



Hydraulics | Hydrology | Geomorphology | Design

MEMORANDUM

Date:	1/21/2011
To:	Ann Van Leer, Chris Klein (San Diego Earth Works)
From:	John Stofleth, Chris Bowles, Chris Campbell (cbec Inc.)
Project:	08-1032 Rose Creek Watershed Restoration Opportunities Analysis
Subject:	Appendix C – Technical Memorandum for Data Collection and Hydrodynamic Model Development on Rose and San Clemente Creeks

BASELINE DATA COLLECTION

cbec performed a stream network field assessment and collected baseline data to observe and document the conditions of the watershed stream network. The field assessment encompassed the Rose Canyon main stem as well as the San Clemente main stem from I-805 to Mission Bay. The field assessment included photographic documentation at key observation points, hydraulic field surveys, stream bed sediment characterization, and water level monitoring. A summary of the procedures used to collect these data are provided below.

Hydraulic Field Surveys

cbec conducted a hydraulic field survey as a part of the baseline data collection effort and was used primarily in the development of the hydraulic model. This effort involved the collection of cross sectional topographic data of the low flow channel and the adjacent floodplain as well as other key features such as bridges and culverts. Hydraulic roughness (Manning's n) values associated with relative densities in vegetative cover and channel bedforms were also observed as a part of this effort and ranged from 0.02 to 0.1. Figure 1 displays the locations of the surveyed cross sections. The surveyed data were prepared in California State Plane (CASP) 1983 Zone 6 (feet) and NAVD 88 vertical datum (feet).

Streambed Sediment Characterization

cbec characterized the size of the streambed sediments within the project reach in an effort to analyze the sediment mobility of the corridor under existing and future rehabilitation conditions. The location of sediment sampling is shown by Figure 2. The sediment samples were analyzed for particle size distribution (PSD) and these results are presented in Figures 3-8. The sediment size data (PSD) were compared to velocity data derived from the hydraulic model,

in conjunction with published maximum incipient velocity to initiate sediment transport, to determine sediment mobility thresholds for Rose Creek and San Clemente Creek (see section 3.8 of the report that accompanies this memorandum) (San Diego Earth Works, 2010).

Water Level Data Collection

Continuous water level (stage) data was also collected at six key locations, as shown by Figure 9, within the project reach beginning in mid January 2010. These data are referenced to the NAVD 88 vertical datum and are displayed in Figures 10-15. The reason for collection of these data was for model validation.

MODEL DEVELOPMENT

A HEC-RAS (RAS) 1-dimensional hydraulic model was developed for approximately 11 miles of Rose and San Clemente Creeks within the RCW from I-805 to Mission Bay. Model development was facilitated by using HEC-GeoRAS, which is a GIS interface for pre-processing model inputs (i.e., cross sections) and post-processing model outputs (i.e., inundation maps). Modeled flows include the 2-, 5-, 10-, 25-, 50-, and 100-year storm events.

Topography

Topography used in the hydraulic model was developed using cross sectional surveys of the low flow channel and adjacent floodplains, collected as described in Section 2.2 of the accompanying report (San Diego Earth Works, 2010). Measured cross sections were taken at approximately 500 to 1,000 feet intervals. The locations of these cross sections are shown in Figure 1. Figures 16-103 displays a cross-sectional view of these topographic data. These data were supplemented with a 1999 topographic dataset developed by the City and County of San Diego (SANGIS). This primarily involved incorporating topographic data to extend the length of the surveyed cross sections across the valley floor. This dataset was collected and processed to an accuracy suitable to develop 2-foot contours. All data were prepared in California State Plane (CASP) 1983 Zone 6 (feet) and NAVD 88 vertical datum (feet).

Hydraulic Structures

Bridges and culverts that were incorporated into the model geometry include Genesee Avenue and Regents Road. Other hydraulic features associated with the concrete lined flood control channel downstream of the confluence were also incorporated. Data used to develop these structures were collected during the hydraulic field survey, while portions of the concrete flood control channel downstream of the confluence were derived from the SANGIS topographic dataset.

Hydraulic Roughness

Hydraulic roughness (Manning's n) values that correspond to the density of vegetative cover and channel bed forms were estimated during the hydraulic field survey using published guidelines (Chow, 1959). These values ranged from 0.02 to 0.1. Figures 16-103 displays a cross-sectional view of these topographic data with the associated Manning's n values.

Model Boundary Conditions

An HSPF hydrologic model of the RCW developed for the City of San Diego by Everest International Consultants (City of San Diego PUD, 2010) was utilized to derive unsteady flow boundary conditions for the hydraulic model. This model utilized hourly rainfall data from Lindberg Field for a 36 year period of record (1970-2006), soils permeability data, land use data and topographic data to produce unsteady flow hydrographs (hourly) for each of the sub-watersheds within the RCW for the 2-, 5, 10-, and 25-year return interval storm events. cbec performed a statistical analysis (flood frequency – USGS Bulletin 17b) using the annual peak discharges output from the terminus of this model to calculate the flow magnitude (recurrence interval) for a given storm event. These peak flows are listed in Table 2 below. Due to the limited period of record and the lack of extreme hydrologic events that occurred within the simulated period, the FEMA prescribed flows were selected for the 50- and 100-year flood events.

Table 2: Results of Flood Frequency Analysis using HSPF Model Output for the 2- to 25-Year Return Interval Events

Annual Exceedance Probability	Flood Event	Peak Discharge (cfs)
0.5	2	2,406
0.2	5	3,264
0.1	10	3,817
0.04	25	4,501
0.02	50 ¹	8,100
0.01	100 ¹	12,000

¹ FEMA prescribed flow were selected for the 50- and 100-year return interval flood events.

The hydraulic model includes a total of 14 boundary conditions for 2- to 25-year return interval events. Of these 14 boundary conditions, 13 were unsteady flow inputs derived from the HSPF hydrologic model. The hydraulic model includes two unsteady flow inputs immediately downstream of I-805. The remaining 11 flow inputs were modeled as lateral or uniform lateral inflows along Rose and San Clemente Creeks. The downstream boundary is a water surface elevation that represents an average tide condition (6.0 ft) according to FEMA guidelines. The locations of the boundary conditions are as shown in Figure 104 and are displayed graphically in Figures 105-136.

Model Limitations

The hydraulic model was developed as a tool to test the restoration feasibility of potential sites within the RCW, with a primary focus from I-805 to the confluence. The model is intended to be used as a planning tool to aid in the concept level development of potential restoration alternatives and as a baseline tool for the development of a final design of selected restoration alternatives.

However, the hydraulic model was constructed at the watershed scale. The topographic data used to construct the model was collected at 500 to 1000 foot intervals and not at a scale appropriate for analyzing the *final design* of particular restoration scenarios. Additional topographic and hydraulic roughness data should be incorporated into the project reach when the selected restoration projects are to be implemented. Alternatively, hydrologic data could be extracted from the existing model to serve as the boundary conditions for a separate hydraulic model that needs to be developed for analysis of the final design of a particular restoration site. The hydraulic model in its current state is not intended to be used for flood prediction / mapping purposes, according to FEMA guidelines. Several updates to the lower portion of the model should be implemented in order for it to be used as a flood prediction / mapping tool. These additional updates may include a denser network of topographic cross sectional data and the implementation of certain hydraulic structures that exist within the flood control channel downstream of the confluence.

The hydraulic model developed for this study utilized topographic data collected as a part of the hydraulic field survey, while the SANGIS topography was used to map inundation results produced from the model. The SANGIS dataset is of adequate resolution to perform these delineations outside of the low-flow channel; however, the low-flow channel represented in this dataset does not provide adequate resolution for hydraulic model development or mapping purposes. The maximum inundation extents from the modeled results in this study typically fall outside the low-flow channel within the areas of interest; therefore, the SANGIS topographic dataset was considered of adequate resolution for mapping inundation extents that fall outside the low-flow channel. Caution should be used when interpreting inundation extents that fall within the low-flow channel (especially in heavily vegetated areas).

RESULTS

Inundation Mapping

HEC-GeoRAS was utilized to map the maximum inundation extents for the 2-, 5-, 10-, 25-, 50-, 100-year return interval flow events for existing and proposed restoration alternative conditions. These results were used to determine the frequency of inundation for portions of the floodplain under existing and proposed project conditions. Figures 137-145 display existing condition inundation mapping from I-805 to Mission Bay for the 2-, 10-, 25- and 100-year events. Inundation mapping for the proposed conditions is included in section 5.4 of the main report at each of the proposed restoration sites (San Diego Earthworks, 2010).

Water Surface Profiles

HEC-GeoRAS was utilized to calculate the maximum water surface elevations for the 2-, 5-, 10-, 25-, 50-, 100-year return interval flow events for existing conditions and the proposed restoration alternative. Figures 148-153 display existing and proposed alternative maximum water surface profiles from I-805 to Mission Bay for the 2-, 5-, 10-, 25-, 50-, 100-year return interval flow events.

REFERENCES

Chow, V. T. 1959. Open-Channel Hydraulics. New York, McGraw- Hill Book Co., 680 p.

City of San Diego PUD. 2010. Final Technical Memorandum #3 – City of San Diego Public Utilities Department, Wet Weather Intermittent Stream Discharge Feasibility Study. Prepared by Everest International Consultants. February 2010.

