

HYDRAULIC ANALYSES FOR OCEAN BREEZE RANCH

May 22, 2019



A handwritten signature in black ink, appearing to read "Wayne W. Chang", positioned above a horizontal line.

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TABLE OF CONTENTS

Introduction.....	1
Hydraulic Analyses.....	2
Permitted and Unpermitted Structures.....	5
Conclusion	6
Declaration of Responsible Charge	7
FEMA Datum Shift Values.....	9

APPENDICES

A. HEC-RAS Analyses

MAP POCKET

HEC-RAS Work Map

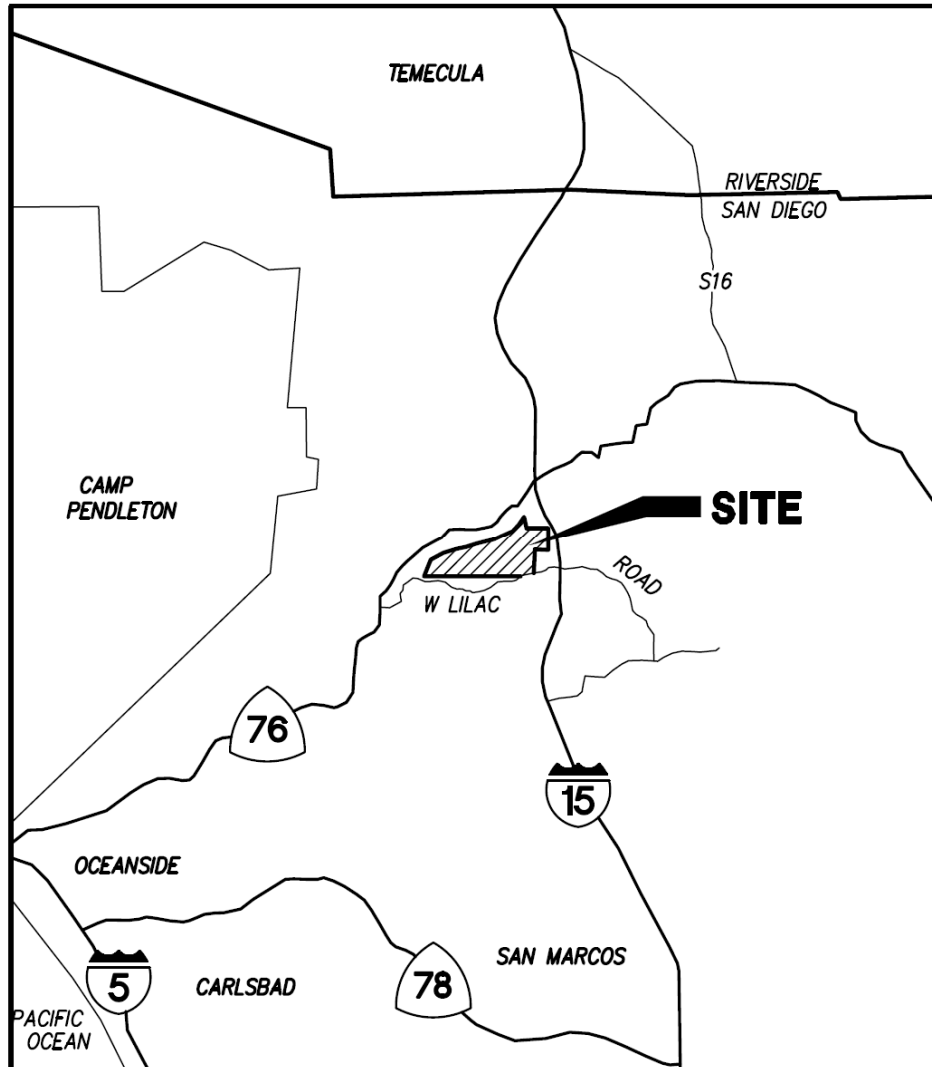
Easterly Unpermitted Area

Westerly Unpermitted Area

CD Containing FIRMs, County Floodplain Maps, HEC-RAS files, Effective HEC-2, this report, Structures Exhibit, Equestrian Center Major Use Permit PDS2016-MUP-16-013 drawing, Shade-Structure-Exh-PDC.pdf, Tentative Map Tract 5615, and Caltrans Highway 76 CLOMR report.

INTRODUCTION

The Ocean Breeze Ranch project consists of approximately 1,402.5 acres within the Bonsall Community Planning Area. The site is located west of Interstate 15, south of the San Luis Rey River and State Route 76, and north of West Lilac Road. The site is generally between the cross streets of Camino del Cielo and Via Ararat Drive along West Lilac Road (see the Vicinity Map).



Vicinity Map

Under pre-project conditions, Ocean Breeze Ranch is primarily a Quarter Horse and Thoroughbred breeding farm. The site contains a few residences, agricultural farms, and a large complex of barns and pastures for horses. The project will preserve the existing residences and barns, but develop a large portion of the site with 396 traditional and estate lots for single-family use.

The San Luis Rey River flows in a westerly direction along the northerly portion of the site just south of State Route 76. There are several documents that provide San Luis Rey River floodplain information. The Flood Insurance Rate Maps (FIRM) covering this report's study reach are Map Number's 06073C0480G, 0485G, 0490G, and 0495G dated May 16, 2012 (see the FIRMs on the CD). The FIRMs delineate an approximate Zone A and shaded Zone X floodplain along the San Luis Rey River. The County of San Diego has published San Luis Rey River floodplain maps (included on the CD), but some of the relevant maps are marked "Preliminary Subject to Revision." According to County Flood Control staff, their San Luis Rey River mapping was adopted. The adoption was prior to the 0.2 feet floodway rise criteria from the *Resource Protection Ordinance* (RPO). More recent floodplain and floodway mapping was not adopted by the County after RPO approval. As a result, the typical 1-foot floodway rise, rather than the RPO's 0.2-foot floodway rise, criteria applies.

Dokken Engineering (Dokken) prepared a November 15, 2015, *CALTRANS Highway 76 "East Section" Improvement Project, San Luis Rey River CLOMR Submittal* (the report is contained on the CD), covering improvements to State Route 76 and associated floodplain grading to create two environmental mitigation sites. The Caltrans improvements and grading have begun, and the floodplain encroachments are anticipated to be complete prior to construction of the portions of Ocean Breeze Ranch within the 100-year floodplain. Therefore, of the various CLOMR analyses, the post-project model will be most representative of existing conditions for Ocean Breeze Ranch. A LOMR for the State Route 76 project is not listed on the FEMA web-site as of the date of this report. A recent discussion with Anthony Barry from County of San Diego Flood Control Engineering suggests that Caltrans may in the process of preparing the LOMR.

Two portions of the proposed project will encroach into the San Luis Rey floodplain (see the HEC-RAS work map in the map pocket). The first portion is within Ocean Breeze Ranch Planning Area 3 at the northwest corner of the site, which will be developed with single-family lots. The second portion is along a segment of Dulin Road that will be extended westerly approximately 1.9 miles to the site. In order to establish the allowable floodplain encroachments, a floodway analysis is needed based on existing conditions. The project grading shall be outside the floodway plus the RPO and Zoning setback requirements. This report contains a floodway analysis based on the topographic information that will be most representative of existing conditions prior to project construction. As mentioned above, since the County floodplain and floodway were not adopted until after the RPO, the floodway can be based on the typical one-foot rise criteria. This report also contains a proposed condition analysis for preliminary design of the project. The analyses have been performed for the project entitlement. The tentative map (County of San Diego Tract 5615 is included on the CD) has been prepared by Project Design Consultants.

HYDRAULIC ANALYSES

Several hydraulic analyses have been performed for the site and are described in this section. This report includes a summary of the past and new hydraulic analyses. The analyses will be relevant to the Conditional Letter of Map Revision and Letter of Map Revision that will ultimately need to be prepared for the project.

Effective and Duplicate Effective Models

Although the FIRMS delineate an approximate Zone A floodplain for the San Luis Rey River along the site, the County of San Diego was able to provide an effective HEC-2 model and floodplain maps (see the CD). The effective HEC-2 is dated December 1975 and the work maps are from 1973. The effective HEC-2 input, output, and work maps also serve as the duplicate effective data.

Corrected Effective Model

The Caltrans Highway 76 CLOMR includes a corrected effective model. The corrections include a vertical datum adjustment from NGVD 29 to NAVD 88, additional cross-sections, roughness coefficient revisions, ineffective flow area changes, overbank station and reach length adjustments, cross-section ID adjustments, and expansion-contraction coefficient modifications. The corrections are described in detail in Section 4.3 of the CLOMR report, which is included on the CD. The corrected effective model is included within the HEC-RAS model.

Existing Condition Models

This report includes updated existing condition 100-year HEC-RAS hydraulic analyses (included on the CD). The analyses have been performed to establish the existing condition floodway along the project site. The following paragraphs describe the input parameters and approach.

The HEC-RAS analyses were based on the Caltrans Highway 76 CLOMR files (provided by the County), so the CLOMR's FEMA Post-Project, FEMA Pre-Project, and FEMA Corrected Effective plans are included. The FEMA Post-Project plan was primarily used for this report. The State Route 76 grading is essentially complete, so the Post-Project plan most closely represents existing conditions among the three plans. Two additional existing condition plans prepared for this report are Exist Cond FP/FW (new existing condition analysis with the County's effective floodway) and Exist Cond FP/FW Adj FW (new existing condition analysis with the adjusted County floodway to meet surcharge requirements). The two additional existing condition plans are based on the CLOMR Post-Project plan with adjustments described next.

The HEC-RAS cross-sections for the study reach are shown on the HEC-RAS Work Map. The study reach starts at cross-section 13.827, which is approximately 2,000 feet downstream of PA-3. The study reach ends at cross-section 16930. These two bounding cross-sections are from the 1975 effective HEC-2, which was provided by County staff (see the CD for the HEC-2 input and output files). The effective cross-sections were used to allow a tie-in with the effective model at the upstream and downstream study limits. Cross-section 13827 from the HEC-2 was renamed 13.827 in HEC-RAS since the cross-section numbers must increase in value. Per the HEC-2 comment cards, the sections are left to right looking upstream. Cross-sections 13.827 and 16930 were reversed in HEC-RAS to be consistent with the remaining HEC-RAS cross-sections (described below). In addition, the cross-section elevations were raised by 2.3 feet per the *Flood Insurance Study* (see excerpt attached after this report text) to convert from NGVD 29 to NAVD 88.

The remaining HEC-RAS cross-sections along Ocean Breeze Ranch (cross-sections 14.053 to 17.090) were created from various sources and match the Dokken CLOMR locations. First, PDC

provided 2-foot contour interval mapping from 2015. This is the most recent available mapping and so was used to create cross-sections along the residential development area (cross-sections 14.322 to 15.086). The PDC mapping was supplemented with Dokken’s post-project 2-foot contour interval mapping, as needed (a portion of cross-section 14.322). Both mapping sources are on NAVD 88. A comparison of the area along Highway 76 reveals that the proposed grading has essentially been complete and is reflected on PDC’s mapping. The cross-sections along the upstream (cross-sections 15.190 to 17.090) and downstream (cross-sections 14.053 to 14.215) end of the study reach are from the Dokken post-project model. Table 1 summarizes the sources used to create the HEC-RAS cross-sections.

Cross-Section	Source	Notes
13.827	Effective County HEC-2	Cross-section reversed, raised 2.3’ to convert to NAVD 88, and renumbered from 13827.
14.053 to 14.215	Dokken CLOMR	Dokken post-project cross-sections (represent existing conditions)
14.322	PDC and Dokken topo	Cross-section created from recent PDC topo, where available, and supplemented with Dokken topo.
14.477 to 15.086	PDC topo	Cross-sections created from recent PDC topo.
15.190 to 17.090	Dokken CLOMR	Dokken post-project cross-sections (represent existing conditions).
16930	Effective County HEC-2	Cross-section reversed and raised 2.3’ to convert to NAVD 88.

Table 1. Source of Cross-Sections used for Project’s HEC-RAS Models

The current site contains easterly and westerly unpermitted areas (see the exhibits in the map pocket). Current aerial photographs indicates that these areas have been disturbed since the County’s effective floodplain maps. The unpermitted areas were defined on the exhibits by comparing recent aerial photographs with the aerial photographs on the effective maps. The current and effective ground elevations were reviewed within the unpermitted areas to determine the amount of fill that was placed. The review revealed that the current elevations are similar or lower than the effective elevations, so fill was not placed. As a result, cross-sections within the unpermitted areas were not adjusted to reflect effective conditions. Split rail fencing exists along the northerly edge of the unpermitted areas. The split rail fencing will have minimal impacts on hydraulics, so were not modeled.

The roughness coefficients, bank stations, and expansion/contraction coefficients in the new cross-sections created from the PDC mapping are set at generally the same locations and with the same values as the approved CLOMR post-project model. This provides consistency with the approved model CLOMR model. The CLOMR reach lengths and 100-year flow rate were used.

The starting water surface elevations at downstream cross-section 13.827 were based on the County effective HEC-2. The effective floodplain and floodway elevations are 179.42 and 180.47 feet NGVD 29 (181.72 and 182.77 feet NAVD 88), respectively. The effective floodway surcharge is 1.05 feet, so exceeds the 1-foot criteria. As a result, the starting floodway elevation was changed to 182.72 feet NAVD 88 in order to meet the surcharge criteria.

After the updated existing condition geometry was created, floodway encroachments were added at the same location as the County floodway at all cross-sections. The County floodway was obtained from SANGIS. The results (see Appendix A) show that the floodway surcharge exceeds 1 foot from cross-sections 14.053 to 14.583, and is negative at cross-section 17.090. Therefore, the floodway encroachments were adjusted to maintain a 0 to 1-foot surcharge. The northerly County floodway line is generally along State Route 76 near the west end of the study reach, so the encroachment along this side was not changed (to avoid placing the highway in the floodway). The southerly encroachment was adjusted to meet the 1-foot surcharge requirement. At cross-section 17.090, the floodway was narrowed equally on both sides of the cross-section to eliminate the negative surcharge. The revised floodway lines are shown on the HEC-RAS Work Map and the results are included in Appendix. A. The floodplain and floodway results are also summarized in Table 2.

The updated existing condition analysis with adjusted floodway ties in to the effective data per regulations. As mentioned above, the downstream floodplain and floodway elevations were based on the effective elevations, which ensure a downstream tie-in. At upstream cross-section 16930, the effective floodplain and floodway elevations are 236.05 and 236.56 feet NGVD 29 (238.35 and 238.86 feet NAVD 88), respectively. The updated existing condition HEC-RAS elevations are 238.12 and 238.49 feet NAVD 88, respectively. Therefore, the new existing condition analysis matches the County's effective floodplain and floodway water surface elevations at the upstream location within the required tolerance of 0.5 feet.

Proposed Condition Model

A proposed condition model was prepared by revising the existing condition geometry to reflect Project Design Consultants' tentative map grading. The proposed fill slopes within the floodplain were assigned a roughness coefficient of 0.050 to reflect proposed landscaping. The proposed grading encroaches into the existing condition floodplain from cross-sections 14.477 to 14.789 as well as at cross-sections 16.499 and 16.573. However, the grading does not encroach into the adjusted floodway and the proposed residential pads have several feet of freeboard over the proposed 100-year water surface elevations. Therefore, the grading meets County and FEMA hydraulic regulations. The floodplain and floodway results are included in Appendix A and summarized in Table 2.

PERMITTED AND UNPERMITTED STRUCTURES

The site contains several existing and proposed structures. The applicant has coordinated with County staff and categorized the structures as follows:

- As-built (AB) – recently built without prior permit
- Existing (E) – existing buildings/structures with permit
- Proposed (P) – proposed new buildings/structures require building permit.

These structures are identified on the Equestrian Center Major Use Permit PDS2016-MUP-16-013 drawing, which is included on the CD. The structure types are also listed and include arenas,

shops, barns, houses, pens, leach fields, mobile homes, pools, a pump house, sheds, and a septic tank. PDC created a separate exhibit (Shade-Structure-Exh-PDC.pdf on the CD) that shows all of the structures and the existing condition 100-year floodplain. The exhibit indicates that some of the structures are not within the floodplain. In addition, comparing the exhibit with the HEC-RAS Work Map reveals that some structures in the floodplain are within an ineffective flow area. The structures that are either not within the floodplain or within an ineffective flow area will not impact hydraulics of the San Luis Rey River.

The remaining structures that are within the active floodplain consist of PS1, PS2, PWR1 through PWR9, Q, P, A1 and A2. All of these structures are either as-built or proposed, and not existing. PS1 and PS2 are pasture sheds, which have a roof supported by columns and are open on all four sides. PWR1 through PWR9 are pens with a roof, which have a roof supported by columns and are open on all four sides except for widely-spaced tubular metal rails to contain horses. Q is a quarantine pen and constructed similar to PWR. P is a therapy pool, which is inground. A1 and A2 are equestrian arenas surrounded by open wood fencing similar to split rail fencing. These as-built or proposed structures have open sides and no walls, or are inground. Consequently, they will allow passage of river flows.

CONCLUSION

This report has been prepared for entitlement of the Ocean Breeze Ranch project along the San Luis Rey River. The County's effective floodway is based on out-of-date topographic mapping. A revised floodway has been established based on topographic information that best reflects the existing conditions that will exist when the project is developed. The project will not encroach into the revised floodway, and the revised floodway is 100 feet or more from the proposed Planning Area 3 grading limits. The pads have been designed to be several feet higher than the adjacent 100-year water surface elevations. Therefore, the project's grading meets the County of San Diego's floodway, setback, and freeboard requirements. This report seeks County of San Diego approval of the updated floodway and tentative map. Additional analyses and a CLOMR and LOMR will be required following the current entitlement phase.

DECLARATION OF RESPONSIBLE CHARGE

I hereby declare that I am the civil engineer of work for this project, that I have exercised responsible charge over the analysis of the project as defined in Section 6703 of the Business and Professions Code, and that the analysis is consistent with current design.

I understand that the check of project drawings and specifications by the County of San Diego is confined to a review only and does not relieve me, as engineer of work, of my responsibilities for project design.



May 22, 2019

Wayne W. Chang
RCE 46548
Exp. June 30, 2019

Date

River Station	Exist. Cond. Floodplain Elev, feet	Exist. Cond. Floodway Elev., feet	Exist. Cond. Surchage, feet	Prop. Cond. Floodplain Elev., feet	Prop. Cond. Floodway Elev., feet	Prop. Cond. Surchage, feet
16930	238.12	238.49	0.37	238.12	238.49	0.37
17.090	236.44	236.45	0.01	236.44	236.45	0.01
16.984	234.24	234.24	0.00	234.24	234.24	0.00
16.882	232.21	232.21	0.00	232.21	232.21	0.00
16.779	229.45	229.54	0.09	229.46	229.53	0.07
16.682	227.37	227.61	0.24	227.37	227.59	0.22
16.573	224.88	225.07	0.19	224.86	225.04	0.18
16.499	223.29	223.43	0.14	223.29	223.43	0.14
16.430	221.99	222.10	0.11	221.99	222.10	0.11
16.385	221.25	221.37	0.12	221.25	221.37	0.12
16.337	220.20	220.38	0.18	220.20	220.38	0.18
16.291	219.46	219.71	0.25	219.46	219.71	0.25
16.246	218.94	219.23	0.29	218.94	219.23	0.29
16.155	217.36	217.74	0.38	217.36	217.74	0.38
16.070	216.40	216.82	0.42	216.40	216.82	0.42
15.977	215.50	215.92	0.42	215.50	215.92	0.42
15.883	214.24	214.71	0.47	214.24	214.71	0.47
15.780	212.31	212.86	0.55	212.31	212.86	0.55
15.677	210.19	210.79	0.60	210.19	210.79	0.60
15.580	208.91	209.42	0.51	208.91	209.42	0.51
15.482	207.70	208.16	0.46	207.70	208.16	0.46
15.389	206.38	206.90	0.52	206.38	206.90	0.52
15.324	205.40	206.10	0.70	205.40	206.10	0.70
15.298	204.85	205.66	0.81	204.85	205.66	0.81
15.190	202.65	203.64	0.99	202.65	203.64	0.99
15.086	200.88	201.73	0.85	200.88	201.73	0.85
14.987	198.89	199.89	1.00	198.93	199.89	0.96
14.890	197.31	198.22	0.91	197.47	198.22	0.75
14.789	195.88	196.74	0.86	196.23	196.74	0.51
14.690	194.21	195.06	0.85	194.61	195.06	0.45
14.583	192.36	193.36	1.00	192.69	193.36	0.67
14.477	190.55	191.39	0.84	190.66	191.39	0.73
14.322	187.83	188.75	0.92	187.83	188.75	0.92
14.215	186.27	187.18	0.91	186.27	187.18	0.91
14.134	185.01	185.83	0.82	185.01	185.83	0.82
14.053	183.25	184.25	1.00	183.25	184.25	1.00
13.827	181.72	182.72	1.00	181.72	182.72	1.00

Table 2. Summary of 100-Year Results

TABLE 12: FLOODING SOURCE DATUM SHIFT VALUES

Stream Name	Elevation (feet NAVD above NGVD)
Moosa Creek (North Branch)	+2.3
Moosa Creek (South Branch)	+2.3
Murphy Canyon Creek	+2.1
Murray Canyon Creek	+2.1
Nestor Creek	+2.1
North Avenue Tributary	+2.3
North Branch Poway Creek	+2.1
North Tributary to Santa Maria Creek	+2.2
Olive Creek	+2.4
Otay River	+2.2
Pala Mesa Creek	+2.2
Paradise Creek	+2.1
Paradise Creek – Valley Road Branch	+2.1
Pilgrim Creek	+2.3
Poggi Canyon Creek	+2.2
Pomerado Creek	+2.1
Poway Creek	+2.1
Rainbow Creek (Main Branch)	+2.3
Rainbow Creek (West Branch)	+2.3
Rattlesnake Creek	+2.1
Rattlesnake Creek Split Flow at Heritage Hills	+2.1
Rattlesnake Creek Split Flow at Midland Road	+2.1
Reidy Creek	+2.3
Reidy Creek Split Flow	+2.3
Rice Canyon Creek	+2.1
Rincon Avenue Tributary	+2.3
Rose Canyon Creek	+2.1
Samagutuma Creek	+2.4
San Clemente Canyon Creek	+2.1
San Diego Bay	+2.2
San Diego River	+2.1
San Dieguito River	+2.1
San Elijo Creek	+2.2
San Luis Rey River	+2.3
San Marcos Creek	+2.3
San Marcos Creek (Below Lake San Marcos)	+2.3
San Marcos Creek Highway 78 Split Flow	+2.3

APPENDIX A

HEC-RAS ANALYSES

EXISTING CONDITION HEC-RAS WITH COUNTY EFFECTIVE FLOODWAY

HEC-RAS Plan: EC FFW River: SLR River Reach: 1

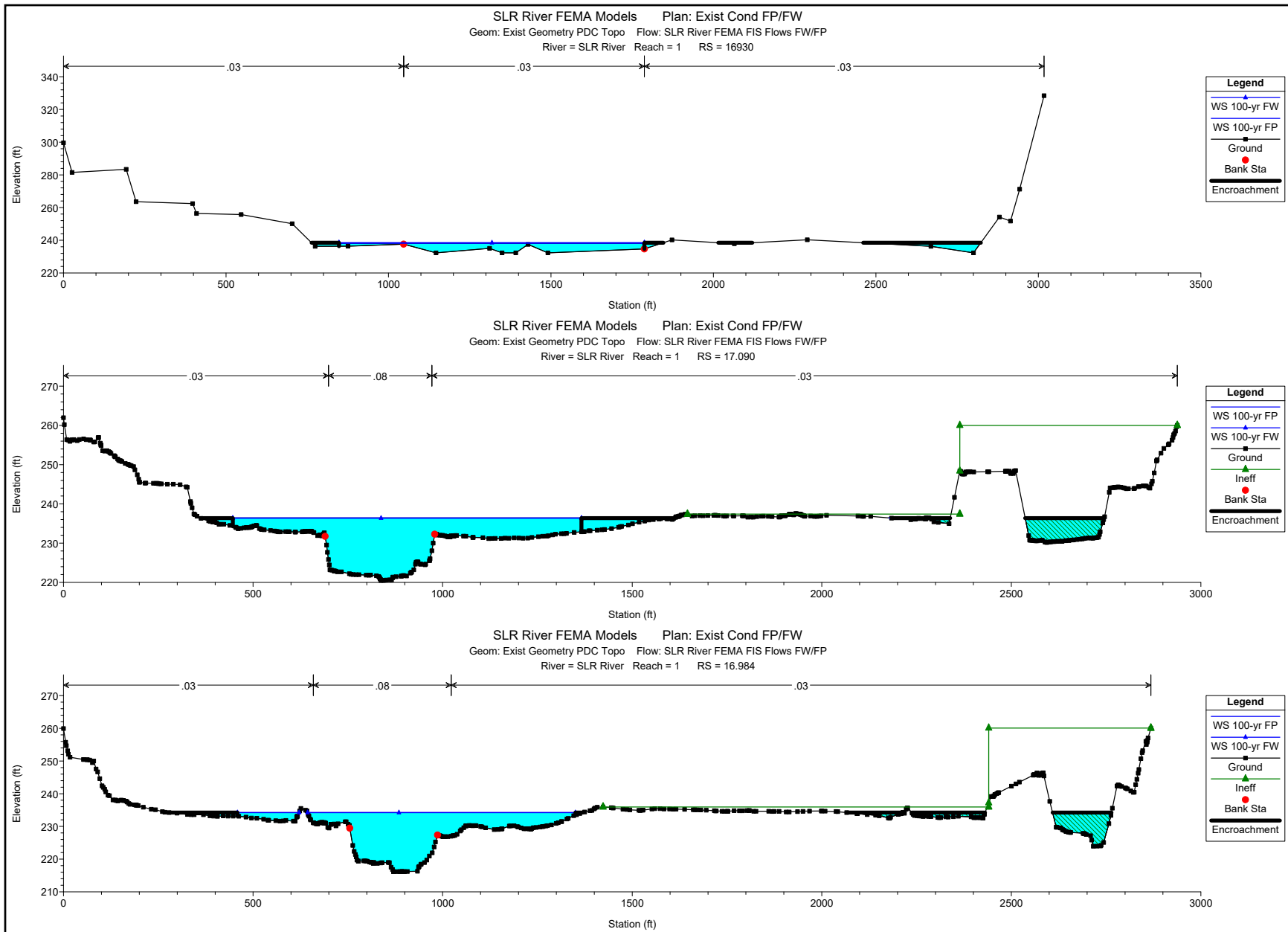
Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Wdth Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
1	16930	100-yr FP	238.12		239.69	1438.98	1878.59	33625.55	5495.86		1046.90	1787.50	
1	16930	100-yr FW	238.49	0.37	240.47	940.00	1755.32	39244.68		847.50	1046.90	1787.50	1787.50
1	17.090	100-yr FP	236.44		236.97	1251.73	4532.84	22625.63	13841.53		690.22	979.03	
1	17.090	100-yr FW	236.37	-0.06	237.02	919.35	4464.95	23103.32	13431.73	446.71	690.22	979.03	1366.06
1	16.984	100-yr FP	234.24		235.04	1068.65	2827.97	25616.77	12555.26		755.11	986.86	
1	16.984	100-yr FW	234.24	0.00	235.05	869.31	2674.71	25504.16	12821.13	458.77	755.11	986.86	1350.22
1	16.882	100-yr FP	232.21		232.83	1074.99	4361.56	33698.11	2940.34		778.16	1123.80	
1	16.882	100-yr FW	232.21	0.00	232.85	839.12	4135.30	33798.13	3066.56	487.69	778.16	1123.80	1326.81
1	16.779	100-yr FP	229.45		230.33	1003.44	2934.87	37692.25	372.87		857.01	1218.06	
1	16.779	100-yr FW	229.54	0.08	230.39	887.26	3252.15	37363.73	384.11	390.35	857.01	1218.06	1474.88
1	16.682	100-yr FP	227.37		227.98	1198.85	3621.17	37039.04	339.79		971.97	1392.82	
1	16.682	100-yr FW	227.61	0.24	228.18	910.06	4288.98	36357.06	353.96	497.06	971.97	1392.82	1759.46
1	16.573	100-yr FP	224.88		225.52	1803.34	3119.02	32384.54	5496.44		890.25	1267.01	
1	16.573	100-yr FW	225.07	0.19	225.78	1325.17	2959.62	34102.47	3937.91	302.10	890.25	1267.01	1627.27
1	16.499	100-yr FP	223.29		223.79	1596.00	788.74	36739.25	3472.02		874.65	1422.09	
1	16.499	100-yr FW	223.43	0.14	223.97	1177.71	965.83	38295.48	1738.69	379.49	874.65	1422.09	1557.20
1	16.430	100-yr FP	221.99		222.47	1282.24	2374.03	37916.24	709.73		624.05	1192.52	
1	16.430	100-yr FW	222.10	0.11	222.60	993.75	1561.84	38944.26	493.89	257.21	624.05	1192.52	1292.11
1	16.385	100-yr FP	221.25		221.69	1285.13	3544.43	35649.05	1806.53		961.62	1512.48	
1	16.385	100-yr FW	221.37	0.12	221.81	1075.96	3225.63	35916.81	1857.56	502.05	961.62	1512.48	1638.56
1	16.337	100-yr FP	220.20		220.76	1466.07	3380.60	35365.80	2253.61		1041.13	1532.14	
1	16.337	100-yr FW	220.38	0.18	220.92	1205.65	3611.56	35170.78	2217.66	410.11	1041.13	1532.14	1653.86
1	16.291	100-yr FP	219.46		219.80	1611.64	13792.67	25956.52	1250.81		1428.99	1843.40	
1	16.291	100-yr FW	219.71	0.25	220.03	1349.53	14085.13	25672.83	1242.04	604.07	1428.99	1843.40	1953.60
1	16.246	100-yr FP	218.94		219.17	1821.24	18413.86	22092.45	493.69		1521.38	1929.65	
1	16.246	100-yr FW	219.23	0.29	219.45	1454.04	18604.21	22044.68	351.11	557.19	1521.38	1929.65	2011.23
1	16.155	100-yr FP	217.36		217.82	1365.83	2753.45	37561.61	684.94		1677.51	2289.62	
1	16.155	100-yr FW	217.74	0.38	218.19	1534.46	1924.62	38569.54	505.84	891.00	1677.51	2289.62	2425.46

