Appendix 5.5 (Continued)

Hydrology (Part 14 of 15)

5 Sediment Transport Considerations

A Fluvial Study was completed for Castaic Creek in January 2006, and approved by LACPW in April 2006, to assess creek bed impacts from potential modifications of fluvial operation from the proposed TPM. No. 18108 development. The study provides a comprehensive assessment of short-term and long-term bed adjustments based on the level of information available. The Fluvial Study describes the following: (1) general adjustment, (2) long term adjustment, (3) other scour, (4) study reach gradation, (5) SAM modeling and analysis, and (6) total scour potential for the purpose of determining soil cement bank protection toe-down and freeboard.

5.1 Types of Adjustments

Modifications to the Castaic Creek System are measured as bed adjustment in feet. Types of adjustments included in the fluvial study include general, long-term, and other scour adjustments. General adjustment consists of scour that occurs in an individual discharge event and may be considered as the difference between sediment inflow and outflow. For example, aggradation describes a situation where sediment inflow is higher than sediment outflow for the same reach. In contrast, if sediment outflow exceeds inflow for a given reach, degradation in the form of scour will occur. Long-term adjustment consists of fluvial process that occur over many rainy seasons and contribute to fluctuation of bed elevation of a river or creek. Other scour types include local scour, bend scour, low-flow incisement, and bedform formation.

5.2 Summary of Fluvial Analyses

The fluvial study analyzed the individual degradational components of eight subreaches of Castaic Creek. The locations of each subreach are shown in Figure 5-1. The relevant subreaches and their results are summarized below.

Subreach SRA1: SAM numerical calculations predict 2.4 feet of degradation in this reach, while long-term aggradation is expected based on the analysis of SRA2. No long-term data is presently available for SRA1. The expected aggradation is a result of the bed recovering from gravel mining. Aggradation is expected to be approximately 0.7 feet. Other scour is dominated in this subreach by scouring at the Interstate 5 Bridge and Old Road Bridge piers. Toe-down and freeboard calculations on the outside of the curve of the reach may be impacted by the bend in this portion of the Creek. Aggradation is set to the Los Angeles County Flood Control District Design Manual (LACFCDDM) depth of 2.5 feet for most sections because the total aggradation predicted by LACFCDDM is greater than that predicted by Los Angeles County Department of Public Works Hydrology and Sedimentation Manual (LACH&SM).

Subreach SRA2: SAM calculations estimate degradation of 1.5 feet, and long-term analysis has shown aggradation of 0.7 feet as the bed recovers from historic gravel mining. Some local bend scour can be found in this subreach. When it is present, bend scour will dominate the total toe-down value. Aggradation is set to the LACFCDDM depth of 2.5 feet for all sections because the total aggradation predicted by LACFCDDM is greater than that predicted by LACH&SM.

Subreach SRA3: SAM estimates 0.3 feet of aggradation in this reach. Long-term historic analysis predicts aggradation of 0.6 feet. Section 8050 in this subreach shows approximately no change in cross-section between 2004 and 2005 suggesting armoring. The presence of historical gravel mining is prominent in 8050 whereby a deep, wide gravel pit is evident in the historic data, and the 1999 section also appears to be recovering from the mining activity. Local scour is expected to be significant in this reach because of the presence of a major bend in the Creek's path. Aggradation is set to the LACFCDDM depth of 2.5 feet for all sections because the total aggradation predicted by LACFCDDM is greater than that predicted by LACH&SM.

Subreach SRA4: SAM numerical calculations predict 1.9 feet of aggradation in this reach, while long-term degradation is expected to be 1.3 feet. Other scour is dominated in this subreach by scouring at Commerce Center Bridge piers. Outside of the curve of the reach will also be impacted by the bend in this portion of

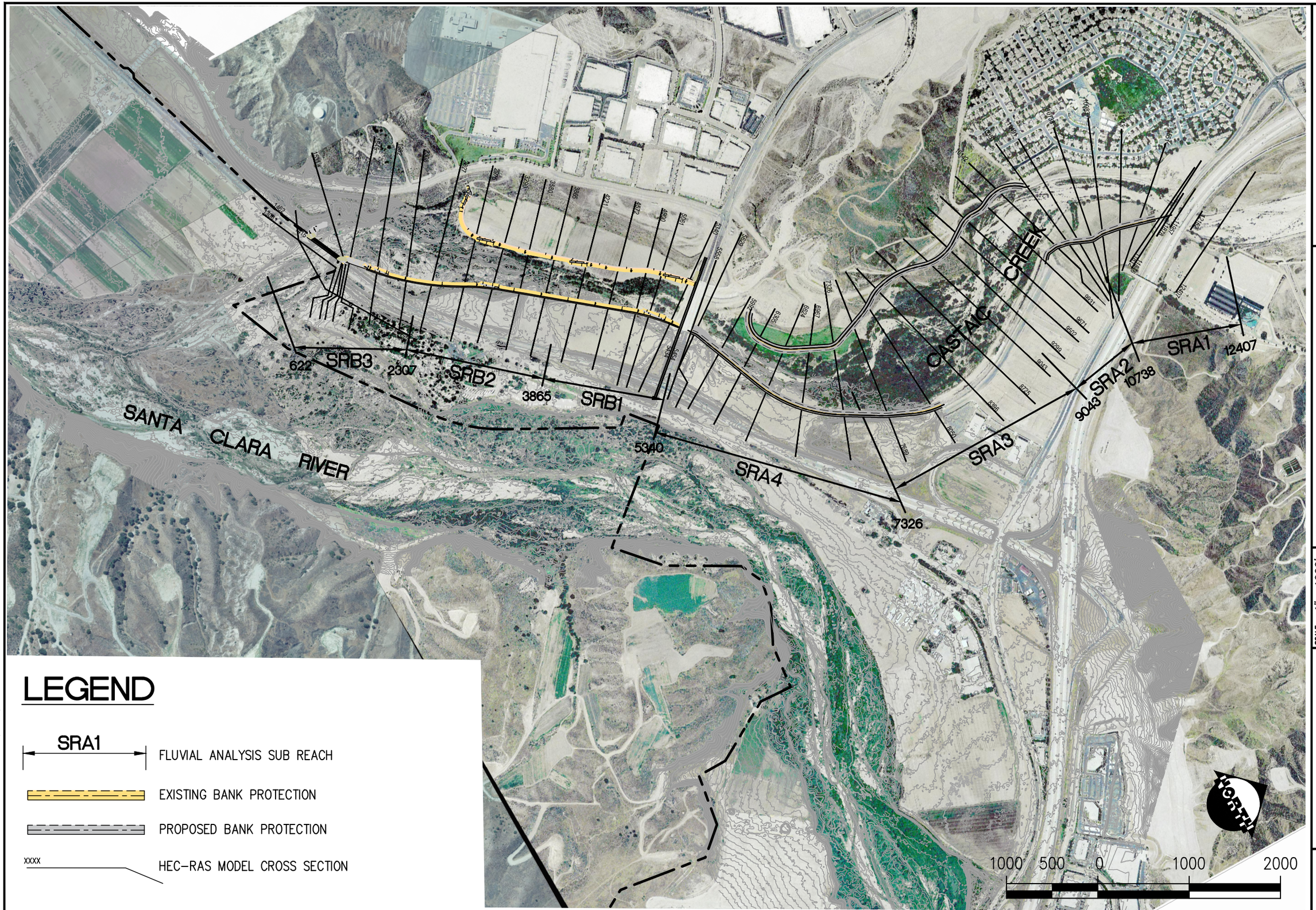
the Creek. The small change in average bed height between 2004 and 2005 suggests the bed is at or approaching the armoring depth below which no additional degradation will occur without a change in sediment inflow characteristics or a change in hydrology. Aggradation in this subreach exceeds three feet at every section and the large general adjustment dominates the components. Hasley Creek confluences in this subreach. The result of the confluence is an increase in discharge. Additionally, some sediment delivery from the Hasley Canyon Creek watershed may occur. This may explain some downstream aggradation observed in SRB3.

Subreach SRB1: SAM calculations estimate degradation of 3.3 feet, and long-term analysis has shown degradation of 2.1 feet. Minor amounts of local scour can be found in most of this subreach as most of it is quite straight. Aggradation is set to the LACFCDDM depth of 2.5 feet for most sections because the total aggradation predicted by LACFCDDM is greater than that predicted by LACH&SM.

Subreach SRB2: SAM estimates degradation of 1.0 feet of degradation in this reach. Long-term historic analysis predicts degradation of 2.7 and 0.8 feet in sections 2975 and 2627, respectively. Section 2975 considers agricultural fill, while 2627 does not. Historic sections show continuous degradation since the construction of the Dam. The thalweg depths in both 1999 and 2004 are lower than in 2005 despite the continued degradation into 2005. Little local scour can be found in this subreach as it is quite straight. Aggradation is set to the LACFCDDM depth of 2.5 feet for all sections because the total aggradation predicted by LACFCDDM is greater than that predicted by LACH&SM.

5.3 Proposed Soil Cement Bank Protection Sediment Transport Considerations

The proposed soil cement bank protection is intended to provide long-term erosion protection from lateral migration of the bank and flood protection for the adjacent proposed development areas. The proposed bank protection was designed based on current LA County Hydraulic Design Criteria. The soil Cement bank protection was designed for flood protection up to the Q_{cap} (31,100 cfs) flood event. All sediment transport considerations were used in the design of the proposed soil cement bank protection to determine the top and toe of the bank.



LEGEND

- SRA1 — FLUVIAL ANALYSIS SUB REACH
- EXISTING BANK PROTECTION
- PROPOSED BANK PROTECTION
- XXXX — HEC-RAS MODEL CROSS SECTION

TITLE
HEC-RAS
CROSS SECTION
LOCATION MAP

JOB
CASTAIC CREEK
FLUVIAL STUDY
LOS ANGELES COUNTY CA

SCALE	1"= 1000'
DESIGNED	EMR
DRAWN	DP
CHECKED	J.C.
DATE	02/27/23
JOB NO.	8065E

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708-7299
PH (714) 481-7300 FAX (714) 481-7299

FIGURE
5-1

6 Proposed Hydraulic Analysis and Floodplain/ Floodway Mapping

The proposed condition HEC-RAS model uses the updated existing condition model as a base. Channel geometry is revised to include the new bank alignments for the proposed soil cement bank protection.

6.1 Proposed Capital Floodplain

The proposed condition floodplain analysis was completed to establish the floodplain limits with the proposed soil cement bank protection included in the cross section geometry. The analysis includes the proposed bank protection, 2013 topography, updated Q_{cap} discharge rates, and Manning's value of 0.06. Table 6-1 provides a summary of the proposed condition hydraulic analysis. Refer to Figure 6-1 for capital floodplain mapping.

6.2 Proposed Capital Floodway

The proposed condition floodway analysis was completed with the same methodology used in the updated existing condition analysis. First, the updated existing condition floodplain was analyzed and all sections with velocity greater than 10 ft/sec were set to have no encroachment. Next, HEC-RAS encroachment methods 4 and 1 were used to generate a floodway. HEC-RAS encroachment method 4 computes encroachment stations to achieve a maximum of a 1.0-foot rise with an equal loss of conveyance on the left and right banks. Then, Method 1 is then used to refine the encroachment stations, where the user specifies the locations of the encroachment stations at each individual cross section. Table 6-1 below provides a summary of the proposed floodplain and floodway hydraulic analysis.

Table 6-1: Proposed Conditions Floodplain and Floodway Comparison, Q_{cap}= 26,400 cfs/ 31,200 cfs (n=0.06)

HEC-RAS River Station	Profile	W.S.E (ft)	FP - FW Delta W.S.E. (ft)	Top Width (ft)	Sta W.S.E. Left (ft)	Sta W.S.E. Right (ft)	Enc. Sta. Left (ft)	Enc. Sta. Right (ft)
12350	FP	1041.2		1185.4	30.6	1224.5		
12350	FW	1041.2	**0.0**	317.0	777.5	1094.5	777.5	1094.5
12146	FP	1040.0		259.8	154.0	1082.4		
12146	FW	1040.1	**0.0**	259.8	664.5	924.4	662.7	928.1
12059.65 BR U	FP	1039.8		246.6	665.1	665.1		
12059.65 BR U	FW	1039.8	**0.0**	246.7	664.5	924.4	662.7	928.1
12059.65 BR D	FP	1037.8		234.9	687.9	687.9		
12059.65 BR D	FW	1037.8	**0.0**	234.9	687.9	926.8	0	0
11957.32	*FP*	*1037.8*		*238.9*	*687.9*	*926.8*		
11957.32	*FW*	*1037.8*	***0.0***	*239.0*	*687.9*	*926.8*	*0*	*0*
11923	FP	1037.7		241.2	688.6	929.8		
11923	FW	1037.8	**0.0**	240.6	688.9	929.5	688.9	929.5
11917.82 BR U	FP	1036.0		201.0	689.1	689.1		
11917.82 BR U	FW	1036.1	**0.1**	201.1	688.9	929.5	688.9	929.5
11917.82 BR D	FP	1035.8		229.7	674.8	674.8		
11917.82 BR D	FW	1035.9	**0.1**	229.7	658.8	928.3	658.8	928.3
11878.32	FP	1036.0		269.5	658.8	928.3		
11878.32	FW	1036.1	**0.1**	269.6	658.8	928.3	658.8	928.3
11845.64	FP	1036.0		324.9	657.4	982.4		
11845.64	FW	1036.1	**0.1**	325.6	657.1	982.7	656.3	982.7
11811.76	*FP*	*1035.2*		*346.2*	*628.4*	*1010.4*		
11811.76	*FW*	*1035.4*	***0.2***	*402.5*	*626.0*	*1081.5*	*0*	*0*
11551.18	FP	1033.3		579.6	556.8	1136.3		
11551.18	FW	1033.8	**0.5**	408.0	621.0	1029.0	621.0	1029.0
11242.98	FP	1031.2		614.5	808.2	1422.7		

HEC-RAS River Station	Profile	W.S.E (ft)	FP - FW Delta W.S.E. (ft)	Top Width (ft)	Sta W.S.E. Left (ft)	Sta W.S.E. Right (ft)	Enc. Sta. Left (ft)	Enc. Sta. Right (ft)
11242.98	FW	1031.6	**0.4**	431.0	923.0	1354.0	923.0	1354.0
10982.86	FP	1028.9		696.4	937.1	1633.6		
10982.86	FW	1029.3	**0.5**	523.0	1066.0	1589.0	1066.0	1589.0
10738.26	FP	1026.5		858.3	502.6	1360.9		
10738.26	FW	1026.9	**0.4**	560.0	675.0	1235.0	675.0	1235.0
10490.82	FP	1023.9		817.0	649.0	1477.6		
10490.82	FW	1024.2	**0.3**	560.0	825.0	1385.0	825.0	1385.0
10351.28	FP	1021.4		760.4	789.1	1549.5		
10351.28	FW	1021.8	**0.3**	530.0	955.0	1485.0	955.0	1485.0
10141.82	FP	1018.9		824.7	824.2	1648.9		
10141.82	FW	1019.7	**0.7**	635.0	890.0	1525.0	890.0	1525.0
9931.16	FP	1017.3		946.2	811.7	1757.9		
9931.16	FW	1018.0	**0.7**	700.0	900.0	1600.0	900.0	1600.0
9670.57	FP	1014.1		1024.8	803.9	1828.7		
9670.57	FW	1014.8	**0.8**	780.0	920.0	1700.0	920.0	1700.0
9501.81	FP	1012.4		1016.1	747.2	1763.3		
9501.81	FW	1013.1	**0.7**	785.0	855.0	1640.0	855.0	1640.0
9298.99	FP	1010.9		1029.2	705.7	1734.9		
9298.99	FW	1011.6	**0.7**	860.0	810.0	1670.0	810.0	1670.0
9042.81	FP	1009.0		1142.9	654.2	1797.1		
9042.81	FW	1009.9	**0.8**	910.8	799.2	1710.0	799.2	1710.0
8724.84	FP	1006.1		1388.3	663.8	2052.1		
8724.84	FW	1007.1	**1.0**	1018.4	858.7	1877.1	858.7	1877.1
8396.13	FP	1003.5		1436.2	539.9	1976.1		
8396.13	FW	1004.3	**0.8**	940.0	785.0	1725.0	785.0	1725.0
8049.79	FP	1002.6		1289.1	473.6	1762.7		
8049.79	FW	1003.4	**0.7**	930.0	690.0	1620.0	690.0	1620.0
7688.71	FP	1002.2		1034.6	555.3	1589.8		
7688.71	FW	1003.0	**0.7**	835.0	645.0	1480.0	645.0	1480.0
7326.46	FP	1001.6		731.3	518.7	1250.0		
7326.46	FW	1002.4	**0.8**	529.0	573.0	1102.0	573.0	1102.0
6966.68	FP	1001.0		624.3	554.9	1179.2		
6966.68	FW	1001.7	**0.7**	463.0	624.0	1087.0	624.0	1087.0
6623.5	FP	999.8		461.9	615.5	1077.3		
6623.5	FW	1000.4	**0.6**	305.0	673.0	978.0	673.0	978.0
6304.52	FP	998.3		362.1	675.3	1037.4		
6304.52	FW	998.8	**0.5**	246.8	720.0	966.8	720.0	966.8
6087.88	FP	997.6		497.0	711.3	1208.4		
6087.88	FW	998.3	**0.7**	341.5	730.0	1071.5	730.0	1071.5
5781.35	FP	995.9		518.2	694.9	1213.1		
5781.35	FW	996.4	**0.5**	359.0	715.0	1074.0	715.0	1074.0
5629.45	FP	994.8		456.6	742.4	1256.0		
5629.45	FW	995.5	**0.7**	324.6	740.4	1065.0	740.4	1065.0
5557.68	FP	994.4		508.1	140.2	690.8		
5557.68	FW	994.9	**0.5**	320.0	200.0	520.0	200.0	520.0
5500 BR U	FP	994.1		475.6	140.2	140.2		
5500 BR U	FW	994.4	**0.3**	296.0	200.0	520.0	200.0	520.0
5500 BR D	FP	993.6		468.7	204.4	204.4		
5500 BR D	FW	994.1	**0.5**	380.4	207.0	635.0	207.0	635.0

HEC-RAS River Station	Profile	W.S.E (ft)	FP - FW Delta W.S.E. (ft)	Top Width (ft)	Sta W.S.E. Left (ft)	Sta W.S.E. Right (ft)	Enc. Sta. Left (ft)	Enc. Sta. Right (ft)
5453.98	FP	993.7		521.4	203.1	724.5		
5453.98	FW	994.2	**0.6**	428.0	207.0	635.0	207.0	635.0
5434.68	FP	993.6		520.0	800.3	1320.2		
5434.68	FW	994.2	**0.6**	452.2	820.0	1272.2	820.0	1272.2

Note:
Bridge Locations: I-5 Bridge at RS 12059.65, Old Rd. Bridge at RS 11917.82, Commerce Ctr. Dr. Bridge at RS 5500
Italicized sections indicate Velocity is greater than 10 ft/s, so there is no encroachment.

6.2.1 Tie-In Locations

The proposed capital floodplain and floodways are tied into the effective ML map in accordance with standard top width tie-in requirements. Proposed top widths must tie in within 5% tolerance of the effective top width. The tie-in cross sections, top widths, and tolerance are detailed in Table 6-2.

Table 6-2: Top width Tie-In Locations

Floodplain			
Cross Section	**ML Effective Top Width (ft)**	**Proposed Top Width (ft)**	**Top Width Tolerance (%)**
12146	260.0	259.8	0.1
5453.98	501.3	521.4	3.8
Floodway			
Cross Section	**ML Effective Top Width (ft)**	**Proposed Top Width (ft)**	**Top Width Tolerance (%)**
12146	255.8	259.8	1.6
5453.98	441.1	428.0	-3.1

6.2.2 Updated Existing Condition and Proposed Condition Comparison

Table 6-3 and Table 6-4 were prepared to show the comparison between existing and proposed floodplain and floodway hydraulic analysis, respectively. The installation of the proposed soil cement bank protection causes a maximum increase in water surface elevation of 1.8 ft and an increase in velocity of a maximum of 3.4 ft/s as shown in Table 6-3. Refer to Figure 6-1 for capital floodway mapping. Figure 6-2 and Figure 6-3 which are the revised ML Map No.'s 335 ML-1 and 2 were created to replace the existing LA County adopted ML Maps.

Table 6-3: Updated Existing and Proposed Conditions Floodplain Water Surface Elevations and Velocities Comparison, Q_{cap}= 26,400 cfs/ 31,100 cfs/ 31,200 cfs (n=0.06)

HEC-RAS River Station	Updated Existing W.S.E. (ft)	Proposed W.S.E (ft)	Delta (ft)	Updated Existing Velocity (ft/s)	Proposed Velocity (ft/s)	Delta (ft/s)
12350	1041.6	1041.2	-0.3	6.5	6.8	0.3
12146	**1040.5**	**1040.0**	**-0.4**	**8.1**	**8.4**	**0.3**
12059.65	Golden State Freeway, I-5					
11957.32	1038.4	1037.8	-0.6	9.6	10.0	0.4
11923	1038.3	1037.7	-0.6	9.4	9.8	0.4
11917.82	The Old Road Bridge					
11878.32	1035.5	1036.0	0.5	10.5	9.9	-0.6
11845.64	1035.4	1036.0	0.6	10.0	9.0	-0.9
11811.76	1033.3	1035.2	1.8	13.3	10.6	-2.8
11551.18	1031.5	1033.3	1.8	7.7	8.5	0.8
11242.98	1029.4	1031.2	1.8	7.1	8.1	0.9
10982.86	1027.8	1028.9	1.0	6.8	9.2	2.4

10738.26	1026.2	1026.5	0.3	6.8	8.6	1.9
10490.82	1023.8	1023.9	0.1	7.2	7.4	0.2
10351.28	1021.6	1021.4	-0.1	8.1	8.4	0.3
10141.82	1019.1	1018.9	-0.2	6.9	6.7	-0.1
9931.16	1017.2	1017.3	0.1	6.2	5.8	-0.4
9670.57	1015.1	1014.1	-1.1	5.7	7.5	1.8
9501.81	1013.8	1012.4	-1.4	6.2	5.7	-0.5
9298.99	1011.8	1010.9	-0.9	7.6	5.7	-2.0
9042.81	1009.3	1009.0	-0.3	6.6	5.7	-0.9
8724.84	1006.3	1006.1	-0.2	5.8	5.7	-0.1
8396.13	1003.3	1003.5	0.2	5.1	4.6	-0.4
8049.79	1002.0	1002.6	0.6	4.0	3.5	-0.5
7688.71	1001.4	1002.2	0.8	3.5	3.2	-0.3
7326.46	1000.2	1001.6	1.4	5.1	4.2	-0.9
6966.68	999.2	1001.0	1.8	4.0	4.4	0.5
6623.5	998.0	999.8	1.8	5.0	6.3	1.3
6304.52	997.0	998.3	1.2	4.4	7.5	3.0
6087.88	996.6	997.6	1.0	4.4	5.7	1.3
5781.35	996.0	995.9	-0.1	5.4	8.8	3.4
5629.45	995.3	994.8	-0.5	6.7	8.7	2.1
5557.68	994.6	994.4	-0.2	7.6	7.8	0.2
5500	Commerce Center Drive Bridge					
5453.98	**993.8**	**993.7**	**-0.1**	**6.5**	**6.6**	**0.1**
5434.68	993.7	993.6	-0.1	6.3	6.4	0.1

Note:
Bolded cross sections indicate tie-in locations where the proposed condition top width is within 5% of the effective ML water surface.

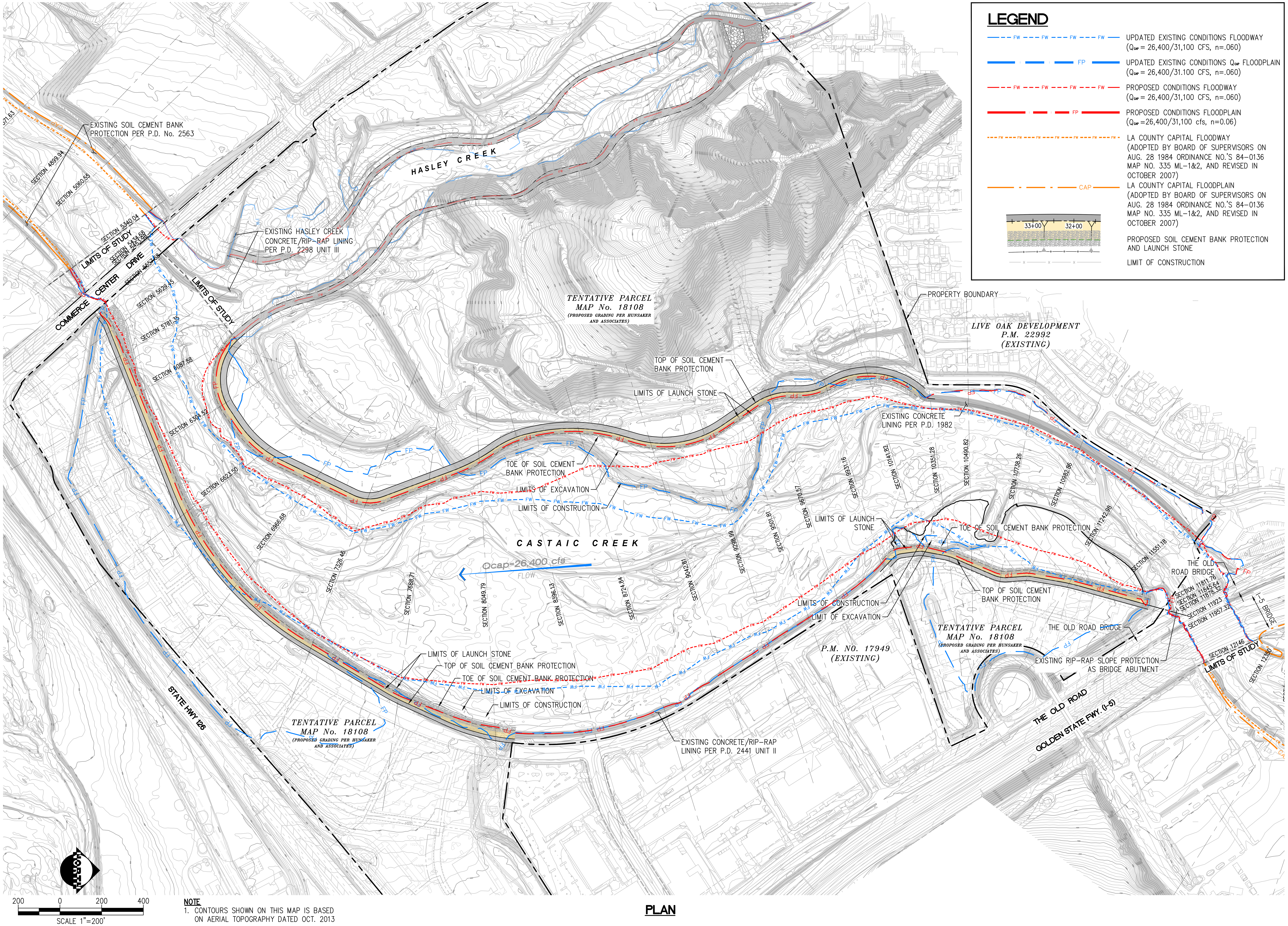
Table 6-4 shows a comparison between the updated existing floodway and proposed condition floodway.

Table 6-4: Updated Existing and Proposed Conditions Floodway Water Surface Elevation and Top Width Comparison, Q_{cap}= 26,400 cfs/ 31,100 cfs/ 31,200 cfs (n=0.06)

HEC-RAS River Station	Updated Existing W.S.E (ft)	Proposed W.S.E. (ft)	W.S.E. Delta (ft)	Updated Existing Top width (ft)	Proposed Top width (ft)	Top width Delta (ft)
12350	1041.5	1041.2	-0.3	320.0	317.0	-3.0
12146	**1040.5**	**1040.1**	**-0.4**	**263.7**	**259.8**	**-3.9**
12059.65 BR U	1040.2	1039.8	-0.4	248.7	246.7	-2.1
12059.65 BR D	1038.4	1037.8	-0.6	235.6	234.9	-0.7
11957.32	1038.4	1037.8	-0.5	239.6	239.0	-0.7
11923	1038.3	1037.8	-0.5	240.2	240.6	0.4
11917.82 BR U	1036.0	1036.1	0.0	199.7	201.1	1.3
11917.82 BR D	1035.6	1035.9	0.4	229.7	229.7	0.0
11878.32	1035.6	1036.1	0.5	635.7	269.6	-366.2
11845.64	1035.5	1036.1	0.6	308.5	325.6	17.1
11811.76	1034.2	1035.4	1.2	301.7	402.5	100.8
11551.18	1032.1	1033.8	1.7	419.0	408.0	-11.0
11242.98	1030.2	1031.6	1.4	541.0	431.0	-110.0
10982.86	1028.8	1029.3	0.5	601.0	523.0	-78.0
10738.26	1026.9	1026.9	0.1	582.0	560.0	-22.0
10490.82	1024.3	1024.2	-0.1	645.0	560.0	-85.0
10351.28	1022.3	1021.8	-0.5	585.0	530.0	-55.0

10141.82	1019.9	1019.7	-0.2	555.0	635.0	80.0
9931.16	1017.9	1018.0	0.1	630.0	700.0	70.0
9670.57	1016.1	1014.8	-1.2	776.0	780.0	4.0
9501.81	1014.8	1013.1	-1.7	618.0	785.0	167.0
9298.99	1012.7	1011.6	-1.0	549.0	860.0	311.0
9042.81	1010.2	1009.9	-0.3	677.0	910.8	233.8
8724.84	1007.3	1007.1	-0.2	919.0	1018.4	99.4
8396.13	1004.0	1004.3	0.3	931.0	940.0	9.0
8049.79	1002.4	1003.4	0.9	925.0	930.0	5.0
7688.71	1001.7	1003.0	1.3	800.0	835.0	35.0
7326.46	1000.7	1002.4	1.7	515.0	529.0	14.0
6966.68	999.7	1001.7	2.0	525.0	463.0	-62.0
6623.5	998.6	1000.4	1.8	425.0	305.0	-120.0
6304.52	997.9	998.8	1.0	400.0	246.8	-153.2
6087.88	997.4	998.3	0.9	390.0	341.5	-48.5
5781.35	996.7	996.4	-0.3	430.0	359.0	-71.1
5629.45	996.2	995.5	-0.7	430.0	324.6	-105.4
5557.68	995.2	994.9	-0.3	315.0	320.0	5.0
5500 BR U	994.7	994.4	-0.2	291.0	296.0	5.0
5500 BR D	994.3	994.1	-0.1	380.8	380.4	-0.4
5453.98	**994.3**	**994.2**	**-0.1**	**428.0**	**428.0**	**0.0**
5434.68	994.3	994.2	-0.1	452.2	452.2	0.1

Notes:
1. Bridge Locations: I-5 Bridge at RS 12059.65, Old Rd. Bridge at RS 11917.82, and Commerce Ctr. Dr. Bridge at RS 5500
2. Bolded cross sections indicate tie-in locations where the proposed condition top width is within 5% of the effective ML water surface.



NOTE
1. CONTOURS SHOWN ON THIS MAP IS BASED ON AERIAL TOPOGRAPHY DATED OCT. 2013

PLAN

NO	BY	DATE	REVISIONS	DATE	APP.

REGISTERED PROFESSIONAL ENGINEER JOSE CRUZ No. 72249 CIVIL STATE OF CALIFORNIA
PRELIMINARY NOT FOR CONSTRUCTION — PROJECT ENGINEER — DATE

PREPARED BY JOSE CRUZ PROJECT ENGINEER
R.C.E. NO. — #72249 EXP. 6/30/24
DRAWN M.M.T. | SCALE 1"=200'
DESIGNED E.M.R.
CHECKED J.C. | DATE 2/22/23

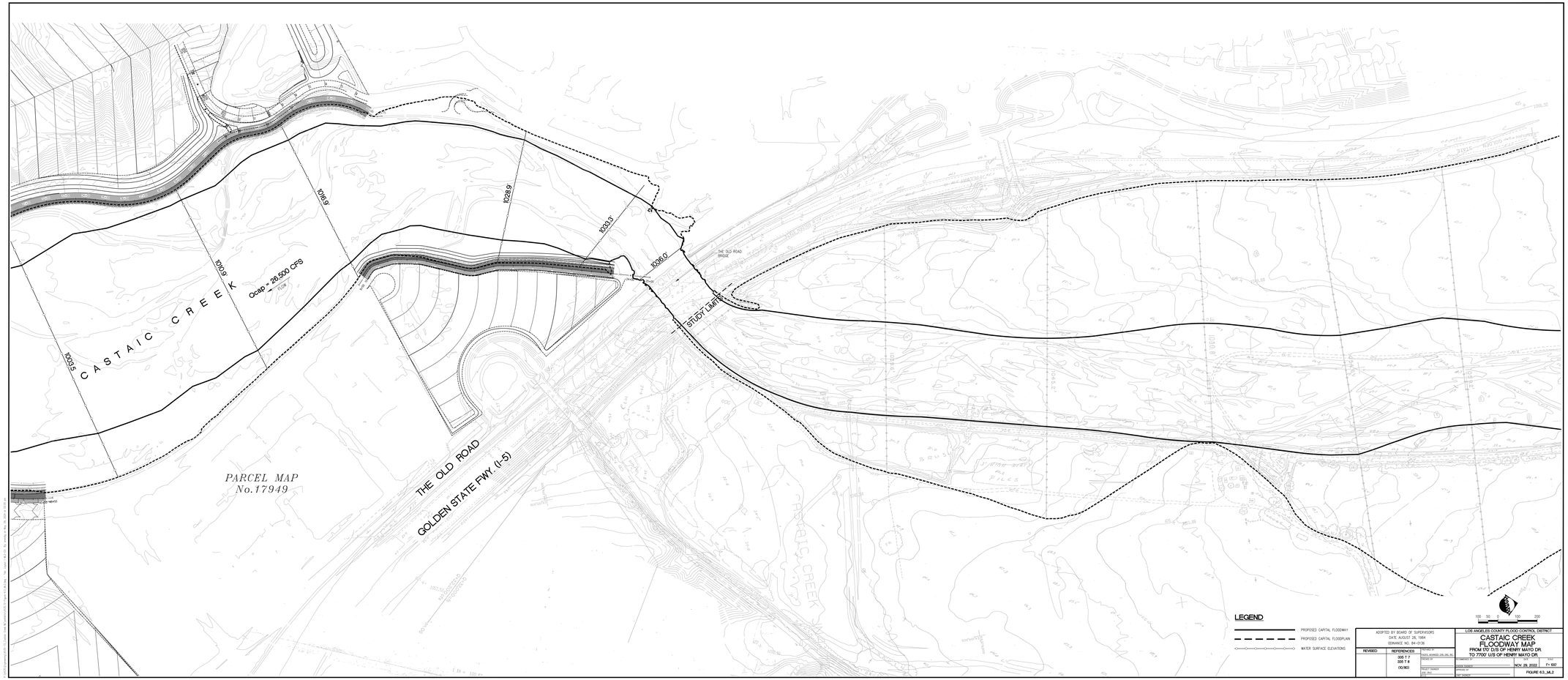
TITLE
PROPOSED CONDITION CAPITAL FLOODPLAN & FLOODWAY MAPPING

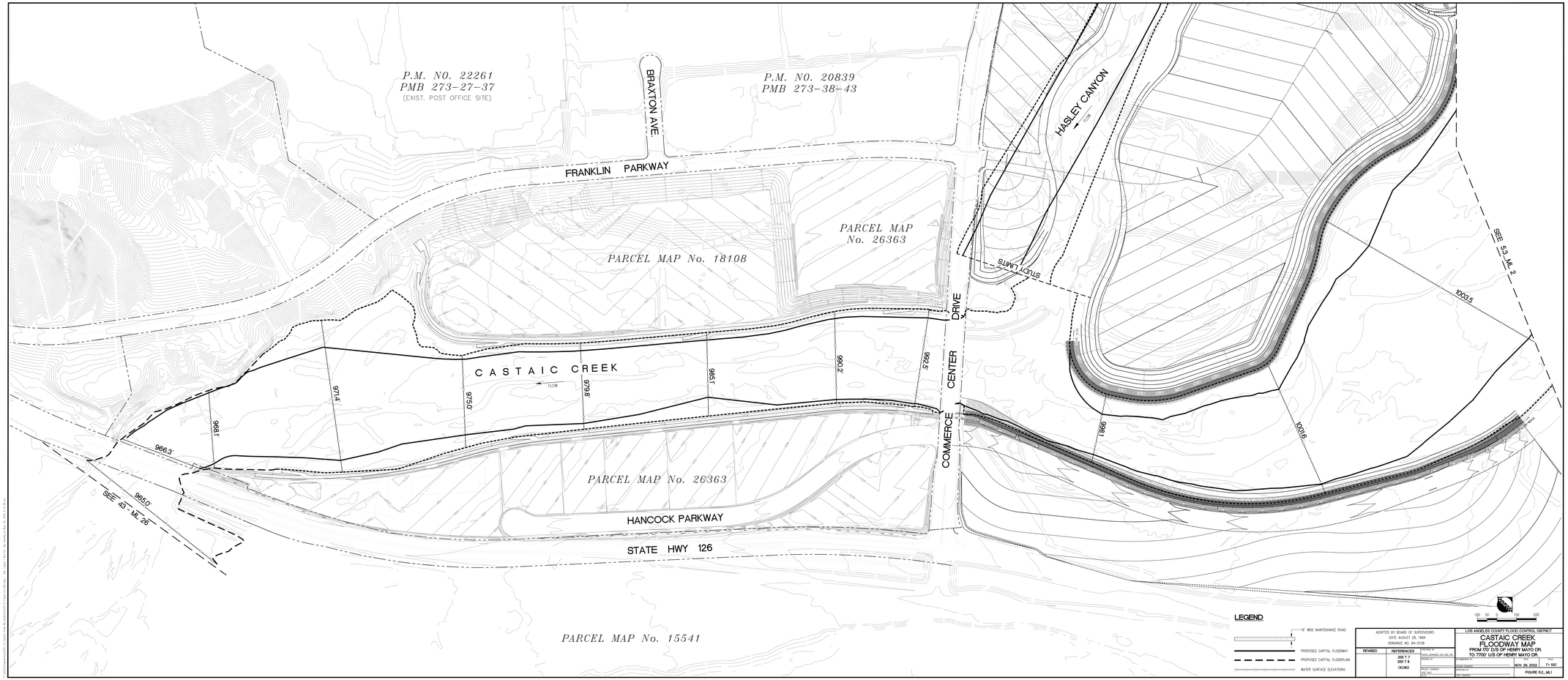
JOB
VALENCIA COMMERCE CENTER
CASTAIC CREEK FLOODPLAIN & FLOODWAY MAPPING FROM COMMERCE CENTER DRIVE TO I-5 FWY
LOS ANGELES COUNTY CA

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

FIGURE 6-1

JOB NO. A535


CASTAIC CREEK
Qcap = 26,500 CFS
FLOW
1016.9'
1019.9'
1028.9'
1033.3'
1038.0'
1039.5
THE OLD ROAD BRIDGE
STUDY LIMITS
PARCEL MAP No.17949
THE OLD ROAD
GOLDEN STATE FWY. (I-5)
CASTAIC CREEK
LEGEND
PROPOSED CAPITAL FLOODWAY
PROPOSED CAPITAL FLOODPLAIN
WATER SURFACE ELEVATIONS
100 50 0 100 200
SCALE
ADOPTED BY BOARD OF SUPERVISORS
DATE: AUGUST 28, 1984
ORDINANCE NO. 84-0136
REVISED
REFERENCES
338 7 7
339 7 8
00/803
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT
CASTAIC CREEK
FLOODWAY MAP
FROM 170' D/S OF HENRY MAYO DR.
TO 7700' U/S OF HENRY MAYO DR.
NOV. 29, 2022
1" = 100'
FIGURE 6.3_MI_2


P.M. NO. 22261
PMB 273-27-37
(EXIST. POST OFFICE SITE)
P.M. NO. 20839
PMB 273-38-43
BRAXTON AVE.
FRANKLIN PARKWAY
HASLEY CANYON
STUDY LIMITS
PARCEL MAP No. 18108
PARCEL MAP No. 26363
PARCEL MAP No. 26363
CASTAIC CREEK
FLOW
DRIVE
CENTER
COMMERCE
HANCOCK PARKWAY
STATE HWY 126
PARCEL MAP No. 15541
SEE 53 - ML 2
SEE 45 - ML 26
1003.5
1001.5
998.1
992.5
990.2
979.8
970.5
971.4
966.3
965.0
LEGEND
16' WIDE MAINTENANCE ROAD
PROPOSED CAPITAL FLOODWAY
PROPOSED CAPITAL FLOODPLAIN
WATER SURFACE ELEVATIONS
ADOPTED BY BOARD OF SUPERVISORS
DATE: AUGUST 28, 1984
ORDINANCE NO. 84-0136
REVISED
REFERENCES
335 7 7
335 7 8
00/803
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT
CASTAIC CREEK
FLOODWAY MAP
FROM 170' D/S OF HENRY MAYO DR.
TO 7700' U/S OF HENRY MAYO DR.
NOV. 29, 2022
1" = 100'
FIGURE 6.2_ML1

7 Summary

Pacific Advanced Civil Engineering, Inc. (PACE) has been retained by FivePoint Communities to prepare a report for LA County Floodplain and Floodway Revision along lower Castaic Creek. This report proposes a revision to existing LA County Adopted Floodway Maps No.'s 335 ML-1and 2 for Castaic Creek between Commerce Center Drive to the Old Rd. / Interstate-5 Bridges. The purpose of this report is to show the following:

1. Existing LA County Adopted Floodway and Floodplain boundaries.
2. Updated existing hydraulic analysis based on current LACPW Q_{cap} hydrology and hydraulic design criteria.
3. Proposed conditions hydraulic analysis based on current LACPW Q_{cap} hydrology and hydraulic design criteria.
4. Methods utilized to generate the existing and proposed conditions floodway boundaries. PACE has created revised LA County ML Maps 335 ML-1 and 2 to replace the existing LA County Adopted ML Maps.

PACE proposes that LA County revise the current adopted capital floodplain and floodway Maps 335-ML-1 and 2 upon completion of Castaic Creek channel improvements. Upon LACPW staff review and approval of this document, the ML Map Revision shall be presented to the Los Angeles county Board of Supervisors for Acceptance of Revision.

PACE
Advanced Water Engineering

Appendix A – LACPW Capital Flood Flow Rates

Reach	Capital Flood Flow Rate (cfs)
A	24,100
B	25,300
C	25,400
D	25,600
E	26,200
F	26,300
G	26,400
H	31,100
I	31,200

QUAD: VALVERDE 1-H1-45
NEW HALL 1-H1-44
WHITAKER PEAK 1-H1-55

2,200 1,100 0 2,200 Feet

ATTACHMENT A

LEGEND

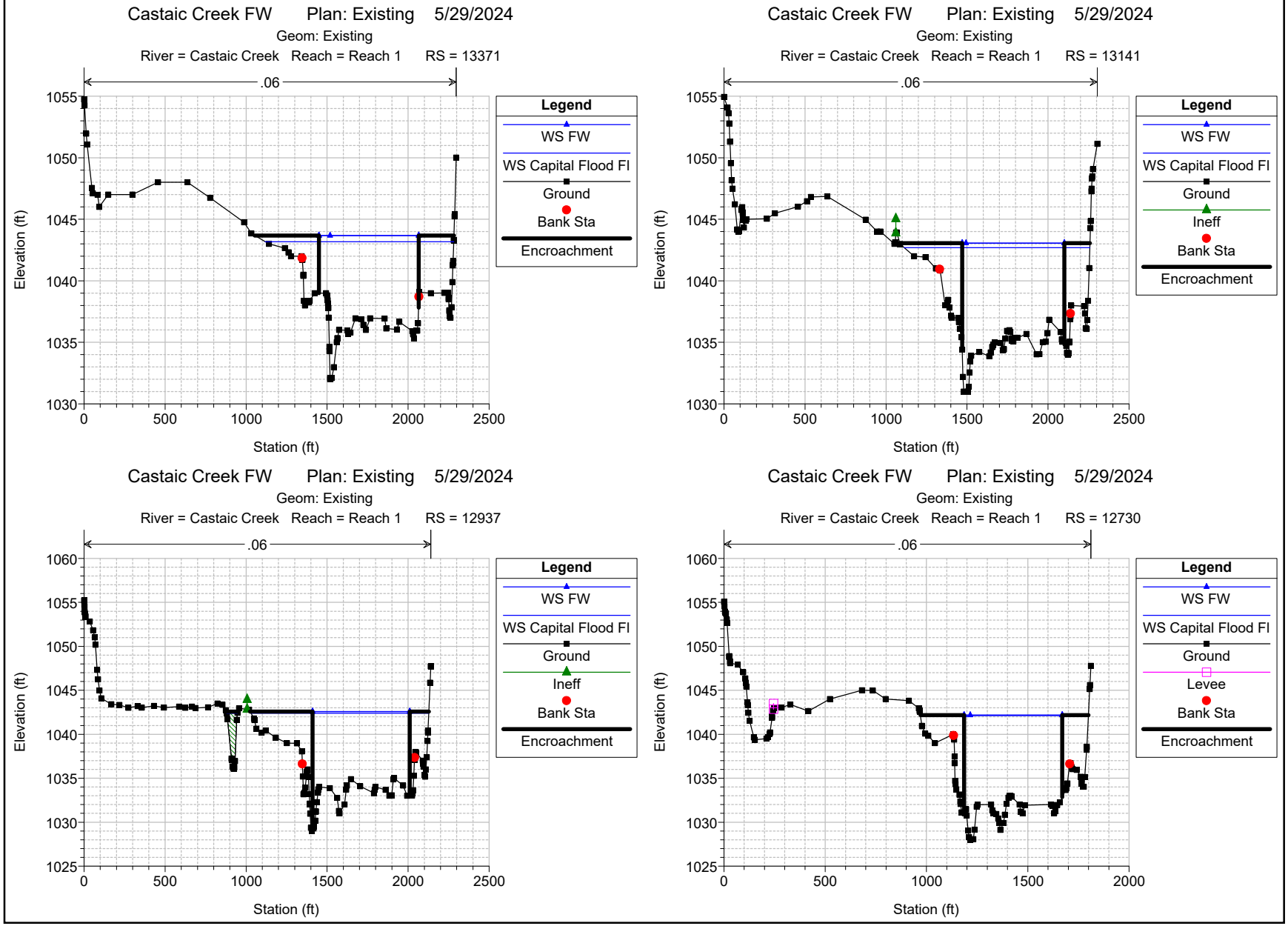
A — Reach

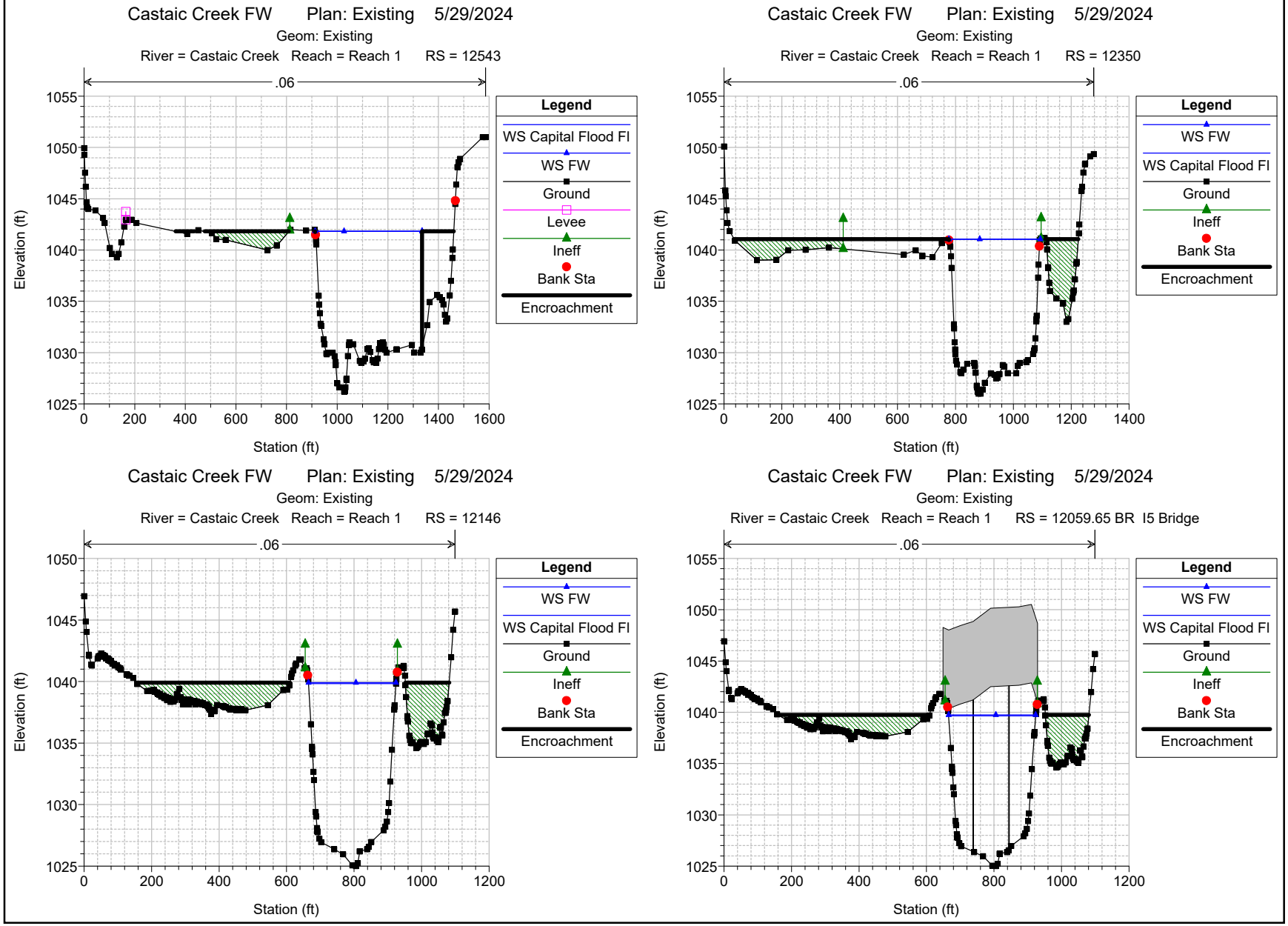
Natural Watercourse

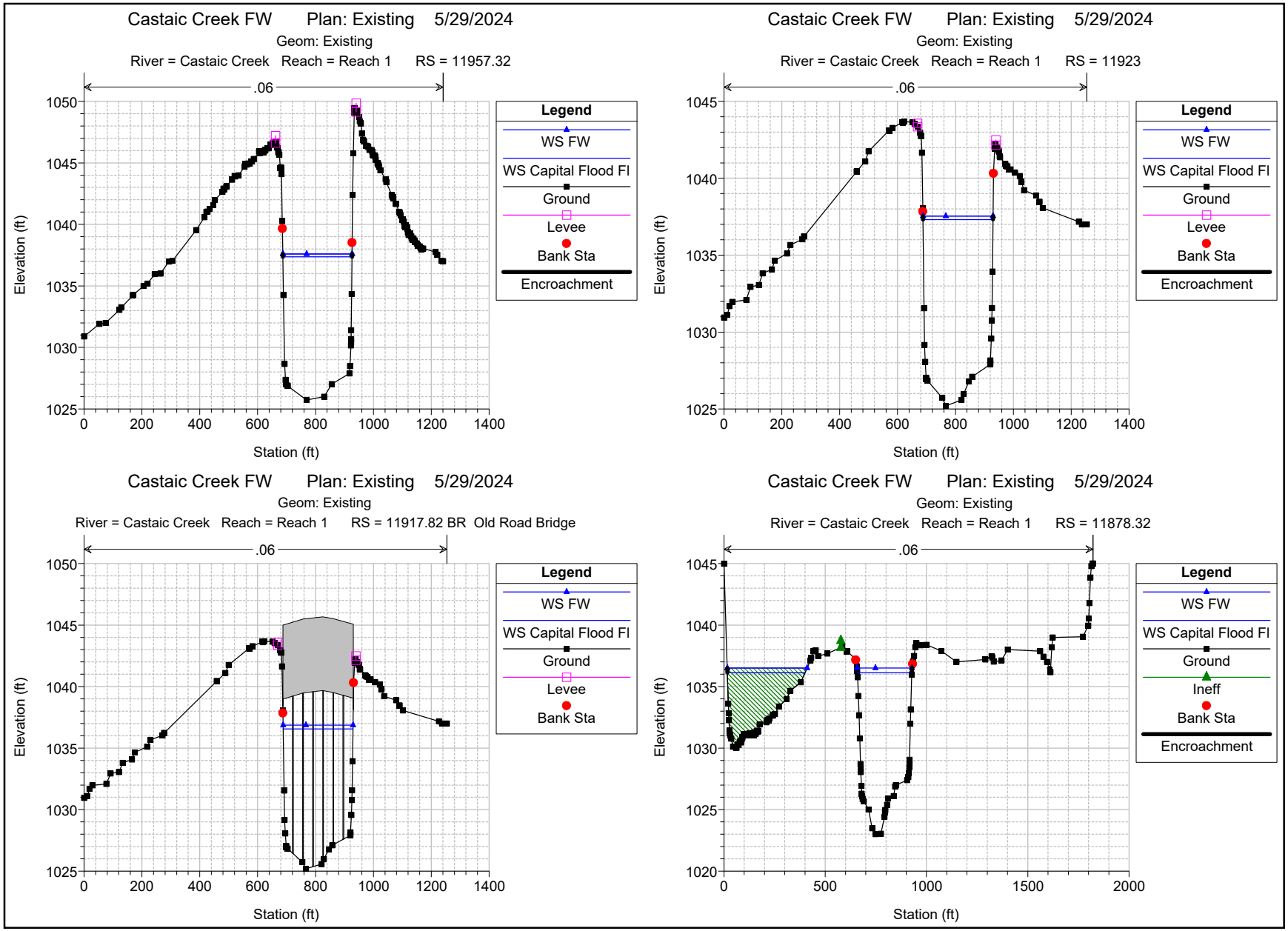
PREPARED BY SSL	LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
DATE 04/03/17	Lower Castaic Creek Capital Flood Flow Rates
SCALE 1" = 2200'	