San Diego Earthworks. 2010. Rose Creek Watershed Wetland, Riparian & Water Quality Restoration Opportunities Analysis. Prepared by cbec Inc., Trestle Environmental and KTU&A. December 2010.



Notes: Image depicts location of surveyed cross sections used in hydraulic model development. Aerial image from Bing maps.



Rose Creek Watershed Restoration Opportunities Analysis
Surveyed Topographic Cross Sections

Project No. 08-1032

Created By: JS

Figure 1



Notes: Streambed sediment samples collected at these locations were analyzed for particle size distribution (PSD) and used as baseline data for sediment transport analysis. Aerial image from Bing maps.



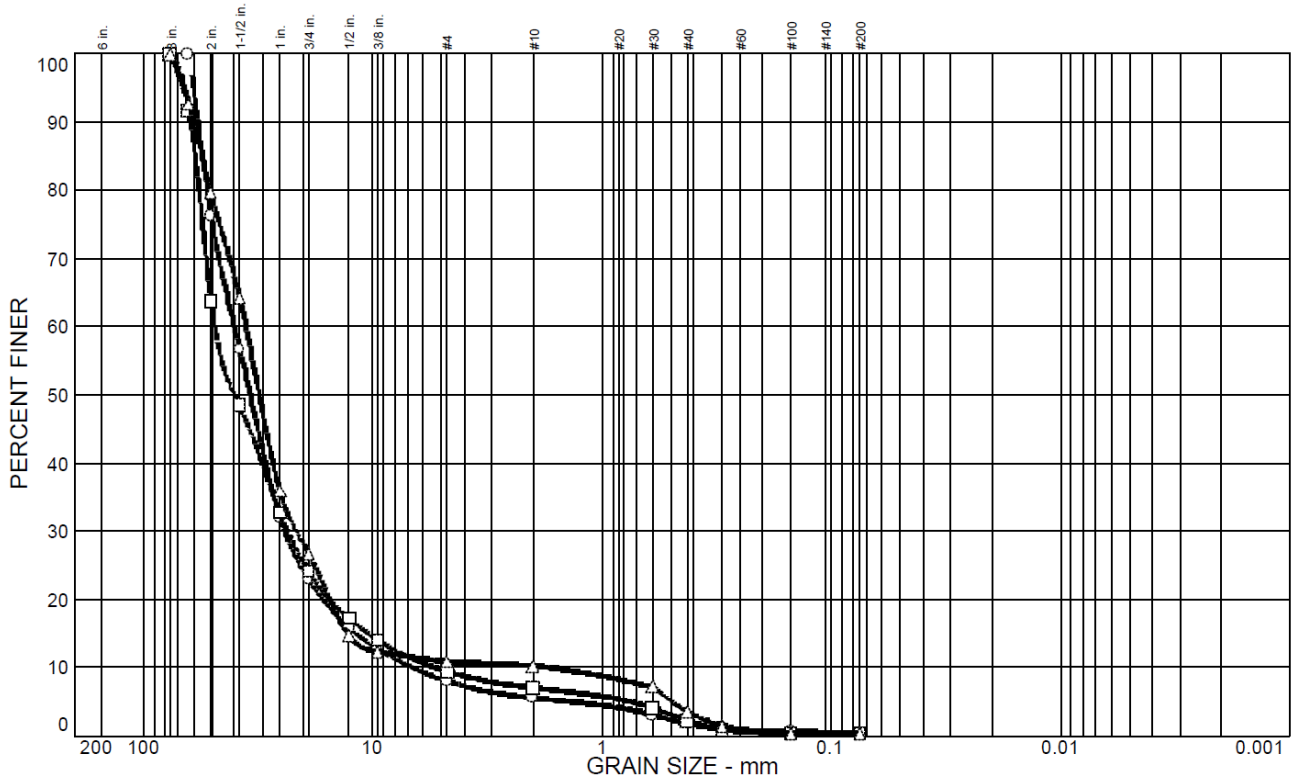
Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Streambed Sediment Sample Collection Sites

Project No. 08-1032

Created By: JS

Figure 2

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		91.9	7.6		0.5				
□		90.5	9.1		0.4				
△		89.1	10.6		0.3				

SIEVE inches size	PERCENT FINER		
	○	□	△
3"	100.0	100.0	100.0
2.5	100.0	91.7	92.6
2	76.3	63.7	79.7
1.5"	56.7	48.5	64.2
1"	32.0	32.7	35.9
3/4"	23.0	24.2	26.8
1/2	15.9	17.3	14.7
3/8"	12.8	14.1	12.4
GRAIN SIZE			
D ₆₀	40.2	48.9	35.8
D ₃₀	24.2	23.5	21.6
D ₁₀	6.66	5.30	1.67
COEFFICIENTS			
C _c	2.19	2.13	7.78
C _u	6.04	9.23	21.49

SIEVE number size	PERCENT FINER		
	○	□	△
#4	8.1	9.5	10.9
#10	5.6	7.1	10.3
#30	3.1	4.1	7.2
#40	1.8	2.3	3.6
#50	1.1	1.0	1.5
#100	0.6	0.4	0.4
#200	0.5	0.4	0.3

SOIL DESCRIPTION
○ Brown Well-Graded GRAVEL
□ Brown Well-Graded GRAVEL
△ Brown Poorly Graded GRAVEL

REMARKS:
○
□
△

- Source: SD-1
- Source: SD-2
- △ Source: SD-3

Notes: Analysis by Cooper Laboratories.



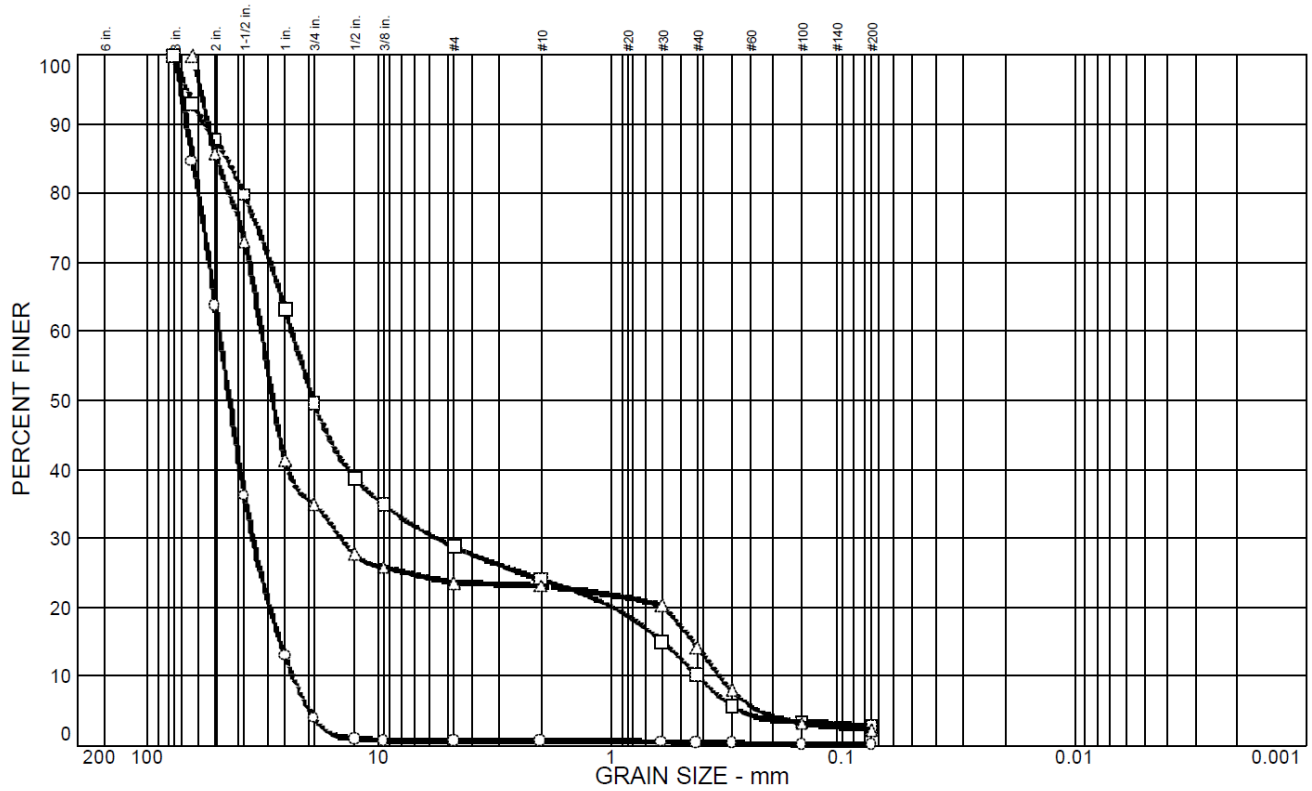
Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek Particle Size Distribution Results SD 1-3

Project No. 08-1032

Created By: JS

Figure 3

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		99.4	0.4		0.2				
□		71.2	26.1		2.7				
△		76.4	21.3		2.3				

SIEVE inches size	PERCENT FINER		
	○	□	△
3"	100.0	100.0	100.0
2.5	84.6	93.0	100.0
2	63.7	87.8	85.8
1.5"	36.2	79.8	73.1
1"	13.0	63.2	41.3
3/4"	4.0	49.6	35.0
1/2	1.0	38.8	27.7
3/8"	0.7	34.9	25.8
GRAIN SIZE			
D ₆₀	48.9	23.8	32.3
D ₃₀	35.1	5.62	14.5
D ₁₀	23.5	0.419	0.339
COEFFICIENTS			
C _c	1.07	3.17	19.29
C _u	2.08	56.75	95.42

SIEVE number size	PERCENT FINER		
	○	□	△
#4	0.6	28.8	23.6
#10	0.6	24.1	23.1
#30	0.5	15.1	20.4
#40	0.4	10.2	14.3
#50	0.3	5.7	8.0
#100	0.2	3.4	3.2
#200	0.2	2.7	2.3

SOIL DESCRIPTION
○ Brown Poorly Graded GRAVEL
□ Brown Poorly Graded GRAVEL w/ Sand
△ Brown Poorly Graded GRAVEL w/ Sand

REMARKS:
○
□
△

- Source: SD-4
- Source: SD-5
- △ Source: SD-6

Notes: Analysis by Cooper Laboratories.