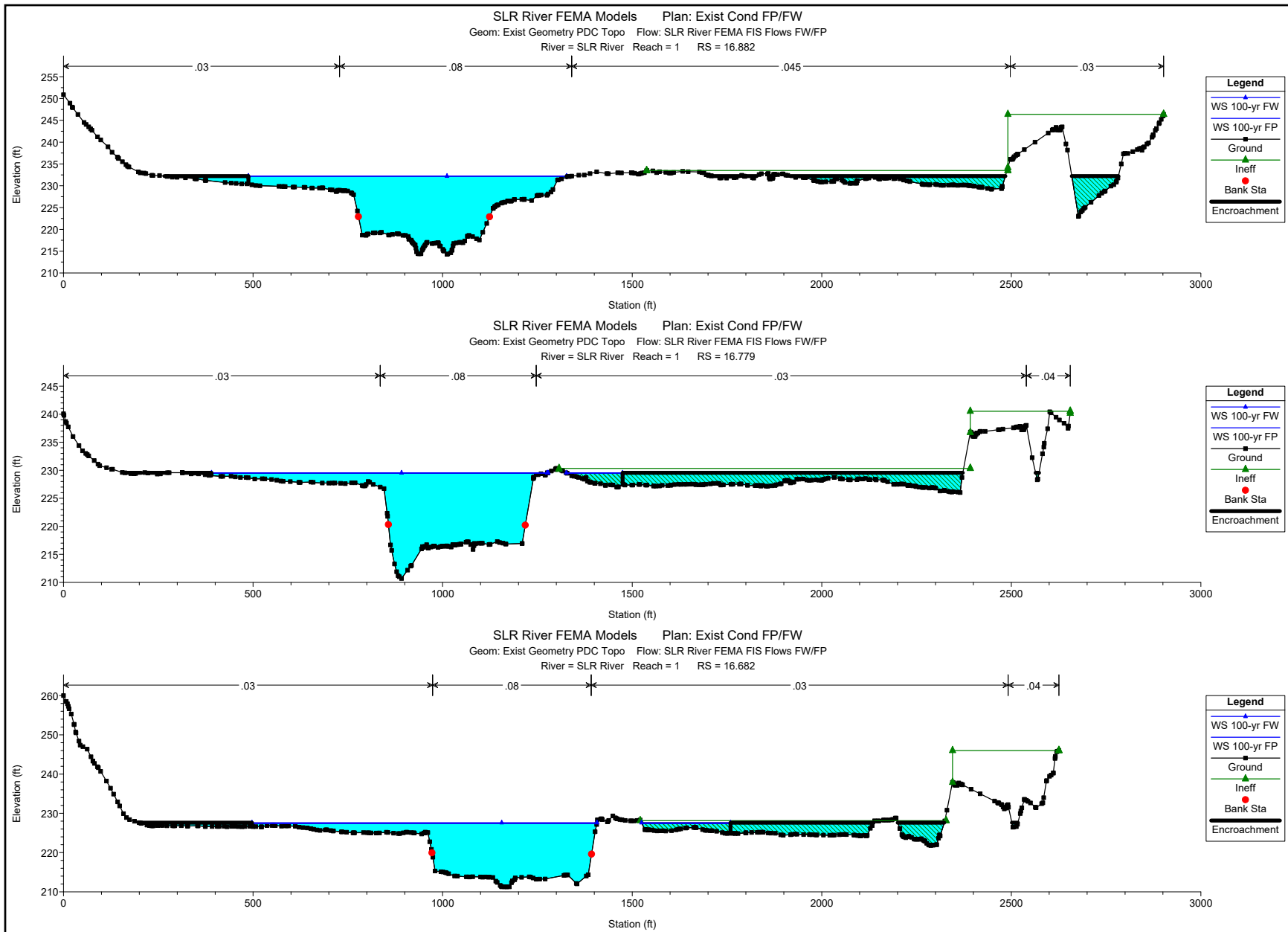
HEC-RAS Plan: EC FPFW River: SLR River Reach: 1 (Continued)

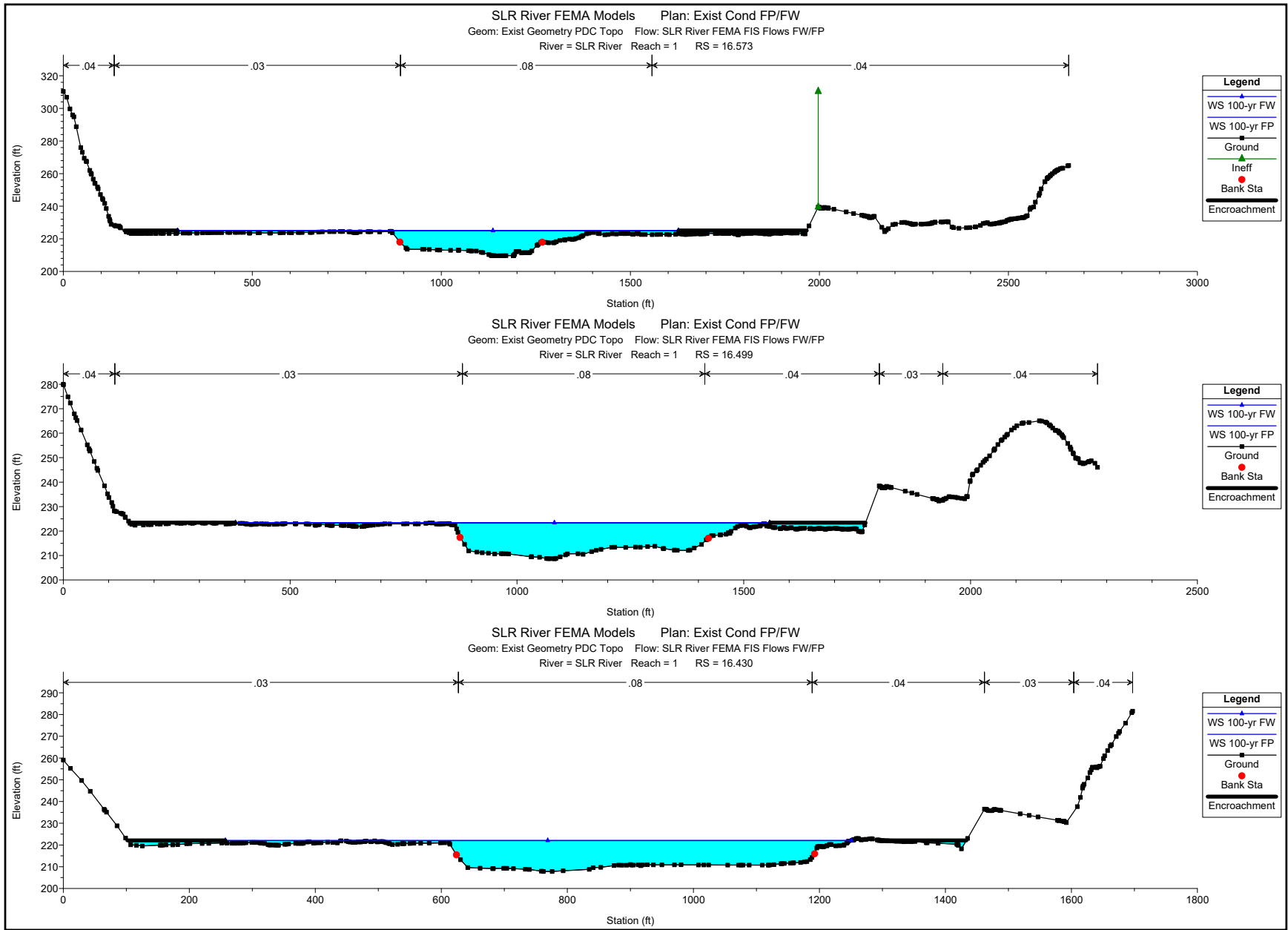
Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Wtd Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
1	16.070	100-yr FP	216.40		216.61	1863.19	572.73	35185.66	5241.62		1640.67	2500.49	
1	16.070	100-yr FW	216.82	0.42	217.04	1483.73	966.59	36860.58	3172.83	1140.26	1640.67	2500.49	2755.73
1	15.977	100-yr FP	215.50		215.71	1771.72	1560.67	27662.19	11777.14		1751.20	2503.79	
1	15.977	100-yr FW	215.92	0.42	216.15	1502.58	2169.92	29895.51	8934.57	1280.19	1751.20	2503.79	2917.72
1	15.883	100-yr FP	214.24		214.54	1900.90	5247.94	24360.97	11391.09		1937.28	2569.26	
1	15.883	100-yr FW	214.70	0.46	215.00	1659.27	6389.14	25687.38	8923.48	1445.83	1937.28	2569.26	3105.10
1	15.780	100-yr FP	212.31		212.66	1767.29	5463.84	31858.53	3677.62		2411.57	3055.03	
1	15.780	100-yr FW	212.84	0.53	213.23	1439.47	4426.82	33949.26	2623.93	2077.91	2411.57	3055.03	3517.38
1	15.677	100-yr FP	210.19		210.52	1816.21	2347.59	34818.65	3833.77		2432.96	3282.76	
1	15.677	100-yr FW	210.75	0.56	211.14	1228.15	459.60	38970.00	1570.40	2391.39	2432.96	3282.76	3619.54
1	15.580	100-yr FP	208.91		209.06	2319.50	2724.12	30658.29	7617.58		2319.61	3175.40	
1	15.580	100-yr FW	209.35	0.44	209.56	1438.41	1109.75	35167.10	4723.15	2105.08	2319.61	3175.40	3543.49
1	15.482	100-yr FP	207.70		207.85	2483.75	6627.84	30900.29	3471.87		2274.15	3386.11	
1	15.482	100-yr FW	208.03	0.33	208.21	1657.00	5985.52	34099.45	915.03	1798.19	2274.15	3386.11	3455.19
1	15.389	100-yr FP	206.38		206.55	1899.89	2476.57	38496.15	27.27		2009.42	3386.85	
1	15.389	100-yr FW	206.67	0.29	206.85	1694.40	2845.71	38154.29		1596.34	2009.42	3386.85	3290.74
1	15.324	100-yr FP	205.40		205.55	1832.81	4331.02	36648.78	20.20		1870.78	3206.32	
1	15.324	100-yr FW	205.78	0.38	205.92	1854.09	4766.23	36204.80	28.96	1393.21	1870.78	3206.32	3492.00
1	15.298	100-yr FP	204.85		205.02	2058.98	11317.63	29539.59	142.78		2065.18	3028.55	
1	15.298	100-yr FW	205.29	0.45	205.46	1728.98	11256.05	29548.12	195.83	1381.88	2065.18	3028.55	3110.86
1	15.190	100-yr FP	202.65		202.90	2533.37	10461.92	28046.84	2491.24		1849.56	2529.33	
1	15.190	100-yr FW	203.25	0.60	203.52	1721.92	7742.83	30322.65	2934.52	1456.07	1849.56	2529.33	3177.99
1	15.086	100-yr FP	200.88		201.09	2335.97	12197.07	17191.66	11611.27		2082.00	2505.09	
1	15.086	100-yr FW	201.47	0.59	201.74	1683.56	11873.01	18773.79	10353.21	1533.56	2082.00	2505.09	3269.78
1	14.987	100-yr FP	198.89		199.19	2172.37	10919.27	24183.27	5897.46		2172.54	2757.25	
1	14.987	100-yr FW	199.77	0.87	200.08	1682.24	11529.79	23872.36	5597.85	1657.29	2172.54	2757.25	3343.11
1	14.890	100-yr FP	197.31		197.56	2389.11	21048.25	16145.71	3806.04		2360.44	2865.81	
1	14.890	100-yr FW	198.18	0.88	198.51	1637.69	14566.93	20417.19	6015.88	1779.83	2360.44	2865.81	3417.52

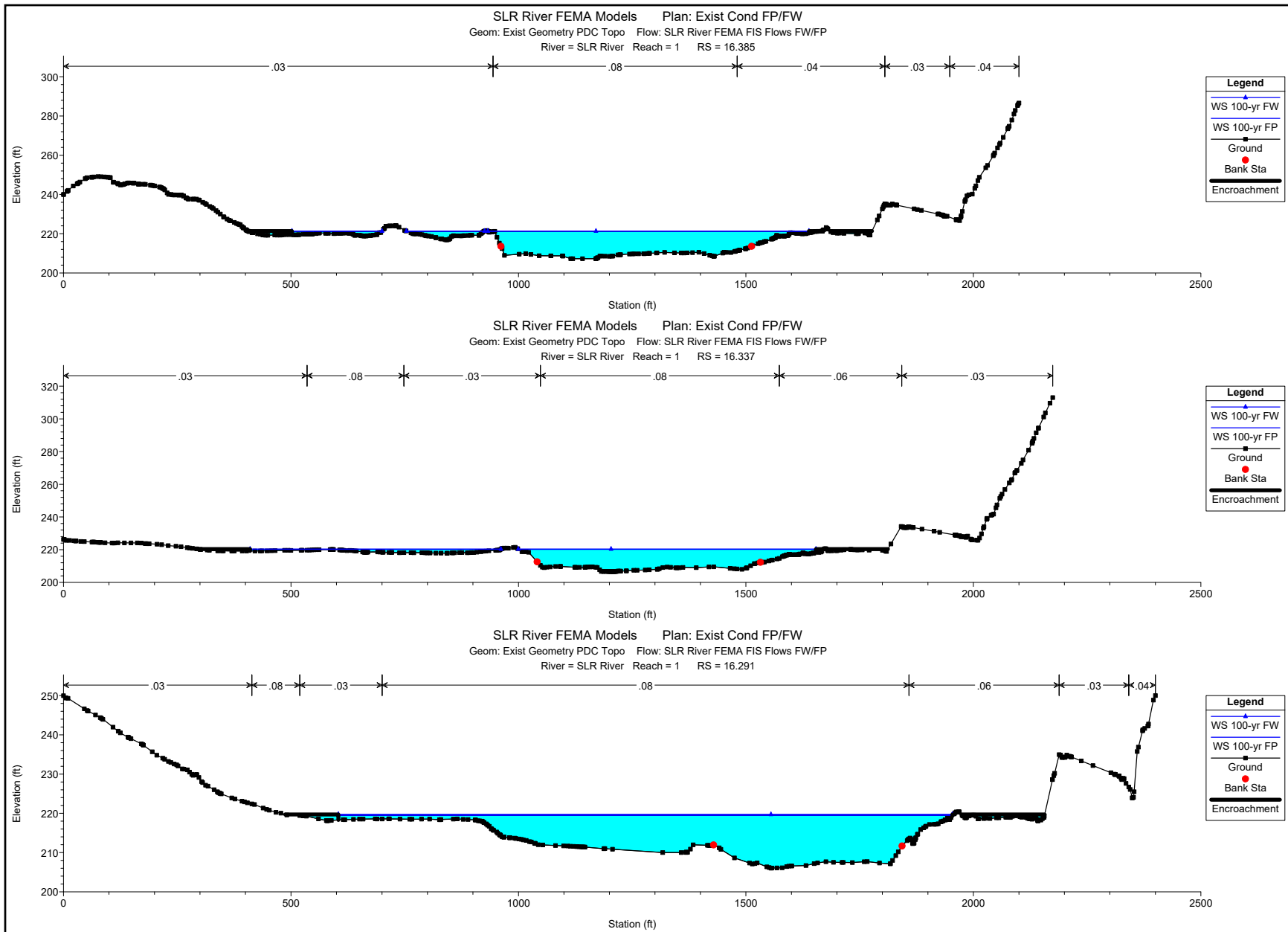
HEC-RAS Plan: EC FPFW River: SLR River Reach: 1 (Continued)

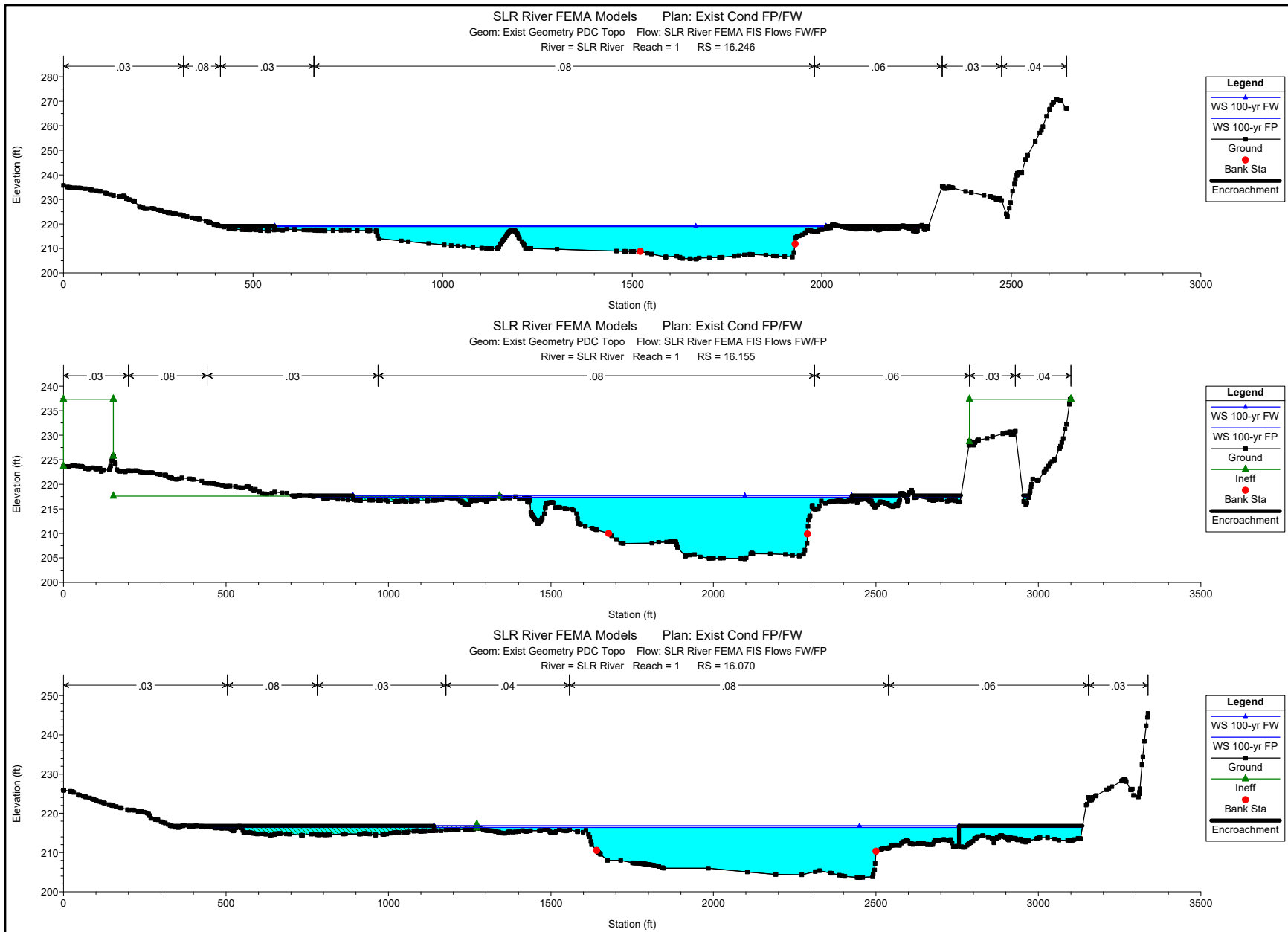
Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Wdth Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
1	14.789	100-yr FP	195.88		196.21	2306.09	20322.63	19532.60	1144.78		2371.61	2858.00	
1	14.789	100-yr FW	196.80	0.92	197.14	1583.80	17834.85	20848.49	2316.66	1712.02	2371.61	2858.00	3298.14
1	14.690	100-yr FP	194.21		194.57	2545.51	27693.81	12938.17	368.02		2488.64	2846.71	
1	14.690	100-yr FW	195.17	0.96	195.66	1485.16	25380.52	14736.09	883.38	1642.40	2488.64	2846.71	3177.12
1	14.583	100-yr FP	192.36		192.64	2555.37	27187.98	13545.75	266.27		2540.46	2920.48	
1	14.583	100-yr FW	193.53	1.17	193.87	1560.82	24913.06	15643.35	443.60	1416.73	2540.46	2920.48	2977.55
1	14.477	100-yr FP	190.55		190.82	2435.15	28782.10	12217.78	0.12		2494.21	2811.99	
1	14.477	100-yr FW	191.87	1.32	192.20	1587.45	27469.84	13530.16		1183.43	2494.21	2811.99	2770.88
1	14.322	100-yr FP	187.83		188.21	2327.03	29597.35	11401.63	1.01		2133.85	2426.75	
1	14.322	100-yr FW	189.44	1.62	189.80	1674.65	27069.42	13930.58		750.75	2133.85	2426.75	2425.40
1	14.215	100-yr FP	186.27		186.54	2232.62	29506.78	11492.86	0.36		2010.74	2351.21	
1	14.215	100-yr FW	187.82	1.55	188.12	1641.44	25390.34	15604.39	5.28	714.88	2010.74	2351.21	2412.57
1	14.134	100-yr FP	185.01		185.29	2183.90	27475.31	13524.25	0.44		2046.86	2399.04	
1	14.134	100-yr FW	186.38	1.37	186.71	1579.71	23022.32	17972.50	5.17	823.99	2046.86	2399.04	2449.92
1	14.053	100-yr FP	183.25		183.62	1985.09	28496.14	12503.64	0.22		1970.64	2269.53	
1	14.053	100-yr FW	184.36	1.11	184.78	1527.29	24664.84	16331.98	3.18	746.04	1970.64	2269.53	2315.39
1	13.827	100-yr FP	181.72		182.07	2069.46	39164.56	1835.44			1672.90	2123.30	
1	13.827	100-yr FW	182.72	1.00	183.14	1646.92	37878.90	3121.10		476.38	1672.90	2123.30	2123.30