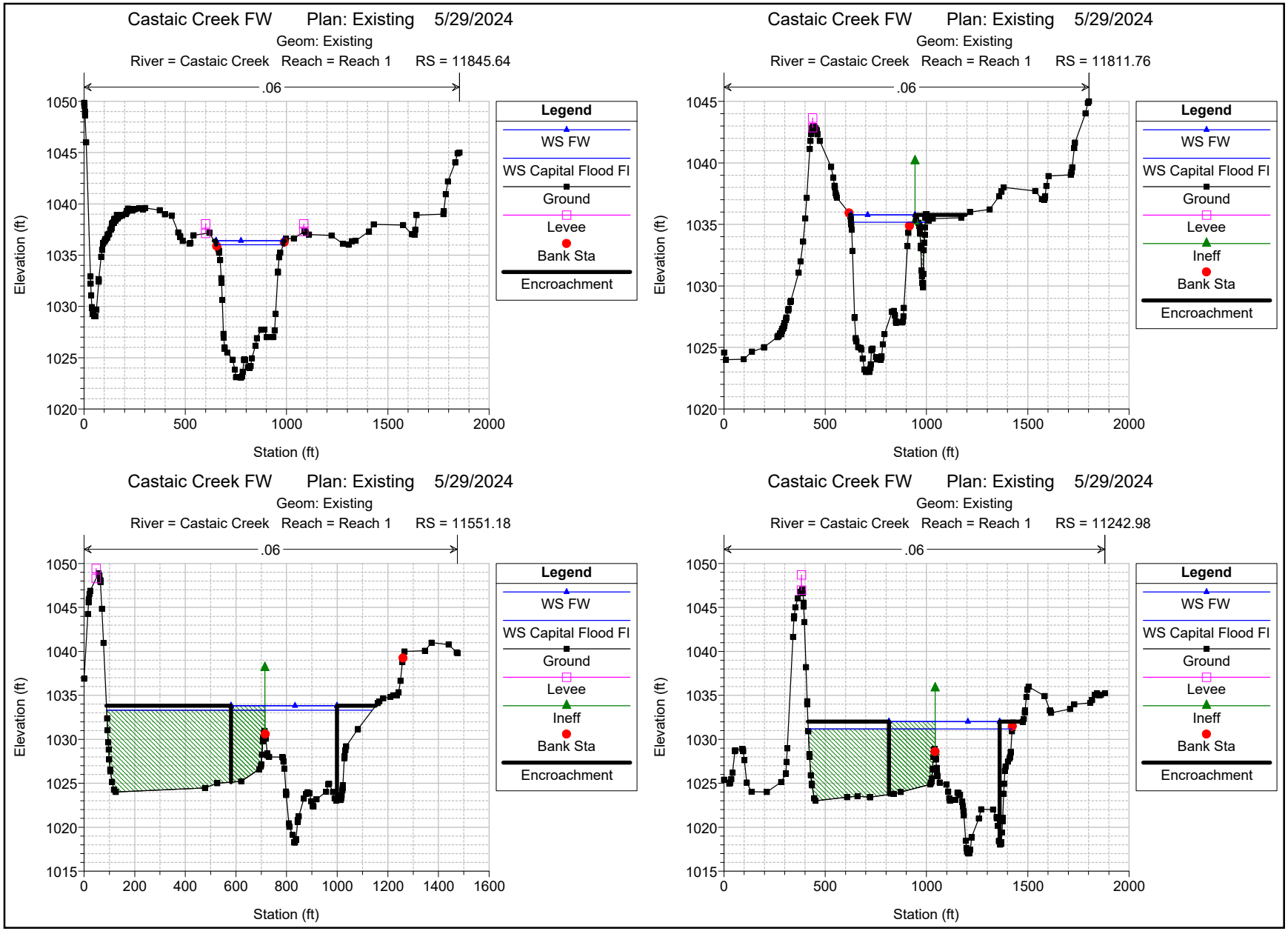
PACE
Advanced Water Engineering

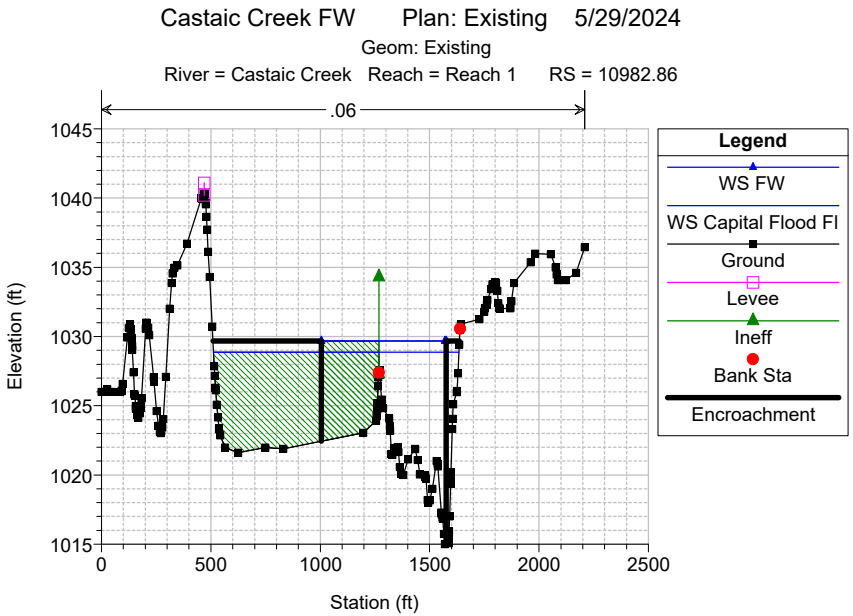
Appendix B – HEC-RAS Existing Condition Results

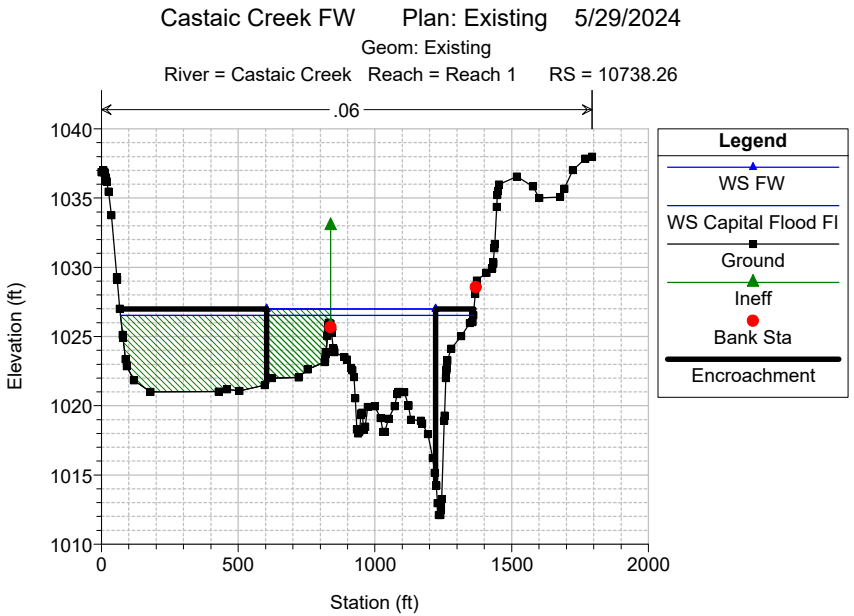

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 13371
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 13141
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 12937
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 12730
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Levee
Bank Sta
Encroachment

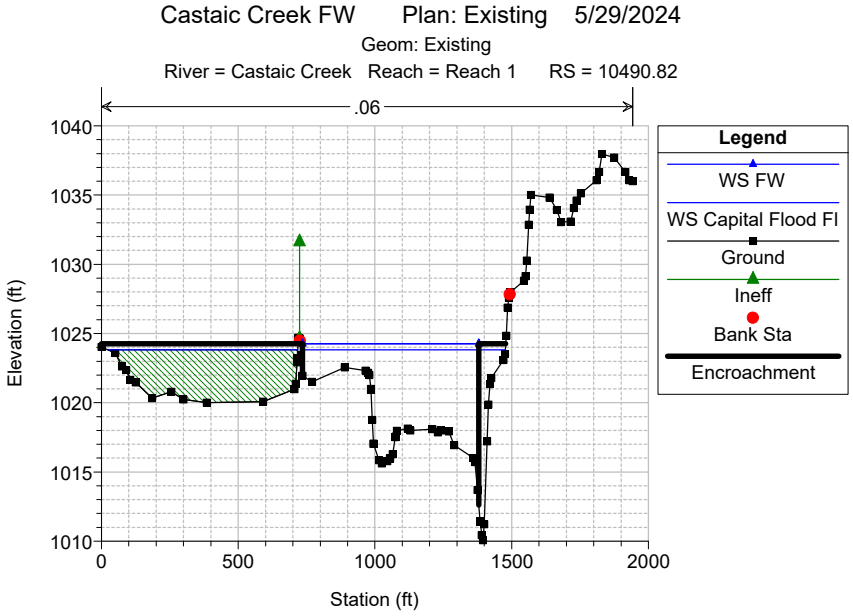

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 12543
.06
Elevation (ft)
Station (ft)
Legend
WS Capital Flood Fl
WS FW
Ground
Levee
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 12350
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 12146
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 12059.65 BR I5 Bridge
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Ineff
Bank Sta
Encroachment

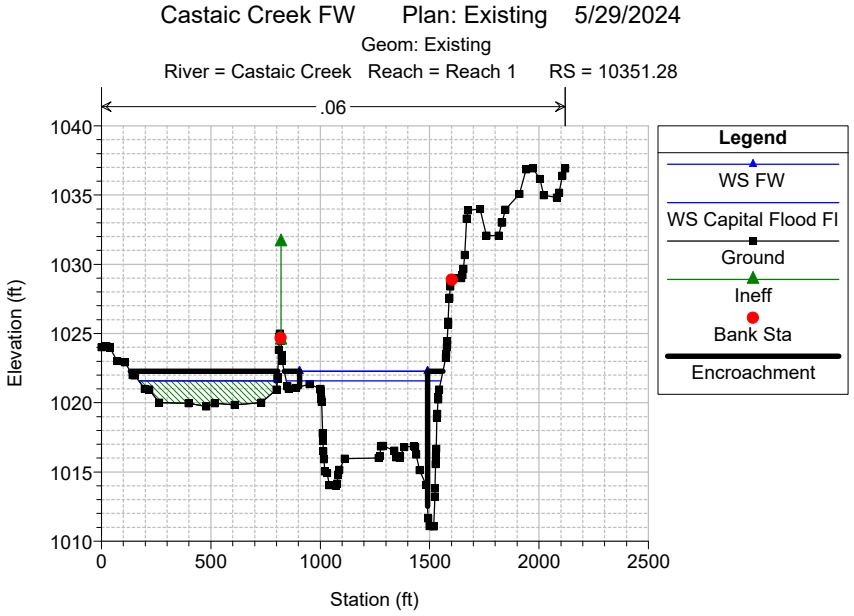

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 11957.32
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Levee
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 11923
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Levee
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 11917.82 BR Old Road Bridge
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Levee
Bank Sta
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 11878.32
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Ineff
Bank Sta
Encroachment

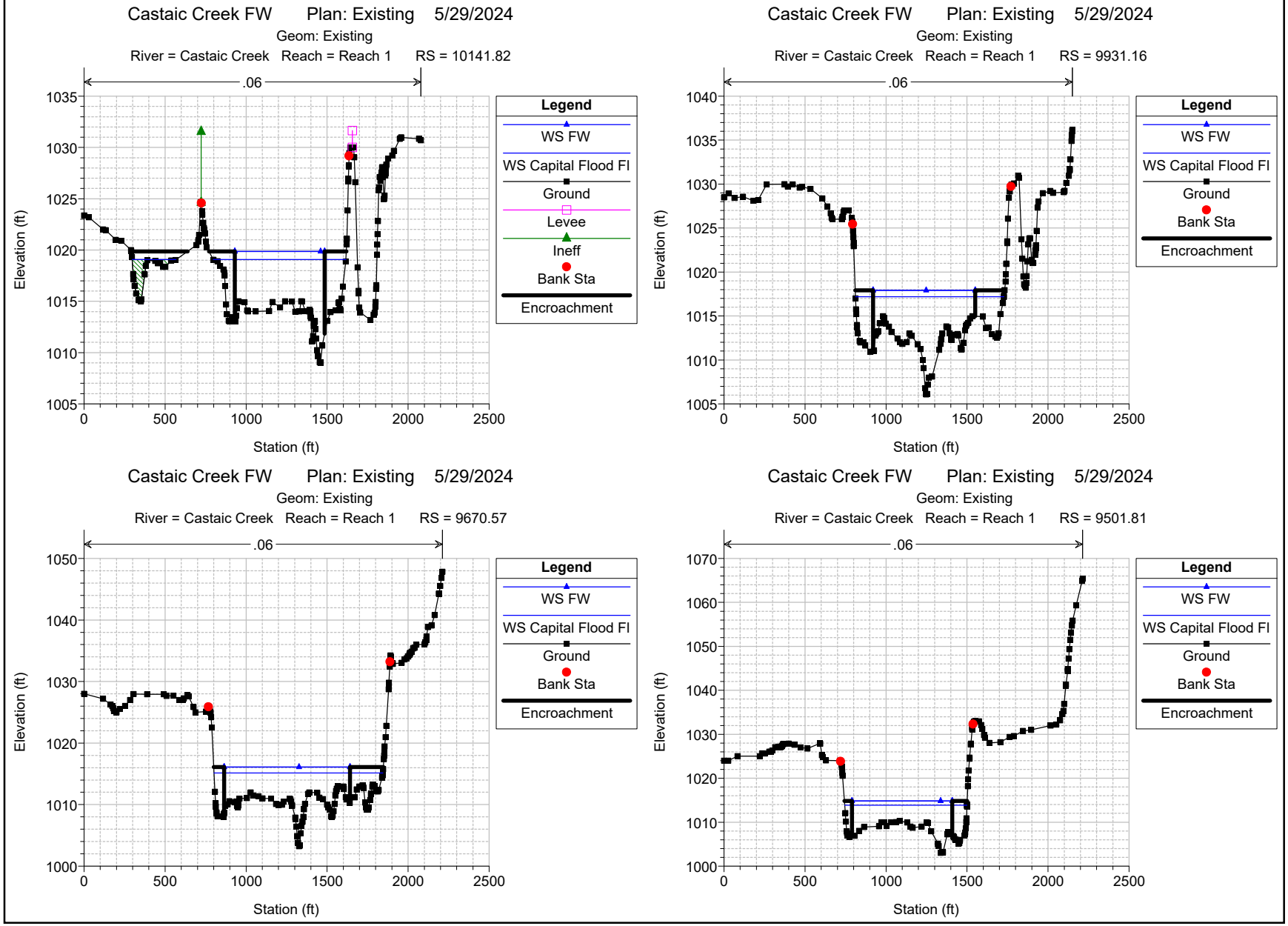

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 11845.64
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Levee
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 11811.76
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Levee
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 11551.18
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Levee
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 11242.98
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Levee
Ineff
Bank Sta
Encroachment

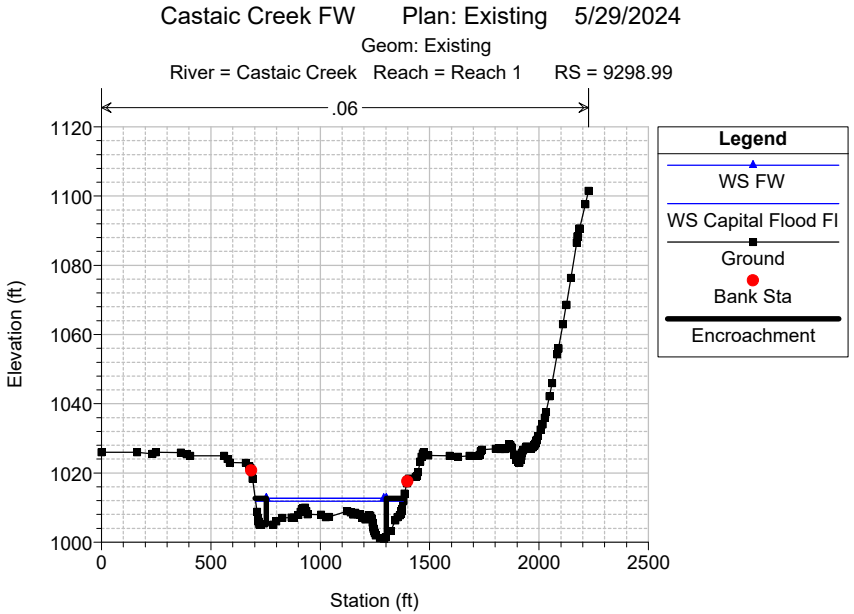

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 10982.86
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Levee
Ineff
Bank Sta
Encroachment

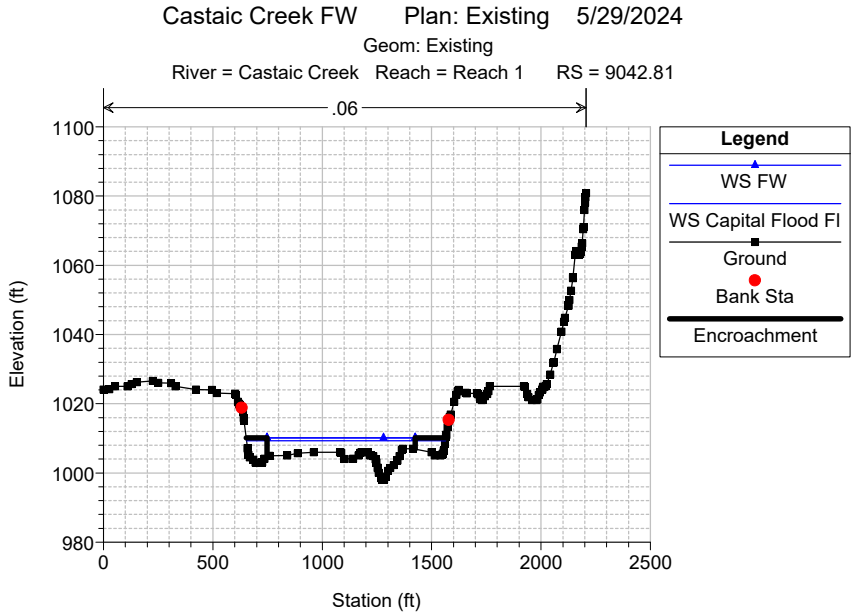

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 10738.26
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Ineff
Bank Sta
Encroachment

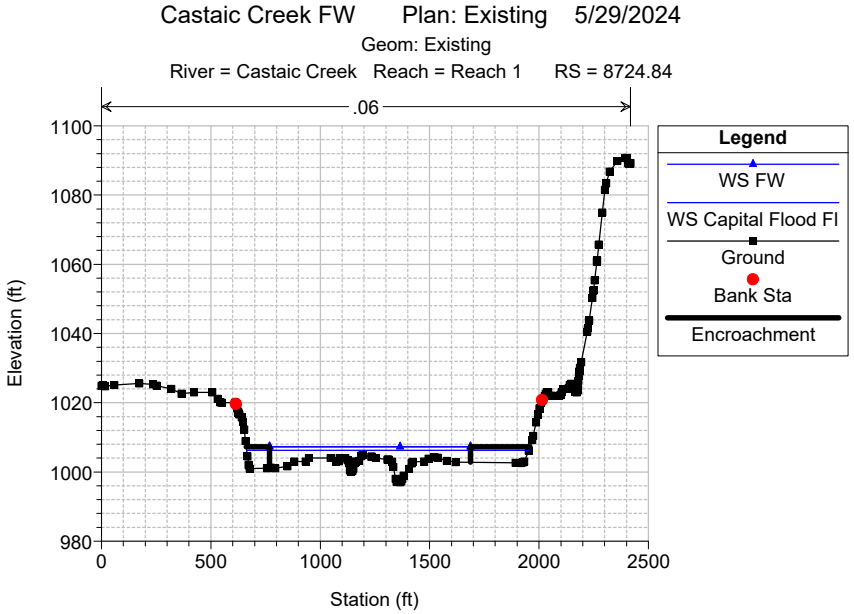

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 10490.82
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Ineff
Bank Sta
Encroachment

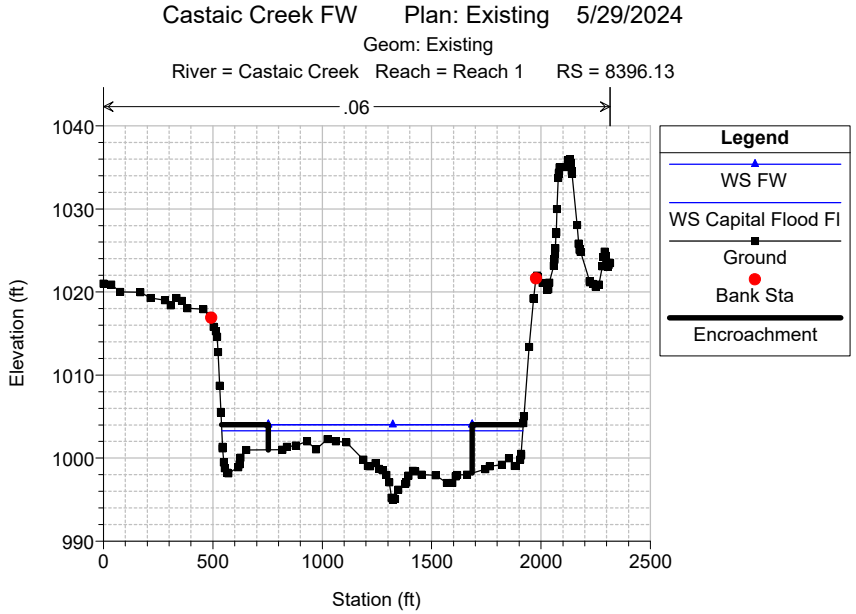

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 10351.28
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Ineff
Bank Sta
Encroachment

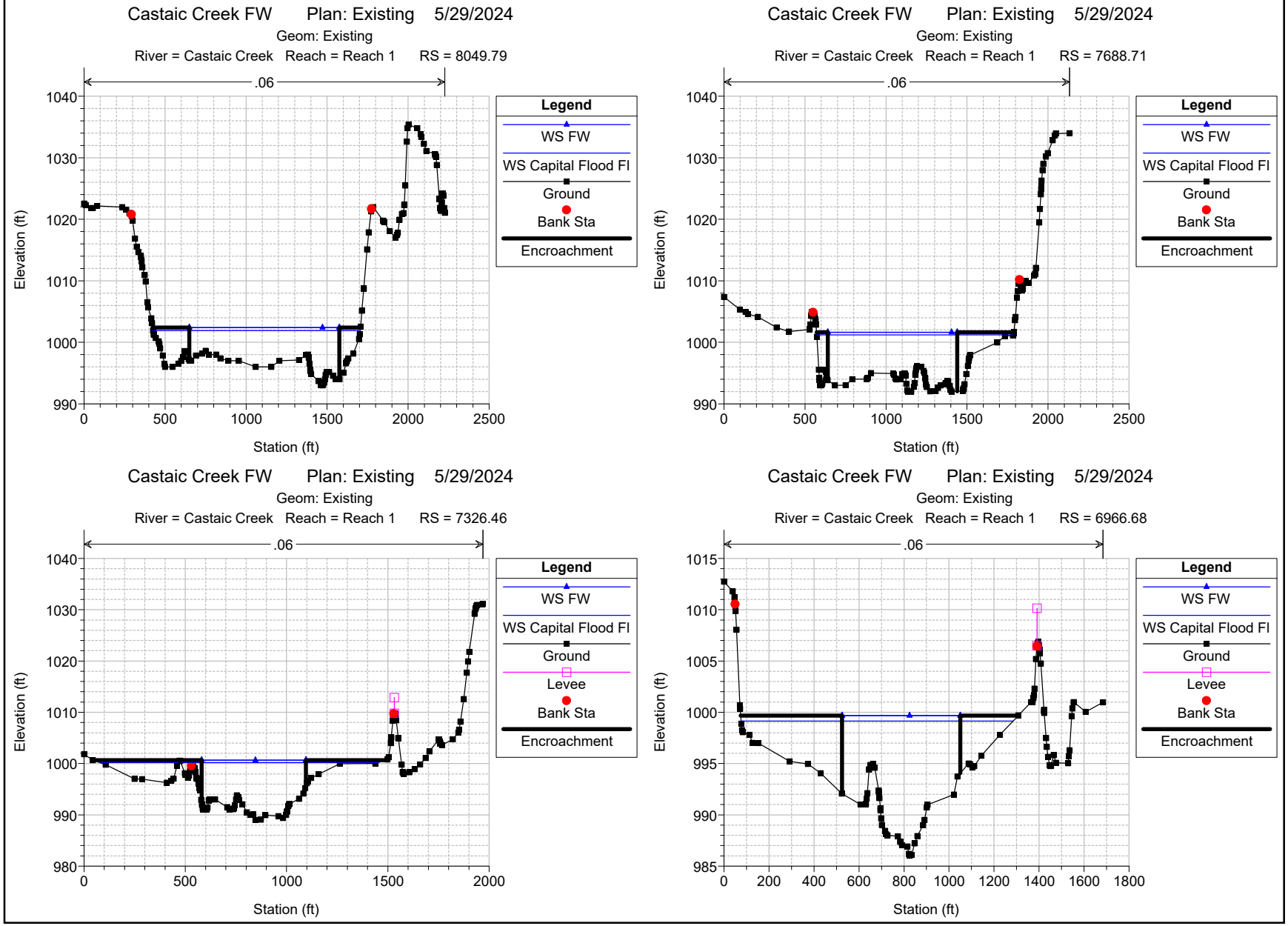

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 10141.82
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Levee
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 9931.16
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 9670.57
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 9501.81
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment

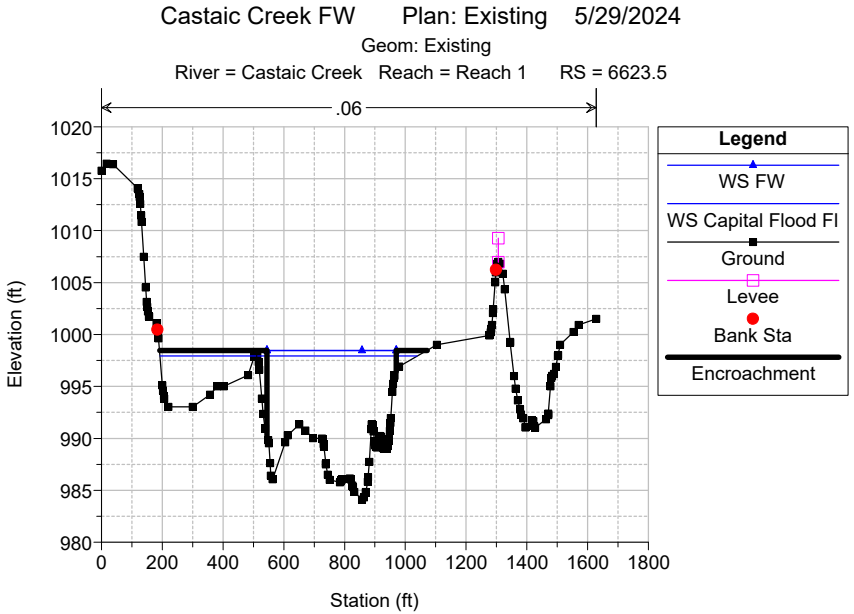

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 9298.99
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment

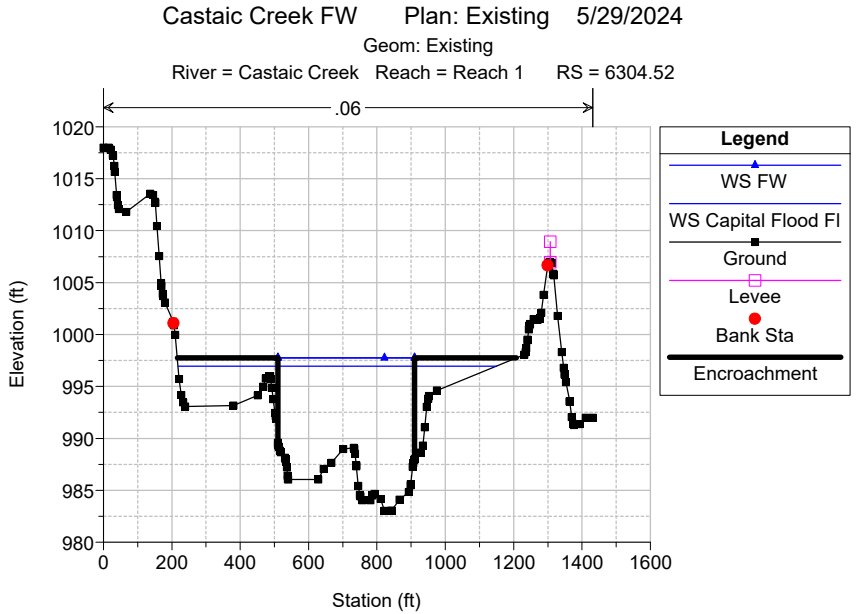

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 9042.81
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment

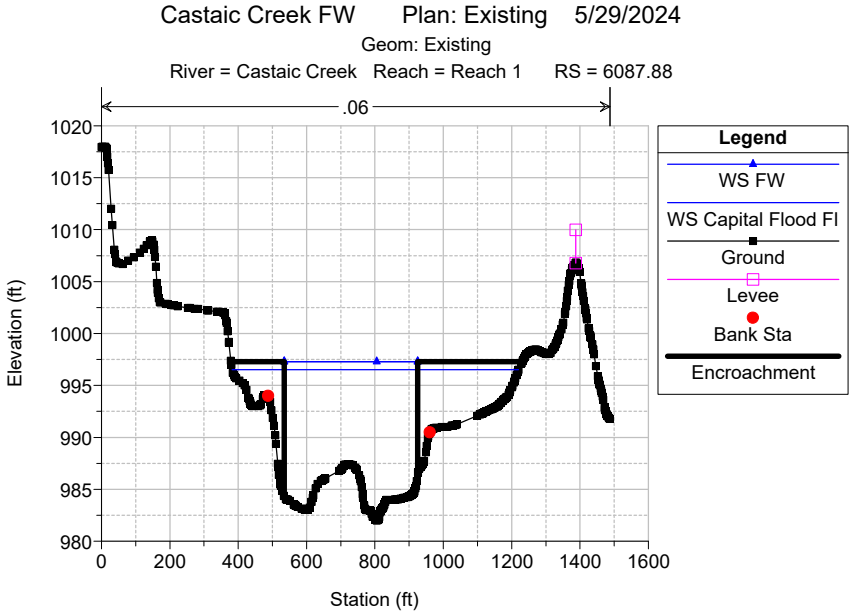

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 8724.84
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment

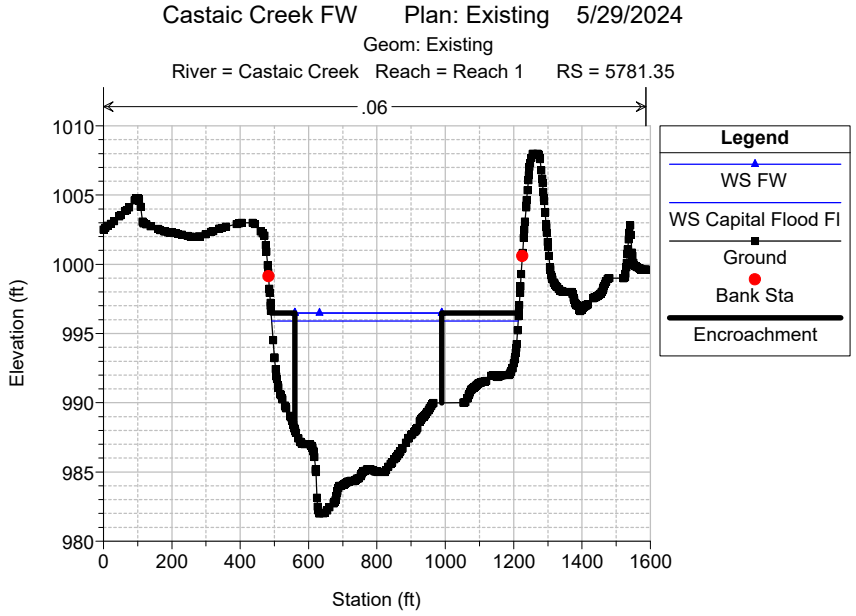

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 8396.13
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment

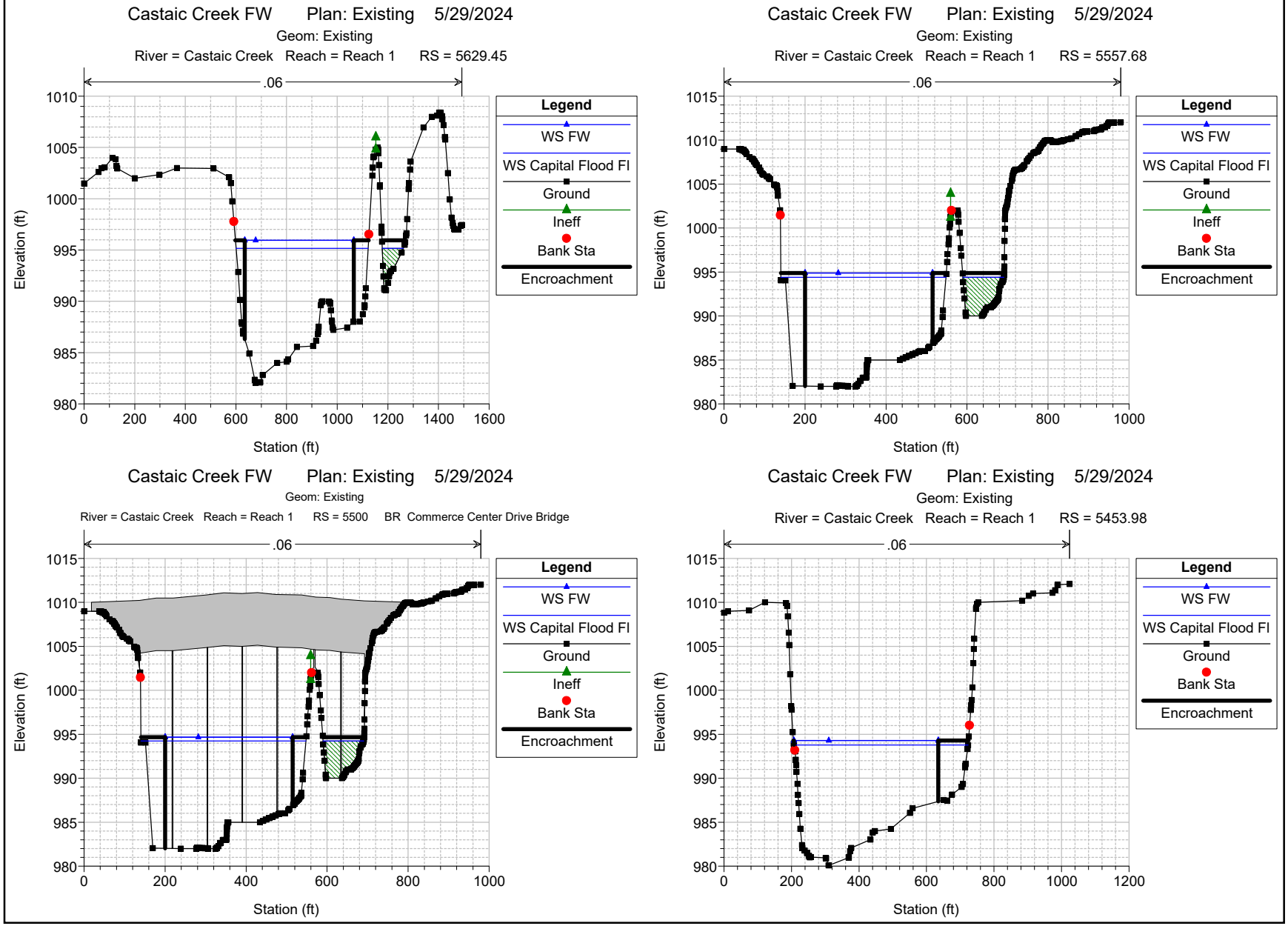

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 8049.79
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 7688.71
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 7326.46
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Levee
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 6966.68
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Levee
Bank Sta
Encroachment

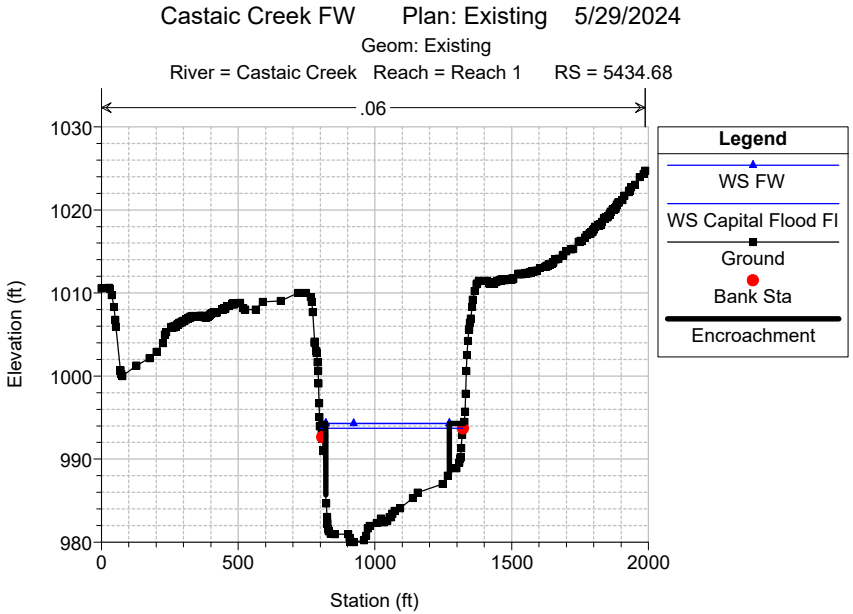

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 6623.5
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Levee
Bank Sta
Encroachment

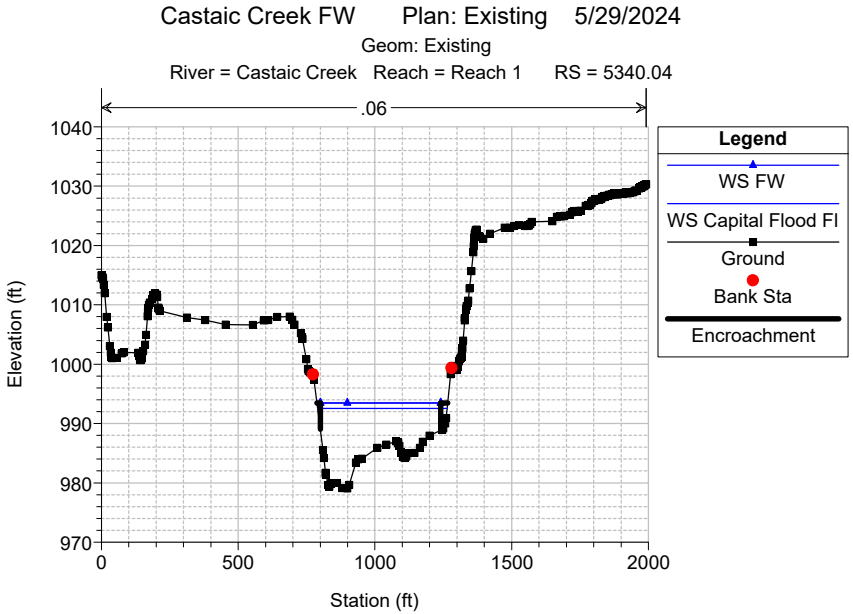

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 6304.52
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Levee
Bank Sta
Encroachment

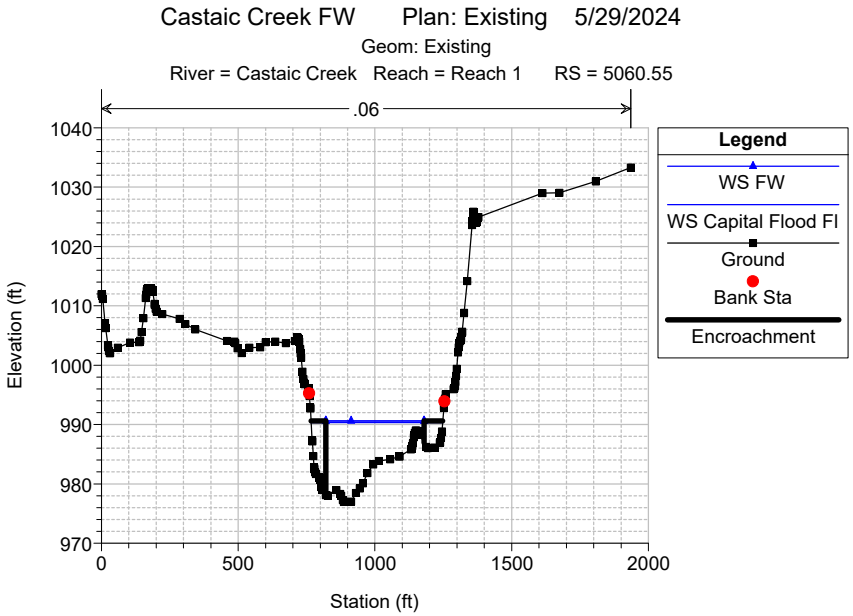

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 6087.88
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Levee
Bank Sta
Encroachment


Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 5781.35
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment


Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 5629.45
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 5557.68
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 5500 BR Commerce Center Drive Bridge
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 5453.98
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment


Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 5434.68
.06
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment
Elevation (ft)
Station (ft)
1030
1020
1010
1000
990
980
0
500
1000
1500
2000


Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 5340.04
.06
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment
Elevation (ft)
Station (ft)
1040
1030
1020
1010
1000
990
980
970
0
500
1000
1500
2000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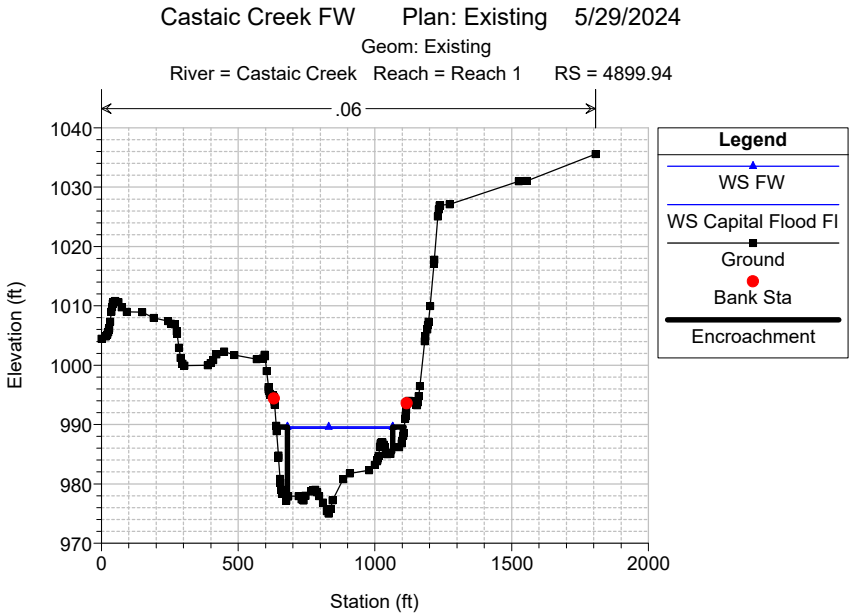
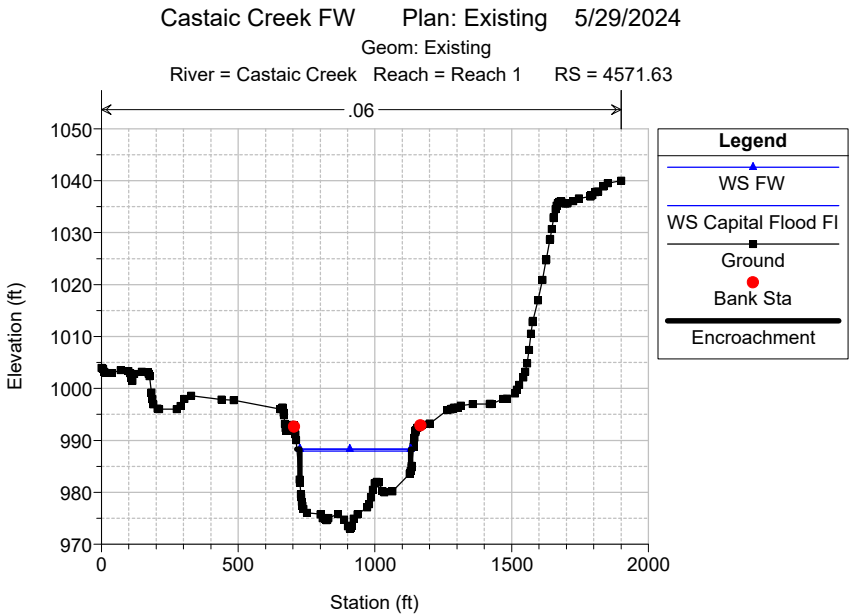
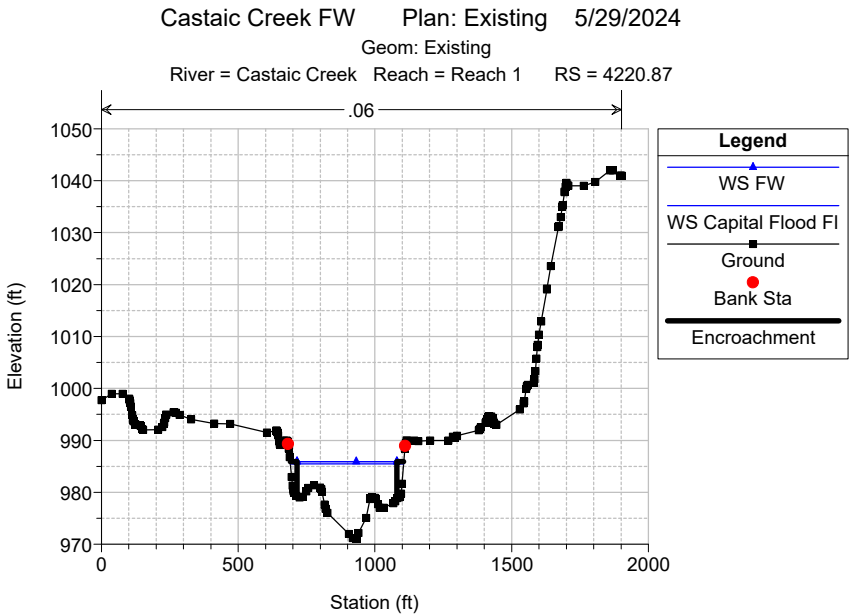
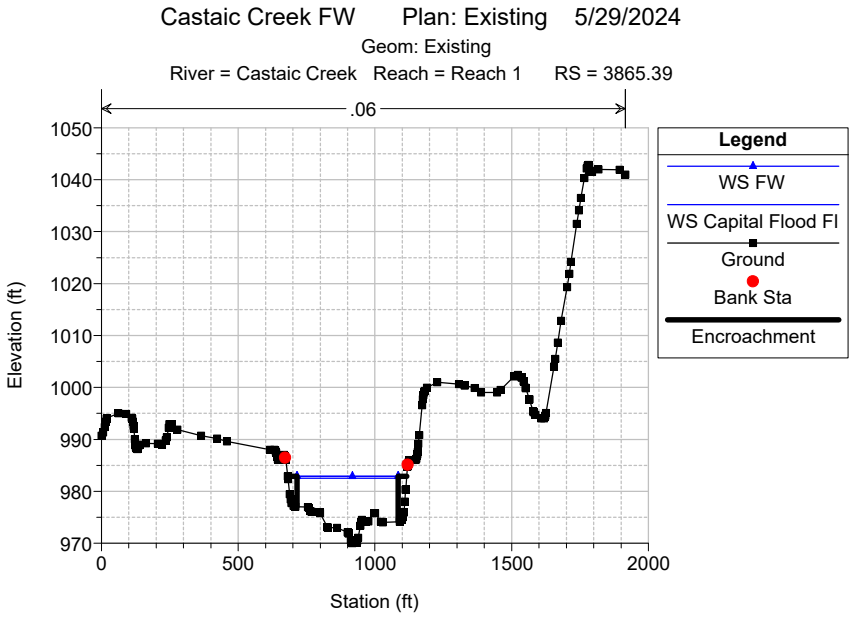
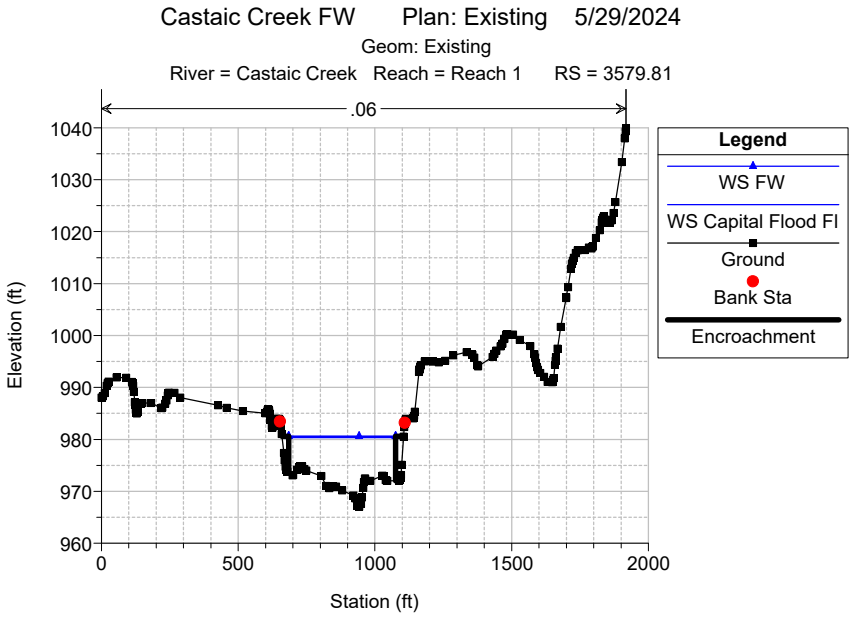
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 5060.55
.06
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment
Elevation (ft)
Station (ft)
1040
1030
1020
1010
1000
990
980
970
0
500
1000
1500
2000