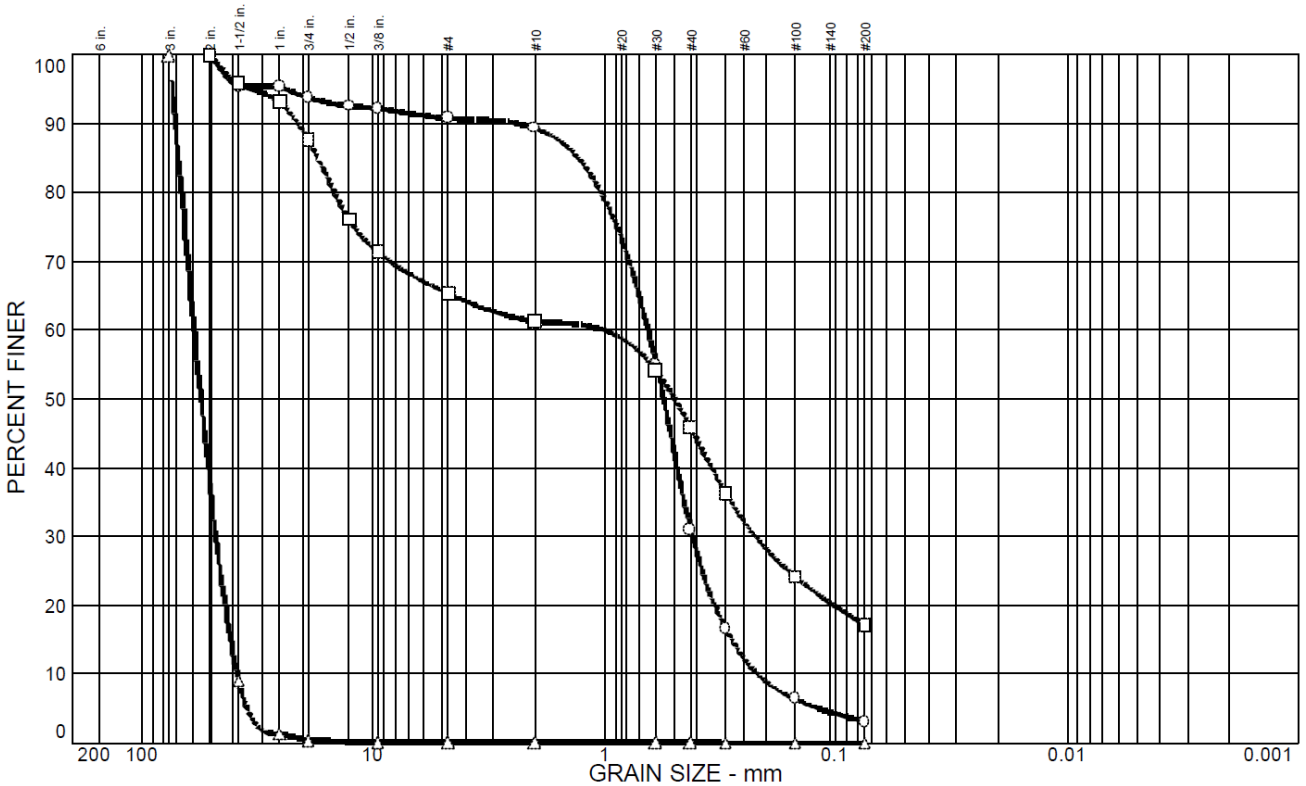
Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek Particle Size Distribution Results SD 4-6

Project No. 08-1032

Created By: JS

Figure 4

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		9.2	87.7		3.1				
□		34.6	48.2		17.2				
△		99.9	0.1		0.0	0.0			

SIEVE inches size	PERCENT FINER		
	○	□	△
3"	100.0	100.0	100.0
2	100.0	100.0	100.0
1.5"	95.4	95.9	9.0
1"	95.4	93.2	1.3
3/4"	93.8	87.6	0.4
1/2	92.6	76.1	0.1
3/8"	92.2	71.4	0.1
GRAIN SIZE			
D60	0.649	0.999	59.6
D30	0.418	0.223	48.0
D10	0.217		38.7
COEFFICIENTS			
C _c	1.24		1.00
C _u	2.99		1.54

SIEVE number size	PERCENT FINER		
	○	□	△
#4	90.8	65.4	0.1
#10	89.4	61.3	0.1
#30	55.0	54.2	0.1
#40	31.0	45.8	0.1
#50	16.6	36.3	0.0
#100	6.4	24.2	0.0
#200	3.1	17.2	0.0

SOIL DESCRIPTION
 ○ Brown Poorly Graded SAND
 □ Brown Silty SAND w/ Gravel
 △ Gray Poorly Graded GRAVEL

REMARKS:
 ○
 □
 △

- Source: SD-7
- Source: SD-8
- △ Source: SD-9

Notes: Analysis by Cooper Laboratories.



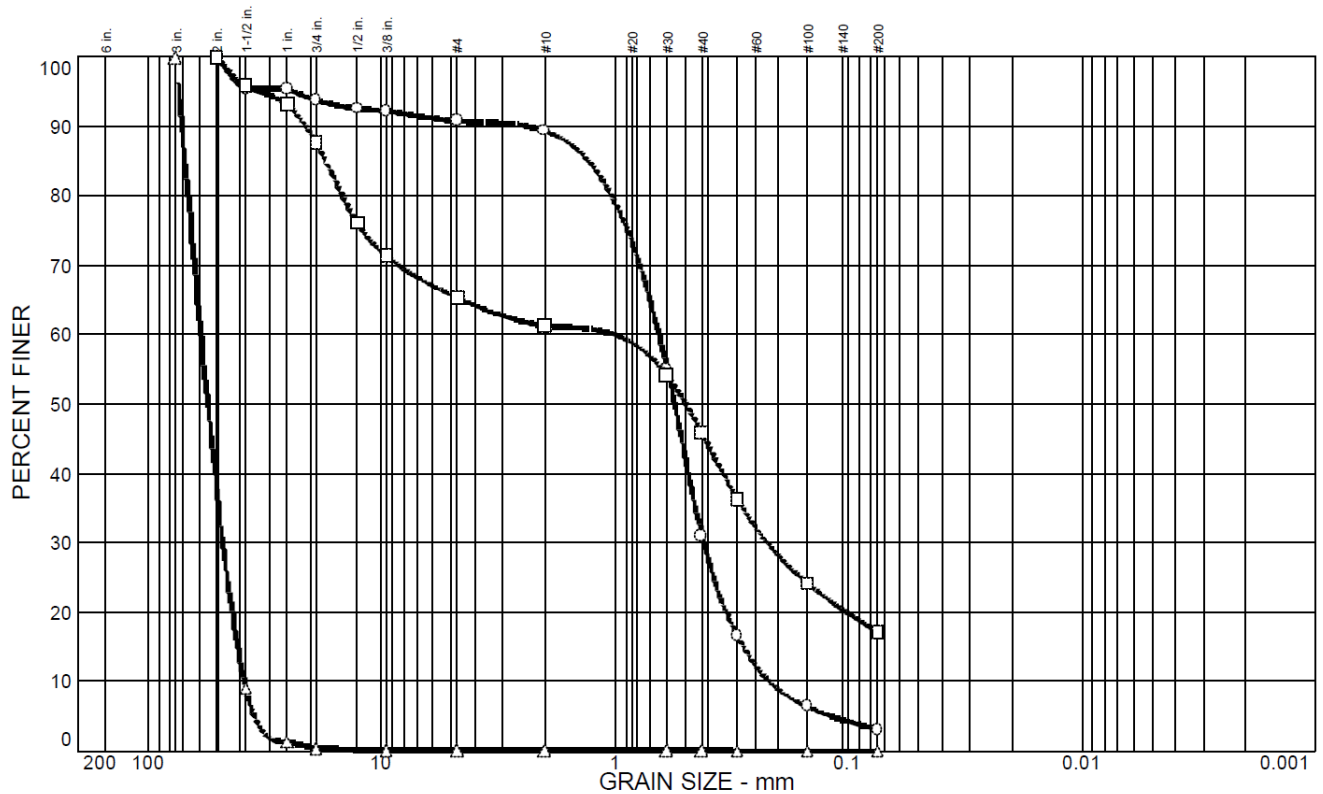
Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek Particle Size Distribution Results SD 7-9