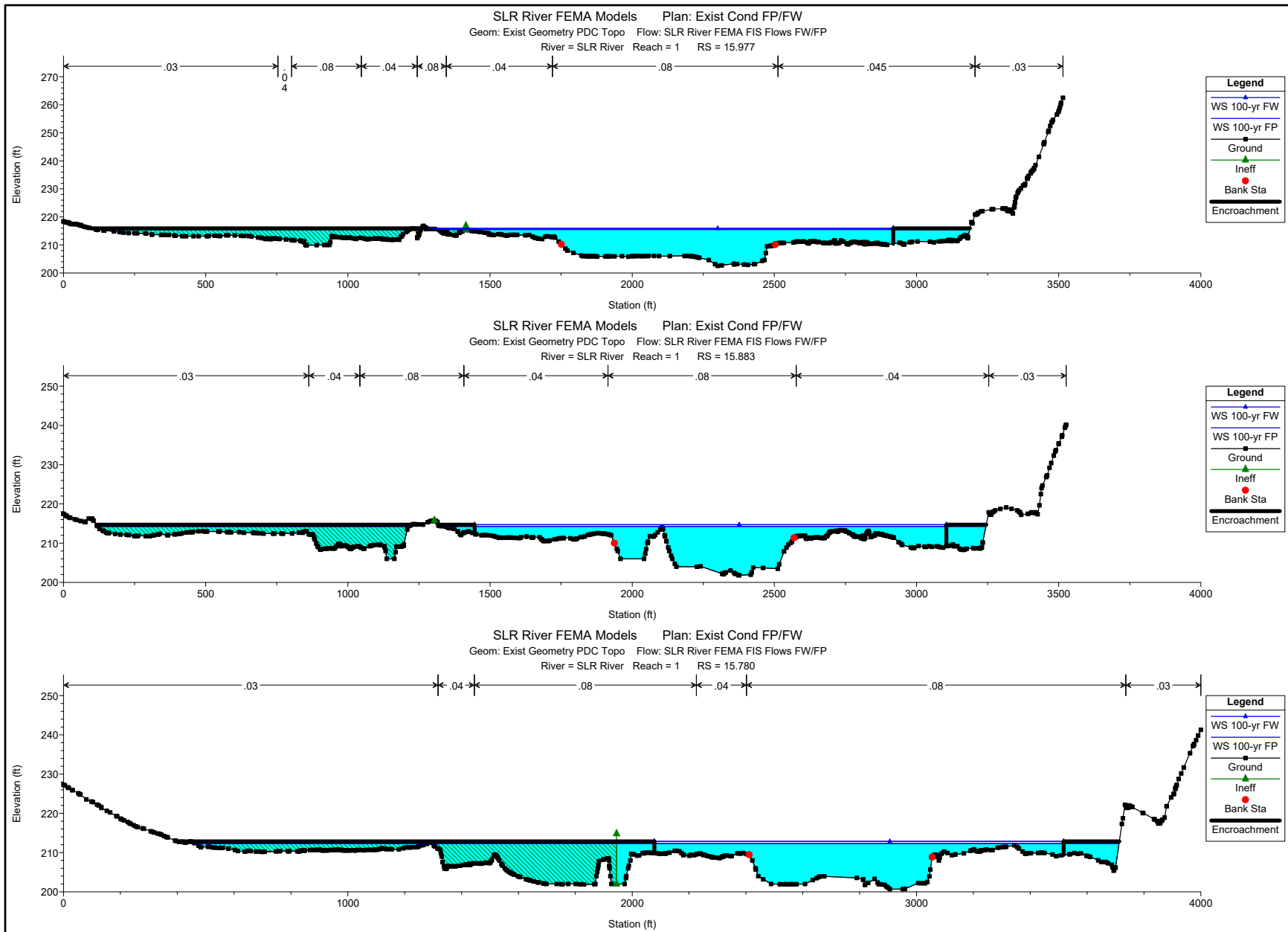


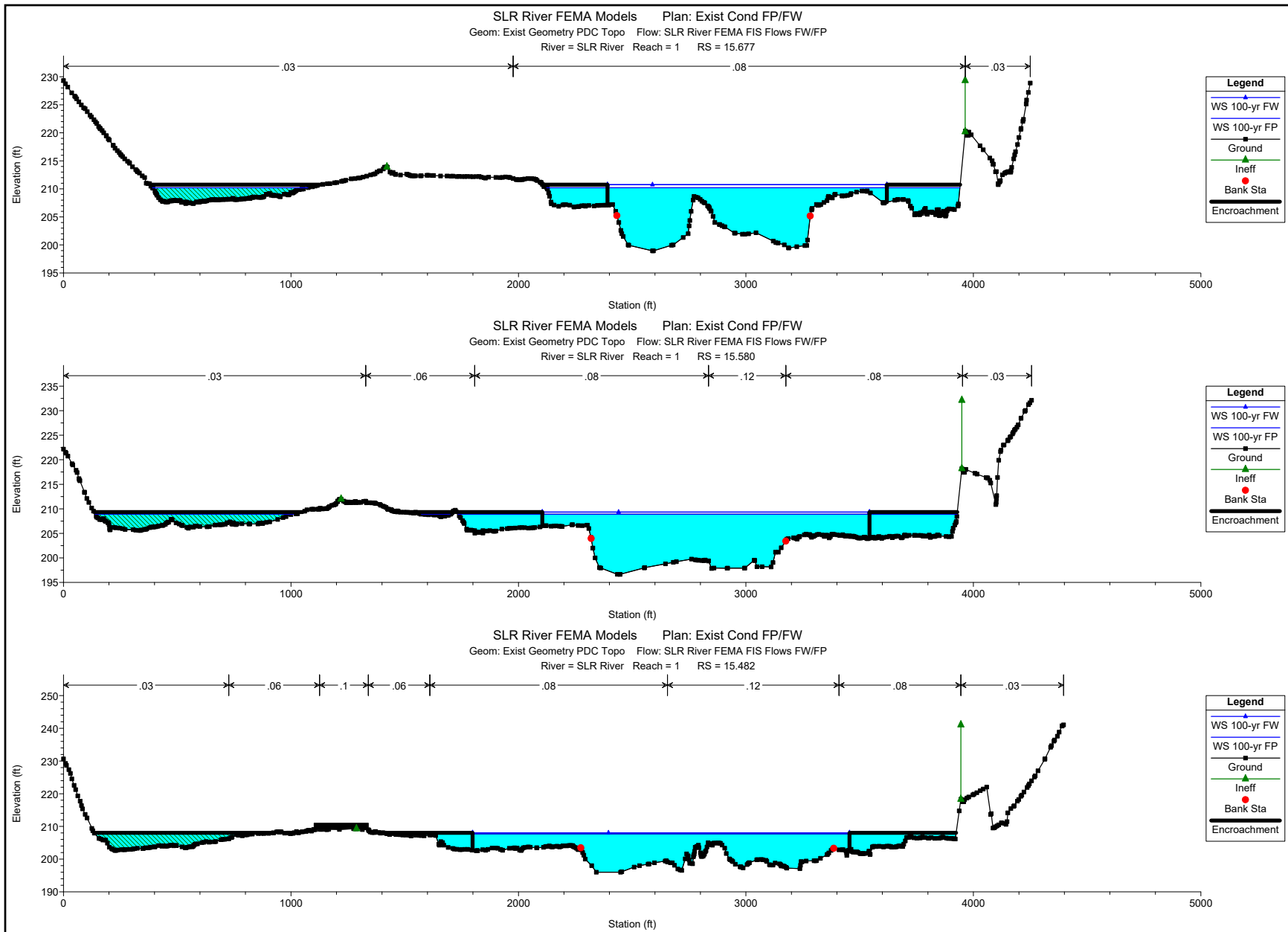


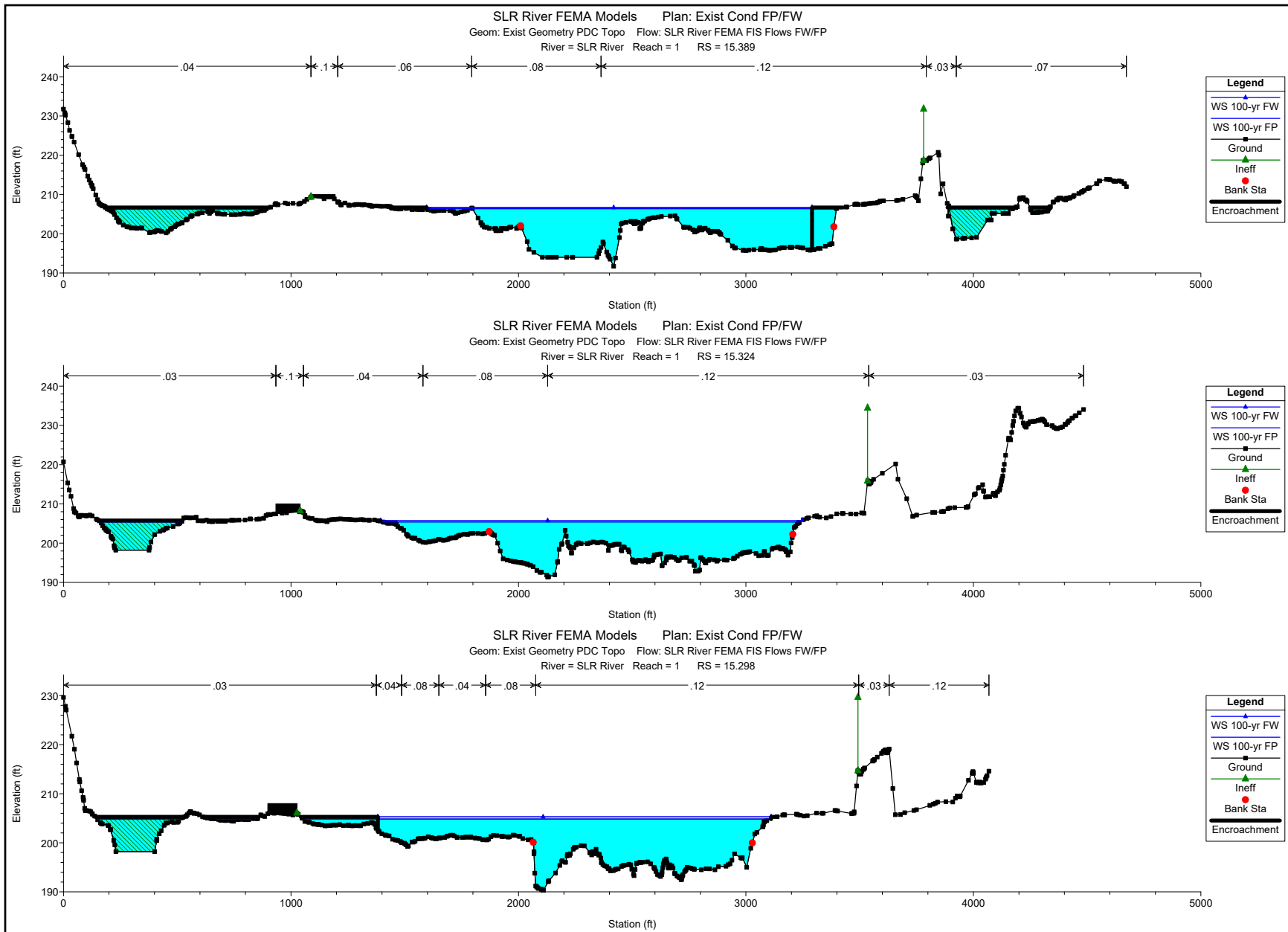


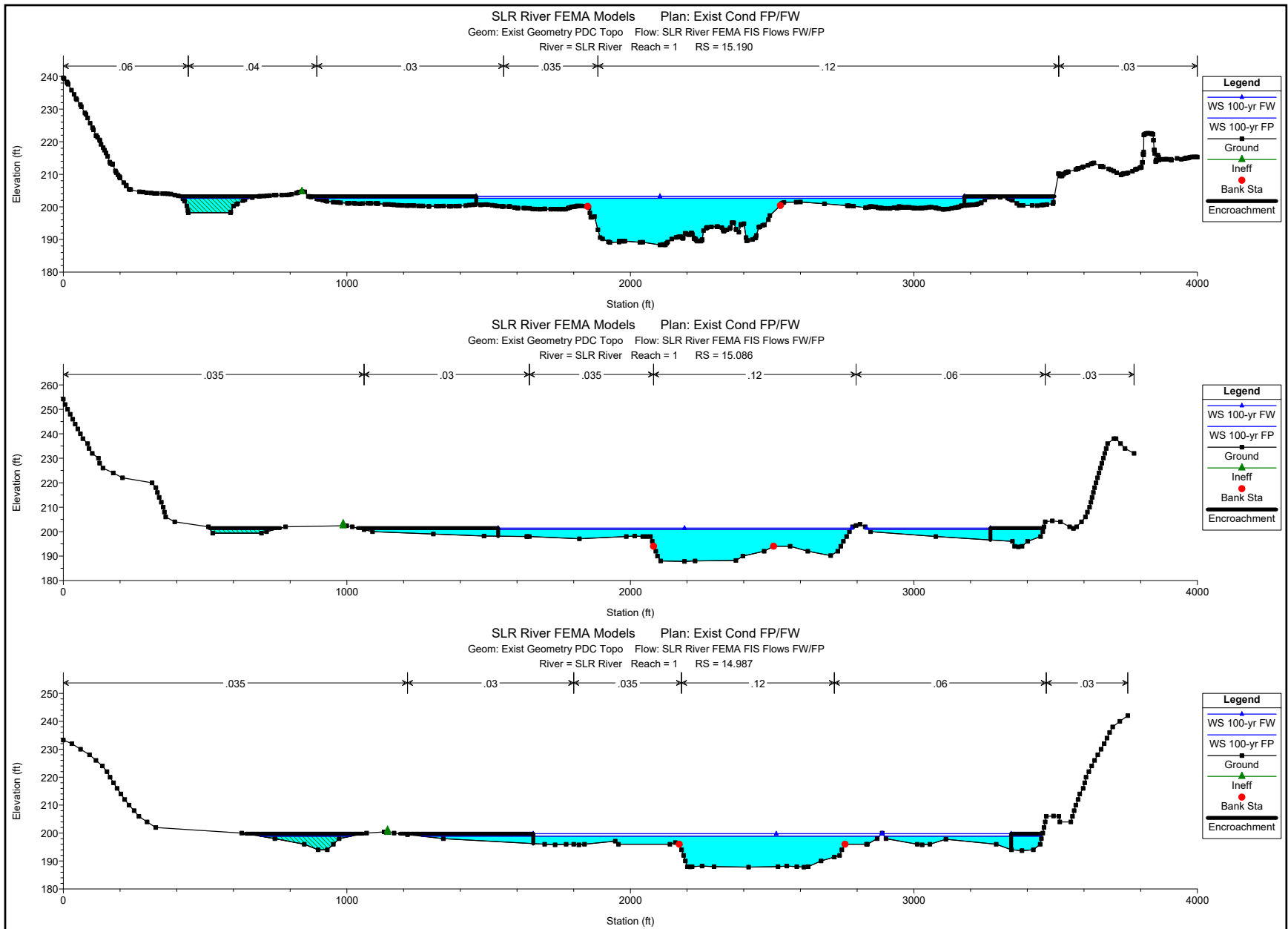


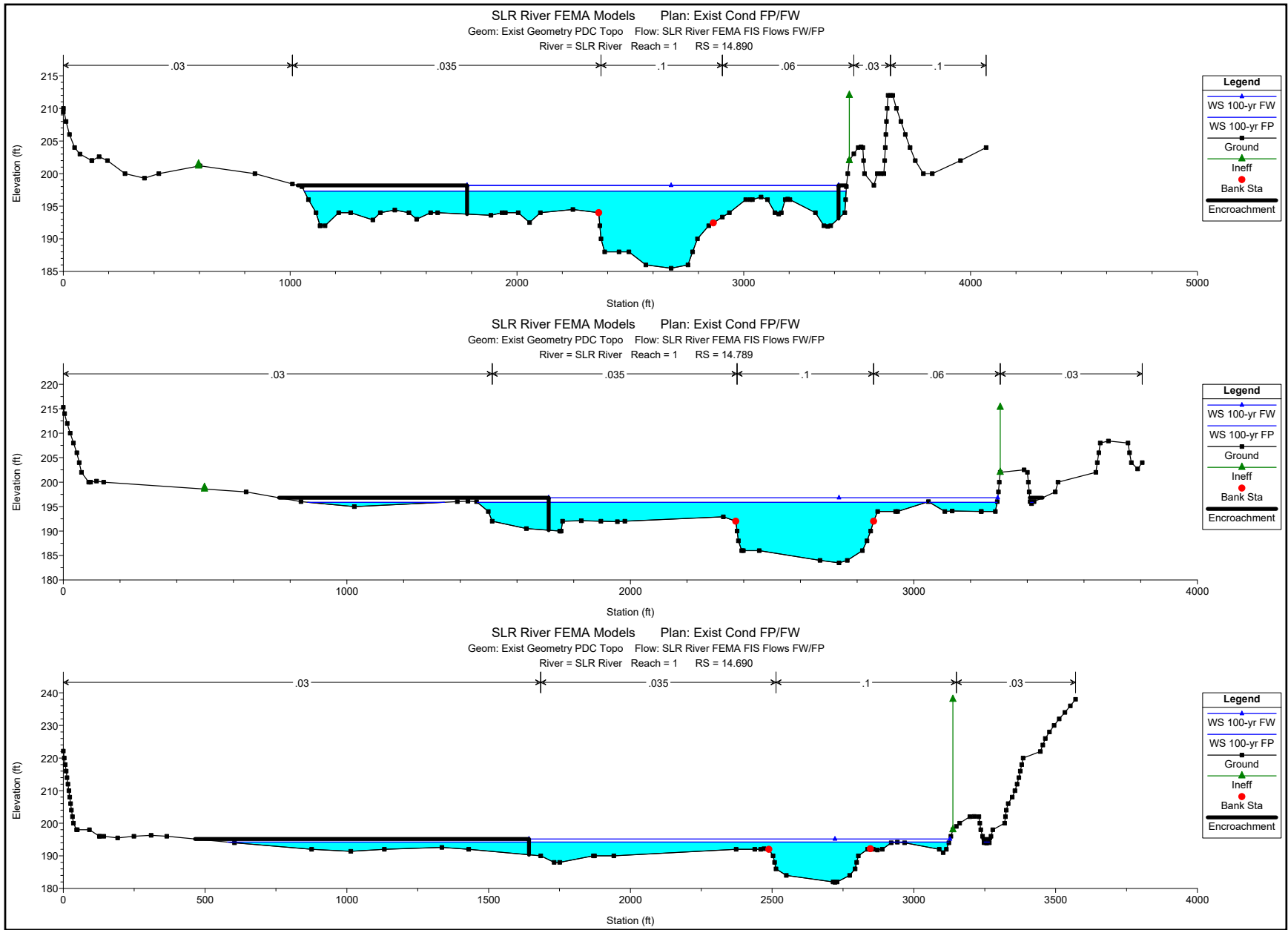


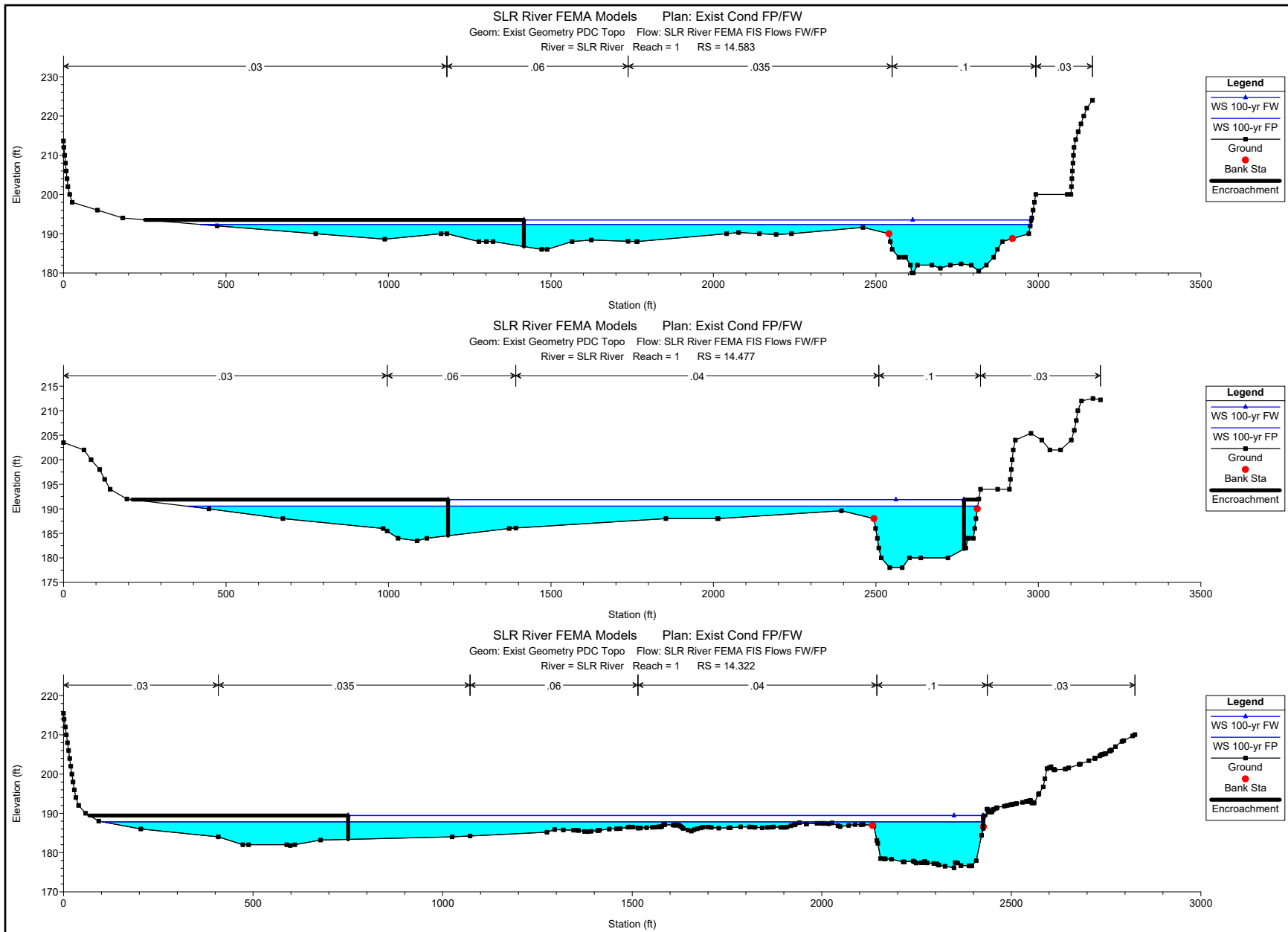


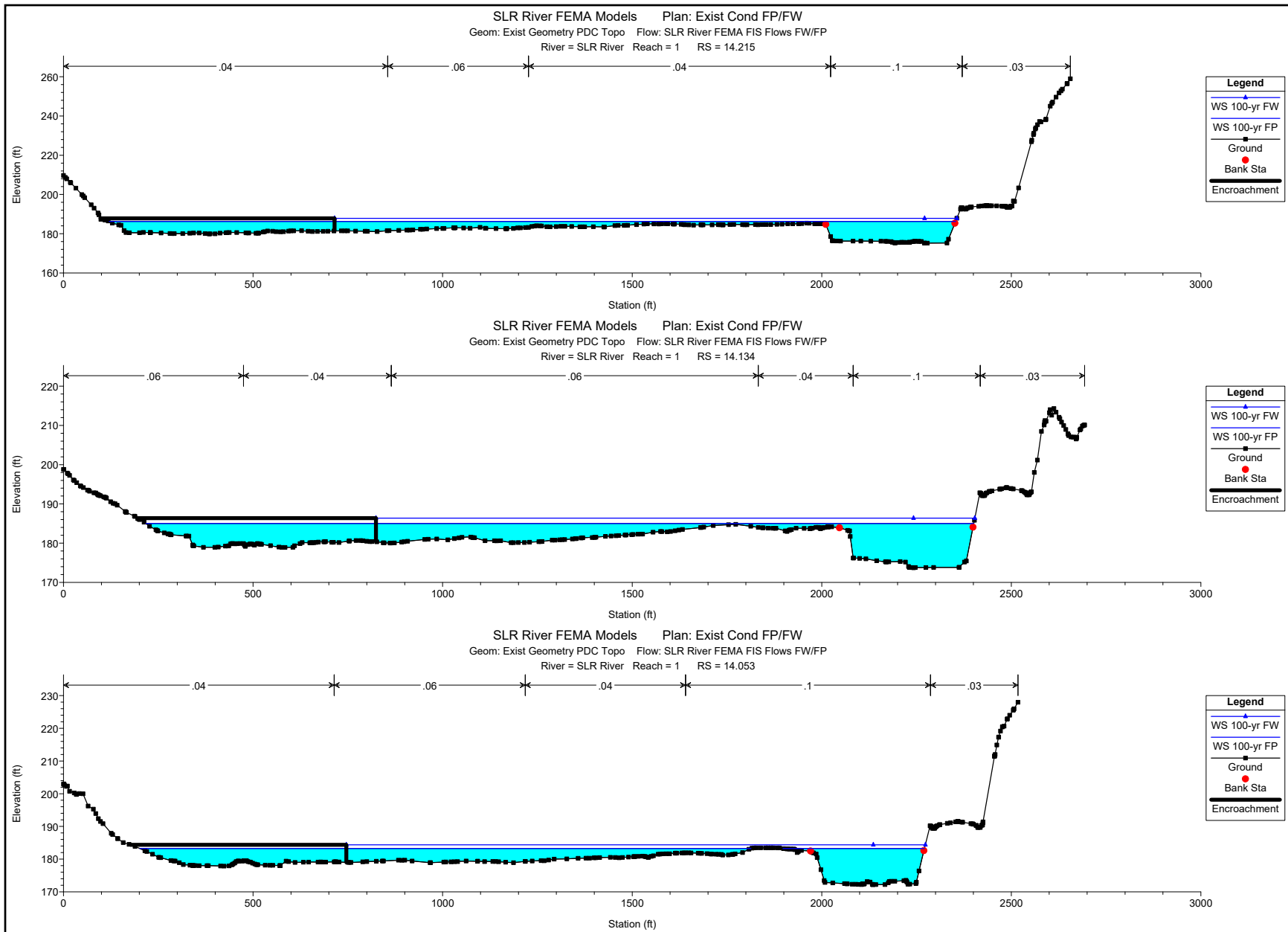




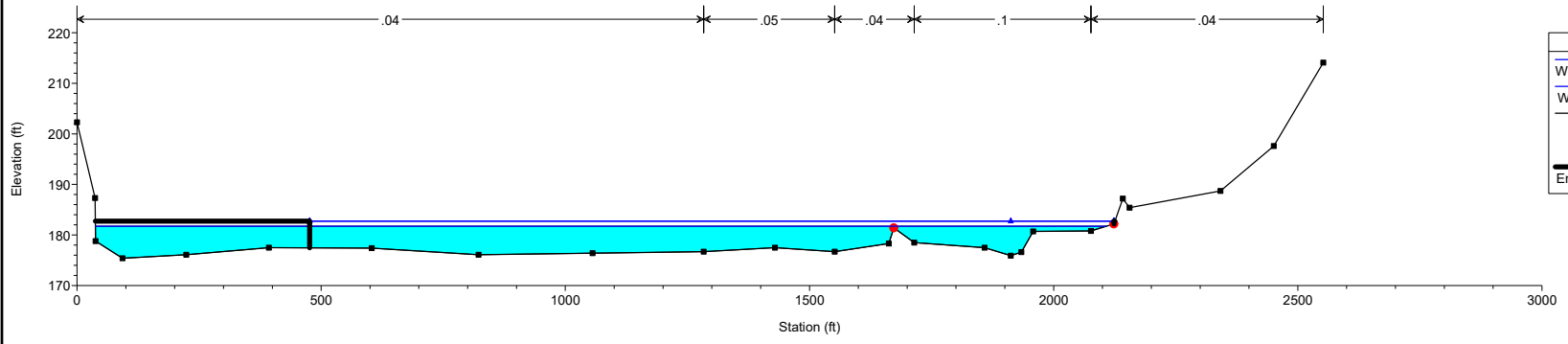








SLR River FEMA Models Plan: Exist Cond FP/FW
Geom: Exist Geometry PDC Topo Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 13.827



