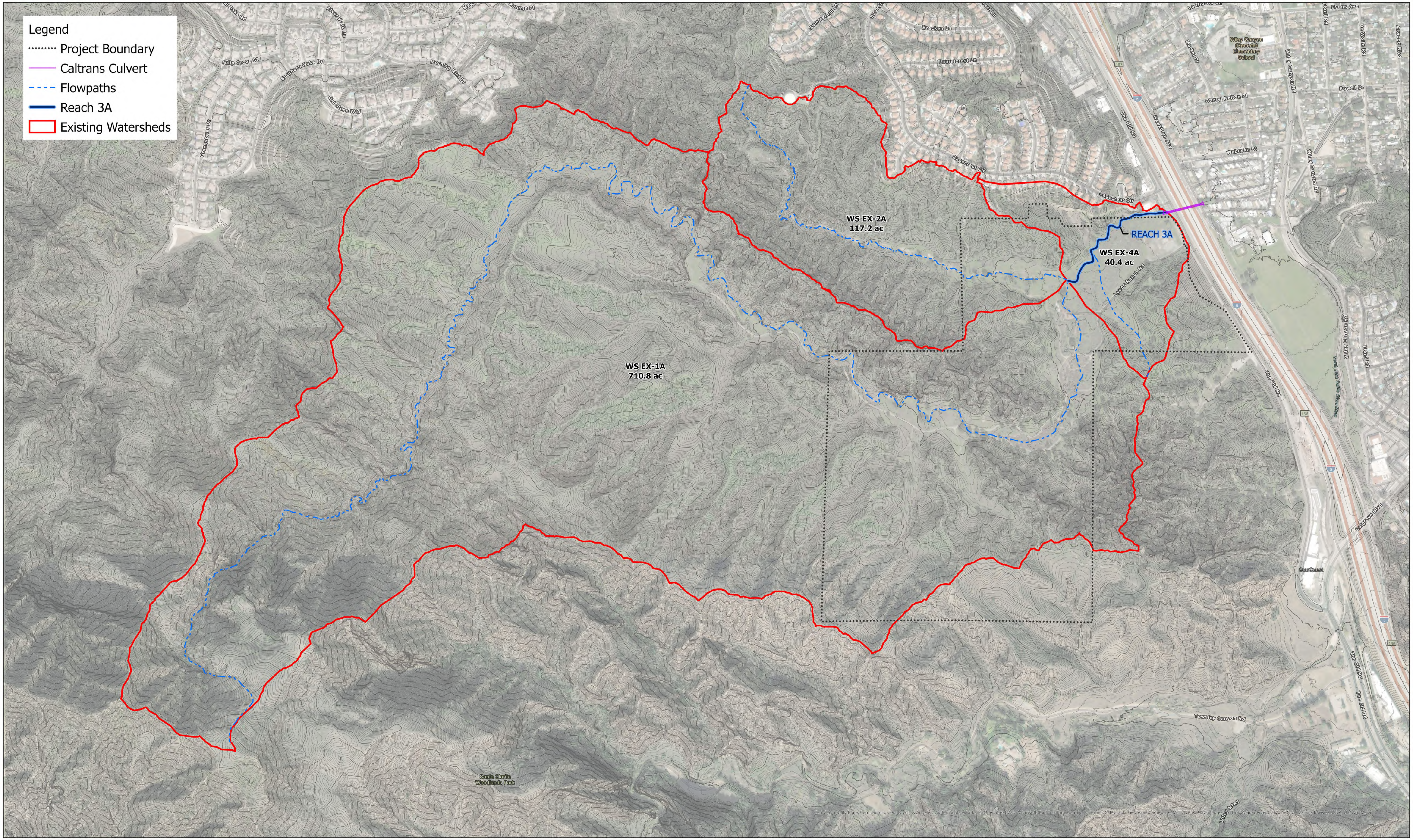
JOB B714

LYONS CANYON
HYDROLOGY MAP
STEVENSON RANCH CA

PACE
Advanced Water Engineering
17520 Newhope Street, Suite 200 | Fountain Valley, CA 92708
P: (714) 481-7300 | www.pacewater.com

SHEET
1
1 OF 1 SHEETS

JOB NO. B714



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LYONS CANYON

EXISTING HYDROLOGY WORKMAP

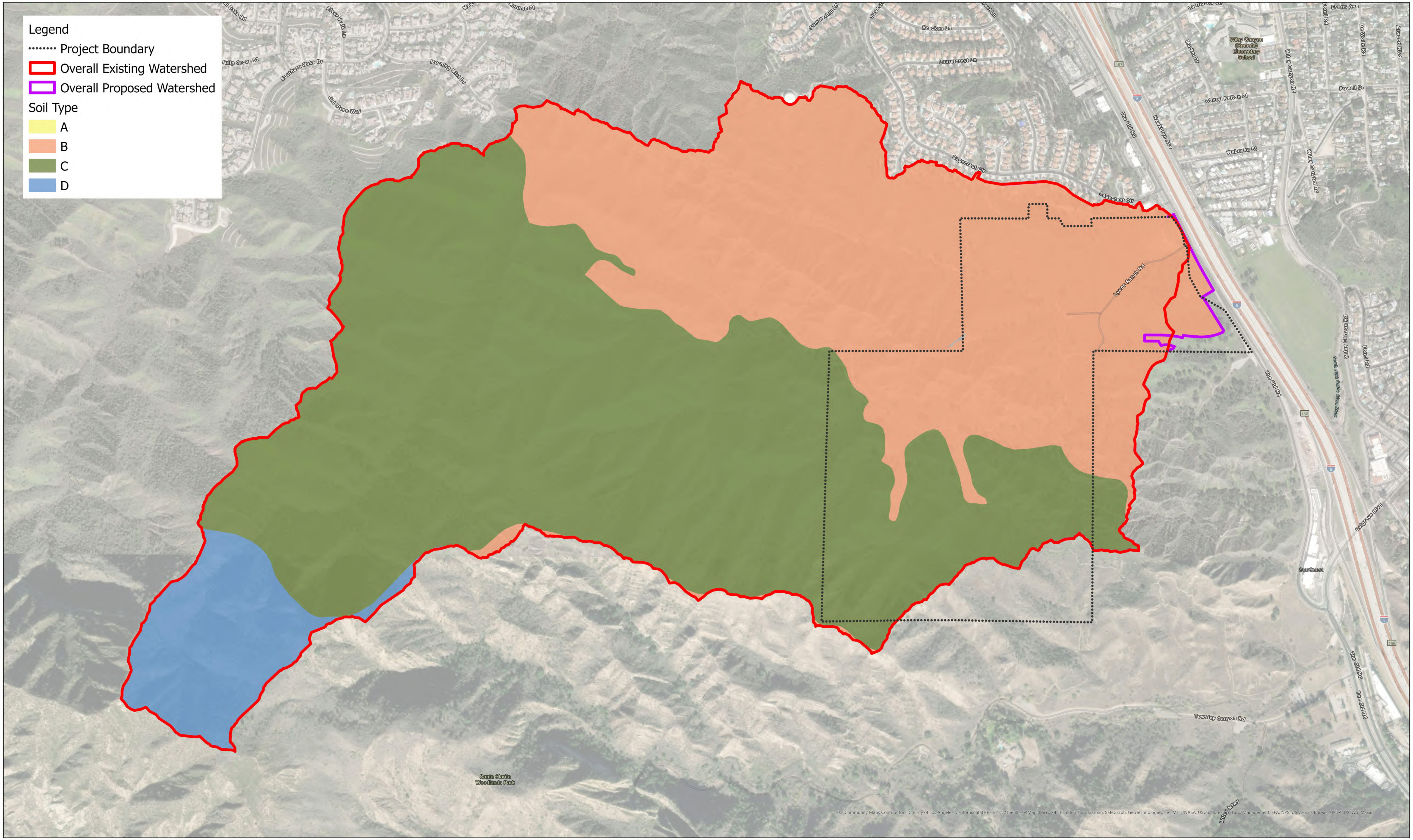
PACE
Advanced Water Engineering

0 400 800 1,600
Feet

Date:
4/12/2024

Job Number:
B714

Exhibit 6



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LYONS CANYON

SOILS MAP

PACE Advanced Water Engineering

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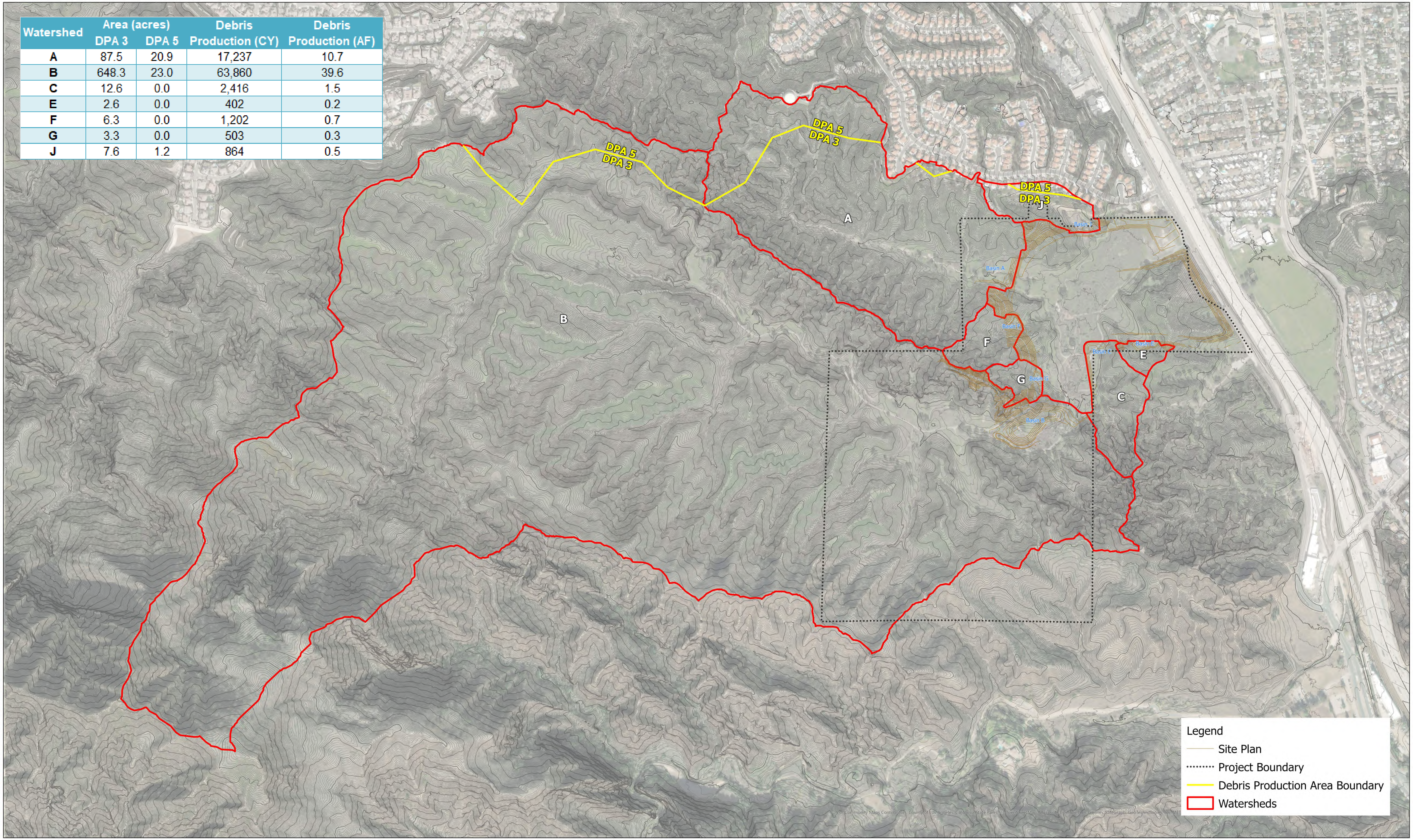
Date:
4/12/2024

Job Number:
B714

Exhibit 7



Watershed	Area (acres)		Debris Production (CY)	Debris Production (AF)
	DPA 3	DPA 5		
A	87.5	20.9	17,237	10.7
B	648.3	23.0	63,860	39.6
C	12.6	0.0	2,416	1.5
E	2.6	0.0	402	0.2
F	6.3	0.0	1,202	0.7
G	3.3	0.0	503	0.3
J	7.6	1.2	864	0.5

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LYONS CANYON

PROPOSED DEBRIS PRODUCTION

0 400 800 1,600 Feet

Date:
4/12/2024

Job Number:
B714

Exhibit 8

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LYONS CANYON

EXISTING XPSWMM HYDRAULIC WORKMAP

PACE Advanced Water Engineering

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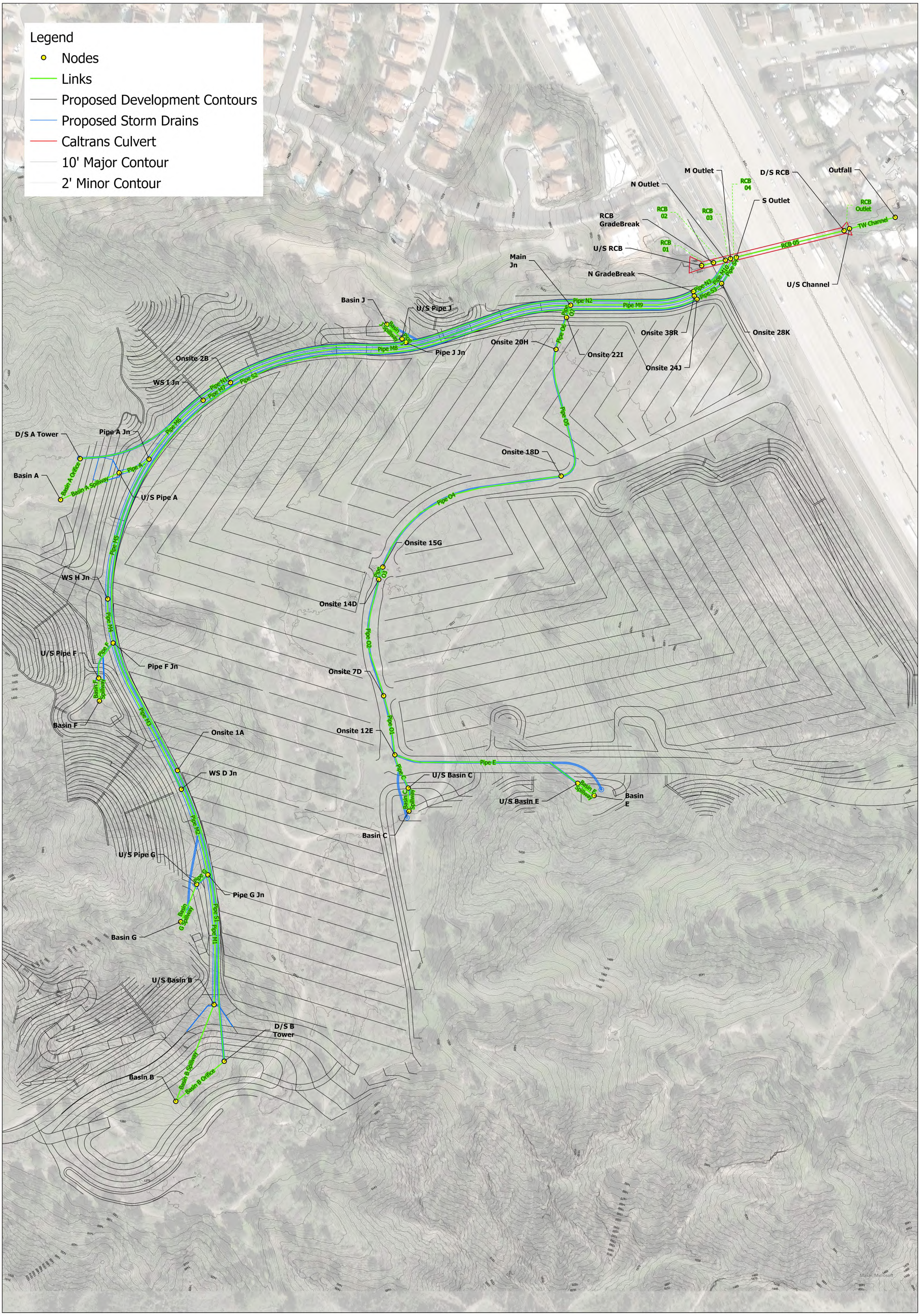
Feet

Date:
4/19/2024

Job Number:
B714

Exhibit 9



\\pacefs01_vm\swprojects\B714\6-GIS\Projects\Lyons_CLOMR\Lyons_CLOMR.aprx - Exh10_Proposed XPSWMM Workmap

LYONS CANYON

PROPOSED XPSWMM HYDRAULIC WORKMAP

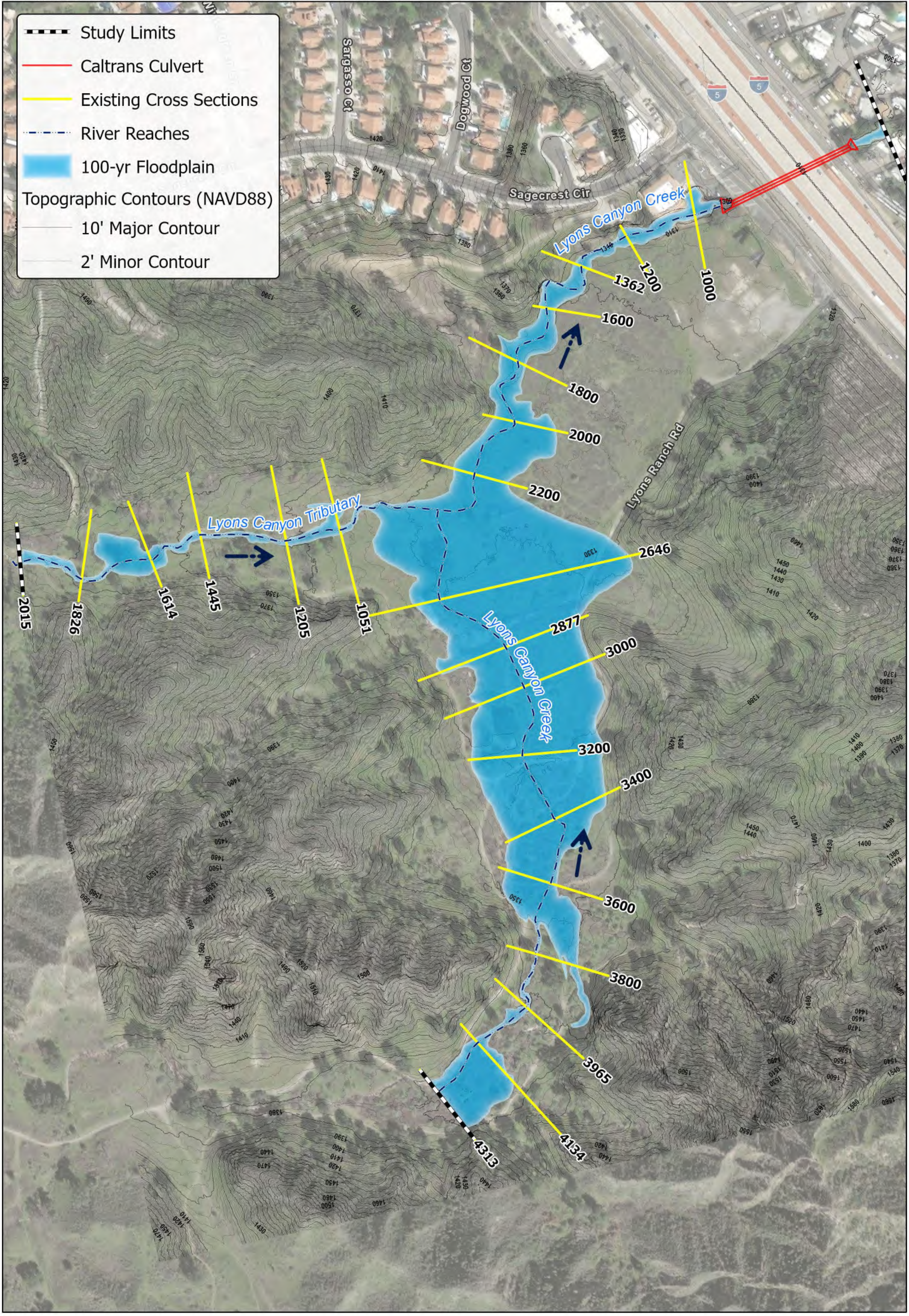
PACE
Advanced Water Engineering

0 100 200 400
Feet

Date:
4/19/2024

Job Number:
B714

Exhibit 10



LYONS CANYON

EXISTING CONDITIONS FLOODPLAIN

PACE
Advanced Water Engineering

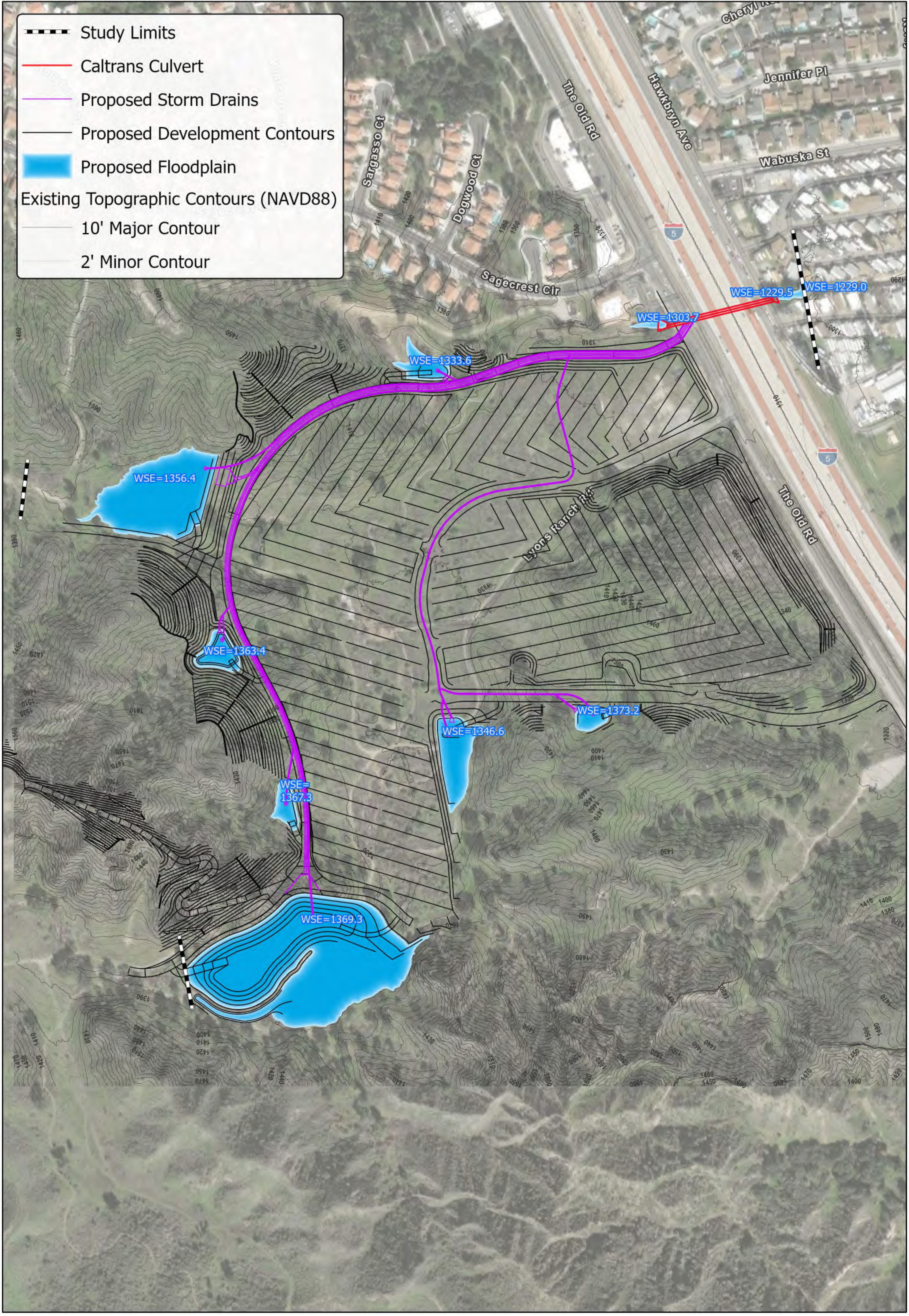
0 125 250 500 Feet

Date:
4/9/2024

Job Number:
B714

Exhibit 11

\\pacefs01_vm\swprojects\B714\6-GIS\Projects\Lyons_CLOMR\Lyons_CLOMR.aprx - Proposed Conditions Floodplain



LYONS CANYON

PROPOSED CONDITIONS FLOODPLAIN

PACE
Advanced Water Engineering

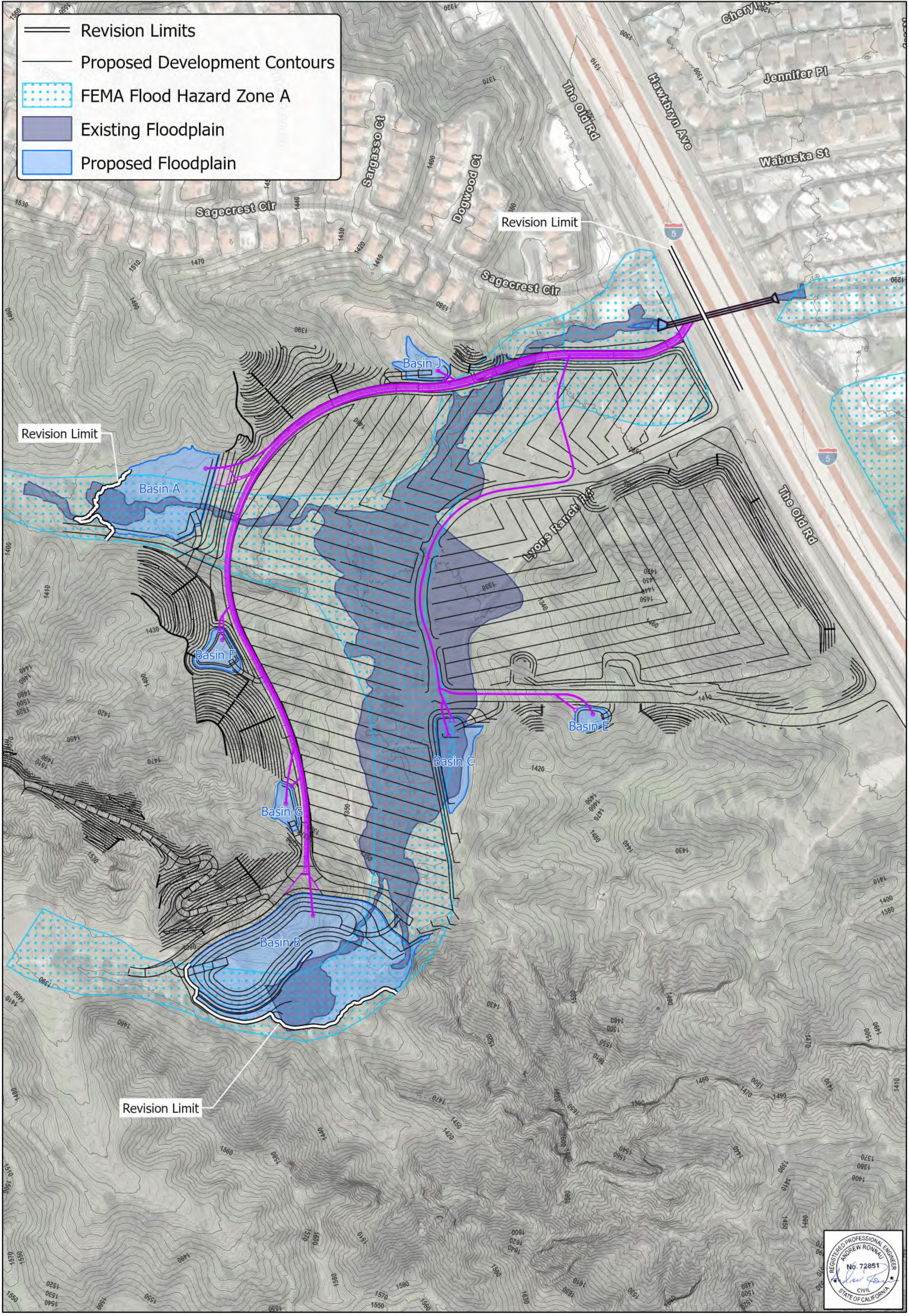
N

0 150 300 600
Feet

Date:
5/14/2024

Job Number:
B714

Exhibit 12



REGISTERED PROFESSIONAL ENGINEER
ANDREW RONNAU
No. 72851
CIVIL
STATE OF CALIFORNIA

LYONS CANYON

FLOODPLAIN COMPARISON MAP

0 150 300 600 Feet

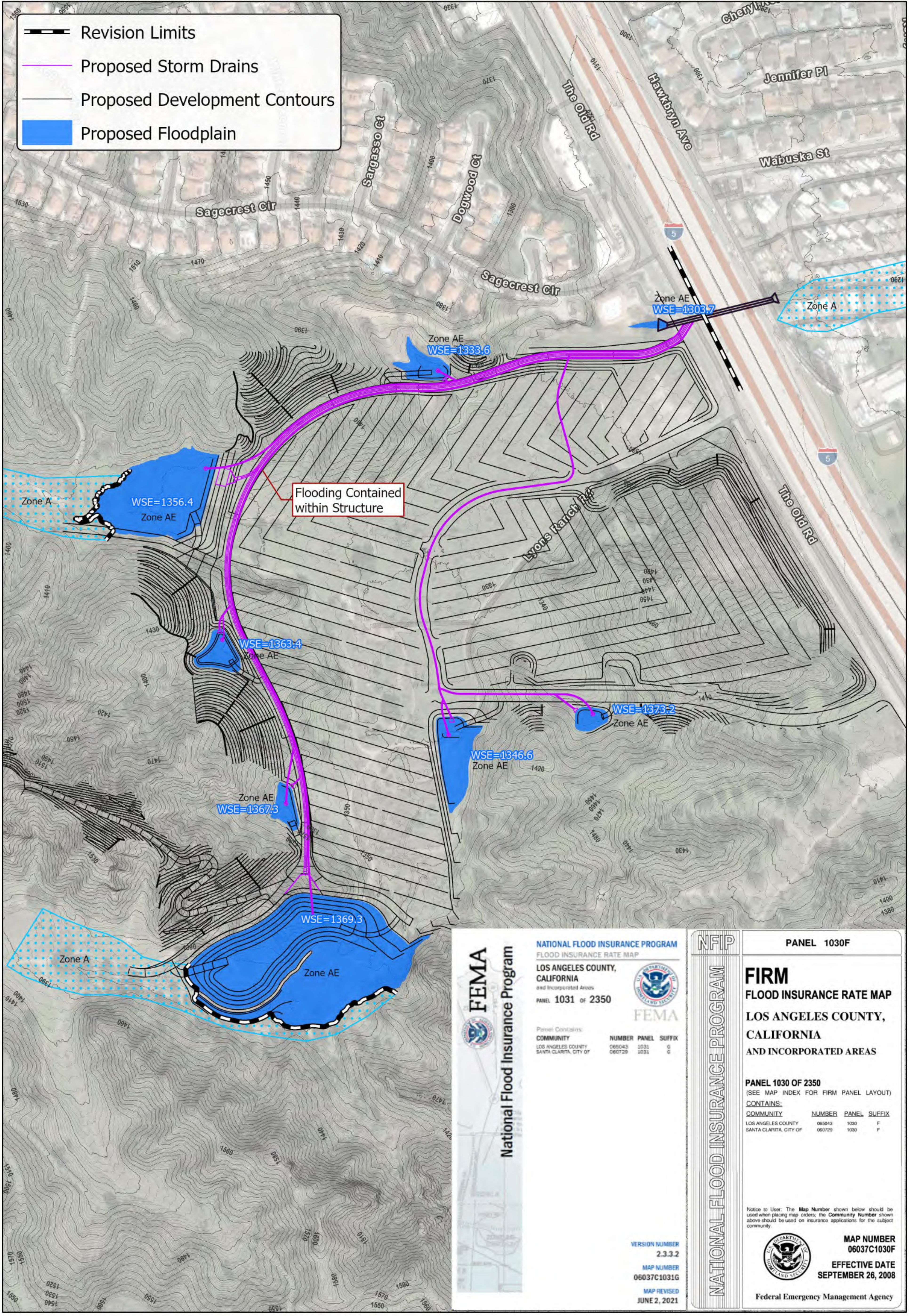
Date: 9/11/2024

Vertical Datum: NAVD88

Job Number: B714

PACE
Advanced Water Engineering

Exhibit 13



NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
LOS ANGELES COUNTY,
CALIFORNIA
and Incorporated Areas
PANEL 1031 OF 2350

FEMA
National Flood Insurance Program

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
LOS ANGELES COUNTY	065043	1031	G
SANTA CLARITA, CITY OF	060729	1031	G

VERSION NUMBER
2.3.3.2
MAP NUMBER
06037C1031G
MAP REVISED
JUNE 2, 2021

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1030F

FIRM
FLOOD INSURANCE RATE MAP
LOS ANGELES COUNTY,
CALIFORNIA
AND INCORPORATED AREAS

PANEL 1030 OF 2350
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LOS ANGELES COUNTY	065043	1030	F
SANTA CLARITA, CITY OF	060729	1030	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06037C1030F
EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency

LYONS CANYON

ANNOTATED FIRM

PACE
Advanced Water Engineering

N

0 150 300 600
Feet

Date:
9/11/2024

Job Number:
B714

Exhibit 14

Appendix A - MT-2 Forms

DEPARTMENT OF HOMELAND SECURITY

Federal Emergency Management Agency

OVERVIEW & CONCURRENCE FORM

OMB Control Number: 1660-0016
Expiration: 1/31/2024

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington, DC 20472 , Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.
PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).
ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.
DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

☒ CLOMR: A letter from DHS-FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72). All CLOMRs require documentation of compliance with the Endangered Species Act. Refer to the Instructions for details.