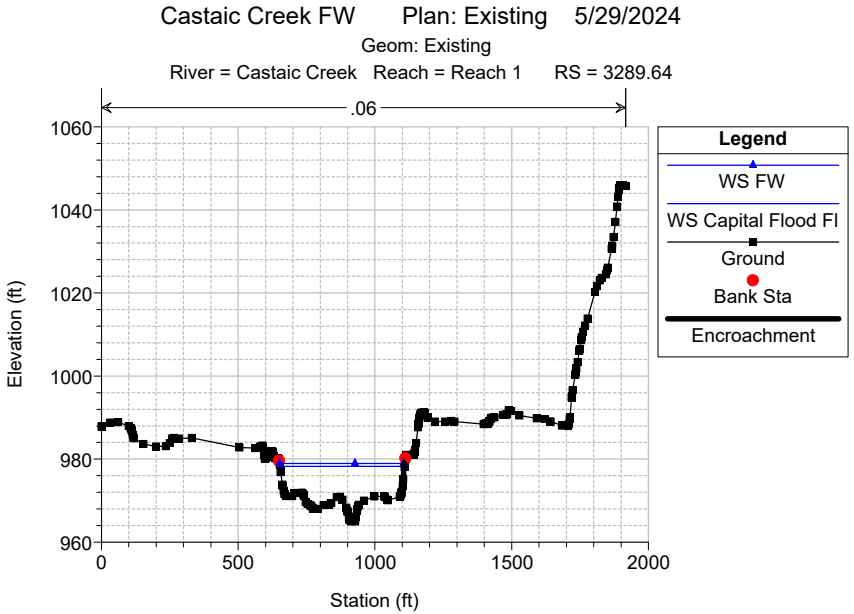

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 4899.94
.06
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment
Elevation (ft)
Station (ft)
1040
1030
1020
1010
1000
990
980
970
0
500
1000
1500
2000

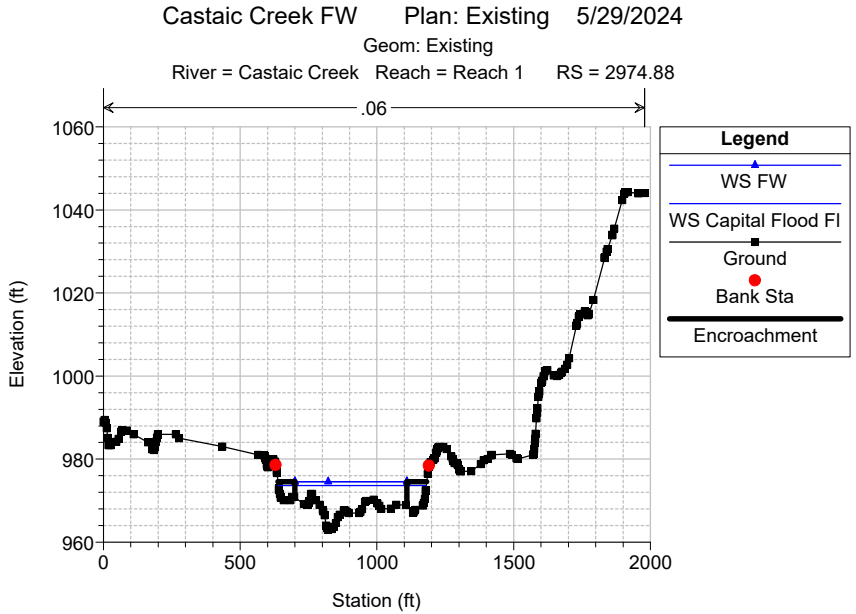

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 4571.63
.06
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

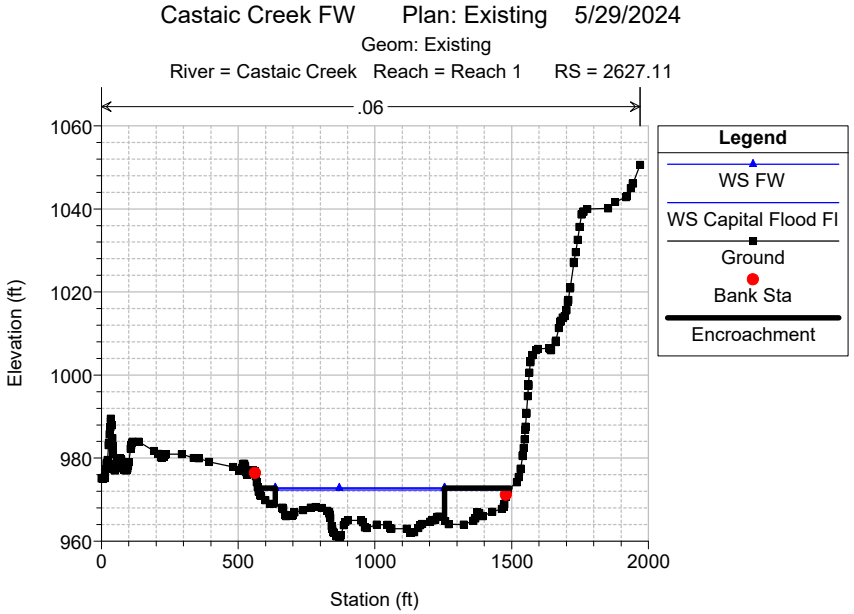

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 4220.87
.06
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

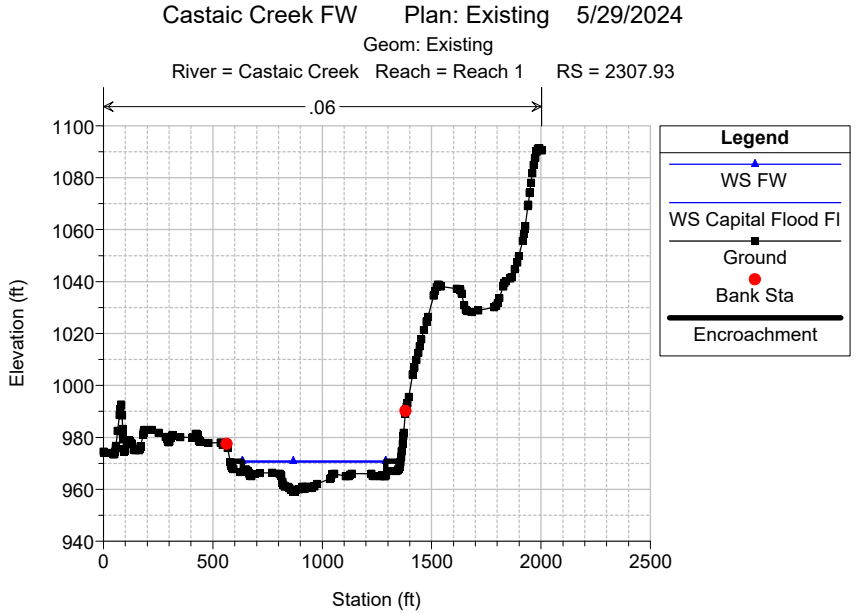

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 3865.39
.06
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

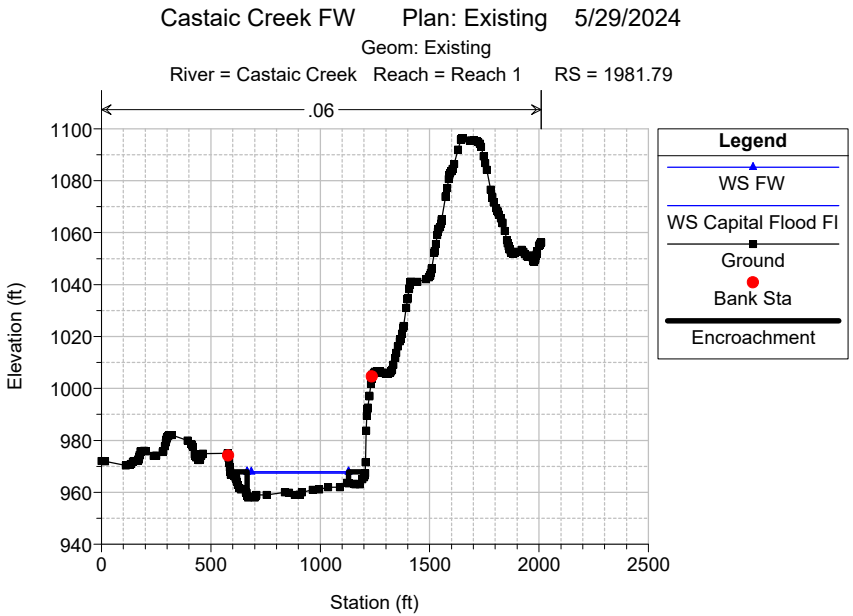

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 3579.81
.06
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment
Elevation (ft)
Station (ft)


Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 3289.64
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment


Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 2974.88
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment

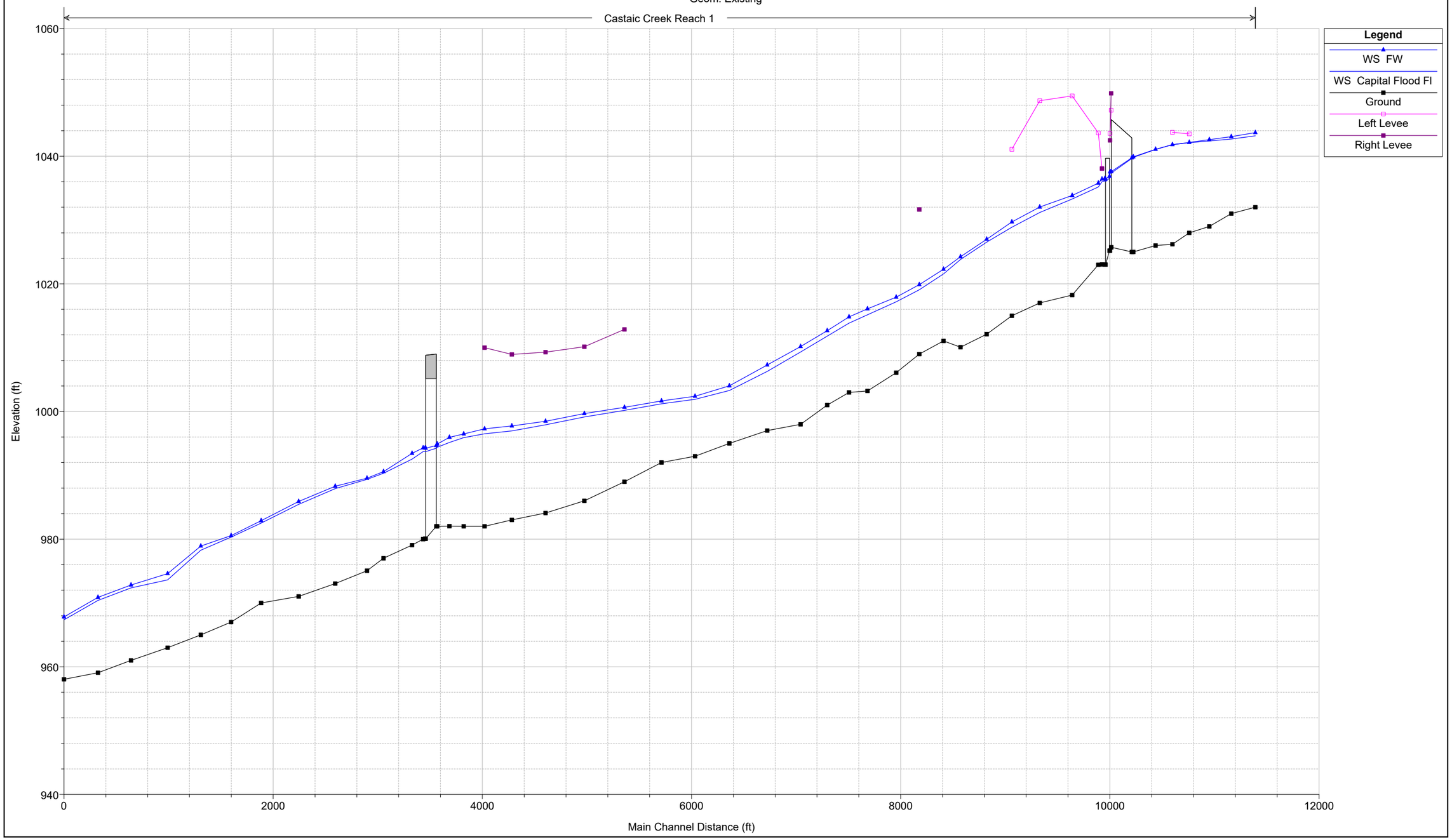

Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 2627.11
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment


Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 2307.93
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment


Castaic Creek FW Plan: Existing 5/29/2024
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 1981.79
.06
Elevation (ft)
1100
1080
1060
1040
1020
1000
980
960
940
0
500
1000
1500
2000
2500
Station (ft)
Legend
WS FW
WS Capital Flood Fl
Ground
Bank Sta
Encroachment

Castaic Creek FW Plan: Existing 5/29/2024

Geom: Existing



HEC-RAS Plan: Exist River: Castaic Creek Reach: Reach 1

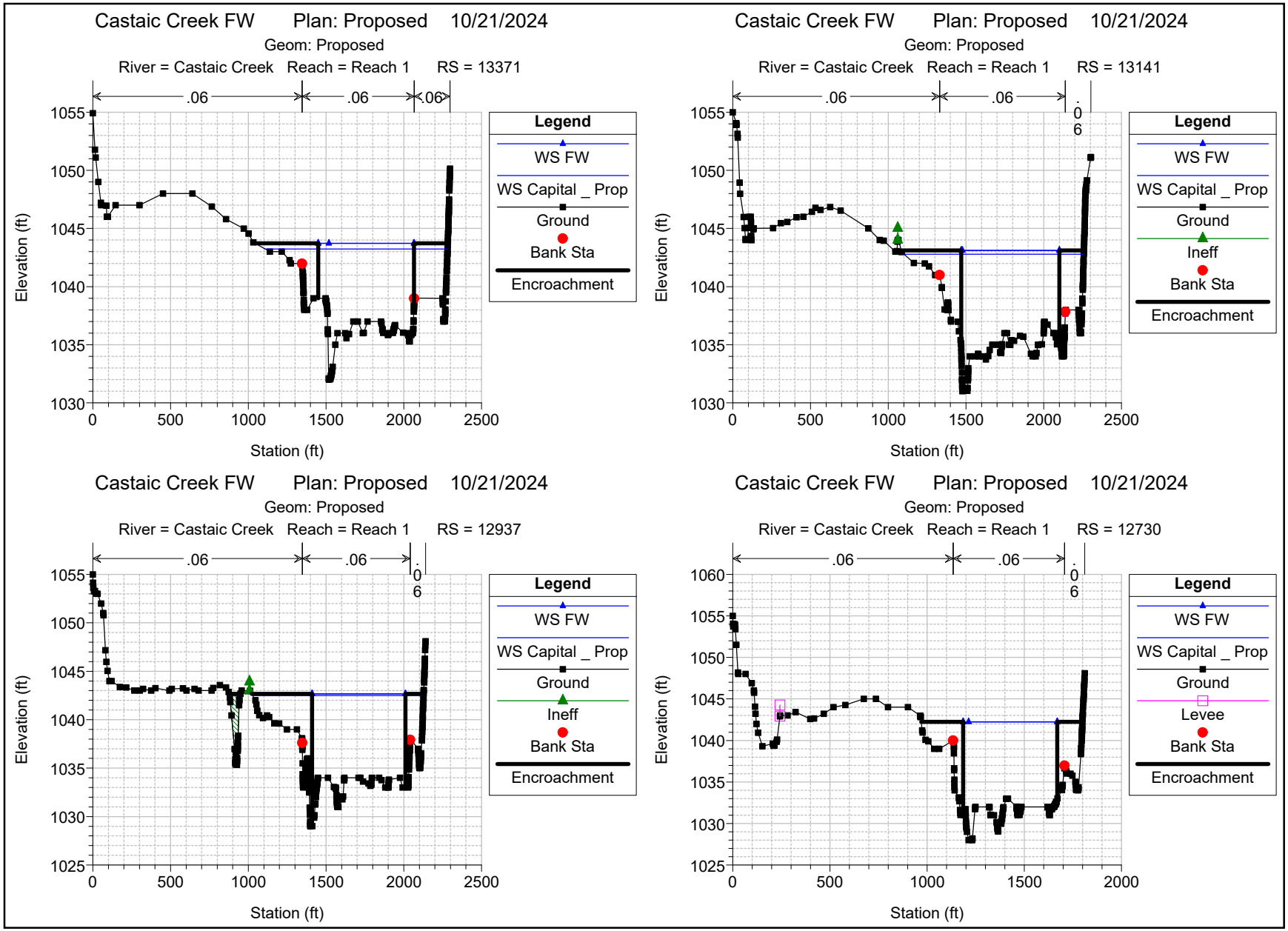
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	13371	Capital Flood Fl	26300.00	1032.00	1043.18		1043.53	0.003258	4.90	5715.79	1163.62	0.34
Reach 1	13371	FW	26300.00	1032.00	1043.68		1044.21	0.003998	5.83	4510.55	615.00	0.38
Reach 1	13141	Capital Flood Fl	26300.00	1031.00	1042.70	1038.43	1042.95	0.001852	4.06	6775.90	1146.05	0.26
Reach 1	13141	FW	26300.00	1031.00	1043.06	1038.54	1043.45	0.002529	5.02	5240.47	630.00	0.31
Reach 1	12937	Capital Flood Fl	26300.00	1029.00	1042.39	1037.07	1042.61	0.001326	3.85	7430.92	1162.71	0.23
Reach 1	12937	FW	26300.00	1029.14	1042.59	1037.44	1042.96	0.002129	4.84	5436.32	600.00	0.28
Reach 1	12730	Capital Flood Fl	26300.00	1027.98	1042.12	1035.81	1042.36	0.001219	4.08	6860.37	829.12	0.22
Reach 1	12730	FW	26300.00	1027.98	1042.17	1035.97	1042.57	0.001880	5.07	5192.21	485.00	0.27
Reach 1	12543	Capital Flood Fl	26300.00	1026.20	1041.82	1034.91	1042.14	0.001454	4.53	5801.86	958.45	0.25
Reach 1	12543	FW	26300.00	1026.20	1041.82	1034.95	1042.26	0.001857	5.36	4905.85	422.29	0.28
Reach 1	12350	Capital Flood Fl	26300.00	1026.00	1041.05	1034.83	1041.78	0.002965	6.91	4142.75	1171.93	0.35
Reach 1	12350	FW	26300.00	1026.00	1041.07	1034.81	1041.85	0.003099	7.08	3715.71	315.77	0.36
Reach 1	12146	Capital Flood Fl	26300.00	1025.00	1039.83	1034.35	1040.96	0.004512	8.55	3075.58	840.91	0.44
Reach 1	12146	FW	26300.00	1025.00	1039.91	1034.33	1041.03	0.004419	8.49	3097.35	259.09	0.43
Reach 1	12059.65		Bridge									
Reach 1	11957.32	Capital Flood Fl	26300.00	1025.73	1037.37	1034.06	1039.08	0.008248	10.48	2508.38	239.25	0.57
Reach 1	11957.32	FW	26300.00	1025.73	1037.59	1034.06	1039.23	0.007705	10.27	2561.94	239.25	0.55
Reach 1	11923	Capital Flood Fl	26300.00	1025.20	1037.31	1033.88	1038.96	0.007884	10.31	2550.75	241.85	0.56
Reach 1	11923	FW	26300.00	1025.20	1037.54	1033.88	1039.12	0.007358	10.09	2606.13	241.85	0.54
Reach 1	11917.82		Bridge									
Reach 1	11878.32	Capital Flood Fl	26300.00	1023.01	1036.13	1032.69	1037.65	0.007687	9.88	2663.11	653.20	0.55
Reach 1	11878.32	FW	26300.00	1023.01	1036.51	1032.68	1037.91	0.006848	9.51	2765.23	665.05	0.53
Reach 1	11845.64	Capital Flood Fl	26300.00	1023.04	1036.01	1032.49	1037.34	0.007929	9.24	2847.38	332.63	0.55
Reach 1	11845.64	FW	26300.00	1023.04	1036.42	1032.48	1037.63	0.006812	8.82	2983.00	332.63	0.52
Reach 1	11811.76	Capital Flood Fl	26400.00	1023.00	1035.17	1032.65	1036.90	0.010332	10.54	2507.83	344.44	0.63
Reach 1	11811.76	FW	26400.00	1023.00	1035.77	1032.64	1037.28	0.008277	9.85	2696.37	315.89	0.57
Reach 1	11551.18	Capital Flood Fl	26400.00	1018.25	1033.30	1030.28	1034.42	0.008260	8.47	3117.22	1049.55	0.55
Reach 1	11551.18	FW	26400.00	1018.25	1033.83	1030.60	1035.26	0.007699	9.59	2753.70	419.00	0.54
Reach 1	11242.98	Capital Flood Fl	26400.00	1017.01	1031.19	1027.79	1032.20	0.006119	8.07	3270.60	1007.08	0.49
Reach 1	11242.98	FW	26400.00	1017.01	1032.02	1028.09	1033.12	0.005736	8.38	3151.14	546.00	0.47
Reach 1	10982.86	Capital Flood Fl	26400.00	1015.00	1028.86	1026.39	1030.19	0.009153	9.25	2853.60	1121.25	0.58
Reach 1	10982.86	FW	26400.00	1015.00	1029.69	1026.96	1031.17	0.009147	9.76	2707.40	571.00	0.58
Reach 1	10738.26	Capital Flood Fl	26400.00	1012.10	1026.52	1024.67	1027.67	0.011492	8.60	3070.83	1290.94	0.63
Reach 1	10738.26	FW	26400.00	1014.61	1026.98	1025.40	1028.54	0.013169	10.02	2634.58	618.31	0.67
Reach 1	10490.82	Capital Flood Fl	26400.00	1010.07	1023.82	1022.07	1024.69	0.011605	7.48	3531.71	1442.80	0.61
Reach 1	10490.82	FW	26400.00	1012.60	1024.26	1022.83	1025.23	0.011827	7.92	3331.93	645.00	0.61
Reach 1	10351.28	Capital Flood Fl	26400.00	1011.06	1021.57	1019.83	1022.60	0.014268	8.14	3244.04	1339.60	0.67
Reach 1	10351.28	FW	26400.00	1012.53	1022.28	1020.39	1023.33	0.011647	8.21	3215.79	585.00	0.62
Reach 1	10141.82	Capital Flood Fl	26400.00	1009.00	1019.08	1017.33	1019.81	0.009739	6.85	3853.70	1089.96	0.56
Reach 1	10141.82	FW	26400.00	1009.00	1019.87	1017.99	1020.85	0.009757	7.93	3330.87	555.00	0.57
Reach 1	9931.16	Capital Flood Fl	26400.00	1006.09	1017.18		1017.78	0.008295	6.24	4227.48	915.02	0.51
Reach 1	9931.16	FW	26400.00	1006.09	1017.92		1018.75	0.008835	7.34	3594.34	630.00	0.54
Reach 1	9670.57	Capital Flood Fl	26400.00	1003.22	1015.14		1015.64	0.007171	5.67	4655.47	1042.02	0.47
Reach 1	9670.57	FW	26400.00	1003.22	1016.08		1016.66	0.006214	6.07	4346.26	776.00	0.45
Reach 1	9501.81	Capital Flood Fl	26400.00	1003.00	1013.84		1014.44	0.006272	6.20	4261.24	754.84	0.46
Reach 1	9501.81	FW	26400.00	1003.00	1014.83		1015.53	0.006378	6.69	3946.84	618.00	0.47
Reach 1	9298.99	Capital Flood Fl	26400.00	1001.00	1011.82		1012.72	0.010831	7.63	3458.05	674.72	0.59
Reach 1	9298.99	FW	26400.00	1001.00	1012.67		1013.75	0.011458	8.33	3169.24	549.00	0.61
Reach 1	9042.81	Capital Flood Fl	26400.00	998.00	1009.32		1010.00	0.010022	6.62	3985.24	909.37	0.56
Reach 1	9042.81	FW	26400.00	998.00	1010.17		1011.00	0.009570	7.32	3607.77	677.00	0.56
Reach 1	8724.84	Capital Flood Fl	26400.00	997.00	1006.28		1006.79	0.009918	5.74	4597.26	1290.32	0.54
Reach 1	8724.84	FW	26400.00	997.00	1007.28		1007.92	0.009458	6.46	4089.47	919.00	0.54
Reach 1	8396.13	Capital Flood Fl	26400.00	995.00	1003.29		1003.69	0.007308	5.11	5167.20	1376.34	0.46
Reach 1	8396.13	FW	26400.00	995.00	1004.01		1004.62	0.008735	6.28	4203.12	931.00	0.52

HEC-RAS Plan: Exist River: Castaic Creek Reach: Reach 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	8049.79	Capital Flood Fl	26400.00	993.00	1001.92		1002.17	0.003023	4.04	6538.19	1279.06	0.31
Reach 1	8049.79	FW	26400.00	993.00	1002.40		1002.76	0.003691	4.85	5440.30	925.00	0.35
Reach 1	7688.71	Capital Flood Fl	26400.00	992.00	1001.21		1001.41	0.001876	3.57	7388.85	1212.09	0.26
Reach 1	7688.71	FW	26400.00	992.00	1001.65		1001.92	0.001878	4.19	6305.99	800.00	0.26
Reach 1	7326.46	Capital Flood Fl	26400.00	989.00	1000.18	995.63	1000.49	0.003617	4.64	6136.86	1361.03	0.35
Reach 1	7326.46	FW	26400.00	989.00	1000.65	995.65	1001.12	0.002595	5.49	4807.26	515.00	0.32
Reach 1	6966.68	Capital Flood Fl	26400.00	986.01	999.15	994.71	999.38	0.002284	3.80	6954.62	1209.34	0.28
Reach 1	6966.68	FW	26400.00	986.01	999.67	994.62	1000.13	0.002557	5.43	4866.13	525.00	0.31
Reach 1	6623.5	Capital Flood Fl	26400.00	984.09	997.92	993.59	998.31	0.003605	5.02	5256.13	840.48	0.35
Reach 1	6623.5	FW	26400.00	984.09	998.47	993.31	999.07	0.003088	6.23	4236.12	425.00	0.35
Reach 1	6304.52	Capital Flood Fl	26400.00	983.01	996.96	991.13	997.27	0.002775	4.46	5917.97	932.22	0.31
Reach 1	6304.52	FW	26400.00	983.01	997.74	991.15	998.23	0.002076	5.64	4683.39	400.00	0.29
Reach 1	6087.88	Capital Flood Fl	26400.00	982.00	996.50	989.74	996.79	0.001308	4.46	6600.36	837.76	0.24
Reach 1	6087.88	FW	26400.00	982.00	997.28	989.88	997.73	0.001732	5.36	4922.44	390.00	0.27
Reach 1	5781.35	Capital Flood Fl	31100.00	982.00	995.91		996.37	0.003094	5.46	5700.17	720.90	0.34
Reach 1	5781.35	FW	31100.00	982.00	996.48		997.21	0.003453	6.84	4545.76	430.00	0.37
Reach 1	5629.45	Capital Flood Fl	31100.00	982.03	995.15	990.95	995.86	0.004102	6.75	4608.76	604.52	0.40
Reach 1	5629.45	FW	31100.00	982.03	995.95	991.10	996.71	0.003787	7.02	4431.95	430.00	0.39
Reach 1	5557.68	Capital Flood Fl	31100.00	982.00	994.39	989.91	995.33	0.004743	7.75	4012.22	509.06	0.44
Reach 1	5557.68	FW	31100.00	982.00	994.90	990.53	996.13	0.005719	8.91	3491.32	315.00	0.47
Reach 1	5500		Bridge									
Reach 1	5453.98	Capital Flood Fl	31100.00	980.08	993.77		994.44	0.003627	6.54	4753.01	516.03	0.38
Reach 1	5453.98	FW	31100.00	980.08	994.30		995.04	0.003380	6.86	4532.49	428.00	0.37
Reach 1	5434.68	Capital Flood Fl	31100.00	980.00	993.72		994.35	0.003251	6.32	4920.45	521.84	0.36
Reach 1	5434.68	FW	31100.00	980.00	994.30		994.92	0.002848	6.33	4910.20	452.15	0.34
Reach 1	5340.04	Capital Flood Fl	31100.00	979.08	992.53		993.68	0.008042	8.58	3624.42	473.83	0.55
Reach 1	5340.04	FW	31100.00	979.08	993.44		994.41	0.005647	7.89	3942.13	440.38	0.46
Reach 1	5060.55	Capital Flood Fl	31100.00	977.01	990.34		991.47	0.008103	8.54	3639.99	480.82	0.55
Reach 1	5060.55	FW	31100.00	977.01	990.59		992.25	0.010930	10.34	3007.98	360.00	0.63
Reach 1	4899.94	Capital Flood Fl	31100.00	975.04	989.37		990.33	0.005943	7.88	3948.14	466.52	0.48
Reach 1	4899.94	FW	31100.00	975.04	989.56		990.76	0.006939	8.79	3538.06	385.00	0.51
Reach 1	4571.63	Capital Flood Fl	31100.00	973.03	987.92		988.78	0.004273	7.40	4201.15	424.98	0.42
Reach 1	4571.63	FW	31100.00	973.03	988.30		989.11	0.003812	7.23	4299.50	405.00	0.39
Reach 1	4220.87	Capital Flood Fl	31100.00	971.03	985.46		986.73	0.008016	9.04	3441.18	413.64	0.55
Reach 1	4220.87	FW	31100.00	971.03	985.91		987.23	0.007556	9.22	3372.70	365.00	0.53
Reach 1	3865.39	Capital Flood Fl	31100.00	970.00	982.51		983.78	0.008487	9.02	3446.43	434.13	0.56
Reach 1	3865.39	FW	31100.00	970.00	982.88		984.31	0.008796	9.60	3239.90	370.00	0.57
Reach 1	3579.81	Capital Flood Fl	31100.00	967.00	980.32		981.46	0.007431	8.59	3622.59	444.01	0.53
Reach 1	3579.81	FW	31100.00	967.00	980.56		981.86	0.007985	9.13	3407.69	390.00	0.54
Reach 1	3289.64	Capital Flood Fl	31100.00	965.00	978.28		979.36	0.006966	8.34	3730.23	455.54	0.51
Reach 1	3289.64	FW	31100.00	965.00	978.93		979.86	0.005429	7.73	4022.70	454.20	0.46
Reach 1	2974.88	Capital Flood Fl	31200.00	963.00	973.62	973.12	975.57	0.023266	11.21	2782.99	540.80	0.87
Reach 1	2974.88	FW	31200.00	963.00	974.59		976.76	0.019712	11.82	2640.58	410.00	0.82
Reach 1	2627.11	Capital Flood Fl	31200.00	961.00	972.35		972.74	0.003153	5.01	6225.07	912.68	0.34
Reach 1	2627.11	FW	31200.00	961.00	972.80		973.44	0.004450	6.42	4857.86	620.00	0.40
Reach 1	2307.93	Capital Flood Fl	31200.00	959.06	970.40	968.39	971.19	0.008189	7.10	4394.81	776.86	0.53
Reach 1	2307.93	FW	31200.00	959.06	970.87		971.68	0.007025	7.22	4321.81	655.00	0.50
Reach 1	1981.79	Capital Flood Fl	31200.00	958.04	967.36	965.21	968.36	0.009101	8.04	3878.27	615.74	0.57
Reach 1	1981.79	FW	31200.00	958.04	967.82	965.48	969.06	0.009099	8.91	3502.78	465.00	0.57