EXISTING CONDITION HEC-RAS WITH ADJUSTED FLOODWAY

HEC-RAS Plan: EC Adj FW River: SLR River Reach: 1

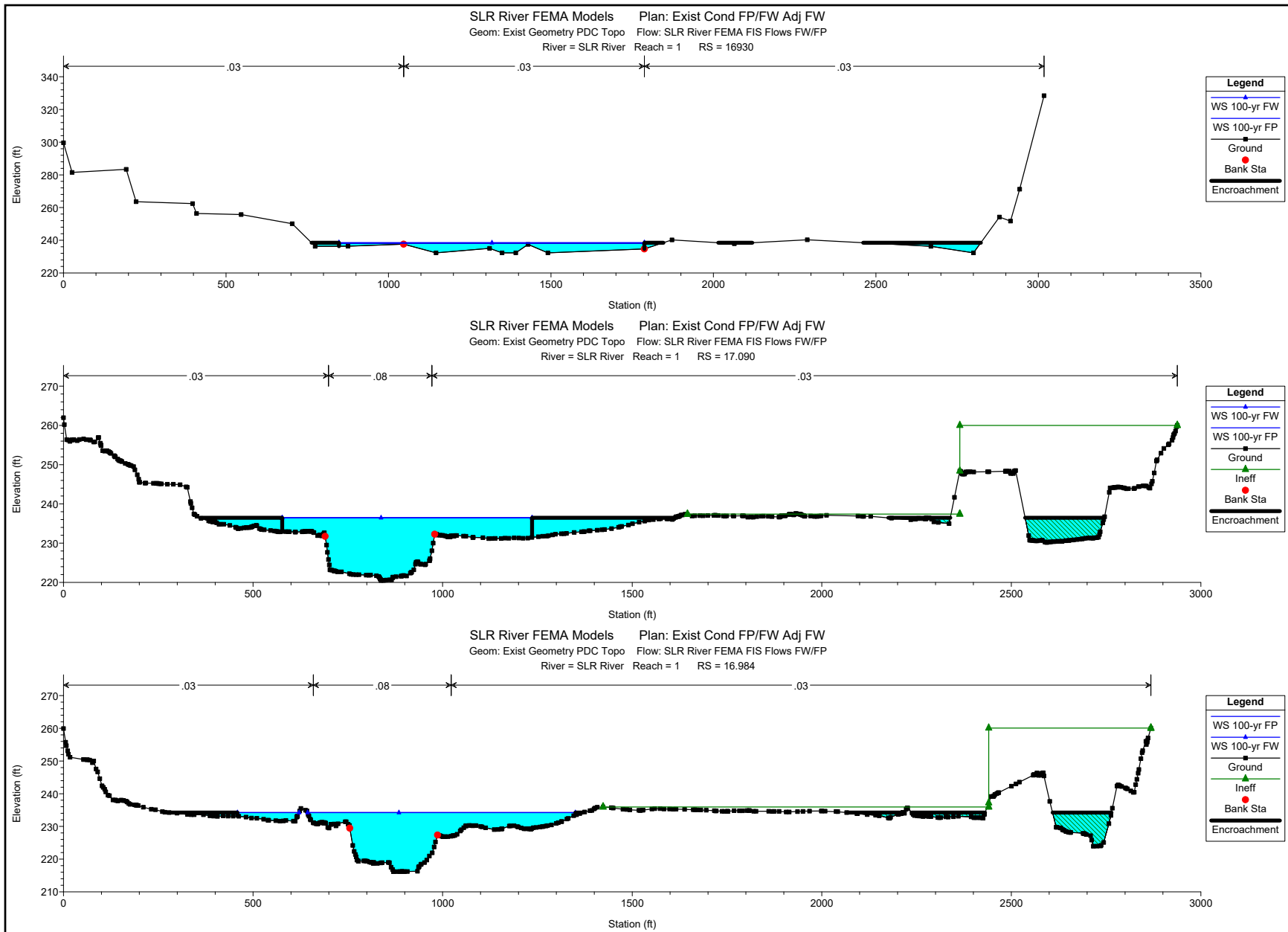
Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Wdth Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
1	16930	100-yr FP	238.12		239.69	1438.98	1878.59	33625.55	5495.86		1046.90	1787.50	
1	16930	100-yr FW	238.49	0.37	240.47	940.00	1755.32	39244.68		847.50	1046.90	1787.50	1787.50
1	17.090	100-yr FP	236.44		236.97	1251.73	4532.84	22625.63	13841.53		690.22	979.03	
1	17.090	100-yr FW	236.45	0.01	237.31	659.35	3096.10	26632.28	11271.61	576.71	690.22	979.03	1236.06
1	16.984	100-yr FP	234.24		235.04	1068.65	2827.97	25616.77	12555.26		755.11	986.86	
1	16.984	100-yr FW	234.24	0.00	235.05	869.31	2674.71	25504.16	12821.13	458.77	755.11	986.86	1350.22
1	16.882	100-yr FP	232.21		232.83	1074.99	4361.56	33698.11	2940.34		778.16	1123.80	
1	16.882	100-yr FW	232.21	0.00	232.85	839.12	4135.30	33798.13	3066.56	487.69	778.16	1123.80	1326.81
1	16.779	100-yr FP	229.45		230.33	1003.44	2934.87	37692.25	372.87		857.01	1218.06	
1	16.779	100-yr FW	229.54	0.08	230.39	887.26	3252.15	37363.73	384.11	390.35	857.01	1218.06	1474.88
1	16.682	100-yr FP	227.37		227.98	1198.85	3621.17	37039.04	339.79		971.97	1392.82	
1	16.682	100-yr FW	227.61	0.24	228.18	910.06	4288.98	36357.06	353.96	497.06	971.97	1392.82	1759.46
1	16.573	100-yr FP	224.88		225.52	1803.34	3119.02	32384.54	5496.44		890.25	1267.01	
1	16.573	100-yr FW	225.07	0.19	225.78	1325.17	2959.72	34102.34	3937.94	302.10	890.25	1267.01	1627.27
1	16.499	100-yr FP	223.29		223.79	1596.00	788.74	36739.25	3472.02		874.65	1422.09	
1	16.499	100-yr FW	223.43	0.14	223.97	1177.71	965.97	38295.28	1738.75	379.49	874.65	1422.09	1557.20
1	16.430	100-yr FP	221.99		222.47	1282.24	2374.03	37916.24	709.73		624.05	1192.52	
1	16.430	100-yr FW	222.10	0.11	222.60	993.75	1562.06	38944.02	493.91	257.21	624.05	1192.52	1292.11
1	16.385	100-yr FP	221.25		221.69	1285.13	3544.43	35649.05	1806.53		961.62	1512.48	
1	16.385	100-yr FW	221.37	0.12	221.81	1075.96	3225.93	35916.41	1857.65	502.05	961.62	1512.48	1638.56
1	16.337	100-yr FP	220.20		220.76	1466.07	3380.60	35365.80	2253.61		1041.13	1532.14	
1	16.337	100-yr FW	220.38	0.18	220.92	1205.66	3612.30	35169.95	2217.74	410.11	1041.13	1532.14	1653.86
1	16.291	100-yr FP	219.46		219.80	1611.64	13792.67	25956.52	1250.81		1428.99	1843.40	
1	16.291	100-yr FW	219.71	0.25	220.03	1349.53	14085.75	25672.09	1242.16	604.07	1428.99	1843.40	1953.60
1	16.246	100-yr FP	218.94		219.17	1821.24	18413.86	22092.45	493.69		1521.38	1929.65	
1	16.246	100-yr FW	219.23	0.29	219.45	1454.04	18604.83	22043.98	351.19	557.19	1521.38	1929.65	2011.23
1	16.155	100-yr FP	217.36		217.82	1365.83	2753.45	37561.61	684.94		1677.51	2289.62	
1	16.155	100-yr FW	217.74	0.38	218.19	1534.46	1926.25	38567.56	506.19	891.00	1677.51	2289.62	2425.46

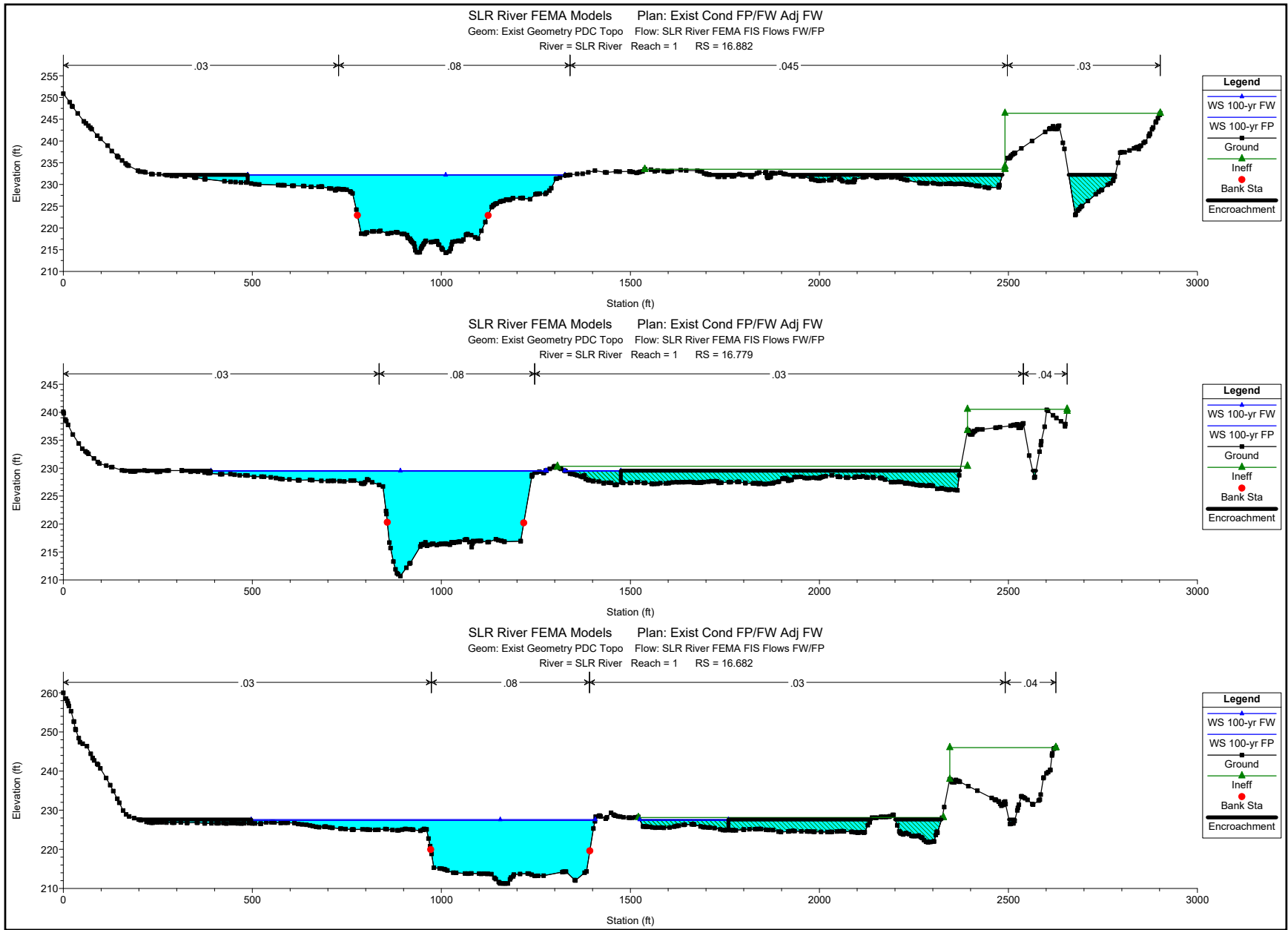
HEC-RAS Plan: EC Adj FW River: SLR River Reach: 1 (Continued)

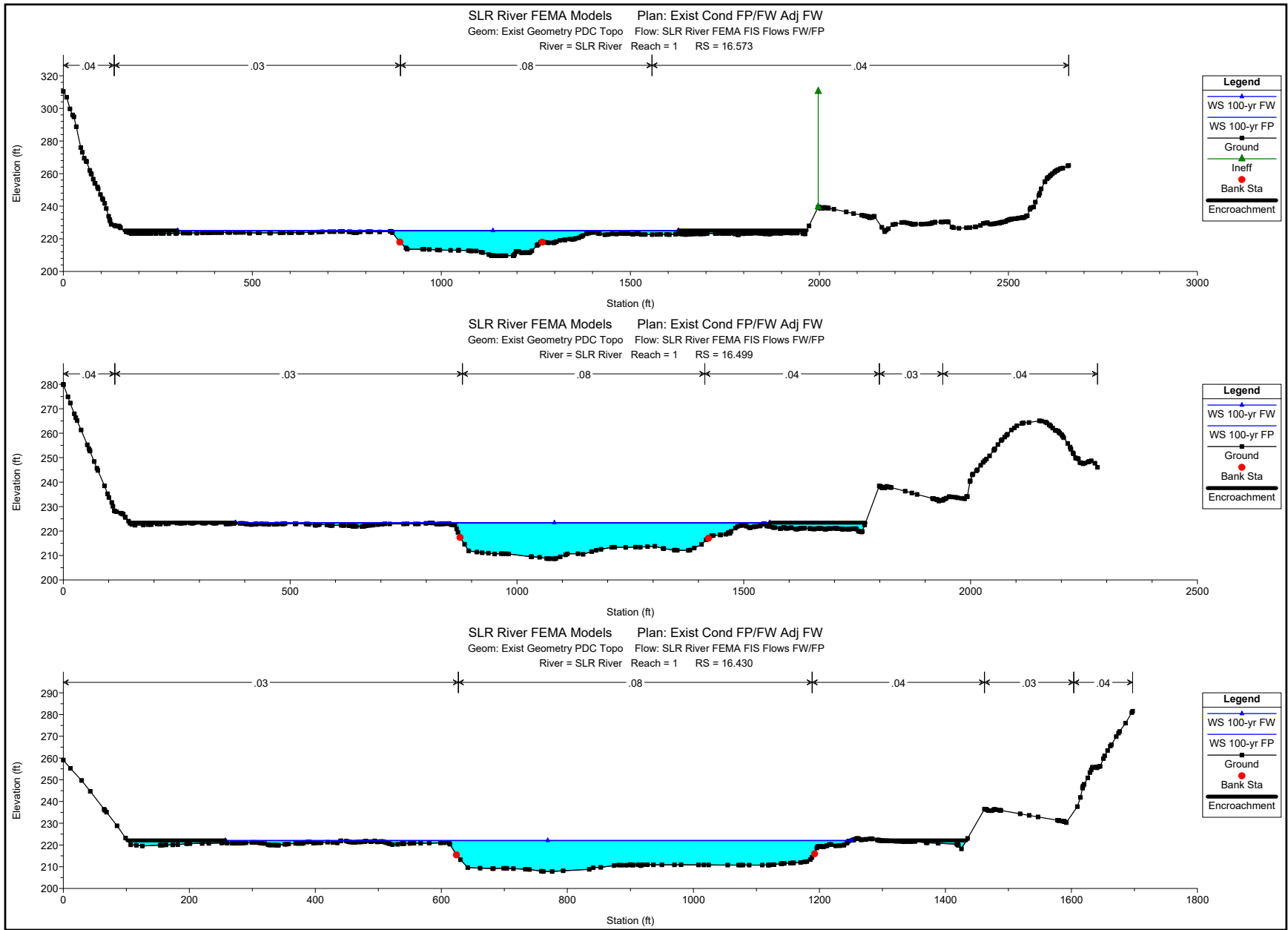
Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Wdth Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
1	16.070	100-yr FP	216.40		216.61	1863.19	572.73	35185.66	5241.62		1640.67	2500.49	
1	16.070	100-yr FW	216.82	0.42	217.04	1483.73	967.93	36858.43	3173.64	1140.26	1640.67	2500.49	2755.73
1	15.977	100-yr FP	215.50		215.71	1771.72	1560.67	27662.19	11777.14		1751.20	2503.79	
1	15.977	100-yr FW	215.92	0.42	216.15	1502.58	2172.27	29891.16	8936.57	1280.19	1751.20	2503.79	2917.72
1	15.883	100-yr FP	214.24		214.54	1900.90	5247.94	24360.97	11391.09		1937.28	2569.26	
1	15.883	100-yr FW	214.71	0.46	215.01	1659.27	6396.29	25673.21	8930.50	1445.83	1937.28	2569.26	3105.10
1	15.780	100-yr FP	212.31		212.66	1767.29	5463.84	31858.53	3677.62		2411.57	3055.03	
1	15.780	100-yr FW	212.86	0.55	213.24	1439.47	4443.34	33917.52	2639.14	2077.91	2411.57	3055.03	3517.38
1	15.677	100-yr FP	210.19		210.52	1816.21	2347.59	34818.65	3833.77		2432.96	3282.76	
1	15.677	100-yr FW	210.79	0.60	211.17	1228.15	463.19	38934.15	1602.66	2391.39	2432.96	3282.76	3619.54
1	15.580	100-yr FP	208.91		209.06	2319.50	2724.12	30658.29	7617.58		2319.61	3175.40	
1	15.580	100-yr FW	209.42	0.52	209.63	1438.41	1141.75	35083.72	4774.53	2105.08	2319.61	3175.40	3543.49
1	15.482	100-yr FP	207.70		207.85	2483.75	6627.84	30900.29	3471.87		2274.15	3386.11	
1	15.482	100-yr FW	208.16	0.46	208.33	1657.00	6097.60	33976.46	925.94	1798.19	2274.15	3386.11	3455.19
1	15.389	100-yr FP	206.38		206.55	1899.89	2476.57	38496.15	27.27		2009.42	3386.85	
1	15.389	100-yr FW	206.90	0.52	207.07	1694.40	3022.55	37977.45		1596.34	2009.42	3386.85	3290.74
1	15.324	100-yr FP	205.40		205.55	1832.81	4331.02	36648.78	20.20		1870.78	3206.32	
1	15.324	100-yr FW	206.10	0.71	206.23	1865.52	5170.21	35792.28	37.51	1393.21	1870.78	3206.32	3492.00
1	15.298	100-yr FP	204.85		205.02	2058.98	11317.63	29539.59	142.78		2065.18	3028.55	
1	15.298	100-yr FW	205.66	0.81	205.82	1620.86	10032.33	30719.53	248.14	1490.00	2065.18	3028.55	3110.86
1	15.190	100-yr FP	202.65		202.90	2533.37	10461.92	28046.84	2491.24		1849.56	2529.33	
1	15.190	100-yr FW	203.64	0.99	203.92	1527.99	5084.08	32291.76	3624.16	1650.00	1849.56	2529.33	3177.99
1	15.086	100-yr FP	200.88		201.09	2335.97	12197.07	17191.66	11611.27		2082.00	2505.09	
1	15.086	100-yr FW	201.73	0.85	202.02	1471.03	8636.25	20521.62	11842.13	1750.00	2082.00	2505.09	3269.78
1	14.987	100-yr FP	198.89		199.19	2172.37	10919.27	24183.27	5897.46		2172.54	2757.25	
1	14.987	100-yr FW	199.89	1.00	200.21	1591.49	9849.31	25014.37	6136.32	1750.00	2172.54	2757.25	3343.11
1	14.890	100-yr FP	197.31		197.56	2389.11	21048.25	16145.71	3806.04		2360.44	2865.81	
1	14.890	100-yr FW	198.22	0.91	198.55	1587.52	13711.10	21035.15	6253.75	1830.00	2360.44	2865.81	3417.52

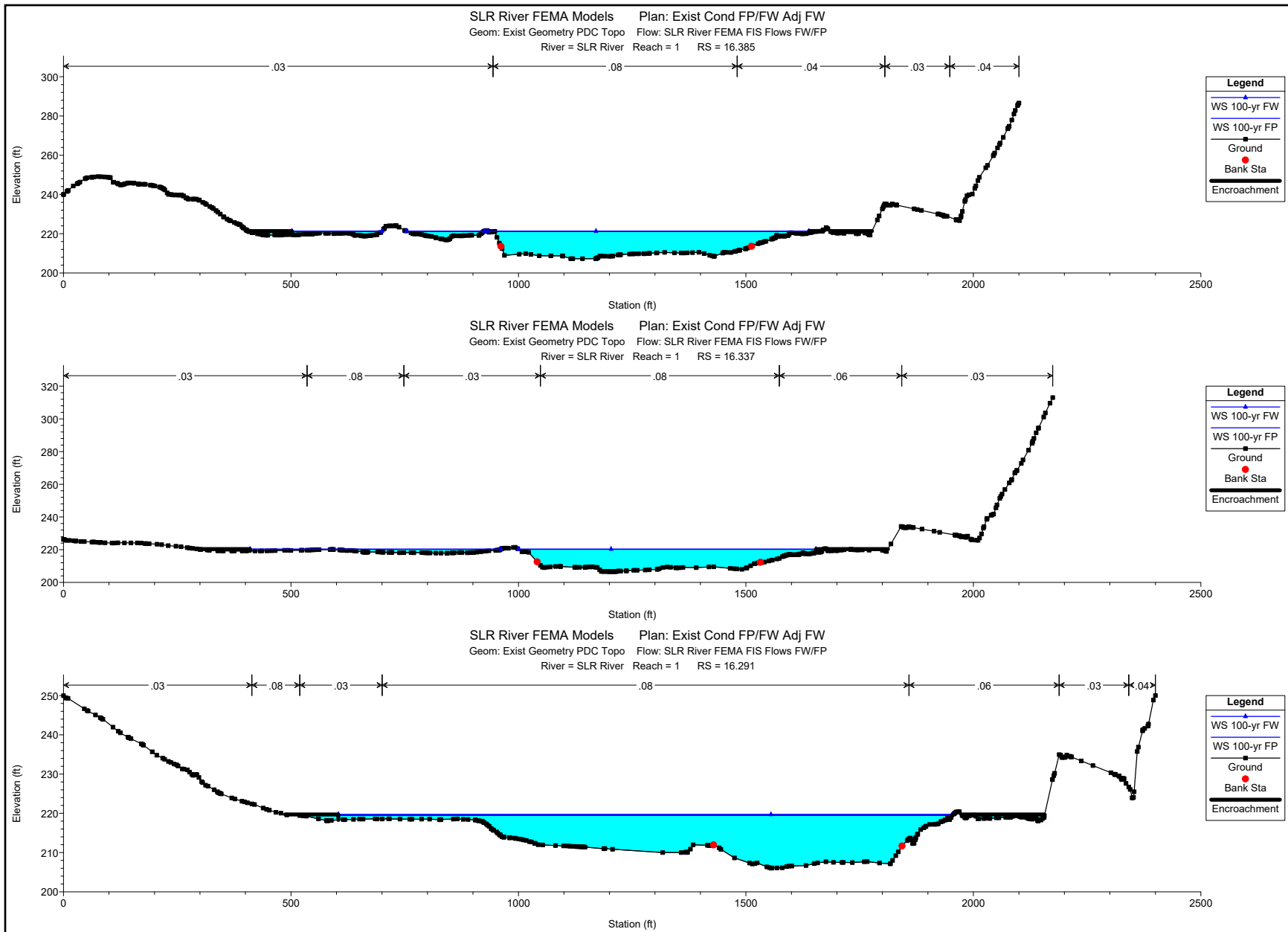
HEC-RAS Plan: EC Adj FW River: SLR River Reach: 1 (Continued)

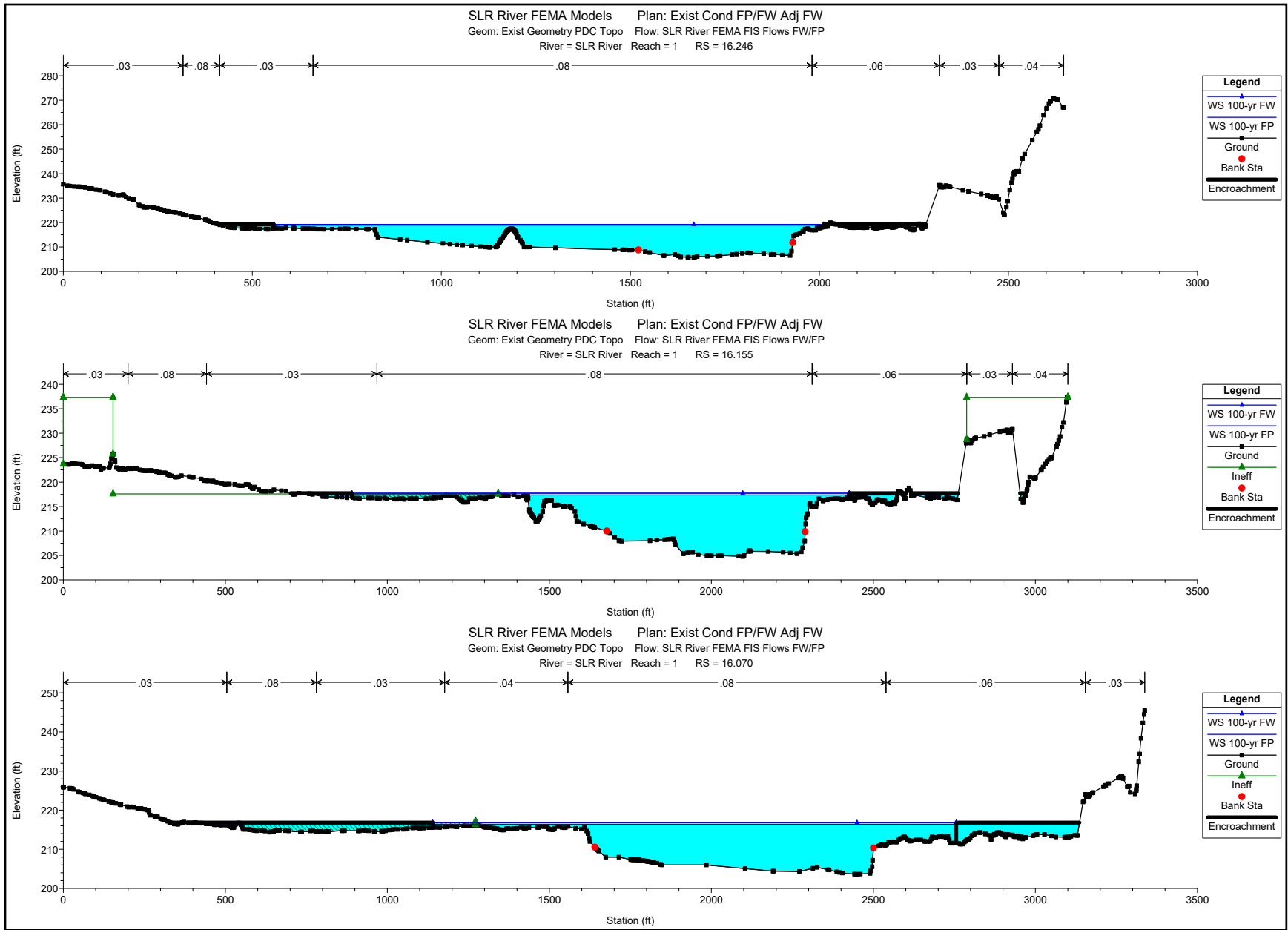
Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Wdth Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
1	14.789	100-yr FP	195.88		196.21	2306.09	20322.63	19532.60	1144.78		2371.61	2858.00	
1	14.789	100-yr FW	196.74	0.86	197.09	1565.70	17254.24	21440.06	2305.70	1730.00	2371.61	2858.00	3298.14
1	14.690	100-yr FP	194.21		194.57	2545.51	27693.81	12938.17	368.02		2488.64	2846.71	
1	14.690	100-yr FW	195.06	0.85	195.56	1517.18	25642.58	14538.76	818.66	1610.00	2488.64	2846.71	3177.12
1	14.583	100-yr FP	192.36		192.64	2555.37	27187.98	13545.75	266.27		2540.46	2920.48	
1	14.583	100-yr FW	193.36	1.00	193.71	1592.55	24929.26	15646.41	424.33	1385.00	2540.46	2920.48	2977.55
1	14.477	100-yr FP	190.55		190.82	2435.15	28782.10	12217.78	0.12		2494.21	2811.99	
1	14.477	100-yr FW	191.39	0.84	191.76	1615.88	26654.52	14345.48		1155.00	2494.21	2811.99	2770.88
1	14.322	100-yr FP	187.83		188.21	2327.03	29597.35	11401.63	1.01		2133.85	2426.75	
1	14.322	100-yr FW	188.75	0.92	189.10	1875.40	28761.96	12238.04		550.00	2133.85	2426.75	2425.40
1	14.215	100-yr FP	186.27		186.54	2232.62	29506.78	11492.86	0.36		2010.74	2351.21	
1	14.215	100-yr FW	187.18	0.90	187.47	1839.99	26917.17	14080.49	2.35	515.00	2010.74	2351.21	2412.57
1	14.134	100-yr FP	185.01		185.29	2183.90	27475.31	13524.25	0.44		2046.86	2399.04	
1	14.134	100-yr FW	185.83	0.82	186.14	1787.59	25405.31	15592.32	2.37	615.00	2046.86	2399.04	2449.92
1	14.053	100-yr FP	183.25		183.62	1985.09	28496.14	12503.64	0.22		1970.64	2269.53	
1	14.053	100-yr FW	184.25	1.00	184.59	1733.09	27344.61	13653.11	2.28	540.00	1970.64	2269.53	2315.39
1	13.827	100-yr FP	181.72		182.07	2069.46	39164.56	1835.44			1672.90	2123.30	
1	13.827	100-yr FW	182.72	1.00	183.14	1646.92	37878.90	3121.10		476.38	1672.90	2123.30	2123.30