Project No. 08-1032

Created By: JS

Figure 5

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		9.2	87.7		3.1				
□		34.6	48.2		17.2				
△		99.9	0.1		0.0				

SIEVE inches size	PERCENT FINER		
	○	□	△
3"	100.0	100.0	100.0
2	100.0	100.0	100.0
1.5"	95.4	95.9	9.0
1"	95.4	93.2	1.3
3/4"	93.8	87.6	0.4
1/2"	92.6	76.1	0.0
3/8"	92.2	71.4	0.1
GRAIN SIZE			
D ₆₀	0.649	0.999	59.6
D ₃₀	0.418	0.223	48.0
D ₁₀	0.217		38.7
COEFFICIENTS			
C _c	1.24		1.00
C _u	2.99		1.54

SIEVE number size	PERCENT FINER		
	○	□	△
#4	90.8	65.4	0.1
#10	89.4	61.3	0.1
#30	55.0	54.2	0.1
#40	31.0	45.8	0.1
#50	16.6	36.3	0.0
#100	6.4	24.2	0.0
#200	3.1	17.2	0.0

SOIL DESCRIPTION
○ Brown Poorly Graded SAND
□ Brown Silty SAND w/ Gravel
△ Gray Poorly Graded GRAVEL

REMARKS:
○
□
△

○ Source: SD-7
 □ Source: SD-8
 △ Source: SD-9

Notes: Analysis by Cooper Laboratories.



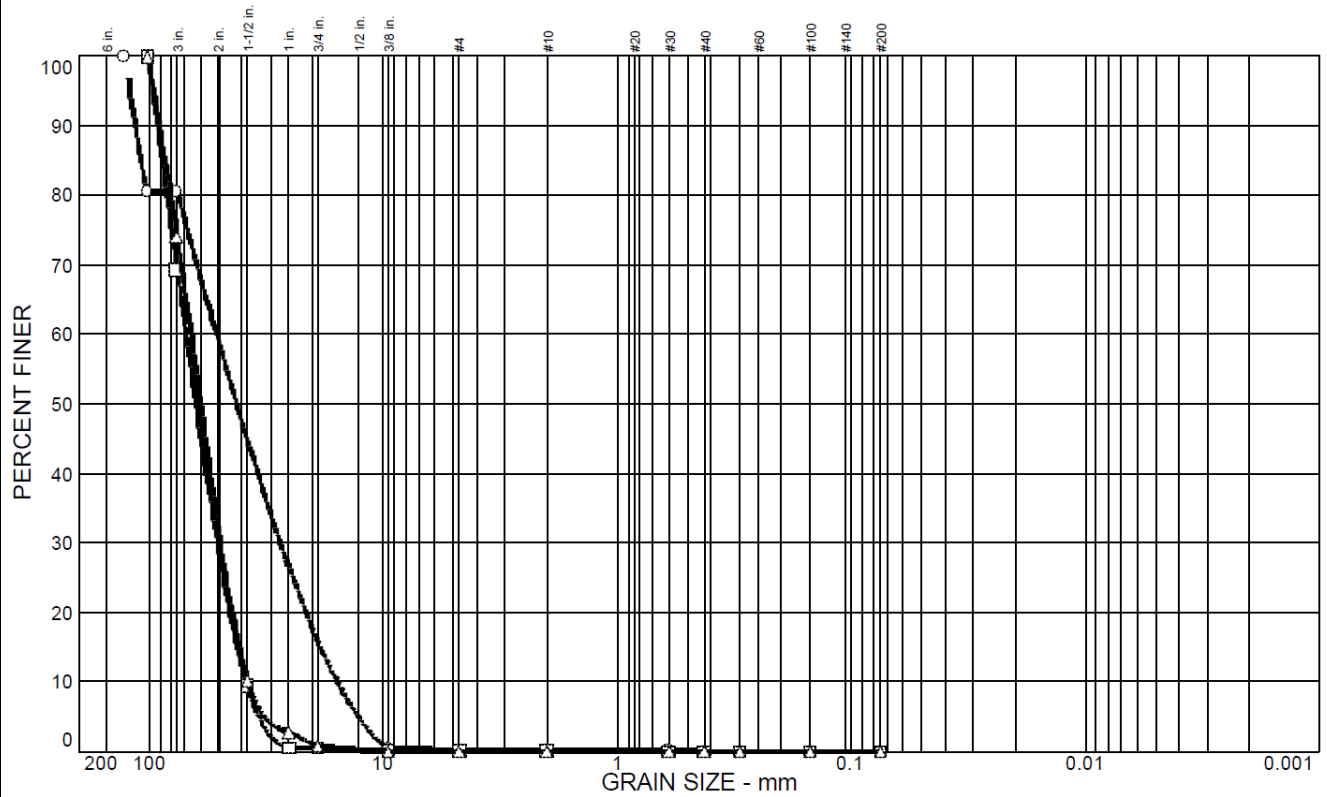
Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek Particle Size Distribution Results SD 7-9

Project No. 08-1032

Created By: JS

Figure 6

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	19.6	80.2	0.2		0.0 0.0	GP			
□	30.6	69.3	0.1		0.0 0.0				
△	26.0	74.0	0.0		0.0 0.0				

SIEVE inches size	PERCENT FINER		
	○	□	△
5	100.0		
4	80.4	100.0	100.0
3	80.4	69.4	74.0
1.5"		9.4	10.3
1"		0.5	2.8
3/4"		0.5	0.8
3/8"	0.5	0.1	0.0
GRAIN SIZE			
D60	51.7	69.7	66.5
D30	27.6	51.3	49.8
D10	15.7	38.6	37.9
COEFFICIENTS			
C _c	0.93	0.98	0.98
C _u	3.28	1.81	1.76

SIEVE number size	PERCENT FINER		
	○	□	△
#4	0.2	0.1	0.0
#10	0.2	0.1	0.0
#30	0.1	0.0	0.0
#40	0.0	0.0	0.0
#50	0.0	0.0	0.0
#100	0.0	0.0	0.0
#200	0.0	0.0	0.0

SOIL DESCRIPTION

○ Brown Poorly Graded GRAVEL w/ Sand

□ Grayish Brown Poorly Graded GRAVEL

△ Gray Poorly Graded GRAVEL

REMARKS:

○

□

△

○ Source: SD-10
 □ Source: SD-11
 △ Source: SD-12

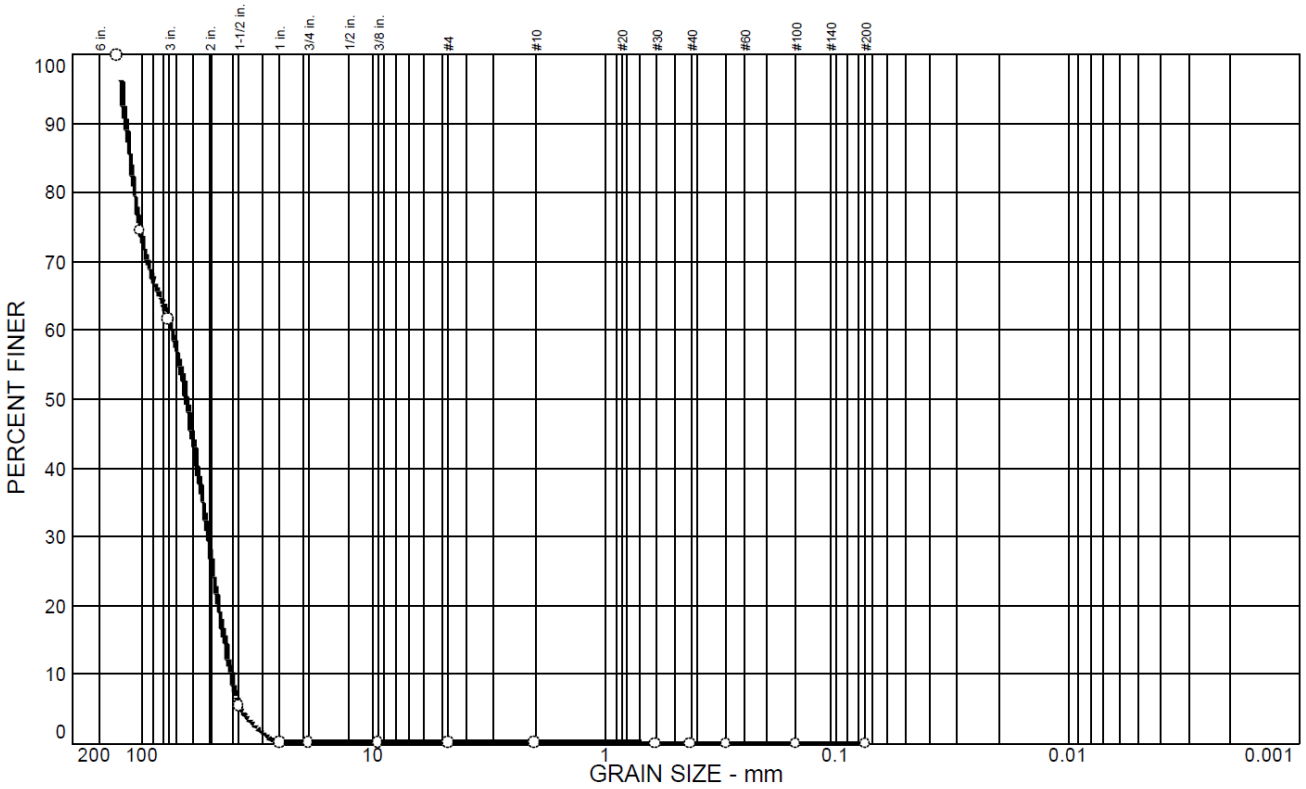
Notes: Analysis by Cooper Laboratories.



Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek Particle Size Distribution Results SD 10-12

Project No. 08-1032 Created By: JS **Figure 7**

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	38.5	61.4	0.1	0.0	0.0				

SIEVE	PERCENT FINER			SIEVE	PERCENT FINER			SOIL DESCRIPTION
inches size	○			number size	○			○ Grayish Brown Poorly Graded GRAVEL
5	100.0			#4	0.1			
4	74.5			#10	0.1			
3"	61.5			#30	0.0			
1.5"	5.4			#40	0.0			
1"	0.1			#50	0.0			
3/4"	0.1			#100	0.0			
3/8"	0.1			#200	0.0			
GRAIN SIZE								
D ₆₀	74.1							REMARKS: ○
D ₃₀	52.0							
D ₁₀	41.2							
COEFFICIENTS								
C _c	0.89							
C _u	1.80							

○ Source: SD-16



Notes: Aerial imagery from Bing maps.

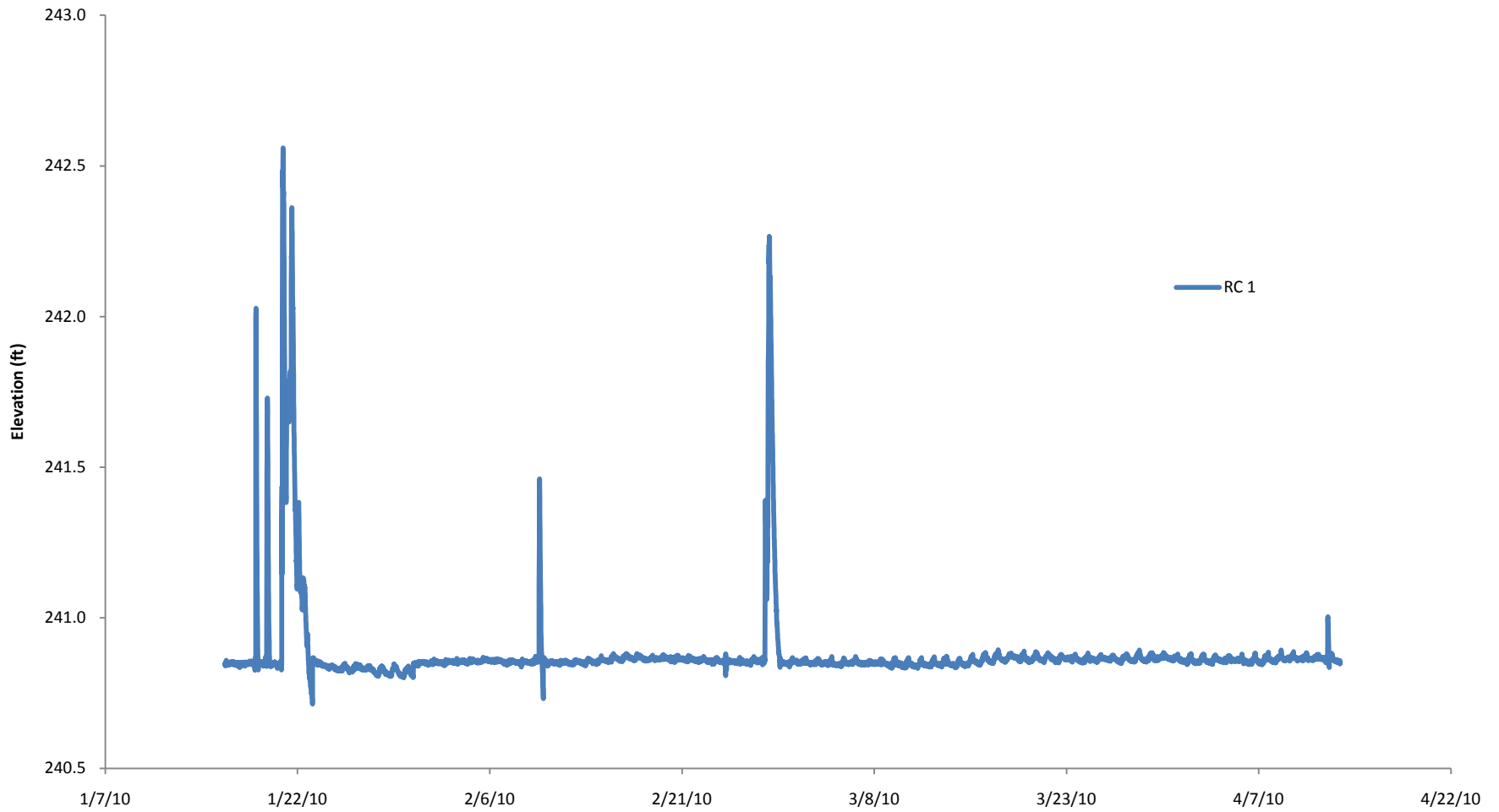


Rose Creek Watershed Restoration Opportunities Analysis - Appendix C
Water Level Monitoring Locations

Project No. 08-1032

Created By: JS

Figure 9



Notes: Water level data references the NAVD 88 vertical datum.



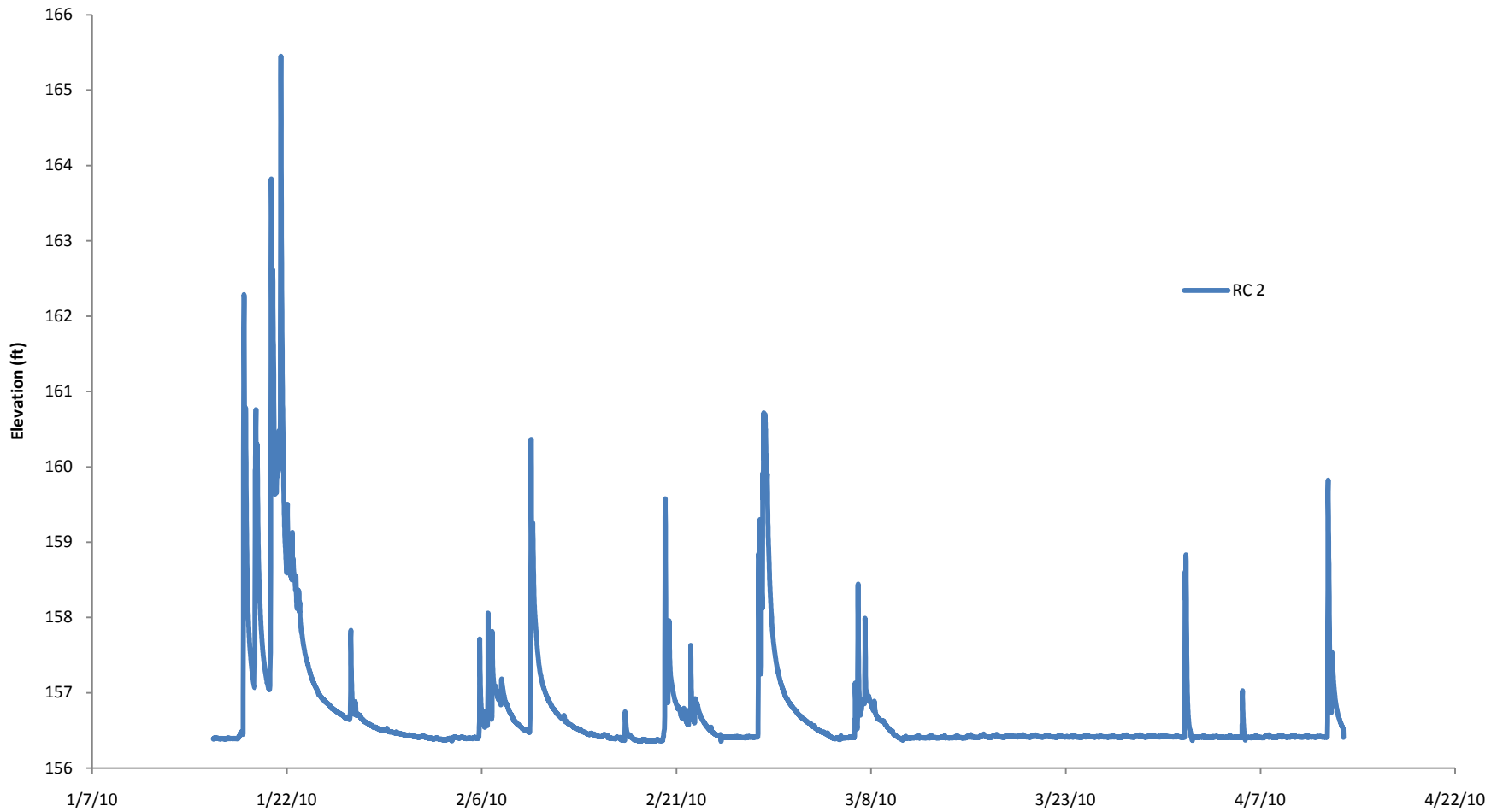
Rose Creek Watershed Restoration Opportunities Analysis – Appendix C

Water Level Data: RC 1

Project No. 08-1032

Created By: JS

Figure 10



Notes: Water level data references the NAVD 88 vertical datum.