PACE
Advanced Water Engineering

Appendix C – HEC-RAS Proposed Condition Results


Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 13371
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 13141
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 12937
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 12730
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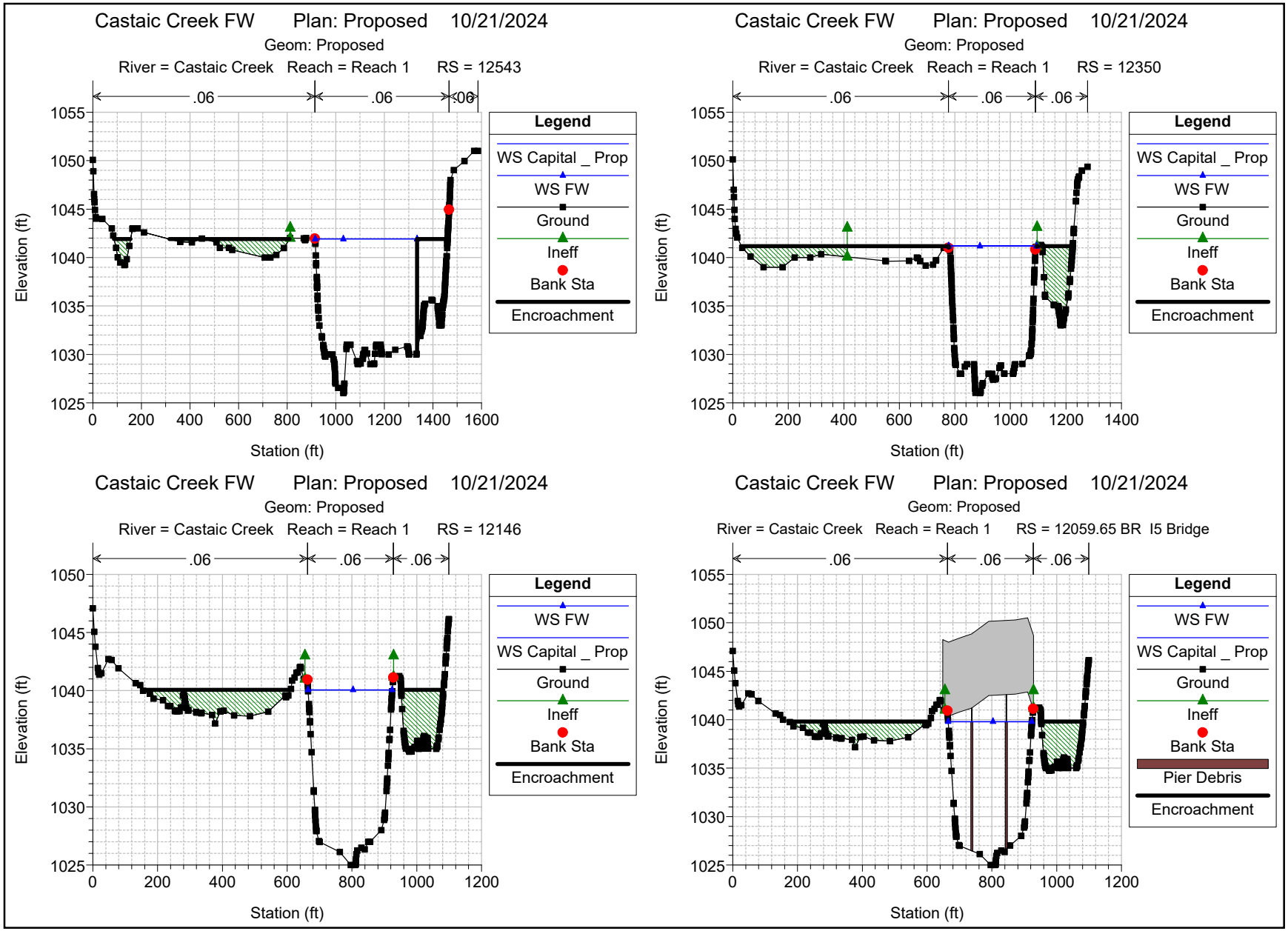
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Levee
Bank Sta
Encroachment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Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 12543
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.06
.06
Elevation (ft)
Station (ft)
Legend
WS Capital _ Prop
WS FW
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 12350
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS Capital _ Prop
WS FW
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 12146
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 12059.65 BR I5 Bridge
.06
.06
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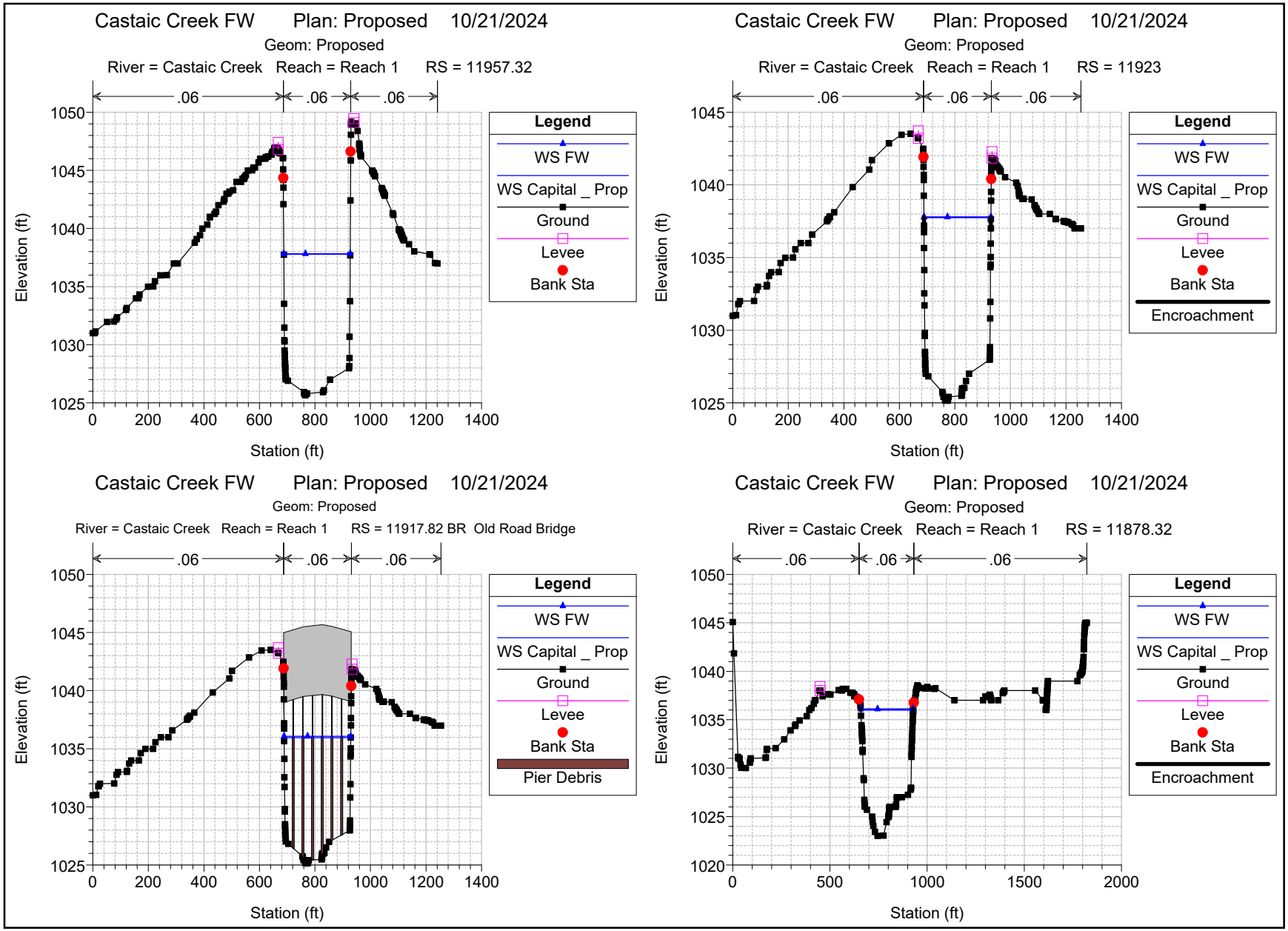
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Ineff
Bank Sta
Pier Debris
Encroachment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Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 11957.32
.06
.06
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Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Levee
Bank Sta
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 11923
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Levee
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 11917.82 BR Old Road Bridge
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Levee
Bank Sta
Pier Debris
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 11878.32
.06
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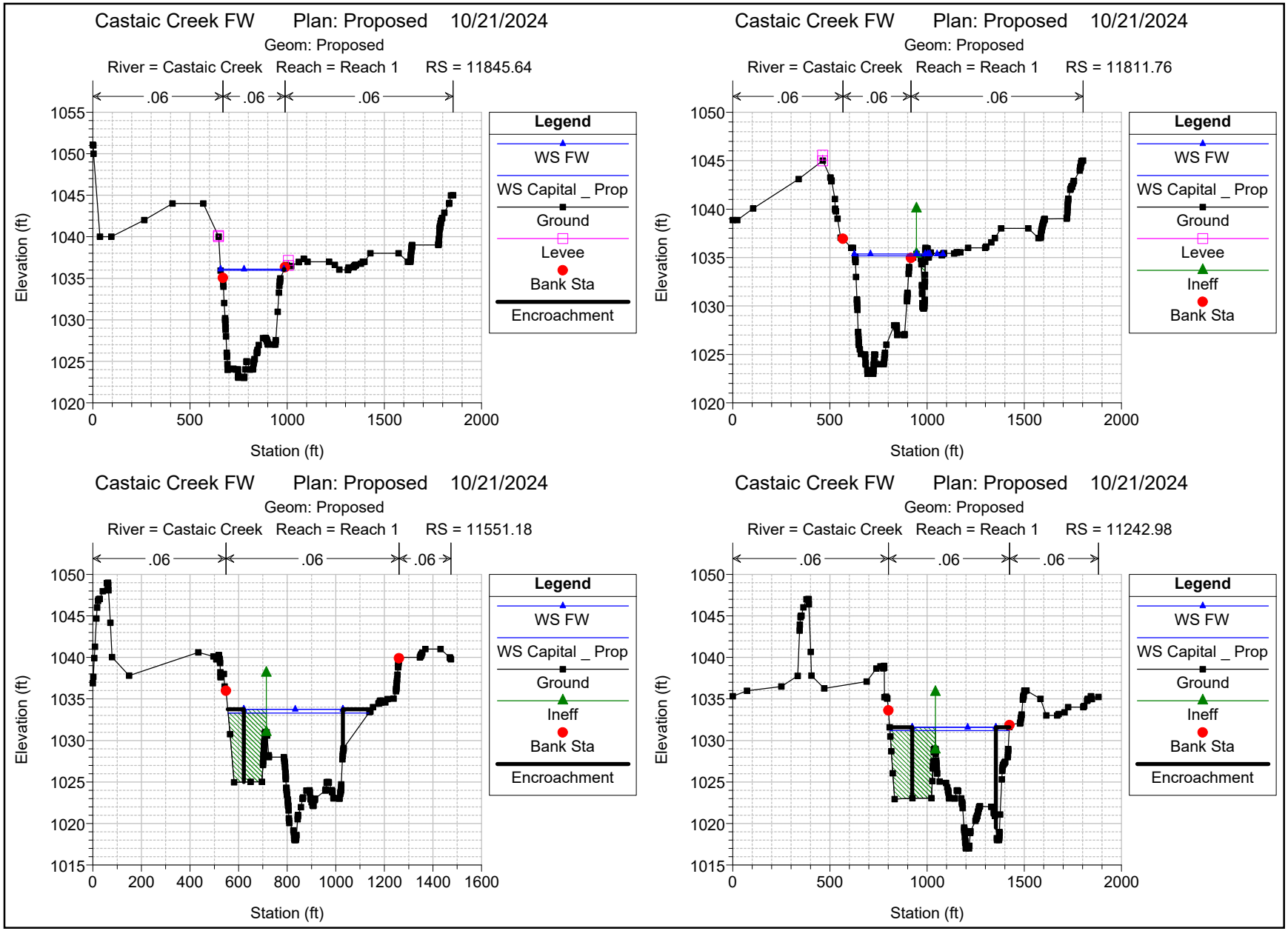
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Levee
Bank Sta
Encroachment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Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 11845.64
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.06
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Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Levee
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 11811.76
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Levee
Ineff
Bank Sta
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 11551.18
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 11242.98
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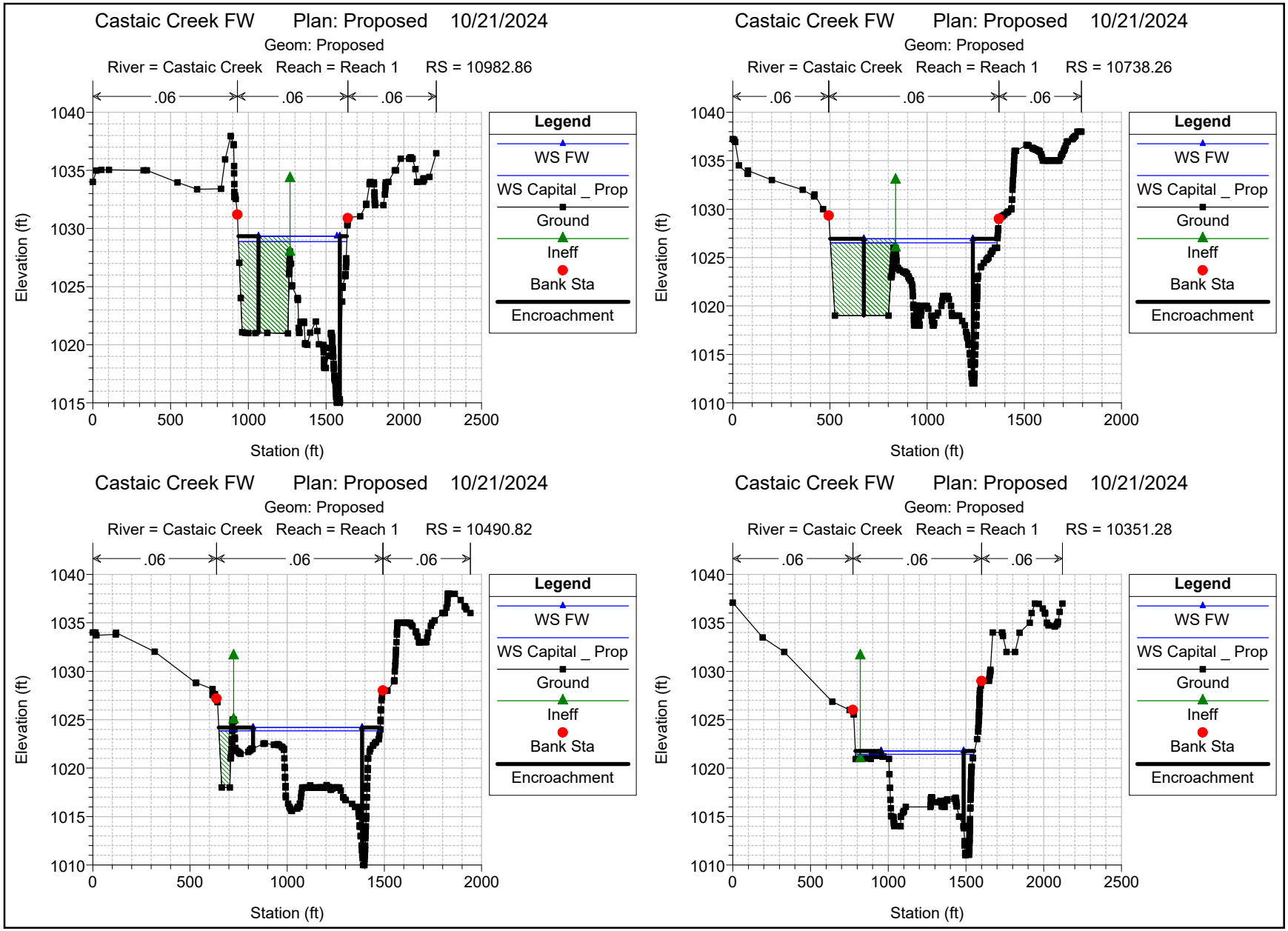
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Ineff
Bank Sta
Encroachment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Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 10982.86
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.06
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Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 10738.26
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 10490.82
.06
.06
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Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 10351.28
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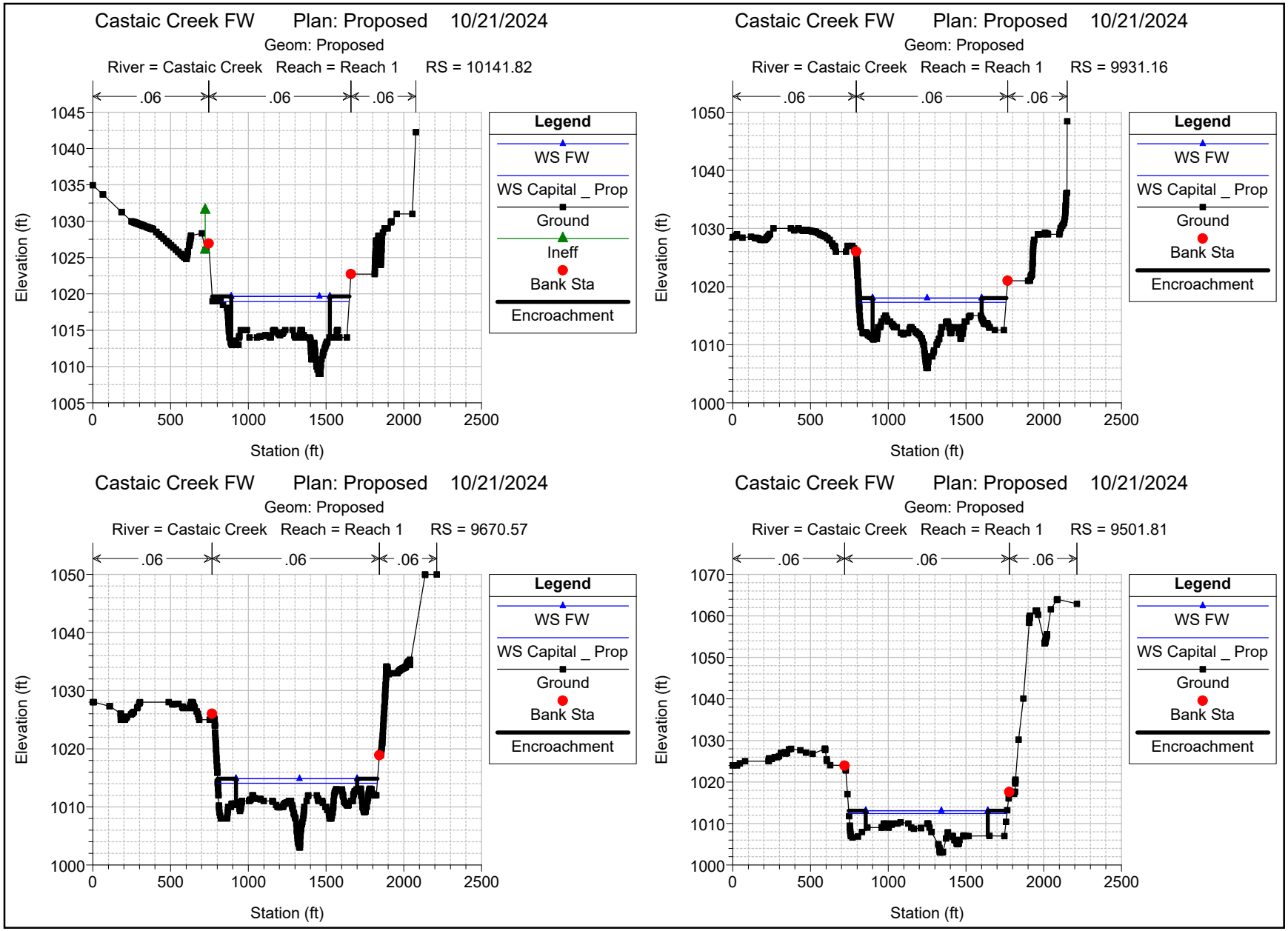
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Ineff
Bank Sta
Encroachment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Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 10141.82
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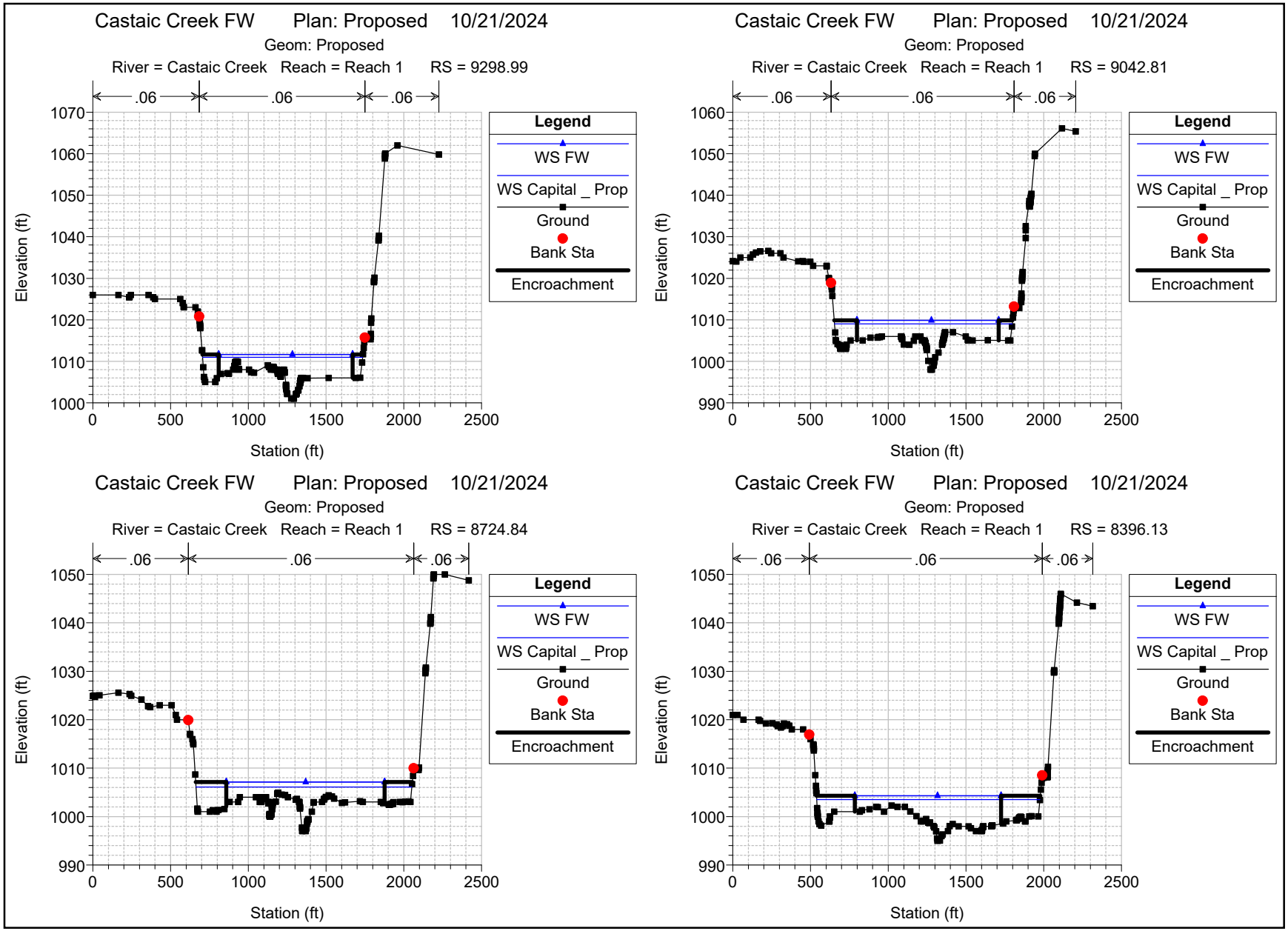
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 9931.16
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 9670.57
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 9501.81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Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 9298.99
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.06
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Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 9042.81
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 8724.84
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 8396.13
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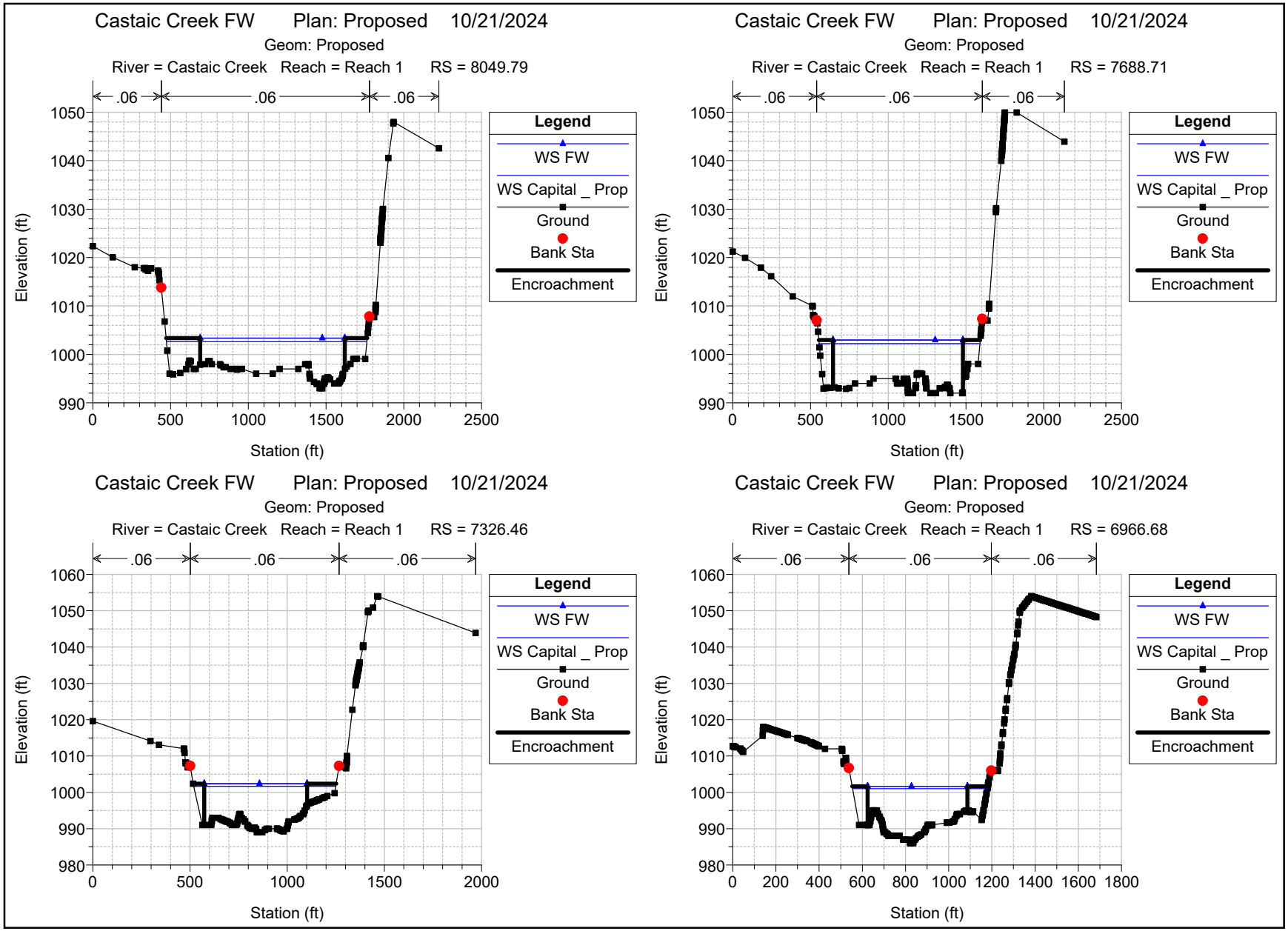
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment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Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 8049.79
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.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 7688.71
.06
.06
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Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 7326.46
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 6966.68
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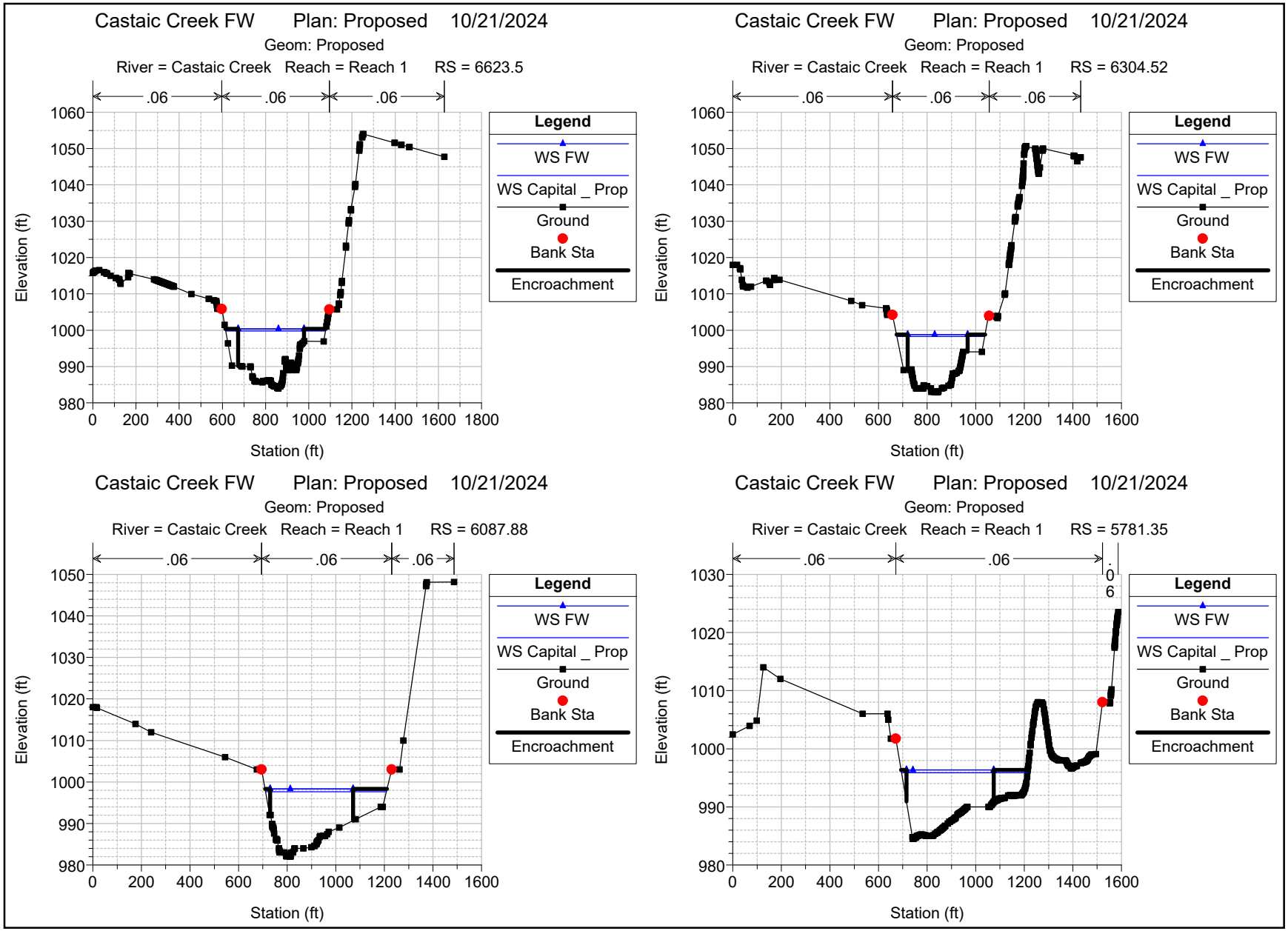
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment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Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 6623.5
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Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 6304.52
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.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 6087.88
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 5781.35
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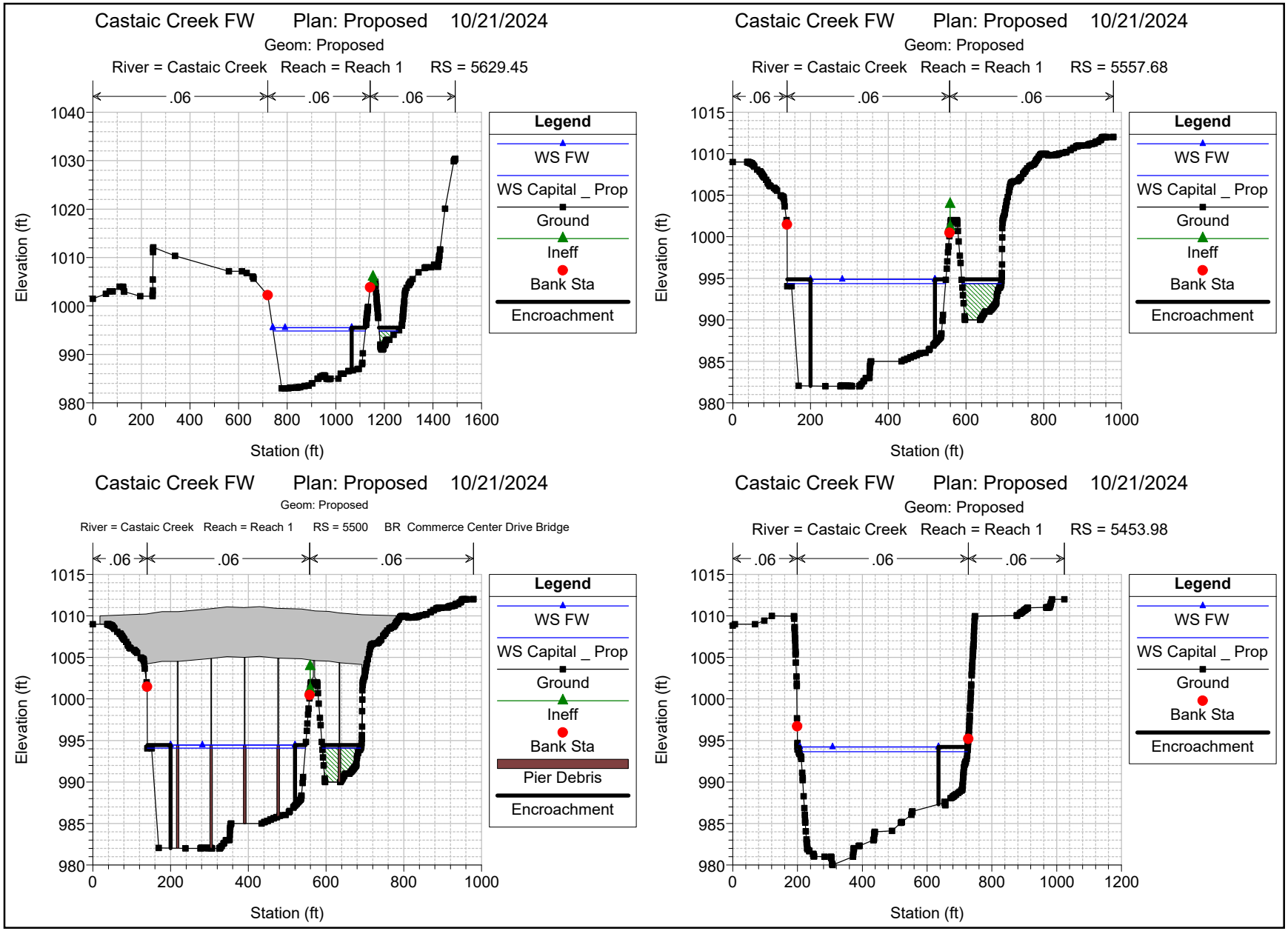
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment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Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 5629.45
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Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 5557.68
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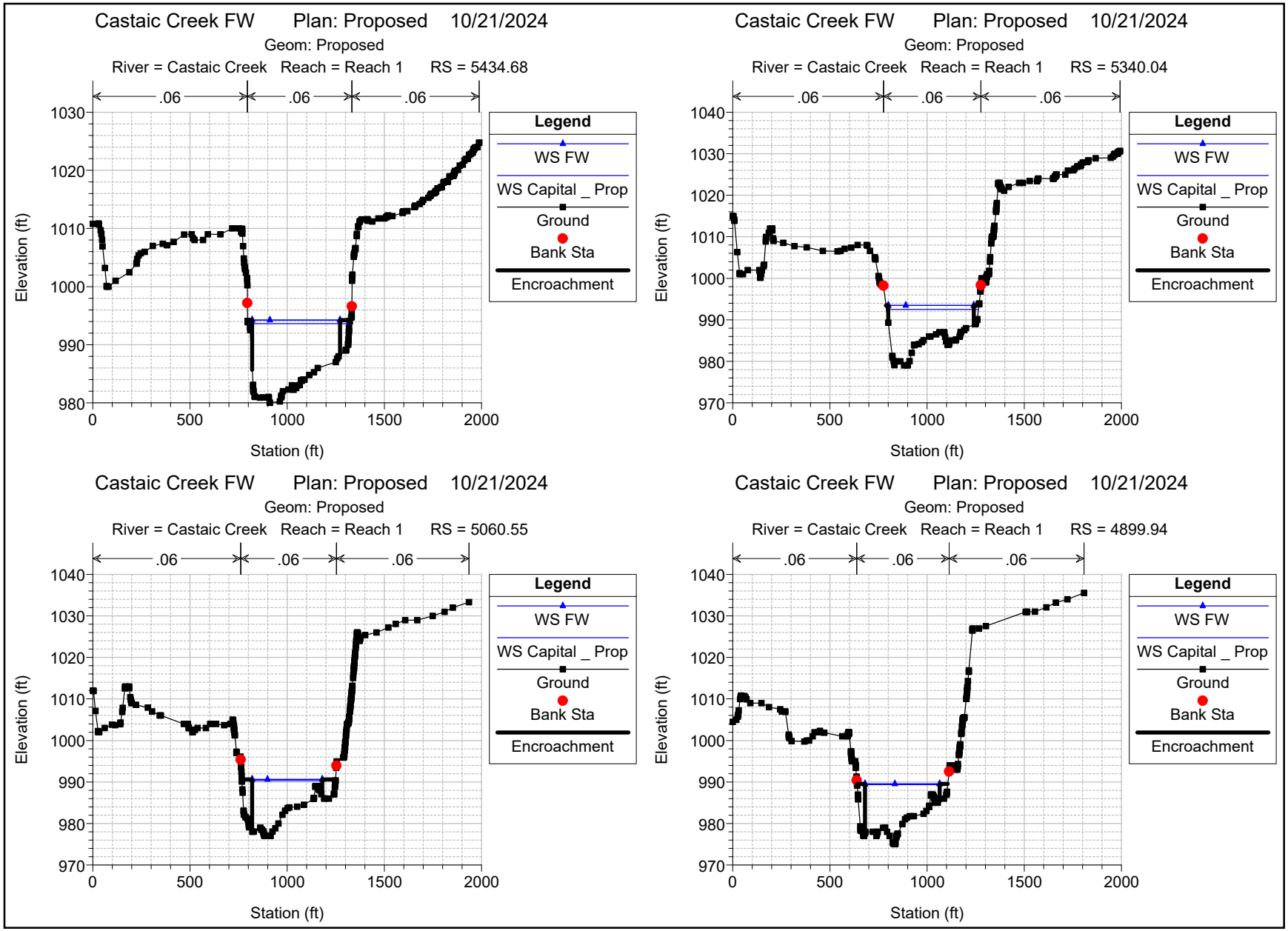
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Ineff
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 5500 BR Commerce Center Drive Bridge
.06 .06 .06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Ineff
Bank Sta
Pier Debris
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 5453.98
.06 .06 .06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment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Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 5434.68
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Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 5340.04
.06
.06
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Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 5060.55
.06
.06
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Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 4899.94
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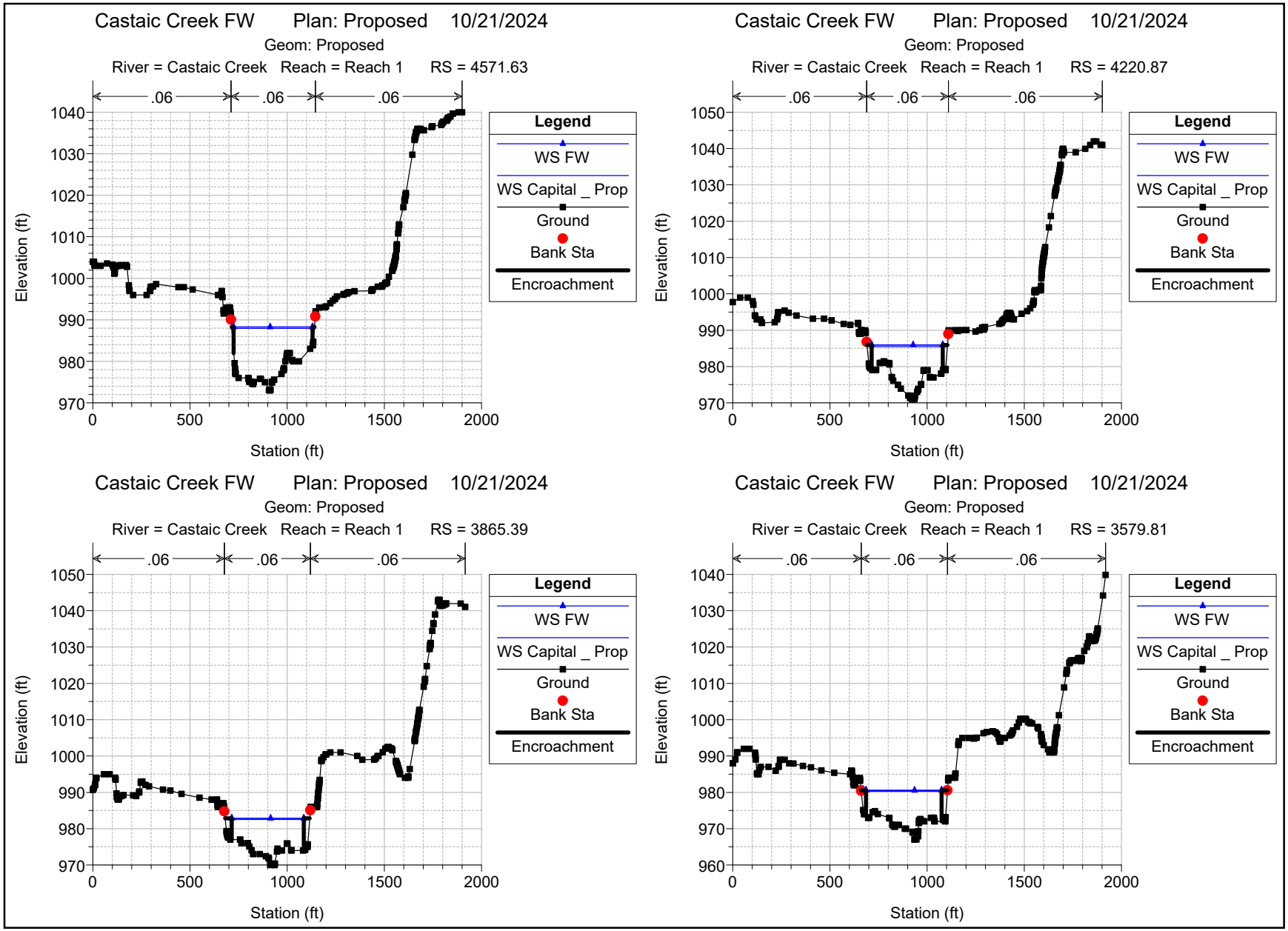
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment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Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 4571.63
.06
.06
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Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 4220.87
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 3865.39
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 3579.81
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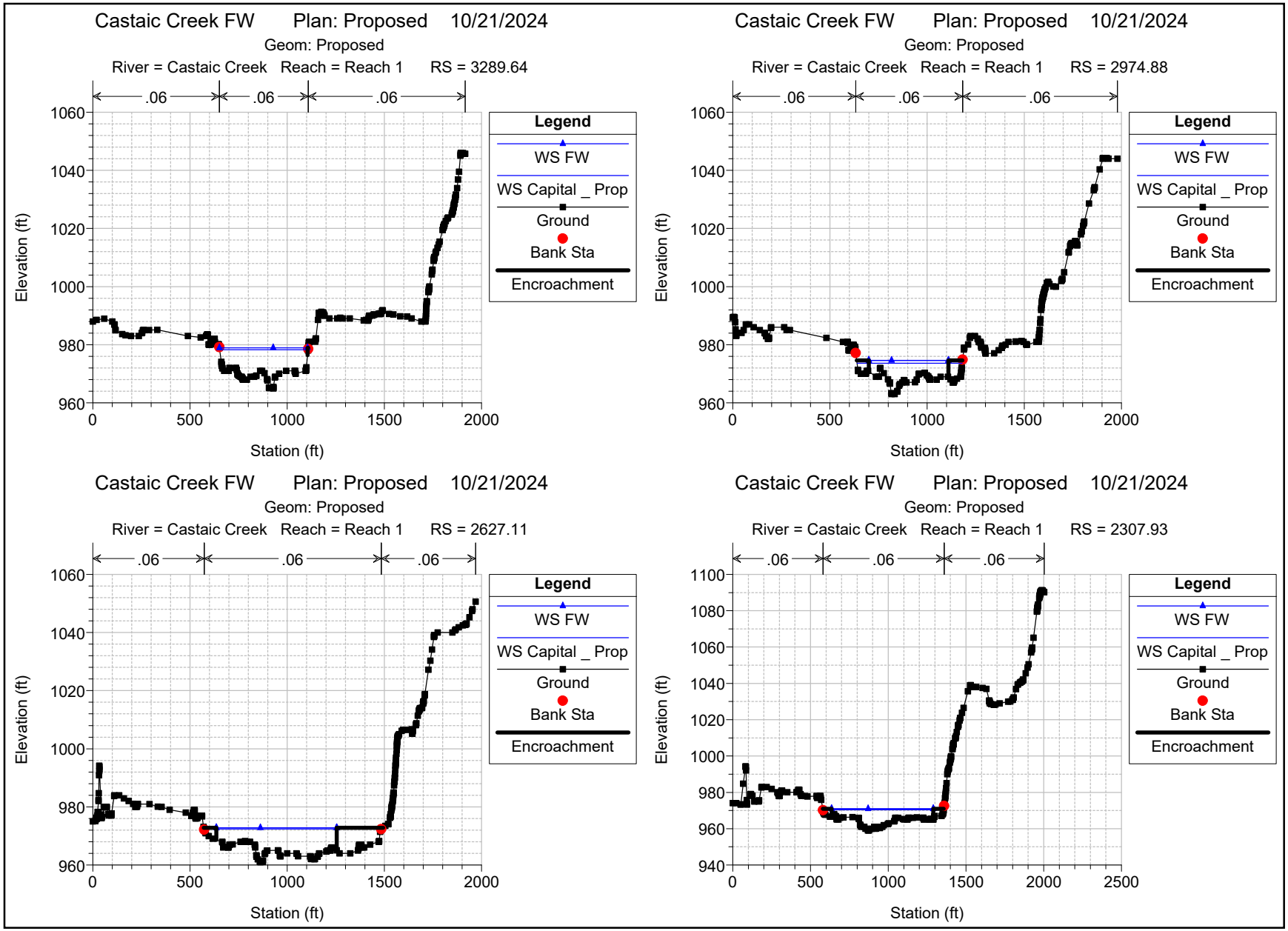
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment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Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 3289.64
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.06
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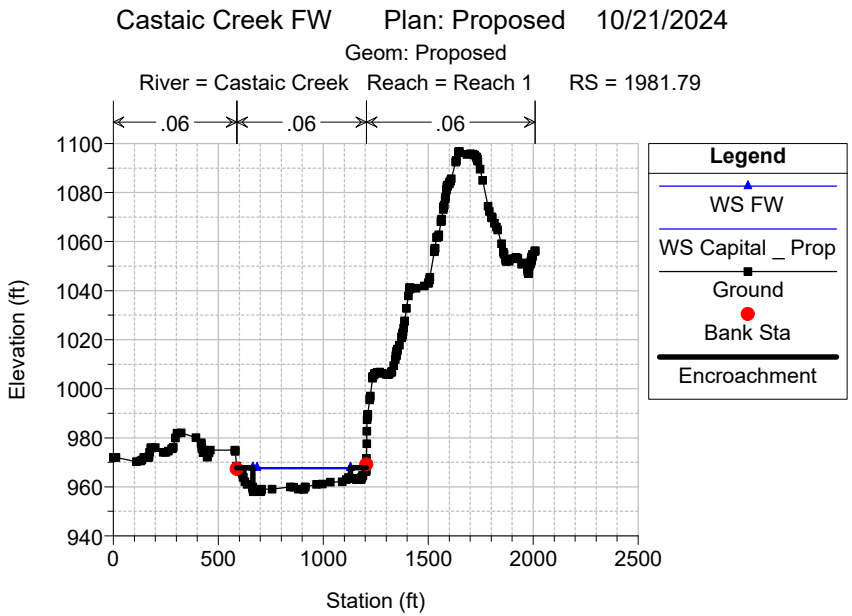
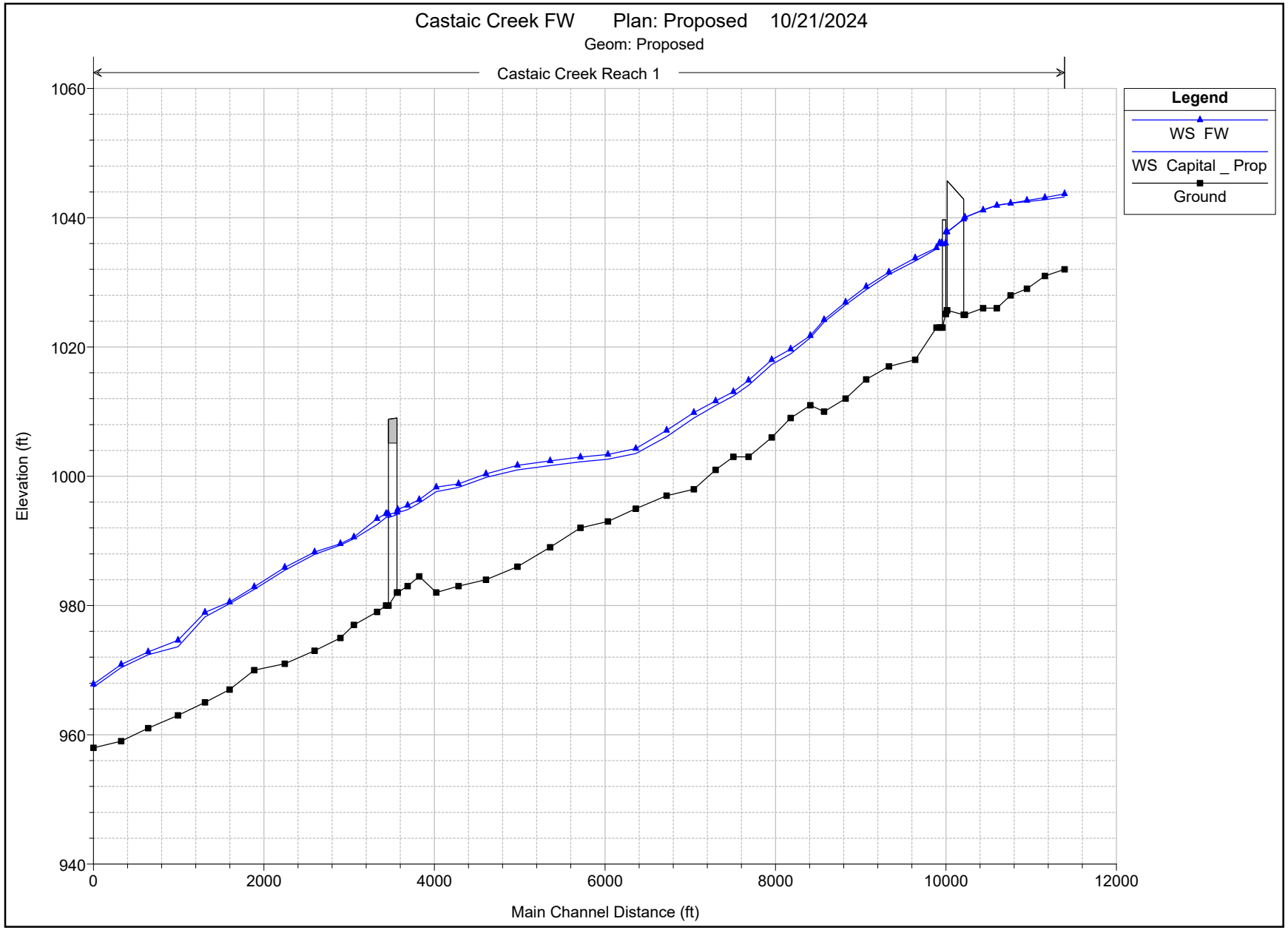
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 2974.88
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 2627.11
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment
Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 2307.93
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment


Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
River = Castaic Creek Reach = Reach 1 RS = 1981.79
.06
.06
.06
Elevation (ft)
1100
1080
1060
1040
1020
1000
980
960
940
0
500
1000
1500
2000
2500
Station (ft)
Legend
WS FW
WS Capital _ Prop
Ground
Bank Sta
Encroachment


Castaic Creek FW Plan: Proposed 10/21/2024
Geom: Proposed
Castaic Creek Reach 1
Legend
WS FW
WS Capital _ Prop
Ground
Elevation (ft)
1060
1040
1020
1000
980
960
940
0
2000
4000
6000
8000
10000
12000
Main Channel Distance (ft)

HEC-RAS Plan: Proposed River: Castaic Creek Reach: Reach 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	13371	Capital _ Prop	26300.00	1032.00	1043.24		1043.58	0.003127	4.83	5790.46	1175.08	0.33
Reach 1	13371	FW	26300.00	1032.00	1043.72		1044.24	0.003911	5.79	4541.04	615.00	0.38
Reach 1	13141	Capital _ Prop	26300.00	1031.00	1042.78	1038.42	1043.02	0.001785	4.01	6865.69	1155.53	0.26
Reach 1	13141	FW	26300.00	1031.00	1043.10	1038.52	1043.49	0.002484	4.99	5270.66	630.00	0.30
Reach 1	12937	Capital _ Prop	26300.00	1029.00	1042.50	1036.93	1042.70	0.001220	3.75	7632.84	1168.65	0.22
Reach 1	12937	FW	26300.00	1029.02	1042.67	1037.31	1043.01	0.001967	4.72	5568.11	600.00	0.27
Reach 1	12730	Capital _ Prop	26300.00	1028.00	1042.23	1035.80	1042.47	0.001172	4.02	6968.77	829.48	0.22
Reach 1	12730	FW	26300.00	1028.00	1042.25	1035.98	1042.64	0.001840	5.03	5228.47	485.00	0.27
Reach 1	12543	Capital _ Prop	26300.00	1026.00	1041.94	1034.87	1042.26	0.001400	4.48	5873.80	1117.55	0.24
Reach 1	12543	FW	26300.00	1026.00	1041.91	1034.93	1042.35	0.001800	5.31	4954.98	420.32	0.27
Reach 1	12350	Capital _ Prop	26300.00	1026.01	1041.22	1034.82	1041.91	0.002807	6.77	4273.94	1185.39	0.34
Reach 1	12350	FW	26300.00	1026.01	1041.18	1034.80	1041.95	0.003023	7.01	3750.28	316.99	0.36
Reach 1	12146	Capital _ Prop	26300.00	1025.00	1040.04	1034.35	1041.14	0.004257	8.39	3136.53	846.39	0.43
Reach 1	12146	FW	26300.00	1025.00	1040.06	1034.33	1041.15	0.004235	8.37	3141.95	259.84	0.42
Reach 1	12059.65		Bridge									
Reach 1	11957.32	Capital _ Prop	26300.00	1025.66	1037.78	1033.94	1039.33	0.007164	10.00	2631.18	238.93	0.53
Reach 1	11957.32	FW	26300.00	1025.66	1037.82	1033.94	1039.36	0.007068	9.95	2642.32	238.96	0.53
Reach 1	11923	Capital _ Prop	26300.00	1025.14	1037.74	1033.79	1039.24	0.006841	9.83	2676.41	241.20	0.52
Reach 1	11923	FW	26300.00	1025.14	1037.79	1033.79	1039.28	0.006747	9.79	2687.48	240.60	0.52
Reach 1	11917.82		Bridge									
Reach 1	11878.32	Capital _ Prop	26300.00	1023.00	1035.98	1032.61	1037.52	0.007874	9.94	2646.82	269.46	0.56
Reach 1	11878.32	FW	26300.00	1023.00	1036.11	1032.60	1037.61	0.007550	9.81	2681.70	269.55	0.55
Reach 1	11845.64	Capital _ Prop	26300.00	1023.00	1035.97	1032.21	1037.24	0.006936	9.04	2914.19	324.94	0.52
Reach 1	11845.64	FW	26300.00	1023.00	1036.10	1032.23	1037.34	0.006618	8.91	2958.56	325.61	0.51
Reach 1	11811.76	Capital _ Prop	26400.00	1023.00	1035.16	1032.63	1036.89	0.010387	10.56	2503.15	346.22	0.63
Reach 1	11811.76	FW	26400.00	1023.00	1035.36	1032.63	1037.01	0.009745	10.32	2564.39	402.47	0.61
Reach 1	11551.18	Capital _ Prop	26400.00	1018.01	1033.30	1030.28	1034.41	0.008214	8.46	3120.39	579.56	0.55
Reach 1	11551.18	FW	26400.00	1018.01	1033.76	1030.13	1034.94	0.006308	8.72	3027.59	408.00	0.50
Reach 1	11242.98	Capital _ Prop	26400.00	1017.00	1031.19	1027.78	1032.20	0.006100	8.06	3274.82	614.54	0.48
Reach 1	11242.98	FW	26400.00	1017.00	1031.59	1028.25	1032.86	0.007132	9.04	2921.78	431.00	0.52
Reach 1	10982.86	Capital _ Prop	26400.00	1015.00	1028.87	1026.40	1030.19	0.009173	9.24	2856.20	696.42	0.58
Reach 1	10982.86	FW	26400.00	1015.00	1029.33	1026.55	1030.73	0.008833	9.49	2780.96	523.00	0.57
Reach 1	10738.26	Capital _ Prop	26400.00	1012.00	1026.52	1024.67	1027.67	0.011593	8.60	3068.34	858.32	0.63
Reach 1	10738.26	FW	26400.00	1012.00	1026.94	1025.04	1028.32	0.011366	9.43	2800.82	560.00	0.63
Reach 1	10490.82	Capital _ Prop	26400.00	1010.00	1023.86	1021.97	1024.71	0.011268	7.40	3566.78	816.96	0.60
Reach 1	10490.82	FW	26400.00	1011.45	1024.20	1022.71	1025.30	0.012029	8.41	3140.57	560.00	0.63
Reach 1	10351.28	Capital _ Prop	26400.00	1011.00	1021.43	1019.83	1022.51	0.016302	8.36	3157.37	760.35	0.71
Reach 1	10351.28	FW	26400.00	1013.97	1021.76	1020.43	1023.09	0.015228	9.26	2850.18	530.00	0.70
Reach 1	10141.82	Capital _ Prop	26400.00	1009.00	1018.92	1017.20	1019.62	0.009186	6.71	3935.60	824.69	0.54
Reach 1	10141.82	FW	26400.00	1009.00	1019.66	1017.58	1020.44	0.007965	7.09	3725.93	635.00	0.52
Reach 1	9931.16	Capital _ Prop	26400.00	1006.00	1017.29		1017.82	0.006951	5.84	4519.95	946.15	0.47
Reach 1	9931.16	FW	26400.00	1006.00	1018.01		1018.71	0.007545	6.72	3930.85	700.00	0.50
Reach 1	9670.57	Capital _ Prop	26400.00	1003.00	1014.06		1014.92	0.017455	7.45	3543.12	1024.81	0.71
Reach 1	9670.57	FW	26400.00	1003.00	1014.84		1015.82	0.015298	7.97	3313.30	780.00	0.68
Reach 1	9501.81	Capital _ Prop	26400.00	1003.00	1012.41		1012.92	0.007212	5.74	4597.90	1016.05	0.48
Reach 1	9501.81	FW	26400.00	1003.00	1013.09		1013.77	0.008335	6.62	3989.25	785.00	0.52
Reach 1	9298.99	Capital _ Prop	26400.00	1001.00	1010.94		1011.43	0.006976	5.65	4669.14	1029.16	0.47
Reach 1	9298.99	FW	26400.00	1001.00	1011.64		1012.19	0.006656	5.96	4426.44	860.00	0.46
Reach 1	9042.81	Capital _ Prop	26400.00	998.00	1009.02		1009.52	0.008065	5.67	4660.10	1142.88	0.49
Reach 1	9042.81	FW	26400.00	998.00	1009.86		1010.42	0.007236	5.98	4412.74	910.83	0.48

HEC-RAS Plan: Proposed River: Castaic Creek Reach: Reach 1 (Continued)

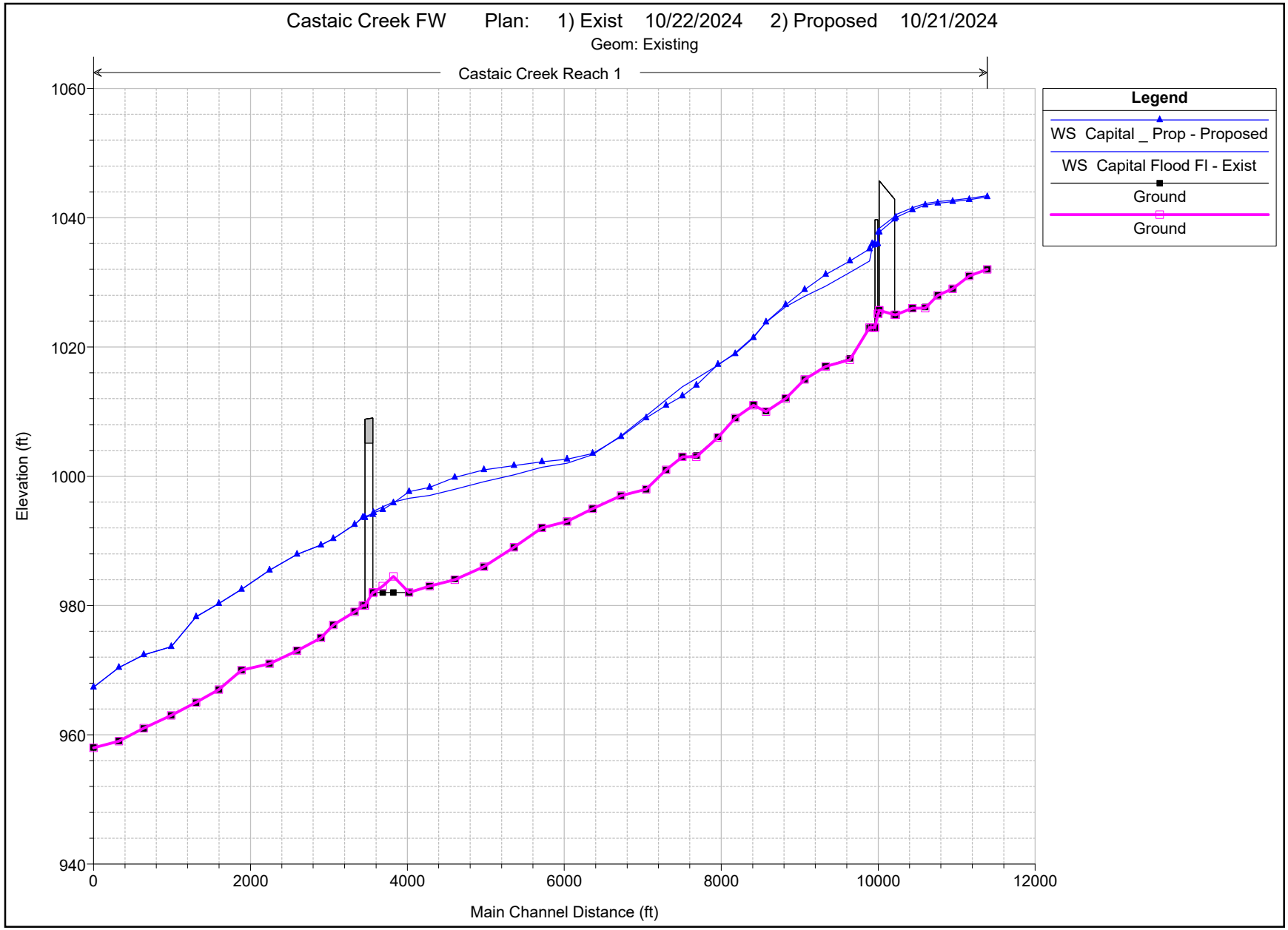
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	8724.84	Capital _ Prop	26400.00	997.00	1006.11		1006.61	0.010473	5.67	4657.98	1388.33	0.55
Reach 1	8724.84	FW	26400.00	997.00	1007.11		1007.73	0.009971	6.30	4190.54	1018.35	0.55
Reach 1	8396.13	Capital _ Prop	26400.00	995.00	1003.52		1003.86	0.005590	4.63	5696.37	1436.15	0.41
Reach 1	8396.13	FW	26400.00	995.00	1004.30		1004.81	0.006525	5.73	4605.86	940.00	0.46
Reach 1	8049.79	Capital _ Prop	26400.00	993.00	1002.63		1002.82	0.001895	3.50	7548.30	1289.12	0.25
Reach 1	8049.79	FW	26400.00	993.00	1003.35		1003.61	0.002087	4.08	6465.03	930.00	0.27
Reach 1	7688.71	Capital _ Prop	26400.00	992.00	1002.22		1002.38	0.001000	3.15	8381.02	1034.56	0.20
Reach 1	7688.71	FW	26400.00	992.00	1002.96		1003.14	0.000995	3.40	7770.71	835.00	0.20
Reach 1	7326.46	Capital _ Prop	26400.00	989.00	1001.64		1001.91	0.001668	4.22	6257.58	731.34	0.25
Reach 1	7326.46	FW	26400.00	989.00	1002.39		1002.71	0.001427	4.53	5831.45	529.00	0.24
Reach 1	6966.68	Capital _ Prop	26400.00	986.00	1000.98		1001.29	0.001588	4.42	5969.07	624.28	0.25
Reach 1	6966.68	FW	26400.00	986.00	1001.69		1002.09	0.001783	5.09	5183.08	463.00	0.27
Reach 1	6623.5	Capital _ Prop	26400.00	984.01	999.80		1000.42	0.003470	6.29	4196.86	461.87	0.37
Reach 1	6623.5	FW	26400.00	984.01	1000.38		1001.18	0.003265	7.16	3685.18	305.00	0.36
Reach 1	6304.52	Capital _ Prop	26400.00	983.00	998.28		999.14	0.004409	7.45	3541.83	362.11	0.42
Reach 1	6304.52	FW	26400.00	983.00	998.82		999.93	0.004372	8.48	3112.93	246.84	0.42
Reach 1	6087.88	Capital _ Prop	26400.00	982.00	997.64		998.14	0.002726	5.70	4631.89	497.04	0.33
Reach 1	6087.88	FW	26400.00	982.00	998.31		998.94	0.002521	6.37	4144.61	341.53	0.32
Reach 1	5781.35	Capital _ Prop	31100.00	984.50	995.88		997.08	0.009840	8.81	3531.04	518.19	0.59
Reach 1	5781.35	FW	31100.00	984.50	996.36		997.92	0.009580	10.00	3108.77	358.95	0.60
Reach 1	5629.45	Capital _ Prop	31100.00	983.00	994.82	991.18	996.01	0.006375	8.74	3559.53	456.55	0.50
Reach 1	5629.45	FW	31100.00	983.00	995.50	991.44	996.80	0.006229	9.15	3399.06	324.58	0.50
Reach 1	5557.68	Capital _ Prop	31100.00	982.00	994.36	989.89	995.30	0.004797	7.78	3995.63	508.07	0.44
Reach 1	5557.68	FW	31100.00	982.00	994.87	990.50	996.08	0.005657	8.83	3522.10	320.00	0.47
Reach 1	5500		Bridge									
Reach 1	5453.98	Capital _ Prop	31100.00	980.00	993.66		994.33	0.003810	6.60	4714.36	521.37	0.39
Reach 1	5453.98	FW	31100.00	980.00	994.21		994.95	0.003485	6.90	4506.32	428.00	0.37
Reach 1	5434.68	Capital _ Prop	31100.00	980.00	993.62		994.25	0.003417	6.39	4865.64	519.95	0.37
Reach 1	5434.68	FW	31100.00	980.00	994.23		994.86	0.002906	6.37	4881.83	452.23	0.34
Reach 1	5340.04	Capital _ Prop	31100.00	979.00	992.52		993.67	0.008116	8.60	3615.15	473.63	0.55
Reach 1	5340.04	FW	31100.00	979.00	993.44		994.41	0.005669	7.90	3938.94	440.52	0.47
Reach 1	5060.55	Capital _ Prop	31100.00	977.00	990.32		991.45	0.008074	8.52	3648.33	481.62	0.55
Reach 1	5060.55	FW	31100.00	977.00	990.59		992.25	0.010920	10.33	3010.21	360.00	0.63
Reach 1	4899.94	Capital _ Prop	31100.00	975.00	989.35		990.32	0.005960	7.88	3946.33	466.36	0.48
Reach 1	4899.94	FW	31100.00	975.00	989.55		990.75	0.006976	8.80	3533.21	385.00	0.51
Reach 1	4571.63	Capital _ Prop	31100.00	973.00	987.91		988.76	0.004282	7.40	4200.52	424.99	0.42
Reach 1	4571.63	FW	31100.00	973.00	988.29		989.10	0.003815	7.23	4300.82	405.00	0.39
Reach 1	4220.87	Capital _ Prop	31100.00	971.00	985.45		986.71	0.008001	9.03	3444.02	413.24	0.55
Reach 1	4220.87	FW	31100.00	971.00	985.91		987.23	0.007537	9.21	3376.08	365.00	0.53
Reach 1	3865.39	Capital _ Prop	31100.00	970.00	982.51		983.77	0.008461	9.01	3450.78	433.93	0.56
Reach 1	3865.39	FW	31100.00	970.00	982.88		984.31	0.008777	9.59	3243.12	370.00	0.57
Reach 1	3579.81	Capital _ Prop	31100.00	967.01	980.31		981.45	0.007441	8.58	3624.14	444.05	0.53
Reach 1	3579.81	FW	31100.00	967.01	980.56		981.86	0.008014	9.13	3406.23	390.00	0.54
Reach 1	3289.64	Capital _ Prop	31100.00	965.01	978.25		979.34	0.007023	8.35	3722.46	455.10	0.52
Reach 1	3289.64	FW	31100.00	965.01	978.92		979.85	0.005437	7.73	4022.09	453.64	0.46
Reach 1	2974.88	Capital _ Prop	31200.00	963.00	973.63	973.14	975.56	0.022824	11.14	2801.48	540.83	0.86
Reach 1	2974.88	FW	31200.00	963.00	974.60		976.76	0.019621	11.79	2645.69	410.00	0.82
Reach 1	2627.11	Capital _ Prop	31200.00	961.01	972.37		972.75	0.003154	5.00	6239.20	913.45	0.34
Reach 1	2627.11	FW	31200.00	961.01	972.82		973.46	0.004429	6.41	4866.53	620.00	0.40
Reach 1	2307.93	Capital _ Prop	31200.00	959.00	970.41	968.40	971.19	0.008208	7.10	4393.07	777.14	0.53
Reach 1	2307.93	FW	31200.00	959.00	970.88		971.69	0.007084	7.23	4314.09	655.00	0.50