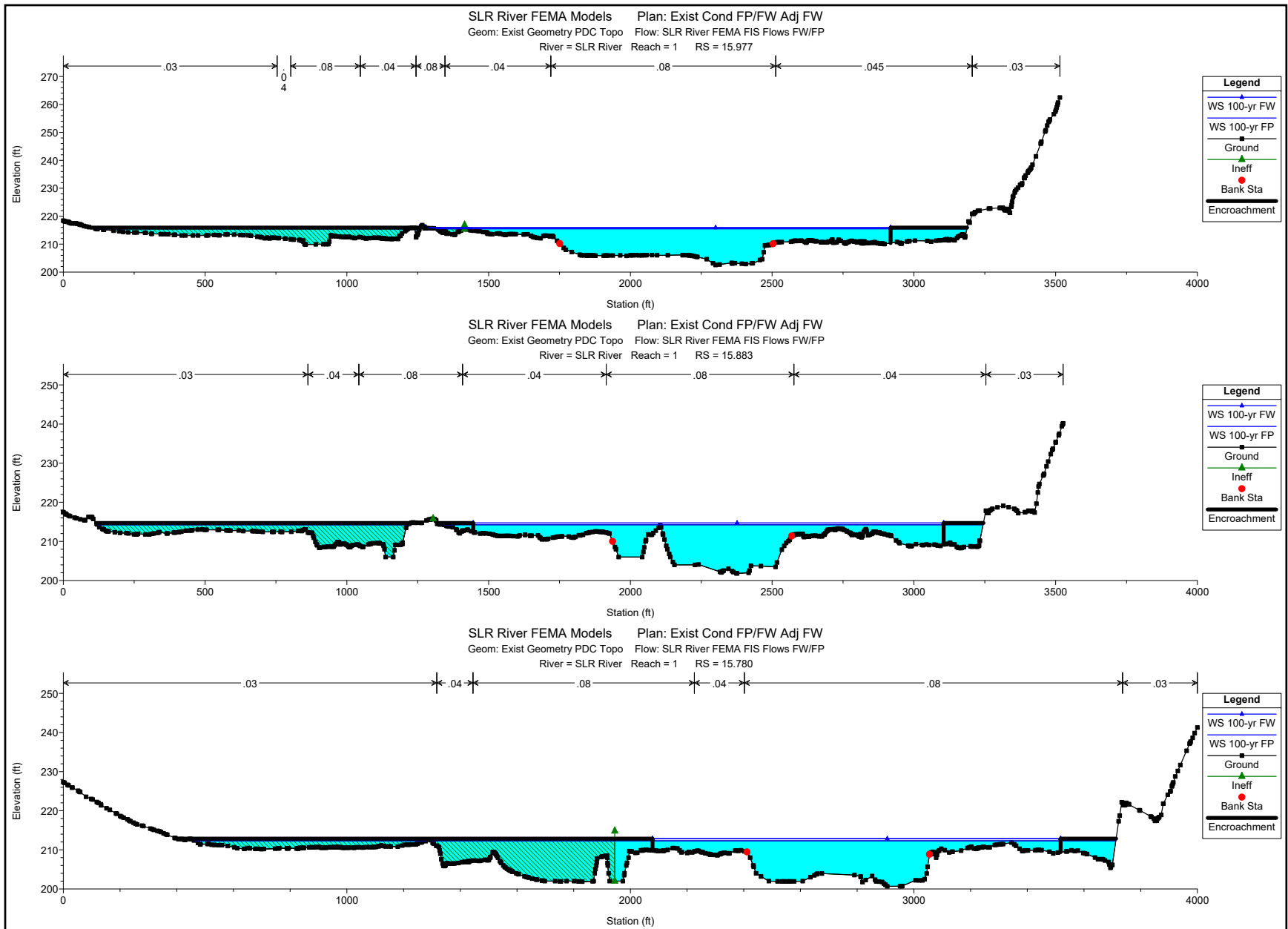


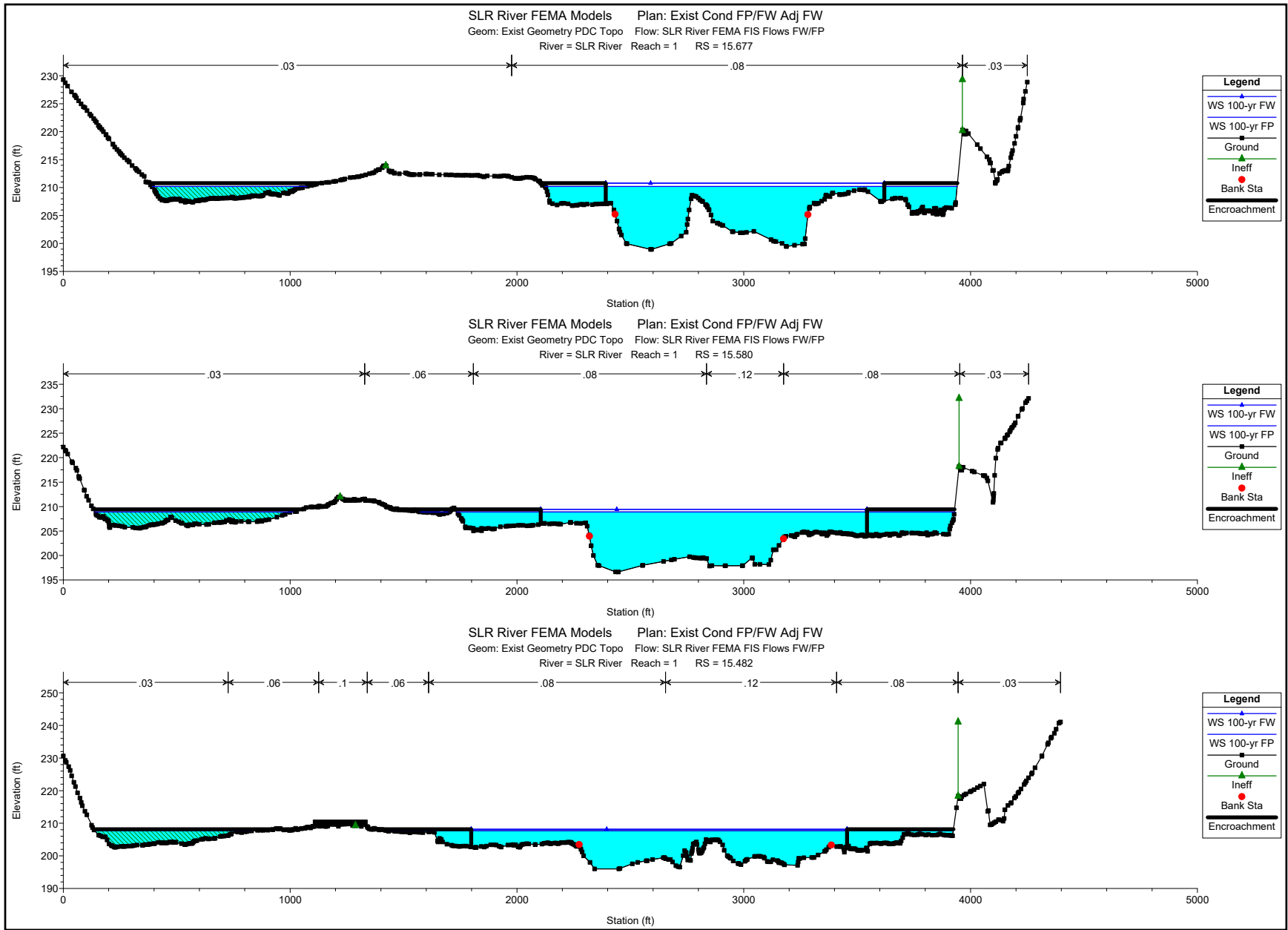


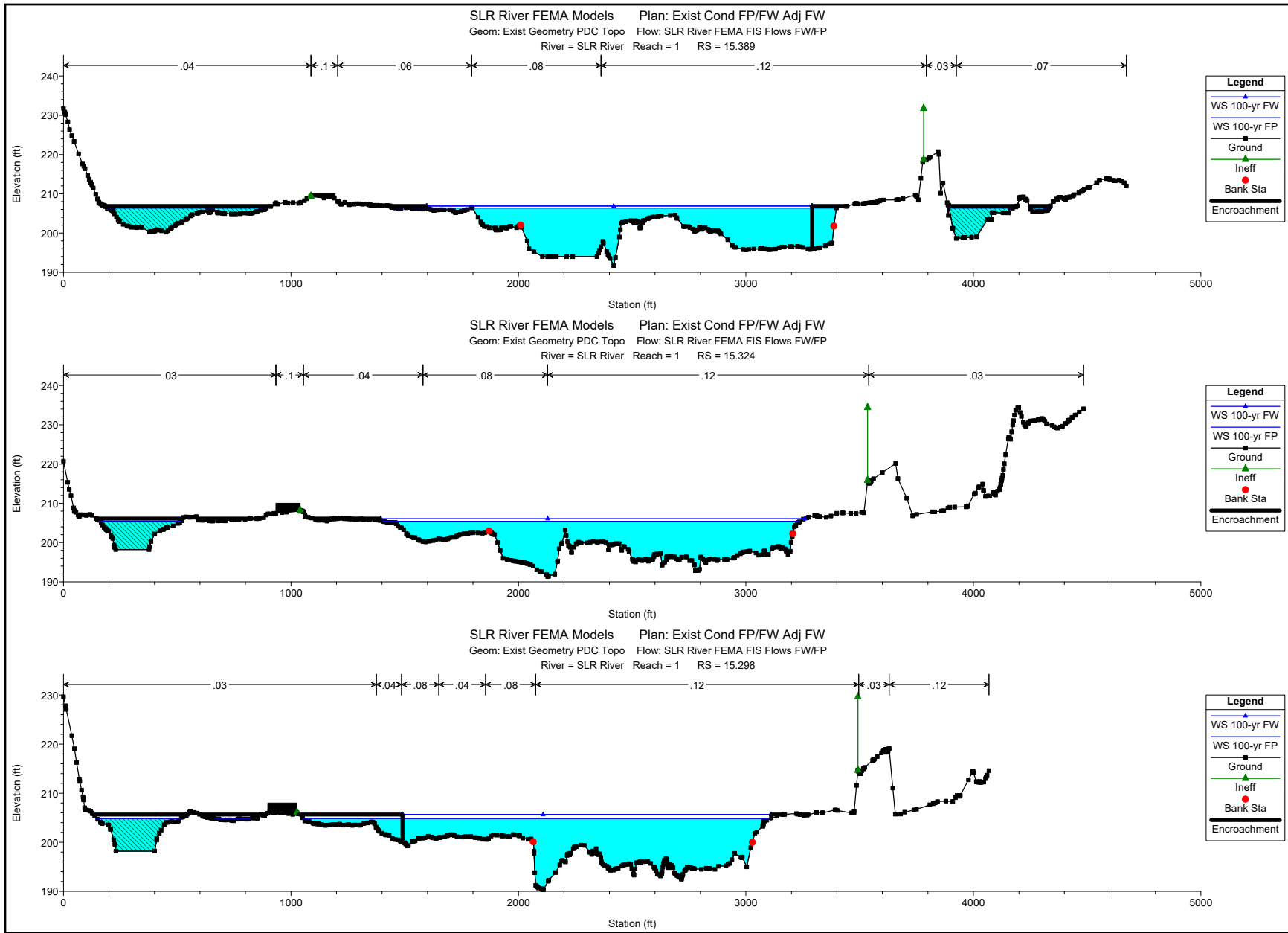


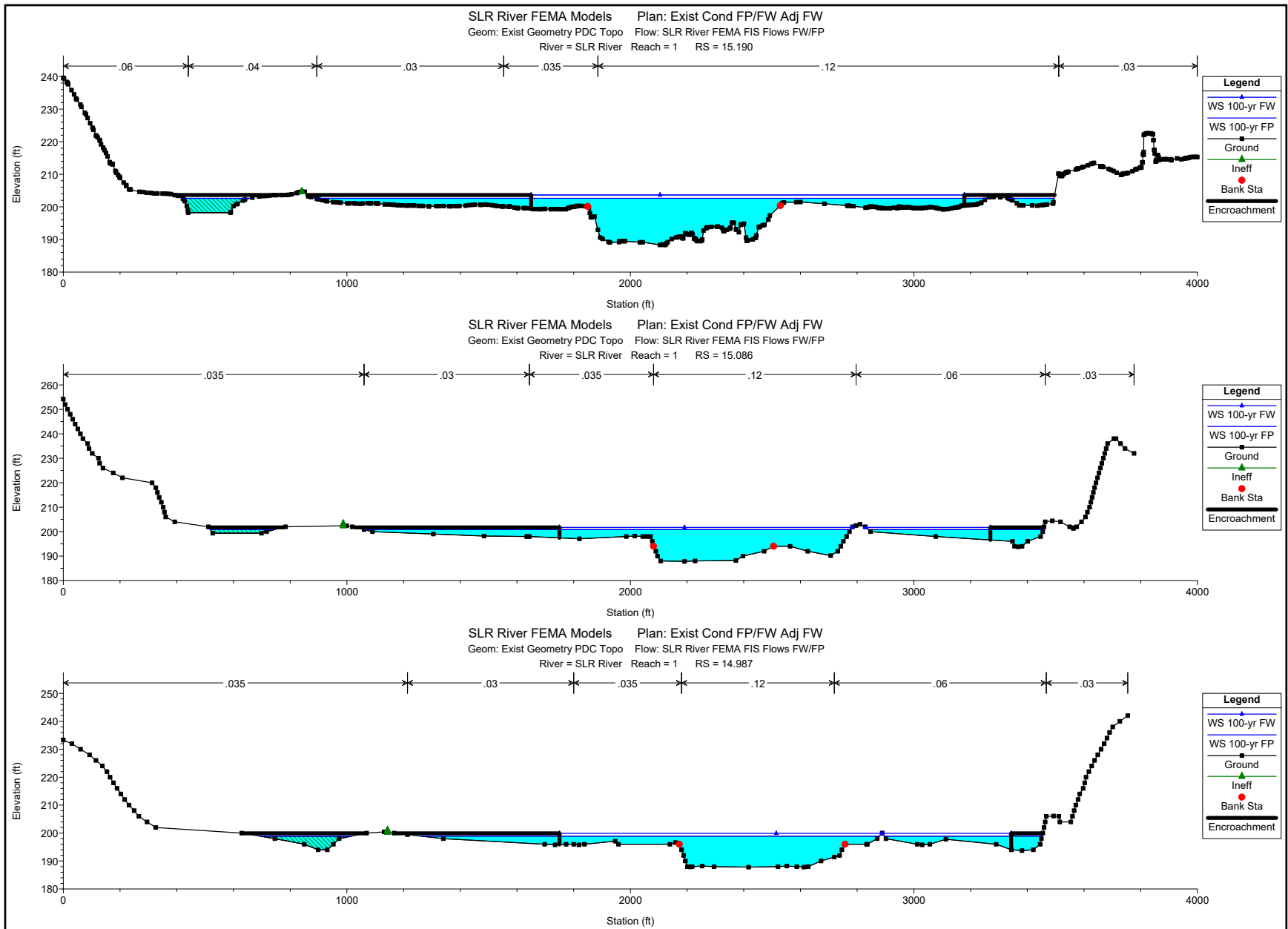


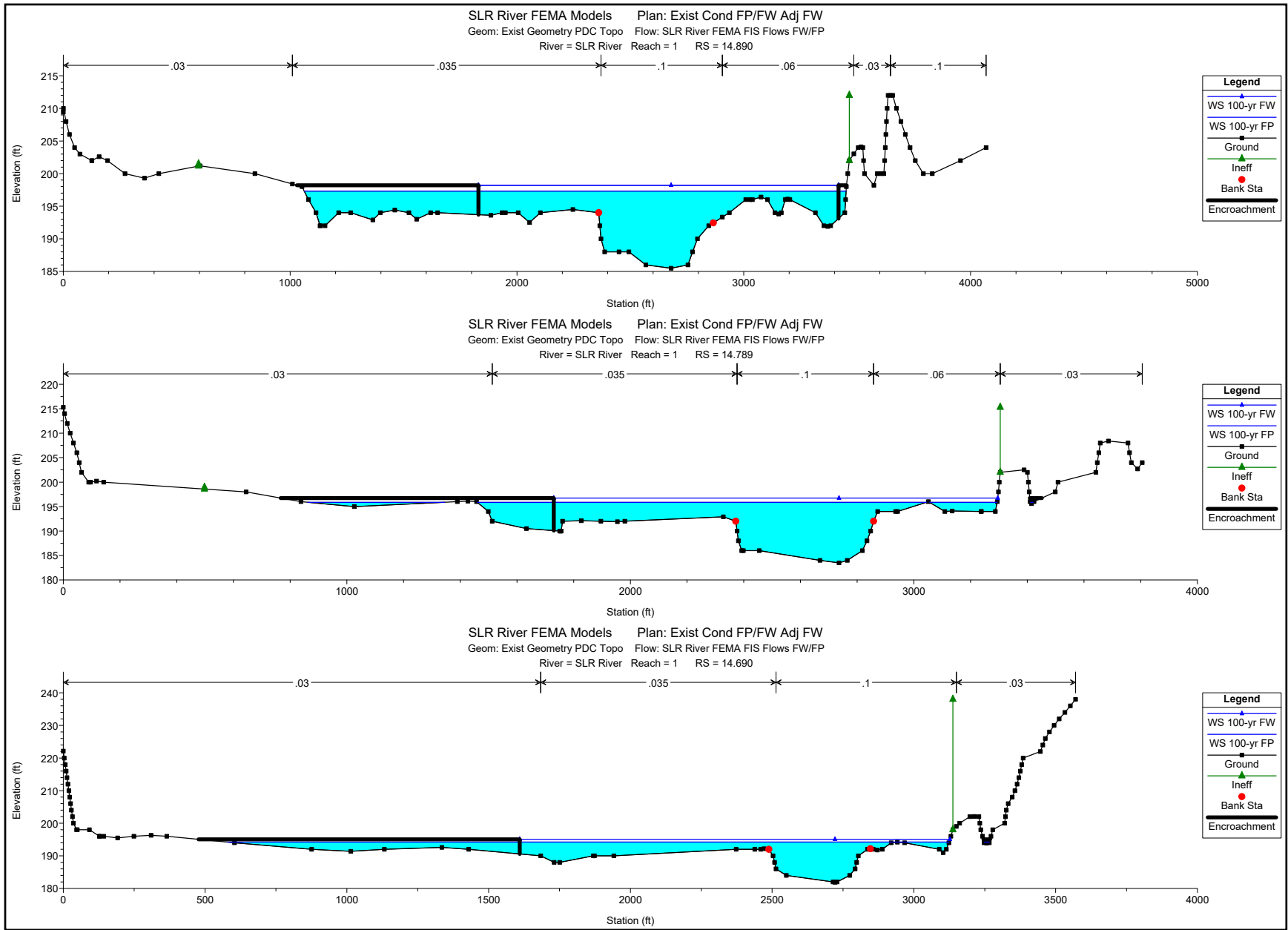


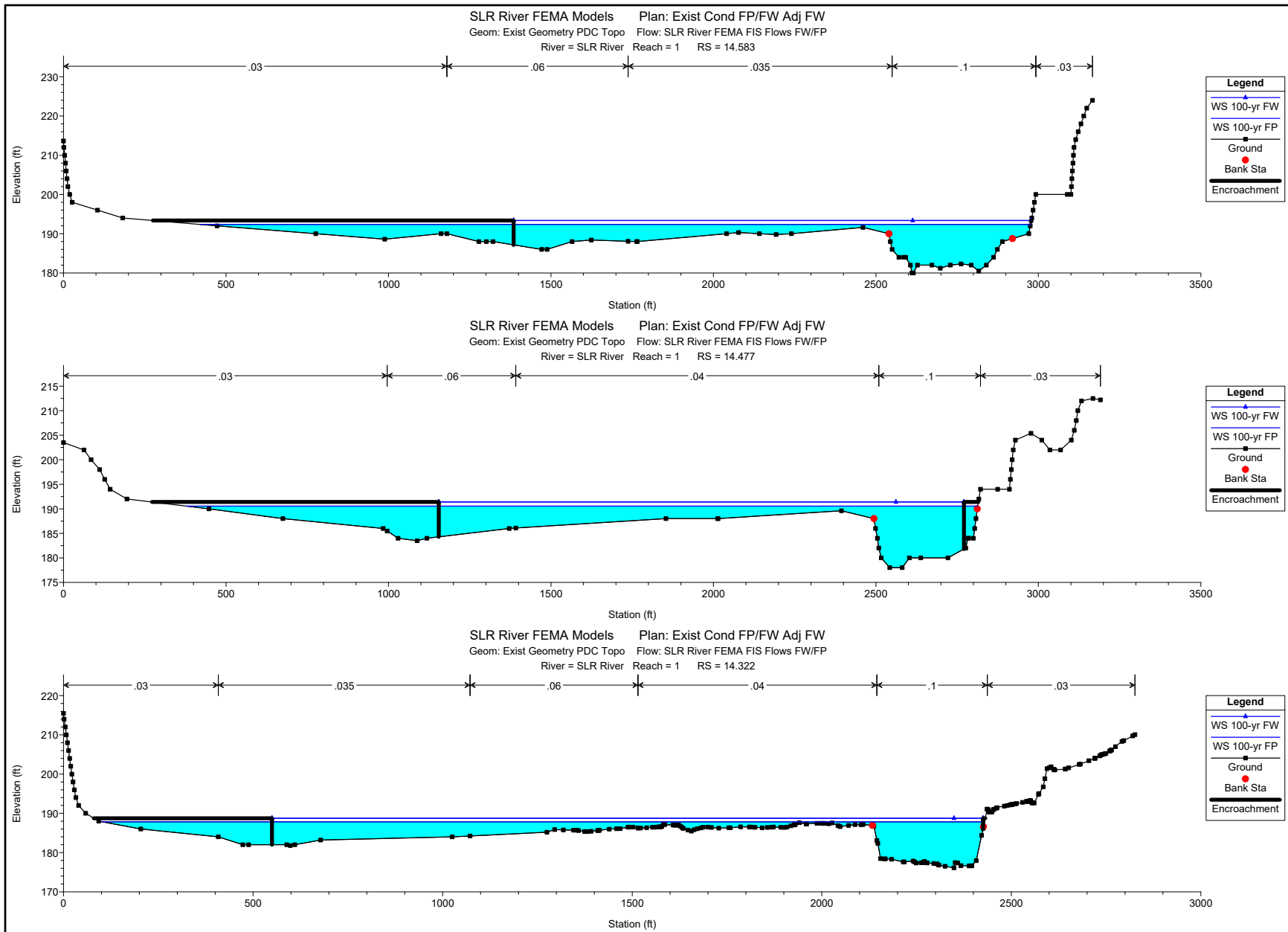


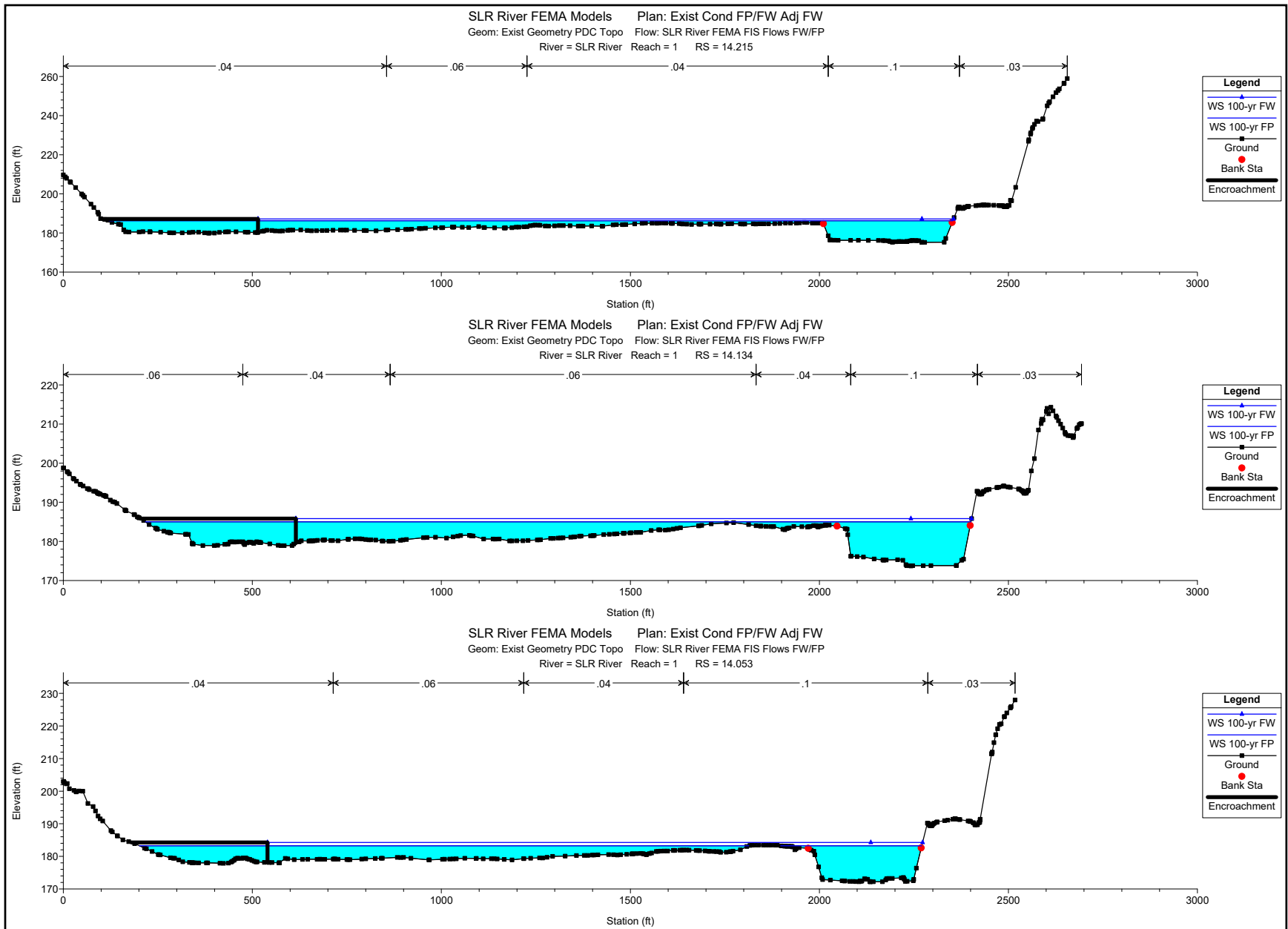




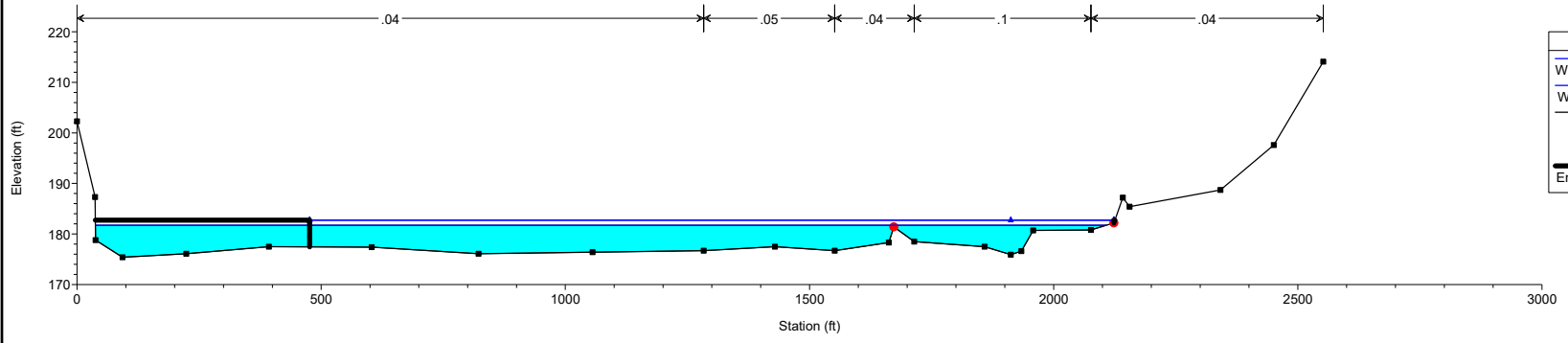








SLR River FEMA Models Plan: Exist Cond FP/FW Adj FW
Geom: Exist Geometry PDC Topo Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 13.827



EXISTING CONDITION HEC-RAS WITH ADJUSTED FLOODWAY

HEC-RAS Plan: Prop Cond River: SLR River Reach: 1

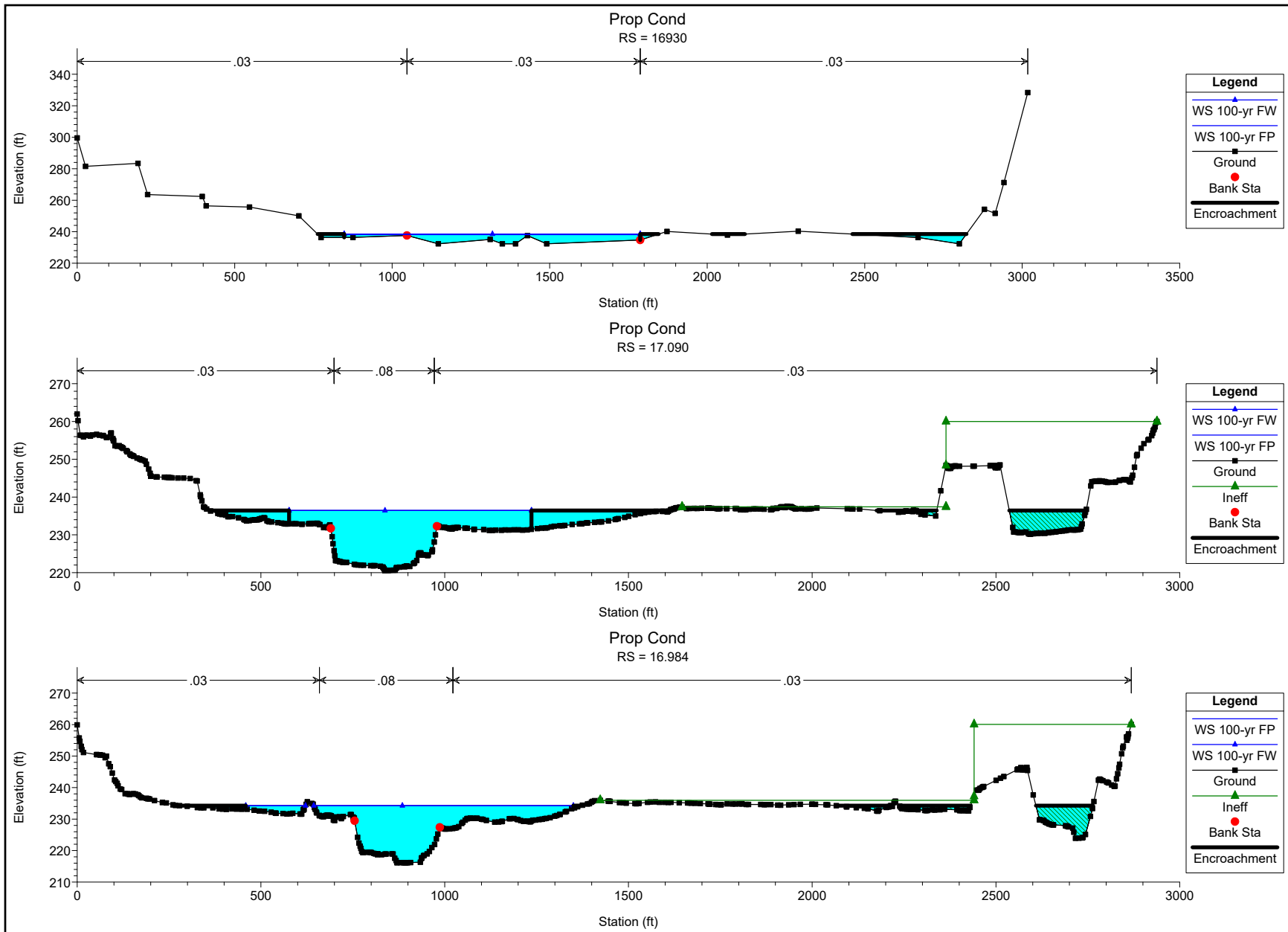
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	16930	100-yr FP	41000.00	232.30	238.12	238.12	239.69	0.006765	10.68	4340.59	1438.98	0.91
1	16930	100-yr FW	41000.00	232.30	238.49	238.49	240.47	0.007007	11.46	3739.09	940.00	0.94
1	17.090	100-yr FP	41000.00	220.50	236.44		236.97	0.002838	5.76	7064.98	1616.52	0.28
1	17.090	100-yr FW	41000.00	220.50	236.45		237.31	0.003920	6.78	5622.08	659.35	0.32
1	16.984	100-yr FP	41000.00	216.17	234.24		235.04	0.004145	7.25	6017.36	1569.29	0.33
1	16.984	100-yr FW	41000.00	216.17	234.24		235.05	0.004111	7.22	5873.92	869.31	0.33
1	16.882	100-yr FP	41000.00	214.28	232.21		232.84	0.003816	6.76	6981.12	1883.14	0.31
1	16.882	100-yr FW	41000.00	214.28	232.21		232.85	0.003841	6.78	6765.33	839.12	0.31
1	16.779	100-yr FP	41000.00	210.71	229.46		230.33	0.005492	7.75	5693.04	2056.00	0.37
1	16.779	100-yr FW	41000.00	210.71	229.53		230.38	0.005305	7.65	5745.42	1035.08	0.37
1	16.682	100-yr FP	41000.00	211.26	227.37		227.98	0.003694	6.44	6807.00	1944.18	0.31
1	16.682	100-yr FW	41000.00	211.26	227.59		228.16	0.003388	6.23	6833.96	1144.76	0.29
1	16.573	100-yr FP	41000.00	209.61	224.86		225.52	0.004918	7.08	7051.37	1765.64	0.36
1	16.573	100-yr FW	41000.00	209.61	225.04		225.77	0.005124	7.30	6587.18	1325.17	0.36
1	16.499	100-yr FP	41000.00	208.63	223.29		223.79	0.003714	5.84	7503.47	1569.11	0.30
1	16.499	100-yr FW	41000.00	208.63	223.43		223.97	0.003870	6.01	7131.03	1177.71	0.31
1	16.430	100-yr FP	41000.00	207.82	221.99		222.47	0.003454	5.67	7620.01	1282.24	0.29
1	16.430	100-yr FW	41000.00	207.82	222.10		222.60	0.003536	5.77	7339.41	993.75	0.30
1	16.385	100-yr FP	41000.00	207.27	221.25		221.69	0.003050	5.50	7873.51	1285.13	0.28
1	16.385	100-yr FW	41000.00	207.27	221.37		221.81	0.002993	5.48	7747.44	1075.96	0.28
1	16.337	100-yr FP	41000.00	206.60	220.20		220.76	0.004433	6.31	7126.53	1466.07	0.33
1	16.337	100-yr FW	41000.00	206.60	220.38		220.92	0.004158	6.18	7172.86	1205.66	0.32
1	16.291	100-yr FP	41000.00	206.04	219.46		219.80	0.003048	5.31	9647.93	1611.64	0.27