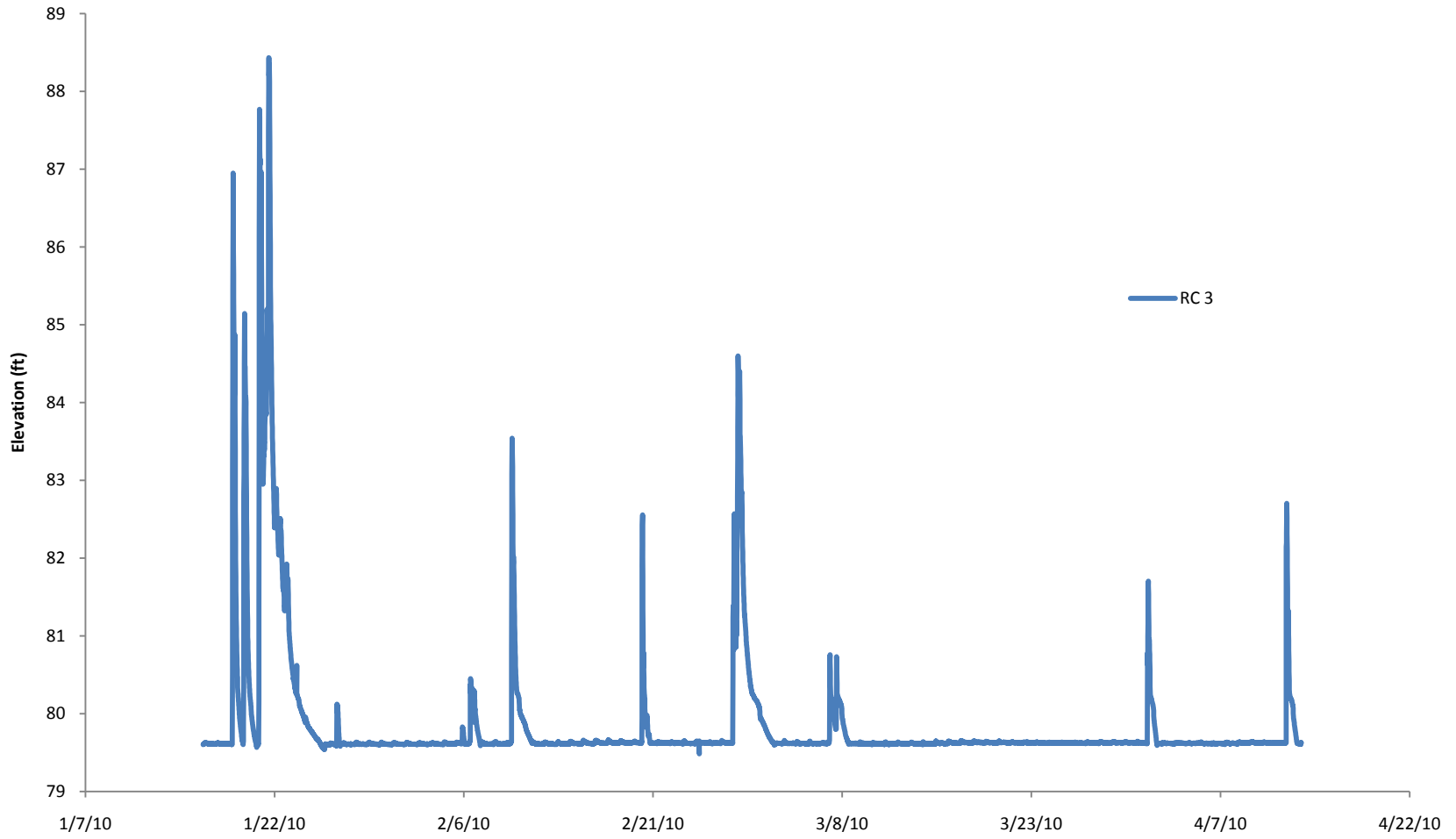
Rose Creek Watershed Restoration Opportunities Analysis - Appendix C

Water Level Data: RC 2

Project No. 08-1032

Created By: JS

Figure 11



Notes: Water level data references the NAVD 88 vertical datum.



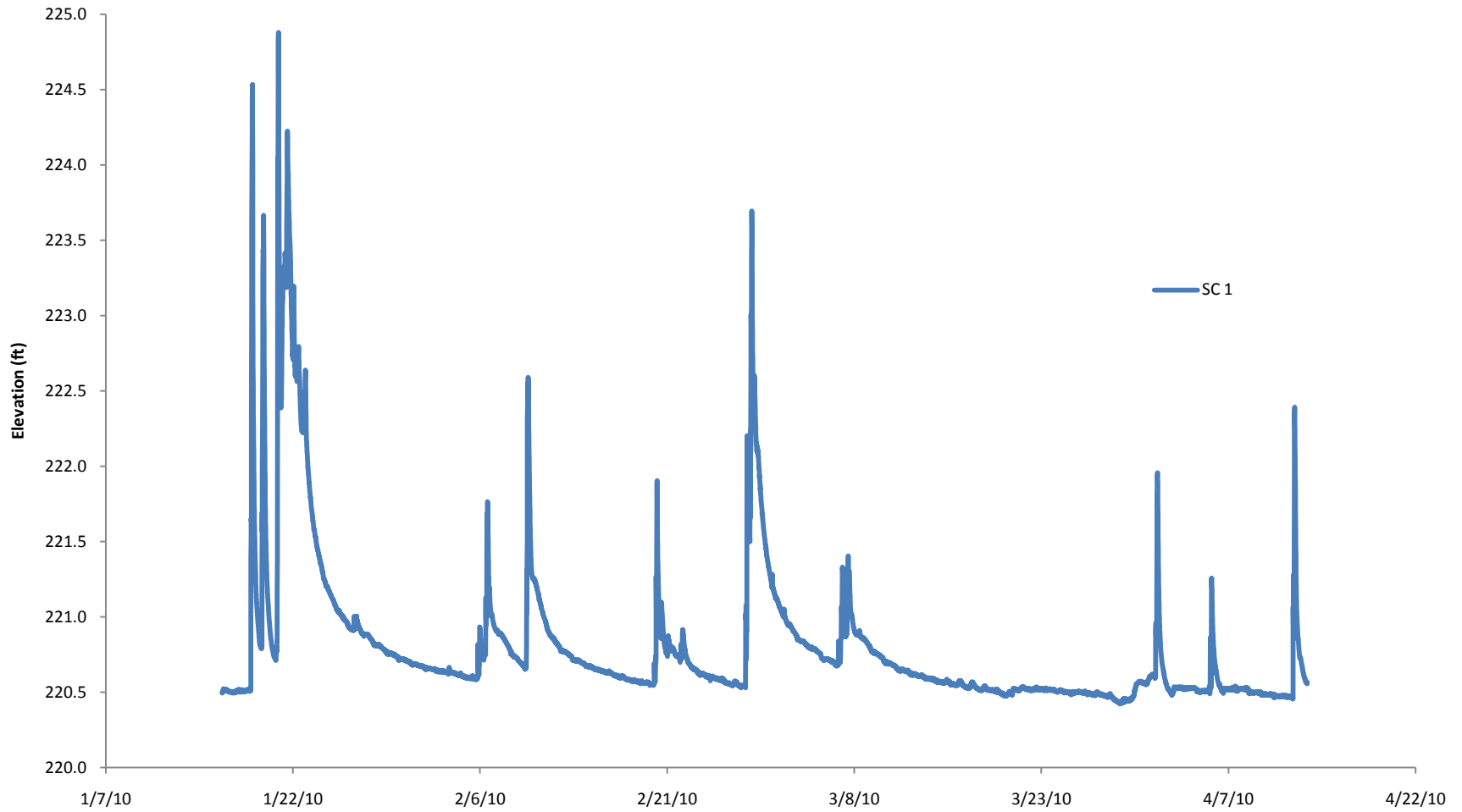
Rose Creek Watershed Restoration Opportunities Analysis - Appendix C

Water Level Data: RC 3

Project No. 08-1032

Created By: JS

Figure 12



Notes: Water level data references the NAVD 88 vertical datum.