HEC-RAS Plan: Proposed River: Castaic Creek Reach: Reach 1 (Continued)

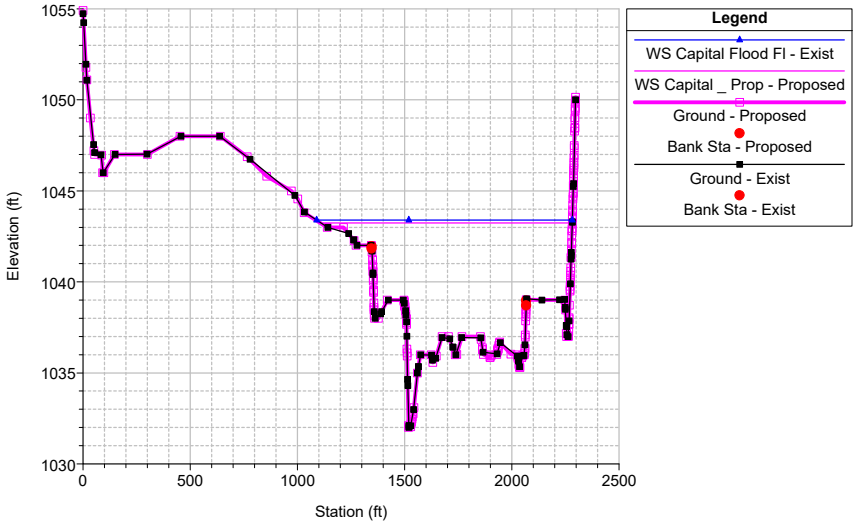
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	1981.79	Capital _ Prop	31200.00	958.00	967.36	965.21	968.37	0.009101	8.04	3882.98	616.95	0.56
Reach 1	1981.79	FW	31200.00	958.00	967.82	965.47	969.05	0.009099	8.91	3503.44	465.00	0.57

PACE
Advanced Water Engineering

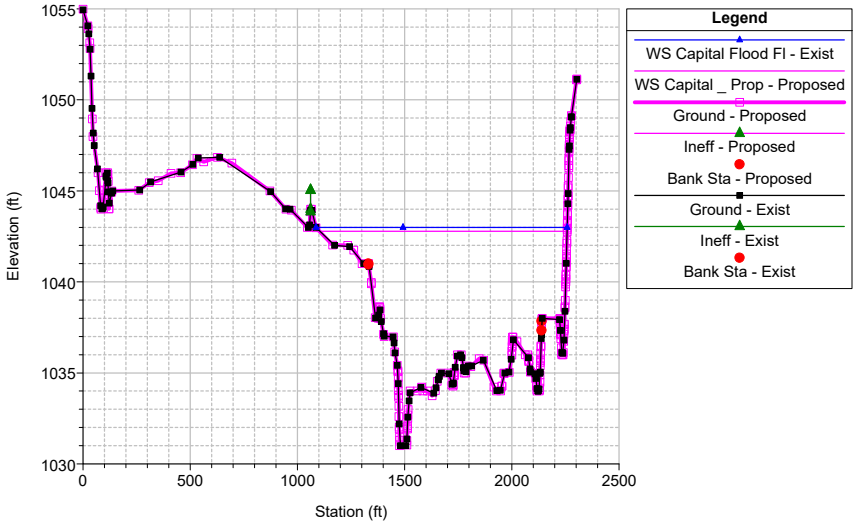
Appendix D – HEC-RAS Cross Section Comparison Existing vs. Proposed Conditions


Castaic Creek FW Plan: 1) Exist 10/22/2024 2) Proposed 10/21/2024
Geom: Existing
Castaic Creek Reach 1
Legend
WS Capital _ Prop - Proposed
WS Capital Flood Fl - Exist
Ground
Ground
Elevation (ft)
1060
1040
1020
1000
980
960
940
0
2000
4000
6000
8000
10000
12000
Main Channel Distance (ft)

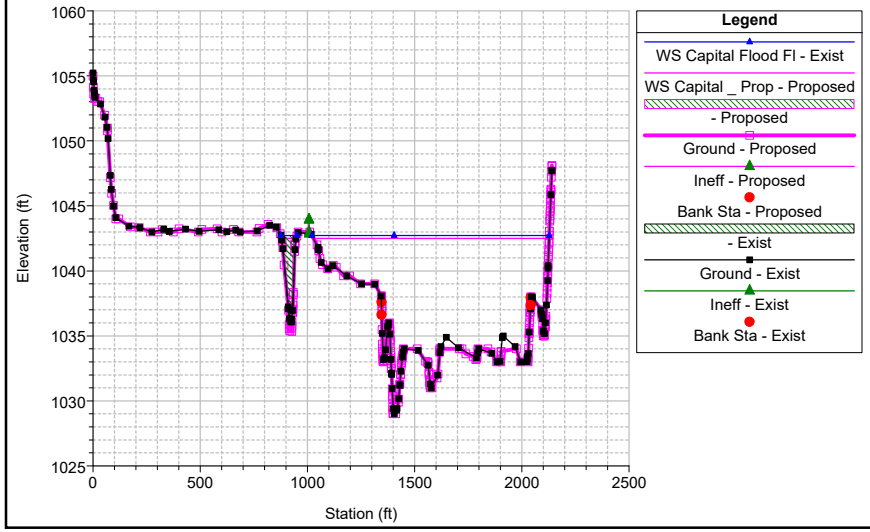
Castaic Creek FW Plan: 1) Exist 2) Proposed
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 13371



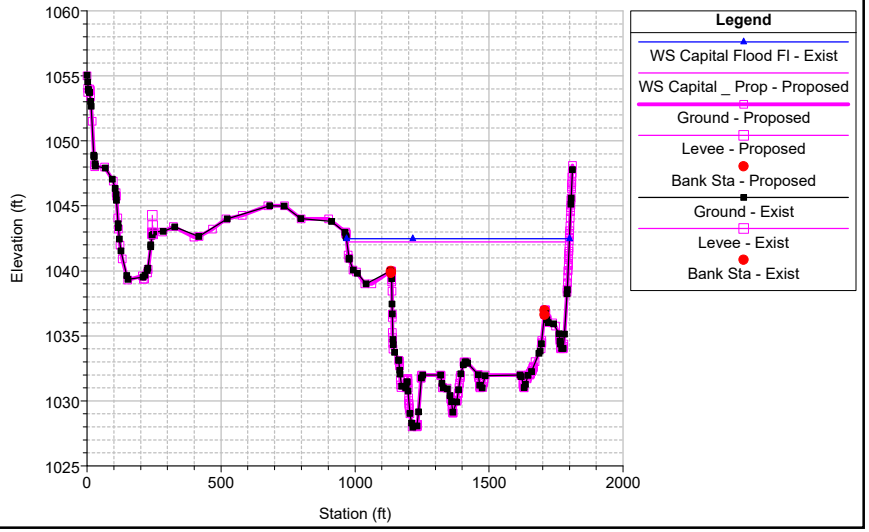
Castaic Creek FW Plan: 1) Exist 2) Proposed
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 13141



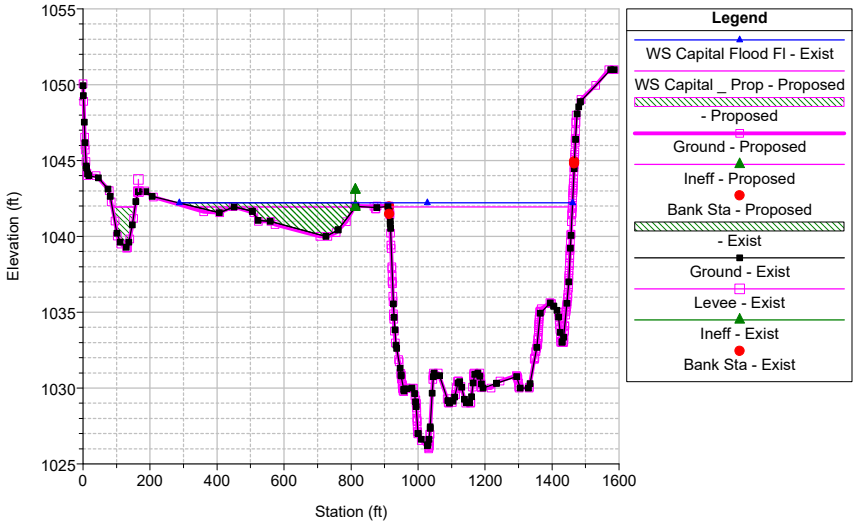
Castaic Creek FW Plan: 1) Exist 2) Proposed
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 12937



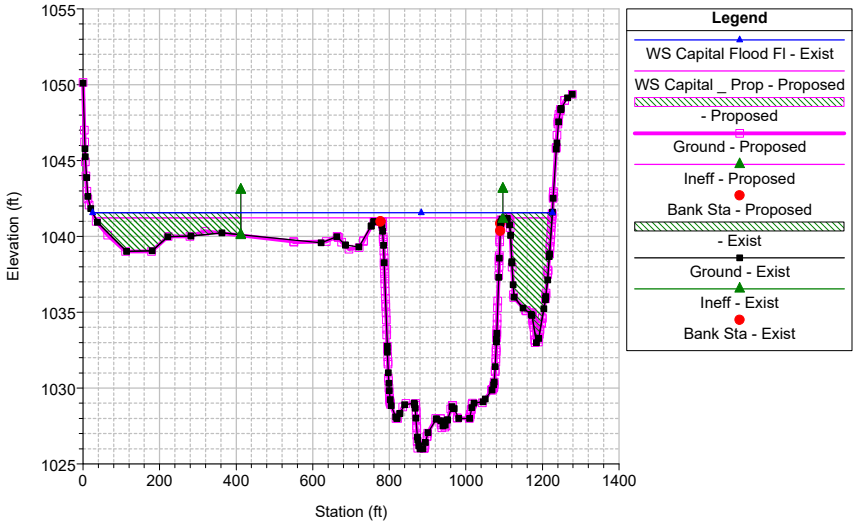
Castaic Creek FW Plan: 1) Exist 2) Proposed
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 12730



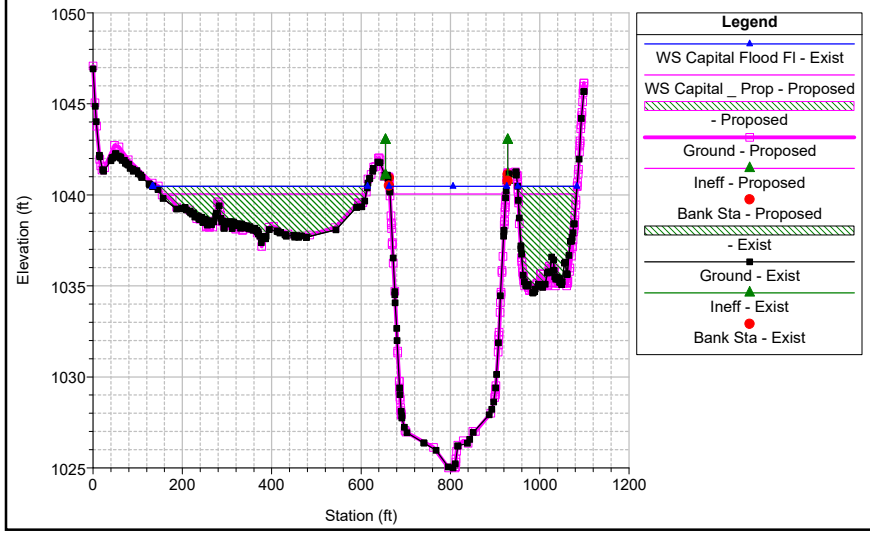
Castaic Creek FW Plan: 1) Exist 2) Proposed
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 12543



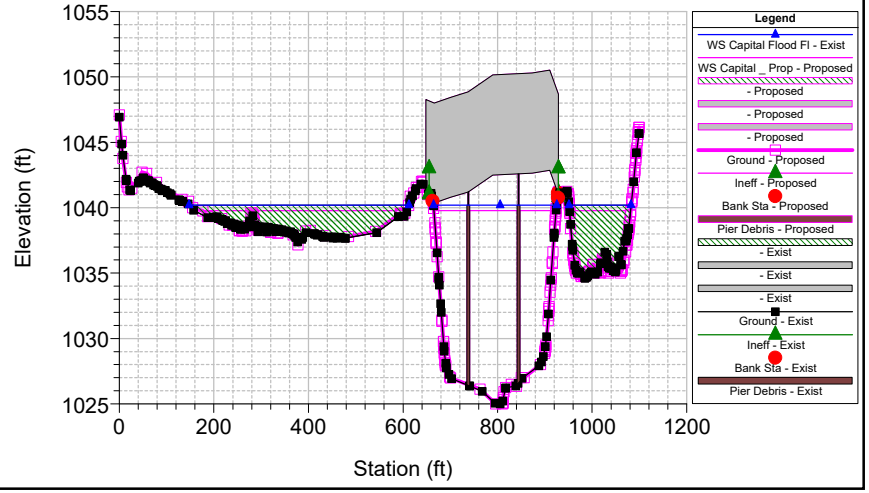
Castaic Creek FW Plan: 1) Exist 2) Proposed
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 12350



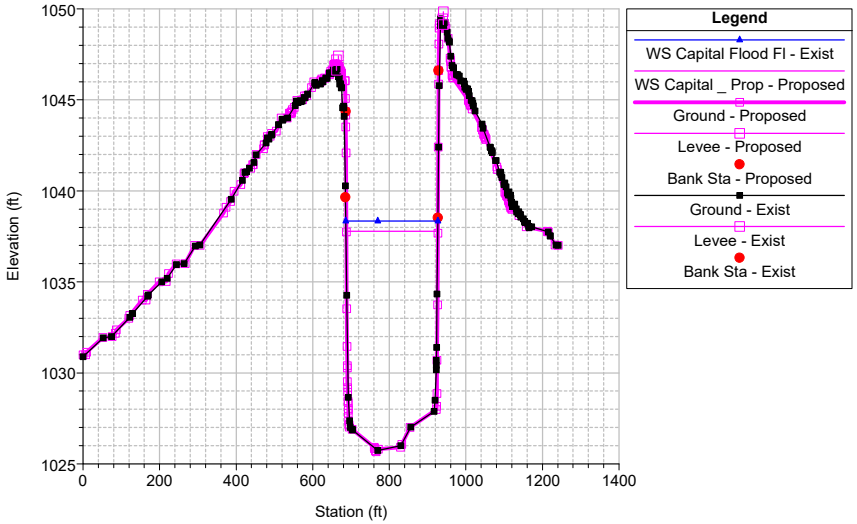
Castaic Creek FW Plan: 1) Exist 2) Proposed
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 12146



Castaic Creek FW Plan: 1) Exist 2) Proposed
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 12059.65 BR I5 Bridge



Castaic Creek FW Plan: 1) Exist 2) Proposed
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 11957.32



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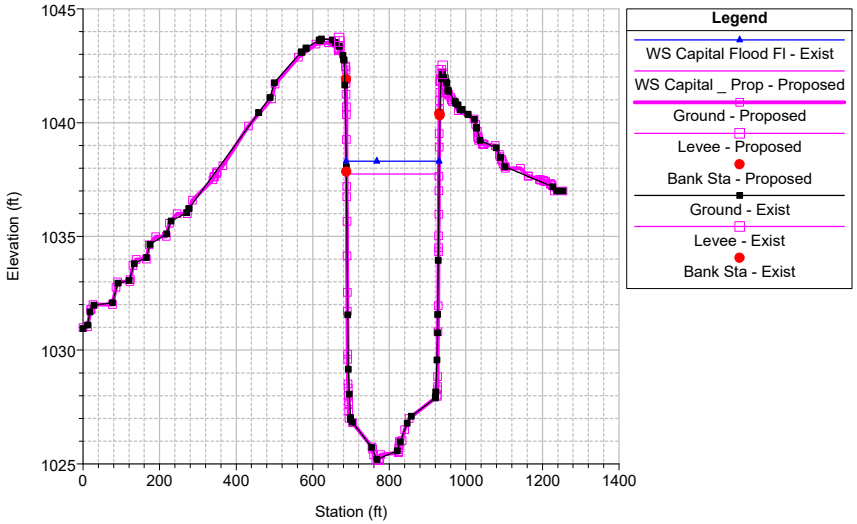
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 11923



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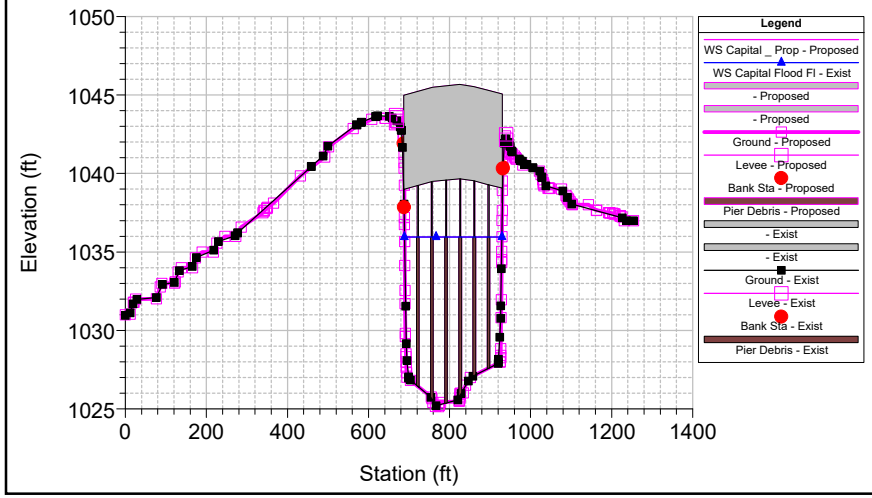
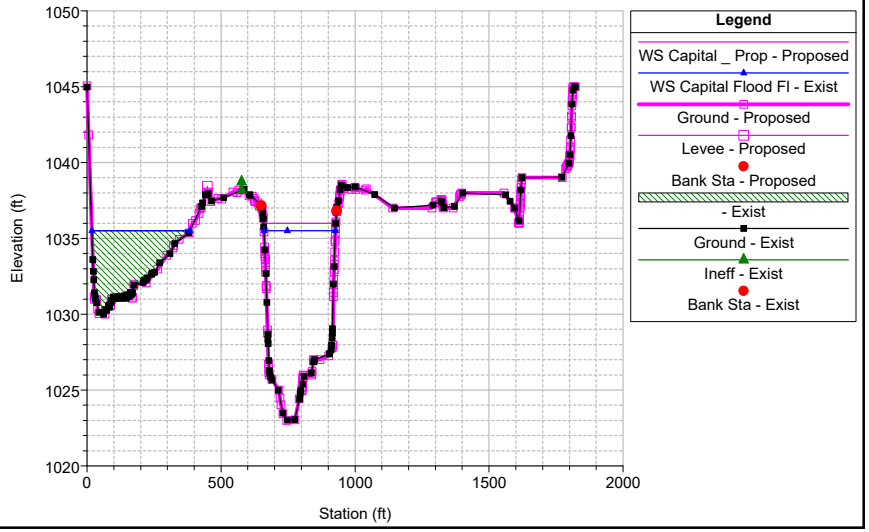
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 11917.82 BR Old Road Bridge



Castaic Creek FW Plan: 1) Exist 2) Proposed
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 11878.32



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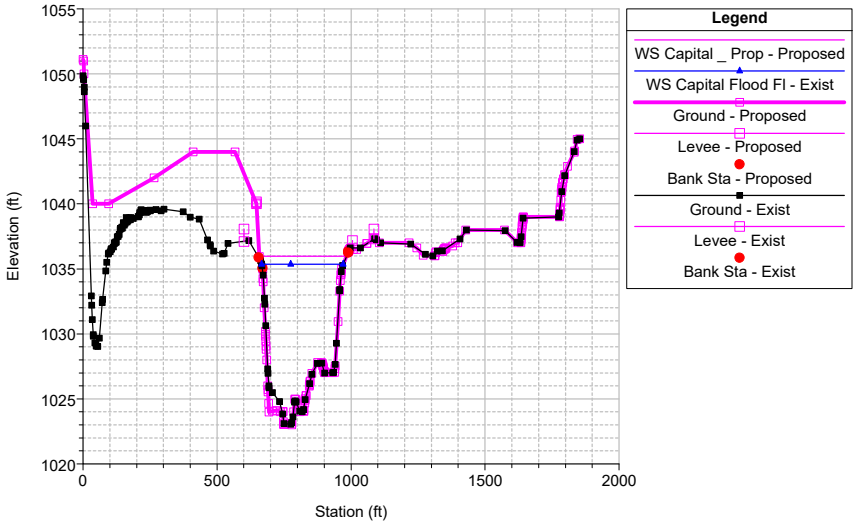
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 11845.64



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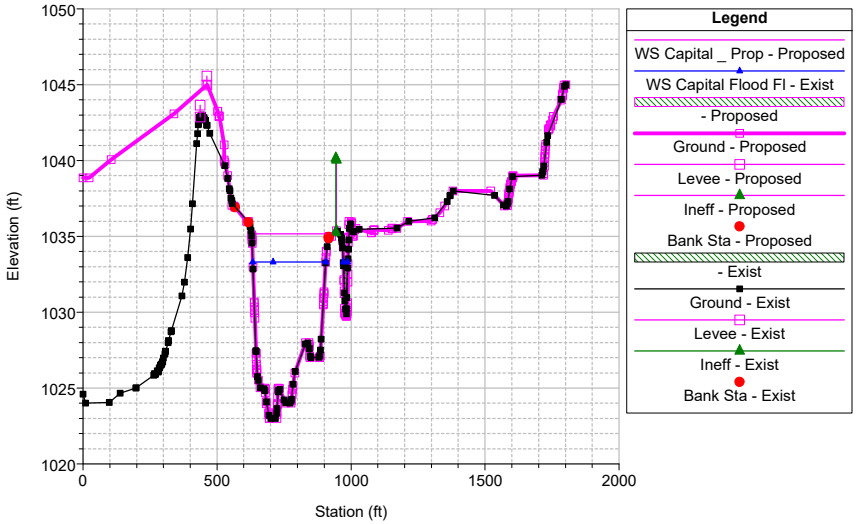
River = Castaic Creek Reach = Reach 1 RS = 11811.76



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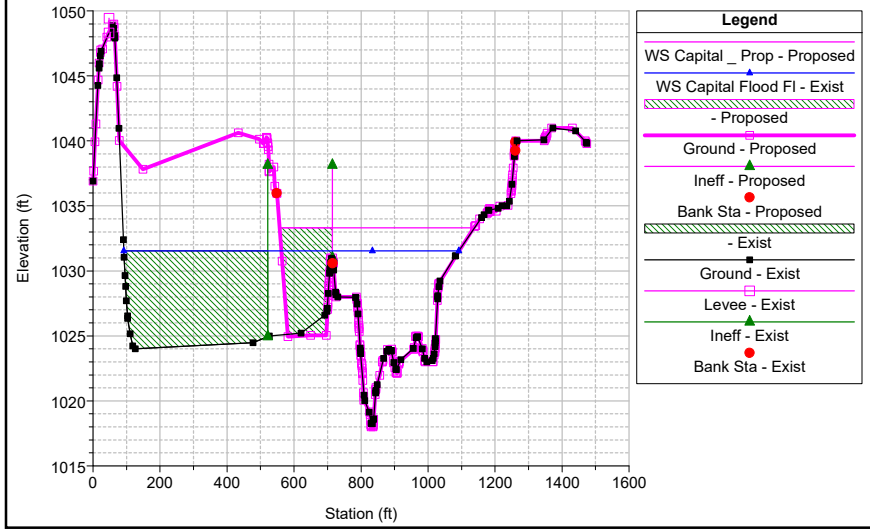
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 11551.18



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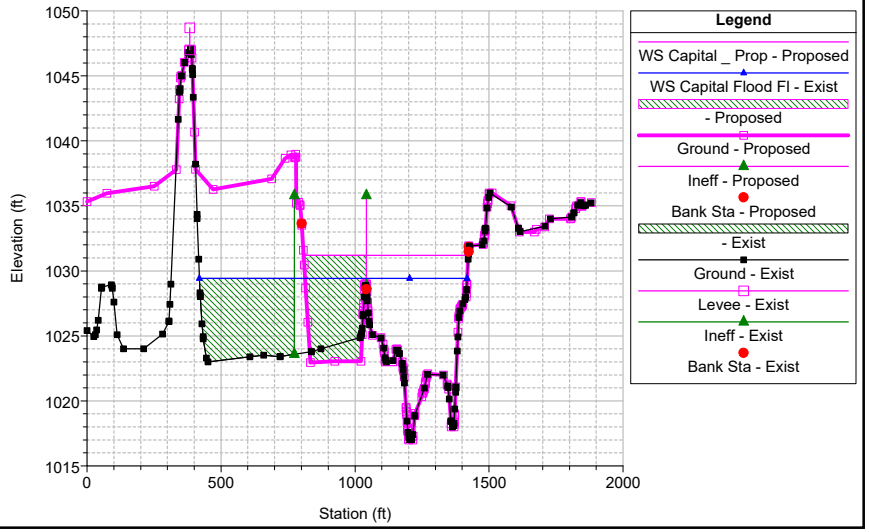

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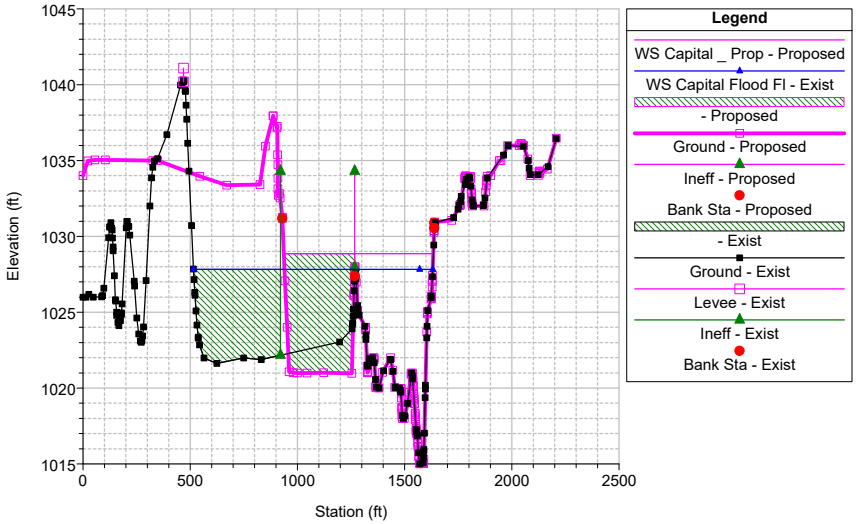

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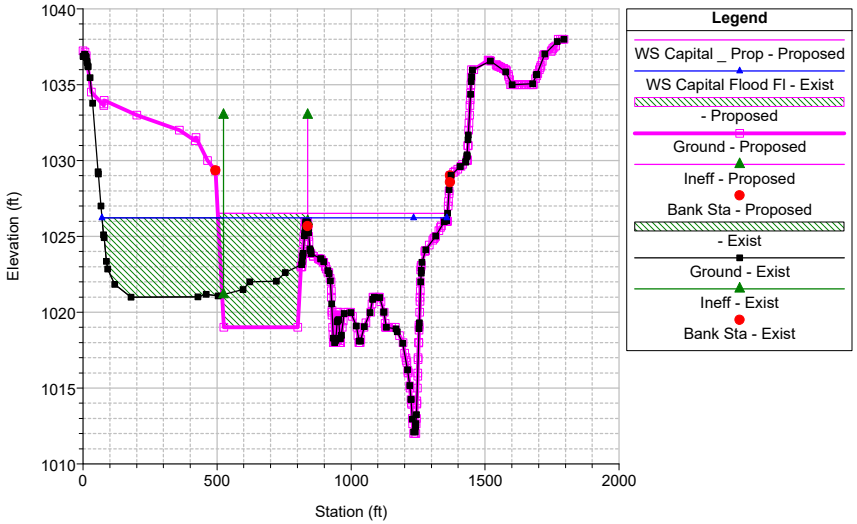

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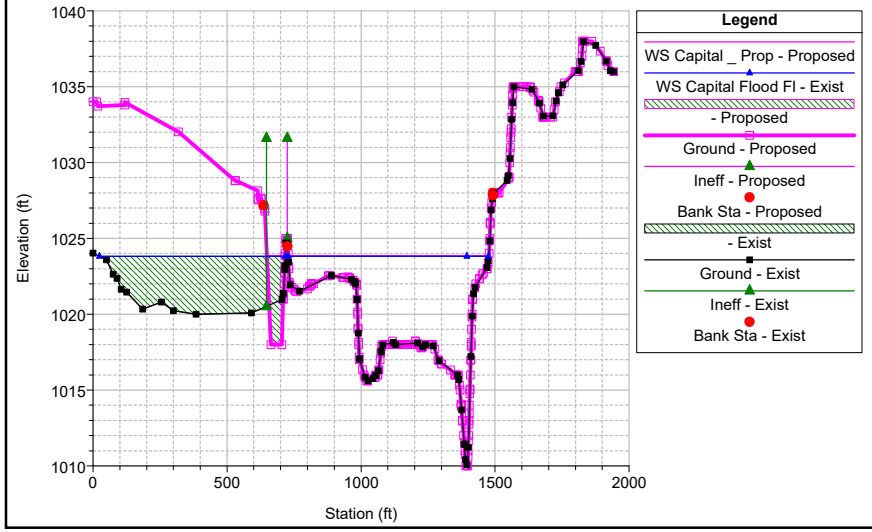
River = Castaic Creek Reach = Reach 1 RS = 10490.82



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Geom: Existing
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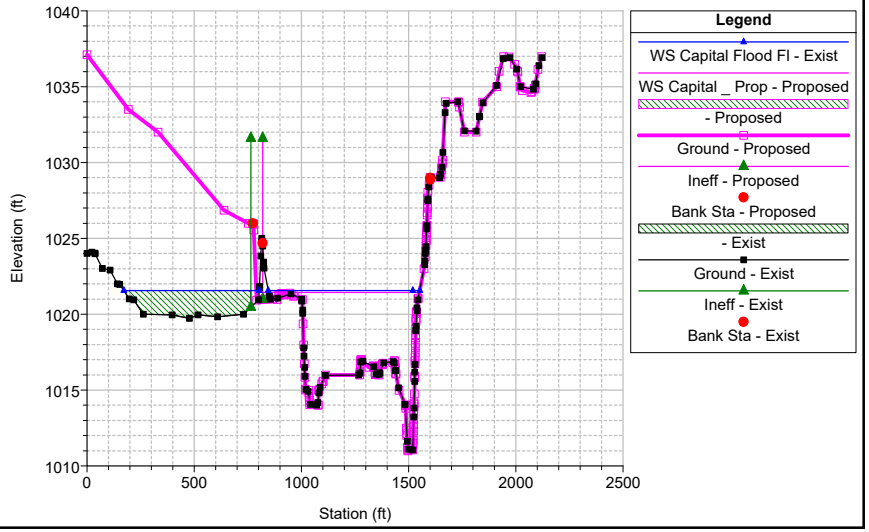

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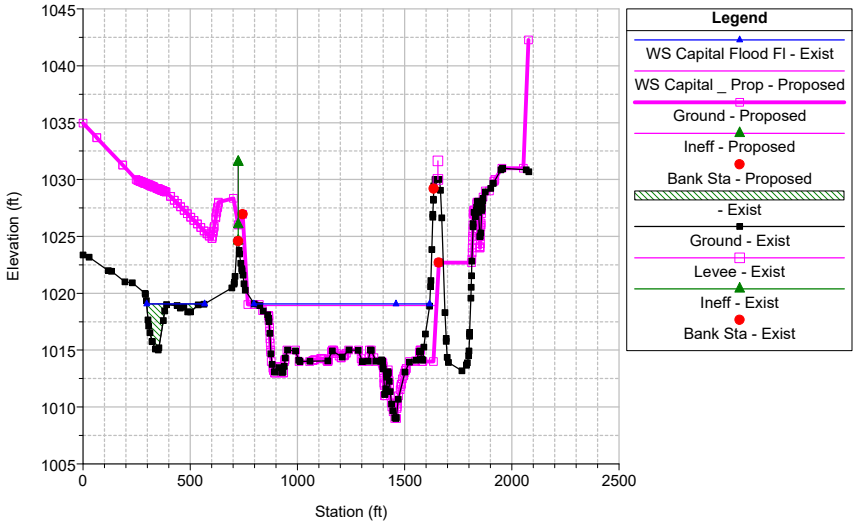

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Geom: Existing
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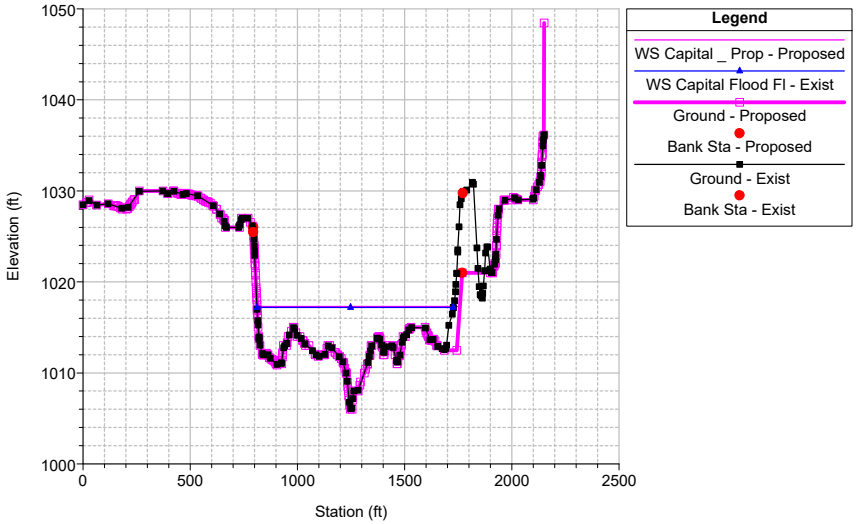

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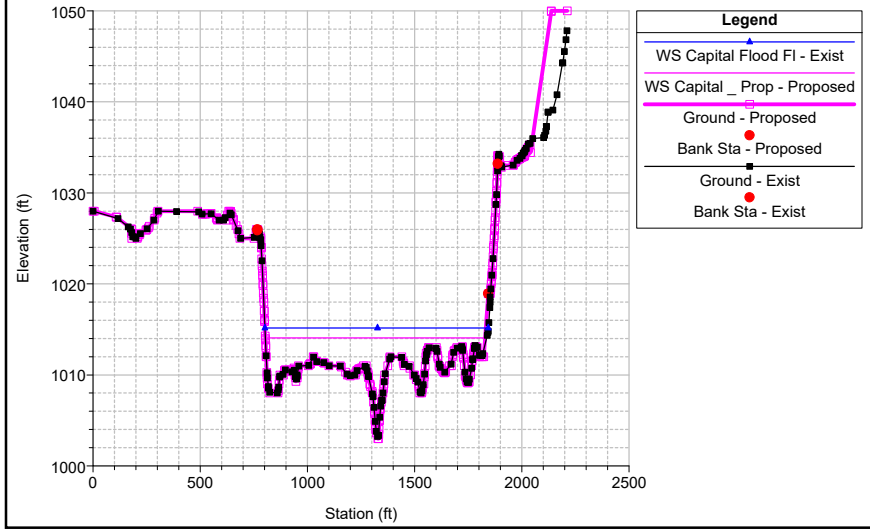
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 9670.57



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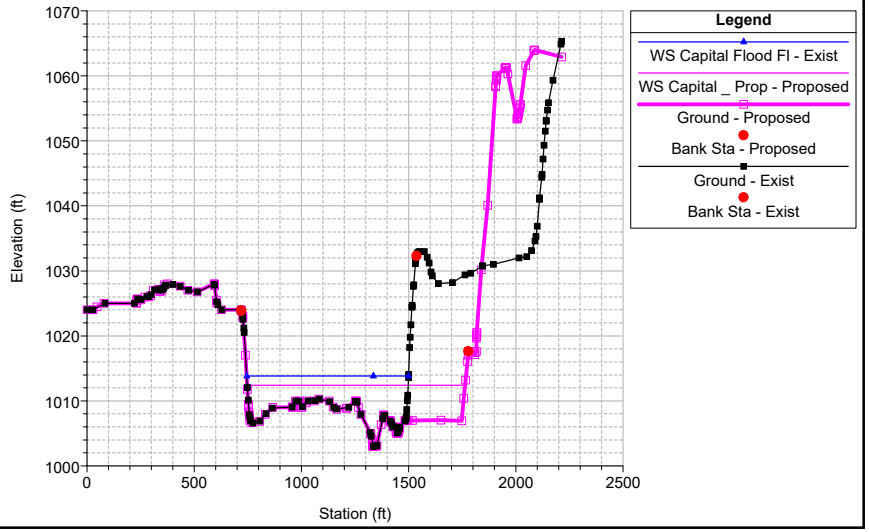
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 9501.81



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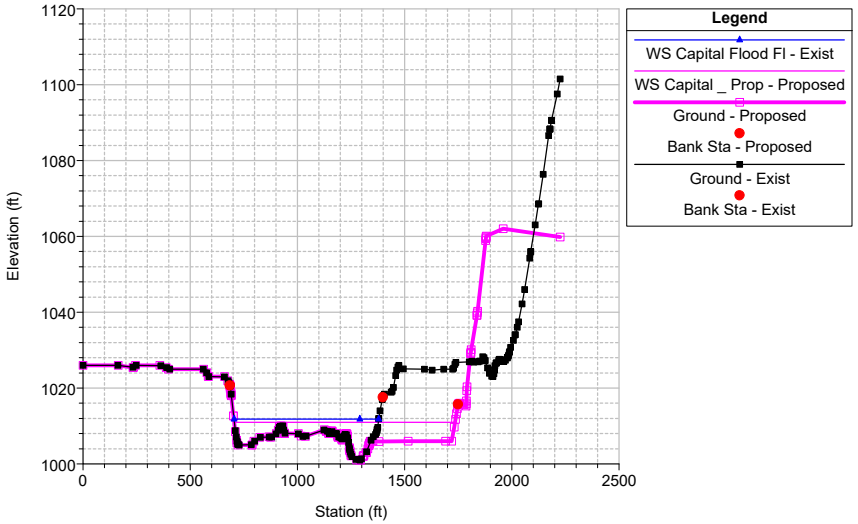
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 9298.99



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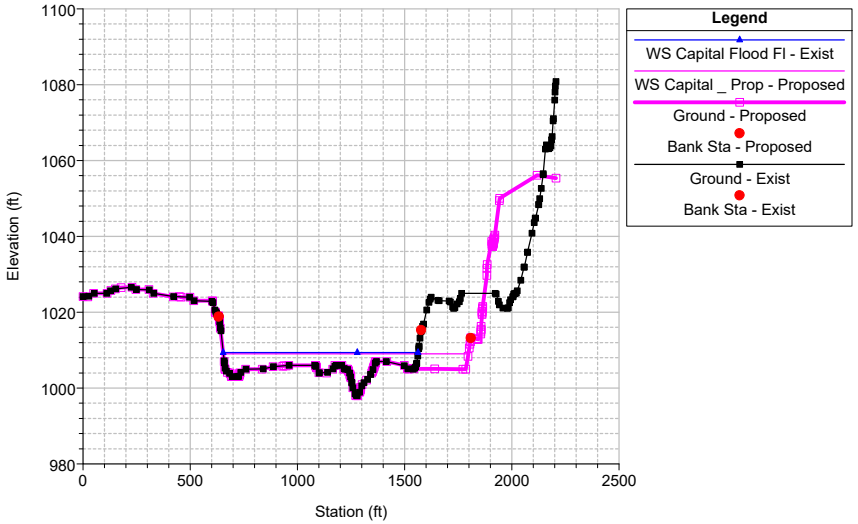
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 9042.81



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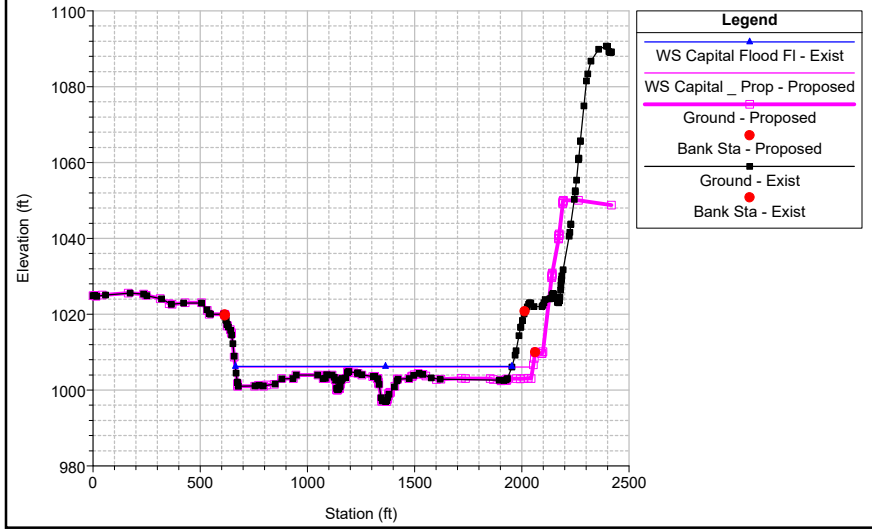
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 8724.84



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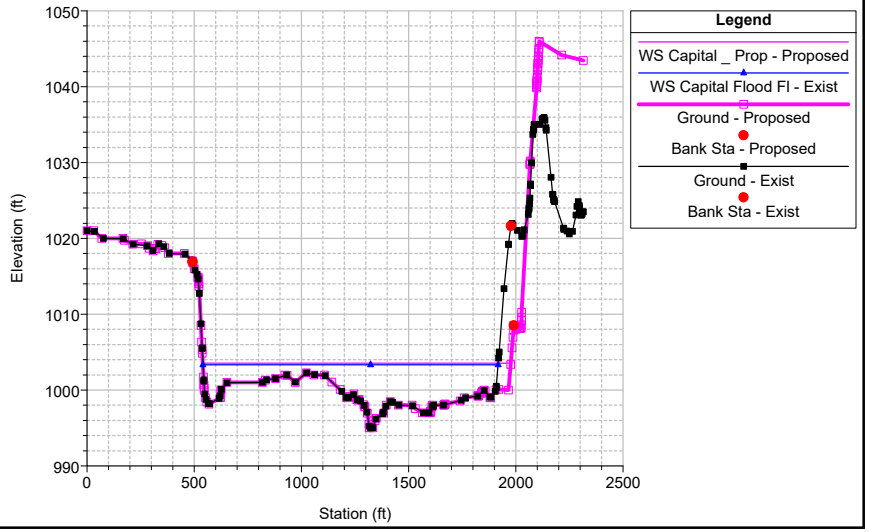
River = Castaic Creek Reach = Reach 1 RS = 8396.13



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Geom: Existing
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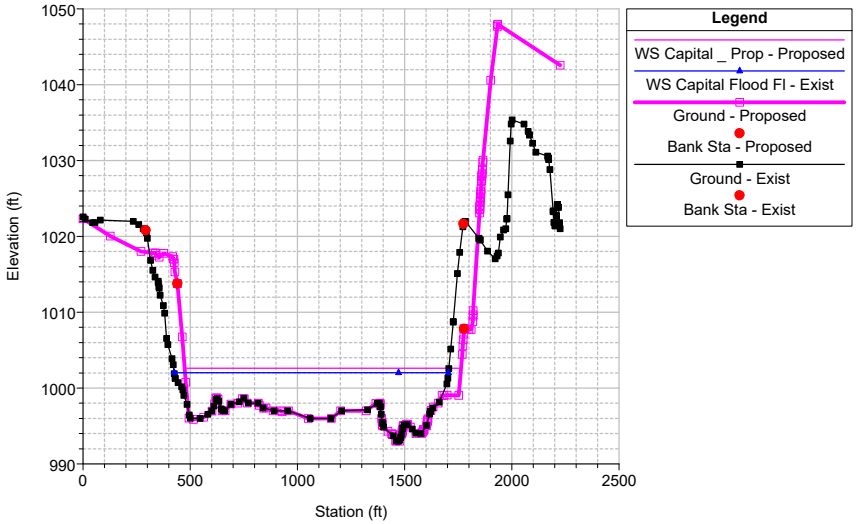

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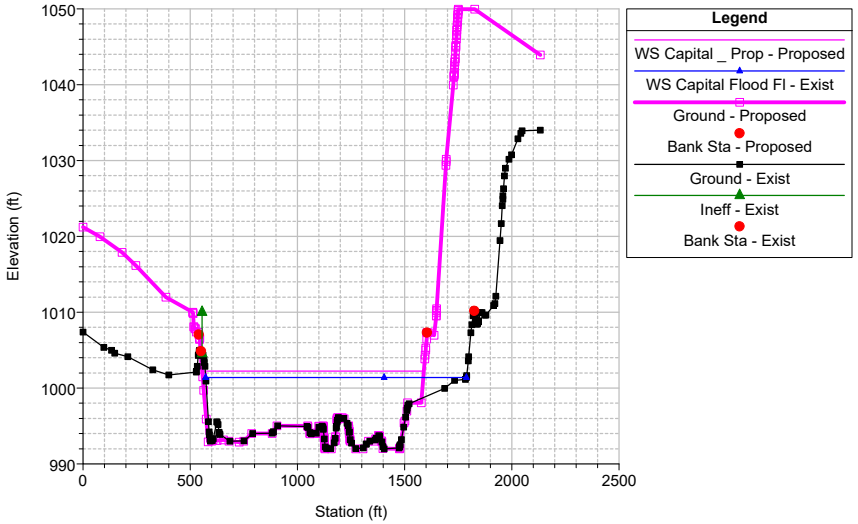
River = Castaic Creek Reach = Reach 1 RS = 7688.71



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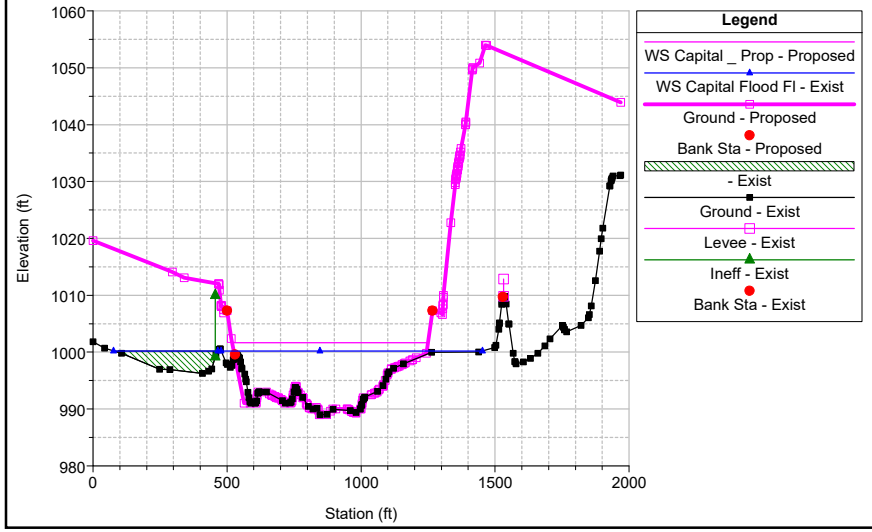
River = Castaic Creek Reach = Reach 1 RS = 7326.46



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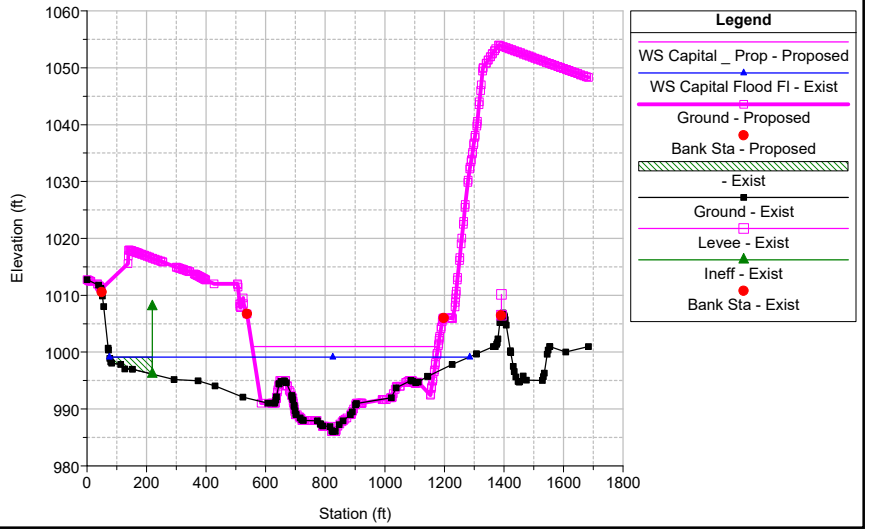
River = Castaic Creek Reach = Reach 1 RS = 6966.68