1	16.291	100-yr FW	41000.00	206.04	219.71		220.03	0.002780	5.14	9820.73	1349.53	0.26
1	16.246	100-yr FP	41000.00	205.69	218.94		219.17	0.002115	4.48	11407.02	1821.24	0.23
1	16.246	100-yr FW	41000.00	205.69	219.23		219.45	0.001944	4.37	11470.34	1454.04	0.22

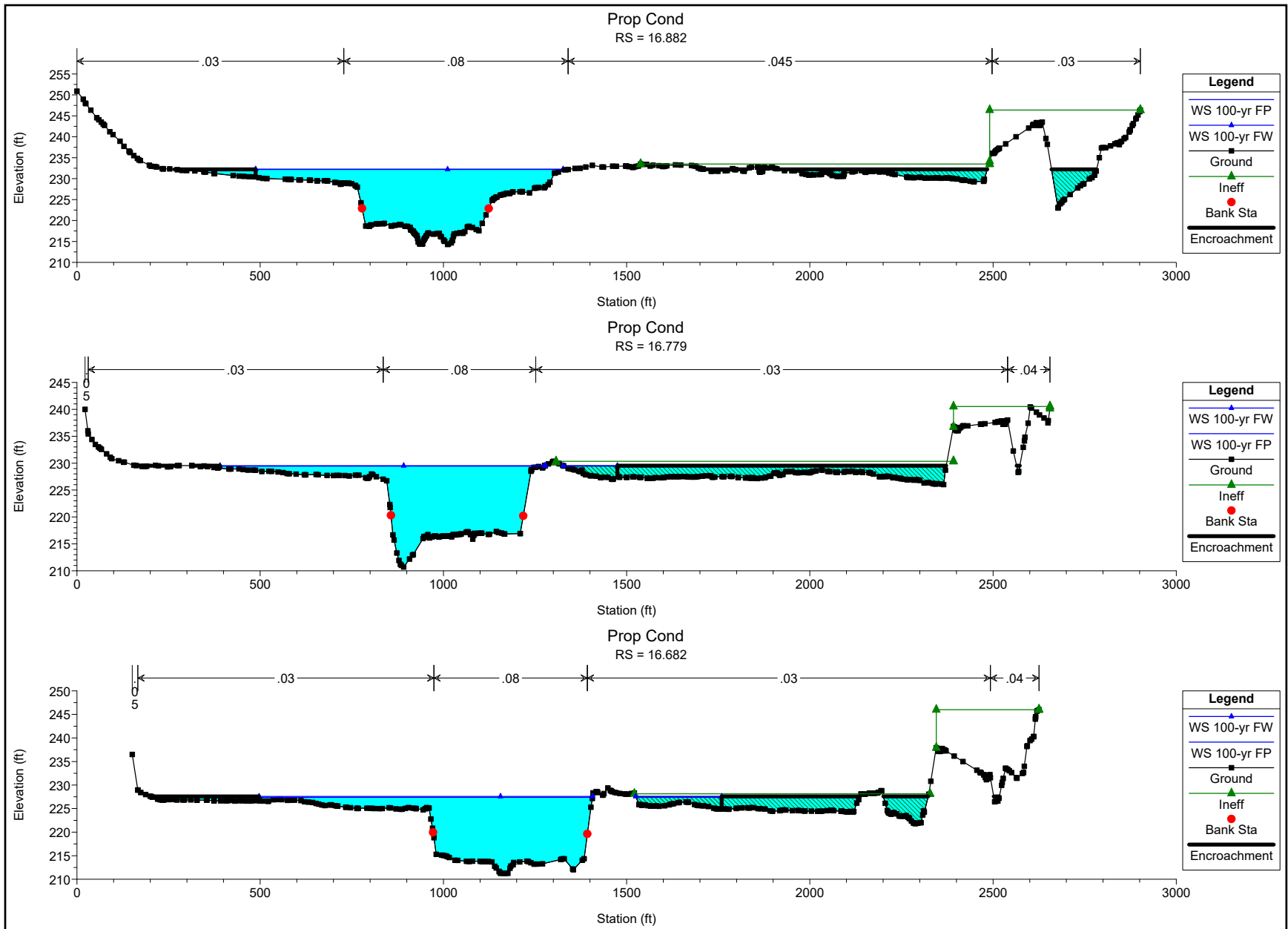
HEC-RAS Plan: Prop Cond River: SLR River Reach: 1 (Continued)

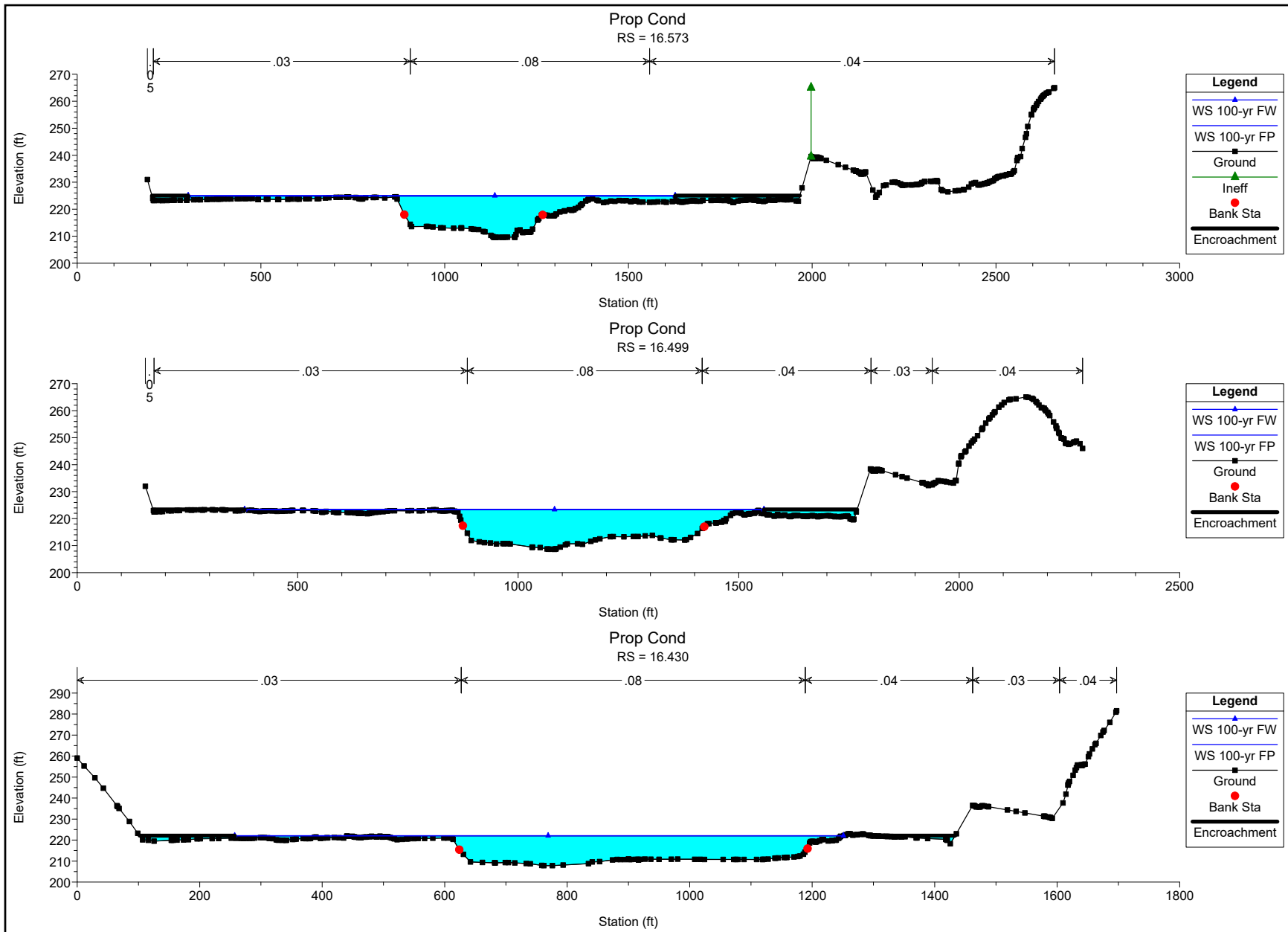
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	16.155	100-yr FP	41000.00	204.78	217.36		217.82	0.003780	5.62	8145.08	1937.25	0.30
1	16.155	100-yr FW	41000.00	204.78	217.74		218.19	0.003557	5.57	8389.54	1534.46	0.29
1	16.070	100-yr FP	41000.00	203.60	216.40		216.61	0.001769	3.80	11905.60	2660.75	0.20
1	16.070	100-yr FW	41000.00	203.60	216.82		217.04	0.001707	3.83	11383.44	1615.47	0.20
1	15.977	100-yr FP	41000.00	202.55	215.50		215.71	0.001846	3.69	11246.42	2991.20	0.21
1	15.977	100-yr FW	41000.00	202.55	215.92		216.15	0.001877	3.83	10767.76	1637.53	0.21
1	15.883	100-yr FP	41000.00	201.83	214.24		214.54	0.003070	4.37	9391.19	2992.00	0.26
1	15.883	100-yr FW	41000.00	201.83	214.71		215.01	0.002873	4.38	9335.80	1659.27	0.25
1	15.780	100-yr FP	41000.00	200.68	212.31		212.66	0.003854	5.18	9439.84	3232.96	0.30
1	15.780	100-yr FW	41000.00	200.68	212.86		213.24	0.003626	5.22	8854.21	1439.47	0.29
1	15.677	100-yr FP	41000.00	198.94	210.19		210.52	0.003940	4.84	9880.17	2499.62	0.29
1	15.677	100-yr FW	41000.00	198.94	210.79		211.17	0.003924	5.05	8662.17	1228.15	0.30
1	15.580	100-yr FP	41000.00	196.65	208.91		209.06	0.002051	3.47	13806.07	3191.68	0.19
1	15.580	100-yr FW	41000.00	196.65	209.42		209.63	0.002283	3.78	11758.59	1438.41	0.20
1	15.482	100-yr FP	41000.00	196.00	207.70		207.85	0.002610	3.25	14009.65	3182.33	0.20
1	15.482	100-yr FW	41000.00	196.00	208.16		208.33	0.002668	3.39	12658.09	1657.00	0.20
1	15.389	100-yr FP	41000.00	191.73	206.38		206.55	0.002677	3.30	12738.55	2961.96	0.20
1	15.389	100-yr FW	41000.00	191.73	206.90		207.07	0.002504	3.33	12652.22	1694.40	0.20
1	15.324	100-yr FP	41000.00	191.35	205.40		205.55	0.003160	3.24	12878.44	2187.99	0.20
1	15.324	100-yr FW	41000.00	191.35	206.10		206.23	0.002317	2.92	14187.50	1865.52	0.17
1	15.298	100-yr FP	41000.00	190.31	204.85		205.02	0.003423	3.24	12280.64	2577.61	0.19
1	15.298	100-yr FW	41000.00	190.31	205.66		205.82	0.002814	3.10	12817.99	1620.86	0.17
1	15.190	100-yr FP	41000.00	188.32	202.65		202.90	0.003588	3.80	11500.99	2771.04	0.20
1	15.190	100-yr FW	41000.00	188.32	203.64		203.92	0.003526	4.01	11053.75	1527.99	0.21
1	15.086	100-yr FP	41000.00	187.80	200.88		201.10	0.002941	3.46	11712.22	2564.25	0.18

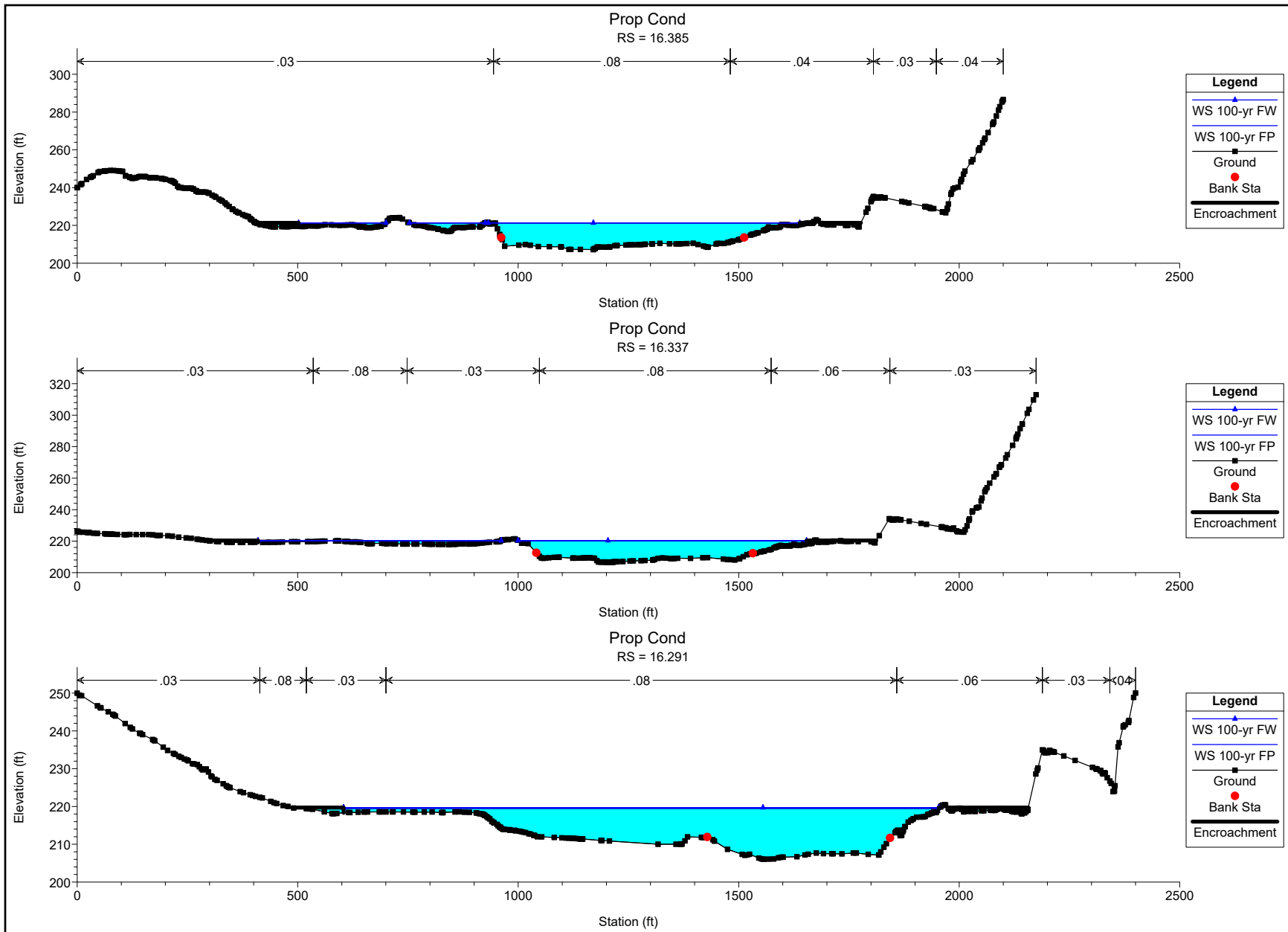
HEC-RAS Plan: Prop Cond River: SLR River Reach: 1 (Continued)