☐ LOMR: A letter from DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72).

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
065043	Los Angeles County	CA	06037C; 06037C;	1030F; 1031G;	09/26/2008 06/02/2021

2. a. Flooding Source: Lyons Canyon Creek

b. Types of Flooding:

☒ Riverine	☐ Coastal	☐ Shallow Flooding (e.g., Zones AO and AH)
☐ Alluvial Fan	☐ Lakes	☐ Other (Attach Description)

3. Project Name/Identifier: Trails at Lyons Canyon

4. FEMA zone designations (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

a. Effective: A

b. Revised: AE

5. Basis for Request and Type of Revision:

a. The basis for this revision request is (check all that apply)

☒ Physical Change	☒ Improved Methodology/Data	☐ Regulatory Floodway Revision	☐ Base Map Changes
☐ Coastal Analysis	☒ Hydraulic Analysis	☒ Hydrologic Analysis	☐ Corrections
☐ Weir-Dam Changes	☐ Levee Certification	☐ Alluvial Fan Analysis	☐ Natural Changes
☒ New Topographic Data	☐ Other (Attach Description)		

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following structures (check all that apply)

Structures:	☐ Channelization	☐ Levee/Floodwall	☐ Bridge/Culvert
	☐ Dam	☒ Fill	☒ Other (Attach Description) - basins, storm drains

6. ☒ Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information.

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $ 6,500

☐ No, Attach Explanation

- Please see the DHS-FEMA Web site at http://www.fema.gov/forms-documents-and-software/flood-map-related-fees for Fee Amounts and Exemptions.

D. SIGNATURES

1. REQUESTOR'S SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: Andrew Ronnau

Company: PACE

Mailing Address:

17520 Newhope St # 200
Fountain Valley, CA 92708

Daytime Telephone: (714) 481-7257

Fax No.:

E-mail Address: aronnau@pacewater.com

Date: 5/16/2024

Signature of Requestor (required):

2. COMMUNITY CONCURRENCE

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirements for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title:

Mailing Address:

Community Name:

Daytime Telephone:

Fax No.:

E-mail Address:

Community Official's Signature (required):

Date:

3. CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Andrew Ronnau
License No.: 72851
Expiration Date: 06/30/2024
Company Name: PACE
Mailing Address:
17520 Newhope St # 200
Fountain Valley, CA 92708
Telephone No.: (714) 481-7257
Fax No.:
E-mail Address: aronnau@pacewater.com
Signature:
Date:

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)	**Required if …**
☒ Riverine Hydrology and Hydraulics Form (Form 2)	New or revised discharges or water-surface elevations
☒ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans

REGISTERED PROFESSIONAL ENGINEER
ANDREW RONNAU
No. 72851
CIVIL
STATE OF CALIFORNIA

Seal (Optional)

DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency

RIVERINE HYDROLOGY & HYDRAULICS FORM (FORM 2)

OMB Control Number: 1660-0016
Expiration: 1/31/2024

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington, DC 20472 , Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.
PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).
ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.
DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

Flooding Source: Lyons Canyon Creek

Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply):

☐ Not revised (skip to section B) ☒ No existing analysis ☐ Improved data
☐ Alternative methodology ☒ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)

3. Methodology for New Hydrologic Analysis (check all that apply)

☒ Precipitation/Runoff Model → Specify Model: HEC-HMS Duration: 24-hr Rainfall Amount: 8.12 in
☐ Statistical Analysis of Gage Records
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters), and documentation to support the new analysis.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

4. HEC-RAS File Description**:

5. Impacts of Sediment Transport on Hydrology

Is the hydrology for the revised flooding source(s) affected by sediment transport? ☒ Yes ☐ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevation (ft.)	
			Effective	Proposed/Revised
Downstream Limit*	Caltrans Culvert	NA	NA	1303.7
Upstream Limit*	Multiple Limits	NA	NA	sin A 1356.3, Basin B 136

*Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

2. Hydraulic Method/Model Used: XPSWMM v2023.2

☐ Steady State ☒ Unsteady State ☒ One-Dimensional ☐ Two-Dimentional

3. Pre-Submittal Review of Hydraulic Models*

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4. HEC-RAS File Description**:

Models Submitted	Natural Run		Floodway Run		Datum
Duplicate Effective Model*	File Name:	Plan Name:	File Name:	Plan Name:	
Corrected Effective Model*	File Name:	Plan Name:	File Name:	Plan Name:	
Existing or Pre-Project Conditions Model	File Name:	Plan Name:	File Name:	Plan Name:	
Revised or Post-Project Conditions Model	File Name:	Plan Name:	File Name:	Plan Name:	
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	

* For details, refer to the corresponding section of the instructions.
**See instructions for information about modeling other then HEC-RAS.

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

A **certified topographic work map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Topographic Information: ☒ Digital Mapping (GIS/CADD) Data Submitted (preferred)

Source: LARIAC4 LA County LiDAR Data (downloaded from NOAA)

Date: 2015-2016

Vertical Datum: NAVD88

Spatial Projection: CA State Plane Zone 5

Accuracy: NVA +/- 0.63 ft (19.2 cm) at 95% confidence level

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM**, at the same scale as the original, annotated to show the boundaries of the revised 1%-and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%-and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area on revision.

☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

1. For LOMR/CLOMR requests, do Base Flood Elevations (BFEs) or Special Flood Hazard Areas (SFHAs) increase compared to the effective BFEs? ☐ Yes ☒ No

   If Yes, please attach **proof of property owner notification**. Examples of property owner notifications can be found in the MT-2 Form 2 Instructions.

2. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations**:

   - The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot compared to pre-project conditions.
   - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-project conditions.

3. Does the request involve the placement or proposed placement of fill? ☒ Yes ☐ No

   If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(A)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

4. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

   If Yes, attach **evidence of regulatory floodway revision notification**. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.

5. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA). For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see the MT-2 instructions for more detail.

DEPARTMENT OF HOMELAND SECURITY

Federal Emergency Management Agency

RIVERINE STRUCTURES FORM (FORM 3)

OMB Control Number: 1660-0016
Expiration: 1/31/2024

PAPERWORK BURDEN DISCLOSURE NOTICE

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PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.
PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).
ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.
DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

Flooding Source: Lyons Canyon Creek

Note: Fill out one form for each flooding source studied

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

Channelization:	complete Section B
Bridge/Culvert:	complete Section C
Dam:	complete Section D
Levee/Floodwall:	complete Section E
Sediment Transport:	complete Section F (if required)

Description Of Modeled Structure

1. Name of Structure: ____________

Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: ____________

Downstream Limit/Cross Section: ____________

Upstream Limit/Cross Section: ____________

2. Name of Structure: ____________

Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: ____________

Downstream Limit/Cross Section: ____________

Upstream Limit/Cross Section: ____________

3. Name of Structure: ____________

Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: ____________

Downstream Limit/Cross Section: ____________

Upstream Limit/Cross Section: ____________

NOTE: FOR MORE STRUCTURES, ATTACH ADDITIONAL PAGES AS NEEDED.

B. CHANNELIZATION

Flooding Source: ______________________________

Name of Structure: ______________________________

1. **Hydraulic Considerations**

The channel was designated to carry _________ (cfs) and/or the _________ - year flood

The design elevation in the channel is based on (check one):

☐ Subcritical flow ☐ Critical flow ☐ Supercritical flow ☐ Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

☐ Inlet to channel ☐ Outlet to channel ☐ At Drop Structures ☐ At Transitions

☐ Other locations (specify): ______________________________

2. **Channel Design Plans**

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.

3. **Accessory Structures**

The channelization includes (check one):

☐ Levees [Attach Section E (Levee/Floodwall)] ☐ Drop structures ☐ Superelevated sections ☐ Energy dissipater

☐ Transitions in cross sectional geometry ☐ Debris basin/detention basin [Attach Section D (Dam/Basin)] ☐ Weir

☐ Other (Describe): ______________________________

4. **Sediment Transport Considerations**

Are the hydraulics of the channel affected by sediment transport? ☐ Yes ☐ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

C. BRIDGE/CULVERT

Flooding Source: ______________________________

Name of Structure: ______________________________

1. This revision reflects (check one):

☐ Bridge/Culvert not modeled in the FIS

☐ Modified Bridge/Culvert previously modeled in the FIS

☐ Revised analysis of Bridge/Culvert previously modeled in the FIS

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8): __________

If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

☐ Dimensions (height, width, span, radius, length)

☐ Shape (culverts only)

☐ Material

☐ Beveling and Rounding

☐ Wink Wall Angle

☐ Skew Angle

☐ Distance between Cross Sections

☐ Erosion Protection

☐ Low Chord Elevations - Upstream and Downstream

☐ Top of Road Elevations - Upstream and Downstream

☐ Structure Invert Elevations - Upstream and Downstream

☐ Stream Invert Elevations - Upstream and Downstream

☐ Cross-Section Locations

4. Sediment Transport Considerations

Are the hydraulics of the channel affected by sediment transport? ☐ Yes ☐ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

D. DAM/BASIN

Flooding Source: Lyons Canyon Creek

Name of Structure: Lyons Canyon Basins A - J

1. This request is for (check one): ☐ Existing Dam/Basin ☒ New Dam/Basin ☐ Modification of existing Dam/Basin

2. The Dam/Basin was designed by (check one): ☐ Federal Agency ☐ State Agency ☒ Private Organization

☐ Local Government Agency Name of the Agency or Organization: Pacific Advanced Civil Engineering (PACE)

3. The Dam was permitted as (check one): ☐ Federal Dam ☐ State Dam

Provide the permit or identification number (ID) for the dam and the appropriate permitting agency or organization

Permit or ID number ________ Permitting Agency or Organization ________

a. ☐ Local Government Dam ☐ Private Dam

Provided related drawings, specification and supporting design information.

4. Does the project involve revised hydrology? ☒ Yes ☐ No

If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

Was the dam/basin designed using critical duration storm? (must account for the maximum volume of runoff)

☒ Yes, provide supporting documentation with your completed Form 2.

☐ No, provide a written explanation and justification for not using the critical duration storm.

5. Does the submittal include debris/sediment yield analysis? ☒ Yes ☐ No

If Yes, then fill out Section F (Sediment Transport). If No, then attach your explanation for why debris/sediment analysis was not considered?

6. Does the Base Flood Elevation behind the dam/basin or downstream of the dam/basin change? ☐ Yes ☒ No

If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

Stillwater Elevation Behind the Dam/Basin

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

7. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one): ☐ Upgrading of an existing levee/floodwall system ☐ A newly constructed levee/floodwall system ☐ Reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ Earthen embankment, dike, berm, etc Stationed _____ to _____

☐ Structured floodwall Stationed _____ to _____

☐ Other (describe): ________ Stationed _____ to _____

E. LEVEE/FLOODWALL (CONTINUED)

c. Structural Type (check one): ☐ Monolithic cast-in place reinforced concrete ☐ Reinforced concrete masonry block
☐ Sheet piling ☐ Other (describe): ______________________________

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?
☐ Yes ☐ No
If Yes, by which agency? ____

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers: __________
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers: __________
3. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers: __________
4. A layout detail for the embankment protection measures. Sheet Numbers: __________
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, Floodwall structure, closure structures, and pump stations. Sheet Numbers: __________

2. Freeboard

a. The minimum freeboard provided above the BFE is:

____

Riverine

3.0 feet or more at the downstream end and throughout ☐ Yes ☐ No
3.5 feet or more at the upstream end ☐ Yes ☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions ☐ Yes ☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater). ☐ Yes ☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation ☐ Yes ☐ No

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

3. Closures

a. Openings through the levee system (check one): ☐ Exists ☐ Does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data
In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

E. LEVEE/FLOODWALL (CONTINUED)

4. Embarkment Protection

a. The maximum levee slope land side is: ________________

b. The maximum levee slope flood side is: ________________

c. The range of velocities along the levee during the base flood is: ____________ (min) to ____________ (max)

d. Embankment material is protected by (describe what kind): ____________

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive Stress

Attach referrences

Reach	Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
					D_{100}	D_{50}	Thickness	
Sta ________ to ________								
Sta ________ to ________								
Sta ________ to ________								
Sta ________ to ________								
Sta ________ to ________								
Sta ________ to ________								

(Extend table on an added sheet as needed and reference each entry)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embarkment and Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: STA:_______ , height ________ ft.

☐ Limiting foundation soil strength:

Strength ϕ = _______ degrees, c = ________ psf

Slope: SS = _______ (h) to ________ (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

c. Summary of stability analysis results: ________________

E. LEVEE/FLOODWALL (CONTINUED)

5. Embarkment and Foundation Stability (continued)

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No
If Yes, describe methodology used:

e. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No
f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No
g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is _________ hours.
Attach engineering analysis to support construction plans.

6. Floodwall and Foundation Stability

a. Describe analysis submittal based on Code (check one): ☐ UBC (1988) ☐ Other (specify): _________

b. Stability analysis submitted provides for: ☐ Overturning ☐ Sliding ☐ If not, explain: _________

c. Loading included in the analyses were: ☐ Lateral earth @ P_A = _________ psf; P_p = __________ psf

☐ Surcharge-Slope @ __________, ☐ surface __________ psf

☐ Wind @ P_w = __________ psf

☐ Seepage (Uplift); _________ ☐ Earthquake @ P_{eq} = __________ %g

☐ 1%-annual-chance significant wave height: __________ ft.

☐ 1%-annual-chance significant wave period: __________ sec.

d. Summary of Stability Analysis Results: Factors of Safety.
Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)
Note: (Extend table on an added sheet as needed and reference)

E. LEVEE/FLOODWALL (CONTINUED)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin?

b. The computed settlement range is __________ ft. to __________ ft.

c. Settlement of the levee crest is determined to be primarily from : ☐ Foundation consolidation

☐ Embankment compression ☐ Other (Describe): ________________________________

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Drainage to pressure conduit: _____________ acres

Drainage to ponding area: _____________ acres

b. Relationship Established:

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: ___________ cfs

e. Which flooding conditions were analyzed?

Gravity flow (Interior Watershed)	☐ Yes	☐ No
Common storm (River Watershed)	☐ Yes	☐ No
Historical ponding probability	☐ Yes	☐ No
Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection.

☐ Yes ☐ No If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is : ___________ cfs

h. The length of levee system used to drive this seepage rate in item g: ___________ ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants: _________ For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric; are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)
Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem

Hydrocompaction ☐ is ☐ is not a problem

Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure? ☐ Yes ☐ No

d. Sediment Transport Considerations:

Was sediment transport considered? ☐ Yes ☐ No

If Yes, then fill out Section F (Sediment Transport). If No, then attach your explanation for why sediment transport was not considered.

10. Operational Plan and Criteria

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations? ☐ Yes ☐ No

c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations? ☐ Yes ☐ No

If the answer is No to any of the above, please attach supporting documentation.

E. LEVEE/FLOODWALL (CONTINUED)

11. Maintenance Plan

Please attach a copy of the fomal maintenance plan for the levee/floodwall

12. Operational and Maintenance Plan

Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

CERTIFICATION OF THE LEVEE DOCUMENTATION

This certification is to be signed and sealed by a licensed registered professional engineer authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.10(e) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: ______________ License No.: __________ Expiration Date: ______________

Company Name: Telephone No.: ______________ Fax No.: ______________

Signature: ______________ Date: __________ E-mail Address: ______________

CERTIFICATION OF THE LEVEE DOCUMENTATION

Flooding Source: Lyons Canyon Creek

Name of Structure: Lyons Canyon Basins A - J

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume __________ acres-feet

Debris load associated with the base flood discharge: Volume 53.9 acres-feet

Sediment transport rate __________ (percent concentration by volume)

Method used to estimate sediment transport: LACSM (Bulked/ Burned and Bulked flow analysis)

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition: __________

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport: __________

Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

Appendix B – FIRM Panels

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC–3, #9202
1315 East–West Highway
Silver Spring, MD 20910–3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713–3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later and from National Geospatial Intelligence Agency imagery produced at a scale of 1:4,000 from photography dated 2003 or later.

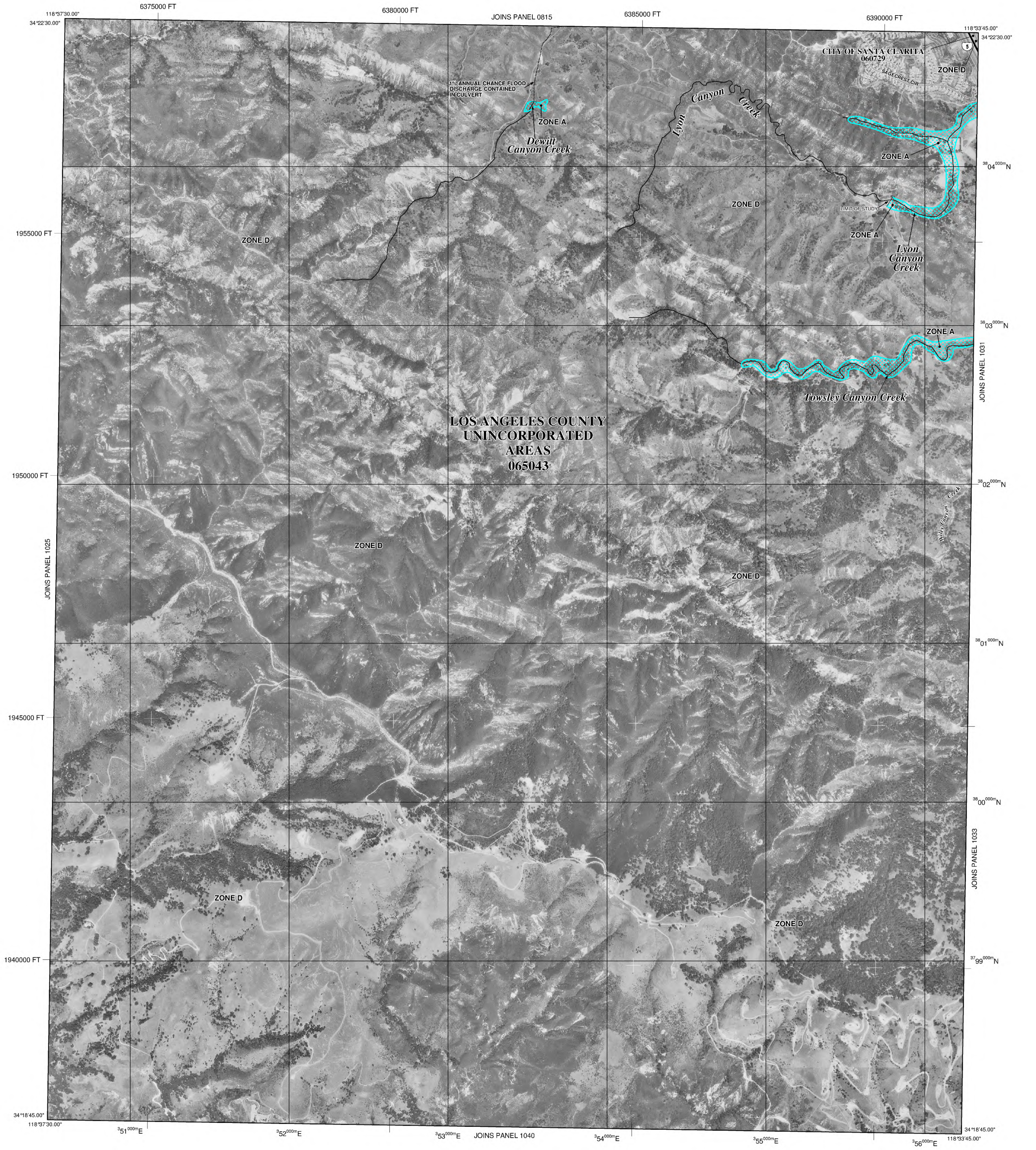
This map reflects more detailed and up–to–date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data*) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de–annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1–800–358–9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report*, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1–800–358–9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1–877–FEMA MAP** (1–877–336–2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

▨ SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

▨ FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

▨ OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

☐ OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

▨ COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

▨ OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

———	1% annual chance floodplain boundary
———	0.2% annual chance floodplain boundary
— — —	Floodway boundary
– —— —— –	Zone D boundary
●●●●●●●●	CBRS and OPA boundary
▨ ←	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
~~ 513 ~~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

Ⓐ——Ⓐ	Cross section line
㉓- - - -㉓	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
$^{42}75^{000m}$N	1000-meter Universal Transverse Mercator grid values, zone 11
6000000 FT	5000-foot grid ticks: California State Plane coordinate system, V zone (FIPSZONE 0405), Lambert Conformal Conic
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 26, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1–800–638–6620.

N

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1030F

FIRM

FLOOD INSURANCE RATE MAP

LOS ANGELES COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 1030 OF 2350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

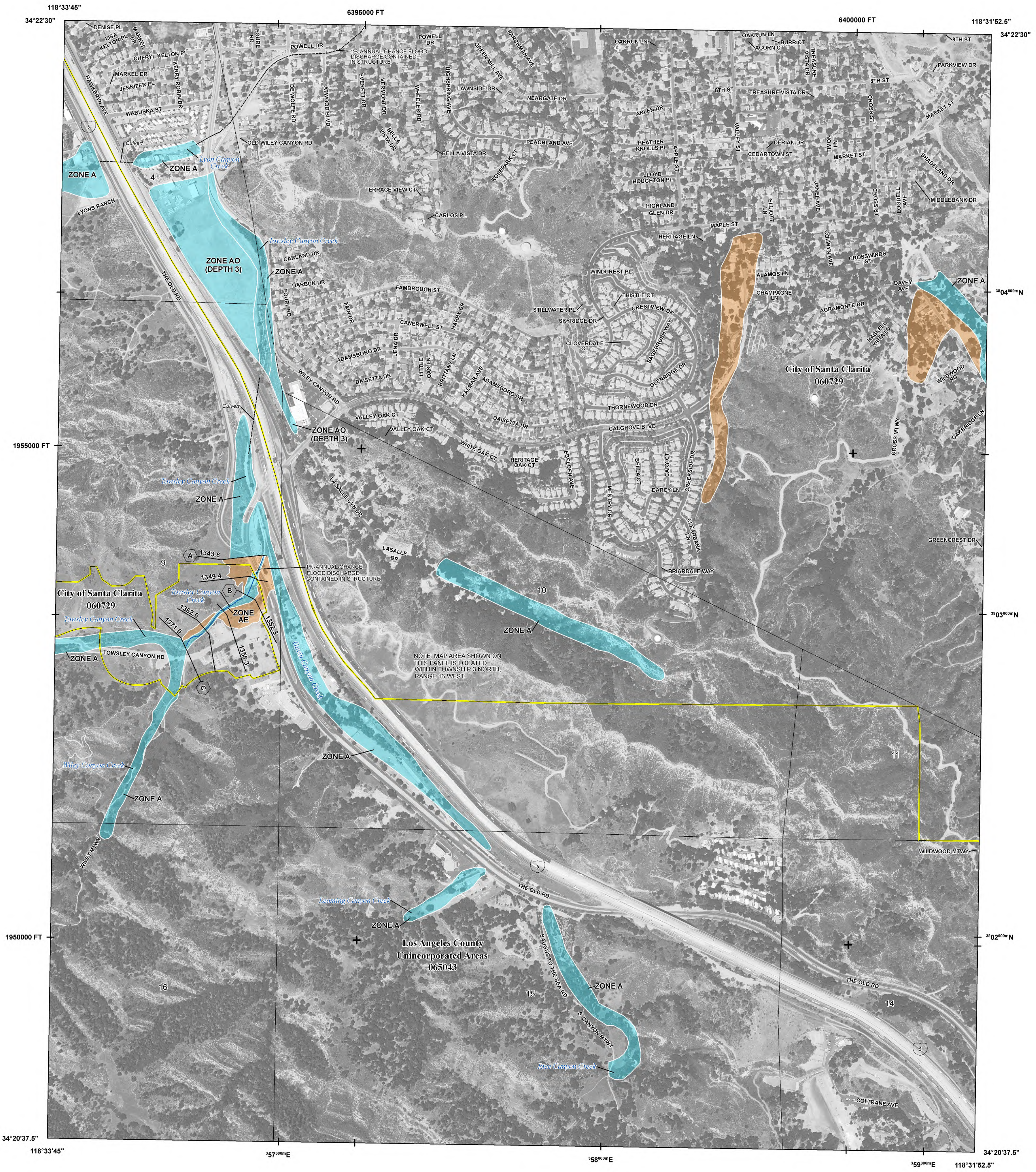
COMMUNITY	NUMBER	PANEL	SUFFIX
LOS ANGELES COUNTY	065043	1030	F
SANTA CLARITA, CITY OF	060729	1030	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06037C1030F

EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	▨	Without Base Flood Elevation (BFE) *Zone A, V, A99* With BFE or Depth *Zone AE, AO, AH, VE, AR* Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	▨	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	▨	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	▨	Area with Reduced Flood Risk due to Levee See Notes *Zone X*
OTHER AREAS	NO SCREEN	Areas of Minimal Flood Hazard *Zone X*
	▨	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	- - - -	Channel, Culvert or Storm Sewer
	⁞⁞⁞⁞	Levee, Dike or Floodwall
	(E) 18.2 / 17.5	Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	(8) - - -	Coastal Transect
	— · —	Coastal Transect Baseline
	— —	Profile Baseline
	—	Hydrographic Feature
	~ 513 ~	Base Flood Elevation Line (BFE)
	—	Limit of Study
OTHER FEATURES	—	Jurisdiction Boundary

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was derived from digital orthophotography collected by the U.S. Department of Agriculture Farm Service Agency. This imagery was flown in 2014 and was produced with a 1-meter ground sample distance.