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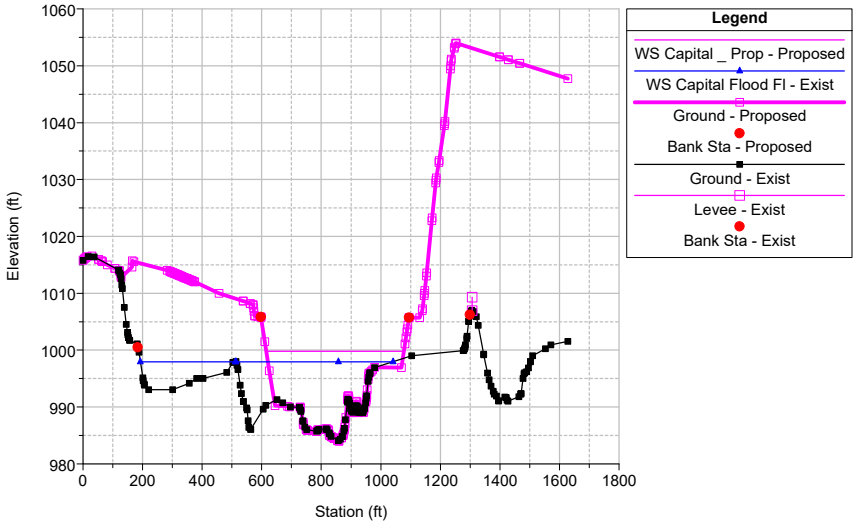
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 6623.5



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Geom: Existing
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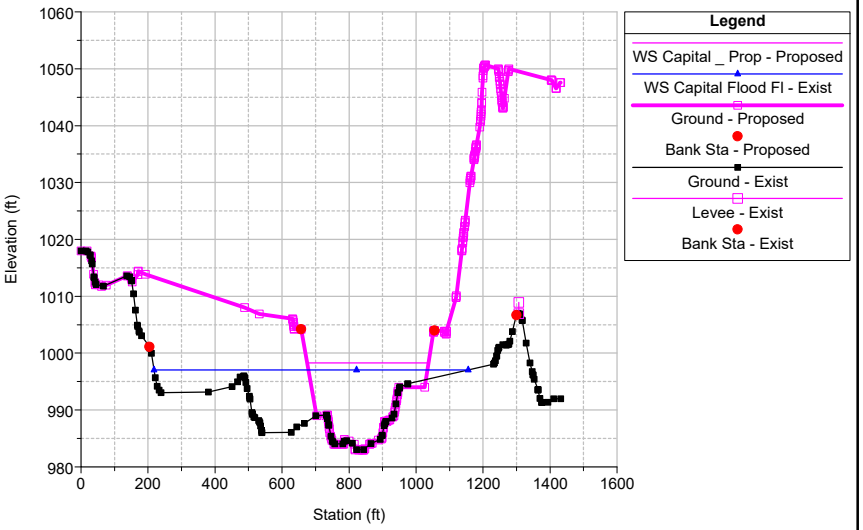

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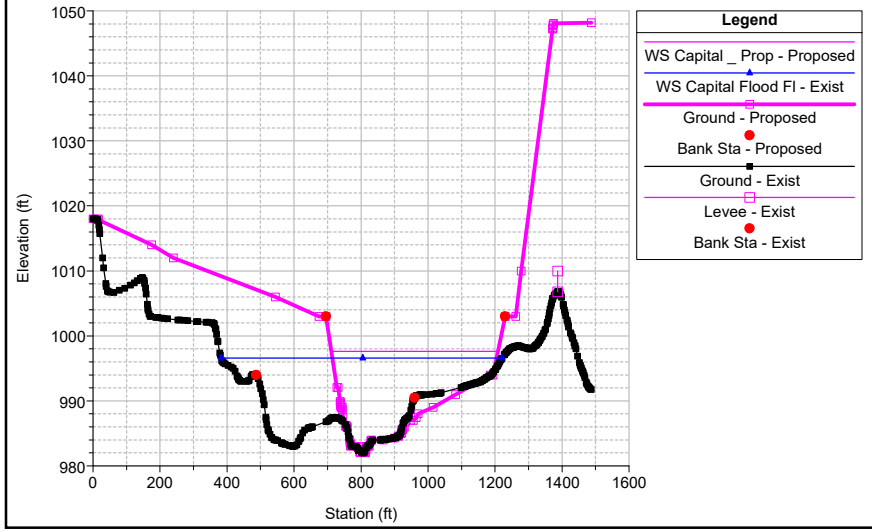
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 6087.88



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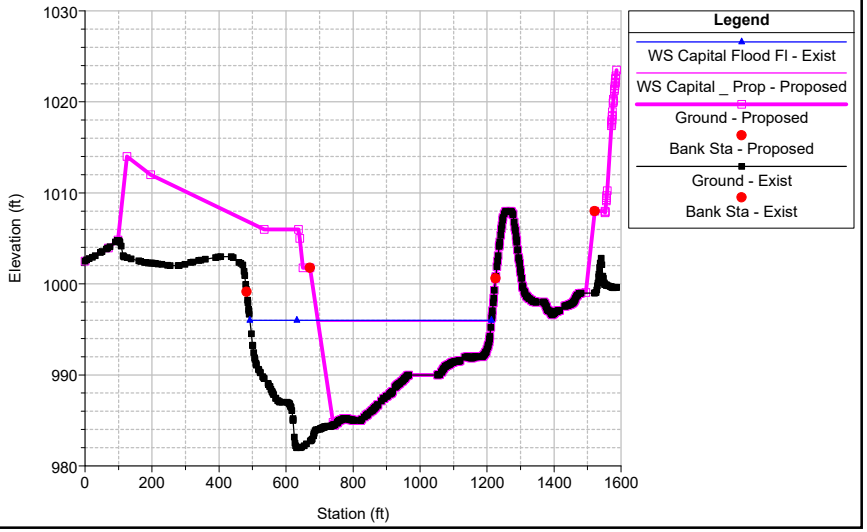
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 5781.35



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Geom: Existing

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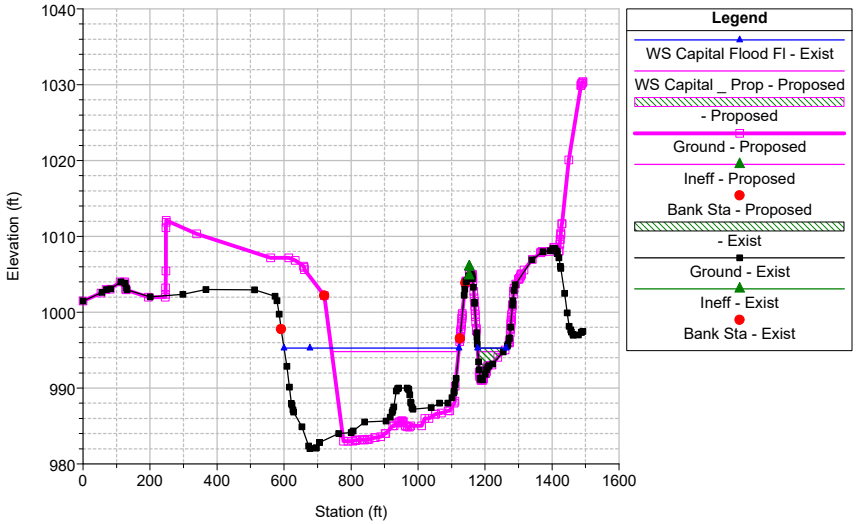

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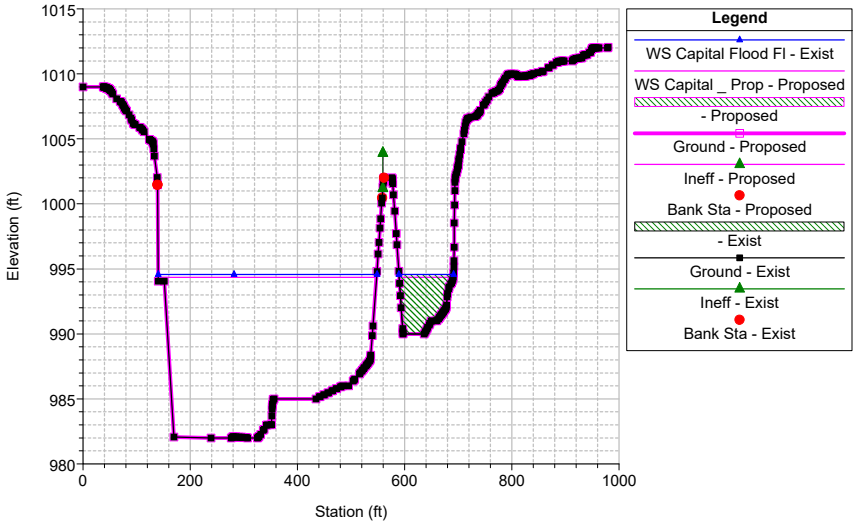
Geom: Existing

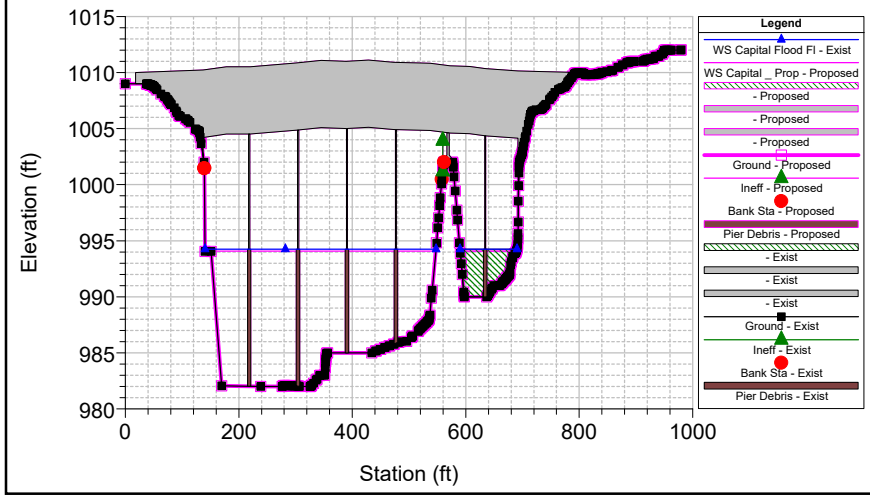
River = Castaic Creek Reach = Reach 1 RS = 5557.68



Castaic Creek FW Plan: 1) Exist 2) Proposed

Geom: Existing

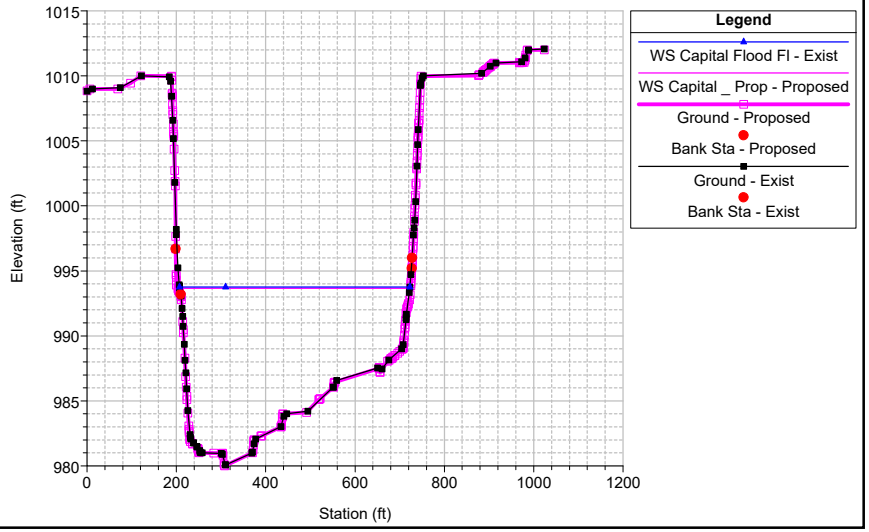
River = Castaic Creek Reach = Reach 1 RS = 5500 BR Commerce Center Drive Bridge



Castaic Creek FW Plan: 1) Exist 2) Proposed

Geom: Existing

River = Castaic Creek Reach = Reach 1 RS = 5453.98



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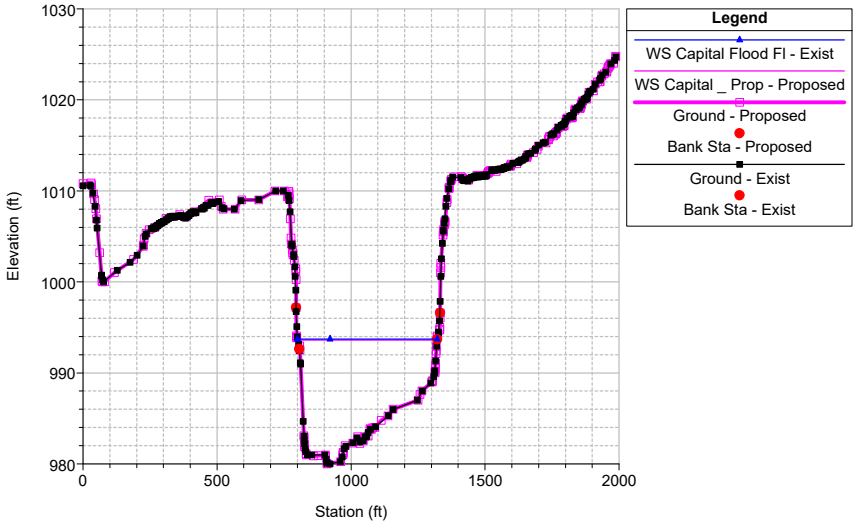
River = Castaic Creek Reach = Reach 1 RS = 5434.68



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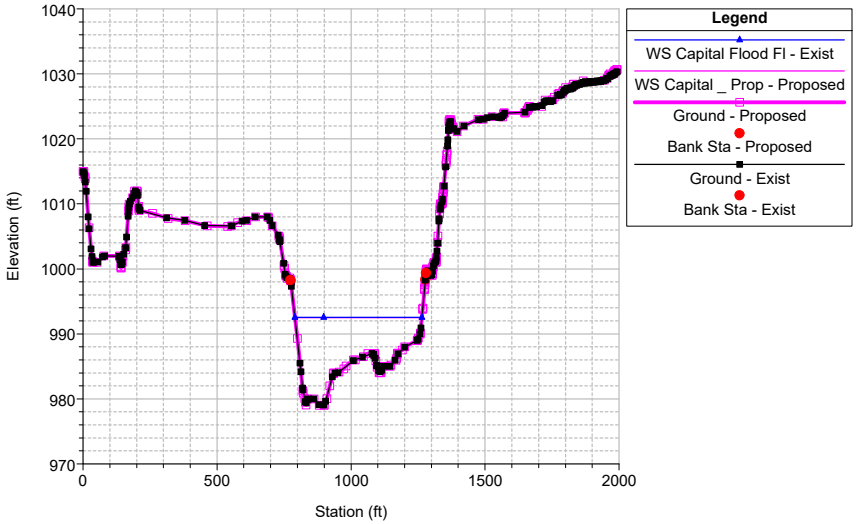
River = Castaic Creek Reach = Reach 1 RS = 5340.04



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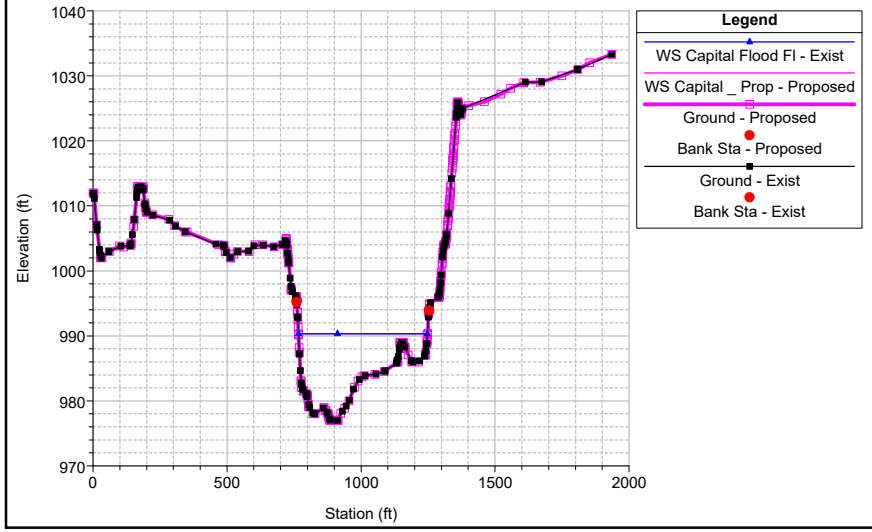
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 5060.55



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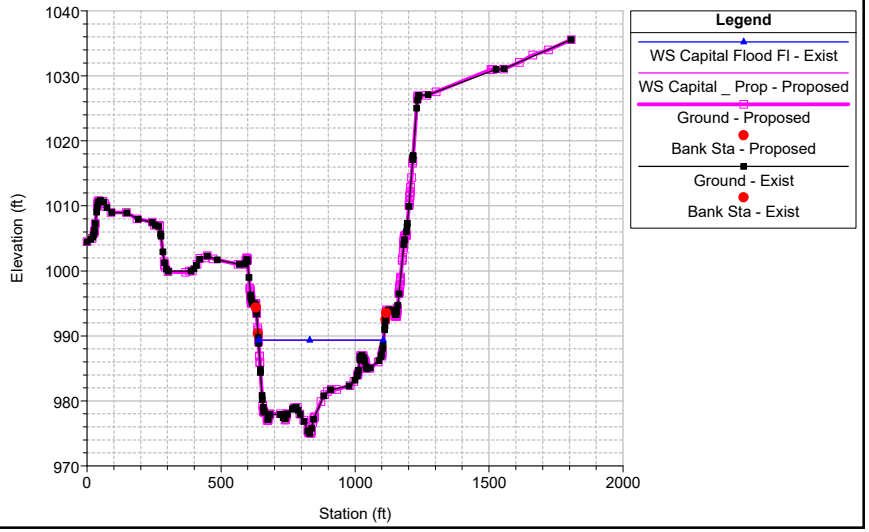
River = Castaic Creek Reach = Reach 1 RS = 4899.94



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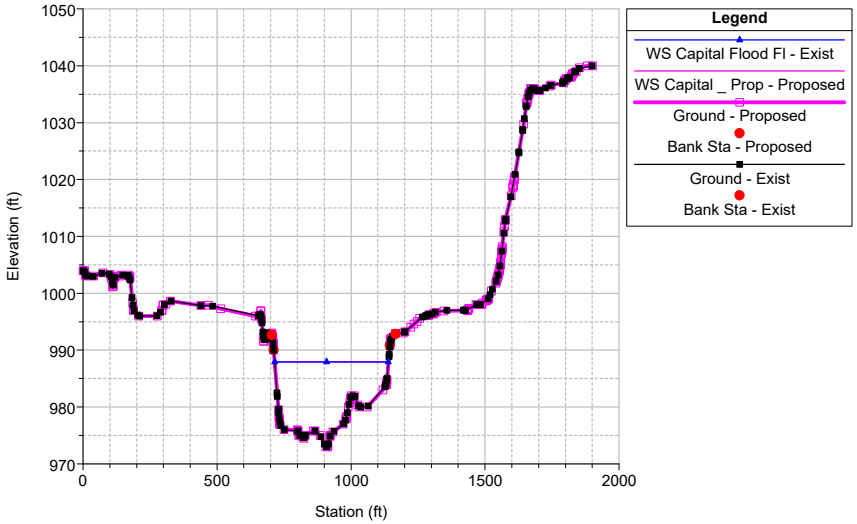
River = Castaic Creek Reach = Reach 1 RS = 4571.63



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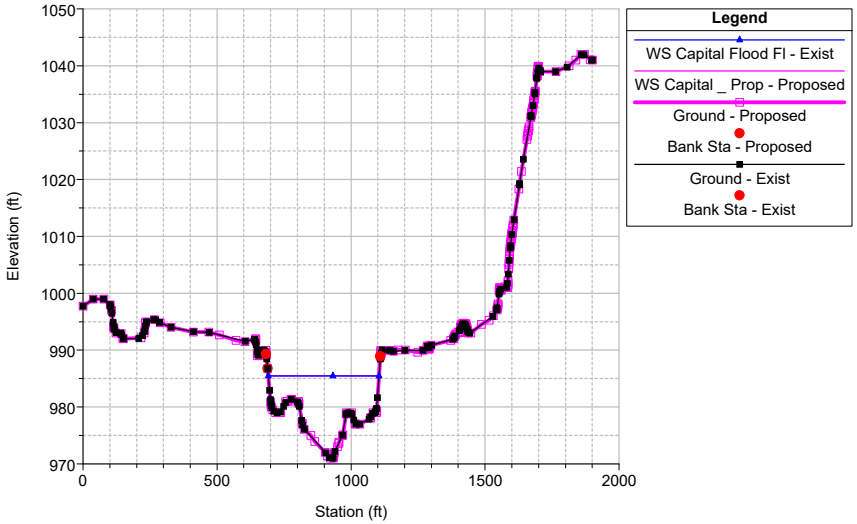
River = Castaic Creek Reach = Reach 1 RS = 4220.87



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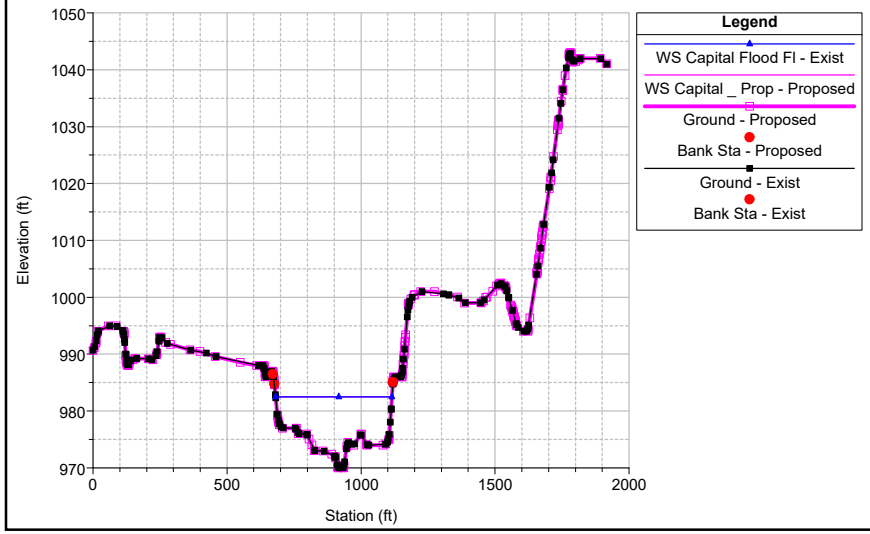
River = Castaic Creek Reach = Reach 1 RS = 3865.39



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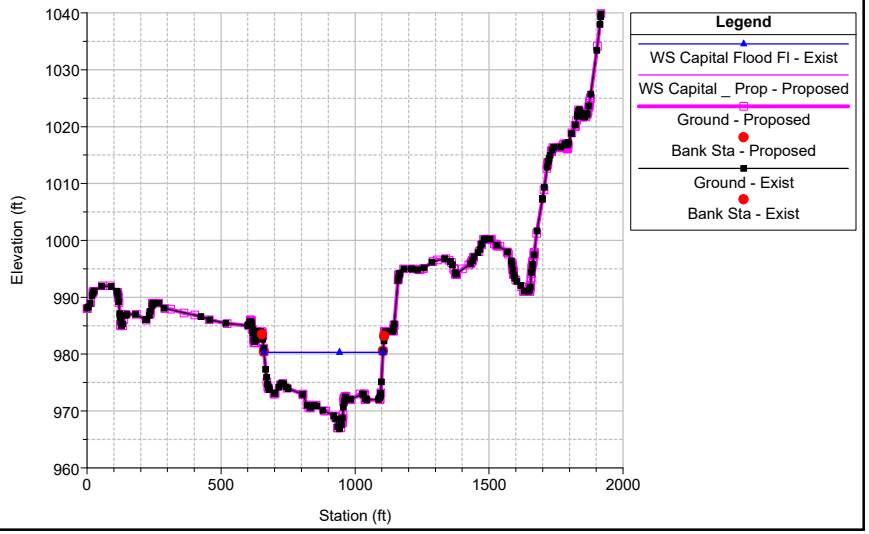
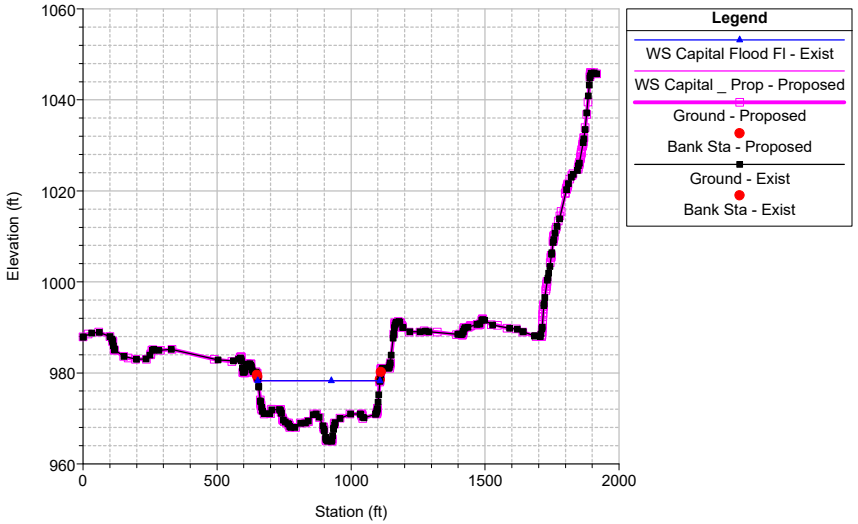


Castaic Creek FW Plan: 1) Exist 2) Proposed
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 3289.64



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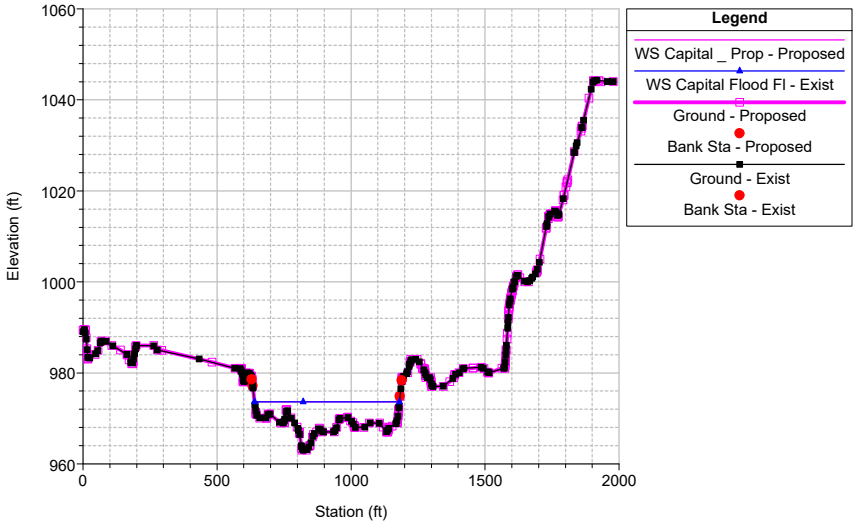
River = Castaic Creek Reach = Reach 1 RS = 2974.88



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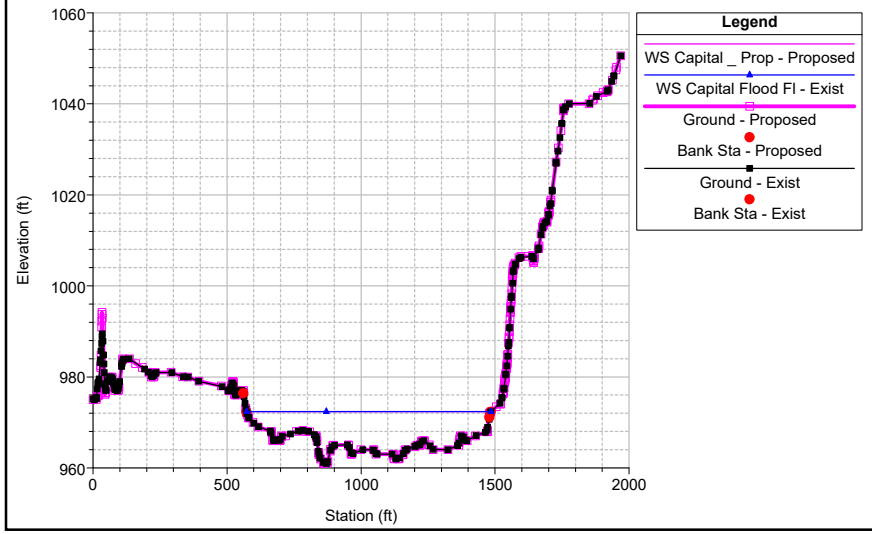
Geom: Existing
River = Castaic Creek Reach = Reach 1 RS = 2627.11



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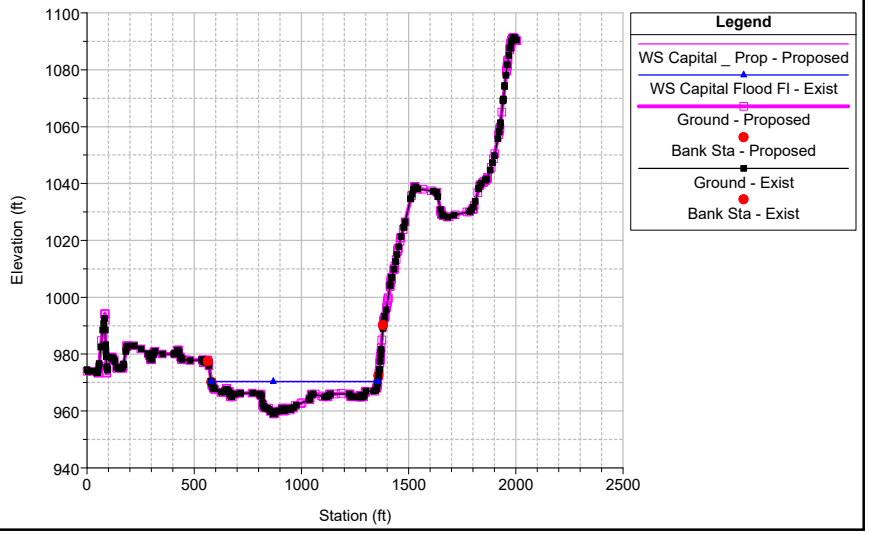
River = Castaic Creek Reach = Reach 1 RS = 2307.93



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Geom: Existing

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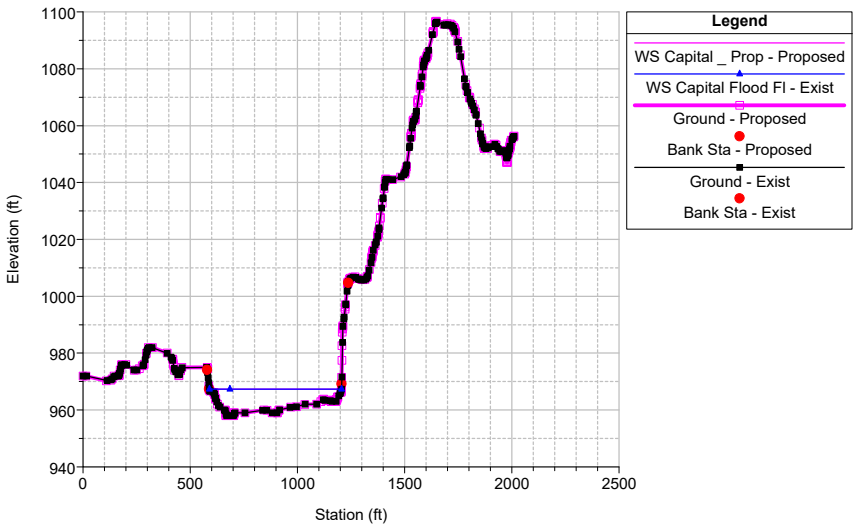

Appendix 5.5h

Hasley Canyon Creek CLOMR

FEMA Application – Conditional Letter of Map Revision

Hasley Canyon Creek Soil Cement Bank Protection
Valencia Commerce Center TPM No. 18108
ESTU No. 2023000284

August 2024
(Revised May 2023)

Prepared For:

FIVEPOINT

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Prepared By:

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Advanced Water Engineering

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PACE JN A535

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1 Introduction

Please find enclosed an application for a Conditional Letter of Map Revision (CLOMR) for the Hasley Canyon Creek Soil Cement Bank Protection Project along Hasley Canyon Creek. The project is located within the unincorporated area of Los Angeles County, three miles west of the City of Santa Clarita, as shown on the vicinity map in **Figure 1-1**. The study reach of Hasley Canyon Creek for this project extends approximately 5,000-ft, from approximately 600 feet downstream of the Commerce Center Drive Bridge over Hasley Canyon Creek to approximately 500 feet downstream of the Hasley Canyon Creek confluence with Castaic Creek. The project involves the implementation of soil cement bank protection improvements for the Valencia Commerce Center (VCC) Industrial Park Development in Tentative Parcel Map (TPM) No. 18108. See **Figure 1-2** for a vicinity map of the project site locations and existing rip-rap and soil cement. The proposed project is located within a FEMA special flood hazard area (SFHA) Zone AE. The AE zone indicates base flood elevations have been established by a previous study.

The effective FEMA Flood Insurance Rate Map (FIRM) panels in the Hasley Canyon Creek study area are numbered 06037C0785G, 06037C0805G, and 06037C0815G and were all revised in June 2021. A subsequent Letter of Map Revision (LOMR) updated the FIRM's at the Hasley Canyon Creek and Castaic Creek confluence and downstream of Commerce Center Drive Bridge, effective October 15, 2021.

The present CLOMR application is in support of a request for the revision of FEMA Flood Insurance Rate Map (FIRM) panels 06037C0805G, as shown on the Effective FIRM panels provided in **Appendix B**. The Hasley Canyon Creek Soil Cement Bank Protection project incorporates more current 2013 topographic data to establish a new hydraulic analysis using HEC-RAS version 6.2.

1.1 Project Background and Description

The Valencia Commerce Center (VCC) Industrial Park Development in Tentative Parcel Map (TPM) No. 18108 will consist of buried soil cement bank protection, a proposed drop structure/stilling basin, two grade control structures, the Franklin Parkway Bridge over Hasley Canyon Creek, and modifications to the existing concrete/rip-rap lined berm (P.D. 2298 Unit III). A more detailed layout of the proposed soil cement bank protection and structures is shown on **Exhibit 1**. Design and analysis of these proposed improvements are described in detail in *Drainage Concept Report Volume III of V, Hasley Canyon Creek Bank Protection, EIMP No. 2019000489*, which was approved by LACPW in March 2022 (PACE, October 2021).

(1) **Proposed Soil Cement Bank Protection** – approximately 3,000 linear feet (LF) of buried soil cement along the east and west bank of Hasley Canyon Creek. At the upstream end, the bank protection along both the east and west banks will join with the existing concrete slope lining (PD 2262). At the downstream end, the proposed Hasley Canyon Creek "East" bank protection joins the proposed Castaic Creek "West" bank protection, and the Hasley Canyon Creek "West" bank protection joins the existing concrete/ rip-rap lining (PD 2298-Unit III).

(2) **Rock Chute and Stilling Basin** – At the upstream end of the proposed soil cement bank protection and existing concrete slope protection, a rock chute and stilling basin are required to convey flow over a ~20ft drop, to dissipate energy and provide erosion protection along the channel bottom.

(3) **Proposed "Franklin Parkway Bridge"** – The Franklin Parkway Bridge has a span of approximately 380 LF and will have two support piers.

(4) **Modified Flow Diversion Berm (PD 2298, Unit III, Linings B and C) at the Castaic Creek/ Hasley Canyon Creek Confluence** – An existing flow diversion berm will be modified in the proposed condition. The existing berm was designed to convey flows from Hasley Canyon Creek under Commerce Center Drive Bridge before joining with Castaic Creek flows downstream of the bridge. In the proposed condition, approximately 150 LF of the existing berm will be removed to allow flows from Hasley Canyon Creek to converge with Castaic Creek flows upstream of the Commerce Center Drive bridge.

P:\A535\6-GIS\Projects\HasleyCreek_CLOMR\A535_HasleyCreekCLOMR\A535_HasleyCreekCLOMR.aprx - Figure 1-1 Project Vicinity Map

VALENCIA COMMERCE CENTER
HASLEY CANYON CREEK CLOMR

PROJECT VICINITY MAP

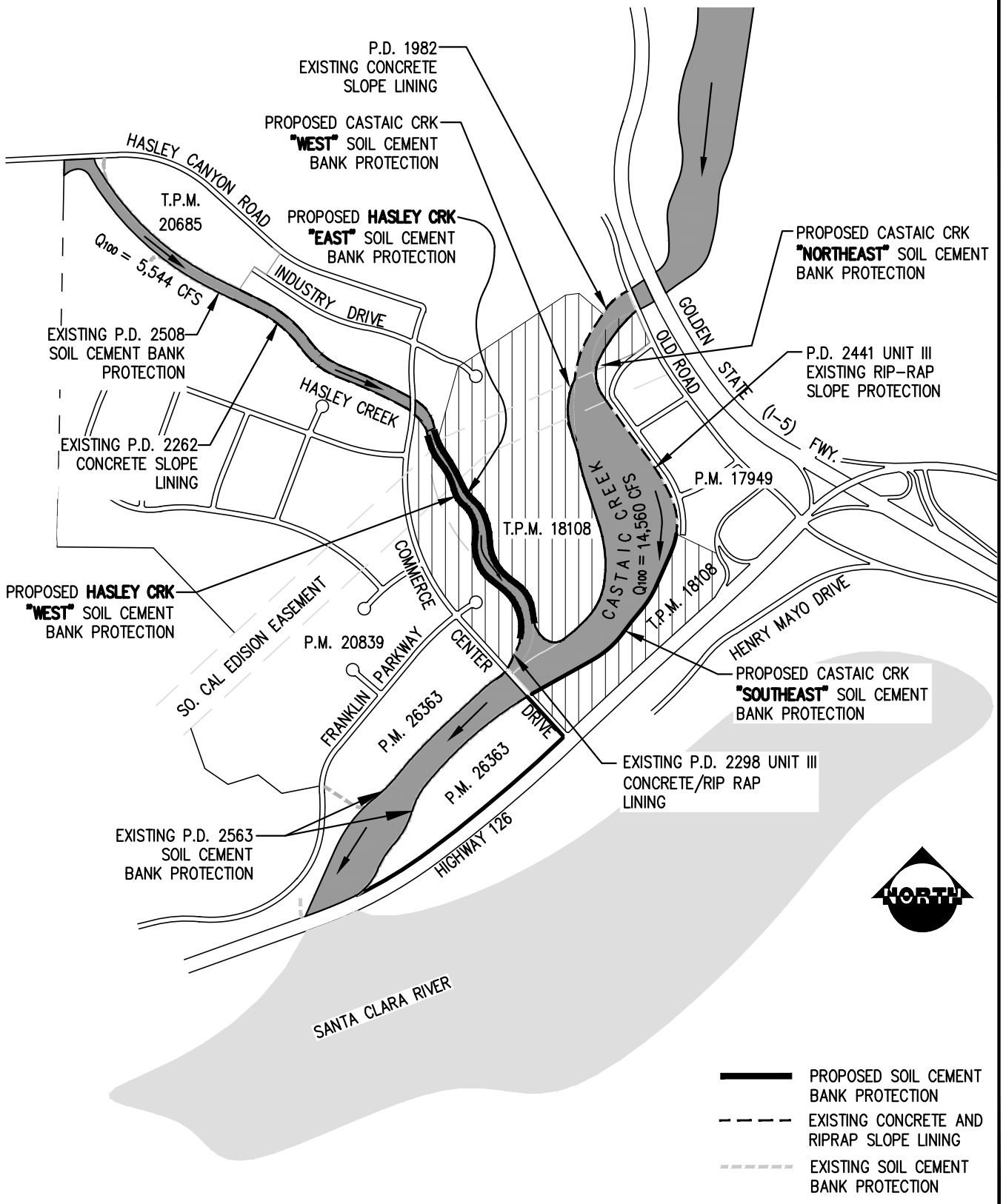
PACE Advanced Water Engineering

0 500 1,000 2,000 Feet

Date: 5/5/2023

Job Number: A535

Figure 1-1



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SCALE	N.T.S.
DESIGNED	EMR
DRAWN	BDP
CHECKED	JC
DATE	MARCH, 2023
JOB NO.	A535_84

HASLEY CREEK
SOIL CEMENT BANK PROTECTION
TPM # 18108

INDEX MAP

FIGURE
1-2

2 Model Background and Development

2.1 Hydrology

The project site is located within Hasley Canyon Creek watershed, which has a drainage area of approximately 7.3 square miles. Based on the Flood Insurance Study (FIS), dated June 2021, the flow rate for the 100 storm event is 1,640 cfs. **Table 2-1** below summarizes the design and FEMA flow rates for Hasley Canyon Creek within the study reach.

Table 2-1: Hasley Canyon Creek Design Hydrology

Storm Event/ Return Period	Design Flow (cfs)	Location
100 – Year	1,640[(1)]	At Confluence with Castaic Creek
100 – Year	820[(2)]	At Flow Diversion Berm, Flow is split evenly on the North and South Sides of the Berm

Notes:
(1) Source FEMA FIS for Los Angeles County and Incorporated Areas, June 2, 2021, see **Appendix B**.
(2) Source FEMA Effective Model for Hasley Canyon Creek, dated 2022

2.2 HEC-RAS Model Development

To fully analyze the study reach of Hasley Canyon Creek near the proposed project, a detailed hydraulic model was developed using the computer application program, HEC-RAS Version 6.2. The model extends from approximately 600 feet downstream of the Commerce Center Drive Bridge over Hasley Canyon Creek (XS 4725) to 40 feet downstream of the Commerce Center Drive Bridge over Castaic Creek, just downstream of the confluence of Hasley Canyon Creek with Castaic Creek. The total floodplain study reach is approximately 3,800 feet. PACE developed existing and proposed conditions HEC-RAS models for the study reach.

2.2.1 FEMA Effective Model

A physical map revision (PMR) was completed for the Hasley Canyon Creek project area in June 2021, which included the confluence of Hasley Canyon Creek with Castaic Creek. A request was made to FEMA for effective models for Hasley Canyon Creek and Castaic Creek based on the revision. The data received from FEMA included an effective model for Hasley Canyon Creek dated 2022, and an effective model for Castaic Creek dated 2021. The Hasley Canyon Creek effective model was used as a design basis for the existing condition and proposed condition tie-in's, discharge, and selection pf manning's n roughness values.

2.2.2 Model Preparation

Hydraulic modeling was performed using HEC-RAS, a computer modeling software developed by the U.S. Army Corps of Engineers (USACE). HEC-RAS is a rigid boundary hydraulic model that assumes the channel bed does not fluctuate, and develops a one-dimensional solution of the energy equation. To do this, energy losses are evaluated by friction through Manning's equation and contraction/expansion is based on the coefficient and change in velocity head. When bridges and confluences are present, the momentum equation or pressure flow/weir equation is used to manage these situations of rapidly varying water surface profile. Per FEMA requirements, the models were run with a subcritical flow regime.

2.2.2.1 FEMA Designations

The proposed project is located within SFHA Zone AE; a detailed hydraulic analysis has been previously performed and there are base flood elevation's (BFE's) provided by FEMA.

2.2.3 *Model Overview*

The following guidelines and assumptions were used to develop the various hydraulic analyses with the HEC-RAS model:

- Cross Section Spacing Intervals
- Cross Geometry Section Geometry
- Discharge
- Flow Regime
- Boundary Conditions
- Selection of Manning roughness – 'n' Values
- Bank Station Definition
- Ineffective Flow Areas
- Hydraulic Structure Data

2.2.3.1 Cross Section Spacing Intervals and Geometry

The corrected effective cross-section geometry is based on 2013 topographic data. This topography includes existing concrete slope lining (per P.D. 2262) at the upstream end of the study reach, existing Hasley Creek Concrete/ rip-rap lining (per P.D. 2298 Unit II) upstream of Commerce Center Drive, existing Castaic Creek soil cement bank protection (per P.D. 2563) downstream of Commerce Center Drive Bridge over Castaic Creek, and the existing flow diversion berm (per P.D. 2298 Unit III) between Hasley Creek and Castaic Creek. A HEC-RAS workmap showing the HEC-RAS cross sections and 2013 topographic contours is shown in **Exhibit 3**.

The proposed conditions cross-section geometry is based on the proposed Hasley Canyon Creek finished grade contours, which tie into the existing 2013 topographic data. The proposed finished grades consist of 3:1 side slopes on each bank, which then transition to a 2 percent slope until the proposed grading daylights with the existing grades near the center of the channel. The proposed cross-sections also include the proposed drop structure and stilling basin which connects the existing channel (per P.D. 2262) upstream of the project to the proposed project bank protection improvements, and extends from HEC-RAS cross-section 4396 to cross-section 4265. Finally, the proposed cross-section geometry includes shortening the flow diversion berm at the Commerce Center Drive Bridge between Hasley Creek and Castaic Creek. Note that some of the cross-section locations differ in the existing and proposed condition geometries, as cross sections were repositioned in the proposed conditions to span the proposed channel and to be oriented perpendicular to the flow direction.

Additional cross-sections are also included at the proposed drop structure and surrounding the proposed Franklin Parkway bridge. A proposed HEC-RAS work map showing the HEC-RAS cross-sections, proposed finished grade contours, and 2013 topographic contours is included in **Exhibit 3**. Note that interpolated cross-sections were used to refine results along the proposed drop structure and within the proposed stilling basin, which experience high energy loss and abrupt changes in water surface elevations, these are not included in **Exhibit 3**.

2.2.3.2 Discharge

The discharges used for the Hasley Canyon Creek analysis were obtained from the FEMA FIS (June 2021). A flow rate of 1,640 cfs was used for the entire study reach upstream of the confluence of Hasley Canyon Creek with Castaic Creek, as shown in **Table 2-1**. Per the FEMA effective model, the 1,640 cfs flow is split at the flow diversion berm, with half the flow (820 cfs) going on along the north side of the berm and the other half (820 cfs) going along the south side of the berm.

2.2.3.3 Hydraulic Flow Regime

The hydraulic analyses were performed in a "subcritical" flow regime. A "mixed" flow regime would more closely reflect the actual conditions that would naturally occur in the hydraulic system, but the intent of the floodplain hydraulic models is strictly for defining flood hazards per FEMA standards.

2.2.3.4 Topographic Data Source

The one-foot aerial topography from 2013 (covering this project's study reach of Castaic Creek and Hasley Canyon Creek) was used for the hydraulic analysis and floodplain delineation. This topography and all elevations are in North American Vertical Datum of 1988 (NAVD88).

2.2.3.5 Boundary Conditions

The boundary condition for the downstream study limit was taken as "normal depth slope" with slope equal to 0.0187 ft/ft. This boundary condition is the same as the boundary condition for the effective model. Note, the model is run in the subcritical flow regime, which does not require an upstream boundary condition.

2.2.3.6 Selection of the Manning's Roughness Value

The FEMA FIS report specifies manning's roughness for Hasley Canyon Creek as 0.020 - 0.040 within the channel and 0.050 - 0.1 for the overbanks. Manning's roughness values within the model were set to match those specified in the effective FEMA model for Hasley Canyon Creek.

2.2.3.7 Hydraulic Structures

The existing conditions hydraulic model includes the Commerce Center Drive Bridge over Castaic Creek (Bridge No. B3794) as well as the existing flow diversion berm (per P.D. 2298 Unit III). Geometry for the Commerce Center Drive Bridge over Castaic Creek was obtained from as-built plans provided in **Appendix F**. The FEMA effective model only includes the portion of Commerce Center Drive Bridge over the Hasley Canyon Creek side or north side of the flow diversion berm. The existing and proposed conditions models follow the same approach as the effective model for the Commerce Center Drive Bridge. The bridge modeled spans approximately 120ft from the north abutment of the bridge (Bridge Abutment 1) to the flow diversion berm (Pier 3) and includes a single pier (Pier 2), per Commerce Center Drive Bridge As-Builts. The bridge is situated between cross sections 593 and 458.

The proposed condition hydraulic model includes the existing Commerce Center Drive Bridge over Castaic Creek, the proposed Franklin Parkway Bridge, the proposed bank improvements, and the modified flow diversion berm. Franklin Parkway bridge is situated between proposed HEC-RAS cross-sections 2305.5 and HEC-RAS cross-section 2190.5, and is approximately 1,000 ft upstream of the Hasley Canyon Creek and Castaic Creek confluence. Franklin Parkway bridge contains two 6-ft wide bridge piers, a bridge span of approximately 300-ft, and a bridge deck 88-ft in width.

2.2.3.8 Ineffective Flow Areas

Ineffective flow markers are incorporated in the model to establish the portion of the channel at each cross section with effective flow. Overbank areas are considered ineffective flow areas until flows reach a specific elevation, after which the effective channel widens to accommodate the higher flows. In the existing condition model, ineffective flow is designated upstream of cross sections 963, with a contraction ration of 1:1, as the natural floodplain narrows going into the north side of the flow diversion berm. This is shown in the topographic workmap, **Exhibit 8**.

2.3 Summary of CLOMR HEC-RAS Models

In summary, the Hasley Canyon Creek CLOMR includes the following condition models:

(1) Duplicate Effective Model:

This represents the effective FEMA model, truncated to the study area, and run on the newest version of HEC-RAS (6.4.1).

(2) Corrected Effective Condition Model/ Pre-Project Condition:

Cross sections cut from 2013 topography and additional cross sections added to the effective model. This model does not include the proposed improvements.

(3) Proposed Condition Model

Cross sections cut from 2013 topography and additional cross sections added to the model with some locations changing to better suit the soil cement bank protection alignment. Cross section geometry includes proposed soil cement bank protection, Franklin Parkway bridge, and the modified flow diversion berm.

3 Sediment Transport Considerations

3.1 Introduction

Various analyses were performed to evaluate the fluvial characteristics and long-term stability of study area in the vicinity of the Lower Hasley Creek improvements as part of the *Drainage Concept Report Volume III of V, Hasley Canyon Creek Bank Protection, EIMP No. 2019000489* (Approved March 2022). The proposed soil cement bank protection, which will be installed on the east and west banks, will provide long-term erosion protection from vertical and lateral migration of the thalweg and flood protection for the adjacent proposed developments. The fluvial study evaluated the impacts from (1) fluvial modifications of the streambed from a single hypothetical storm event, or the general adjustment and (2) long-term changes in the floodplain fluvial operation, or the long term adjustment.

3.1.1 Types of Adjustment

Bed adjustment in feet quantify the fluvial modifications and long-term changes of the streambed. A positive adjustment indicates bed aggradation, while a negative adjustment indicates bed degradation. PACE considered several types of adjustment in this study including:

- *Long-Term Adjustment* which accounts for fluvial processes that occur over many rainy seasons and contribute to fluctuations in the creek's bed elevation.
- *General Adjustment* which accounts for scour that occurs during an individual storm event. Aggradation describes a situation in which the quantity of sediment that enters a given reach is higher than the quantity of sediment that exits the same reach, and degradation describes a situation in which sediment outflow exceeds inflow for a given reach.
- *Other Scour* is comprised of local scour, bend scour, low-flow incisement, and bed form height.

The total vertical adjustment (total scour) is the sum of the general adjustment, long-term adjustment, and other scour. The toe of the soil cement was designed to be at or below the maximum calculated total scour and is shown on the soil cement profiles in the "West" and "East" banks in **Exhibits 6 and 7**, respectively.

4 Proposed Hasley Canyon Creek Modifications and Improvements

The proposed improvements at Valencia Commerce Center (VCC) Industrial Park Development in Tentative Parcel Map (TPM) No. 18108 consist of soil cement bank protection along both banks of Hasley Canyon Creek, installation of a rock chute stilling basin and two grade control structures, construction of the proposed Franklin Parkway Bridge, and modifications to an existing diversion berm/ flow splitter. Below is a summary of the design of the proposed improvements.