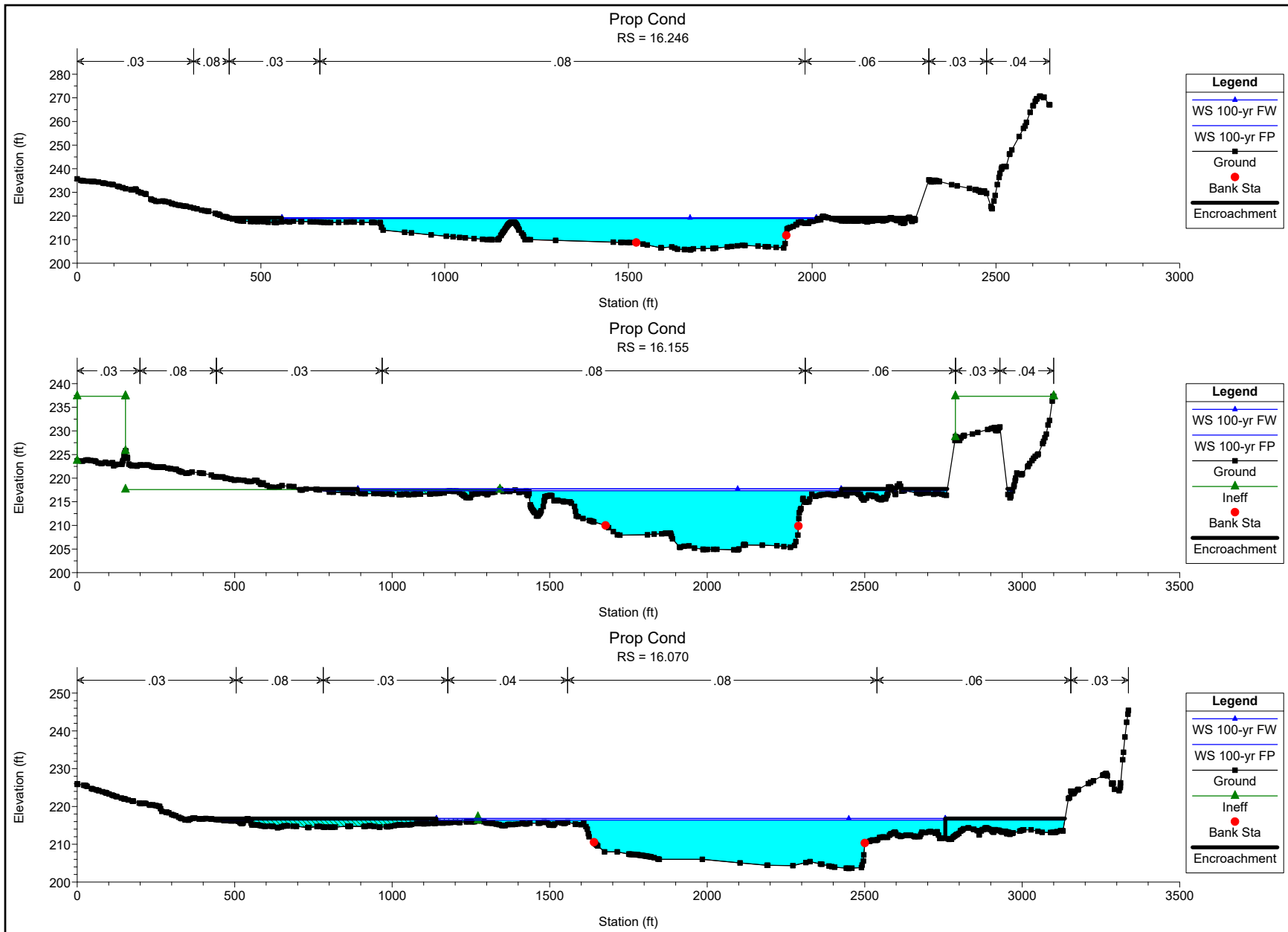
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	15.086	100-yr FW	41000.00	187.80	201.73		202.02	0.003327	3.86	10560.91	1471.03	0.19
1	14.987	100-yr FP	41000.00	187.80	198.93		199.22	0.004563	4.06	9806.80	2501.36	0.22
1	14.987	100-yr FW	41000.00	187.80	199.89		200.21	0.003648	3.85	9954.60	1591.49	0.20
1	14.890	100-yr FP	41000.00	185.50	197.47		197.71	0.002065	3.14	11456.95	2391.67	0.18
1	14.890	100-yr FW	41000.00	185.50	198.22		198.55	0.002927	3.92	9688.53	1587.52	0.21
1	14.789	100-yr FP	41000.00	183.50	196.23		196.55	0.002310	3.53	9981.60	1897.09	0.19
1	14.789	100-yr FW	41000.00	183.50	196.74		197.09	0.002610	3.86	9499.71	1565.70	0.20
1	14.690	100-yr FP	41000.00	181.90	194.61		195.07	0.003209	3.97	8293.84	1793.56	0.22
1	14.690	100-yr FW	41000.00	181.90	195.06		195.56	0.003043	3.99	8211.10	1517.18	0.22
1	14.583	100-yr FP	41000.00	180.00	192.69		193.02	0.003834	4.18	9060.68	1895.64	0.24
1	14.583	100-yr FW	41000.00	180.00	193.36		193.71	0.003245	4.03	8965.09	1592.55	0.22
1	14.477	100-yr FP	41000.00	178.00	190.66		190.98	0.003398	4.12	9087.10	1946.62	0.23
1	14.477	100-yr FW	41000.00	178.00	191.39		191.76	0.003656	4.55	8406.81	1615.88	0.24
1	14.322	100-yr FP	41000.00	176.12	187.83		188.21	0.003432	4.01	8441.40	2327.03	0.23
1	14.322	100-yr FW	41000.00	176.12	188.75		189.10	0.002955	3.94	8727.08	1875.40	0.21
1	14.215	100-yr FP	41000.00	175.20	186.27		186.54	0.002444	3.42	10046.73	2232.62	0.19
1	14.215	100-yr FW	41000.00	175.20	187.18		187.47	0.002739	3.84	9539.99	1839.99	0.21
1	14.134	100-yr FP	41000.00	173.77	185.01		185.29	0.003664	4.15	9569.88	2183.90	0.24
1	14.134	100-yr FW	41000.00	173.77	185.83		186.14	0.003666	4.40	9179.34	1787.59	0.24
1	14.053	100-yr FP	41000.00	172.22	183.25		183.62	0.004532	4.43	8437.42	1985.09	0.25
1	14.053	100-yr FW	41000.00	172.22	184.25		184.59	0.003865	4.37	8753.39	1733.09	0.24
1	13.827	100-yr FP	41000.00	175.90	181.72	179.42	182.07	0.002186	1.53	9233.96	2069.46	0.16
1	13.827	100-yr FW	41000.00	175.90	182.72	180.03	183.14	0.002189	1.89	8656.54	1646.92	0.17