SCALE

N

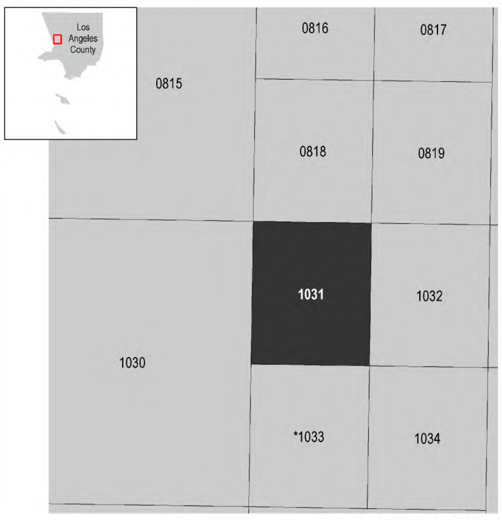
Map Projection:
Universal Transverse Mercator Zone 11N; North American Datum 1983;
Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



*PANEL NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

LOS ANGELES COUNTY,
CALIFORNIA
and Incorporated Areas

PANEL 1031 OF 2350

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
LOS ANGELES COUNTY	065043	1031	G
SANTA CLARITA, CITY OF	060729	1031	G

VERSION NUMBER
2.3.3.2

MAP NUMBER
06037C1031G

MAP REVISED
JUNE 2, 2021

Appendix C – NOAA Atlas 14 Rainfall Depths

NOAA Atlas 14, Volume 6, Version 2
Location name: Stevenson Ranch, California, USA*
Latitude: 34.3663°, Longitude: -118.577°
Elevation: 1585 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	0.135 (0.112-0.163)	0.176 (0.146-0.213)	0.230 (0.191-0.280)	0.275 (0.227-0.337)	0.337 (0.268-0.429)	0.386 (0.300-0.501)	0.436 (0.331-0.581)	0.489 (0.359-0.671)	0.560 (0.395-0.804)	0.617 (0.419-0.918)
10-min	0.193 (0.161-0.234)	0.252 (0.210-0.305)	0.330 (0.274-0.401)	0.394 (0.325-0.483)	0.484 (0.384-0.614)	0.553 (0.430-0.719)	0.625 (0.474-0.833)	0.700 (0.515-0.961)	0.803 (0.566-1.15)	0.884 (0.600-1.32)
15-min	0.233 (0.195-0.283)	0.304 (0.254-0.369)	0.399 (0.331-0.485)	0.477 (0.393-0.585)	0.585 (0.465-0.743)	0.669 (0.520-0.869)	0.756 (0.573-1.01)	0.847 (0.623-1.16)	0.971 (0.684-1.39)	1.07 (0.726-1.59)
30-min	0.324 (0.270-0.392)	0.422 (0.352-0.512)	0.553 (0.460-0.673)	0.662 (0.545-0.812)	0.812 (0.645-1.03)	0.929 (0.722-1.21)	1.05 (0.795-1.40)	1.18 (0.865-1.61)	1.35 (0.949-1.93)	1.48 (1.01-2.21)
60-min	0.501 (0.418-0.606)	0.652 (0.544-0.791)	0.855 (0.710-1.04)	1.02 (0.842-1.25)	1.25 (0.997-1.59)	1.44 (1.12-1.86)	1.62 (1.23-2.16)	1.82 (1.34-2.49)	2.08 (1.47-2.99)	2.29 (1.56-3.41)
2-hr	0.757 (0.631-0.916)	0.980 (0.817-1.19)	1.28 (1.06-1.56)	1.53 (1.26-1.88)	1.88 (1.49-2.39)	2.15 (1.68-2.80)	2.44 (1.85-3.25)	2.74 (2.02-3.76)	3.16 (2.22-4.53)	3.49 (2.37-5.19)
3-hr	0.942 (0.786-1.14)	1.22 (1.02-1.48)	1.59 (1.32-1.93)	1.90 (1.56-2.33)	2.33 (1.85-2.96)	2.67 (2.08-3.47)	3.02 (2.29-4.03)	3.40 (2.50-4.67)	3.92 (2.76-5.62)	4.34 (2.94-6.45)
6-hr	1.38 (1.15-1.67)	1.79 (1.49-2.17)	2.33 (1.94-2.84)	2.78 (2.29-3.41)	3.41 (2.71-4.33)	3.90 (3.04-5.07)	4.42 (3.35-5.89)	4.96 (3.65-6.80)	5.70 (4.02-8.18)	6.30 (4.28-9.37)
12-hr	1.86 (1.55-2.25)	2.43 (2.02-2.95)	3.19 (2.65-3.88)	3.81 (3.14-4.68)	4.67 (3.71-5.93)	5.33 (4.14-6.92)	6.00 (4.55-8.00)	6.71 (4.93-9.21)	7.66 (5.40-11.0)	8.41 (5.71-12.5)
24-hr	2.42 (2.15-2.79)	3.23 (2.86-3.73)	4.29 (3.78-4.96)	5.15 (4.51-6.00)	6.32 (5.35-7.61)	7.21 (5.98-8.87)	8.12 (6.57-10.2)	9.05 (7.12-11.7)	10.3 (7.78-13.9)	11.3 (8.23-15.8)
2-day	3.02 (2.68-3.48)	4.12 (3.65-4.75)	5.57 (4.91-6.44)	6.74 (5.90-7.86)	8.35 (7.07-10.1)	9.58 (7.95-11.8)	10.8 (8.77-13.7)	12.1 (9.55-15.7)	13.9 (10.5-18.8)	15.3 (11.1-21.4)
3-day	3.36 (2.98-3.87)	4.66 (4.12-5.38)	6.38 (5.63-7.38)	7.80 (6.82-9.09)	9.73 (8.24-11.7)	11.2 (9.31-13.8)	12.8 (10.3-16.1)	14.3 (11.3-18.6)	16.5 (12.5-22.3)	18.2 (13.3-25.5)
4-day	3.65 (3.23-4.20)	5.10 (4.52-5.89)	7.04 (6.21-8.14)	8.64 (7.56-10.1)	10.8 (9.18-13.1)	12.5 (10.4-15.4)	14.3 (11.6-18.0)	16.1 (12.7-20.9)	18.6 (14.1-25.2)	20.6 (15.0-28.8)
7-day	4.16 (3.69-4.79)	5.86 (5.19-6.76)	8.15 (7.19-9.42)	10.0 (8.79-11.7)	12.7 (10.7-15.3)	14.7 (12.2-18.2)	16.9 (13.7-21.3)	19.1 (15.1-24.8)	22.2 (16.8-30.0)	24.7 (18.0-34.5)
10-day	4.46 (3.95-5.14)	6.31 (5.58-7.27)	8.80 (7.76-10.2)	10.9 (9.52-12.7)	13.8 (11.7-16.6)	16.1 (13.3-19.8)	18.4 (14.9-23.3)	21.0 (16.5-27.2)	24.4 (18.5-33.0)	27.2 (19.8-38.1)
20-day	5.22 (4.62-6.01)	7.43 (6.57-8.57)	10.4 (9.21-12.1)	13.0 (11.3-15.1)	16.5 (14.0-19.9)	19.4 (16.1-23.8)	22.3 (18.1-28.2)	25.5 (20.1-33.1)	29.9 (22.6-40.4)	33.5 (24.4-46.8)
30-day	6.13 (5.43-7.06)	8.72 (7.72-10.1)	12.3 (10.8-14.2)	15.3 (13.4-17.8)	19.5 (16.5-23.5)	22.9 (19.0-28.2)	26.4 (21.4-33.3)	30.2 (23.8-39.2)	35.6 (26.8-48.0)	39.8 (29.1-55.7)
45-day	7.27 (6.44-8.37)	10.3 (9.08-11.8)	14.4 (12.7-16.6)	17.8 (15.6-20.8)	22.8 (19.3-27.5)	26.7 (22.2-32.9)	30.9 (25.0-39.0)	35.4 (27.8-45.9)	41.6 (31.4-56.3)	46.7 (34.1-65.3)
60-day	8.21 (7.27-9.46)	11.5 (10.2-13.2)	16.0 (14.1-18.5)	19.8 (17.3-23.1)	25.2 (21.3-30.4)	29.6 (24.5-36.4)	34.1 (27.6-43.1)	39.0 (30.7-50.6)	45.9 (34.7-62.1)	51.5 (37.6-72.1)

[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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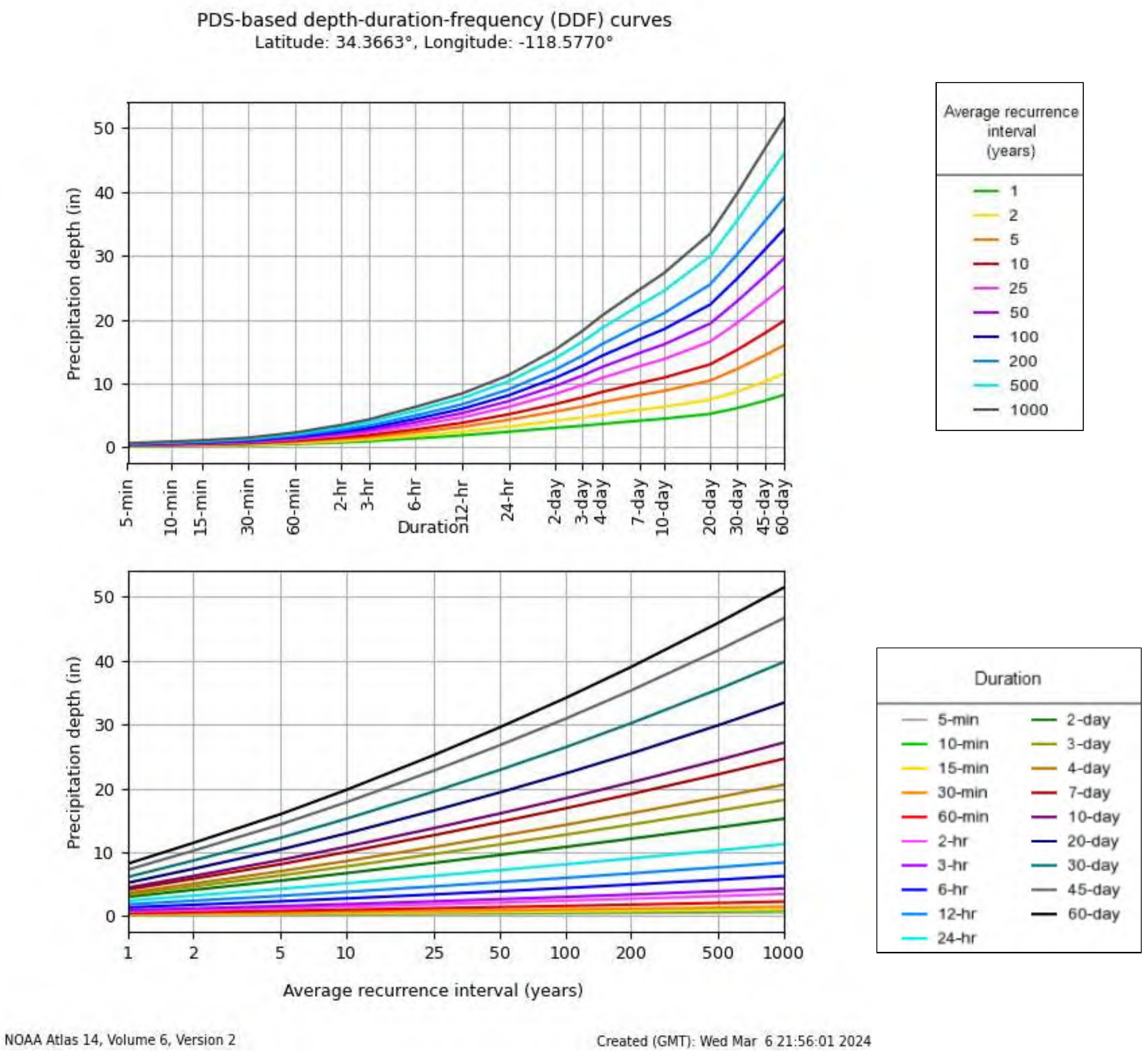
PF graphical



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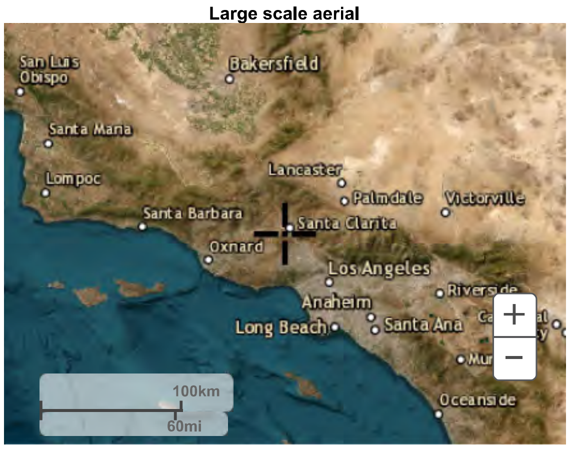
Maps & aerials

Small scale terrain

Large scale terrain

Large scale map

Large scale aerial



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Appendix D – Curve Number and Percent Impervious Calculations

Subarea	Acreage	Land Use	Soil Type	% Impervious	Pervious CN	Weighted % Imp.	Weighted CN
Existing Conditions							
EX-1A	73.53	Undeveloped	B	0	68	0.00	76.72
	199.00	Undeveloped	C	0	79		
	57.76	Undeveloped	D	0	84		
	4.43	Undeveloped	B	0	68		
	57.56	Undeveloped	C	0	79		
	0.23	Undeveloped	B	0	68		
	70.85	Undeveloped	C	0	79		
	0.39	Undeveloped	B	0	68		
	3.42	Undeveloped	C	0	79		
	15.40	Undeveloped	B	0	68		
	4.93	Undeveloped	C	0	79		
	0.53	Undeveloped	B	0	68		
	49.94	Undeveloped	C	0	79		
	0.59	Undeveloped	C	0	79		
	16.81	Undeveloped	B	0	68		
	3.41	Undeveloped	B	0	68		
	55.29	Undeveloped	C	0	79		
	2.40	Undeveloped	B	0	68		
	18.75	Undeveloped	C	0	79		
	9.01	Undeveloped	B	0	68		
	18.80	Undeveloped	C	0	79		
	27.64	Undeveloped	B	0	68		
	0.46	Undeveloped	C	0	79		
	19.68	Undeveloped	B	0	68		
EX-2A	113.57	Undeveloped	B	0	68	0.13	67.79
	3.12	Landscaped	B	0	61		
	0.41	1/4 ac Residential	B	38	61		
EX-4A	14.41	Undeveloped	B	0	68	1.13	67.14
	5.81	Undeveloped	B	0	68		
	3.28	Landscaped	B	0	61		
	0.96	1/4 ac Residential	B	38	61		
	15.92	Undeveloped	B	0	68		
	0.55	Landscaped	B	0	61		
	0.26	1/4 ac Residential	B	38	61		

Subarea	Acreage	Land Use	Soil Type	% Impervious	Pervious CN	Weighted % Imp.	Weighted CN
Proposed- Offsite							
B	103.29	Undeveloped	B	0	68	0.00	76
	2.26	Basin	B	0	82		
	3.12	Landscaped	B	0	61		
	0.41	1/4 ac Residential	B	38	61		
	73.53	Undeveloped	B	0	68		
	199.00	Undeveloped	C	0	79		
	57.76	Undeveloped	D	0	84		
	4.43	Undeveloped	B	0	68		
	57.56	Undeveloped	C	0	79		
	0.23	Undeveloped	B	0	68		
	70.85	Undeveloped	C	0	79		
	0.39	Undeveloped	B	0	68		
	3.42	Undeveloped	C	0	79		
	15.40	Undeveloped	B	0	68		
	4.93	Undeveloped	C	0	79		
	0.53	Undeveloped	B	0	68		
	49.94	Undeveloped	C	0	79		
	15.76	Undeveloped	B	0	68		
	0.59	Undeveloped	C	0	79		
	3.41	Undeveloped	B	0	68		
	55.29	Undeveloped	C	0	79		
	2.40	Undeveloped	B	0	68		
	18.75	Undeveloped	C	0	79		
	2.77	Undeveloped	B	0	68		
	0.73	Undeveloped	C	0	79		
	18.51	Undeveloped	C	0	79		
	6.08	Undeveloped	B	0	68		
	5.18	Basin	B	0	82		
	3.11	Landscaped	B	0	61		
	0.82	Roads	B	100	98		
C	11.04	Undeveloped	B	0	68	0.0	70
	1.53	Basin	B	0	82		
D	1.24	Landscaped	B	0	61	0.0	61
E	1.84	Undeveloped	B	0	68	0.0	67
	0.13	Basin	B	0	82		
	0.65	Landscaped	B	0	61		
F	6.43	Undeveloped	B	0	68	0.0	68
	0.38	Basin	B	0	82		
	0.38	Landscaped	B	0	61		
G	2.91	Undeveloped	B	0	68	0.0	68
	0.26	Basin	B	0	82		
	0.77	Landscaped	B	0	61		
H	1.48	Landscaped	B	0	61	0.0	61
I	2.49	Landscaped	B	0	61	0.0	61

Subarea	Acreage	Land Use	Soil Type	% Impervious	Pervious CN	Weighted % Imp.	Weighted CN
Proposed- Offsite							
J	3.95	Undeveloped	B	0	68	4.2	64
J	3.84	Landscaped	B	0	61		
J	0.96	1/4 ac Residential	B	38	61		
K	1.12	Undeveloped	B	0	68	4.3	64
K	0.92	Landscaped	B	0	61		
K	0.26	1/4 ac Residential	B	38	61		
Proposed- Onsite							
O1A	5.95	1/8 ac Residential	B	65	61	76.8	73
O1A	3.02	Roads	B	100	98		
O2B	4.65	1/8 ac Residential	B	65	61	81.6	79
O2B	4.20	Roads	B	100	98		
O7D	6.98	1/8 ac Residential	B	65	61	72.9	69
O7D	2.03	Roads	B	100	98		
O12E	1.15	Roads	B	100	98	100.0	98
O14D	0.37	Roads	B	100	98	100.0	98
O15G	1.71	Roads	B	100	98	73.2	70
O15G	5.60	1/8 ac Residential	B	65	61		
O18D	1.43	Roads	B	100	98	100.0	98
O20H	2.25	Roads	B	100	98	77.1	74
O20H	4.28	1/8 ac Residential	B	65	61		
O22I	0.62	1/8 ac Residential	B	65	61	82.9	80
O22I	0.64	Roads	B	100	98		
O28K	0.93	Roads	B	100	98	100.0	98
O24J	1.45	Commercial and Busines	B	85	61	45.4	66
O24J	0.55	Roads	B	100	98		
O24J	1.92	Landscaped	B	0	61		
O38R	1.25	Roads	B	100	98	100.0	98

Land Use	% Impervious	Composite CN				Pervious CN			
Soil Type		A	B	C	D	A	B	C	D
Undeveloped	0	49	68	79	84	49	68	79	84
Basin	0	72	82	87	89	72	82	87	89
Landscaped	0	39	61	74	80	39	61	74	80
1/4 ac Residential	38	61	75	83	87	39	61	74	80
1/8 ac Residential	65	77	85	90	92	39	61	74	80
Open Space and Recreation	0	39	61	74	80	39	61	74	80
Commercial and Business	85	89	92	94	95	39	61	74	80
Roads	100	98	98	98	98	98	98	98	98

Notes

* Undeveloped areas treated as Desert shrub- good cover

**Landscaped areas treated as "Open Space and Recreation- Good Condition"

*** Roads entirely impervious, so set pervious CN = impervious CN

****Basin/Water treated as dirt road

Appendix E – Lag Time Calculations

Proposed Calculations

Subarea	Time of Concentration (min)	Lag Time (min)	Lag Time for Model (min)	Lag Time (hr)	S-graph
C	4.02	3.22	5.00	0.08	Foothill S-graph
D	2.32	1.85	5.00	0.08	Valley Developed S-graph
E	4.15	3.32	5.00	0.08	Foothill S-graph
F	4.14	3.31	5.00	0.08	Foothill S-graph
G	3.40	2.72	5.00	0.08	Foothill S-graph
H	3.15	2.52	5.00	0.08	Valley Developed S-graph
I	2.58	2.06	5.00	0.08	Valley Developed S-graph
J	12.34	9.88	9.88	0.16	Foothill S-graph
K	5.56	4.45	5.00	0.08	Valley Undeveloped S-graph
O1A	8.78	7.02	7.02	0.12	Valley Developed S-graph
O2B	6.95	5.56	5.56	0.09	Valley Developed S-graph
O7D	8.14	6.51	6.51	0.11	Valley Developed S-graph
O12E	2.80	2.24	5.00	0.08	Valley Developed S-graph
O14D	1.50	1.20	5.00	0.08	Valley Developed S-graph
O15G	5.91	4.73	5.00	0.08	Valley Developed S-graph
O18D	2.09	1.67	5.00	0.08	Valley Developed S-graph
O20H	6.01	4.81	5.00	0.08	Valley Developed S-graph
O22I	5.90	4.72	5.00	0.08	Valley Developed S-graph
O24J	4.65	3.72	5.00	0.08	Valley Developed S-graph
O28K	5.81	4.65	5.00	0.08	Valley Developed S-graph
O38R	4.13	3.30	5.00	0.08	Valley Developed S-graph

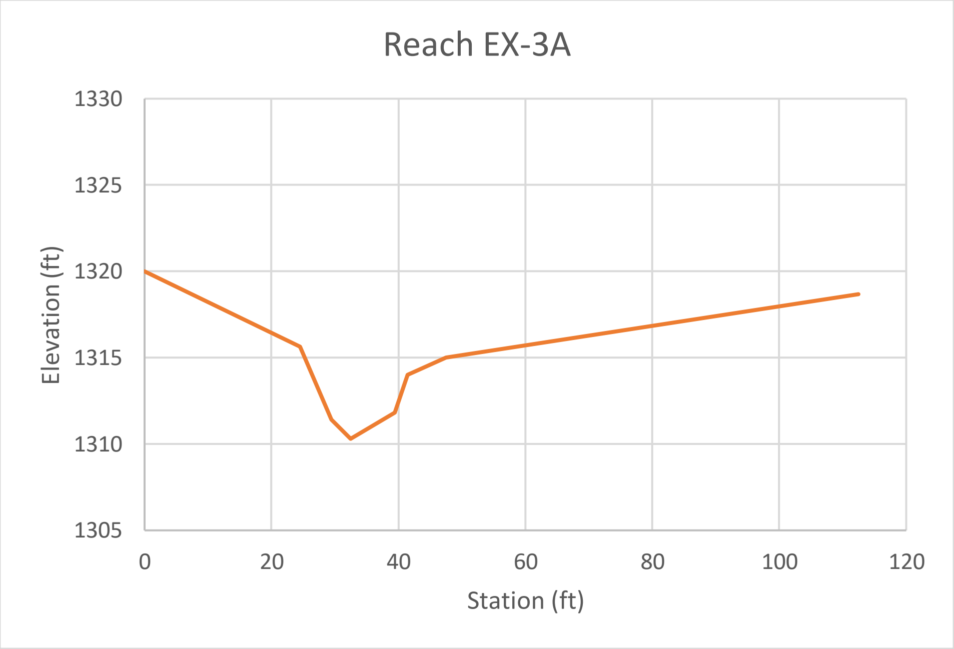
Empirical Calculations

Subarea	Lag Time (min)	Lag Time (hr)	S-graph
EX-1A	34.30	0.57	Foothill S-graph
EX-2A	15.48	0.26	Foothill S-graph
EX-4A	5.70	0.10	Valley Undeveloped S-graph
A	10.87	0.18	Foothill S-graph
B	41.00	0.68	Foothill S-graph

Appendix F – Reach 3A Storage – Discharge Curve

Reach Parameters

Length	1460.211381	ft
Upstream Elev	1325	ft
Downstream Elev	1298	ft
Slope	0.0188	ft/ft
Roughness	0.04	



Cross-Section Data

Shifted Sta	Elevation
0	1320
24.47	1315.65
29.47	1311.42
32.47	1310.3
39.47	1311.83
41.47	1314
47.47	1315
112.47	1318.67

Normal Depth Results

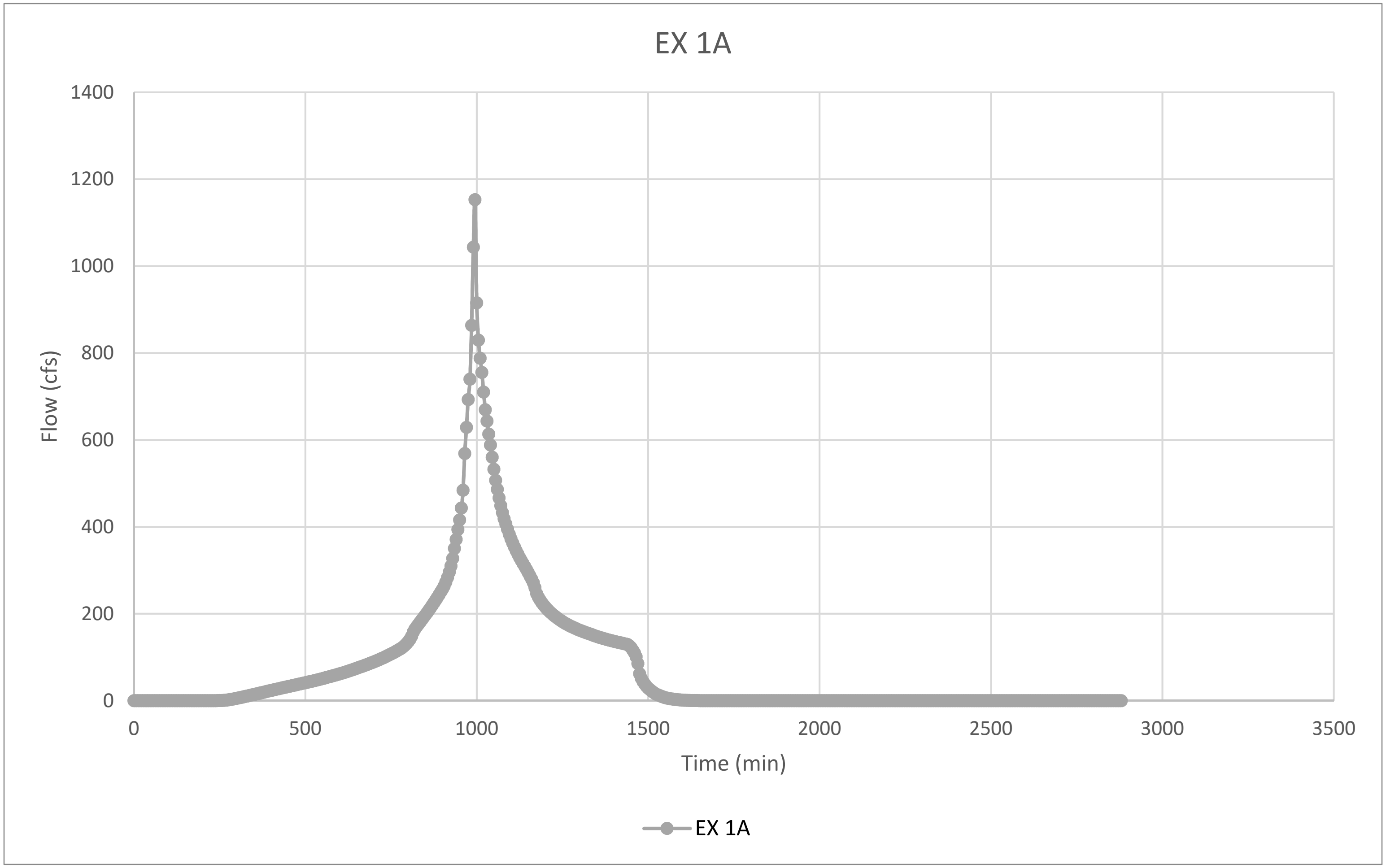
Stage	Discharge	Area (sqft)	Volume (AF)
1310.3	0	0	0.00
1311	4	1.8	0.06
1312	47	10.1	0.34
1313	149	22	0.74
1314	294	35.3	1.18
1315	474	55.1	1.85
1316	674	86	2.88
1317	1147	140.5	4.71
1318	1969	218.9	7.34

Appendix G – Existing and Proposed Hydrographs

Existing Condition

Existing Condition:

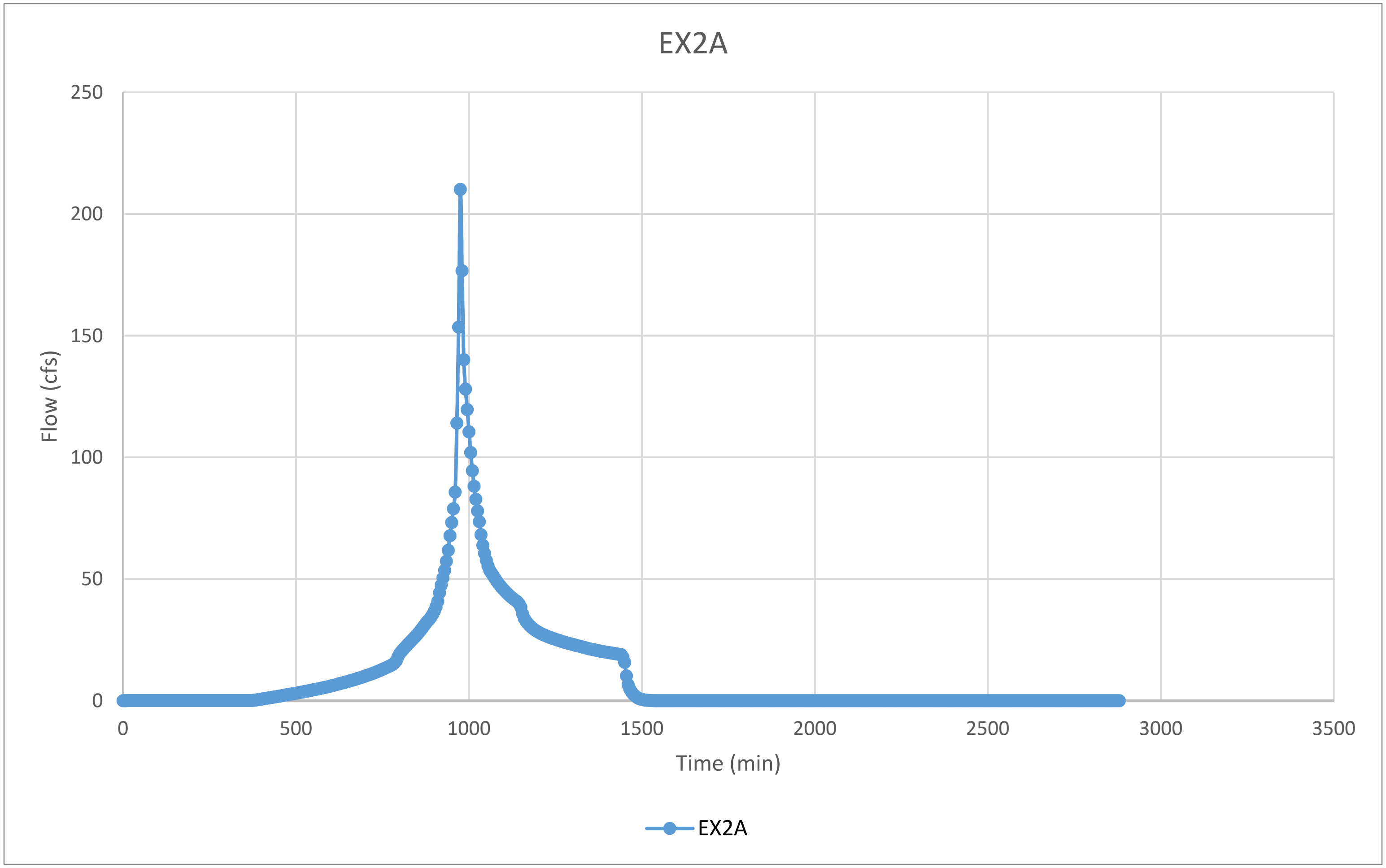
Subarea EX 1A



Max Flow: 1152.93 cfs

Existing Condition:

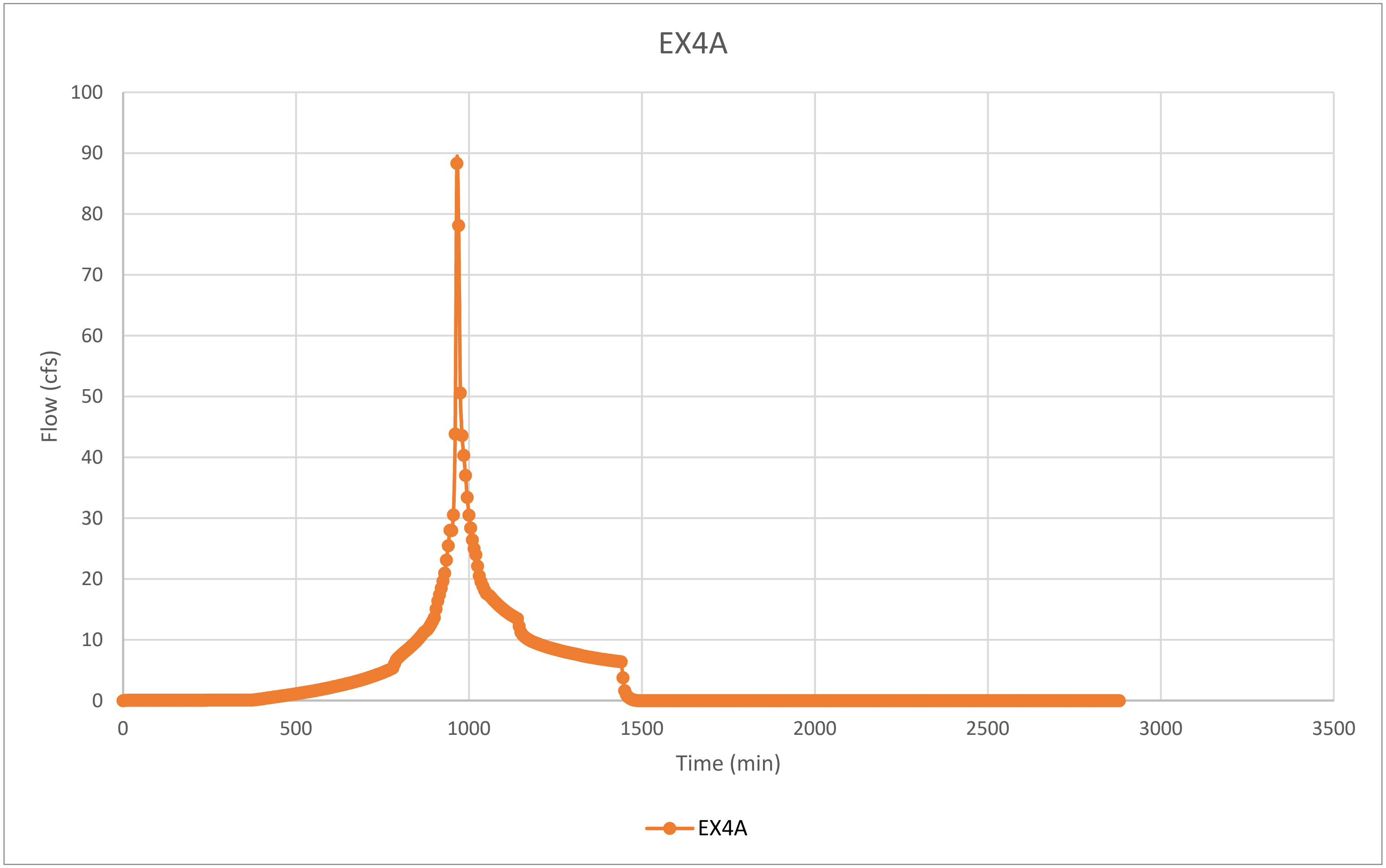
Subarea EX 2A



Max Flow: 210.12 cfs

Existing Condition:

Subarea EX 4A

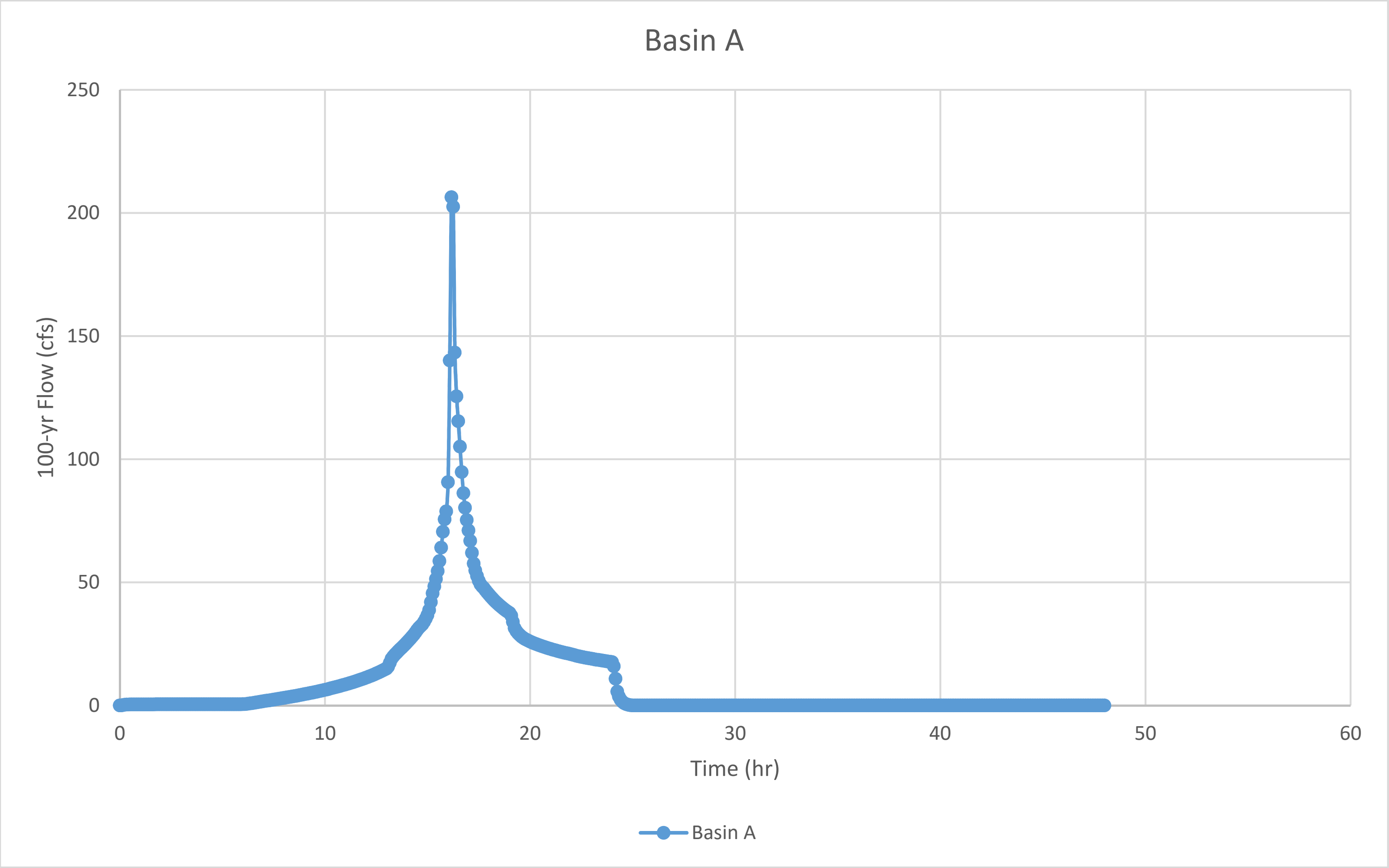


Max Flow: 88.30 cfs

Proposed Condition, Offsite

Proposed Condition, Offsite:

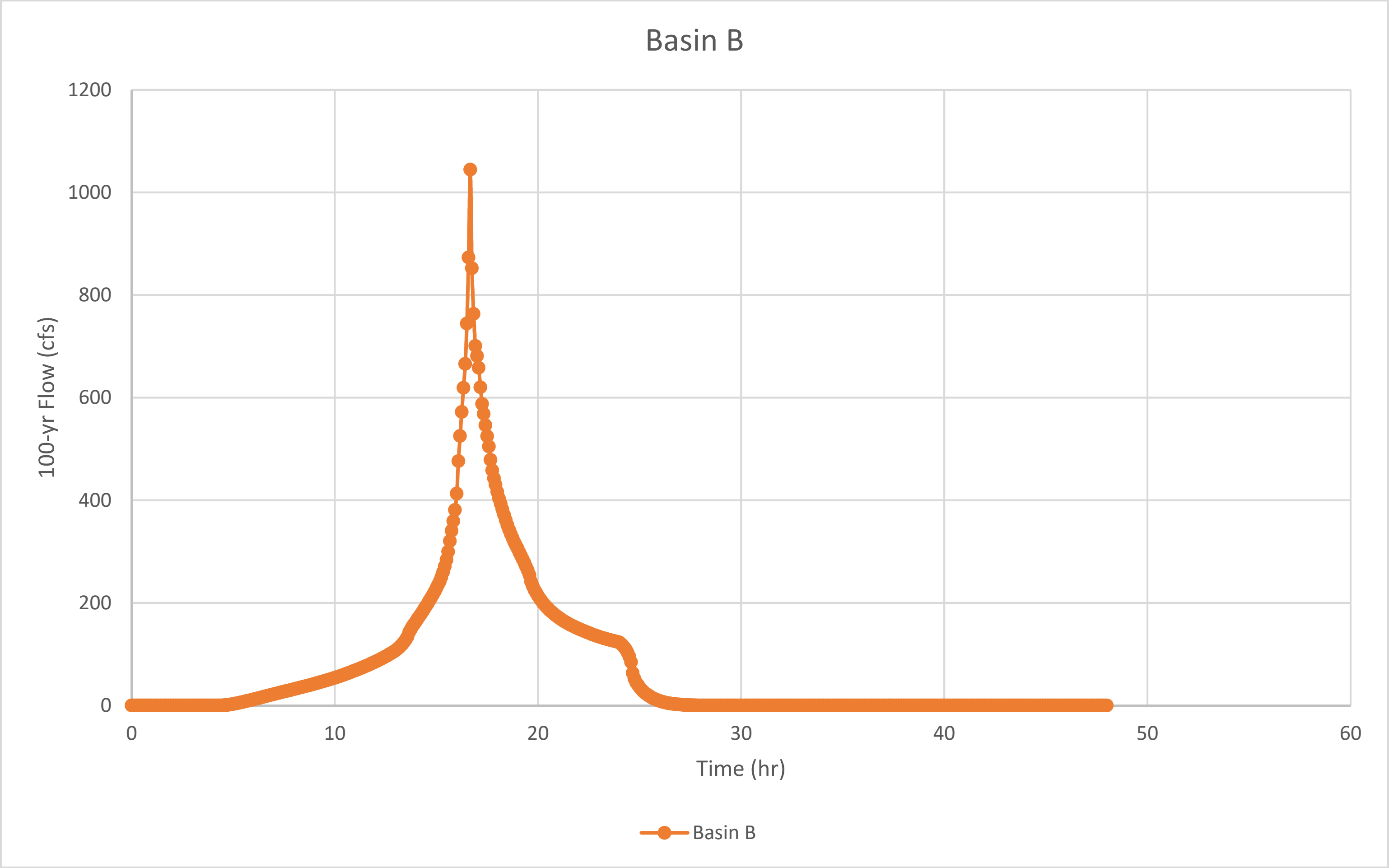
Basin A



Max Flow: 206.4 cfs

Proposed Condition, Offsite:

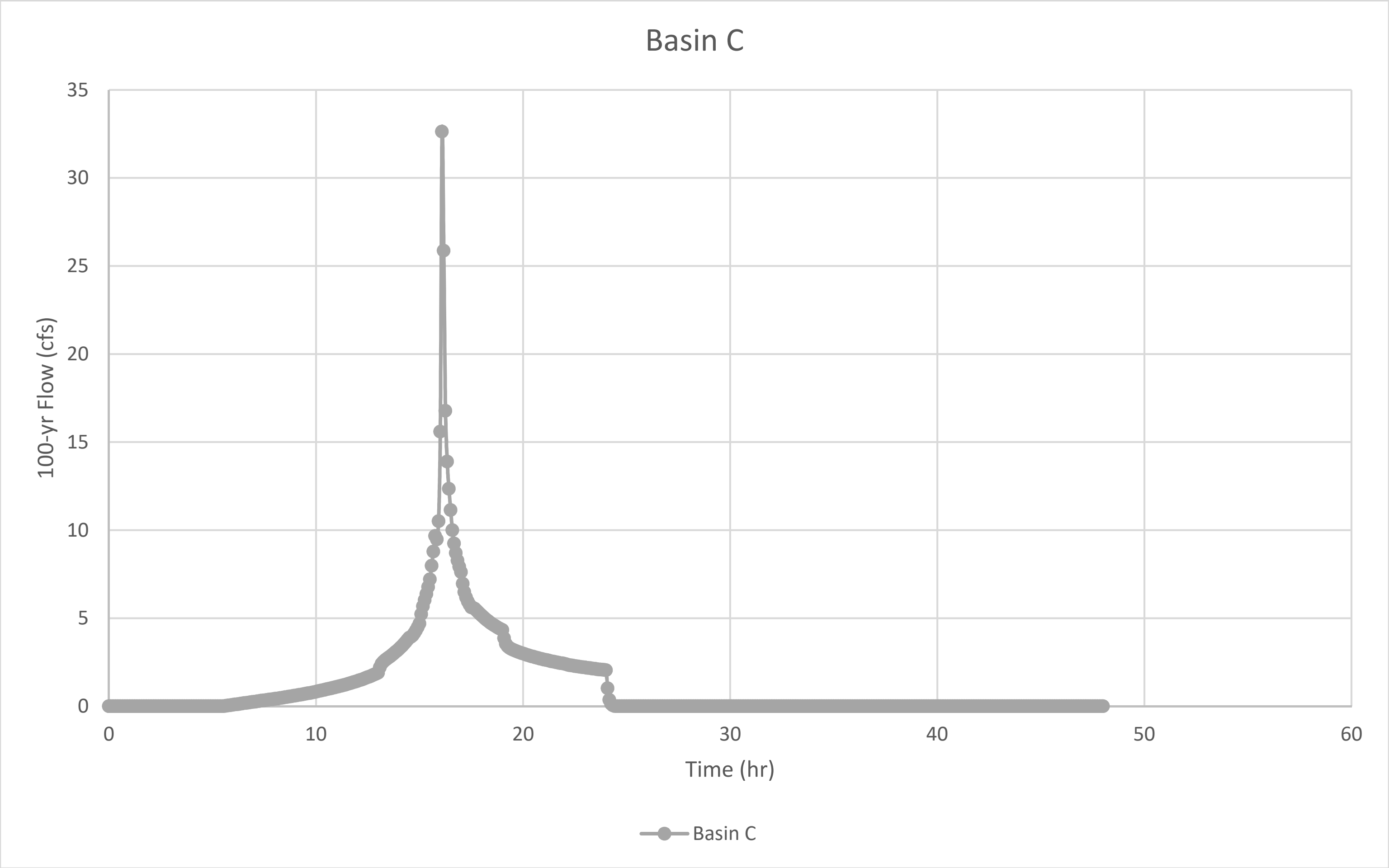
Basin B



Max Flow: 1044.49 cfs

Proposed Condition, Offsite:

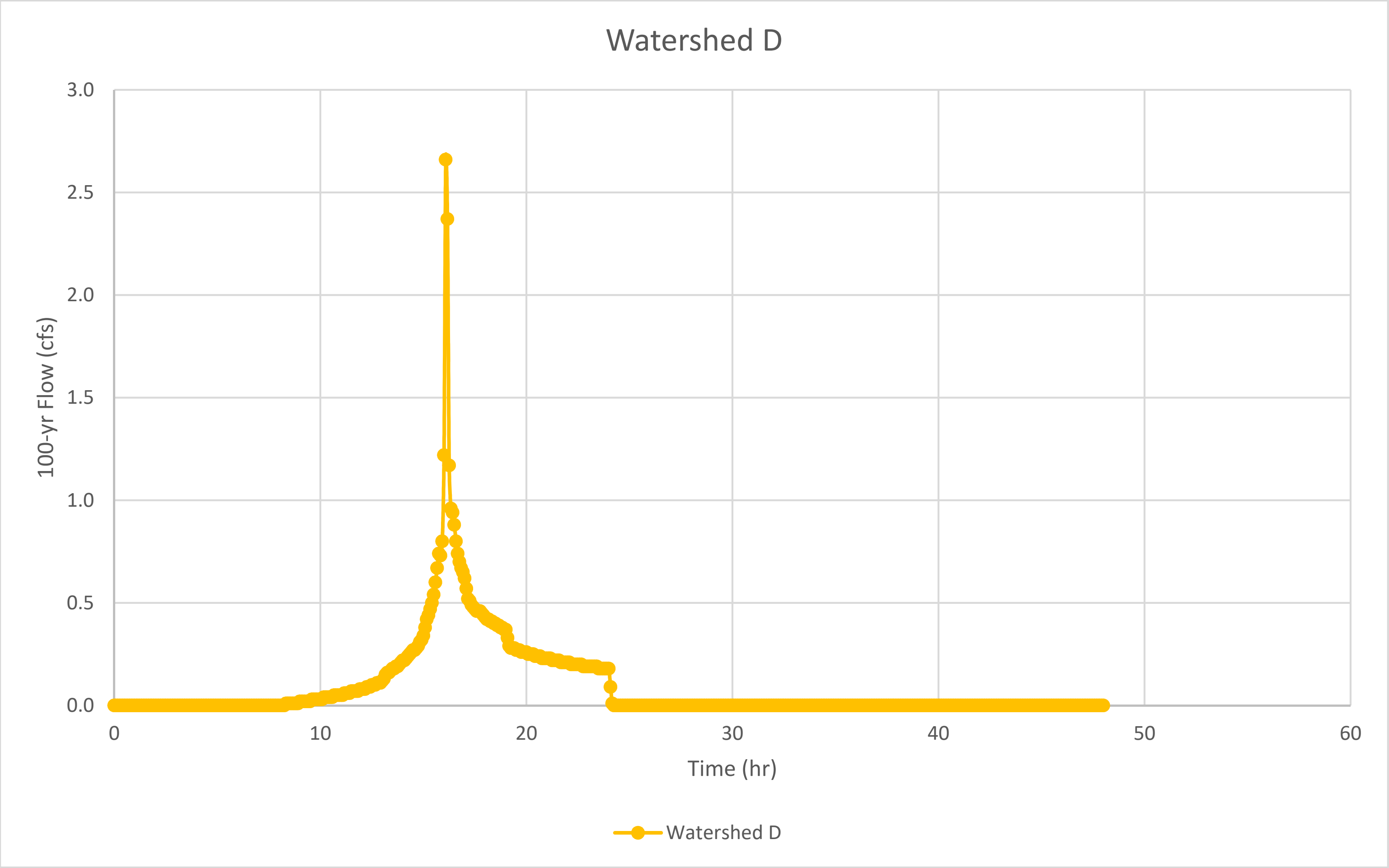
Basin C



Max Flow: 32.63 cfs

Proposed Condition, Offsite:

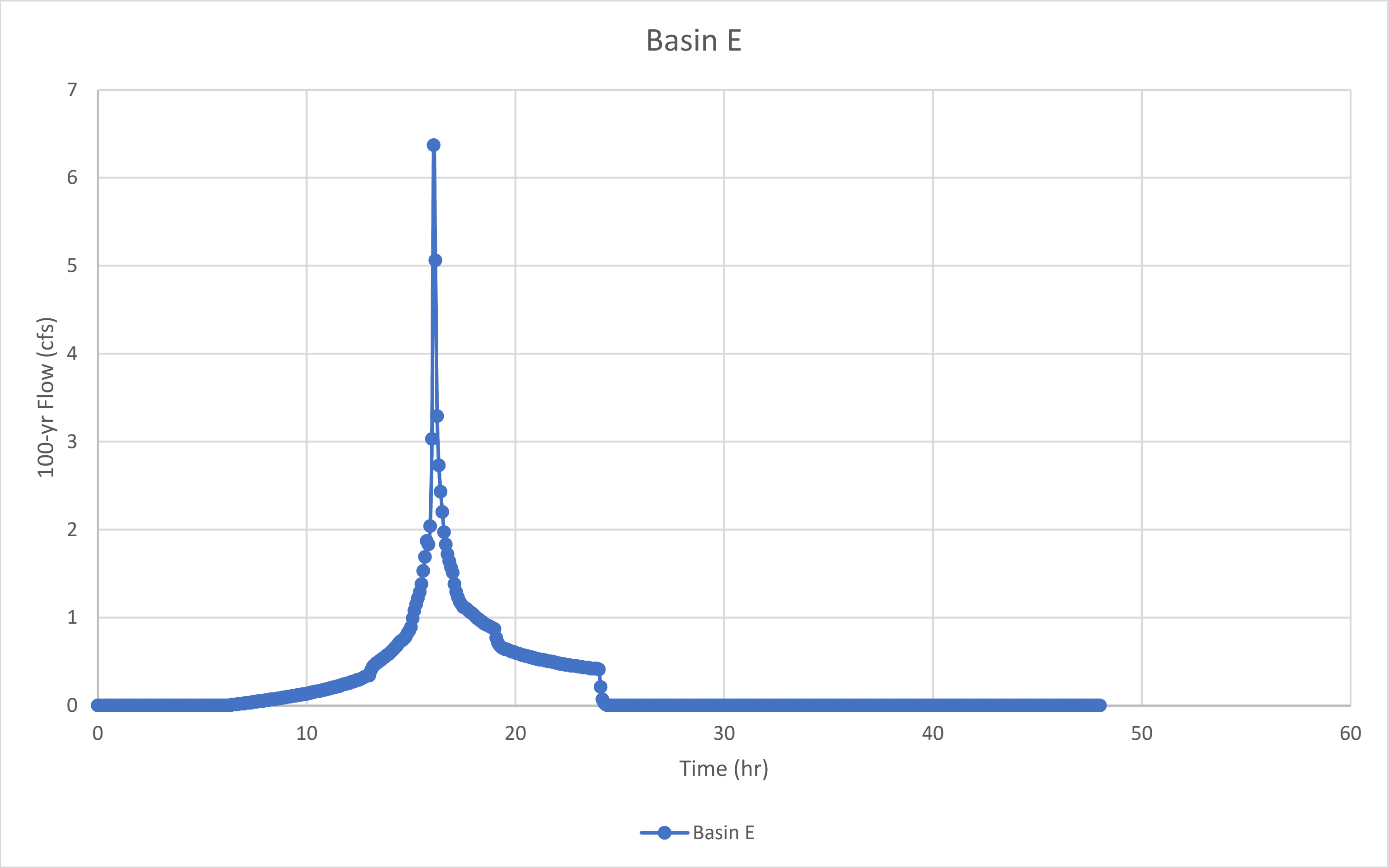
Watershed D



Max Flow: 2.66 cfs

Proposed Condition, Offsite:

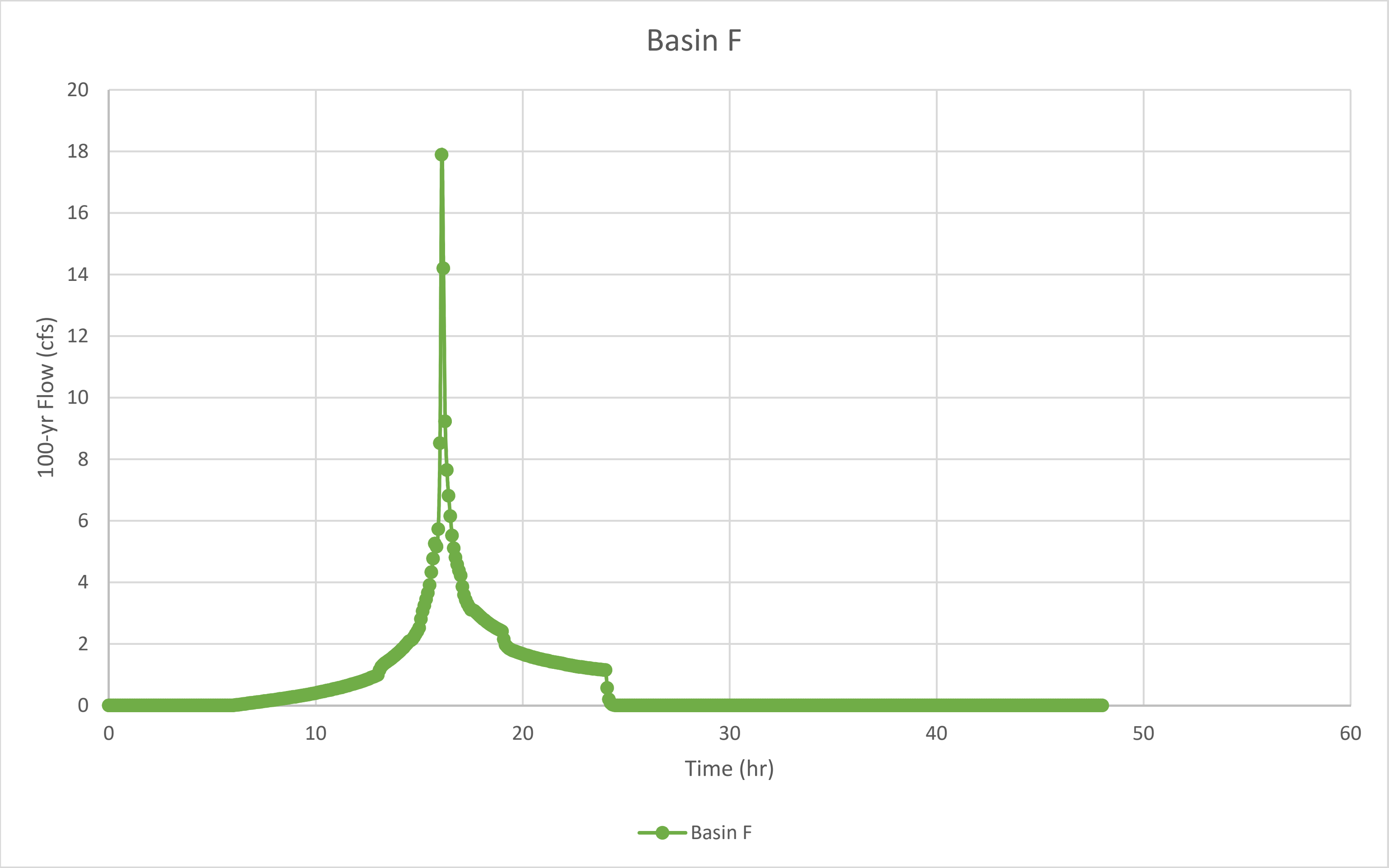
Basin E



Max Flow: 6.37 cfs

Proposed Condition, Offsite:

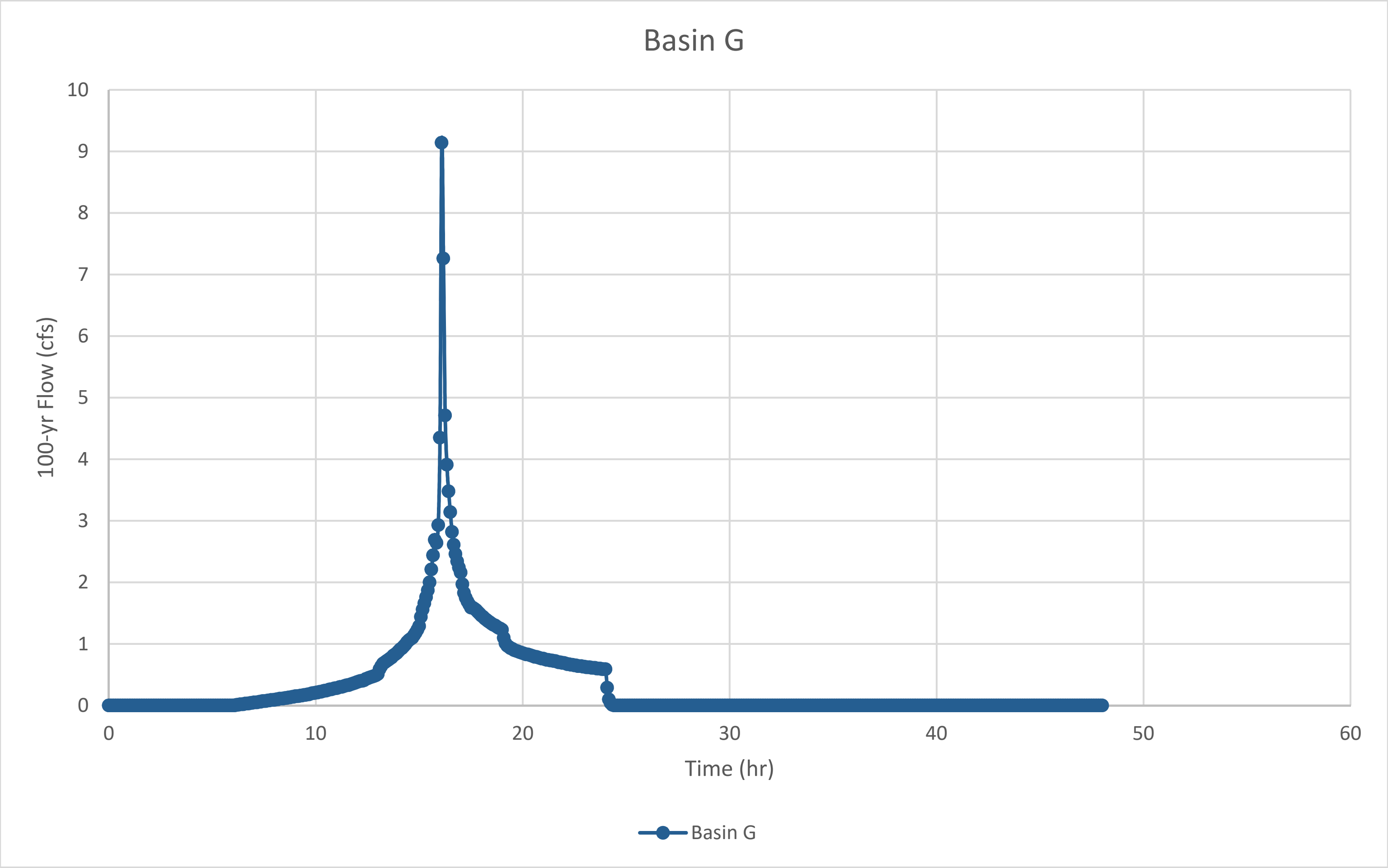
Basin F



Max Flow: 17.89 cfs

Proposed Condition, Offsite:

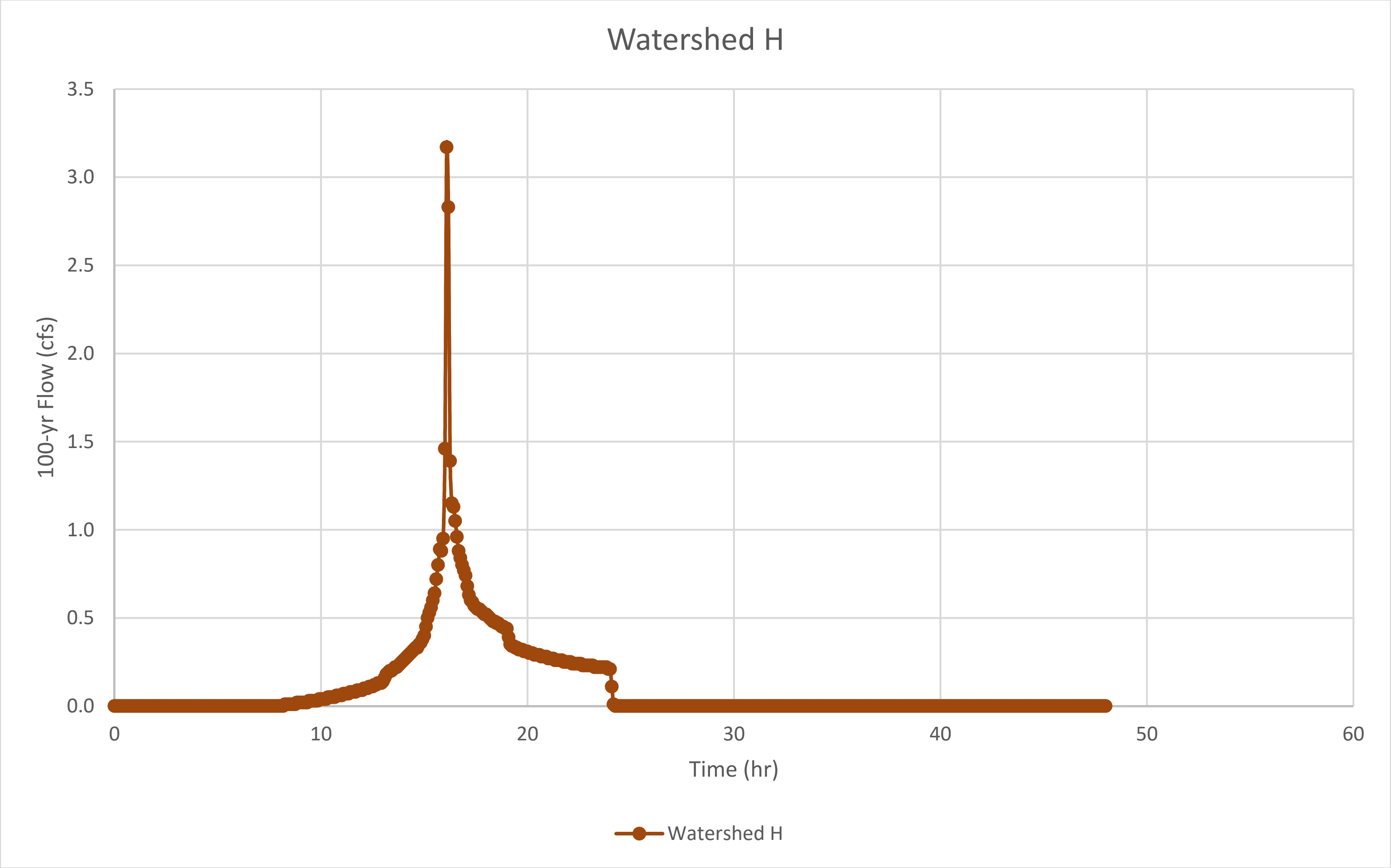
Basin G



Max Flow: 9.14 cfs

Proposed Condition, Offsite:

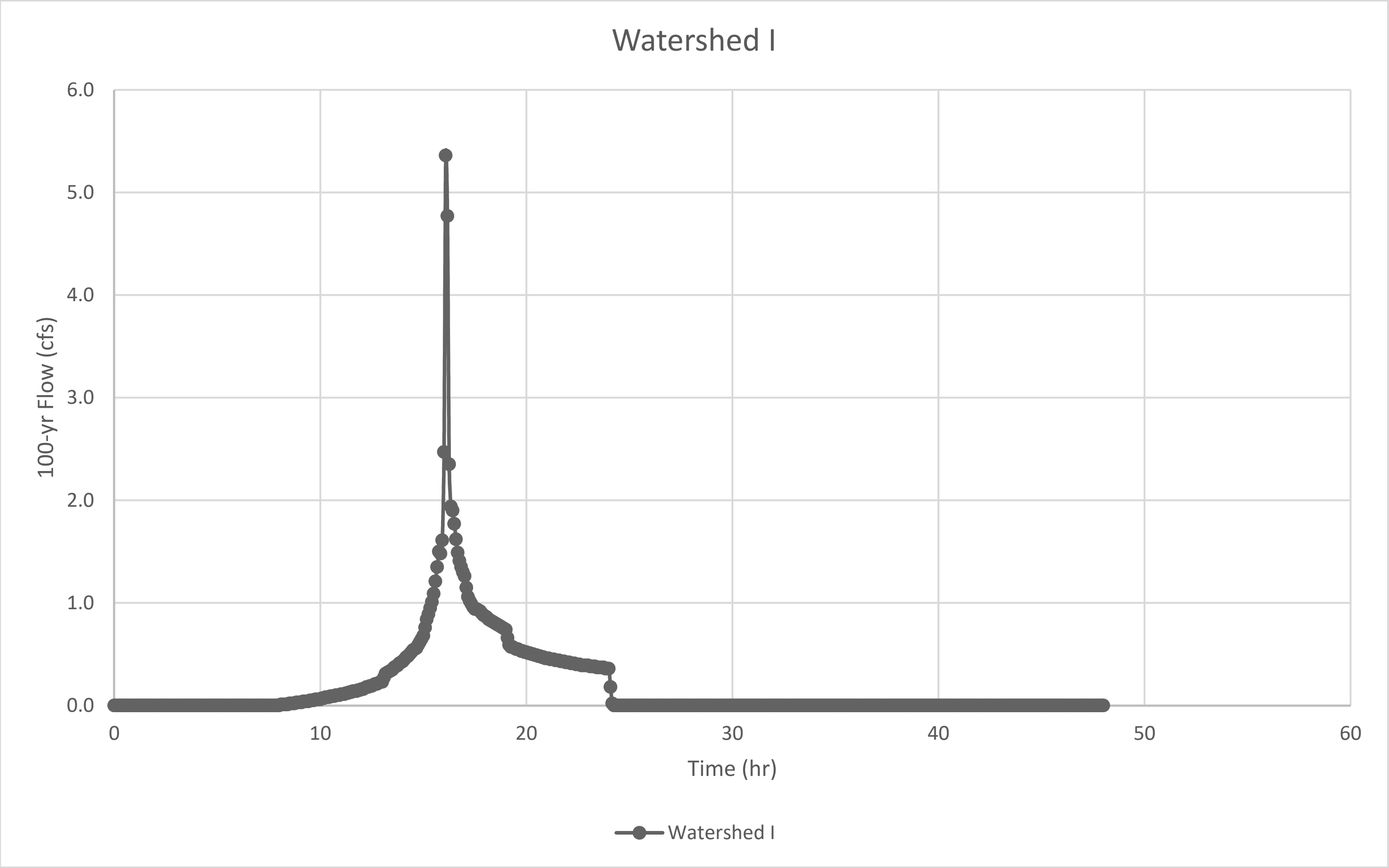
Watershed H



Max Flow: 3.17 cfs

Proposed Condition, Offsite:

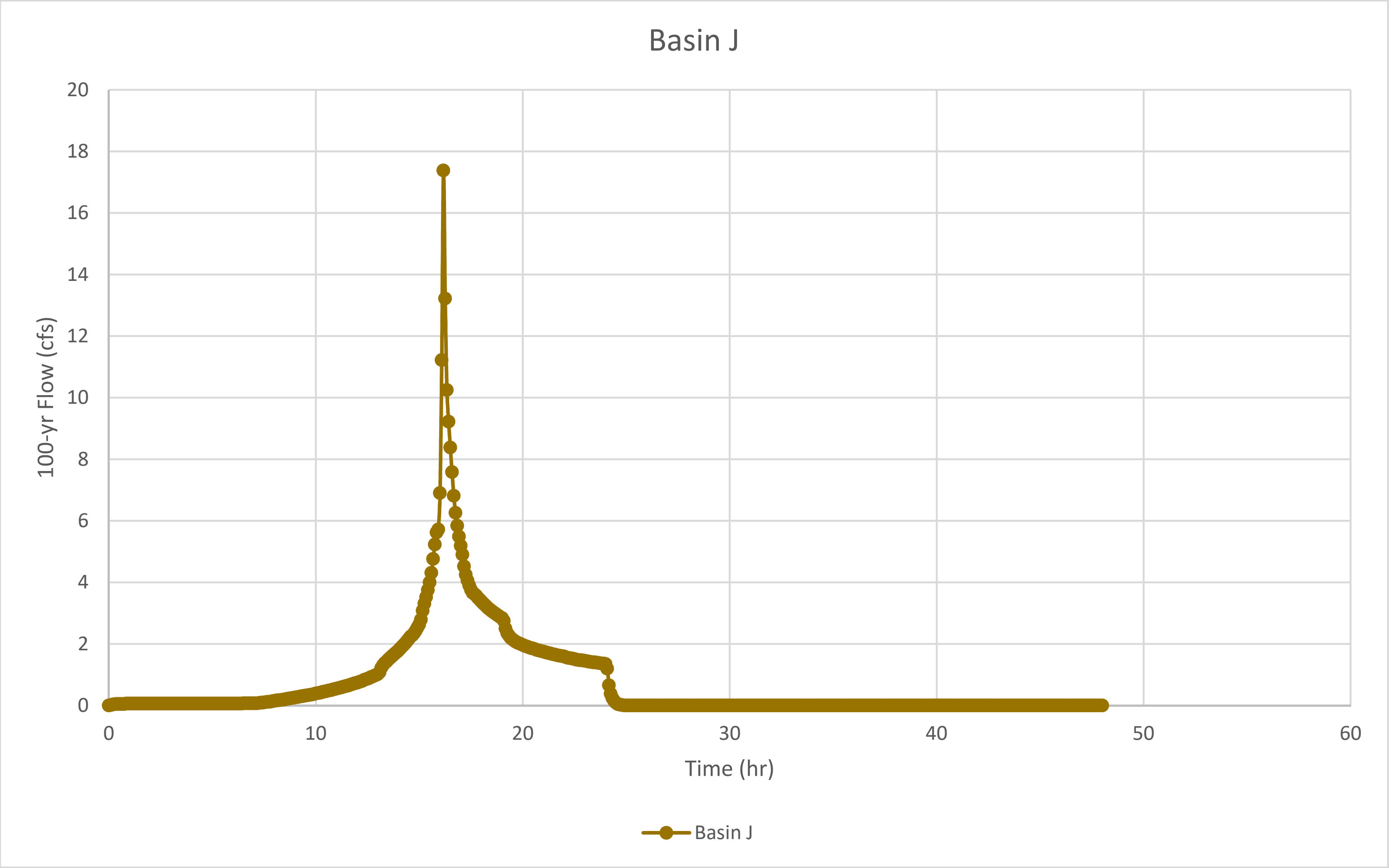
Watershed I



Max Flow: 5.36 cfs

Proposed Condition, Offsite:

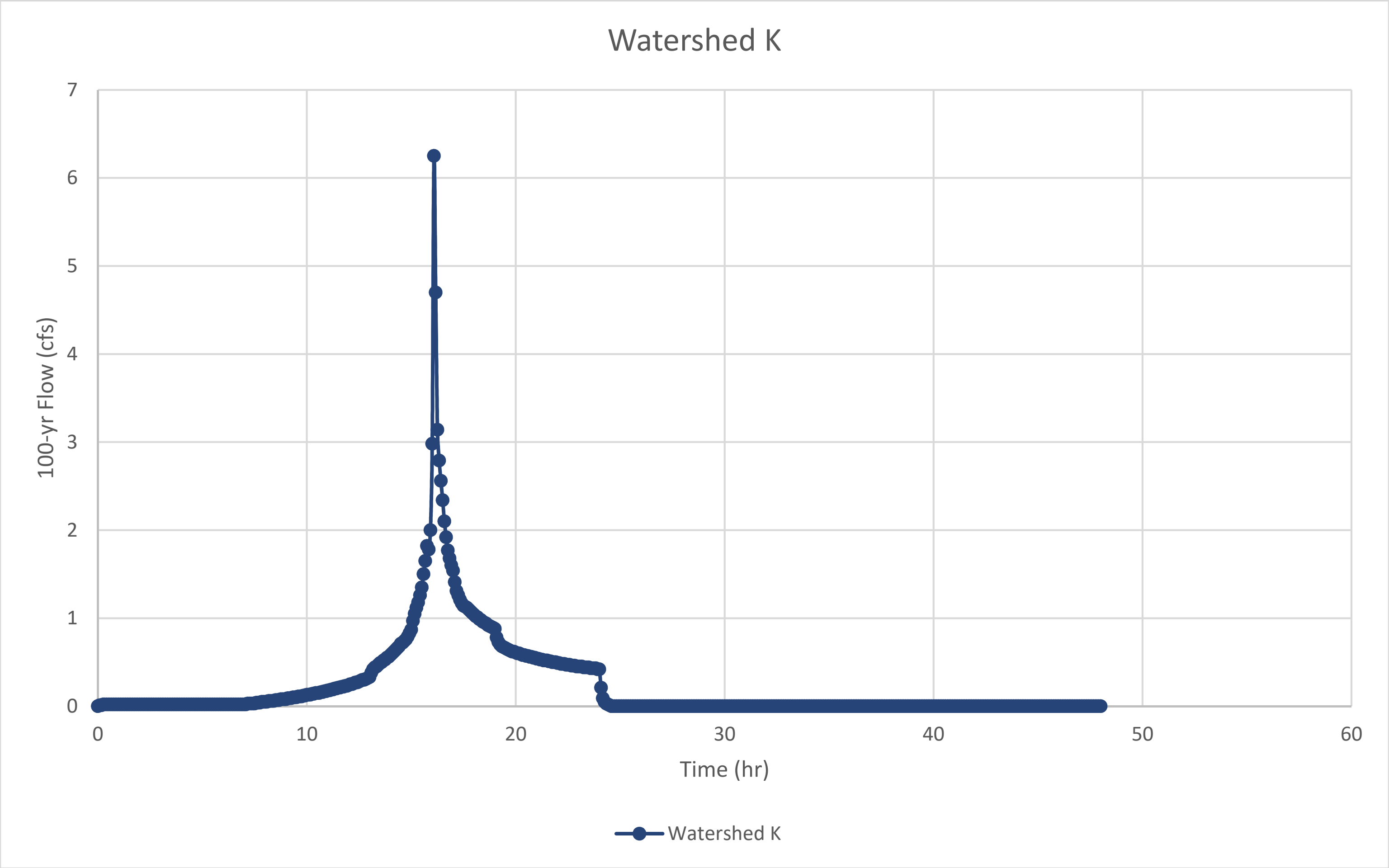
Basin J



Max Flow: 17.38 cfs

Proposed Condition, Offsite:

Watershed K

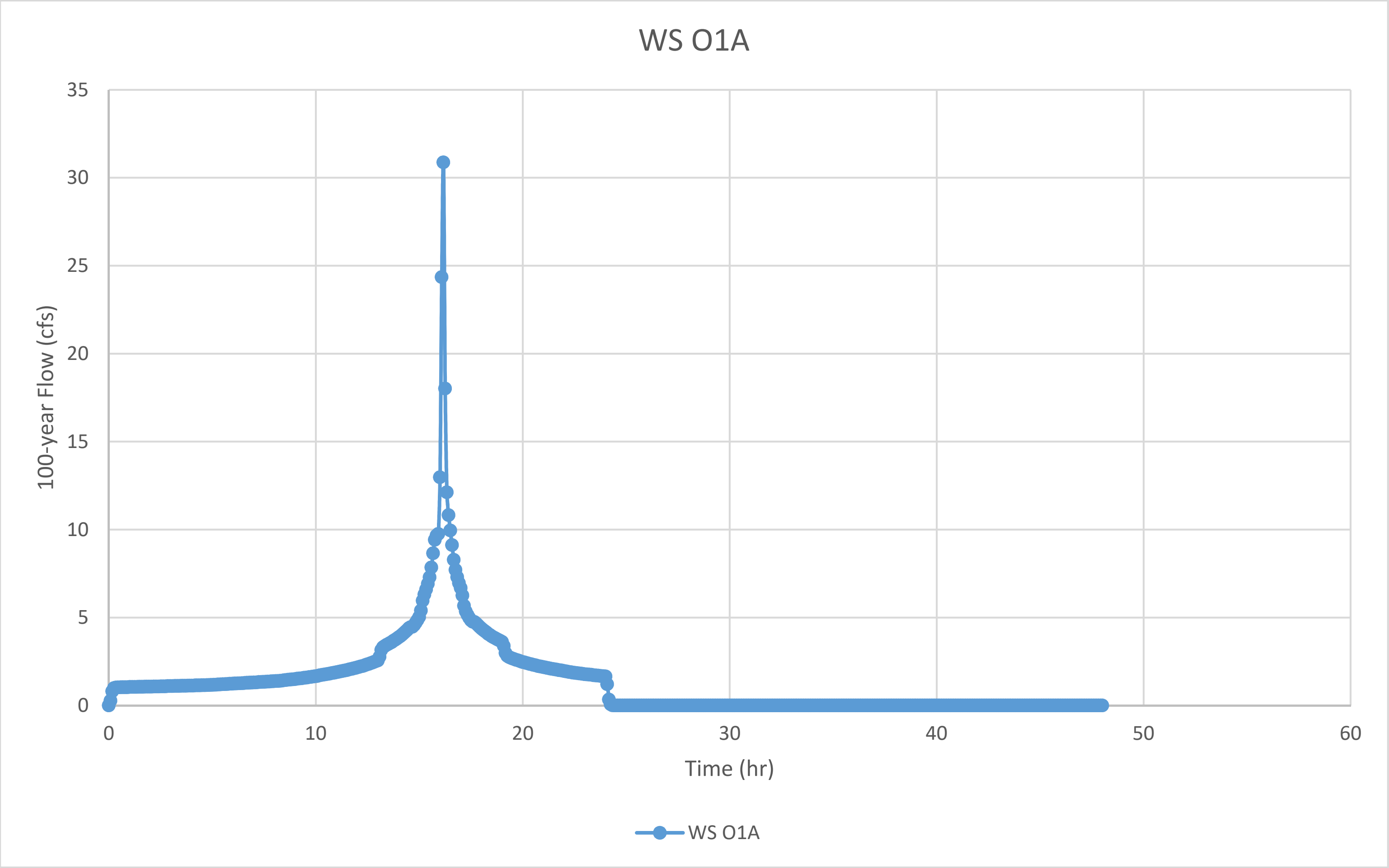


Max Flow: 6.25 cfs

Proposed Condition, Onsite

Proposed Condition, Onsite:

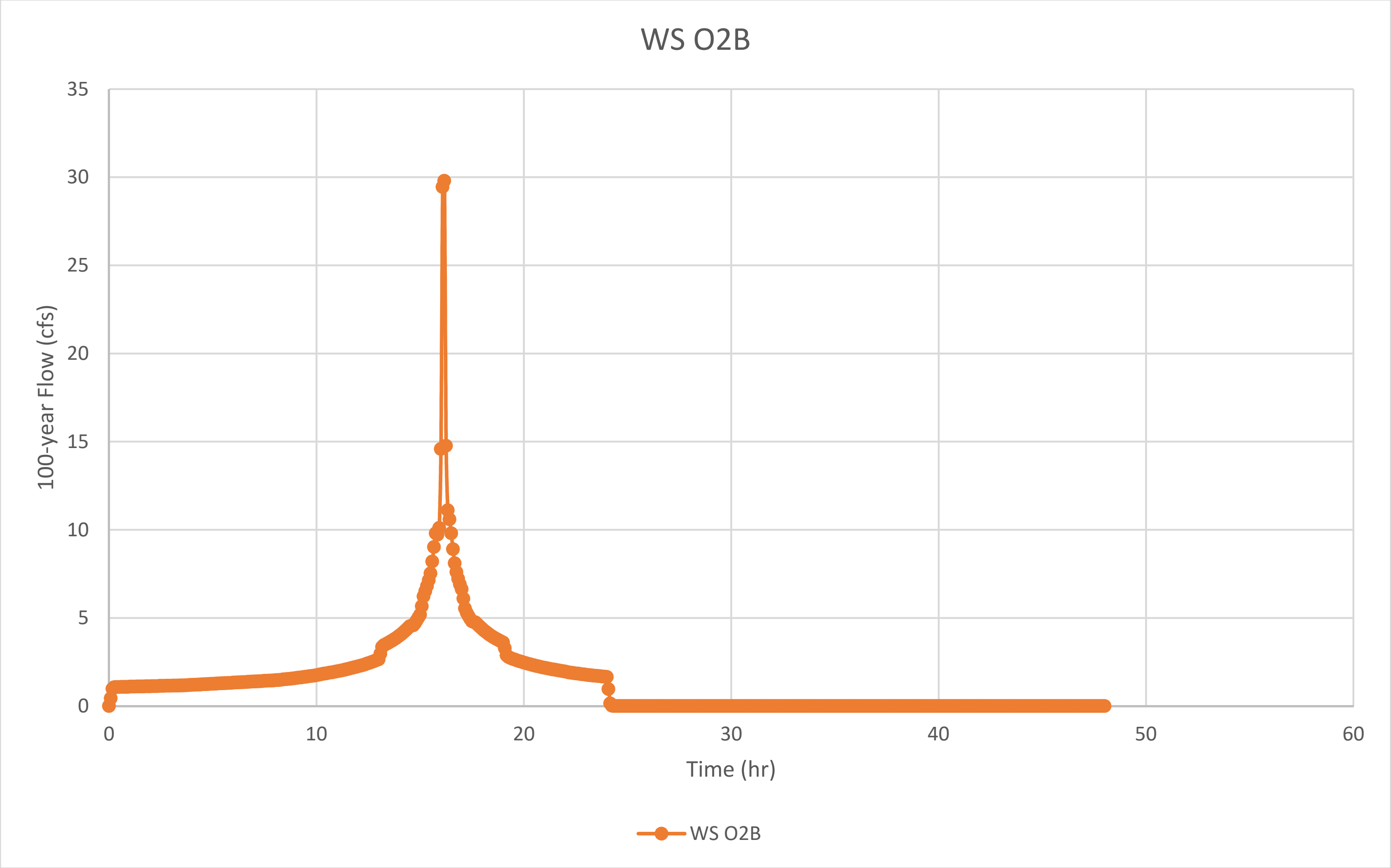
Watershed O1A



Max Flow: 30.87 cfs

Proposed Condition, Onsite:

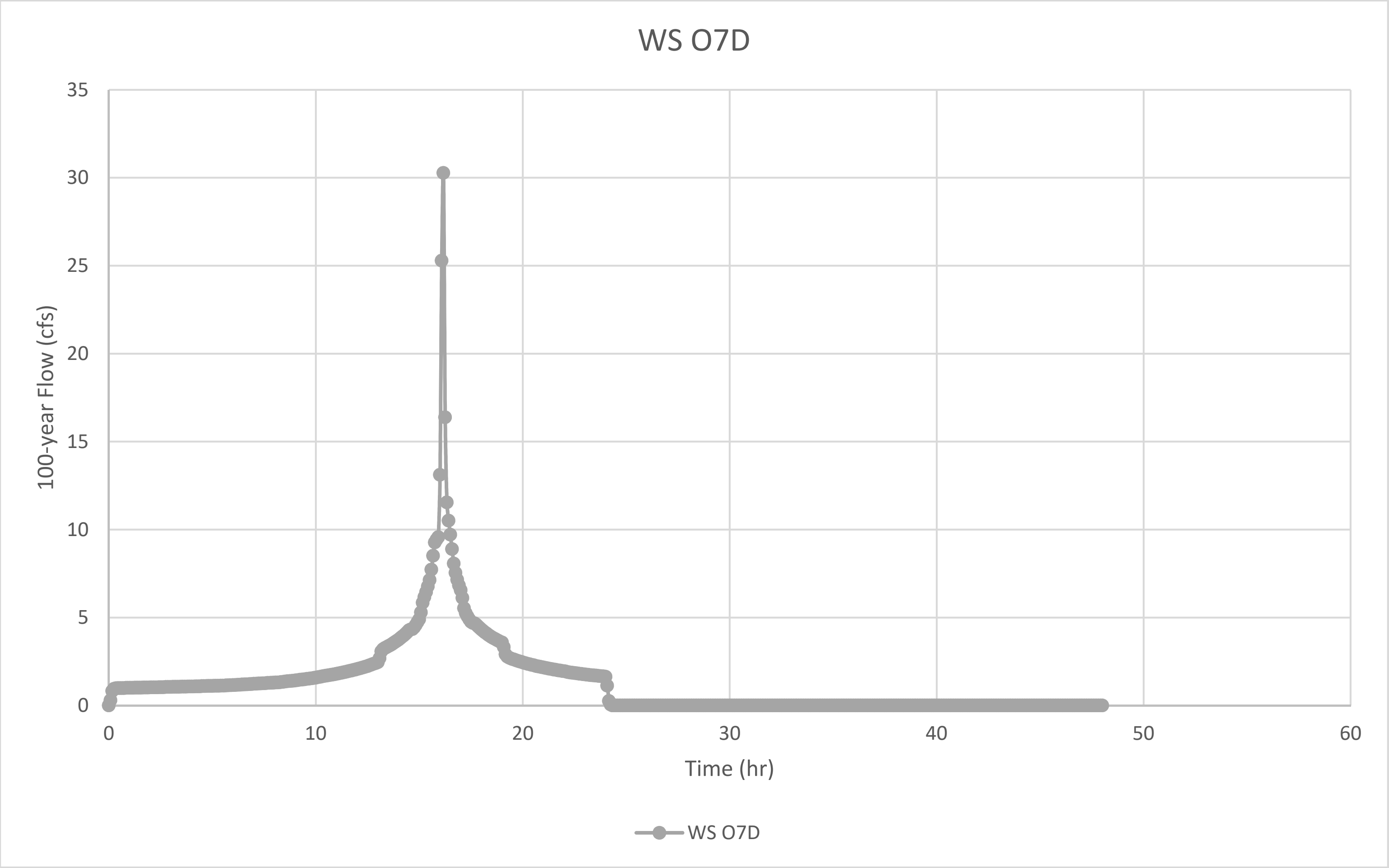
Watershed O2B



Max Flow: 29.8 cfs

Proposed Condition, Onsite:

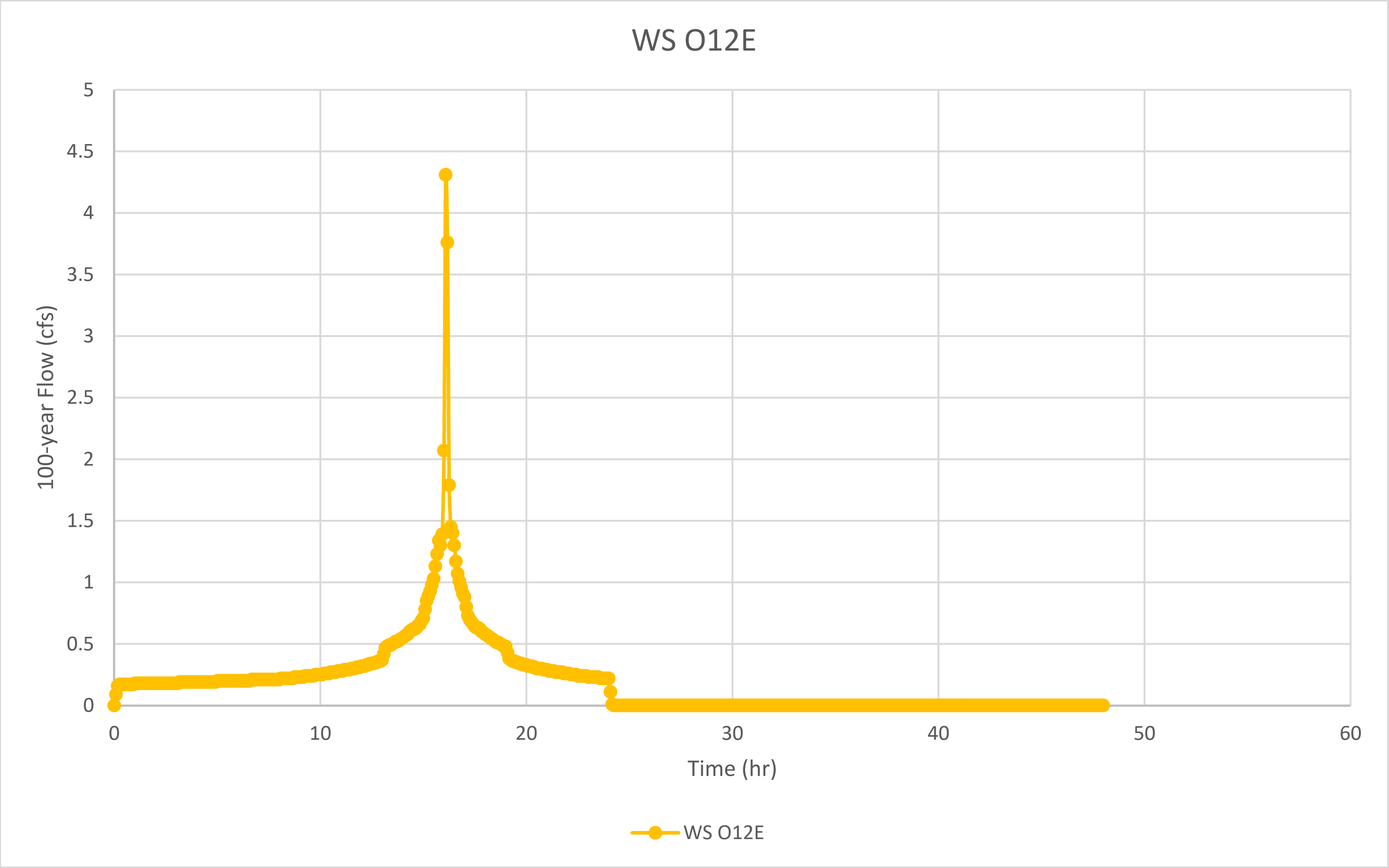
Watershed O7D



Max Flow: 30.27 cfs

Proposed Condition, Onsite:

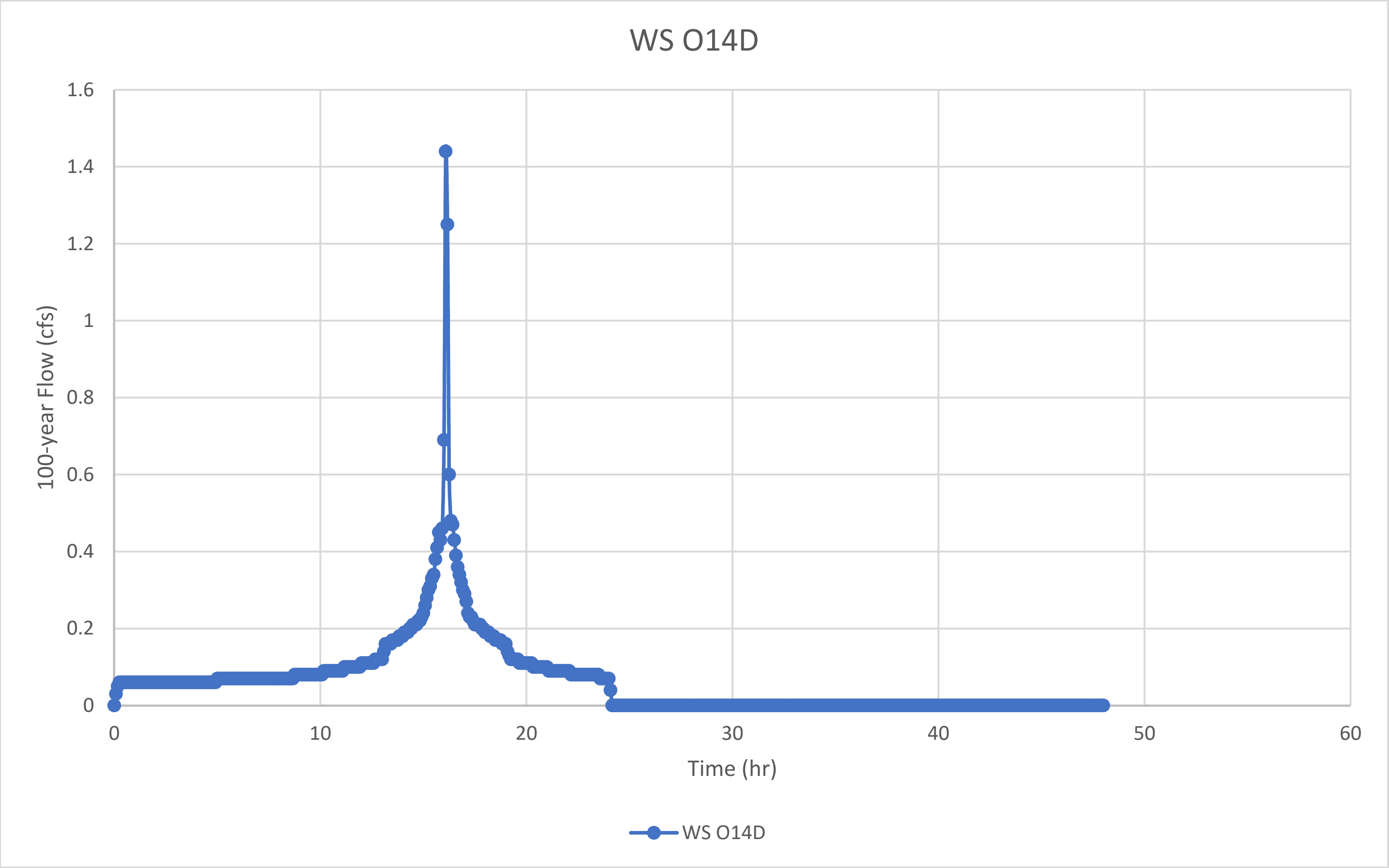
Watershed O12E



Max Flow: 4.3 cfs

Proposed Condition, Onsite:

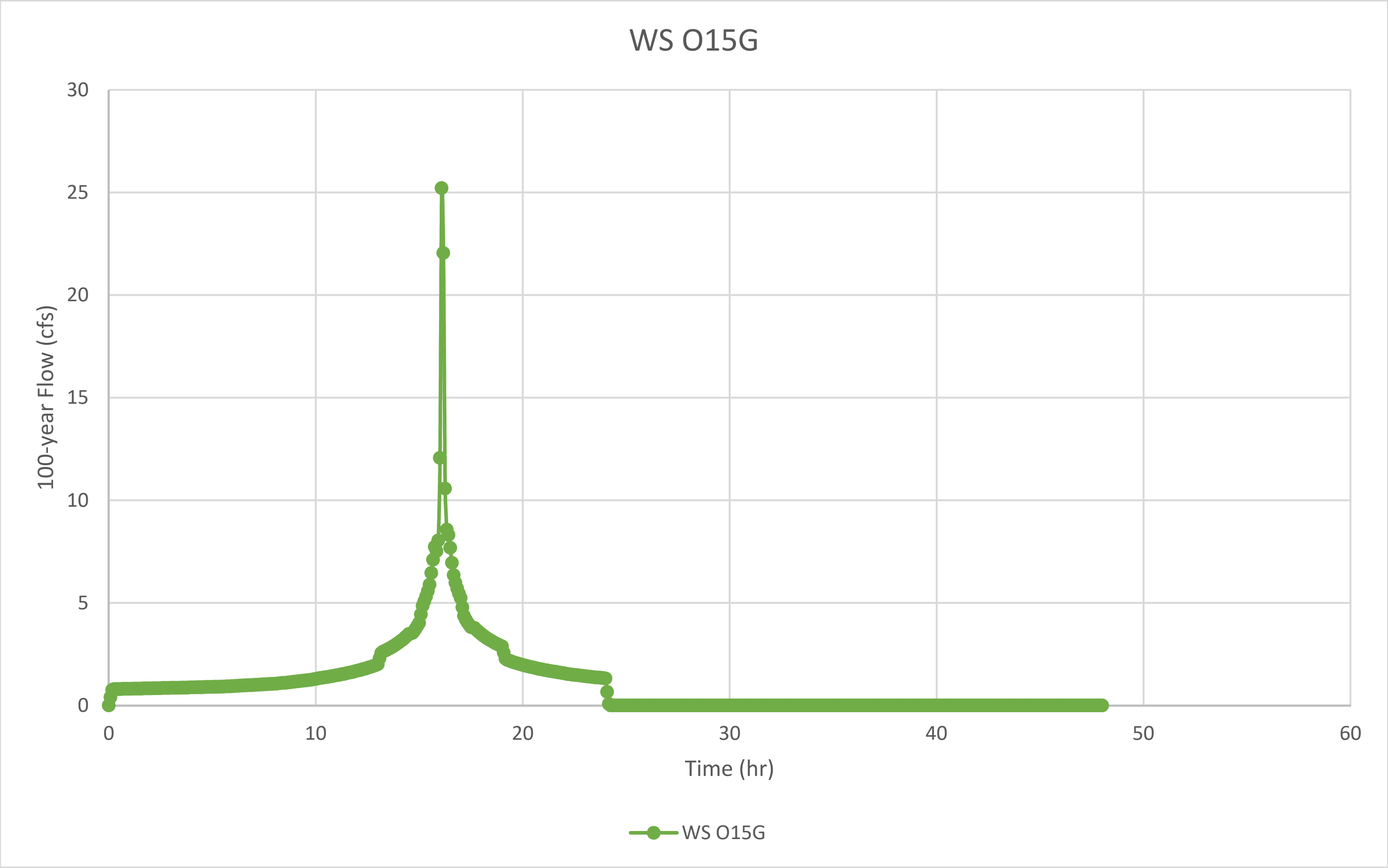
Watershed O14D



Max Flow: 1.4 cfs

Proposed Condition, Onsite:

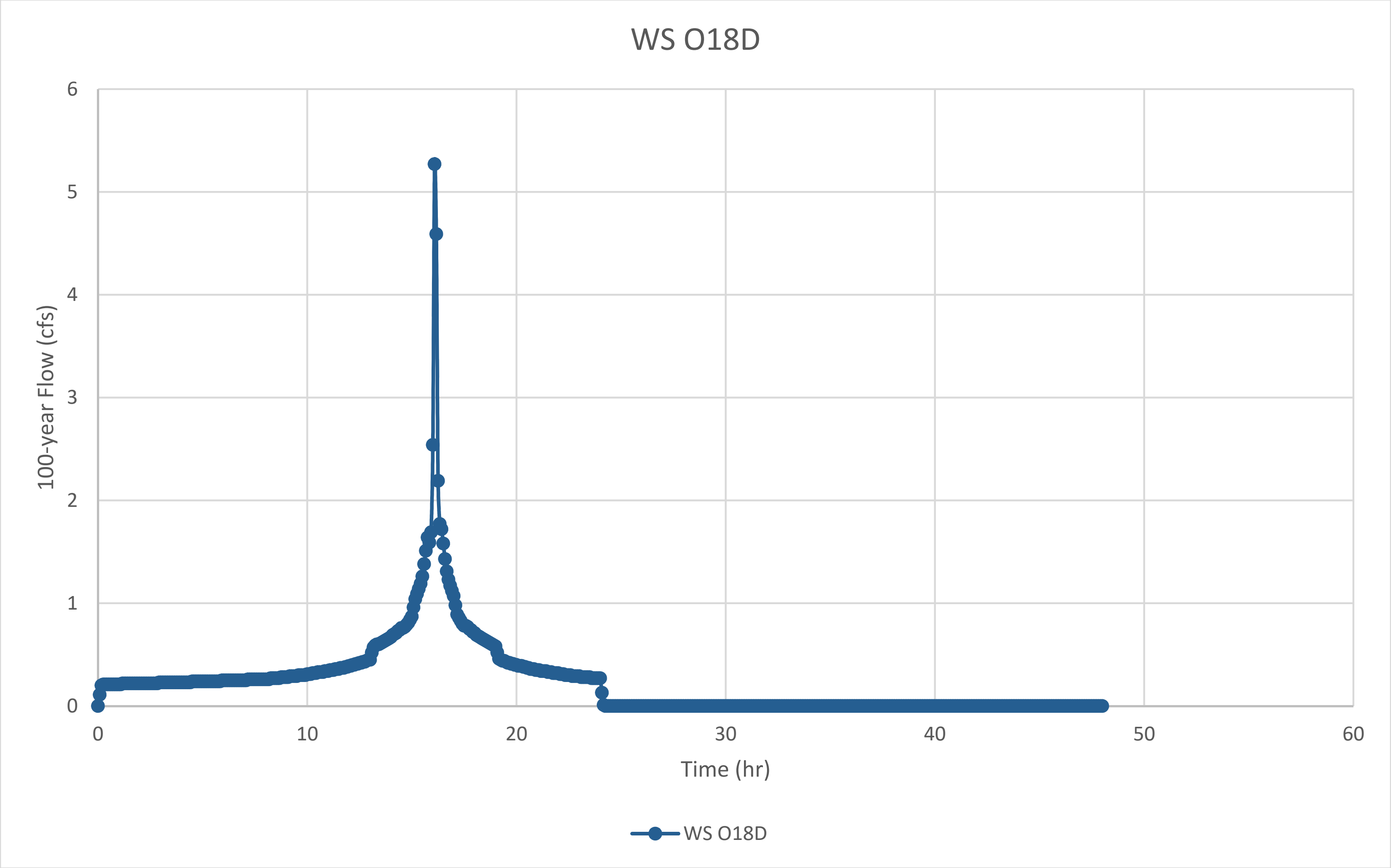
Watershed O15G



Max Flow: 25.21 cfs

Proposed Condition, Onsite:

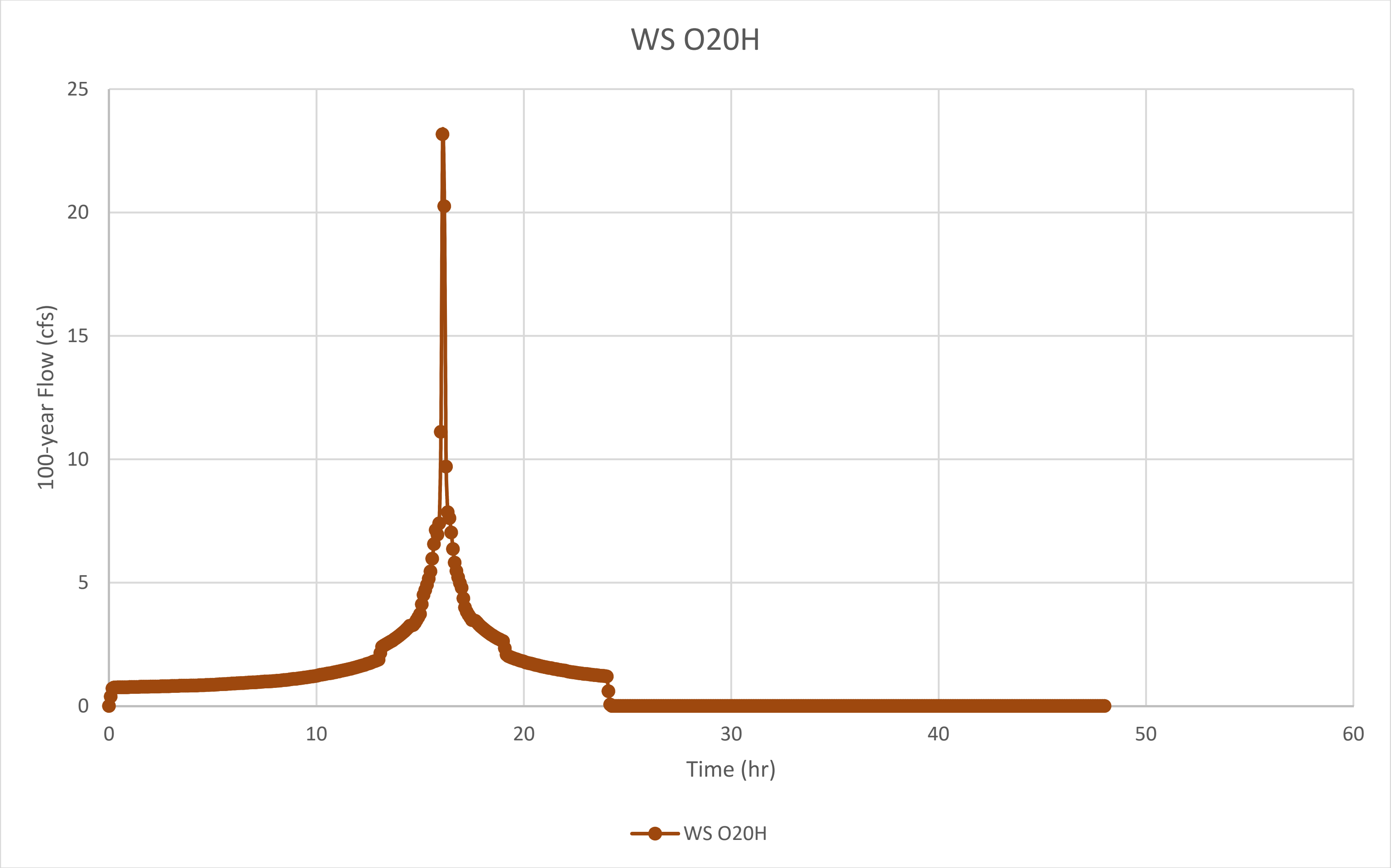
Watershed O18D



Max Flow: 5.27 cfs

Proposed Condition, Onsite:

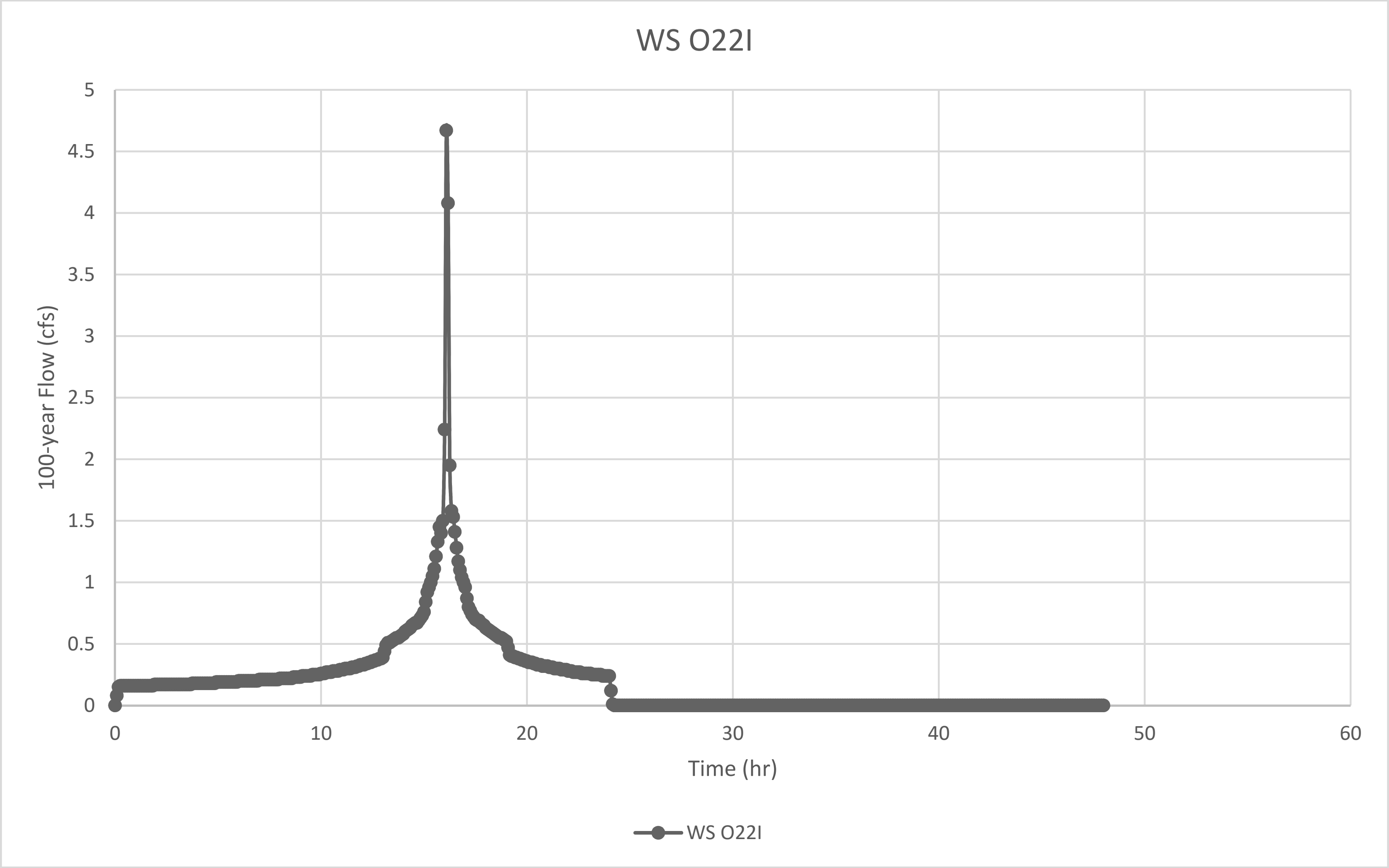
Watershed O20H



Max Flow: 23.17 cfs

Proposed Condition, Onsite:

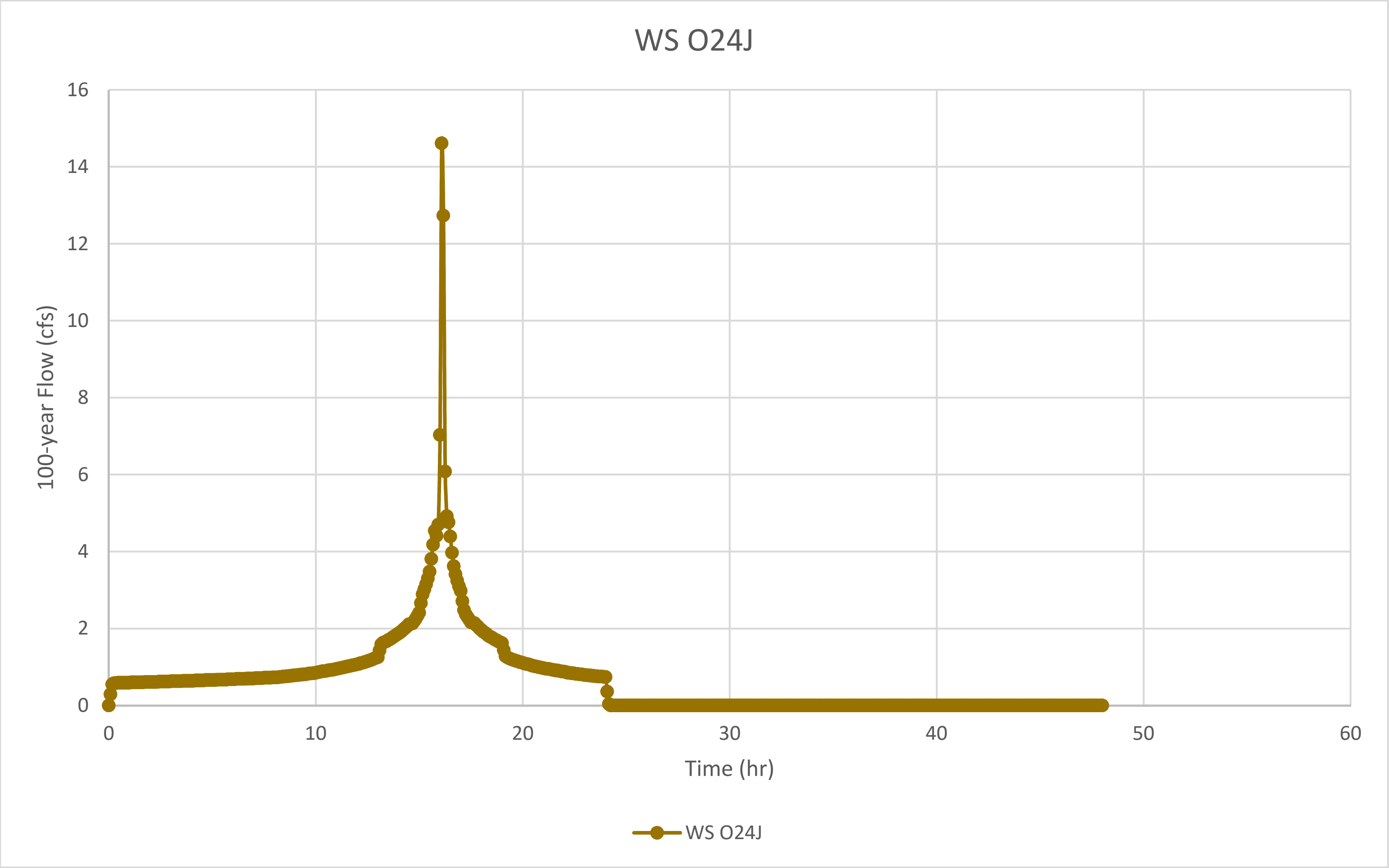
Watershed O22I



Max Flow: 4.67 cfs

Proposed Condition, Onsite:

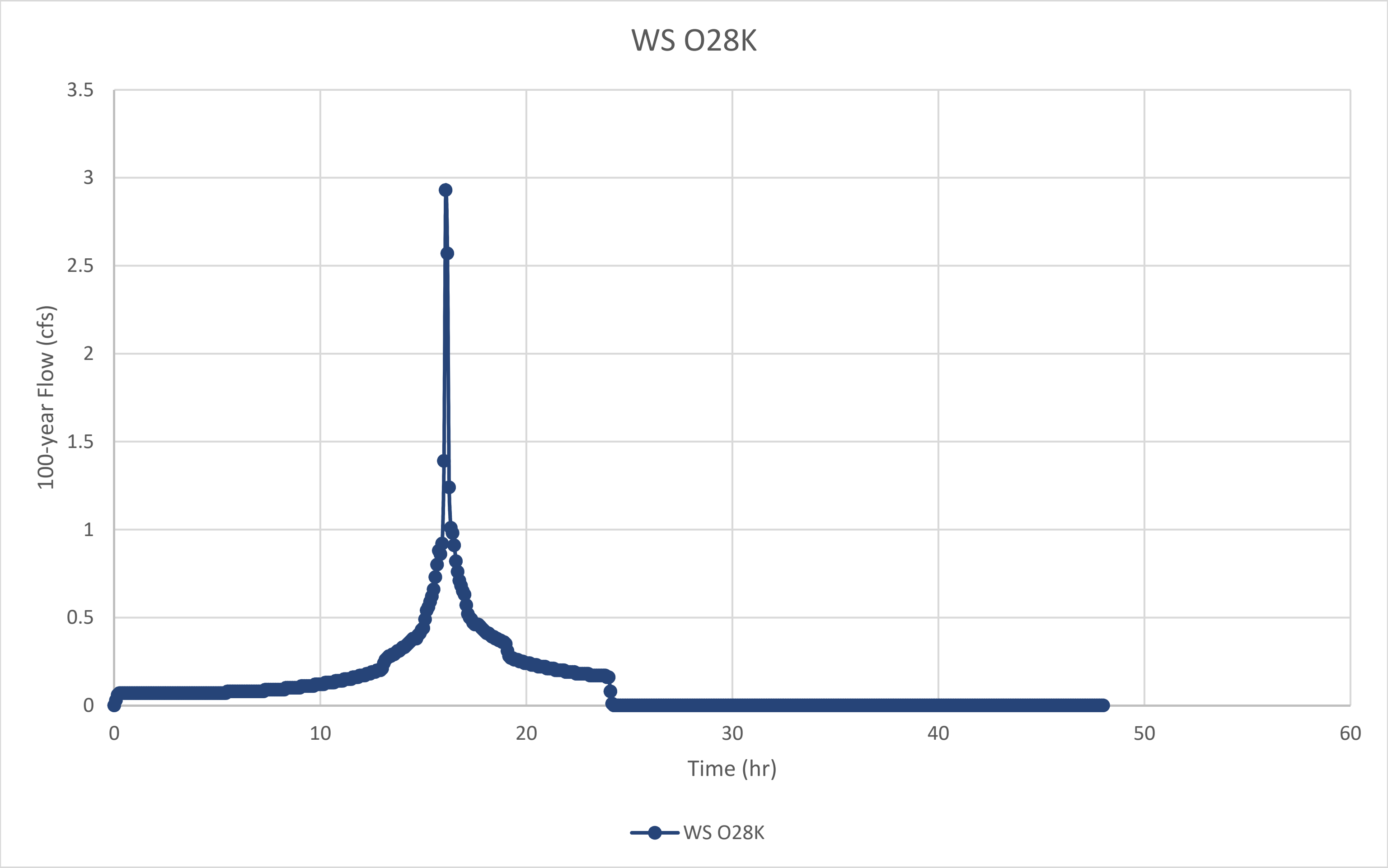
Watershed O24J



Max Flow: 14.61 cfs

Proposed Condition, Onsite:

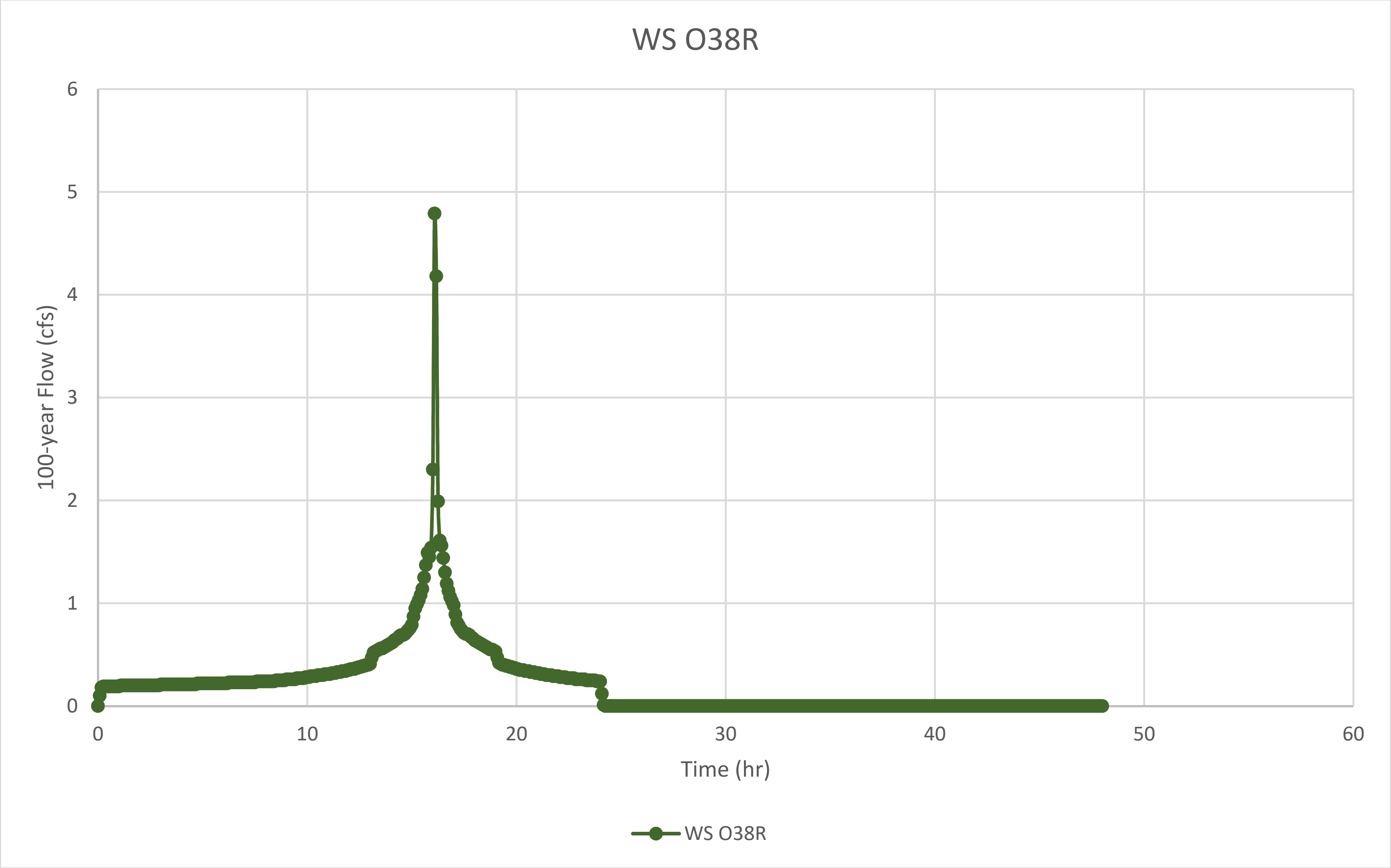
Watershed O28K



Max Flow: 2.93 cfs

Proposed Condition, Onsite:

Watershed O38R



Max Flow: 4.79 cfs

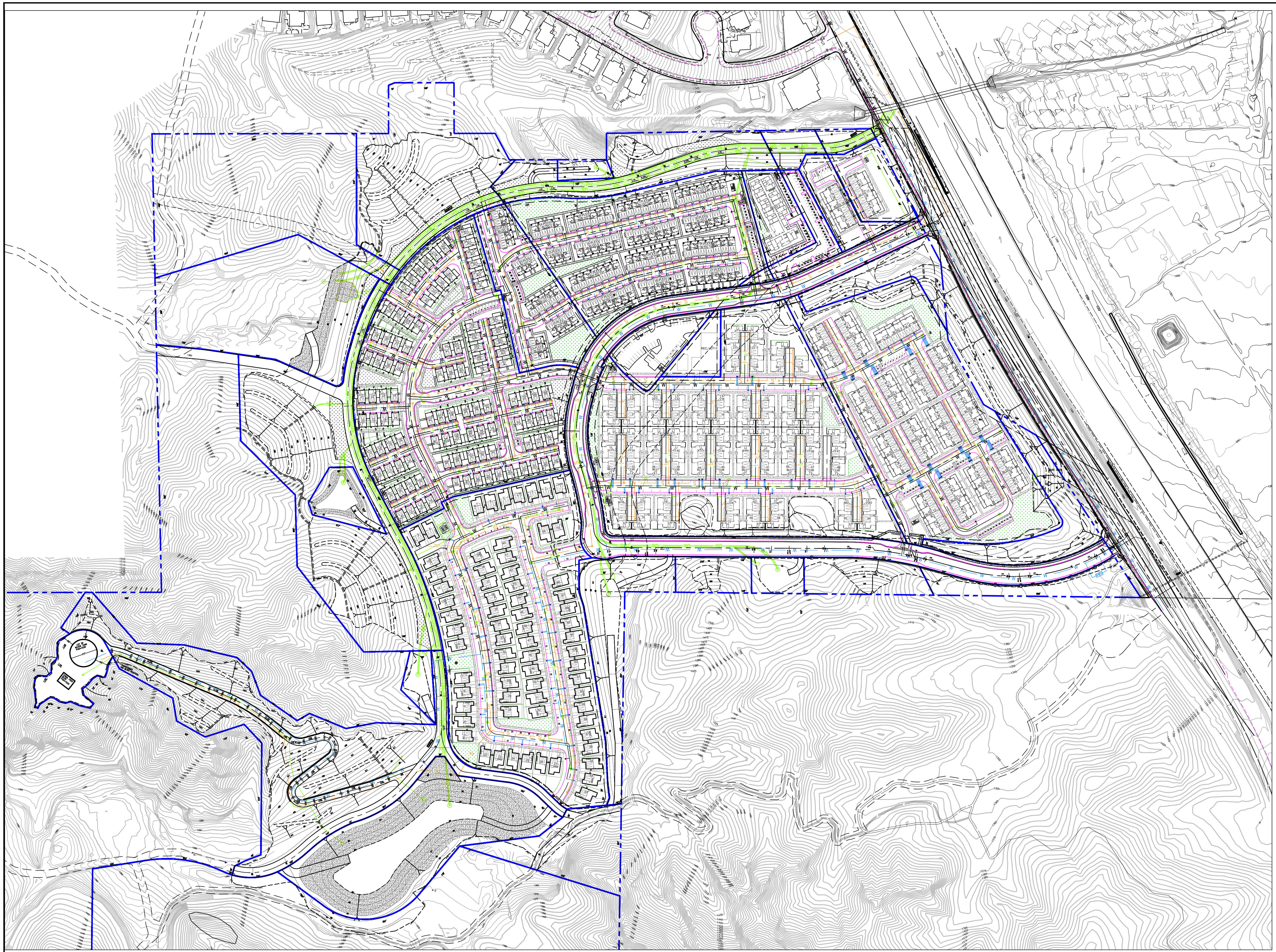
Appendix H – Debris Production Calculations

DEBRIS PRODUCTION CALCUALTIONS

DPA Zone	Total Area (ac)	Developed Area (ac)	Total Area (mi^2)	Undeveloped Area (mi^2)	Developed Area (mi^2)	Debris Production Rate (CY/sq mi)		Debris Vol (CY)	Debris Vol (AF)	Required Structure
						Undeveloped Area (in DPA Zone)	Total Area (Both Zones)			
Basin A										
3	88.2	4.8	0.13781	0.13032	0.00750	124000	111000	17358	**10.76**	Debris Basin
5	20.9	0.6	0.03263	0.03172	0.00091	82000	64000			
Total	109.1	5.4	0.17044							
Basin B										
3	648.3	9.1	1.01297	0.99875	0.01422	62000	61000	63860	**39.58**	Debris Basin
5	23.0	0.0	0.03592	0.03592	0.00000	82000	35500			
Total	671.3	9.1	1.04889	1.03467	0.01422					
Basin J										
3	7.6	3.7	0.01188	0.00617	0.00570	140000	140000	864	**0.54**	Elevated Inlet
5	1.2	1.2	0.00181	0.00000	0.00181	82000	82000			
Total	8.8	4.8	0.01369	0.00617	0.00752					

Watershed	DPA Zone	Total Area (ac)	Developed Area (ac)	Area in Square Miles			Debris Production Rate (CY/sq mi)		Debris Production (CY)	Debris Production (AF)	Required Structure
				Total	Undeveloped	Developed	Undeveloped Area	Total Area			
Watersheds C through I											
C	3	12.57	1.53	0.01964	0.01726	0.00238	140000	140000	2416	**1.50**	Elevated Inlet
E	3	2.62	0.78	0.00409	0.00287	0.00122	140000	140000	402	**0.25**	Elevated Inlet
F	3	7.20	0.77	0.01125	0.01005	0.00120	140000	140000	1407	**0.87**	Elevated Inlet
G	3	3.68	1.03	0.00575	0.00414	0.00161	140000	140000	579	**0.36**	Elevated Inlet

Appendix I – Site Plans



LEGEND:

	PROJECT BOUNDARY
	PROPOSED LOT LINE
20	EXISTING CONTOUR
1400	PROPOSED CONTOUR
	PROPOSED TOP/TOE OF SLOPE
	PROPOSED DAYLIGHT
	EXISTING RIGHT OF WAY
	PROPOSED RIGHT OF WAY
S	PROPOSED SEWER LINE
W	PROPOSED WATER LINE
SD	PROPOSED STORM DRAIN LINE
	EXISTING CURB
	PROPOSED CURB
	PROPOSED YARD FENCE
+ + +	OPEN SPACE AREA FOR OUTDOOR AMENITY

GRAPHIC SCALE

0 50 100 200

(IN FEET)
1 inch = 100 ft.

UNITED CIVIL INC
30141 Agoura Road, Suite 215
Agoura Hills, CA 91301
PH: (818) 707-8648

5/22/2024
SIEW HUAT NG R.C.E. 46026 DATE

SIEW HUAT NG
NO.46026
EXP.12-31-22

OWNER/APPLICANT:

NUWI LYONS CANYON, LLC
2001 WILSHIRE BOULEVARD, SUITE 401
SANTA MONICA, CA 90403
TEL: (310) 864-2427

NO.	DATE	REVISIONS	BY	APPR

THE TRAILS AT LYONS CANYON
MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP NO. 83301
(FOR CONDOMINIUM PURPOSES)

LOCATED IN THE UNINCORPORATED TERRITORY OF
THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

SITE DEVELOPMENT PLAN

DATE:
JANUARY 5, 2024

SHEET 1
OF 1

Q:\Santa Clarita\Lyons Canyon Ranch\UCI\Exhibit\Lyons Site Plan Exhibit Utilities.dwg

Appendix J – Outlet Tower Standard Details

If for any reason an elevated inlet cannot meet the requirements, then a debris basin is required. A typical elevated inlet is shown in Figure 4.3.2.

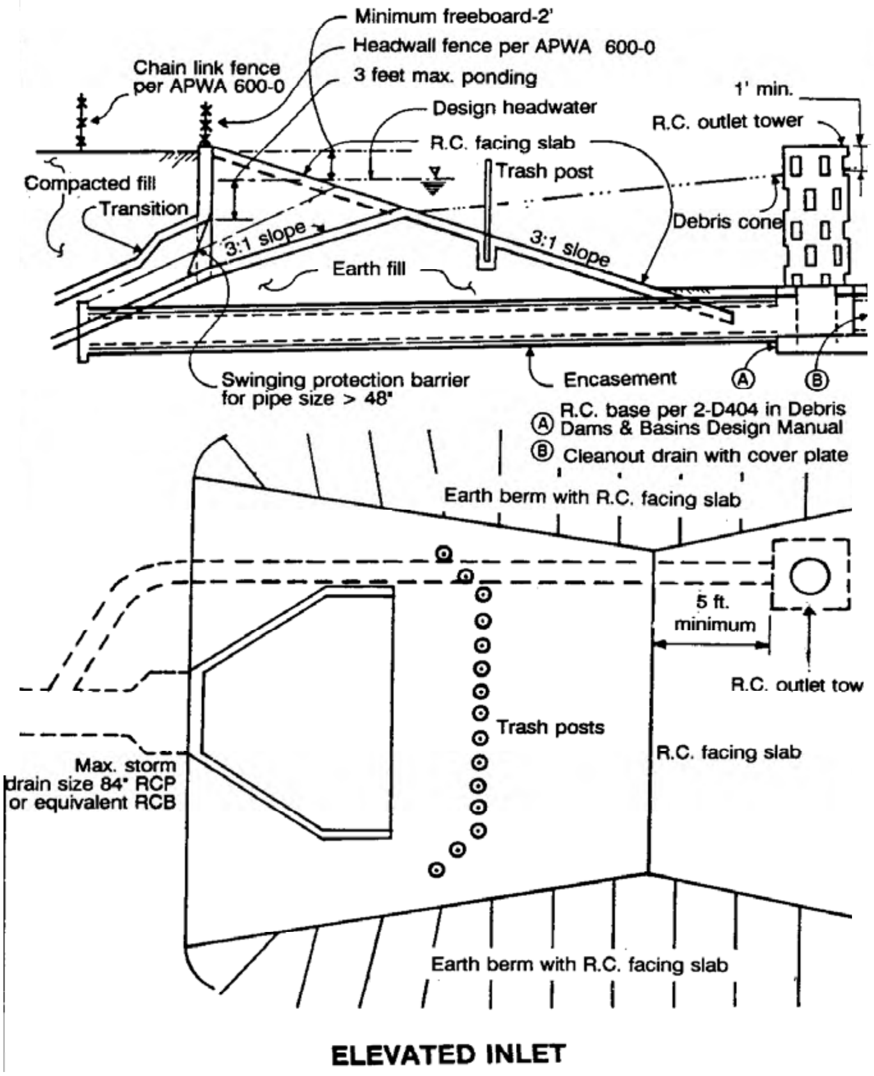
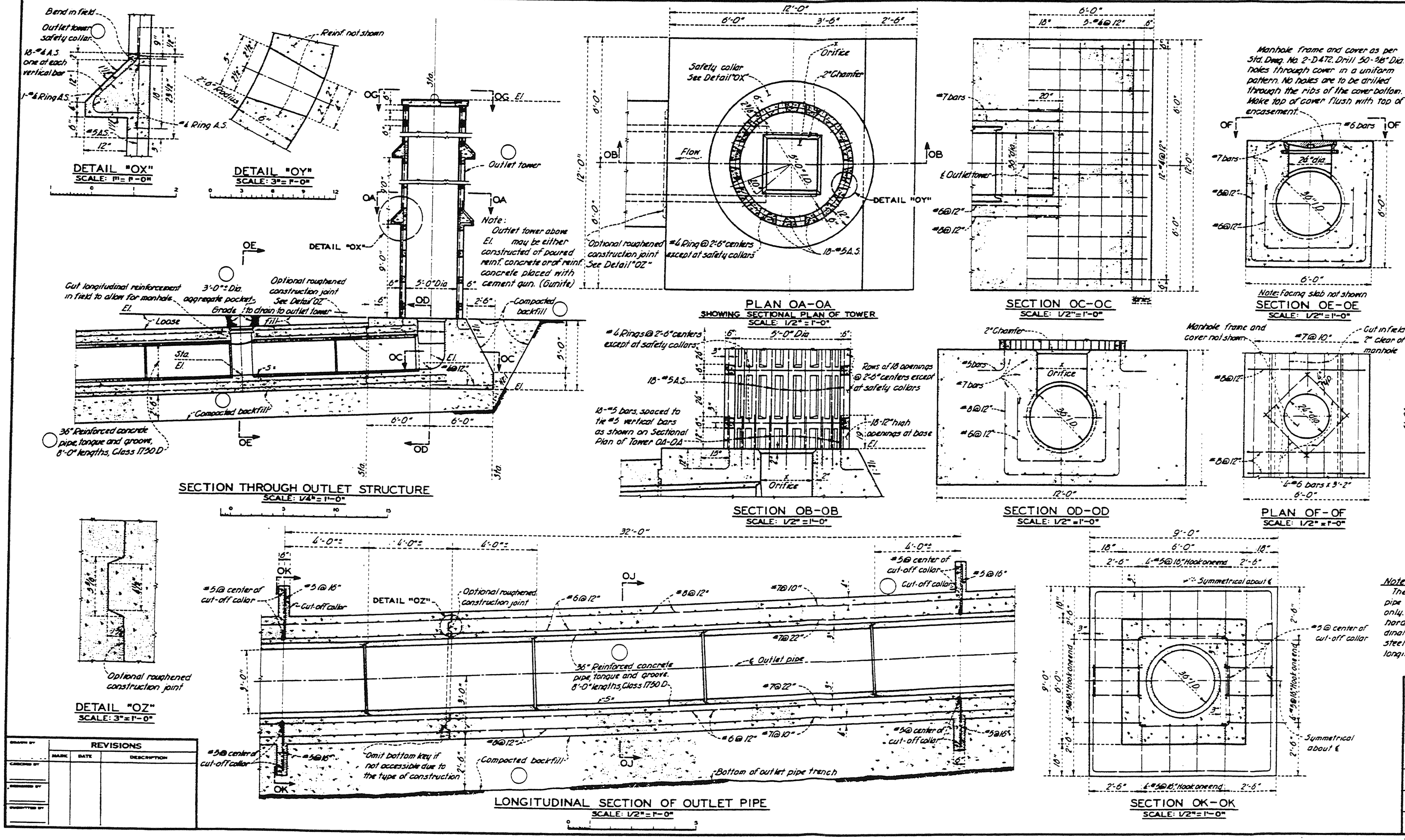


Figure 4.3.2
Elevated Inlet



Note:
The longitudinal #7 bars shown in the outlet pipe encasement are designed for hard grade steel only. If medium grade steel is used in place of hard grade steel, the size or number of longitudinal bars must be increased to provide a total steel area equal to 1.275 times the total area of longitudinal bars shown hereon.

LOS ANGELES COUNTY
FLOOD CONTROL DISTRICT

OUTLET WORKS

EARTHWORK AND
STRUCTURAL DETAILS

RECOMMENDED BY
APPROVED BY
CHIEF ENGINEER

SCALE	DATE	DWG. NO. 2-D404
AS SHOWN	APRIL 1964	SHEET OF

Revised 2-80 D. B. Man.

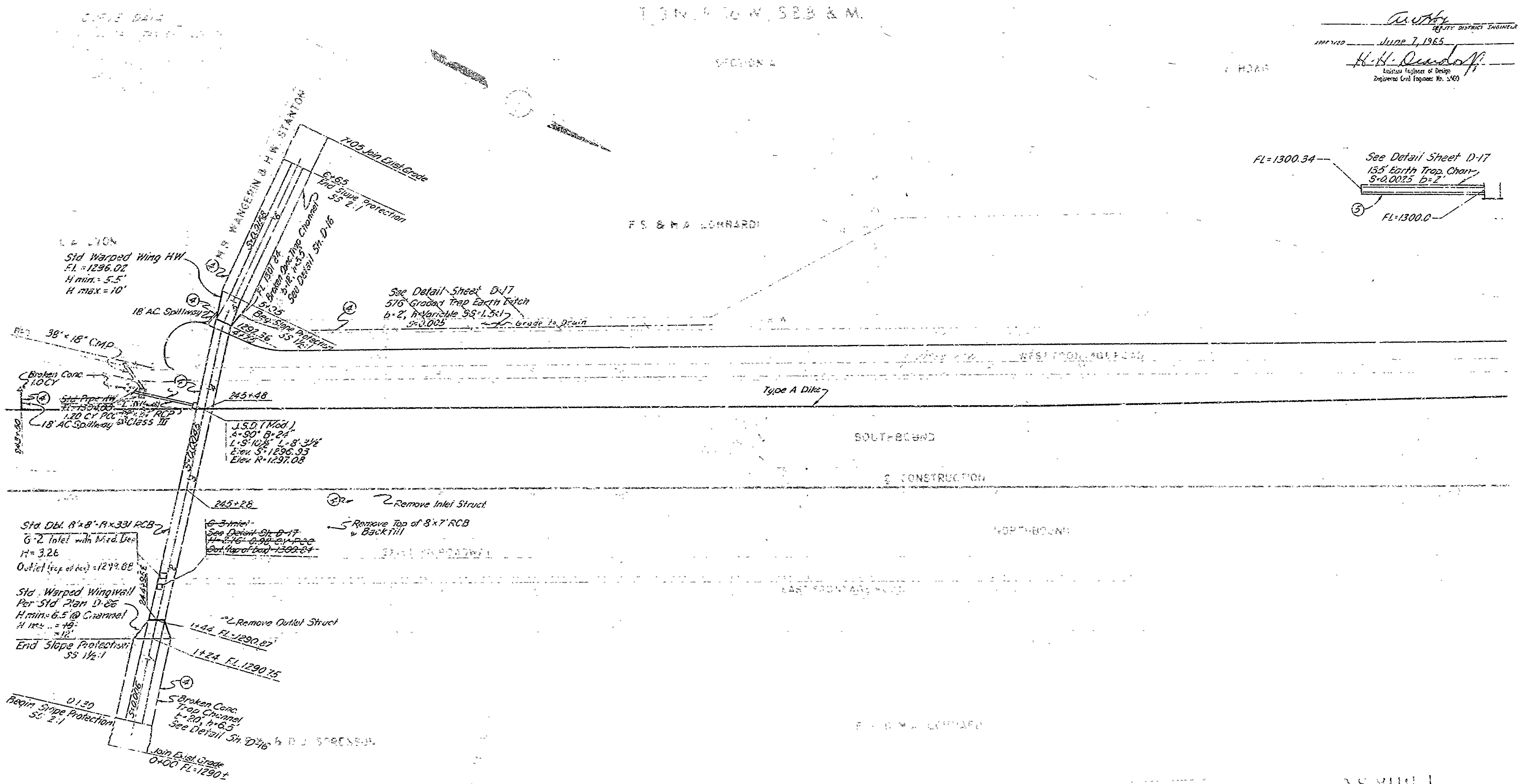
Appendix K – Caltrans Culvert As-Built Plans

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJ.	SHEET NO.	TOTAL SHEETS
07	LA	5	49.1/53.7	48	156

DEPUTY DISTRICT ENGINEER

APPROVED June 7, 1965

H. H. Dendorff
Assistant Engineer of Design
Registered Civil Engineer No. 5560



Fill and compact old channel to adjacent ground level, and grade to drain.

AS BUILT PLANS
Contract No 07-034724
Date Completed 10-19-67
Document No. 70000113

AS BUILT
CONTRACT NO. 07-034724
R. W. Drew
10-18-67

DRAINAGE

D-3

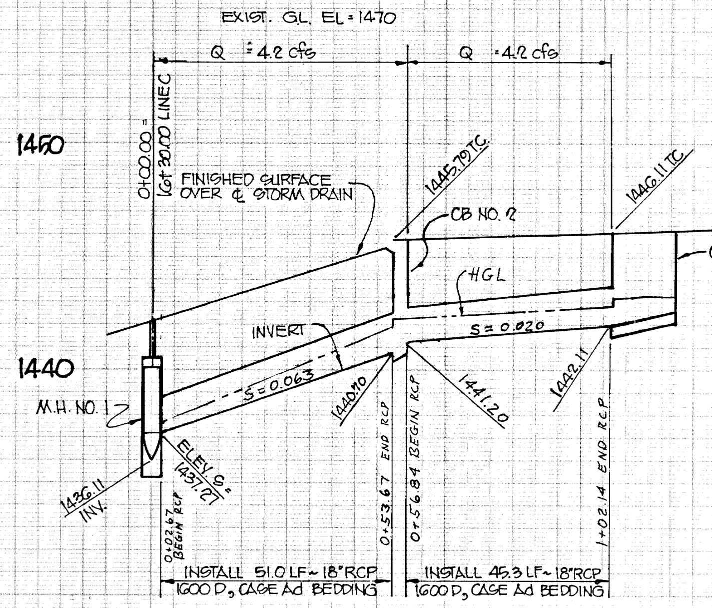
PROJECT ENGINEER	DATE	DESIGN ENGINEER	DATE	APPROVAL RECOMMENDED BY	DATE
R. Allen	9/64	H. Heckeroth	9/64	W. E. Schaefer	9/64

REV 3-65

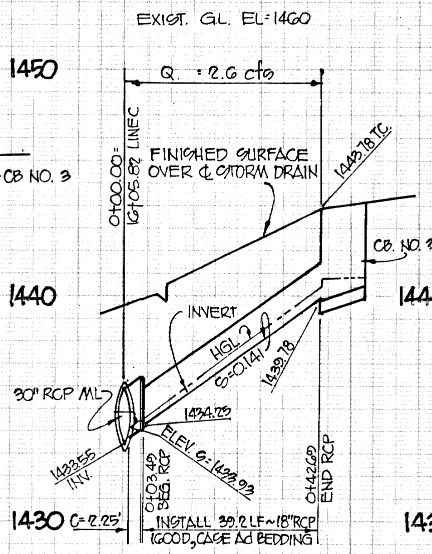
166 18

48

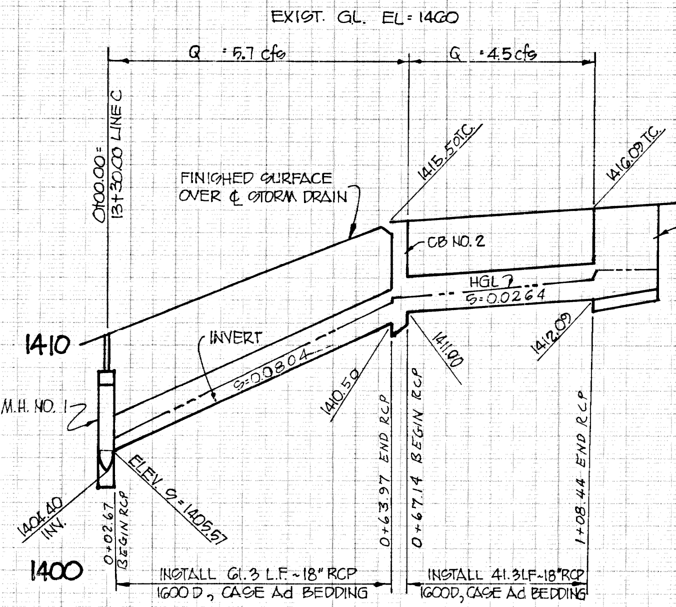
STORM DRAIN PLANS IN
TRACT No. ~~43791~~ 43792 43793 ④ P.M. 18001 P.D. No. 1977



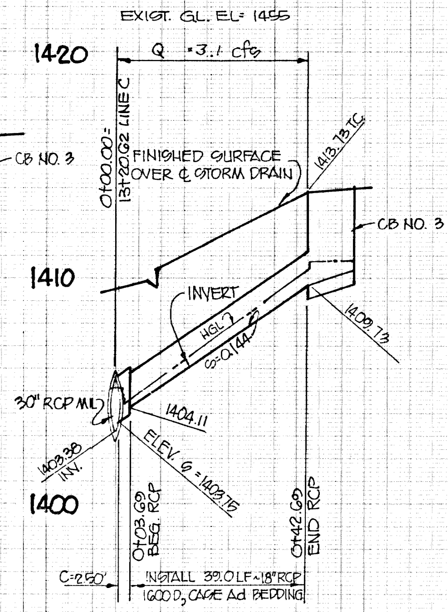
LINE C-6



LINE C-7



LINE C-8



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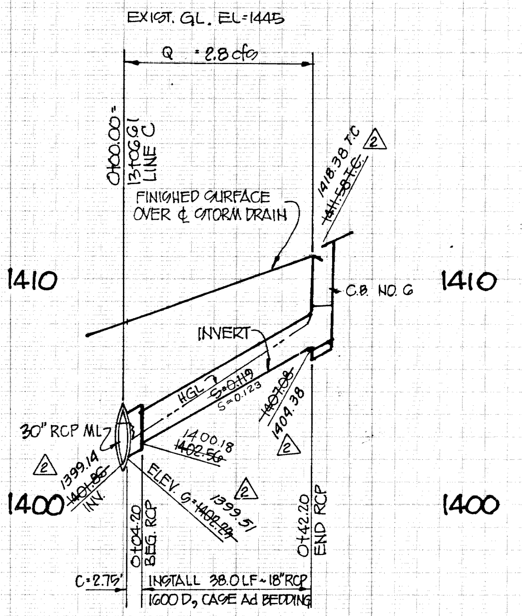