4.1 Rock Chute and Stilling Basin

At the upstream termination/junction point of the proposed soil cement bank protection and the existing concrete slope protection, a rock chute and stilling basin are required to convey flow over the roughly 20-foot drop, to dissipate the energy and to provide erosion protection along the channel bottom. The crest of the rock chute is designed to tie in with the channel invert at the end of the existing concrete slope-lined channel (PD No. 2262). The chute and stilling basin will be rock lined along the bottom with exposed soil cement along the side slopes. The chute will be designed with a 3:1 (H:V) slope along the invert and 1.5:1 (H:V) side slopes for the exposed soil cement. The bottom width of the channel is approximately 85 feet at the crest of the chute and approximately 50 feet at the toe of the chute. The stilling basin will be level along the invert and will extend approximately 100 feet downstream. The end of the stilling basin will have a 2.5:1 (H:V) slope to tie in with the invert of the channel, and the end sill will extend roughly ten feet downstream. From this point, a sloped cut-off will be provided that will extend down to the toe of soil cement elevation at a 2:1 (H:V) slope. The proposed layout of the drop structure is shown in **Exhibit 4**.

4.2 Grade Control Structures

The proposed project also includes the construction of two grade control structures. The purpose of the grade control structures is to maintain the stability of the natural streambed by controlling head cutting and reducing long-term scour in the channel. One of the proposed grade control structures will be placed at HEC-RAS River Station 1804, approximately 675 ft upstream of the Hasley Canyon Creek and Castaic Creek confluence. The other proposed grade control structure will be placed between HEC-RAS River Stations 3190.5 and 3304, approximately 915 ft upstream of the proposed Franklin Parkway Bridge. Both grade control structures will be constructed of riprap, and the top of the structures will be set at the existing grade of the channel. The structures will be buried deep enough to prevent vertical erosion during peak flows from undermining the structure.

4.3 Franklin Parkway Bridge

The proposed project also includes the addition of the Franklin Parkway Bridge crossing over Hasley Creek. The Franklin Parkway Bridge is still in the conceptual design phase. The bridge is proposed to be located between HEC-RAS cross sections 2190.5 and 2305.5, approximately 1,000 ft upstream of the confluence of Castaic Creek and Hasley Canyon Creek. The bridge will have a proposed span of approximately 350 feet, a deck width of 88 feet, and two, six-foot support piers.

4.4 Modifications to the Existing Berm

The existing concrete and riprap lined berm (see Linings B and C on PD 2298, Unit III) is located at the confluence between Castaic Creek and Hasley Canyon Creek. The berm was designed to divert flows from Hasley Canyon Creek into Castaic Creek downstream of the Commerce Center Drive Bridge. However, a large storm in January 2005 caused flows to bifurcate the berm. This change caused the berm to become an obstruction to flows and increase chances of blockages to either flow path, into Castaic Creek, or under Commerce Center Drive.

In the proposed condition, the upstream portion of the flow diversion berm will be removed and lowered to the scour depth. This will remove the obstruction to the flow path of Hasley Canyon Creek and allow water

into Castaic Creek upstream of Commerce Center Drive Bridge. **Exhibit 5** depicts the proposed modifications to the existing flow diversion berm.

According to the as-built drawings, the existing flow diversion berm is approximately 500 feet in length and is 16-feet-wide as measured along the top of the berm. The berm consists of two linings. Lining B is a concrete lining that was installed along the Hasley Canyon Creek side of the berm. Lining C is comprised of mostly rip-rap and was placed along the side of the berm facing Castaic Creek. The as-built drawings (PD 2298, Unit III) for the flow diversion berm are provided in **Appendix G**. It should be noted that the elevations shown on PD 2298, Unit III are referenced to the NGVD 1929. A datum shift of +2.638 feet should be applied to convert NGVD 1929 elevations to NAVD 1988 elevations, as the HEC-RAS model datum is NAVD 88.

A portion of the upstream end of the existing flow diversion berm will be removed such that the modified flow diversion berm will be reduced to 150 feet in length upstream of Commerce Center Drive Bridge. Rip-rap will be placed at the upstream end of the berm. The portion of the flow diversion berm above the estimated scour elevations will be removed to eliminate the obstruction of flows from Hasley Creek entering Castaic Creek upstream of Commerce Center Drive Bridge.

4.5 Soil Cement Bank Protection

The proposed Lower Hasley Canyon Creek bank protection will consist of buried soil cement bank protection. The bank protection improvements will be located east of Commerce Center Drive, along the east and west banks of Hasley Canyon Creek. The proposed bank protection along the east and west banks of Hasley Canyon Creek will be approximately 3,000 linear feet and will protect the VCC Industrial Park Development from potential flooding and erosion. At the upstream end of Hasley Canyon Creek, the bank protection along both the east and west banks will join with the existing concrete slope lining (PD 2262). At the downstream end, the proposed Hasley Canyon Creek “East” bank protection joins the proposed Castaic Creek “West” bank protection, and the Hasley Canyon Creek “West” bank protection joins the existing concrete/ rip-rap lining (PD 2298-Unit III).

4.5.1 Design of Soil Cement Bank Protection

The “structural” segment of the proposed Lower Hasley Creek bank protection consists of LACPW standard buried soil cement to provide the appropriate level of freeboard and scour protection for all storm events up to the Capital Flood. The critical factors in determining the design of the bank protection were based on the following criteria:

1. Flood control stability and durability of bank protection.
2. Safety concerns regarding access to and from the channel in dry and wet conditions.
3. Bank protection maintenance considerations.
4. Environmental compatibility with the native area and resource enhancement concepts, and aesthetic considerations.
5. Constructability and cost of construction.

Soil cement bank protection is constructed as a monolithic and homogenous structure consisting of approximately 90% native soils and 10% cement. The typical section consists of 8-foot wide and 6 to 12-inch thick layers of soil cement. Each layer of soil cement is set back from the edge of the previous layer, at a 1.5:1 slope. The entire section varies in total height based on varying freeboard, flow depth and toe-down requirements.

The proposed soil cement bank protection addresses the above design criteria as follows:

1. Soil cement provides a stable riverbank protection material, in terms of both surface erosion and structural stability. Preliminary geotechnical analysis indicates that locally available native soils are considered acceptable for use in soil cement mix.

2. For the majority of the reach, soil cement bank protection will be completely buried with a variable backfill slope of 3:1 (H:V) or flatter. Near the upstream tie in to the existing concrete slope protection within the chute, the soil cement will be partially exposed.

4.6 Channel Freeboard Requirements

The proposed top of bank protection was designed to maintain a minimum 2.5 ft of freeboard based on LACPW design criteria. The LACPW design criteria is based on a Capital flood flow of 9,480 cfs and a manning's roughness coefficient of n = 0.085.

This CLOMR floodplain mapping analysis uses the 100-yr FEMA FIS flow rate of 1,640 cfs, which provides freeboard that exceeds the FEMA requirements. The freeboard height above the FEMA 100-year base flood elevation is summarized for the "West" and "East" banks in **Table 4-1** and **Table 4-2**, respectively.

Table 4-1: "West" Bank Soil Cement Bank Protection Freeboard Summary

HEC-RAS Cross Section	West Soil Cement Bank Station	Proposed Top of Bank Elevation [ft]	Proposed Condition 100-yr WSE [ft] (Q_{100} = 1,640 cfs)	Freeboard above 100-yr WSE [ft]
4396/End Top of Soil Cement, Join Existing Concrete Slope Lining, P.D. No. 2262	39+89.01	1071.1	1061.6	9.5
4300	39+27.91	1065.0	1042.2	22.8
4282	39+08.28	1063.0	1039.6	23.4
4276	38+65.51	1058.7	1039.7	19.0
4270	38+07.80	1053.0	1039.8	13.3
4265	37+97.72	1052.9	1039.6	13.3
4258	37+85.91	1052.8	1039.6	13.2
4157	37+09.64	1051.9	1039.7	12.3
4055.5	35+63.04	1050.3	1039.3	11.0
3940.5	34+77.22	1049.4	1038.0	11.4
3844	33+70.62	1047.5	1035.5	12.0
3747	32+79.01	1045.9	1034.2	11.7
3650	31+64.34	1043.9	1032.5	11.4
3554	30+37.39	1041.7	1030.5	11.2
3440.5	29+23.41	1039.7	1029.5	10.2
3372	28+60.84	1038.6	1028.5	10.1
3304	28+08.81	1037.7	1027.0	10.7
3190.5	27+01.61	1035.8	1025.7	10.1
3105	26+53.53	1035.0	1024.4	10.6
3020	25+83.13	1033.7	1024.0	9.8
2934	25+02.70	1032.3	1022.4	9.9
2820.5	23+87.44	1030.3	1019.1	11.2
2748	23+00.00	1028.8	1017.9	10.9
2675.5	21+95.89	1027.0	1016.7	10.3
2560.5	20+87.57	1025.1	1014.8	10.2
2476	19+64.82	1022.9	1014.1	8.9

HEC-RAS Cross Section	West Soil Cement Bank Station	Proposed Top of Bank Elevation [ft]	Proposed Condition 100-yr WSE [ft] (Q_{100} = 1,640 cfs)	Freeboard above 100-yr WSE [ft]
2391	18+61.46	1021.1	1012.4	8.7
2305.5	18+01.98	1020.1	1011.9	8.2
2190.5	16+83.64	1018.0	1008.9	9.0
2122	15+77.90	1016.1	1007.7	8.4
2054	15+24.32	1015.2	1005.9	9.2
1940.5	14+47.40	1013.8	1004.7	9.1
1872	13+93.42	1013.0	1003.1	9.9
1804	13+30.05	1012.1	1002.0	10.1
1689	12+13.58	1010.4	999.5	11.0
1584	11+45.70	1009.5	997.7	11.8
Begin West Bank Soil Cement Top, Join Existing Slope Lining (Per P.D. 2296 Unit III)	10+44.81	1008	-	-

Table 4-2: "East" Bank Soil Cement Bank Protection Freeboard

HEC-RAS Cross Section	East Soil Cement Bank Station	Proposed Top of Bank Elevation [ft]	Proposed Condition 100-yr WSE [ft] (Q_{100} = 1,640 cfs)	Freeboard above 100-yr WSE [ft]
End Top Soil Cement, Join Existing Concrete Slope Lining P.D. No. 2262	40+29.97	-	-	-
4396	39+91.02	1071.1	1061.6	9.4
4300	39+29.98	1065.0	1042.2	22.8
4282	39+11.65	1063.1	1039.6	23.5
4276	38+74.34	1059.4	1039.7	19.7
4270	38+43.10	1056.3	1039.8	16.5
4265	38+32.25	1055.2	1039.6	15.6
4258	38+20.42	1054.0	1039.6	14.4
4157	37+48.37	1051.5	1039.7	11.8
4055.5	36+60.38	1050.5	1039.3	11.2
3940.5	35+53.64	1049.3	1038.0	11.3
3844	34+26.58	1047.2	1035.5	11.6
3747	33+25.47	1045.5	1034.2	11.3
3650	32+40.49	1044.0	1032.5	11.5
3554	31+63.21	1042.7	1030.5	12.2
3440.5	30+45.90	1040.7	1029.5	11.2
3372	29+63.35	1039.3	1028.5	10.7
3304	28+84.58	1037.9	1027.0	10.9
3190.5	27+60.89	1035.8	1025.7	10.1
3105	26+56.85	1034.1	1024.4	9.7
3020	25+44.48	1032.1	1024.0	8.2
2934	24+53.29	1029.9	1022.4	7.5
2820.5	23+39.34	1027.1	1019.1	8.0
2748	22+82.85	1026.2	1017.9	8.3
2675.5	22+15.00	1025.0	1016.7	8.4

HEC-RAS Cross Section	East Soil Cement Bank Station	Proposed Top of Bank Elevation [ft]	Proposed Condition 100-yr WSE [ft] (Q_{100} = 1,640 cfs)	Freeboard above 100-yr WSE [ft]
2560.5	21+36.58	1023.8	1014.8	8.9
2476	20+70.49	1022.7	1014.1	8.6
2391	20+00.15	1021.5	1012.4	9.1
2305.5	19+14.24	1020.1	1011.9	8.2
2190.5	18+09.13	1018.4	1008.9	9.4
2122	17+41.40	1017.2	1007.7	9.5
2054	16+40.43	1015.6	1005.9	9.7
1940.5	15+36.82	1013.9	1004.7	9.2
1872	14+22.46	1012.0	1003.1	8.9
1804	13+50.46	1010.7	1002.0	8.8
1689	12+34.30	1008.8	999.5	9.3
1584	10+97.28	-	997.7	-
Begin Top Soil Cement, Join the proposed Castaic Creek Soil Cement Bank Protection	10+00.00	1006.8	-	-

The final top and toe of the proposed soil cement bank protection is shown in profile for the “West” and “East” banks on **Exhibit’s 6 and 7**, respectively.

4.7 Bank Protection Toe-Down Design Summary

The proposed toe of the soil cement bank protection was design based on the estimated scour depth within the Creek. Per LACPW Hydraulic Design criteria, a Manning’s roughness coefficient of n=0.025 was utilized to determine the maximum velocities within the study limits.

The types of scour analyzed include long-term scour, local scour, contraction scour, local scour at the bridge piers, bend scour, low-flow incisement, and bedform height.

5 Hydraulic Analysis Results

5.1 Baseline Corrected Effective Hydraulic Analysis

The main purpose of the corrected effective analysis (pre-project) is to serve as a basis of comparison for the proposed condition (post-project) analysis. A complete summary of the corrected effective hydraulic results is presented in **Appendix D**.

A comparison between the duplicate effective and corrected effective models is provided in **Table 5-1** to shown the changes in water surface elevation (WSEL) and velocity resulting from the updated topography. Note that the corrected effective model has additional sections not included in the duplicate effective model, see **Exhibit 2** for a comparison of the duplicate effective and corrected effective cross sections. See **Appendix C** for a complete summary of the duplicate effective HEC-RAS results.

Table 5-1: Flow Depth and Velocity Comparison for the Duplicate Effective and Corrected Effective (Q_{100} = 1,640/ 820 cfs)

Effective HEC-RAS Cross Section	Duplicate Effective		Corrected Effective HEC-RAS Cross Section	Corrected Effective		Difference [Corrected Effective - Duplicate Effective]	
	WSEL (ft)	Velocity (fps)		WSEL (ft)	Velocity (fps)	WSEL (ft)	Velocity (fps)
4295	1070.5	8.9					
4213	1069.8	8.1	4725	1070.0	7.2	0.3	-0.9
4127	1068.6	8.1	4648	1070.2	4.4	1.7	-3.7
			4622	1069.4	8.1		
			4523	1067.5	8.1		
			4396	1065.0	8.0		
3834	1062.4	7.2					
3764	1060.8	6.1	4294	1061.3	6.0	0.5	0.0
3728	1059.6	6.5	4255	1058.6	6.6	-0.9	0.1
			4207	1048.9	7.4		
			4164	1039.4	6.8		
			4133	1039.4	1.9		
			4100.5	1038.9	5.5		
			4078	1038.4	7.2		
			4055.5	1038.3	6.9		
3447	1040.1	6.5					
			3940.5	1036.5	9.4		
			3844	1035.6	7.8		
			3747	1034.5	6.9		
			3650	1032.7	8.1		
			3564	1030.8	5.9		
2997	1034.1	9.6					
			3465	1030.2	5.3		
			3369	1028.6	8.6		
2767	1029.9	5.6	3304	1027.4	7.9	-2.5	2.3
2676	1028.6	5.8					
			3190.5	1025.5	8.5		
2568	1026.9	6.8	3105	1024.0	8.1	-2.9	1.3
			3020	1023.4	6.3		
			2934	1021.8	8.5		
			2820.5	1019.2	7.9		
2253	1021.9	7.5					
			2748	1017.8	7.1		
			2675.5	1016.8	6.8		
			2560.5	1014.7	8.0		

Effective HEC-RAS Cross Section	Duplicate Effective		Corrected Effective HEC-RAS Cross Section	Corrected Effective		Difference [Corrected Effective - Duplicate Effective]	
	WSEL (ft)	Velocity (fps)		WSEL (ft)	Velocity (fps)	WSEL (ft)	Velocity (fps)
1907	1015.6	5.6	2476	1013.8	5.5	-1.8	0.0
			2391	1012.5	6.0		
1795	1013.2	6.3					
			2305	1010.7	6.3		
1715	1011.9	5.1					
			2190	1008.3	5.9		
			2122	1007.5	6.8		
1510	1008.4	7.7					
			2054	1006.3	7.8		
			1940	1004.6	5.9		
			1872	1003.4	7.0		
1269	1003.5	7.9					
			1804	1002.2	7.8		
1137	1000.8	7.1					
			1689	999.7	6.2		
North Side of Flow Diversion Berm[2]							
963	997.8	5.5	963	998.0	6.0	0.2	0.5
			704	994.6	5.3		
616	994.3	3.7	616	994.3	3.7	0.0	0.0
593	994.3	3.3	593	994.3	3.3	0.0	0.0
584	Commerce Center Drive Bridge						
458	990.5	6.6	458	990.5	6.6	0.0	0.0
358	988.6	8.2	358	988.6	8.2	0.0	0.0
290	986.6	7.6	290	986.6	7.6	0.0	0.0
South Side of Flow Diversion Berm[2]							
731	996.6	5.9	731	996.6	7.0	0.0	1.1
665	995.3	6.3	665	995.3	5.8	0.0	-0.6
512	992.1	5.8	512	992.6	5.7	0.4	-0.1
336	988.7	5.4	336	988.7	5.4	0.0	0.0
203	986.4	5.5	203	986.4	5.5	0.0	0.0

Note:
[1]Blank cells indicate locations where a HEC-RAS cross section is only included in one of the models, either duplicate effective or corrected effective.
[2]Flow is reduced from 1640 cfs to 820 cfs at the flow diversion berm (cross sections 963 and 731).

5.2 Proposed Condition Hydraulic Analysis

The proposed condition model differs from the corrected effective model in that the proposed condition model includes:

- the soil cement bank protection and accompanied re-grading of the channel
- the proposed Franklin Parkway Bridge
- modifications to the flow diversion berm
- the drop strucutre

A complete summary of the proposed condition hydraulic results is presented in **Appendix E**. **Table 5-2** provides a comparison of the water surface elevation and velocity results between the proposed condition and corrected effective models.

Table 5-2: Flow Depth and Velocity Comparison for Corrected Effective and Proposed Condition (Q_{100} = 1,640/820 cfs)

Corrected Effective HEC-RAS Cross Section	Corrected Effective		Proposed HEC-RAS Cross Section	Proposed Condition		Difference [Proposed – Corrected Effective]	
	WSEL (ft)	Velocity (fps)		WSEL (ft)	Velocity (fps)	WSEL (ft)	Velocity (fps)
4725	1070.0	7.2	4725	1070.1	6.9	0.1	-0.3
4648	1070.2	4.4	4648	1070.2	4.4	0.0	0.0
4622	1069.4	8.1	4622	1069.4	8.1	0.0	0.0
4523	1067.5	8.1	4523	1067.5	8.2	0.0	0.0
4396	1065.0	8.0	4396	1061.6	8.3	-3.4	0.3
4055.5	1038.3	6.9	4055.5	1039.3	4.6	1.0	-2.3
3940.5	1036.5	9.4	3940.5	1038.0	6.3	1.5	-3.1
3844	1035.6	7.8	3844	1035.5	7.0	0.0	-0.8
3747	1034.5	6.9	3747	1034.2	4.6	-0.3	-2.3
3650	1032.7	8.1	3650	1032.5	7.3	-0.1	-0.9
3564	1030.8	5.9	3554	1030.5	6.0	-0.3	0.1
3304	1027.4	7.9	3304	1027.0	5.9	-0.4	-2.0
3190.5	1025.5	8.5	3190.5	1025.7	3.9	0.2	-4.6
3105	1024.0	8.1	3105	1024.4	7.3	0.4	-0.8
3020	1023.4	6.3	3020	1024.0	4.4	0.6	-1.9
2934	1021.8	8.5	2934	1022.4	7.3	0.6	-1.2
2820.5	1019.2	7.9	2820.5	1019.1	7.1	-0.1	-0.8
2748	1017.8	7.1	2748	1017.9	5.8	0.1	-1.3
2675.5	1016.8	6.8	2675.5	1016.7	6.0	-0.1	-0.8
2560.5	1014.7	8.0	2560.5	1014.8	7.6	0.2	-0.4
2476	1013.8	5.5	2476	1014.1	4.1	0.3	-1.4
2391	1012.5	6.0	2391	1012.4	6.4	-0.1	0.3
2305	1010.7	6.3	2305.5	1011.9	3.1	1.2	-3.2
			2250	Proposed Franklin Parkway Bridge			
2190	1008.3	5.9	2190.5	1008.9	5.3	0.6	-0.7
2122	1007.5	6.8	2122	1007.7	5.1	0.3	-1.6
2054	1006.3	7.8	2054	1005.9	6.5	-0.3	-1.3
1940	1004.6	5.9	1940.5	1004.7	4.7	0.1	-1.3
1872	1003.4	7.0	1872	1003.1	6.8	-0.3	-0.2
1804	1002.2	7.8	1804	1002.0	5.5	-0.2	-2.2
1689	999.7	6.2	1689	999.5	6.1	-0.3	-0.1
North Side of Flow Diversion Berm[1]							
963	998.0	6.0					
704	994.6	5.3	704	994.6	5.4	0.0	0.0
616	994.3	3.7	616	994.3	3.7	0.0	0.0
593	994.3	3.3	593	994.3	3.3	0.0	0.0
584	Commerce Center Drive Bridge						
458	990.5	6.6	458	990.5	6.6	0.0	0.0
358	988.6	8.2	358	988.6	8.2	0.0	0.0
290	986.6	7.6	290	986.6	7.6	0.0	0.0
South Side of Flow Diversion Berm[1]							
731	996.6	7.0					
665	995.3	5.8					
336	988.7	5.4	336	988.7	5.4	0.0	0.0
203	986.4	5.5	203	986.4	5.5	0.0	0.0

Note:
[1]Blank cells indicate locations where a HEC-RAS cross section is only included in the corrected effective model
[2]Flow is reduced from 1640 cfs to 820 cfs at the flow diversion berm (cross sections 963 and 731 in the corrected effective condition and cross sections 704 and 336 in the proposed condition).
[3]Tie-in Located denoted in shaded cells.

Table 5-3 summarizes the tie-in analysis for the proposed floodplain modifications. The tie-in points, where the FIRM will be modified, are at locations where the revised floodplain is within 5% of the FEMA effective floodplain top width and the change in water surface elevation is 0.5 ft or less. See **Exhibit 2** for a comparison of the FEMA effective cross sections and the proposed condition cross sections.

Table 5-3: Tie-In Analysis for the Effective and Proposed Condition (Q_{100} = 1,640/820 cfs)

Effective HEC-RAS Cross Section	Effective WSEL (ft)	Effective Top-width (ft)	Proposed HEC-RAS Cross Section	Proposed WSEL (ft)	Proposed Top-width (ft)	Difference in WSEL [Proposed - Effective] (ft)	Top-width Within 5%? Yes or No
4213	**1069.8**	**101.5**	**4725**	**1070.1**	**103.5**	**0.3**	**YES**
4127	1068.6	101.5	4648	1070.2	106.9	1.7	NO
2767	1029.9	197.9	3304	1027.0	261.8	-2.9	NO
1907	1015.6	242.2	2476	1014.1	247.8	-1.5	YES
North Side of Flow Diversion Berm							
616	**994.3**	**94.1**	**616**	**994.3**	**94.1**	**0.0**	**YES**
593	994.3	99.0	593	994.3	99.0	0.0	YES
584	Commerce Center Drive Bridge						
458	990.5	76.9	458	990.5	76.9	0.0	YES
358	988.6	77.2	358	988.6	77.2	0.0	YES
290	986.6	84.6	290	986.6	84.6	0.0	YES
South Side of Flow Diversion Berm							
336	**988.7**	**119.4**	**336**	**988.7**	**119.4**	**0.0**	**YES**
203	986.4	153.0	203	986.4	153.0	0.0	YES

Notes:
[1] Bolded Cross Section with Red Outline indicate Tie-In locations with the effective floodplain.

5.3 Hydraulic Analysis Results and Floodplain Discussion

For the purpose of this CLOMR application, a detailed analysis of Hasley Creek from approximately 600 feet downstream of the Commerce Center Drive Bridge over Hasley Canyon Creek to approximately 40 feet downstream of the confluence of Hasley Canyon Creek with Castaic Creek is presented herein, including a hydraulic analysis of the Creek with proposed soil cement bank protection and the proposed Franklin Parkway Bridge.

According to the analysis, the proposed soil cement bank protection will cause the 100-yr floodplain to primarily widen at the location of the proposed bank protection. In addition, there are both increases and decreases in the 100-yr water surface elevations, with a maximum increase of 1.2 ft directly upstream of Commerce Center Drive Bridge over Castaic Creek. All increases above 0.5 ft are within the limits of the proposed soil cement bank protection and do not cause impacts to any offsite properties.

The topographic work map in **Exhibit 8** shows the floodplain limits resulting from the proposed bank protection improvements. Detailed HEC-RAS results can be found in **Appendices D and E**.

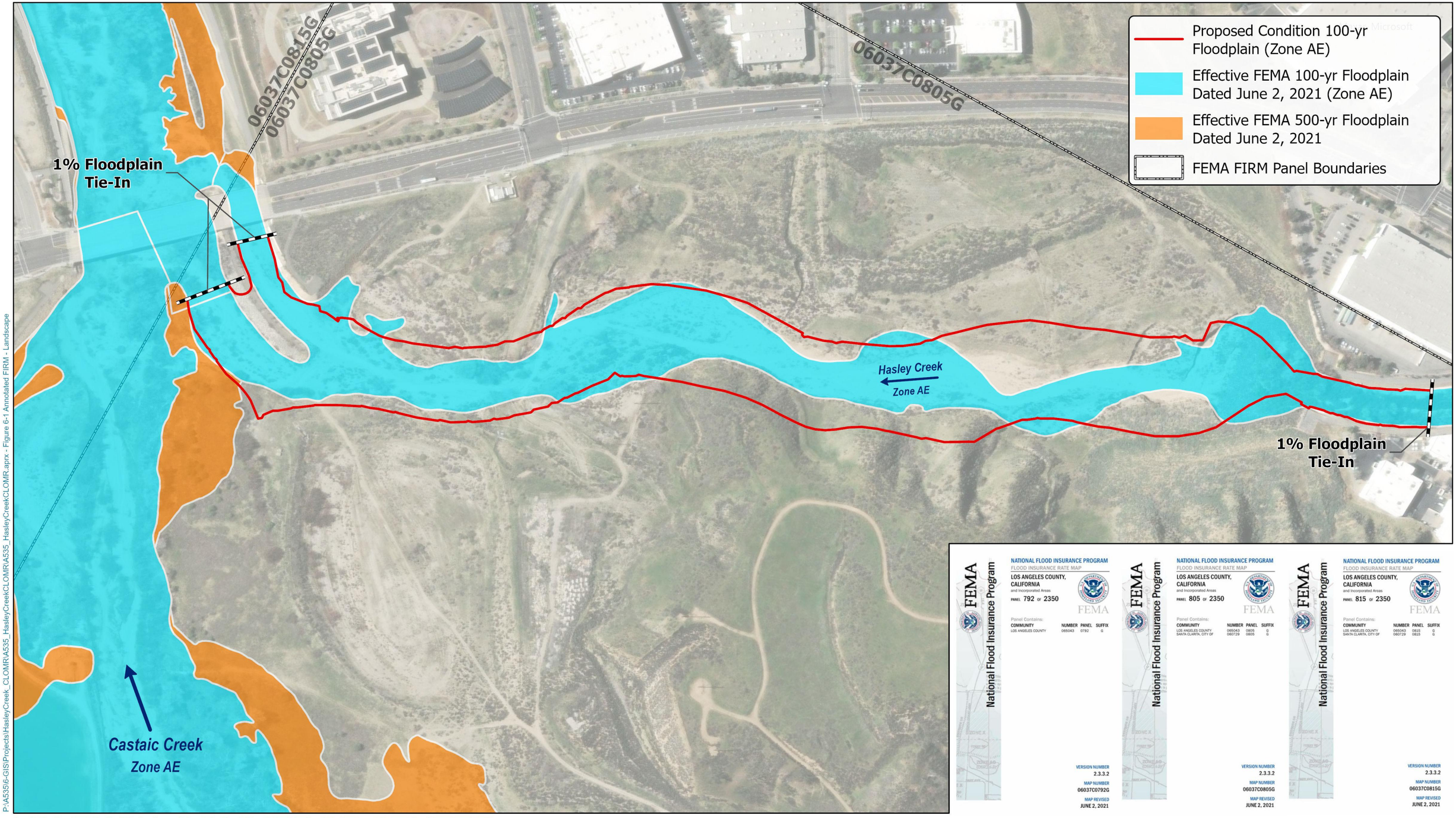
6 Conclusion

The proposed addition of the “West” and “East” soil cement bank protection at Valencia Commerce Center (VCC) Industrial Park Development in Tentative Parcel Map (TPM) No. 18108 results in changes in water surface elevations between the upstream (HEC-RAS XS 4396) and downstream limits (HEC-RAS XS 1061) of study. After a detailed evaluation, which included updated topographic data from 2013 and the inclusion of the proposed improvements, the final modeled floodplain results in a primarily widened 100-yr floodplain within the limits of the study.

The corrected effective 100-year floodplain is wide at the location of the proposed project due to the natural channel being unconstrained. The project results in a floodplain that is both narrower and wider than the corrected effective along the proposed bank protection. This results in water surface elevations that both increase and decrease at locations of narrowing and widening. The maximum increase in water surface elevation is just upstream of Commerce Center Drive Bridge over Castaic Creek, with an increase of 1.2 ft. The proposed soil cement bank protection meets FEMA minimum freeboard requirements.

The comparison analysis shows that the floodplain extents for the study reach tie-in to the FEMA Zone AE floodplain for 100-yr Base Flood Elevations (BFEs) within 0.5-ft or less. The upstream and downstream tie-in locations are at HEC-RAS river stations 4396 and 1061, respectively. These abide by FEMA guidelines for flood hazard analysis.

Based on the present application and enclosed analyses, we are requesting that FEMA provide a Conditional Letter of Map Revision for the proposed Soil Cement Bank Protection Project on Hasley Canyon Creek, affecting FIRM Panel 06037C0805G. The proposed condition 100-year floodplain and base flood elevations are shown on the Annotated FIRM in **Figure 6-1**.



P:\A535\6-GIS\Projects\HasleyCreek_CLOMR\A535_HasleyCreekCLOMR\A535_HasleyCreekCLOMR.aprx - Figure 6-1 Annotated FIRM - Landscape

VALENCIA COMMERCE CENTER
HASLEY CANYON CREEK CLOMR

ANNOTATED FIRM

PACE Advanced Water Engineering

0 125 250 500 Feet

Date: 7/25/2024

Job Number: A535

Figure 6-1

References

FEMA, Flood Insurance Study (FIS), Number 06037CV002F. June 2, 2021.

PACE, Drainage Concept Report, Volume III or V, Hasley Canyon Creek Bank Protection EIMP No. 2019000489. October 2021. (Approved by LACPW March 2022).

PACE, FEMA Application Conditional Letter of Map Revision, Castaic Creek Bank Protection for Valencia Commerce Center (From 1-5 Freeway to Commerce Center Drive). March 2023.

PACE, Hydraulic Analysis Technical Assessment Report for Engineered Earthen-Bottom Flood Control Channels Located Within the Santa Clara River Watershed and Antelope Valley Watershed. August 2017.

R.T. Franklin and Associates, Memo – Gradation Laboratory Test Results, Parcel Map 20685, March 27, 2003

PACE
Advanced Water Engineering

Exhibits

PARCEL MAP No. 20839

FRANKLIN PARKWAY

LIVINGSTON AVE

HARRISON PARKWAY

COMMERCE CENTER DRIVE

PROPERTY BOUNDARY

CASTAIC CREEK

EXISTING CASTAIC CREEK SOIL CEMENT BANK PROTECTION PER P.D. NO. 2563

EXISTING HASLEY CREEK CONCRETE/RIPRAP LINING (PER P.D. 2298 UNIT III)

TENTATIVE PARCEL MAP No. 18108 (GRADING PLAN BY OTHERS)

STA 10+50.89
BEGIN WEST BANK SOIL CEMENT
=TIE-IN EXISTING HASLEY CREEK LINING

EXISTING FLOW DIVERSION BERM PER PD 2298 UNIT III (LENGTH TO BE MODIFIED AS SHOWN)

PROPOSED GRADE CONTROL STRUCTURE #1

PROPOSED FRANKLIN PARKWAY BRIDGE

HASLEY CREEK
Q_{100} = 1,640 cfs

PROPOSED GRADE CONTROL STRUCTURE #2

PROPOSED DROP/STILLING BASIN STRUCTURE

STA 39+89.01
END WEST BANK SOIL CEMENT JOIN EXISTING CONCRETE SLOPE LINING

EXISTING CONCRETE SLOPE LINING PER P.D. 2262

CASTAIC CREEK

STA 10+00.00
BEGIN EAST BANK SOIL CEMENT
=STA 10+00 TIE-IN
TO CASTAIC CREEK WEST BANK

CASTAIC CREEK SOIL CEMENT BANK PROTECTION PER DCR VOL. II OF V PREPARED BY PACE

STA 39+91.02
END EAST BANK SOIL CEMENT JOIN EXISTING CONCRETE SLOPE LINING

TENTATIVE PARCEL MAP No. 18108 (GRADING PLAN BY OTHERS)

100 0 100 200
SCALE 1"=100'

NO	BY	DATE		DATE	APP.

JOB VALENCIA COMMERCE CENTER

HASLEY CANYON CREEK
CLOMR

LOS ANGELES COUNTY CA.

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

PREPARED	
PROJECT ENGINEER	
R.C.E. NO.	
EXP.	
DRAWN	SCALE 1"=100'
DESIGNED	
CHECKED	DATE

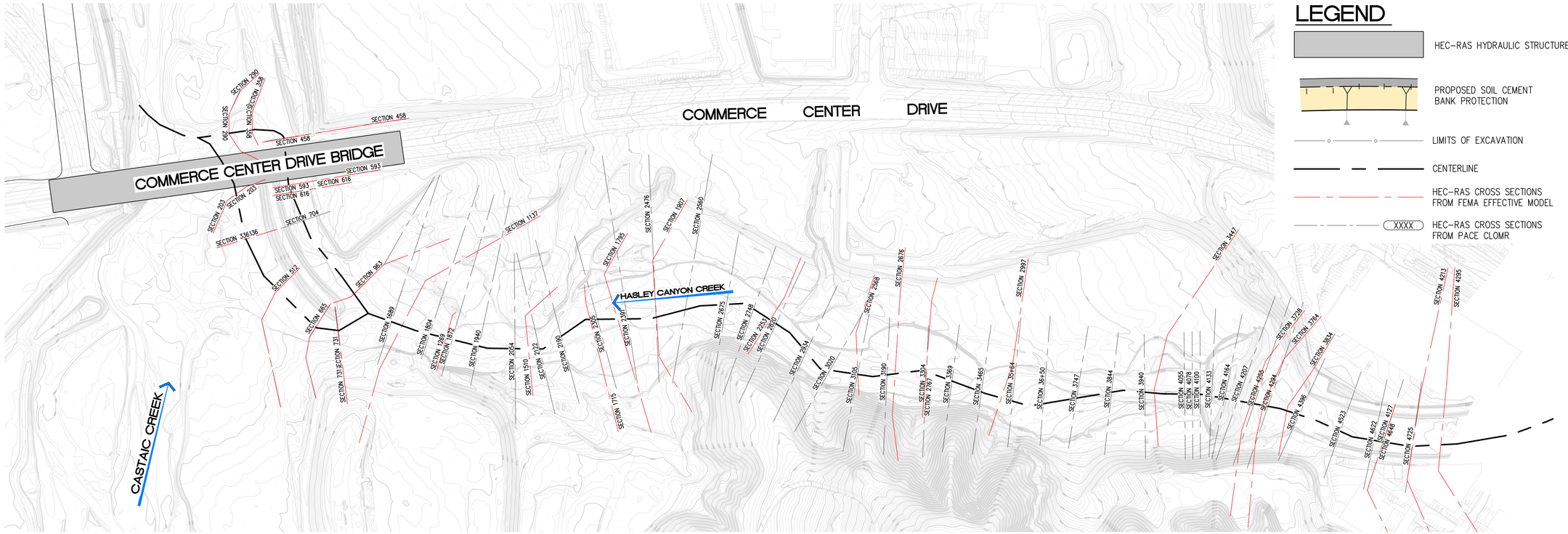
REGISTERED PROFESSIONAL ENGINEER JOSE CRUZ No. 72249 CIVIL STATE OF CALIFORNIA

TITLE

HASLEY CANYON CREEK PROPOSED IMPROVEMENTS

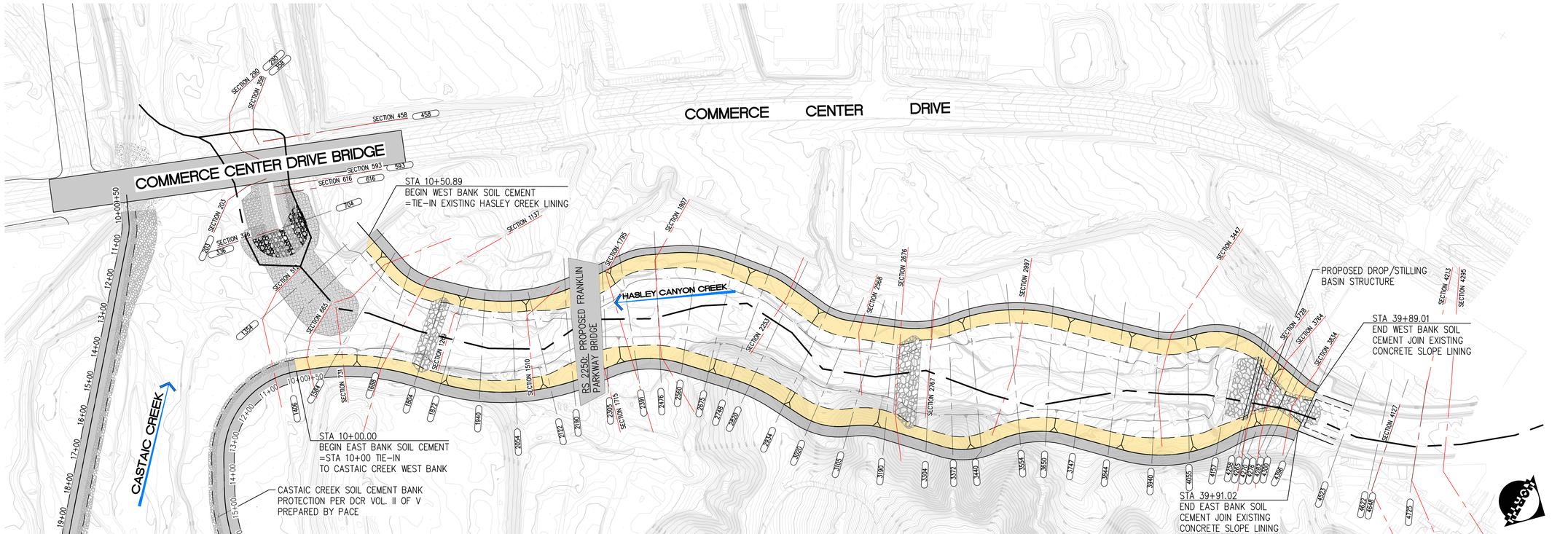
EXHIBIT 1

JOB NO. A535



EFFECTIVE vs CORRECTED EFFECTIVE HEC-RAS SECTIONS

SCALE 1"=150'



EFFECTIVE vs PROPOSED CONDITION HEC-RAS SECTIONS

SCALE 1"=150'

NO	BY	DATE	REVISIONS	DATE	APP.

REGISTERED PROFESSIONAL ENGINEER ★ JESSE CRUZ ★ No. 72249 ★ CIVIL ★ STATE OF CALIFORNIA

SCALE	1"=150'
DESIGNED	E.M.R.
DRAWN	M.M.T.
CHECKED	J.C.
DATE	03/2023
JOB NO.	A535

TITLE
HASLEY CANYON CREEK CLOMR HEC-RAS CROSS SECTION COMPARISON

JOB
HASLEY CANYON CREEK
VALENCIA COMMERCE CENTER
Los Angeles County CA

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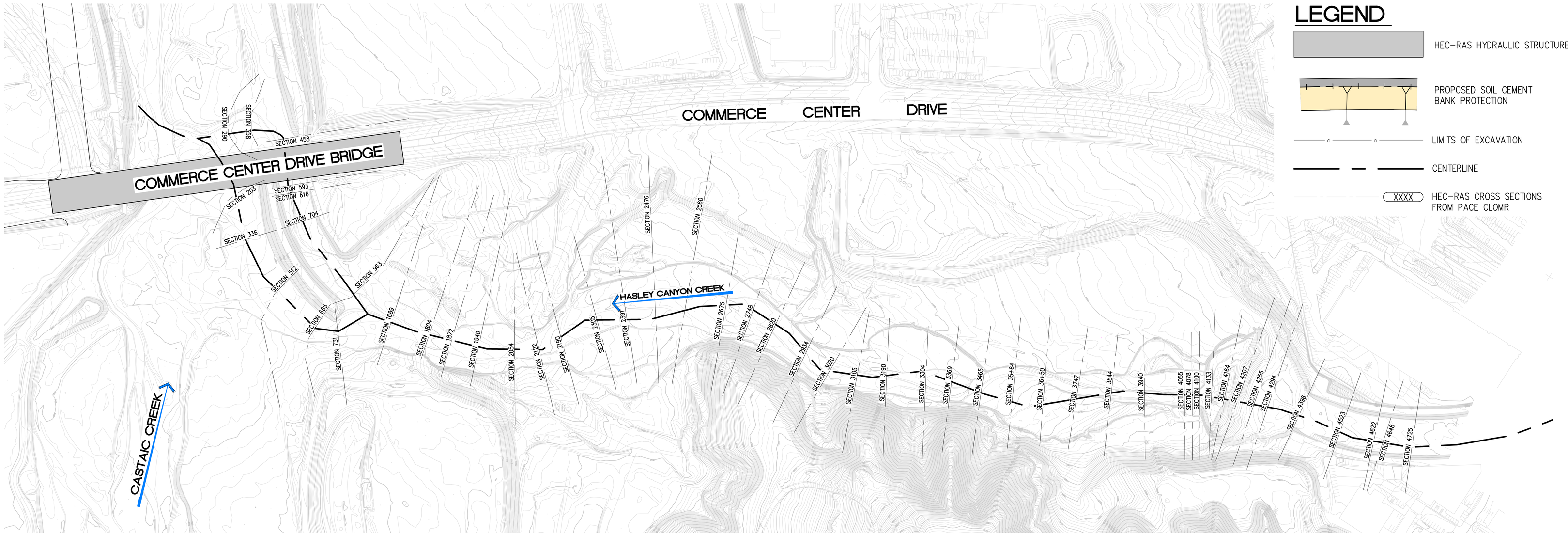
EXHIBIT
2

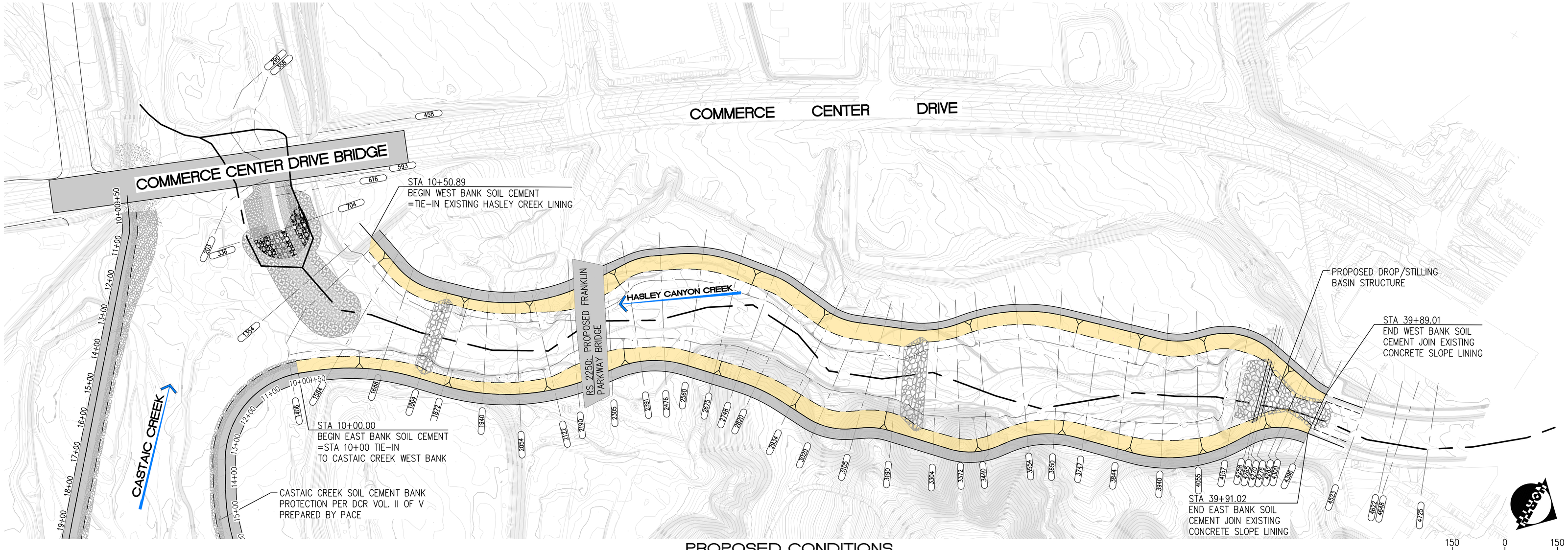
JOB NO. A535

P:\A535\Engineering\A535-84_Hasley Canyon Creek CLOMR\exhibits\A535-84_Exhibit-2 HEC-RAS Workmap\EXMassProposed.dwg - Tab: 24x36 - by emeloj on 05/05/24 at 8:18:38 AM



CORRECTED EFFECTIVE CONDITIONS

SCALE 1"=150'



PROPOSED CONDITIONS

SCALE 1"=150'

NO	BY	DATE	REVISIONS	DATE	APP.

REGISTERED PROFESSIONAL ENGINEER ★ JOSE CRUZ ★ No. 72249 ★ STATE OF CALIFORNIA ★ CIVIL

SCALE	1"=150'
DESIGNED	E.M.R.
DRAWN	M.M.T.
CHECKED	J.C.
DATE	03/2023
JOB NO.	A535

TITLE
HASLEY CANYON CREEK CLOMR CORRECTED EFFECTIVE & PROPOSED HEC-RAS WORKMAP

JOB
HASLEY CANYON CREEK
VALENCIA COMMERCE CENTER
Los Angeles County CA

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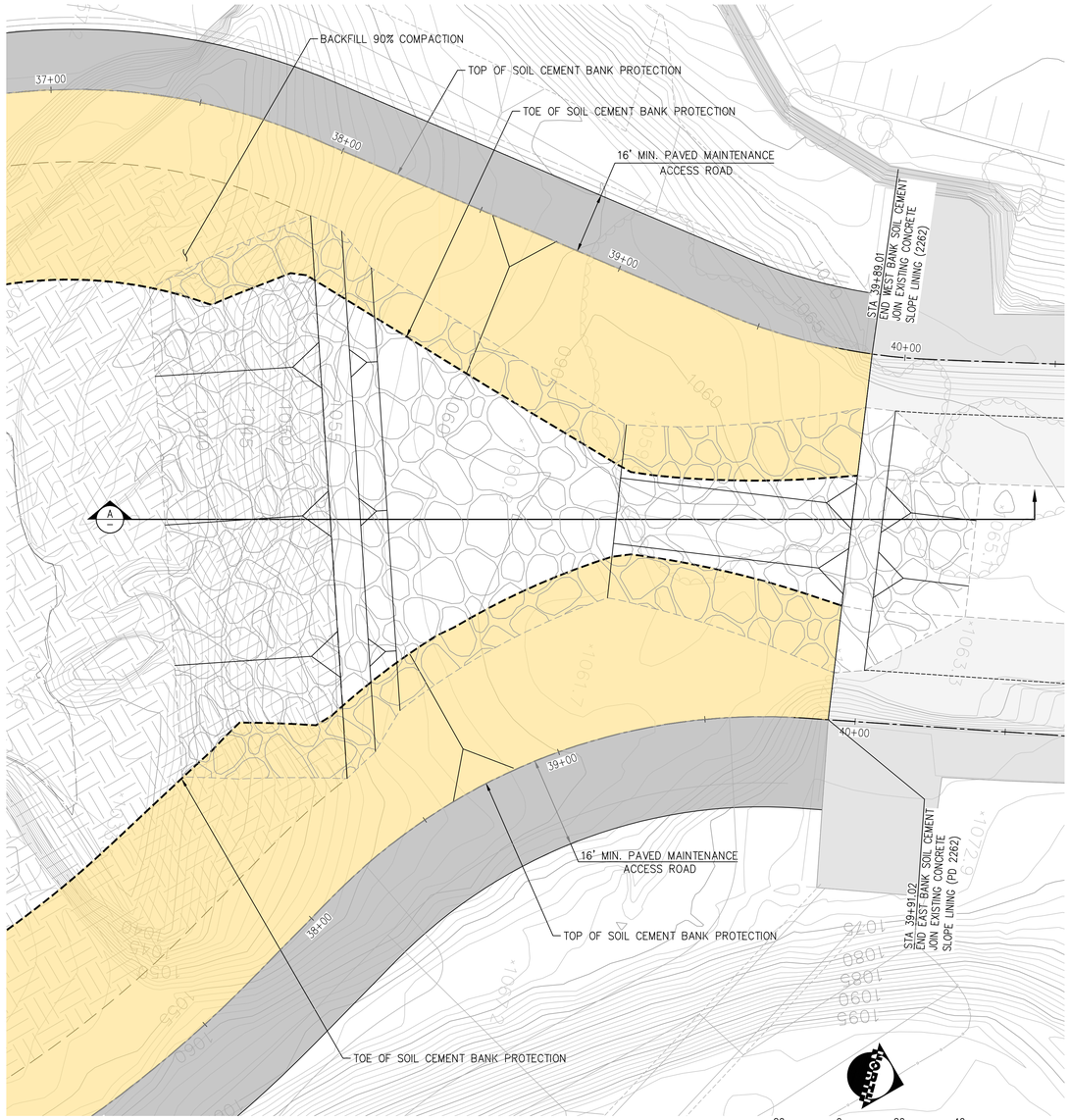
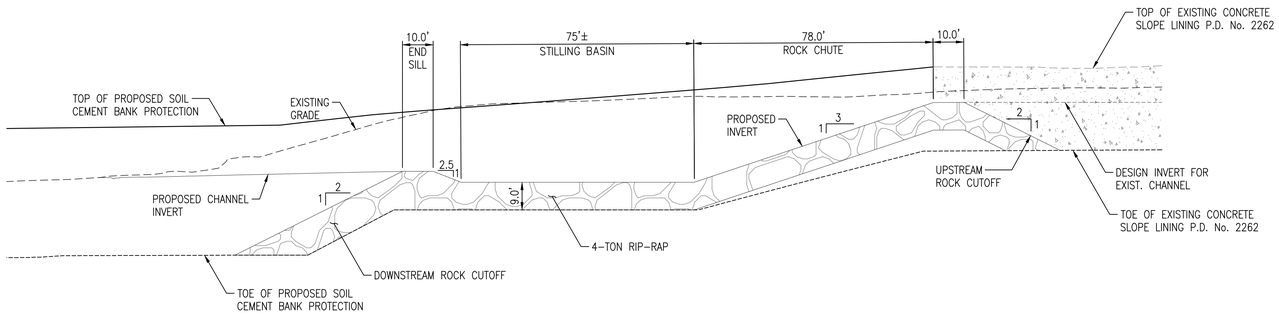
EXHIBIT 3

JOB NO. A535



TYPICAL DROP STRUCTURE PLAN



DROP STRUCTURE SECTION 'A'

SCALE 1"=20'

NO	BY	DATE		DATE	APP.