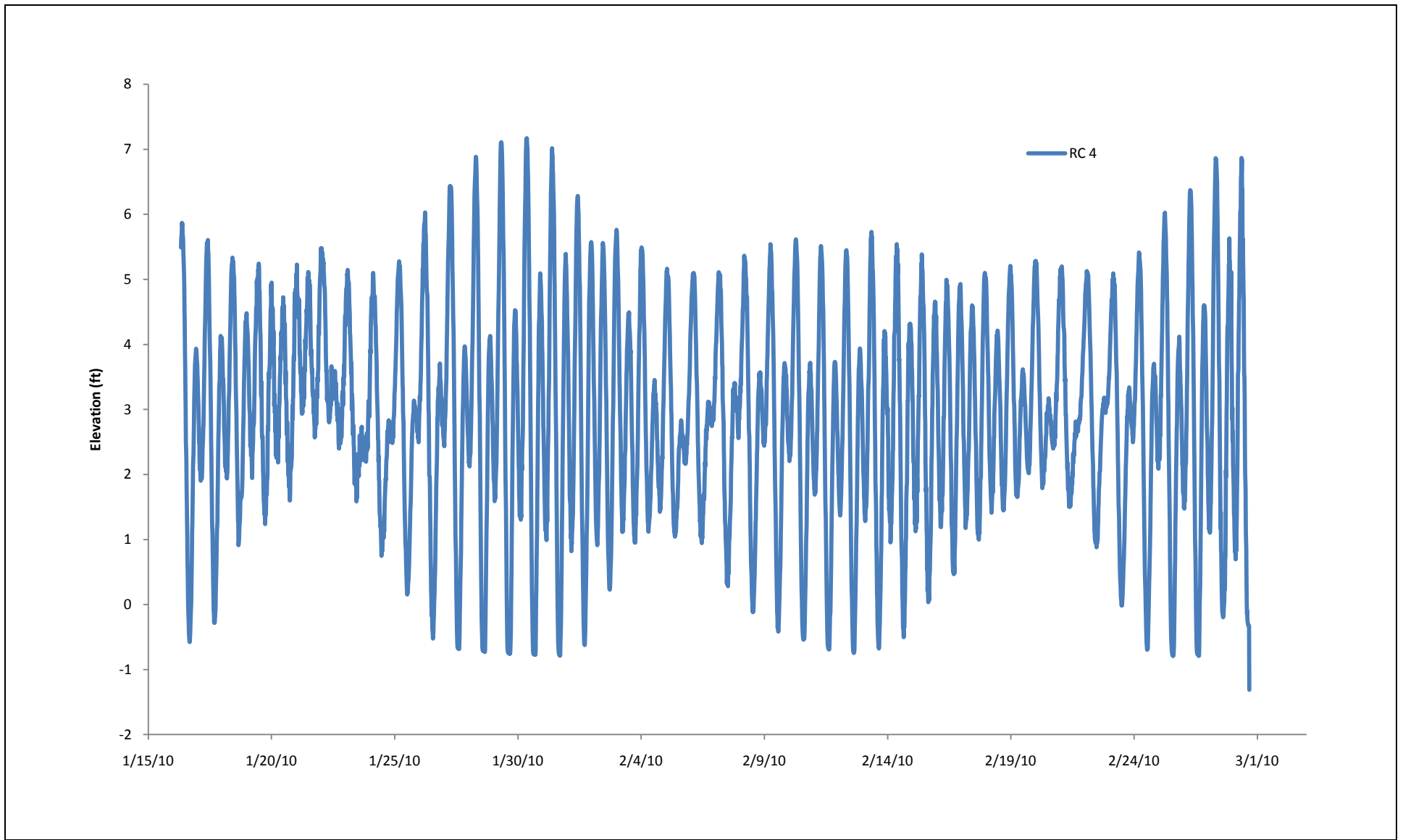
Rose Creek Watershed Restoration Opportunities Analysis - Appendix C

Water Level Data: SC 1

Project No. 08-1032

Created By: JS

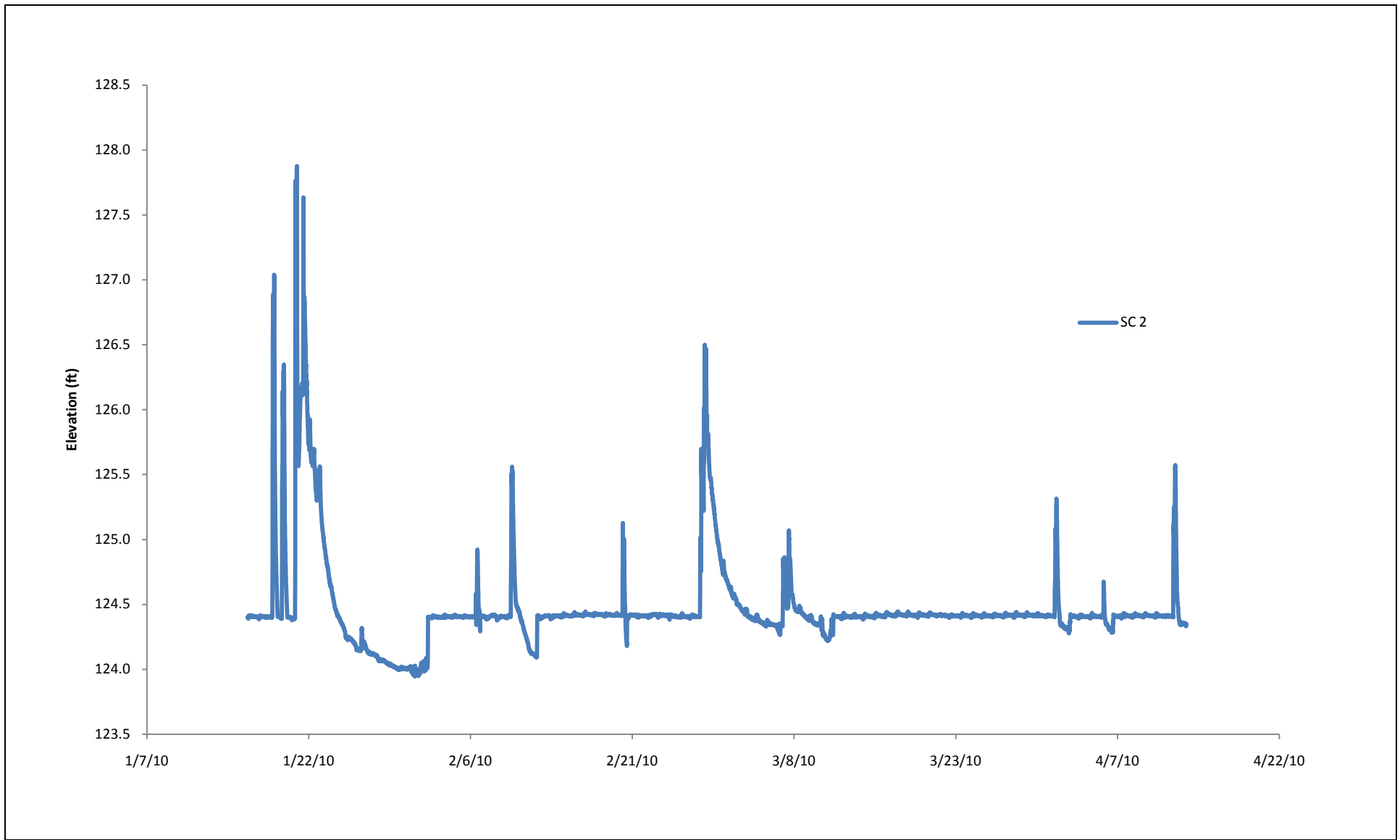
Figure 13



Notes: Water level data references the NAVD 88 vertical datum.



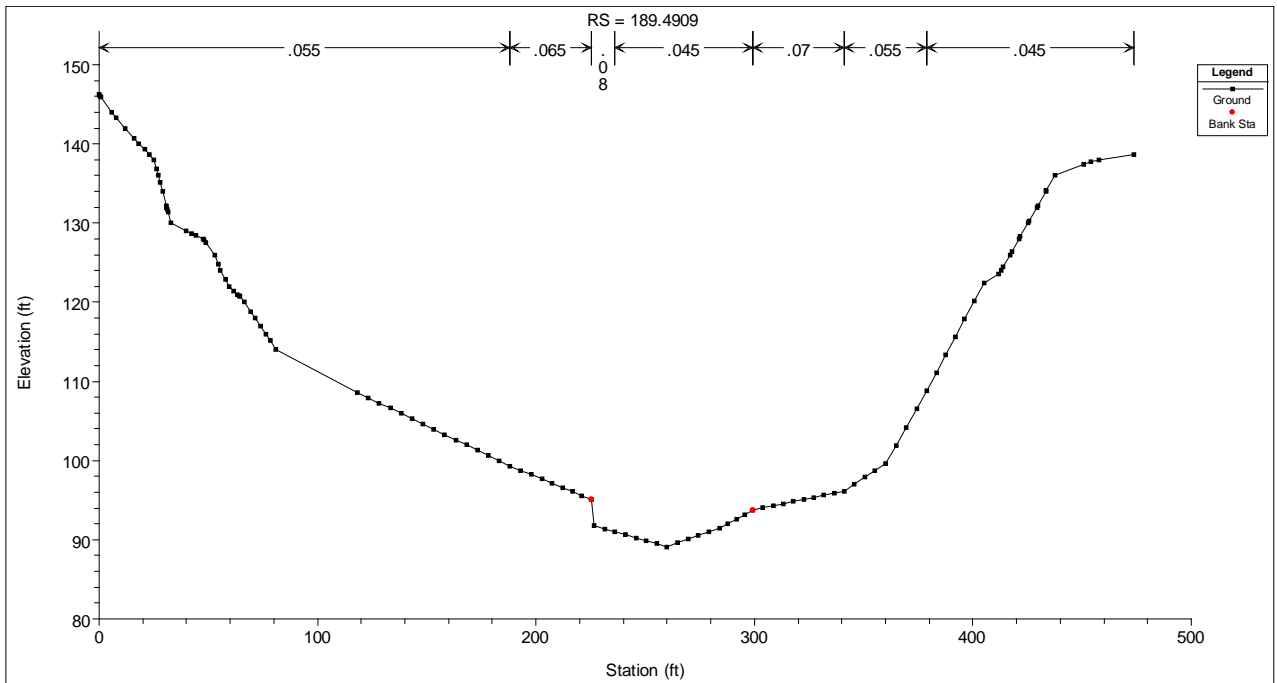
<i>Rose Creek Watershed Restoration Opportunities Analysis - Appendix C</i>		
Water Level Data: RC 4		
Project No. 08-1032	Created By: JS	Figure 14



Notes: Water level data references the NAVD 88 vertical datum.