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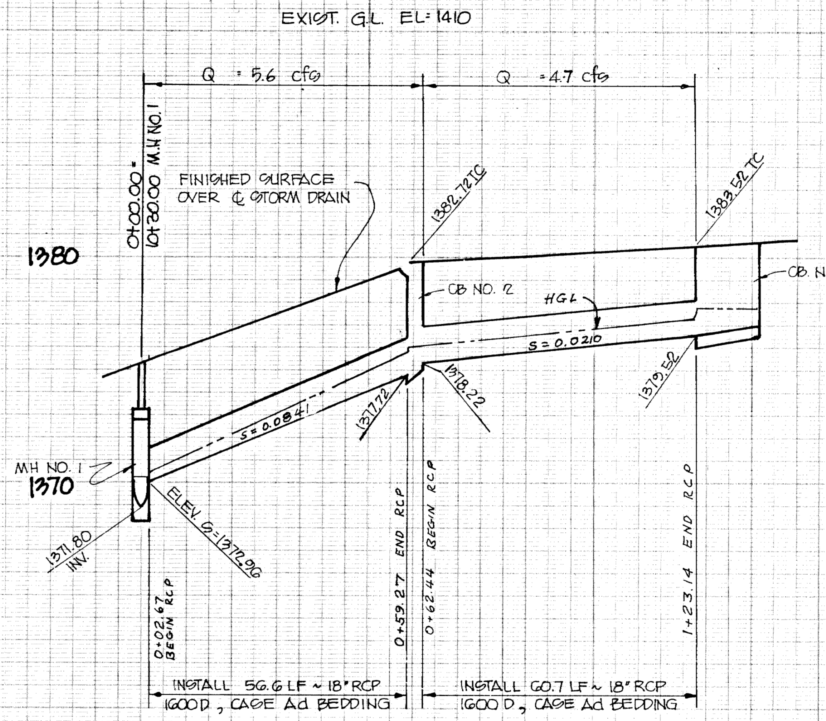
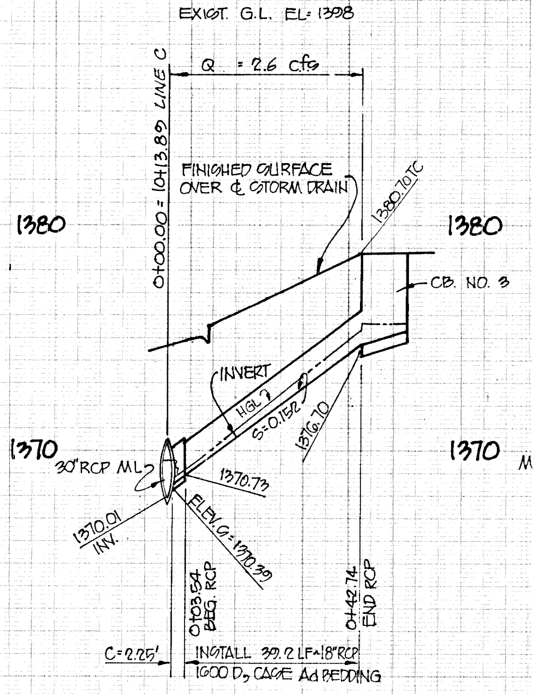


LINE C-11



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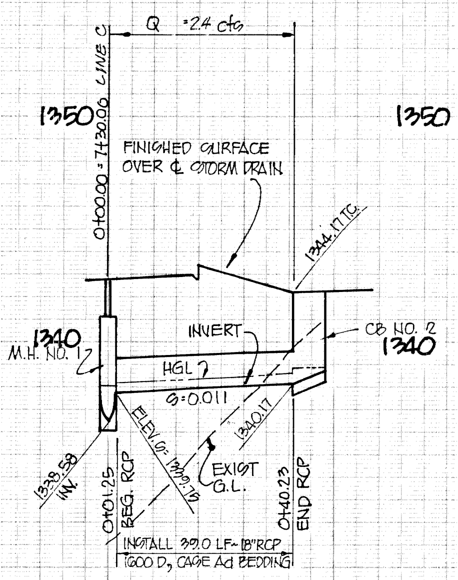
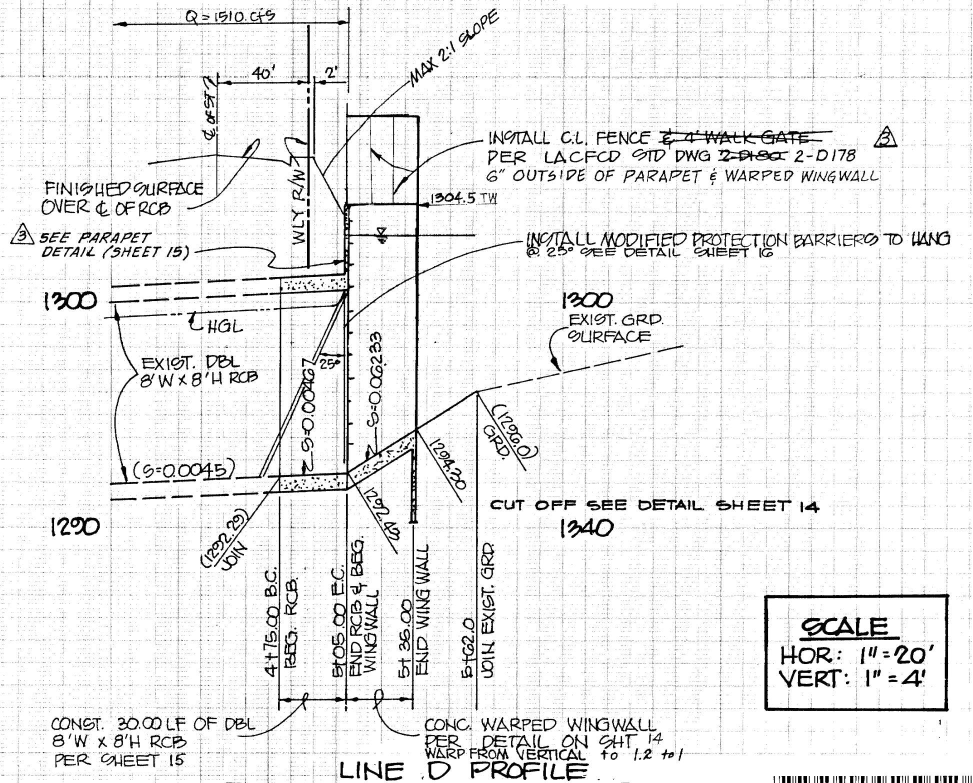


LINE C-13



LINE D PROFILE

SCALE: HORIZ = 1"=40'
VERT. = 1"=4'

4

5

SCALE
HOR: 1"=20'
VERT: 1"=4'

PF510043

12/31/89

NO.	REVISION	REVISED BY	APPROVED BY	DATE
②	RELOCATE C.B.		David A. Distelari	12/11/86
③	ADDED PARAPET DETAIL & REVISED FENCING		David A. Distelari	12/16/86
④	ADDED P.M. 18001		David A. Distelari	1/29/87

DES BY P.V.V.
DRWN BY ДИ
CHKD BY TKJ

PLANS PREPARED BY:
JOEL SILVERMAN & ASSOCIATES
20300 VENTURA BLVD - SUITE 350
WOODLAND HILLS, CA. 91364
(818) 999-5560
SIGNATURE: RCE NO. 16842

COUNTY OF LOS ANGELES, CALIFORNIA
THOMAS A. TIDEMANSON DIRECTOR OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION
CHECKED BY: R.H. Kalom RCE NO. 29363 DATE: 7/30/86
OFFICE OF THE DIRECTOR OF PUBLIC WORKS

SHT 10 of 16 SHTS

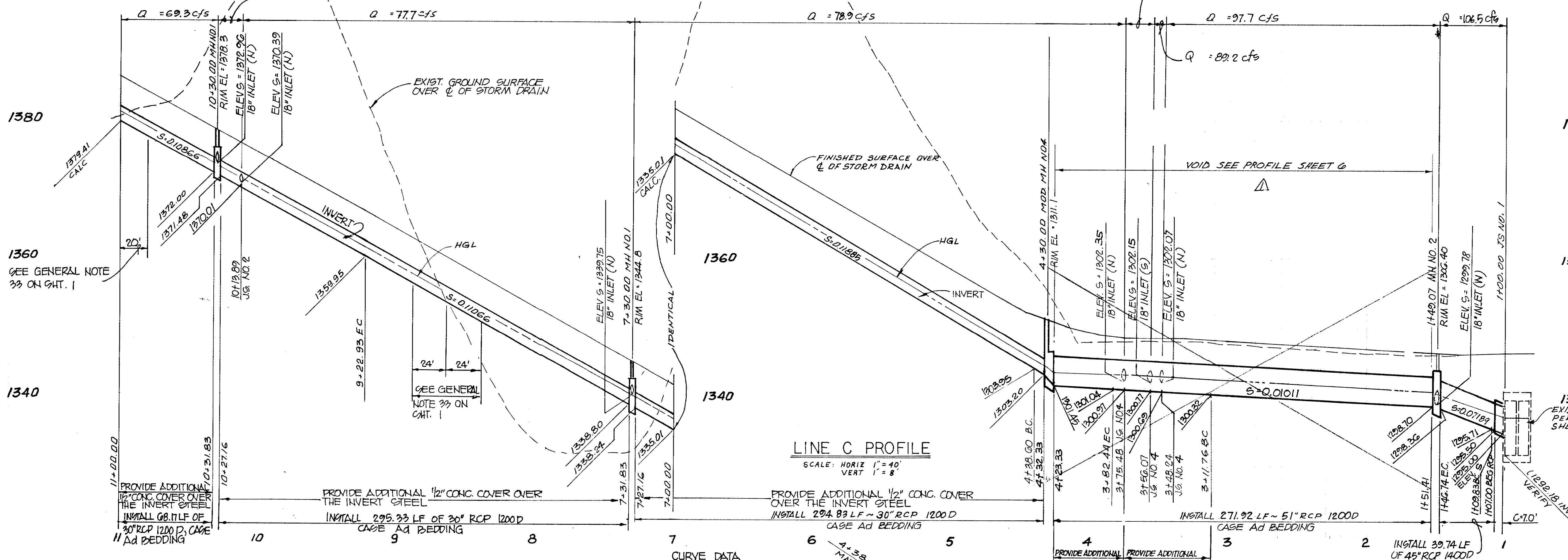
377-F134.10

02/18/86 18:49
02/18/86 17:16
SYSTEM P.SCOT P.SCOT
SYSTEM P.SCOT P.SCOT

L.A. Co. Road Dept. Sheet #2
Southern Calif. Blueprint Co. 9/82

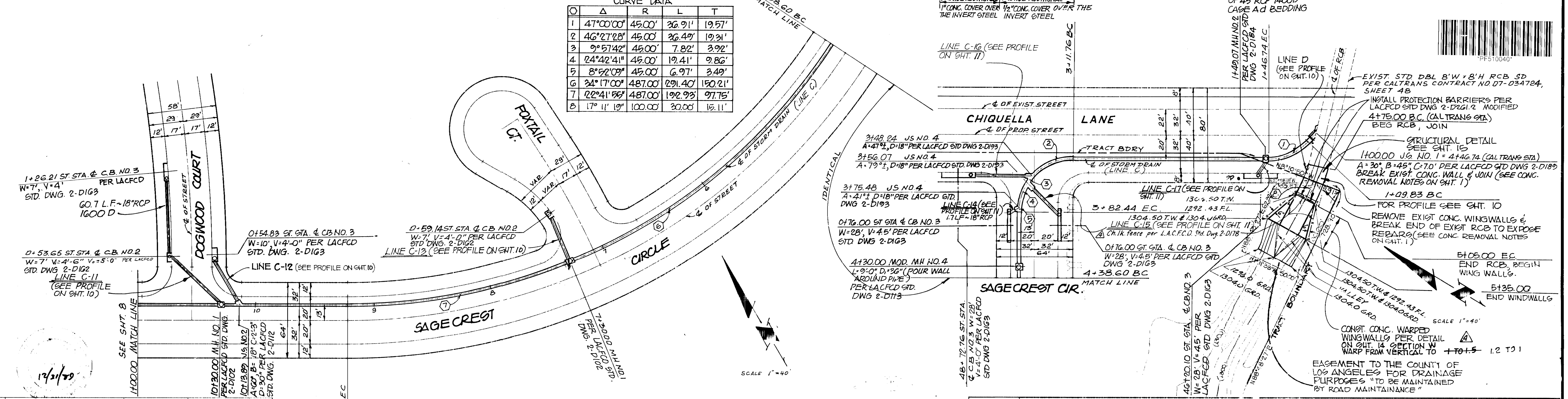
STORM DRAIN PLANS IN
TRACT No. ~~43791~~ 43792 43793 △5 P.M. 18001 P.D. No. 1977

337-F134.7



CURVE DATA

⬡	Δ	R	L	T
1	47°00'00"	45.00'	36.91'	19.57'
2	46°27'28"	45.00'	36.49'	19.31'
3	9°57'42"	45.00'	7.82'	3.92'
4	24°42'41"	45.00'	19.41'	9.86'
5	8°52'09"	45.00'	6.97'	3.49'
6	34°17'00"	487.00'	291.40'	150.21'
7	22°41'55"	487.00'	192.93'	97.75'
8	17°11'19"	100.00'	30.00'	15.11'



PF510040

12/31/89

NO.	REVISION	REVISED BY	APPROVED BY	DATE
△1	LINE "C" STA. 1+51.41 TO STA. 4+23.33 (DELETED)		David A. Diotalevi	8/22/86
△4	REVISED WARPED WINGWALLS SHOW FENCING PER 2-D178		David A. Diotalevi	12/12/86
△5	ADDED P.M. 18001		David A. Diotalevi	1/29/87

DES BY	P.V.V.
DRWN BY	[illegible]
CHKD BY	TKJ

PLANS PREPARED BY:
JOEL SILVERMAN & ASSOCIATES
20300 VENTURA BLVD - SUITE 350
WOODLAND HILLS, CA. 91364
(818) 999-5560
SIGNATURE Joel Silverman RCE NO. 16844 Oct 30, '89

COUNTY OF LOS ANGELES, CALIFORNIA
THOMAS A. TIDEMANSON DIRECTOR OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION
CHECKED BY: R H Kulow RCE NO. 29363 DATE: 7/30/86
OFFICE OF THE DIRECTOR OF PUBLIC WORKS

SHT 7 of 16 SHTS

L.A. Co. ROAD DEPT. SHEET #2
SOUTHERN CALIF. BLUEPRINT Co. 9/82

02/18/86 10:18
SYSTEM P.SCOT, P.SCOT

Appendix L – Basin Stage-Area and Volume Curves

BASIN STAGE-AREA AND STAGE-VOLUME CURVES CONSIDERING SLOPED DEBRIS CONE

Elevation (ft)	Depth (ft)	Area (ac)	Area Considering Debris (ac)	Cumulative Vol Considering Debris (AF)
Basin A				
1350.00	0.00	0.670	0.000	0.00
1353.45	**3.45**	**1.368**	**0.000**	**0.00**
1354.00	4.00	1.479	0.133	0.04
1355.00	5.00	1.681	0.514	0.36
1360.00	10.00	2.731	2.213	7.18
1365.00	15.00	4.125	4.068	22.88
Basin B				
1350.00	0.00	0.826	0.000	0.00
1355.00	5.00	1.292	0.000	0.00
1360.00	10.00	1.843	0.000	0.00
1365.40	**15.40**	**3.070**	**0.000**	**0.00**
1366.00	16.00	3.286	0.484	0.15
1367.00	17.00	3.609	1.307	1.04
1368.00	18.00	4.685	2.131	2.76
1370.00	20.00	5.347	3.848	8.74
1372.00	22.00	6.019	5.646	18.23
1375.00	25.00	6.700	6.700	36.75

Notes:

Bolded elevation represents the debris elevation at the basin's spillway

Debris extents and elevation calculations were completed in GIS using sloped debris cone and proposed basin grading

Debris slopes were set to 1.9% and 1.3% for Basins A and B, respectively

Debris load for Basins A and B are 10.76 AF and 39.59 AF, respectively

BASIN STAGE-AREA AND STAGE-VOLUME CURVES CONSIDERING FLAT DEBRIS CONE

Elevation (ft)	Depth (ft)	Area (sq ft)	Area (ac)	Incremental Volume (AF)	Cumulative Vol (AF)	Area Considering Debris (ac)	Cumulative Vol Considering Debris (AF)
Basin C							
1340.00	0.00	2277	0.052	0.00	0.00	0.000	0.00
1344.99	4.99	23816	0.547	1.49	1.49	0.000	0.00
1345.00	5.00	23859	0.548	0.01	1.50	0.548	0.00
1350.00	**10.00**	**42085**	**0.966**	**3.78**	**5.28**	**0.966**	**3.79**
1355.00	15.00	63715	1.463	6.07	11.36	1.463	9.86
Basin E							
1370.00	0.00	4493	0.103	0.00	0.00	0.000	0.00
1371.93	1.93	6699	0.154	0.25	0.25	0.000	0.00
1371.94	**1.94**	**6711**	**0.154**	**0.00**	**0.25**	**0.154**	**0.00**
1375.00	5.00	10197	0.234	0.59	0.84	0.234	0.59
1375.50	5.50	10816	0.248	0.12	0.96	0.248	0.71
Basin F							
1357.50	0.00	5972	0.137	0.00	0.00	0.000	0.00
1358.00	0.50	6505	0.149	0.07	0.07	0.000	0.00
1360.00	2.50	8779	0.202	0.35	0.42	0.000	0.00
1361.89	4.39	11701	0.269	0.44	0.87	0.000	0.00
1361.90	**4.40**	**11717**	**0.269**	**0.00**	**0.87**	**0.269**	**0.00**
1365.00	7.50	16502	0.379	1.00	1.87	0.379	1.00
1365.50	8.00	17801	0.409	0.20	2.07	0.409	1.20
Basin G							
1363.00	0.00	3585	0.082	0.00	0.00	0.000	0.00
1365.00	2.00	5642	0.130	0.21	0.21	0.000	0.00
1366.00	3.00	7085	0.163	0.15	0.36	0.000	0.00
1366.01	**3.01**	**7100**	**0.163**	**0.00**	**0.36**	**0.163**	**0.00**
1370.00	7.00	12838	0.295	0.91	1.27	0.295	0.91
Basin J							
1325.50	0.00	0	0.000	0.00	0.00	0.000	0.00
1330.00	4.50	4570	0.105	0.24	0.24	0.000	0.00
1332.00	6.50	7918	0.182	0.29	0.52	0.000	0.00
1332.08	6.58	8176	0.188	0.01	0.54	0.000	0.00
1332.09	**6.59**	**8208**	**0.188**	**0.00**	**0.54**	**0.188**	**0.00**
1335.00	9.50	17540	0.403	0.86	1.40	0.403	0.86
1336.00	10.50	21373	0.491	0.45	1.85	0.491	1.31

Note: Bolded elevation represents the debris elevation in the basin, assuming a flat (0% slope) debris cone

Appendix M – ESA Compliance Documents

DUDEK
225 SOUTH LAKE AVENUE
SUITE M210
PASADENA, CALIFORNIA 91101
T 626.204.9800

MEMORANDUM

To:	Corey Harpole-New Urban West Inc.
From:	Michael Cady, Senior Biologist
Subject:	Trails at Lyon's Canyon – Federal Endangered Act Species Determination
Date:	May 8, 2024
cc:	Jonathan Frankel, Kristin Starbird, Dudek; Daria Sarraf, Dudek
Attachment(s):	List attachment(s) here

For the Trails at Lyon's Canyon Project ("Project"), individual plants and wildlife species were evaluated based on their "special-status." This included plants and wildlife that are listed through the federal Endangered Species Act (FESA). A site-specific survey program was designed to accurately document the botanical and wildlife resources within the Project site, and consisted of six components: (1) a literature search; (2) preparation of a list of target FESA-listed species could occur within the Project site; (3) general field reconnaissance surveys; (4) vegetation mapping; (5) habitat assessments, and (6) focused surveys for FESA-listed plants and wildlife that have suitable habitat on site.

The California Department of Fish and Wildlife's California Natural Diversity Database[1] and the California Native Plant Society's Inventory of Rare and Endangered Plants of California[2] were queried for the U.S. Geologic Survey's 7.5-inch topographic quadrangle that contains the Project and the eight surrounding quadrangles (Canoga Park, Calabasas, Mint Canyon, Newhall, Oat Mountain, San Fernando, Simi Valley East, Val Verde, and Van Nuys, California). These queries resulted in the FESA-listed species that have records within the nine quadrangles.

Results

Table 1 lists the FESA-listed plant and wildlife species with records in the nine quadrangles. The determination of the potential to occur was based on the existing conditions and the results of the surveys. As shown in Table 1, no FESA-listed plant or wildlife species were found on the Project site. California condor () has low potential to occur as a transient during foraging because this species maintains a large home range and may travel large distances to forage for carrion; however, it is not expected to nest on site and no impacts would be expected. Monarch butterfly has a moderate potential to occur, but it is only a candidate for listing under FESA and does not warrant the protections of it. All other species are not expected to occur.

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[1] California Department of Fish and Wildlife. 2024. California Natural Diversity Database: RareFind 5. Records of occurrence for U.S.G.S. 7.5- minute Quadrangle maps: Calabasas, Canoga Park, Mint Canyon, Newhall, Oat Mountain, San Fernando, Simi Valley East, Val Verde, Van Nuys. California Department of Fish and Wildlife, State of California Resources Agency. Sacramento, California.

[2] California Native Plant Society. 2024. Inventory of Rare and Endangered Plants (online edition, v9-01 1.5). Rare Plant Program. California Native Plant Society, Sacramento, CA. Website. Accessed March 2022. http://www.rareplants.cnps.org.

Table 1. Federal Endangered Species Act-Listed Species with Records in the Project Vicinity and Their Potential to Occur

Scientific Name	Common Name	Status	Habitat Requirements	Potential to Occur
Plants				
Astragalus brauntonii	Braunton's milk-vetch	Endangered	Closed-cone coniferous forest, chaparral, coastal sage scrub, valley and foothill grassland. Usually carbonate soils. Recent burn or disturbed areas.	Not expected to occur. The Project site is outside of the recorded range of the species and it was not detected during focused surveys.
Berberis nevinii	Nevin's barberry	Endangered	Sandy or gravelly soils in chaparral, cismontane woodland, coastal scrub, and riparian scrub.	Not expected to occur. Suitable habitat is present, and the Project site is within the range of the species, but this conspicuous shrub species was not detected during focused surveys.
Chorizanthe parryi var. *fernandina*	San Fernando Valley spineflower	Candidate	Coastal sage scrub, occurring on sandy soils.	Not expected to occur. Suitable habitat is present; however, the Project site is not within the modern range of the species and the species was not detected during focused surveys.
Dodecahema leptoceras	slender-horned spineflower	Endangered	Sandy soils in alluvial scrub, chaparral, and cismontane woodland located on hydrologically connected upper flood terraces.	Not expected to occur. The Project site lacks the alluvial scrub and hydrologically connected upper flood terraces the species is associated with, and the species was not detected during focused surveys.
Dudleya cymose ssp. *agourensis*	Agoura Hills dudleya	Threatened	Rocky and volcanic soils in chaparral and cismontane woodland.	Not expected to occur. Rocky and volcanic soils are not present within the Project site and the species was not detected during focused surveys.
Navarretia fossalis	spreading navarretia	Threatened	Vernal pools, playas, chenopod scrub, marshes and swamps (assorted shallow freshwater).	Not expected to occur. Vernal pools, playas, chenopod scrub, and marshes and swamps are not present within the Project site.

Table 1. Federal Endangered Species Act-Listed Species with Records in the Project Vicinity and Their Potential to Occur

Scientific Name	Common Name	Status	Habitat Requirements	Potential to Occur
Orcuttia californica	California Orcutt grass	Endangered	Vernal pools.	Not expected to occur. No vernal pools or seasonal pools are present within the Project site and the species was not detected during focused surveys.
Wildlife				
Branchinecta lynchi	vernal pool fairy shrimp	Threatened	Seasonal vernal pools.	Not expected to occur. Habitat for this species does not occur within the Project site.
Danaus plexippus pop. 1	monarch butterfly - California overwintering population	Candidate	Roosts in winter in wind-protected tree groves along the California coast from northern Mendocino to Baja California, Mexico.	Moderate potential to occur during spring/summer months only for foraging. Not expected to occur during winter roosting period. No distinctive stands of milkweed (Asclepias spp.) host plants were noted occurring within the Project footprint, so there is low potential for the species to breed on site.
Euphydryas editha quino	quino checkerspot butterfly	Endangered	Larval and adult phases each have distinct habitat requirements tied to host plant species and topography. Larval host plants include *Plantago erecta* and *Castilleja exserta*. Adults occur on sparsely vegetated rounded hilltops and ridgelines and are known to disperse through disturbed habitats to reach suitable nectar plants.	Not expected to occur. This species is considered extirpated from the vicinity of the Project site.

Table 1. Federal Endangered Species Act-Listed Species with Records in the Project Vicinity and Their Potential to Occur

Scientific Name	Common Name	Status	Habitat Requirements	Potential to Occur
Catostomus santaanae	Santa Ana sucker	Threatened	Small, shallow streams, less than 7 meters in width, with currents ranging from swift in the canyons to sluggish in the bottom lands. Preferred substrates are generally coarse and consist of gravel, rubble, and boulders with growths of filamentous algae, but occasionally they are found on sand/mud substrates.	Not expected to occur. Aquatic habitat is not present within the Project site.
Gasterosteus aculeatus williamsoni	unarmored threespine stickleback	Endangered	Slow-moving reaches or quiet-water microhabitats in streams and rivers, usually shaded by dense and abundant vegetation.	Not expected to occur. Aquatic habitat is not present within the Project site.
Anaxyrus californicus	arroyo toad	Endangered	Inhabits arid scrub, rocky washes, grasslands, chaparral.	Not expected to occur. Slow-moving streams with open, sandy terraces are not present within the Project site or within one-half mile of the Project site (based on aerial imagery review).
Rana draytonii	California red-legged frog	Threatened	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby, or emergent riparian vegetation.	Not expected to occur. Permanent sources of deep water are not present within the Project site or within one-half mile of the Project site (based on aerial imagery review).
Coccyzus americanus occidentalis (nesting)	western yellow-billed cuckoo	Threatened	Dense, wide riparian woodlands with well-developed understories.	Not expected to occur. Riparian stands within the Project site consist of low, dense riparian scrub and oak riparian lacking a developed understory.

Table 1. Federal Endangered Species Act-Listed Species with Records in the Project Vicinity and Their Potential to Occur

Scientific Name	Common Name	Status	Habitat Requirements	Potential to Occur
Gymnogyps californianus	California condor	Endangered	Nests on high mountain cliff faces. Scavenges in habitats ranging from Pacific beaches to mountain forests and meadows.	Low potential to occur (foraging only). While the nearest known nesting occurrences include the Sespe Condor Sanctuary and Tejon Ranch, approximately 17 miles from the Project site at the nearest, this species maintains a large home range and may travel large distances to forage for carrion. As such, the species may be transient in the Project site during foraging.
Polioptila californica californica	coastal California gnatcatcher	Threatened	Low elevation coastal sage scrub and coastal bluff scrub.	Not expected to occur. The species was not detected during focused surveys.
Vireo bellii pusillus	least Bell's vireo	Endangered	Dense riparian habitats with a stratified canopy, including southern willow scrub, mule fat scrub, and riparian forest.	Not expected to occur. The species was not detected during focused surveys.

Appendix N – HEC-HMS Output

Existing Condition Watersheds
HEC-HMS Output

PACE

Project: B714 Lyons Clomr Prop Onsite
Simulation Run: Existing_100yr
Simulation Start: 31 December 2049, 24:00
Simulation End: 2 January 2050, 24:00

HMS Version: 4.12
Executed: 10 September 2024, 17:18

Global Results Summary

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
EX - 1A	1.11	1152.94	01Jan2050, 16:35	5.36
EX - 2A	0.18	210.09	01Jan2050, 16:15	4.32
EX - 3A	1.29	1220.53	01Jan2050, 16:35	5.21
EX - 4A	0.06	88.33	01Jan2050, 16:05	4.28
EX - 5A	1.36	1253.94	01Jan2050, 16:35	5.17

Proposed Offsite Watersheds
HEC-HMS Output

Project: B714 Lyons Clomr Proposed Offsite
Simulation Run: Proposed_Offsite_100yr
Simulation Start: 31 December 2049, 24:00
Simulation End: 2 January 2050, 24:00

HMS Version: 4.12
Executed: 10 September 2024, 17:07

Global Results Summary

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
A	0.17	206.4	01Jan2050, 16:10	4.44
B	1.05	1044.49	01Jan2050, 16:40	5.27
C	0.02	32.63	01Jan2050, 16:05	4.57
J	0.01	17.38	01Jan2050, 16:10	4.06
F	0.01	17.89	01Jan2050, 16:05	4.34
G	0.01	9.14	01Jan2050, 16:05	4.34
K	0	6.25	01Jan2050, 16:05	4.06
E	0	6.37	01Jan2050, 16:05	4.22
I	0	5.36	01Jan2050, 16:05	3.54
H	0	3.17	01Jan2050, 16:05	3.54
D	0	2.66	01Jan2050, 16:05	3.54

Proposed Onsite Watersheds
HEC-HMS Output

Project: B714 Lyons Clomr Prop Onsite
Simulation Run: Proposed_Onsite_100yr
Simulation Start: 31 December 2049, 24:00
Simulation End: 2 January 2050, 24:00

HMS Version: 4.12
Executed: 10 September 2024, 17:16

Global Results Summary

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
O1a	0.01	30.87	01Jan2050, 16:10	7.39
O2b	0.01	29.8	01Jan2050, 16:10	7.65
O7d	0.01	30.27	01Jan2050, 16:10	7.14
O12e	0	4.31	01Jan2050, 16:05	8.12
O14d	0	1.44	01Jan2050, 16:05	8.12
O15g	0.01	25.21	01Jan2050, 16:05	7.16
O18d	0	5.27	01Jan2050, 16:05	8.12
O20h	0.01	23.17	01Jan2050, 16:05	7.41
O22i	0	4.67	01Jan2050, 16:05	7.71
O24j	0.01	14.61	01Jan2050, 16:05	8.12
O28k	0	2.93	01Jan2050, 16:05	5.94
O38r	0	4.79	01Jan2050, 16:05	8.12