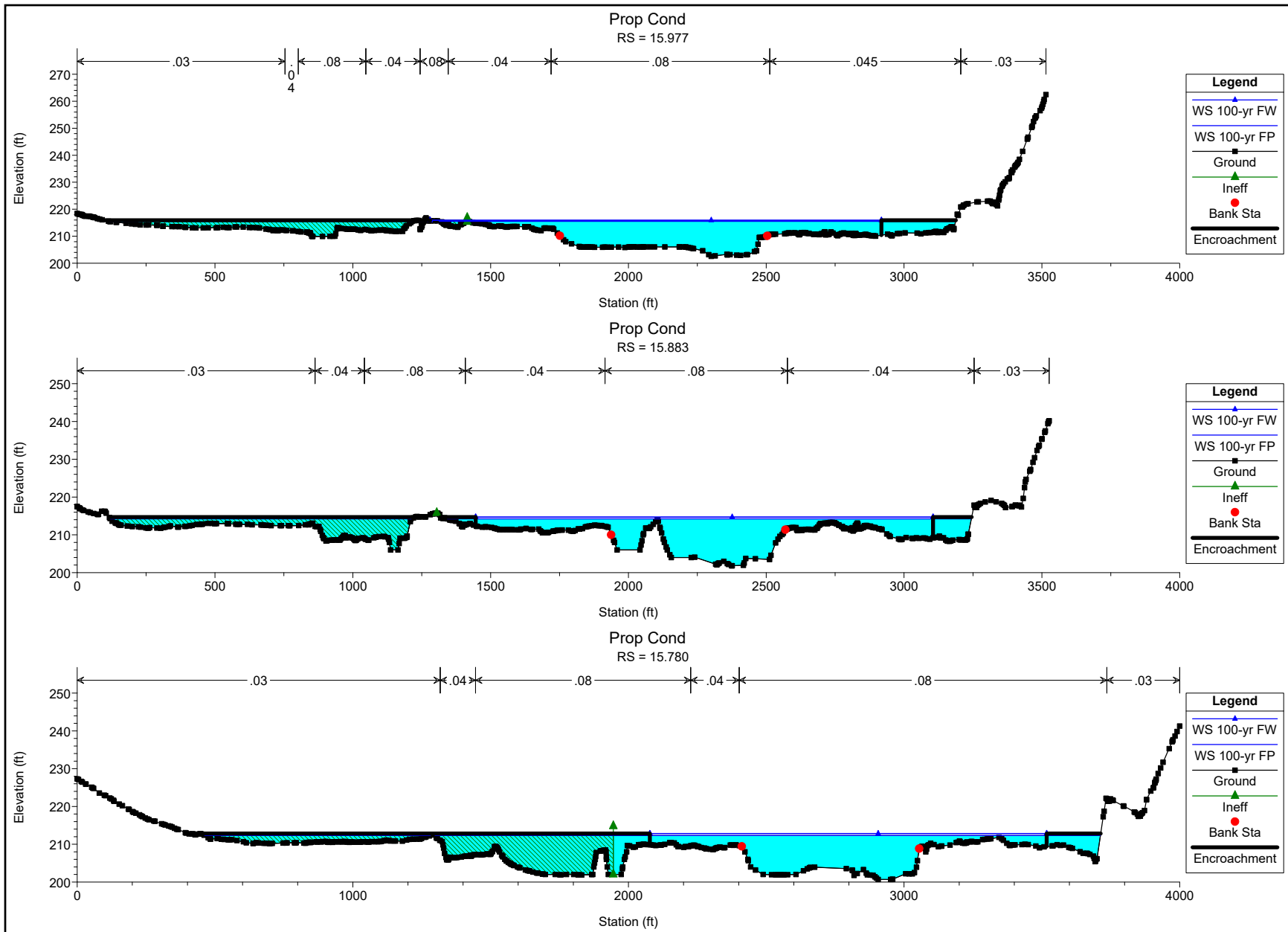


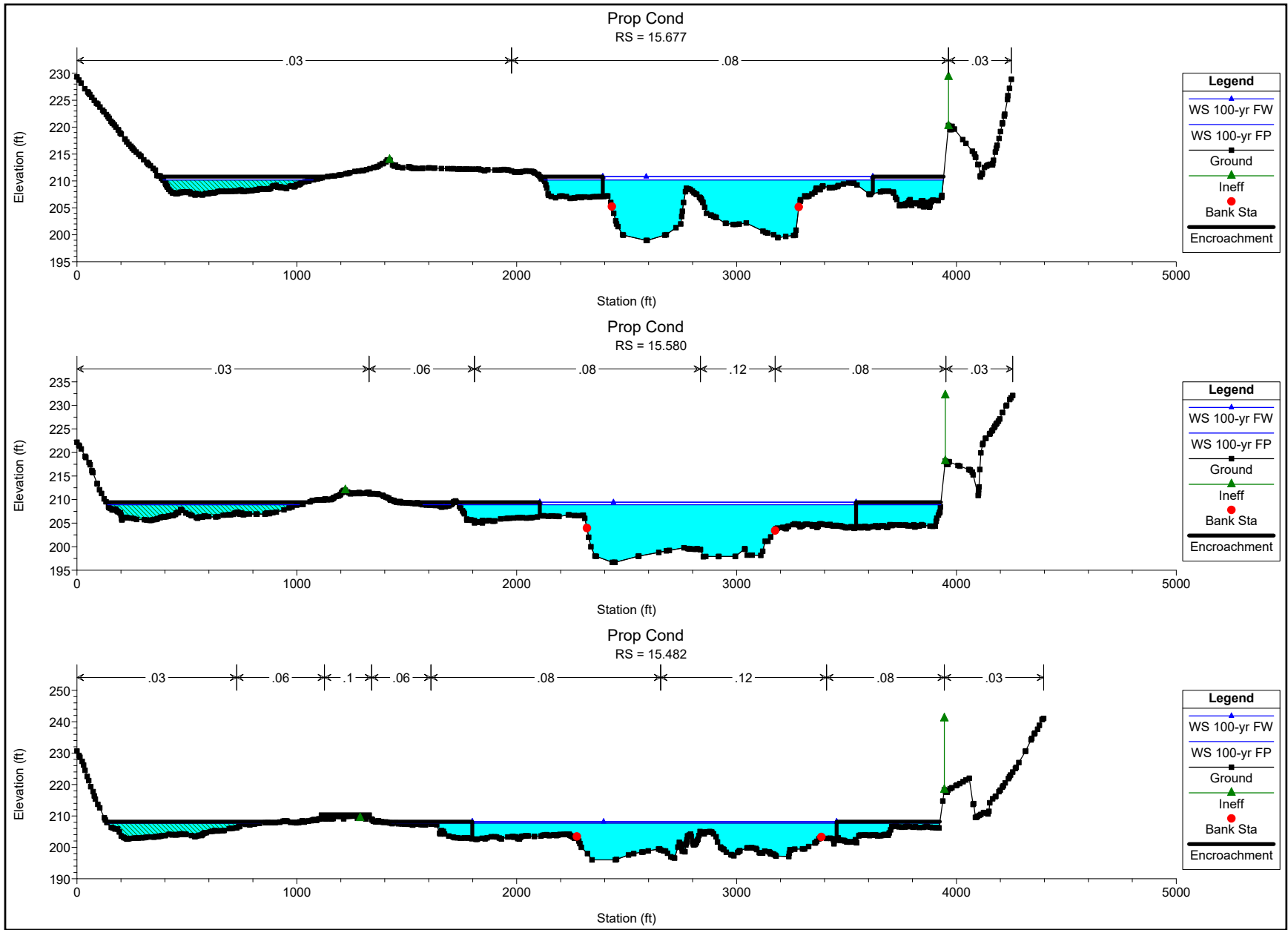


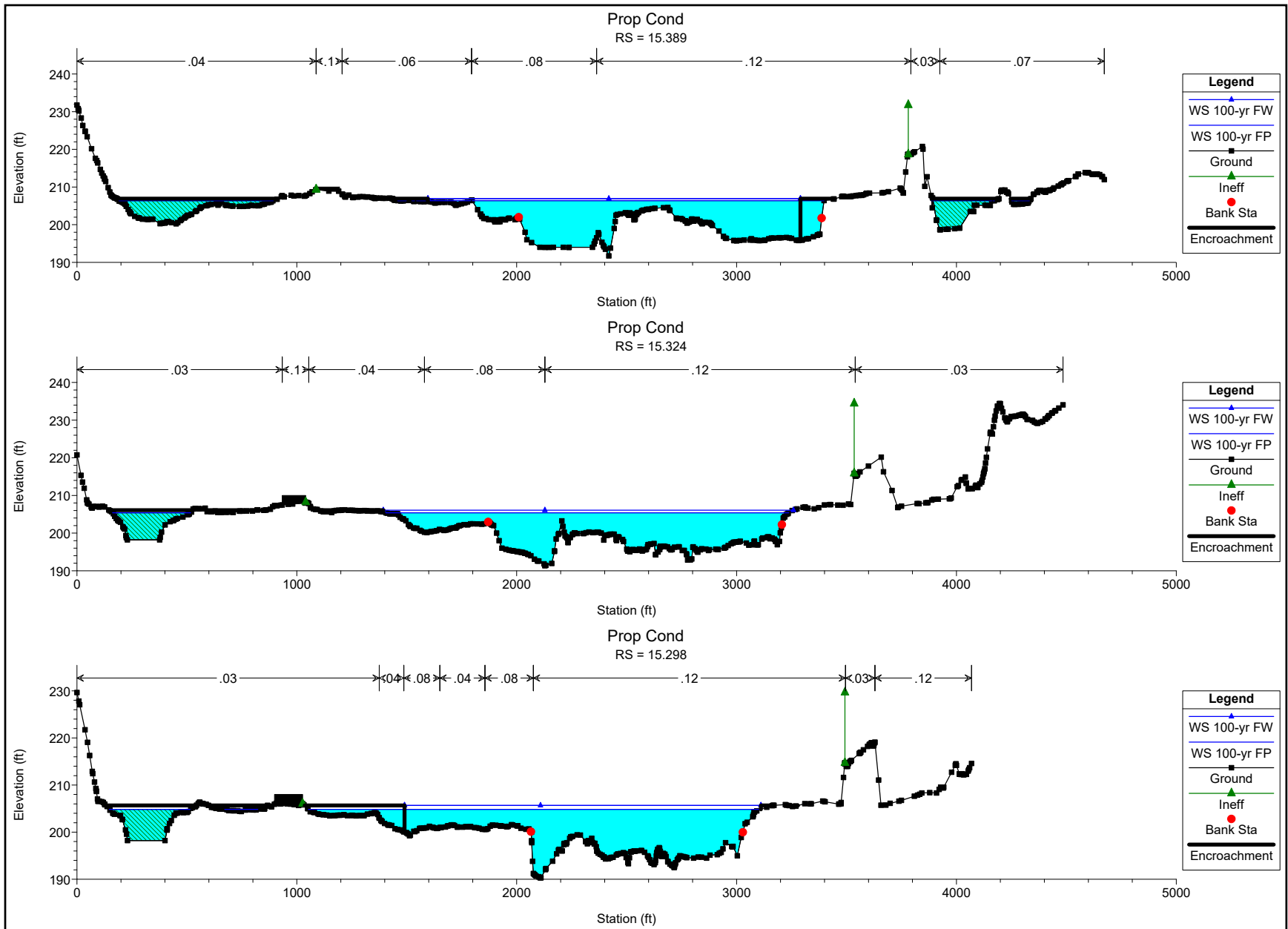


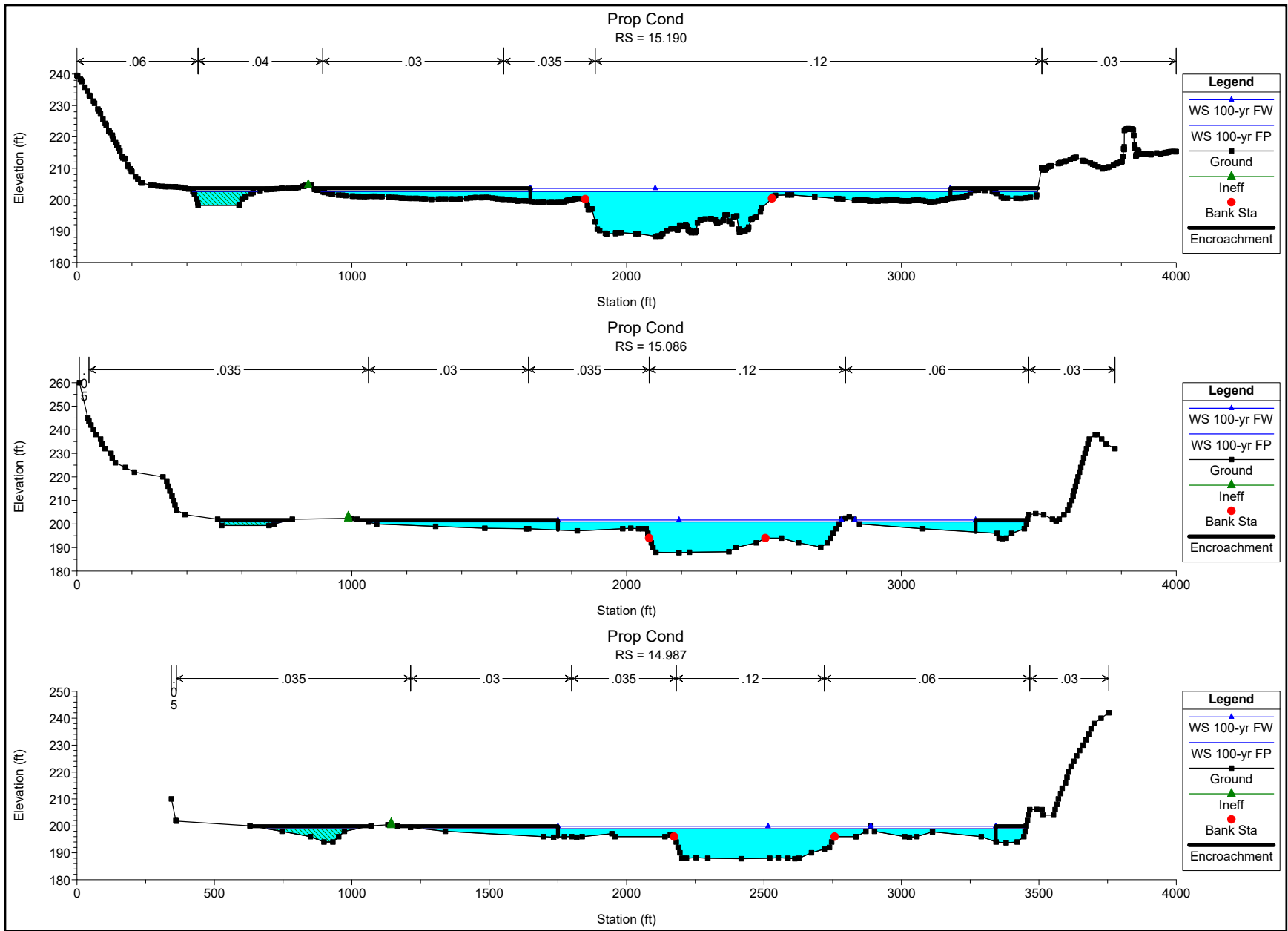


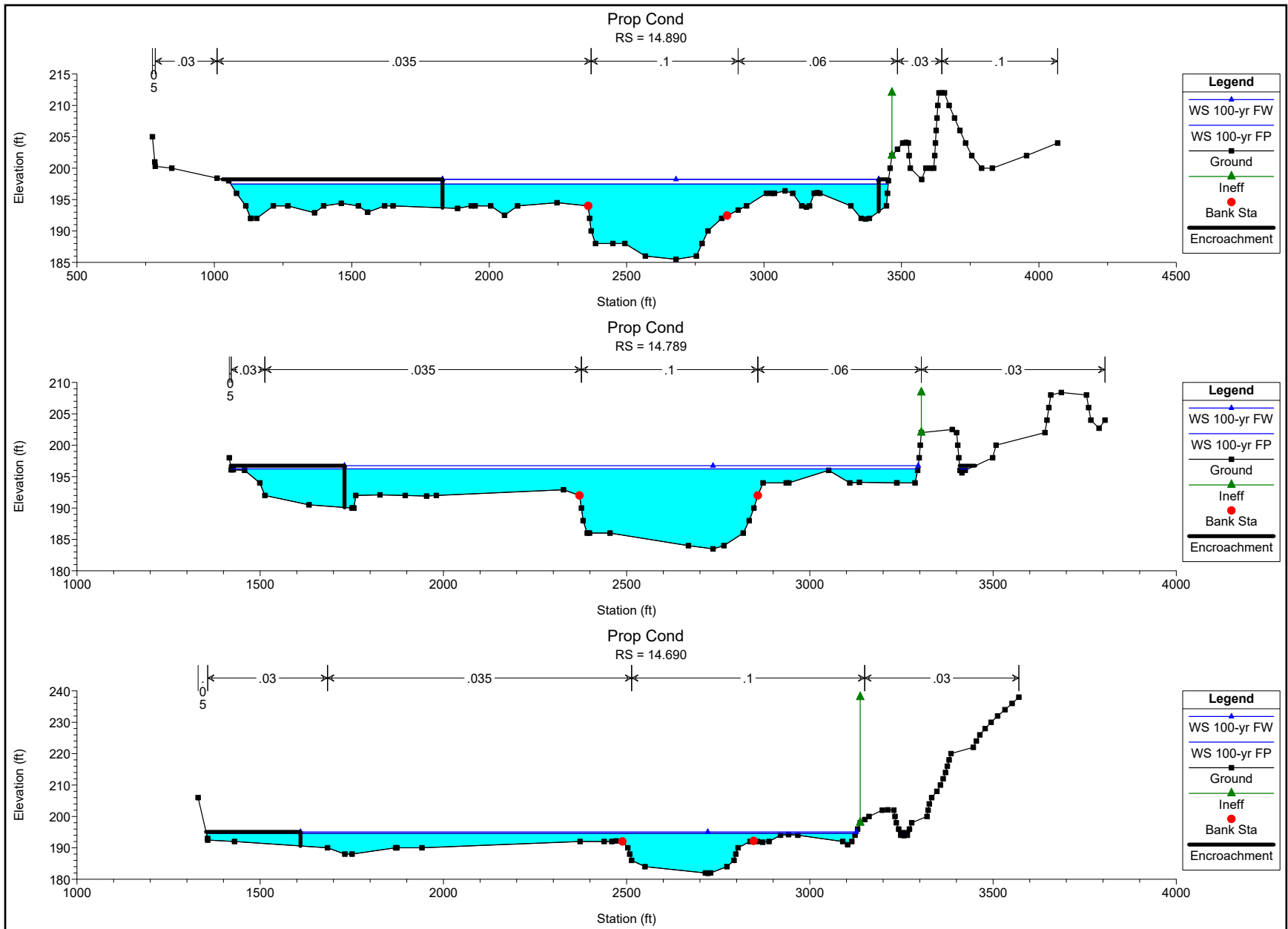


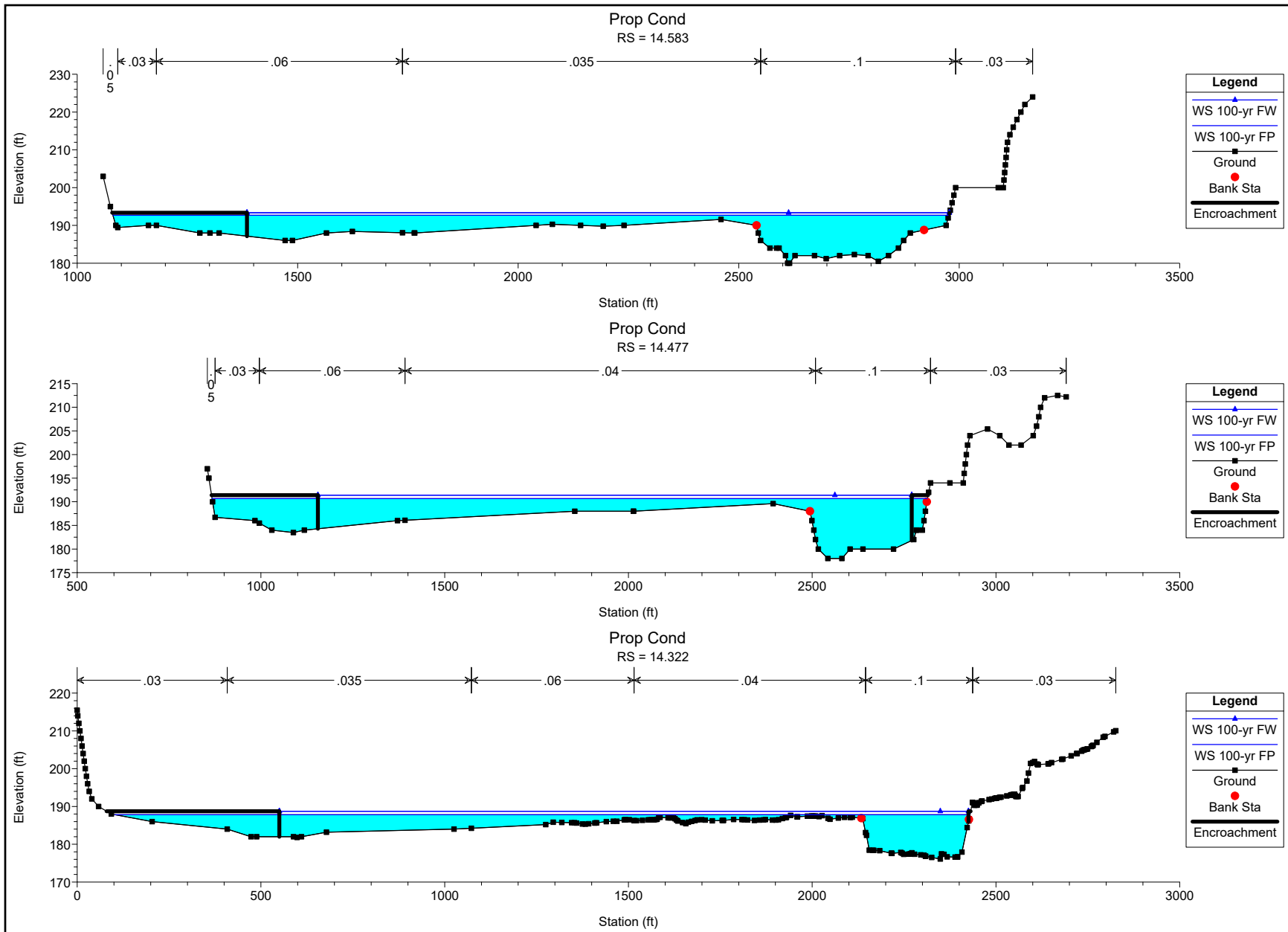


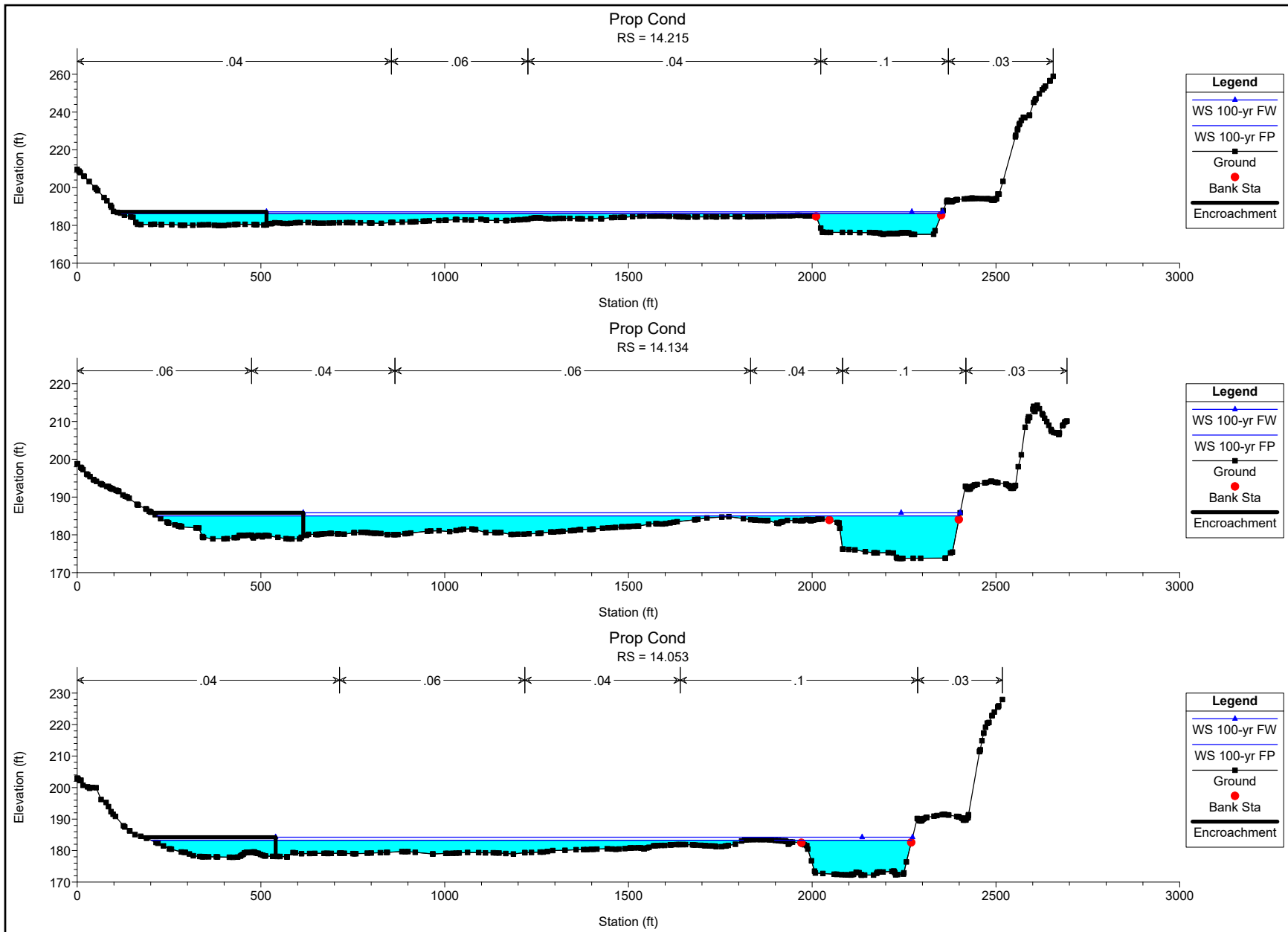


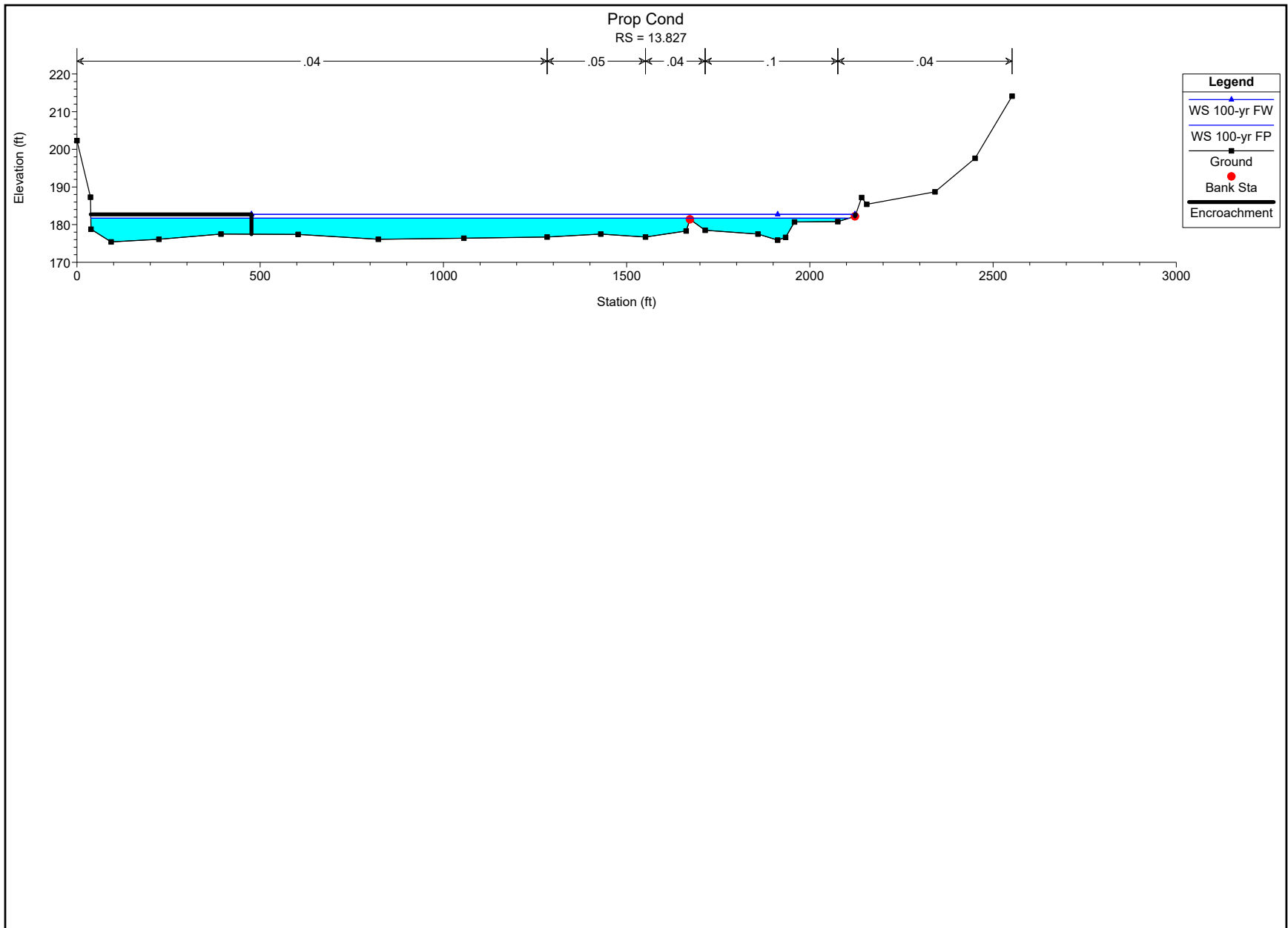


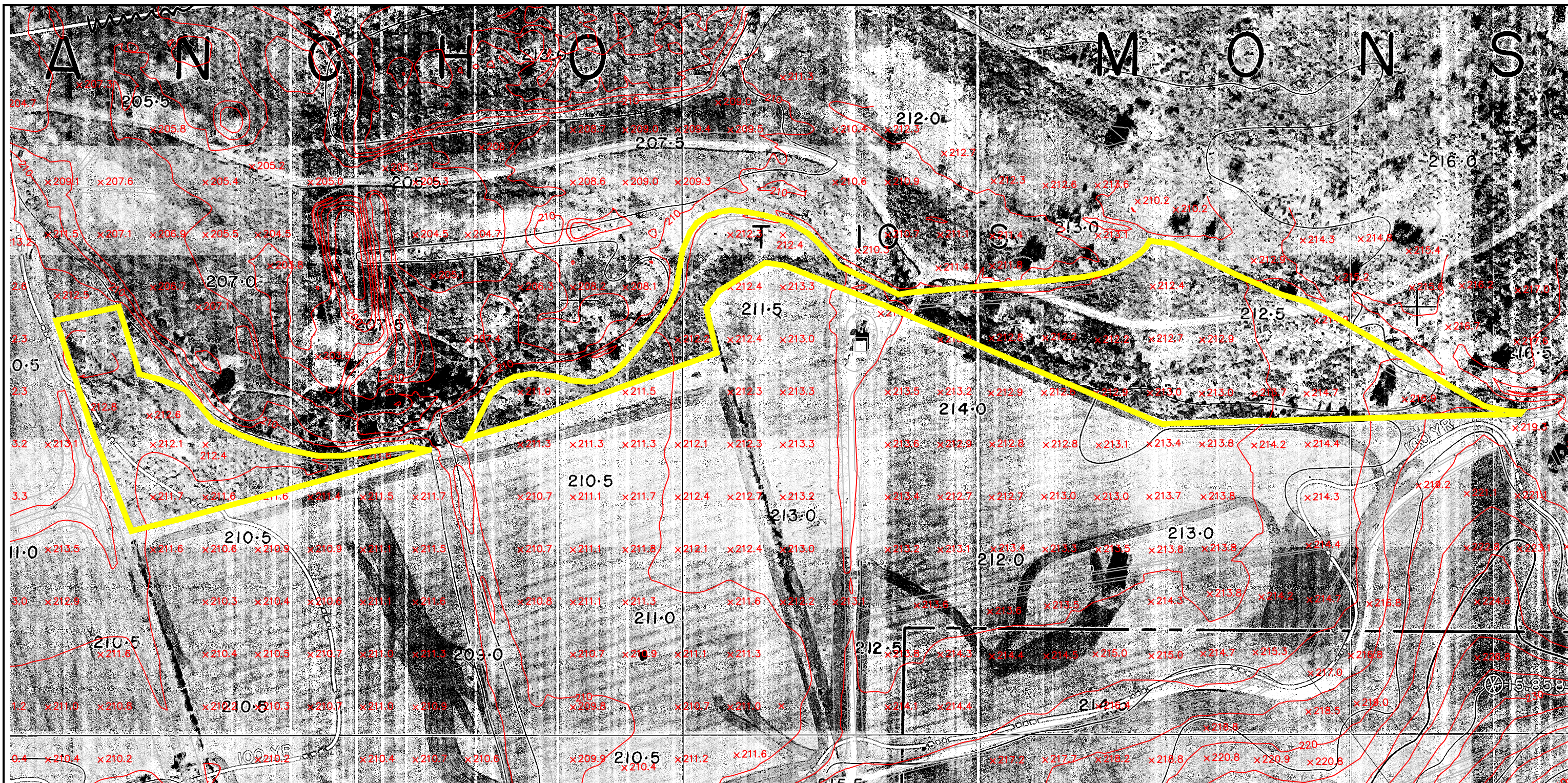












NOTE:
 THE YELLOW OUTLINE DEFINES AN UNPERMITTED DISTURBED AREA (SEE THE HEC-RAS WORK MAP FOR LOCATION). COMPARISON OF THE CURRENT ELEVATIONS (RED) WITH EFFECTIVE ELEVATIONS (IMAGE) SHOWS THAT THE CURRENT ELEVATIONS ARE SIMILAR OR LOWER THAN THE EFFECTIVE ELEVATIONS. THE CURRENT ELEVATIONS ARE ON NAVD 88 AND EFFECTIVE ELEVATIONS ARE ON NGVD 29 (NAVD 88 = NGVD + 2.3').

EASTERLY UNPERMITTED AREA

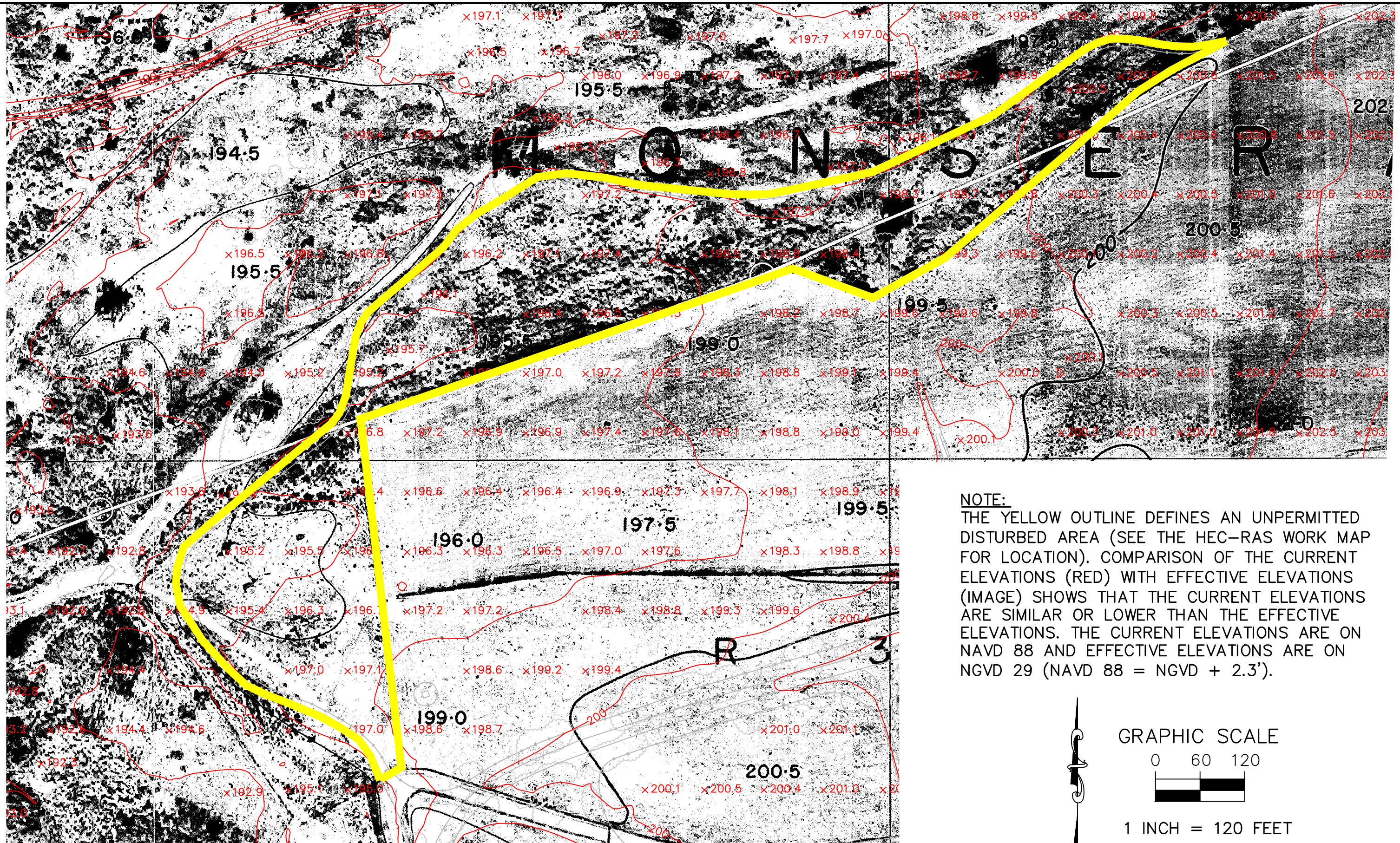


GRAPHIC SCALE

0 75 150



1 INCH = 150 FEET



NOTE:
 THE YELLOW OUTLINE DEFINES AN UNPERMITTED DISTURBED AREA (SEE THE HEC-RAS WORK MAP FOR LOCATION). COMPARISON OF THE CURRENT ELEVATIONS (RED) WITH EFFECTIVE ELEVATIONS (IMAGE) SHOWS THAT THE CURRENT ELEVATIONS ARE SIMILAR OR LOWER THAN THE EFFECTIVE ELEVATIONS. THE CURRENT ELEVATIONS ARE ON NAVD 88 AND EFFECTIVE ELEVATIONS ARE ON NGVD 29 (NAVD 88 = NGVD + 2.3').



GRAPHIC SCALE

0 60 120



1 INCH = 120 FEET

WESTERLY UNPERMITTED AREA

LEGEND:

- HEC-RAS CROSS-SECTION
- FIRM EFFECTIVE ZONE A 100-YEAR FLOODPLAIN
- FIRM EFFECTIVE ZONE X 500-YEAR FLOODPLAIN
- EFFECTIVE COUNTY OF SAN DIEGO FLOODWAY
- PRE-PROJECT (EXISTING CONDITION) FLOODPLAIN
- PRE-PROJECT (EXISTING CONDITION) AND POST-PROJECT (PROPOSED CONDITION) FLOODWAY
- POST-PROJECT (PROPOSED CONDITION) FLOODPLAIN
- INEFFECTIVE PRE- AND POST-PROJECT FLOODPLAIN AREAS
- - - UNPERMITTED AREAS

NOTES:

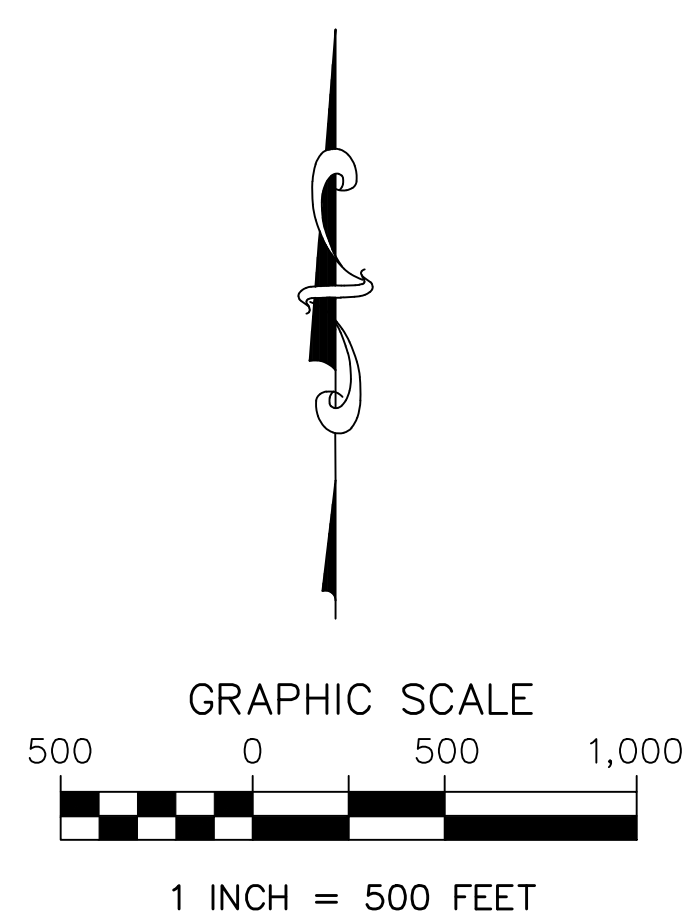
THE PROPOSED CONDITION FLOODPLAIN WILL ULTIMATELY TIE-INTO CALTRANS' LOMR FLOODPLAIN AT THE UPSTREAM AND DOWNSTREAM ENDS OF THE STUDY REACH. THE TIE-IN WILL BE INCLUDED ON THE CLOMR.

WHERE THE EFFECTIVE ZONE X FLOODPLAIN IS COINCIDENT WITH THE EFFECTIVE ZONE A FLOODPLAIN, ONLY THE ZONE A FLOODPLAIN IS SHOWN.

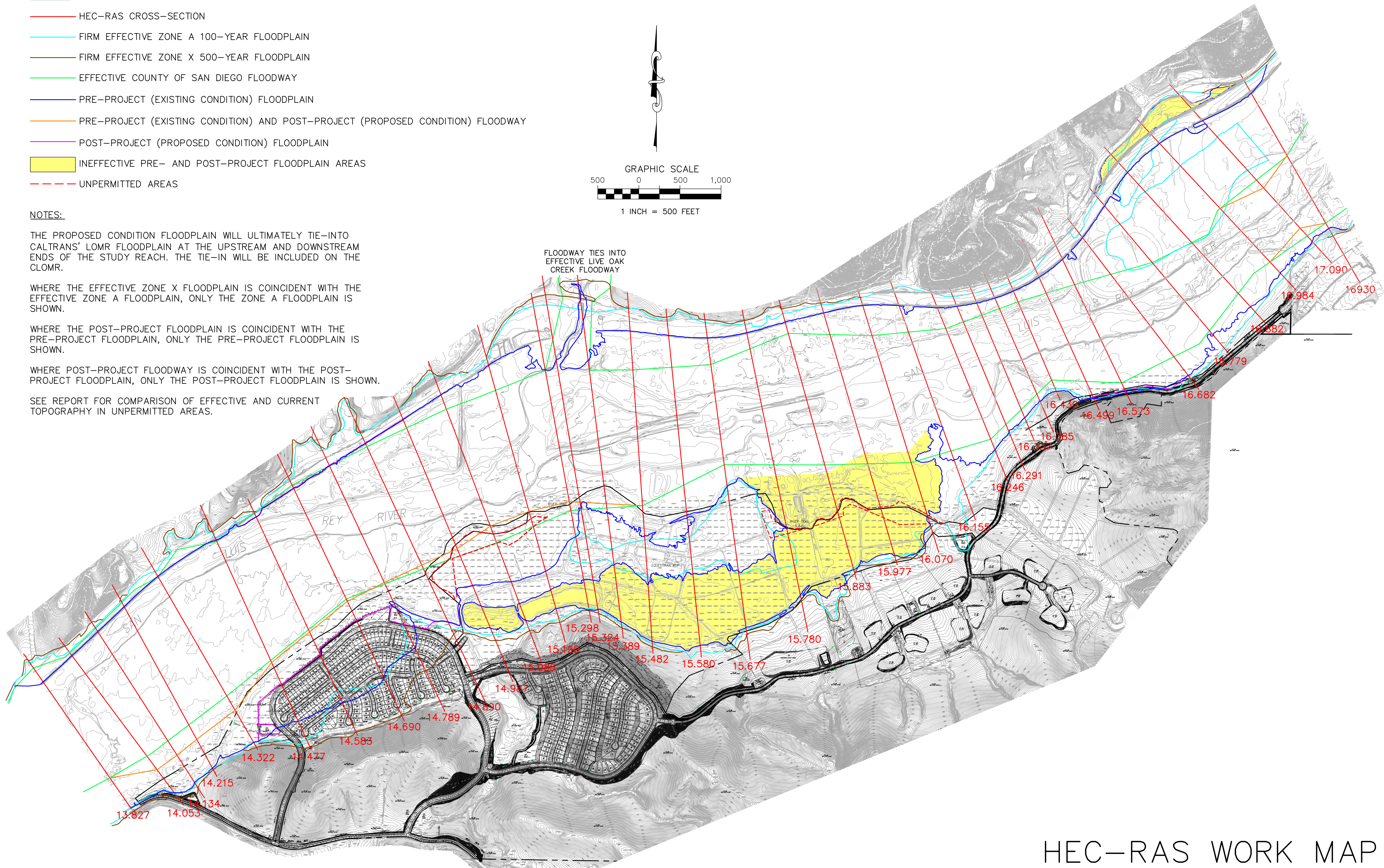
WHERE THE POST-PROJECT FLOODPLAIN IS COINCIDENT WITH THE PRE-PROJECT FLOODPLAIN, ONLY THE PRE-PROJECT FLOODPLAIN IS SHOWN.

WHERE POST-PROJECT FLOODWAY IS COINCIDENT WITH THE POST-PROJECT FLOODPLAIN, ONLY THE POST-PROJECT FLOODPLAIN IS SHOWN.

SEE REPORT FOR COMPARISON OF EFFECTIVE AND CURRENT TOPOGRAPHY IN UNPERMITTED AREAS.



FLOODWAY TIES INTO EFFECTIVE LIVE OAK CREEK FLOODWAY



HEC-RAS WORK MAP