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HASLEY CANYON CREEK CLOMR

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PREPARED	JOSE CRUZ
PROJECT ENGINEER R.C.E. No.	72249
EXP.	06/30/2022
DRAWN	BDP
SCALE	AS SHOWN
DESIGNED	JC
CHECKED	MEK
DATE	7/25/2024

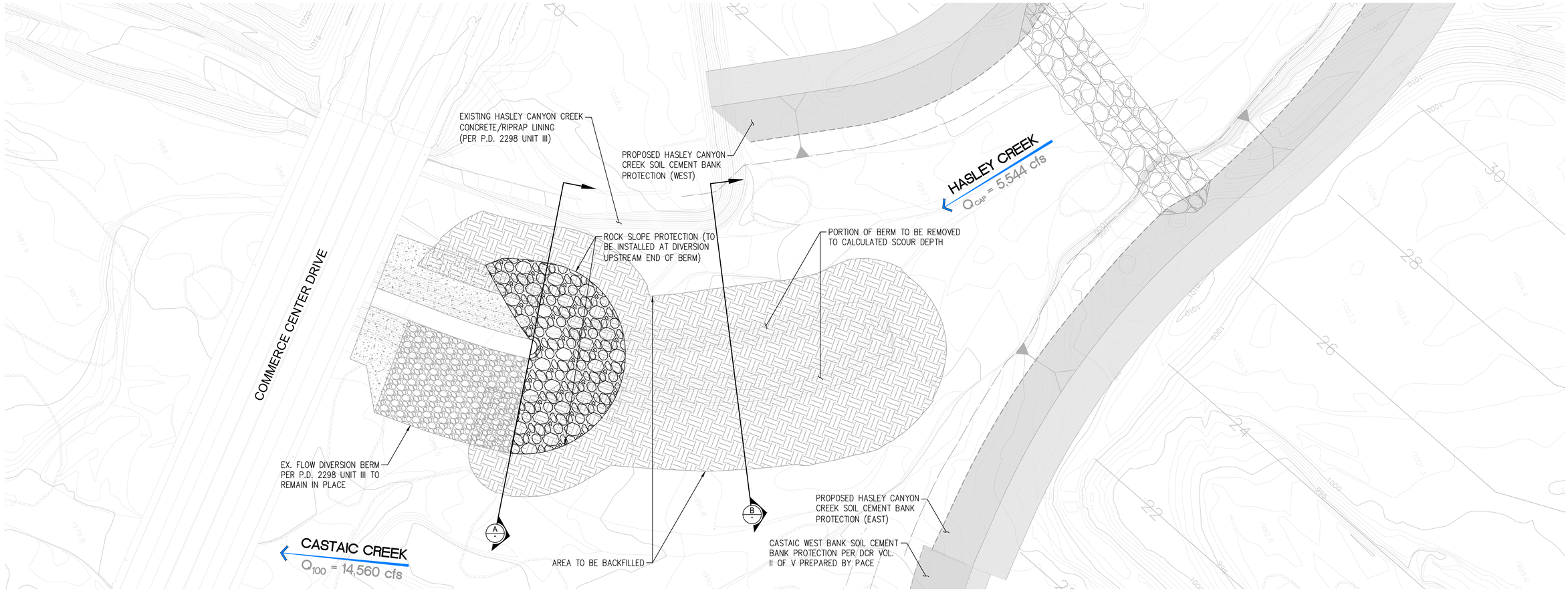
REGISTERED PROFESSIONAL ENGINEER JOSE CRUZ No. 72249 CIVIL STATE OF CALIFORNIA

TITLE

PROPOSED DROP STRUCTURE (AT UPSTREAM TERMINATION)

EXHIBIT 4

JOB NO. A535

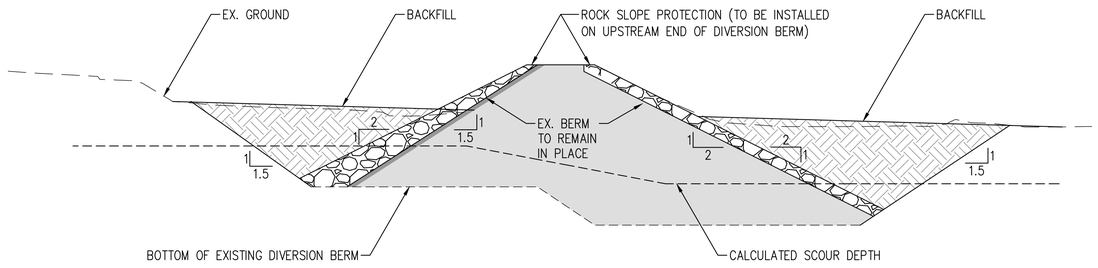


PLAN - MODIFIED DIVERSION BERM

NORTH

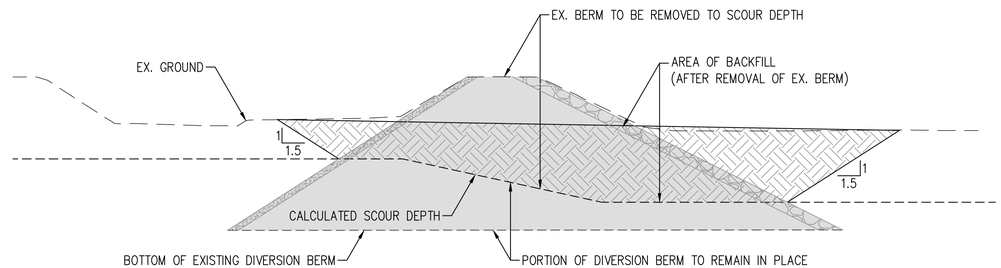
40 0 40 80

SCALE 1"=40'



SECTION A - PORTION OF DIVERSION BERM TO REMAIN

SCALE 1"=20'



SECTION B - PORTION OF DIVERSION BERM TO MODIFY

SCALE 1"=20'

NO	BY	DATE		DATE	APP.

JOB VALENCIA COMMERCE CENTER

HASLEY CANYON CREEK CLOMR

LOS ANGELES COUNTY CA.

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

PREPARED	JOSE CRUZ
PROJECT ENGINEER	
R.C.E. NO.	72249
EXP.	06/30/2022
DRAWN	BDP
SCALE	AS SHOWN
DESIGNED	JC
CHECKED	EMR
DATE	7/19/2023

REGISTERED PROFESSIONAL ENGINEER
JOSE CRUZ
No. 72249
CIVIL
STATE OF CALIFORNIA

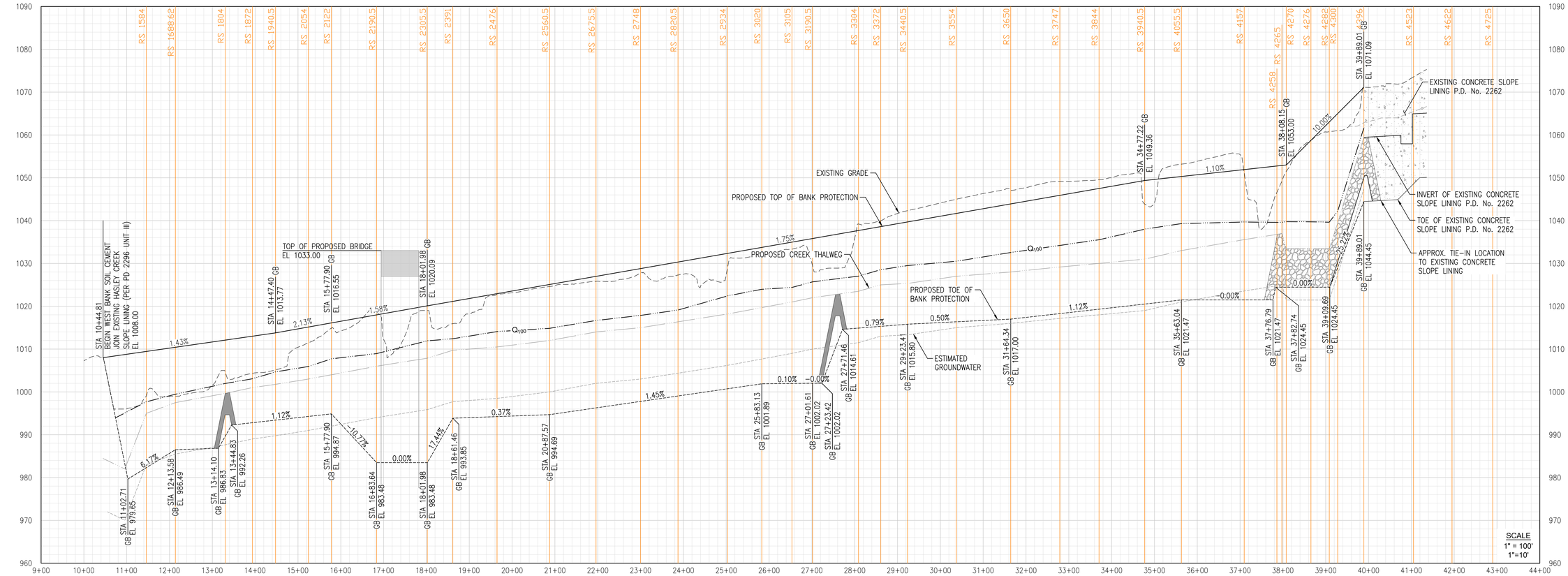
TITLE

PROPOSED MODIFICATION OF DIVERSION BERM

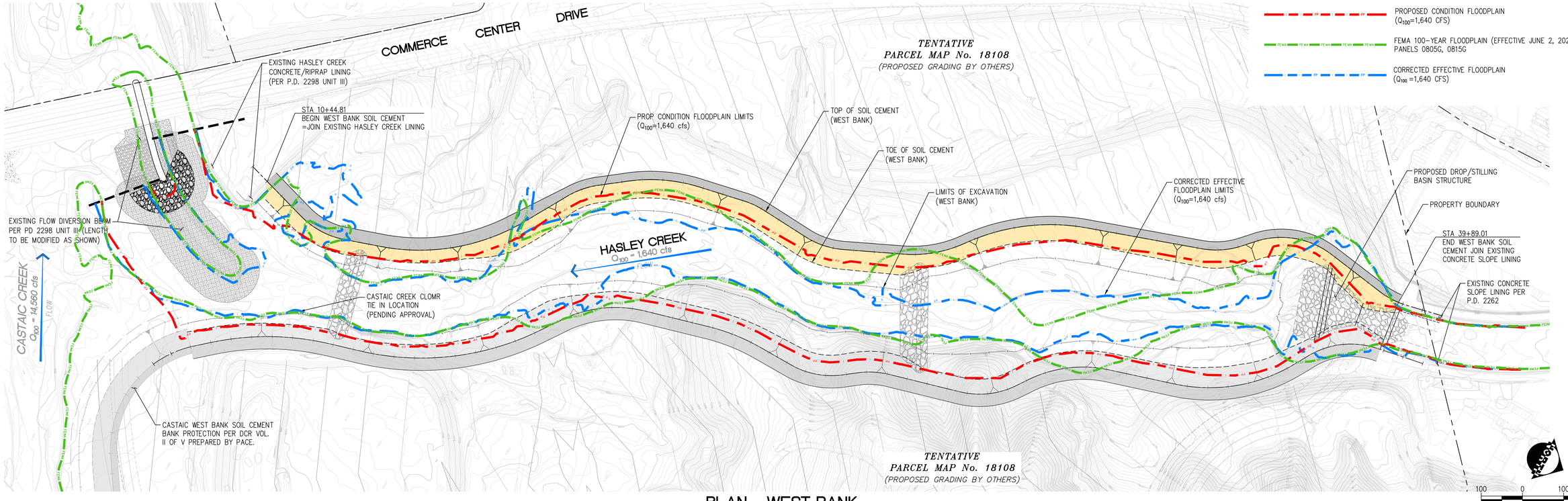
EXHIBIT

5

JOB NO. A535



PROFILE - WEST BANK



LEGEND

- PROPOSED CONDITION FLOODPLAIN (Q_{100}=1,640 CFS)
- FEMA 100-YEAR FLOODPLAIN (EFFECTIVE JUNE 2, 2021) FIRM PANELS 0805G, 0815G
- CORRECTED EFFECTIVE FLOODPLAIN (Q_{100} =1,640 CFS)

PLAN - WEST BANK

NO	BY	DATE		DATE	APP.

JOB

HASLEY CANYON CREEK CLOMR

SOIL CEMENT BANK PROTECTION

TPM. #18108 DCR VOL. III OF V

LOS ANGELES COUNTY CA.

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

PREPARED JOSE CRUZ
PROJECT ENGINEER
R.C.E. No. 72249
EXP. 06/30/2022
DRAWN BDP | SCALE AS SHOWN
DESIGNED JC
CHECKED MEK | DATE 7/25/2024

REGISTERED PROFESSIONAL ENGINEER JOSE CRUZ No. 72249 CIVIL STATE OF CALIFORNIA

TITLE

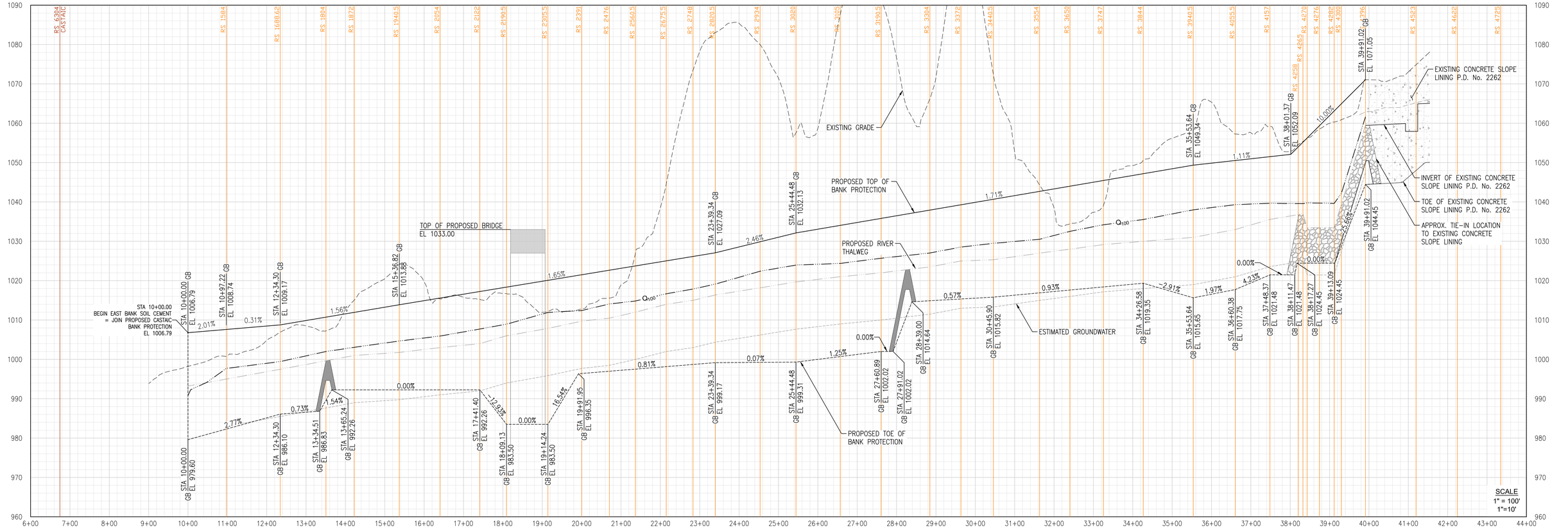
WEST BANK PROTECTION PLAN AND PROFILE

EIMP. 20190000489

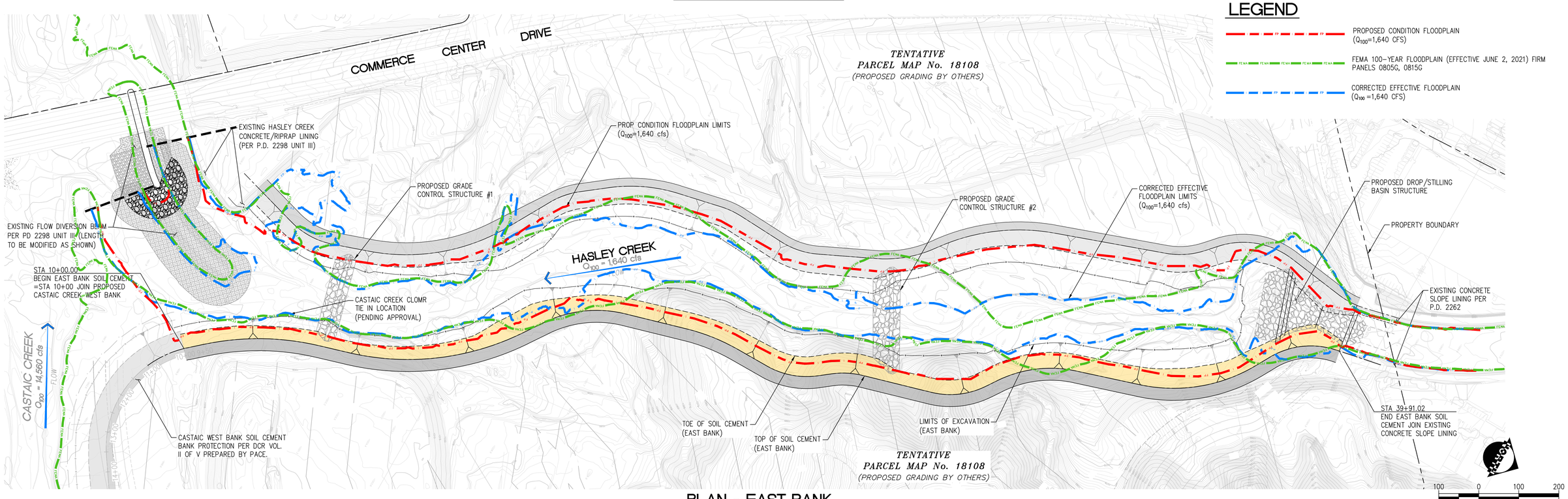
EXHIBIT 6

JOB NO. A535

P:\A535\Engineering\A535-84_Hasley Canyon Creek CLOMR\exhibits\A535-32-Exhibit 5 - West Bank Profile (Figure-08).dwg - Tab: Layout By: erandig on Jul 25, 2024 at 10:23 am



PROFILE - EAST BANK



PLAN - EAST BANK

LEGEND

- PROPOSED CONDITION FLOODPLAIN (Q_{100}=1,640 CFS)
- FEMA 100-YEAR FLOODPLAIN (EFFECTIVE JUNE 2, 2021) FIRM PANELS 0805G, 0815G
- CORRECTED EFFECTIVE FLOODPLAIN (Q_{100} =1,640 CFS)

NO	BY	DATE		DATE	APP.

JOB

HASLEY CANYON CREEK CLOMR

SOIL CEMENT BANK PROTECTION

TPM. #18108 DCR VOL. III OF V

LOS ANGELES COUNTY CA.

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

PREPARED	JOSE CRUZ
PROJECT ENGINEER R.C.E. NO.	72249
EXP.	06/30/2022
DRAWN	BDP
SCALE	AS SHOWN
DESIGNED	JC
CHECKED	MEK
DATE	7/25/2024

REGISTERED PROFESSIONAL ENGINEER JOSE CRUZ No. 72249 CIVIL STATE OF CALIFORNIA

TITLE

EAST BANK PROTECTION PLAN AND PROFILE

EIMP. 2019000489

EXHIBIT 7

JOB NO. A535

P:\A535\Engineering\A535-84_Hasley Canyon Creek CLOMR\exhibits\A535-32-Exhibit 6-East Bank Profile.dwg - Tab: Layout By: ersadig on Jul 25, 2024 at 10:26 am

LEGEND

- PROPOSED CONDITION FLOODPLAIN (Q_{100}=1,640 CFS)
- CORRECTED EFFECTIVE FLOODPLAIN (Q_{100}=1,640 CFS)
- EFFECTIVE FEMA 100-YR FLOODPLAIN DATED JUNE 2, 2021 (Q_{100}=1,640 CFS)
- XXXX PROPOSED CONDITIONS HEC-RAS SECTION
- INEFFECTIVE FLOW AREA

PARCEL MAP No. 20839

TENTATIVE PARCEL MAP No. 18108 (GRADING PLAN BY OTHERS)

TENTATIVE PARCEL MAP No. 18108 (GRADING PLAN BY OTHERS)

FRANKLIN PARKWAY

LIVINGSTON AVE

HARRISON PARKWAY

COMMERCE CENTER DRIVE

CASTAIC CREEK

COMMERCE CENTER DRIVE BRIDGE

FRANKLIN PARKWAY BRIDGE

HASLEY CREEK
Q = 1640 CFS

PROPERTY BOUNDARY

EXISTING CASTAIC CREEK SOIL CEMENT BANK PROTECTION PER P.D. NO. 2563

EXISTING HASLEY CREEK CONCRETE/RIPRAP LINING (PER P.D. 2298 UNIT III)

LIMIT OF REVISION

STA 10+50.89
BEGIN WEST BANK SOIL CEMENT
=TIE-IN EXISTING HASLEY CREEK LINING

EXISTING FLOW DIVERSION BERM PER PD 2298 UNIT III (LENGTH TO BE MODIFIED AS SHOWN)

STA 10+00.00
BEGIN EAST BANK SOIL CEMENT
=STA 10+00 TIE-IN
TO CASTAIC CREEK WEST BANK

CASTAIC CREEK SOIL CEMENT BANK PROTECTION PER DCR VOL. II OF V PREPARED BY PACE
ESTU No. 2001000012

ADMINISTRATIVE FLOODPLAIN AND FLOODWAY ADJUSTMENT (WDENING)

PROPOSED DROP/STILLING BASIN STRUCTURE

STA 39+89.01
END WEST BANK SOIL CEMENT JOIN EXISTING CONCRETE SLOPE LINING

EXISTING CONCRETE SLOPE LINING PER P.D. 2262

STA 39+91.02
END EAST BANK SOIL CEMENT JOIN EXISTING CONCRETE SLOPE LINING

NOTE

1. CONTOURS SHOWN ON THIS MAP ARE BASED ON AERIAL TOPOGRAPHY DATED OCT. 2013
2. ALL ELEVATIONS ARE SHOWN IN FEET AND DECIMALS THEREOF BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).

100 0 100 200
SCALE 1"=100'

NO	BY	DATE	REVISIONS	DATE	APP.

REGISTERED PROFESSIONAL ENGINEER ★ JOSE CRUZ ★ No. 72249 ★ CIVIL ★ STATE OF CALIFORNIA

SCALE	1"=150'
DESIGNED	E.M.R.
DRAWN	M.M.T.
CHECKED	J.C.
DATE	03/2023
JOB NO.	A535

TITLE
HASLEY CANYON CREEK CLOMR
TOPOGRAPHIC WORKMAP

JOB
HASLEY CANYON CREEK
VALENCIA COMMERCE CENTER
Los Angeles County CA

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

EXHIBIT 8

JOB NO. A535

PACE
Advanced Water Engineering

Appendix A – MT-2 Forms

MT-2 Form 1: Overview and Concurrence

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	0792G	06/02/2021
065043	Los Angeles County	CA; CA	06037C	0805G; 0815G	06/02/2021

2. a. Flooding Source: Castaic 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: Castaic Creek Bank Protection for Valencia Commerce Center (From The Old Road to Commerce Center Dri

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

a. Effective: AE

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)

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: Alex Herrell	Company: The Newhall Land and Farming Company	
Mailing Address: 25124 Springfield Court, Suite 300 Valencia, CA 91355	Daytime Telephone: 661-255-4000	Fax No.:
	E-mail Address: alex.herrell@fivepoint.com	
	Date: 2/19/2023	

Signature of Requestor (required): Alex Herrell

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:	

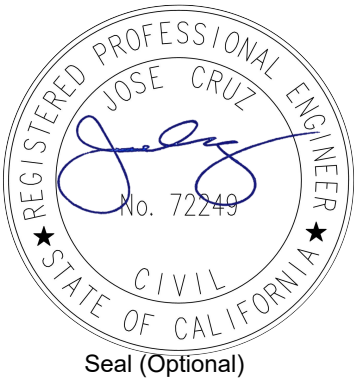
3. CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

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: Jose Cruz	License No.: 72249	Expiration Date: 6/30/2024 6/30/2026
Company Name: PACE	Mailing Address: 17520 Newhope St. #200 Fountain Valley, CA 92708	
Telephone No.: (714) 481-7300 Fax No.: (714) 481-7299		
E-mail Address: jcruz@pacewater.com		
Signature:		Date: 2/14/2023

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



Seal (Optional)

MT-2 Form 2: Riverine Hydrology and Hydraulics

PACE

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: Hasley 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: _____ Duration: _____ Rainfall Amount: _____

☐ 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*				
Upstream Limit*				

*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: _____

☒ 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: Kimley-Horn | Date: 2013

Vertical Datum: North American Vertical Datum of 1988 (NAVD88) | Spatial Projection: State Plane Zone 5

Accuracy: 1-ft aerial topography

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.

MT-2 Form 3: Riverine Structures

PACE

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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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: Hasley 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: Hasley Cayon Creek "East" Bank Protection

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

   Location of Structure: Along the East Bank of Hasley Canyon Creek

   Downstream Limit/Cross Section: 1689

   Upstream Limit/Cross Section: 4396

2. Name of Structure: Hasley Cayon Creek "West" Bank Protection

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

   Location of Structure: Along the West Bank of Hasley Canyon Creek

   Downstream Limit/Cross Section: 1689

   Upstream Limit/Cross Section: 4396

3. Name of Structure: Franklin Parkway Bridge

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

   Location of Structure: ~950' Upstream of the Confluence with Castaic

   Downstream Limit/Cross Section: 2190

   Upstream Limit/Cross Section: 2305

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

B. CHANNELIZATION

Flooding Source: Hasley Canyon Creek

Name of Structure: Hasley Canyon Creek Soil Cement Bank Protection

1. Hydraulic Considerations

The channel was designated to carry 9,480 (cfs) and/or the Qcap - 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: Hasley Canyon Creek

Name of Structure: Franklin Parkway Bridge

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): HEC-RAS

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: _____

Name of Structure: _____

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: _____

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: Hasley Canyon Creek

Name of Structure: Hasley Canyon Creek Soil Cement Bank Protection

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 _____ acres-feet

Sediment transport rate _____ (percent concentration by volume)

Method used to estimate sediment transport: SAM

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: Following LA County Hydrology and Sedimentation Manual and a Continuity Analysis using SAM

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.

PACE
Advanced Water Engineering

Appendix B – Relevant Effective FEMA Data

FEMA FIS: Hasley Canyon Creek Flow Rates

PACE

FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 2 OF 9

LOS ANGELES COUNTY, CALIFORNIA

AND INCORPORATED AREAS

COMMUNITY NAME	NUMBER	COMMUNITY NAME	NUMBER
AGOURA HILLS, CITY OF	065072	COMMERCE, CITY OF	060110
ALHAMBRA, CITY OF*	060095	COMPTON, CITY OF	060111
ARCADIA, CITY OF*	065014	COVINA, CITY OF*	065024
ARTESIA, CITY OF*	060097	CUDAHY, CITY OF	060657
AVALON, CITY OF	060098	CULVER CITY, CITY OF	060114
AZUSA, CITY OF	065015	DIAMOND BAR, CITY OF	060741
BALDWIN PARK, CITY OF*	060100	DOWNEY, CITY OF	060645
BELL, CITY OF*	060101	DUARTE, CITY OF*	065026
BELL GARDENS, CITY OF	060656	EL MONTE, CITY OF*	060658
BELLFLOWER, CITY OF	060102	EL SEGUNDO, CITY OF	060118
BEVERLY HILLS, CITY OF*	060655	GARDENA, CITY OF	060119
BRADBURY, CITY OF*	065017	GLENDALE, CITY OF	065030
BURBANK, CITY OF	065018	GLENDORA, CITY OF*	065031
CALABASAS, CITY OF	060749	HAWAIIAN GARDENS, CITY OF*	065032
CARSON, CITY OF	060107	HAWTHORNE, CITY OF*	060123
CERRITOS, CITY OF	060108	HERMOSA BEACH, CITY OF	060124
CLAREMONT, CITY OF*	060109	HIDDEN HILLS, CITY OF	060125

*No Special Flood Hazard Areas Identified

REVISED: June 2, 2021

FLOOD INSURANCE STUDY NUMBER

06037CV002F

Version Number 2.3.3.2

FEMA

COMMUNITY NAME	NUMBER	COMMUNITY NAME	NUMBER
HUNTINGTON PARK, CITY OF*	060126	PICO RIVERA, CITY OF	060148
INDUSTRY, CITY OF*	065035	POMONA, CITY OF*	060149
INGLEWOOD, CITY OF*	065036	RANCHO PALOS VERDES, CITY OF	060464
IRWINDALE, CITY OF*	060129	REDONDO BEACH, CITY OF	060150
LA CANADA FLINTRIDGE, CITY OF*	060669	ROLLING HILLS, CITY OF*	060151
LA HABRA HEIGHTS, CITY OF*	060701	ROLLING HILLS ESTATES, CITY OF*	065054
LA MIRADA, CITY OF	060131	ROSEMEAD, CITY OF*	060153
LA PUENTE*, CITY OF	065039	SAN DIMAS, CITY OF	060154
LA VERNE, CITY OF	060133	SAN FERNANDO, CITY OF	060628
LAKEWOOD, CITY OF	060130	SAN GABRIEL, CITY OF*	065055
LANCASTER, CITY OF	060672	SAN MARINO, CITY OF*	065057
LAWNDALE, CITY OF*	060134	SANTA CLARITA, CITY OF	060729
LOMITA, CITY OF*	060135	SANTA FE SPRINGS, CITY OF	060158
LONG BEACH, CITY OF	060136	SANTA MONICA, CITY OF	060159
LOS ANGELES, CITY OF	060137	SIERRA MADRE, CITY OF*	065059
LOS ANGELES COUNTY UNINCORPORATED AREAS	065043	SIGNAL HILL, CITY OF*	060161
LYNWOOD, CITY OF	060635	SOUTH EL MONTE, CITY OF*	060162
MALIBU, CITY OF	060745	SOUTH GATE, CITY OF	060163
MANHATTAN BEACH, CITY OF	060138	SOUTH PASADENA, CITY OF*	065061
MAYWOOD, CITY OF*	060651	TEMPLE CITY, CITY OF*	060653
MONROVIA, CITY OF*	065046	TORRANCE, CITY OF	060165
MONTEBELLO, CITY OF	060141	VERNON, CITY OF*	060166
MONTEREY PARK, CITY OF*	065047	WALNUT, CITY OF*	065069
NORWALK, CITY OF	060652	WEST COVINA, CITY OF	060666
PALMDALE, CITY OF	060144	WEST HOLLYWOOD, CITY OF*	060720
PALOS VERDES ESTATES, CITY OF	060145	WESTLAKE VILLAGE, CITY OF	060744
PARAMOUNT, CITY OF	065049	WHITTIER, CITY OF	060169
PASADENA, CITY OF*	065050		

*No Special Flood Hazard Areas Identified

REVISED: June 2, 2021

FLOOD INSURANCE STUDY NUMBER

06037CV002F

Version Number 2.3.3.2

Table 10: Summary of Discharges, continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Harbor District Shallow Flooding	Denker Avenue, vicinity of 204th Street	0.3	60	*	130	170	*	260
Haskell Canyon	At confluence with Bouquet Canyon Creek	9.8	730	*	2,240	3,320	*	7,360
Hasley Canyon Creek	Approximately 1,150 feet downstream of Halsey Canyon Road	7.3	*	*	*	5,544	*	10,163
Hasley Canyon Creek	Approximately 550 feet downstream ofRomero Canyon Road	5.9	*	*	*	4,523	*	8,292
Hasley Canyon Creek	Approximately 600 feet downstream of Romero Canyon Road	*	220	*	680	1,006	*	2,230
Hasley Canyon Creek	Approximately 0.2 miles downstream of Hasley Canyon Road	*	330	*	1,010	1,503	*	3,330
Hasley Canyon Creek	At confluence with Castaic Creek	*	360	*	1,110	1,640	*	3,640
Hollywood Shallow Flooding	Third Street at Kenmore Avenue	3.4	800	*	1,800	2,300	*	3,500
Hollywood Shallow Flooding	South of Hollywood Freeway, vicinity of Kenmore Avenue	3.2	830	*	1,800	2,300	*	3,700
Hollywood Shallow Flooding	Santa Monica Boulevard, vicinity of Mariposa Avenue	2.8	940	*	2,100	2,700	*	4,200
Hollywood Shallow Flooding	Madison Avenue at Monroe Street	0.5	160	*	350	440	*	690
Hyde Park Shallow Flooding	South of Southwest Drive, vicinity of Van Ness Avenue	4.2	730	*	1,600	2,100	*	3,200
Hyde Park Shallow Flooding	Wilton Place, vicinity of Gage Avenue	3.3	770	*	1,600	1,900	*	3,000

FEMA Flood Insurance Rate Map Panels

MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 4 NORTH, RANGE 17 WEST AND TOWNSHIP 5 NORTH, RANGE 17 WEST

Los Angeles County
Unincorporated Areas
065043

ZONE A
ZONE AE
ZONE AO
0.2%-ANNUAL-CHANCE FLOOD DISCHARGE CONTAINED IN STRUCTURE
1%-ANNUAL-CHANCE FLOOD DISCHARGE CONTAINED IN STRUCTURE
LIMIT OF STUDY

Santa Felicia Canyon Creek
Romero Canyon Creek
Hasley Canyon Creek
Sloan Canyon Creek
San Martinez Chiquito Canyon
Acacia Canyon
Villa Canyon Creek

ROMERO CANYON RD
ROMERO-SLOAN CUTOFF
SLOAN CANYON RD
SLOAN CANYON RD
PARKER RD
PARKER RD
OAKHORN AVE
HIPSHOT DR
BOBCAT WAY
CHUCKER CT
GELDING RD
ROYAL RD
BRANCH RD
WINDY WAY
GREEN HILL DR
THE OLD RD
STALLION PL
CAM DEL VALLE
ARROW POINT DR
VACA ST
APPLEWOOD LN
DELL CT
MEADOWGRASS DR
QUAIL VALLEY RD
FOREST MEADOW PL
HEATHER LN
CLOVERLEAF PL
GREENWOOD PL
COUNTRYSIDE LN
RIVERDALE PL
CHERRY DR
LARIOS RANCH DR
GILMOUR ST
AYALA RD
HASLEY CANYON RD
DESERT SHADOW RD
BYFIELD RD
OAK CREEK RD
HAWKSET ST
RUPERT LN
SLEEPY CREEK LN
COIT RD
REMINGTON RD
MADLOY ST
APARRI AVE
ROMERO CANYON RD
ANVIK ST
SHARP RD
BURLWOOD DR
HIDDEN VALLEY CT
VALLEY GLEN CT
SAGECREST WAY
RIDGEWAY CT
ARROYO OAK LN
SAN MARTINEZ RD
LOMA VERDE MOUNTAINWAY
PARADISE RD
CHIQUITO CANYON RD
MADISON WAY
HILL ST
KENNINGSTON RD
EUCLID AVE
TRELLIS RD
LEXINGTON DR
PARKER AVE
SHERIDAN RD
KENWOOD AVE
ELLIS PL
OAKWOOD AVE
VAL VERDE RD
RAINBOW DR
DEL VALLE RD
COOLIDGE AVE
BORTON ST
VERDALE AVE
DELWOOD ST
JUSTAMERE AVE
AMHURST DR
TERRAZA CT
SORRENTO PL
CANNES PL
SAINT TROPEZ PL
HILLCREST PKWY
BASSET DR
MALLORCA PL
CAPALLERO DR
SAN REMO PL
MADRID PL
TERRACINA PL
BARCELONA PL
BARCELONA RD
BONSAI CT
APPALACHIAN
BERYL PL
KNOLL CT
ARROYO CT
PARK VISTA DR
SHASTA CT
BRYCE DR
WHITNEY DR
KAREN CT
VINEYARD LN
FOOTHILL RD
CLOVER CT
CASCADE RD
LUPINE ST
STAR CYN PL
JUNE ROSE CT
FALLS RD
YOSEMITE DR
HAYWARD DR
HAMLET WAY
BRIDLEWOOD DR
BANCROFT PL
CASHMERE PL
BERKSHIRE PL
CAMBRIDGE AVE
GIBRALTAR LN
SOMERSET CT
SPRINGVALE LN
PICADILLY PL
ALTON WAY
CASTLEBURY PL
INDUSTRY DR
HASLEY CANYON RD
SILVER ST
LEA WALK
LOMITA DR
SILVER ST
KERNEY
CROMWELL AVE
ELK AVE
HUNSTOCK ST
DRIVER AVE
CENTRAL AVE
DUBOIS ST
WINDSOR RD
LINCOLN AVE
VAN BUREN ST
MADISON ST
HARDING AVE
WILSON ST
JACKSON ST
ROOSEVELT AVE
WITHERSPOON PKWY
AVE PERRY
AVE WILLIAMS
AVE SHERMAN
AVE PAINE
COMMERCE CENTER DR
LIVINGSTON AVE
HARRISON PKWY

Note: Terrain is too steep to map all cross sections. Refer to profile for Water Surface Elevations.

T. 5 N.
T. 4 N.

118°41'15"
34°30'00"
2005000 FT
6355000 FT
6360000 FT
6365000 FT
6370000 FT
118°37'30"
34°30'00"
2000000 FT
1995000 FT
1990000 FT
1985000 FT
34°26'15"
$^{45}_{000m}$E
$^{46}_{000m}$E
$^{47}_{000m}$E
$^{48}_{000m}$E
$^{49}_{000m}$E
$^{50}_{000m}$E
118°41'15"
118°37'30"
34°26'15"
$^{38}_{000m}$N
$^{38}_{000m}$N
$^{38}_{000m}$N
$^{38}_{000m}$N
$^{38}_{000m}$N
$^{38}_{000m}$N

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

OTHER FEATURES
- 18.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

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SCALE

N

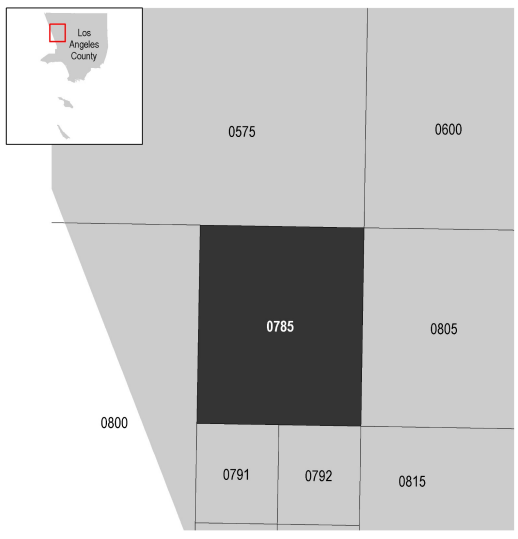
Map Projection:
Universal Transverse Mercator Zone 11N; North American Datum 1983;
Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 1,000 feet 1:12,000

0 1,000 2,000 4,000 feet

0 250 500 1,000 meters

PANEL LOCATOR



FEMA
National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

LOS ANGELES COUNTY, CALIFORNIA
and Incorporated Areas

PANEL 785 OF 2350

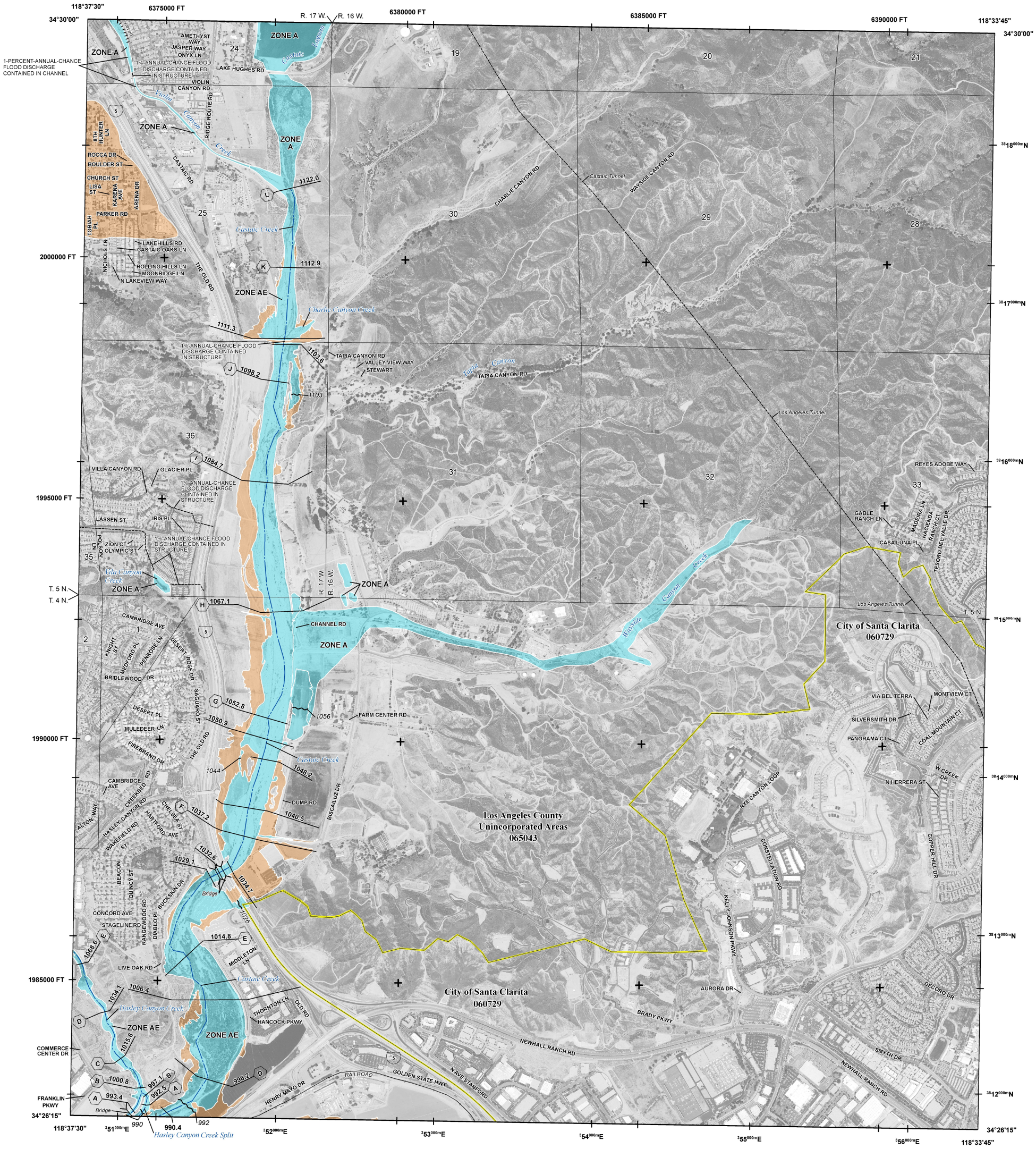
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
LOS ANGELES COUNTY	065043	0785	G

VERSION NUMBER
2.3.3.2

MAP NUMBER
06037C0785G

MAP REVISED
JUNE 2, 2021



FLOOD HAZARD INFORMATION

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OTHER AREAS OF FLOOD HAZARD
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- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
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- 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

OTHER FEATURES
- E 18.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation (BFE)
- 8 Coastal Transect
- Coastal Transect Baseline
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- Hydrographic Feature
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- Limit of Study
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SCALE

N

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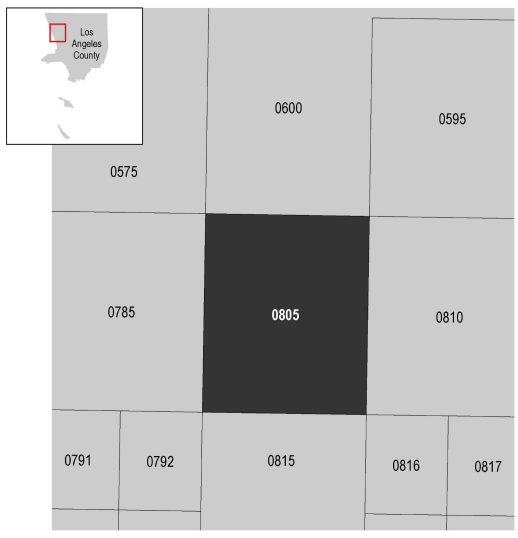
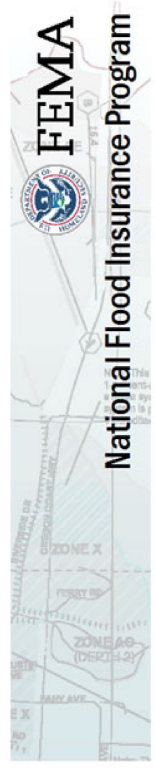
1 inch = 1,000 feet 1:12,000

0 1,000 2,000 4,000 feet

0 250 500 1,000 meters

PANEL LOCATOR





NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

LOS ANGELES COUNTY, CALIFORNIA
and Incorporated Areas

PANEL 805 OF 2350

FEMA

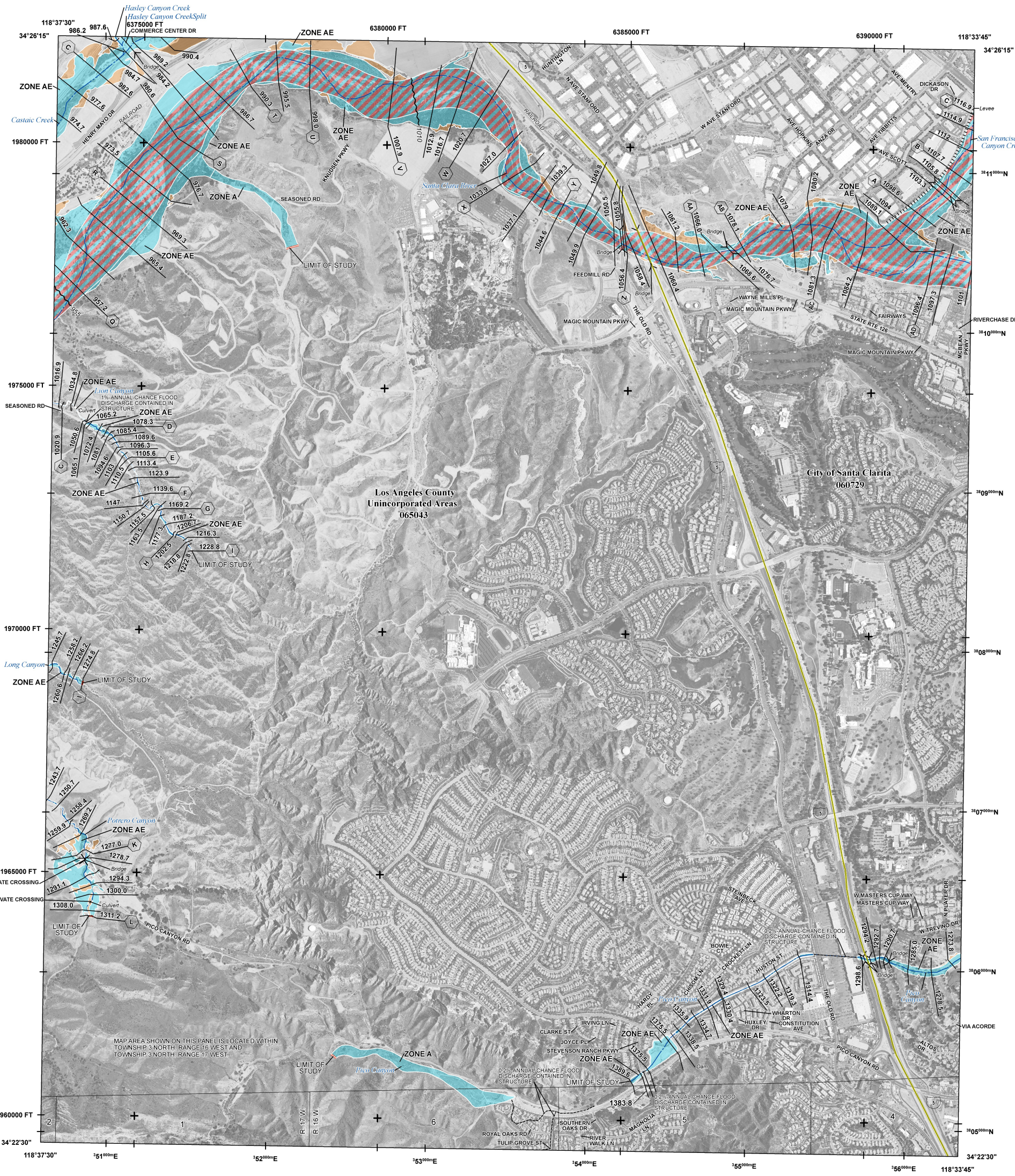
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
LOS ANGELES COUNTY	065043	0805	G
SANTA CLARITA, CITY OF	060729	0805	G

VERSION NUMBER
2.3.3.2

MAP NUMBER
06037C0805G

MAP REVISED
JUNE 2, 2021



FLOOD HAZARD INFORMATION

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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 Cross Sections with 1% Annual Chance
	17.5 Water Surface Elevation (BFE)
	(8) Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
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OTHER FEATURES	Limit of Study
	Jurisdiction Boundary

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SCALE

N

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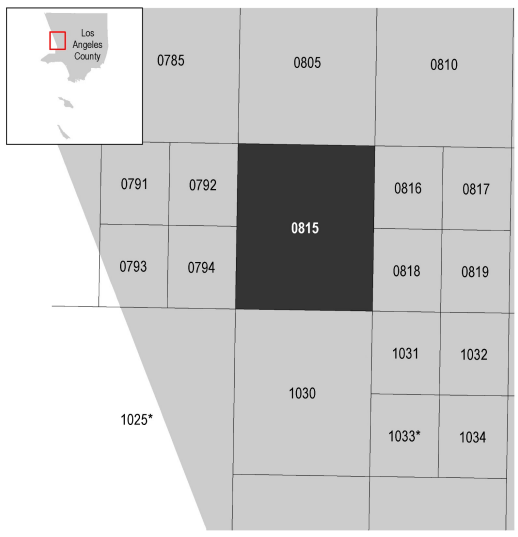

*PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

LOS ANGELES COUNTY, CALIFORNIA
and Incorporated Areas

PANEL 815 OF 2350

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
LOS ANGELES COUNTY	065043	0815	G
SANTA CLARITA, CITY OF	060729	0815	G

VERSION NUMBER
2.3.3.2

MAP NUMBER
06037C0815G

MAP REVISED
JUNE 2, 2021