<i>Rose Creek Watershed Restoration Opportunities Analysis - Appendix C</i>		
Water Level Data: SC 2		
Project No. 08-1032	Created By: JS	Figure 15



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

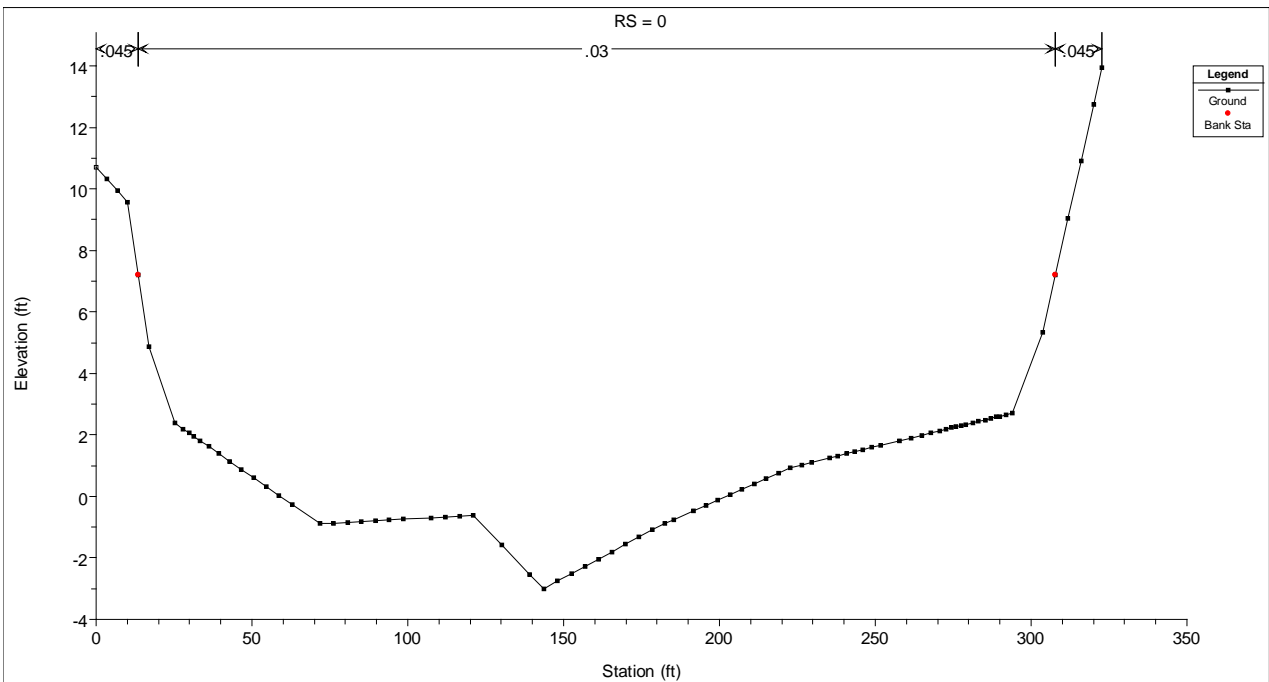
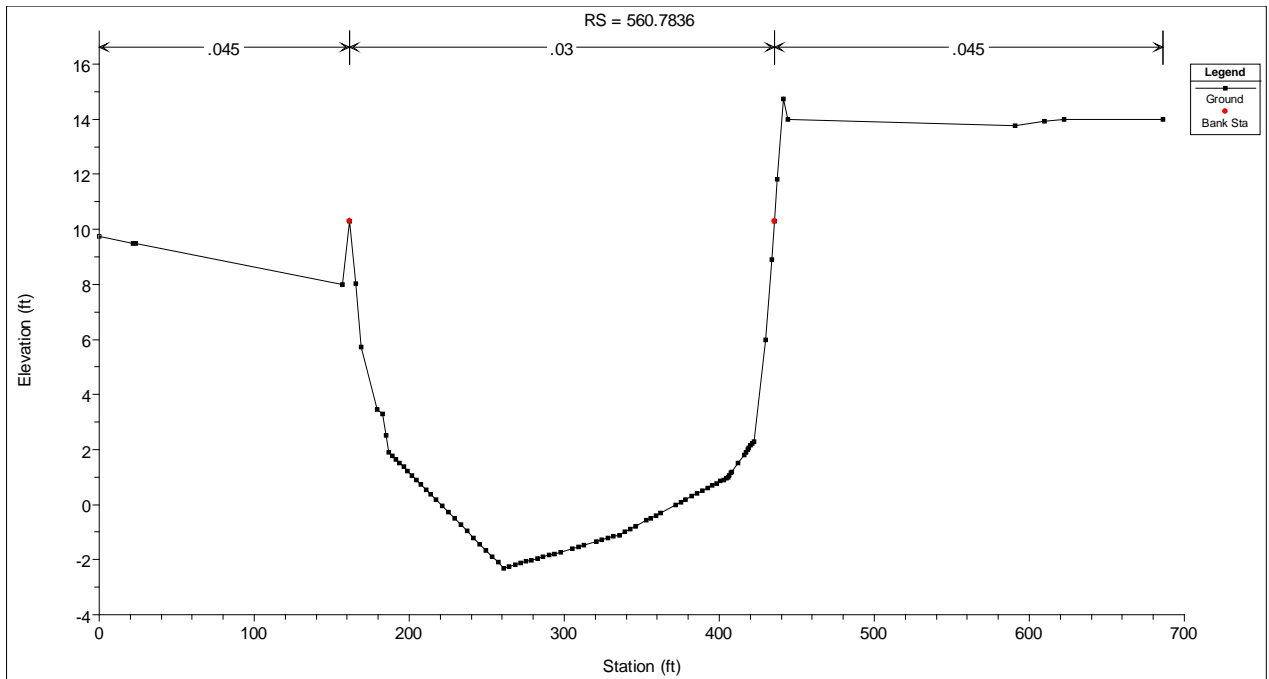


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 189.4909

Project No. 08-1032

Created By: LA

Figure 16



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

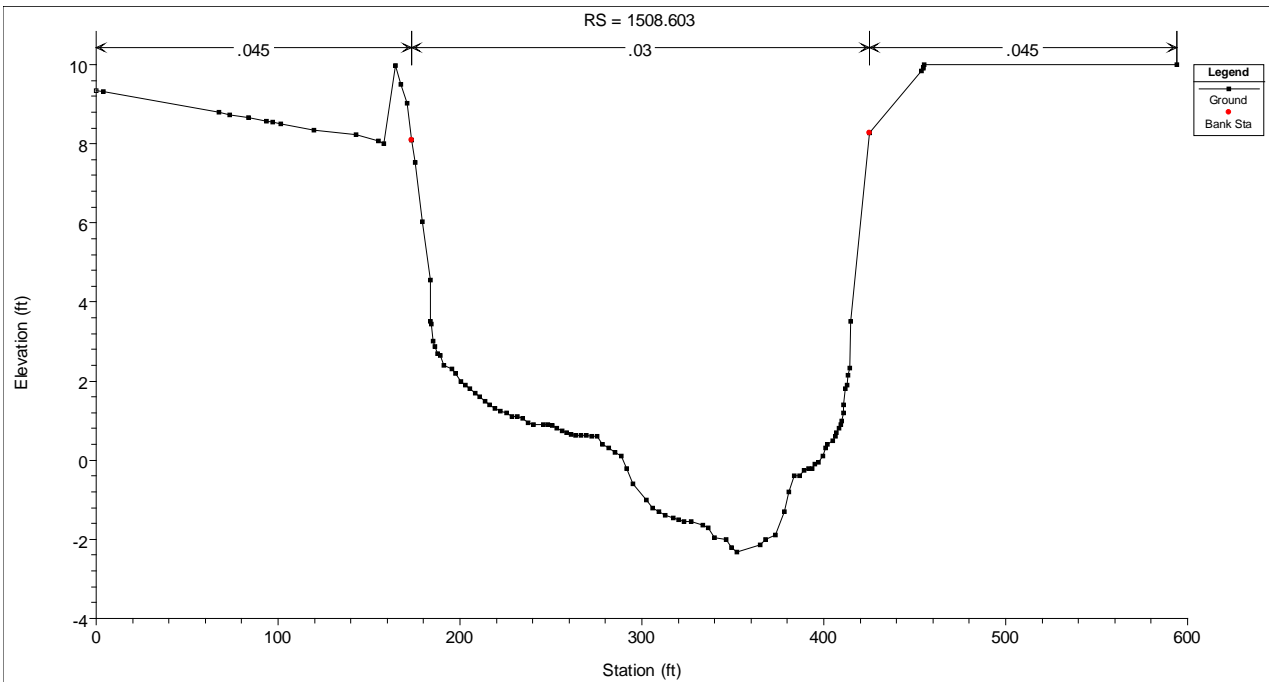
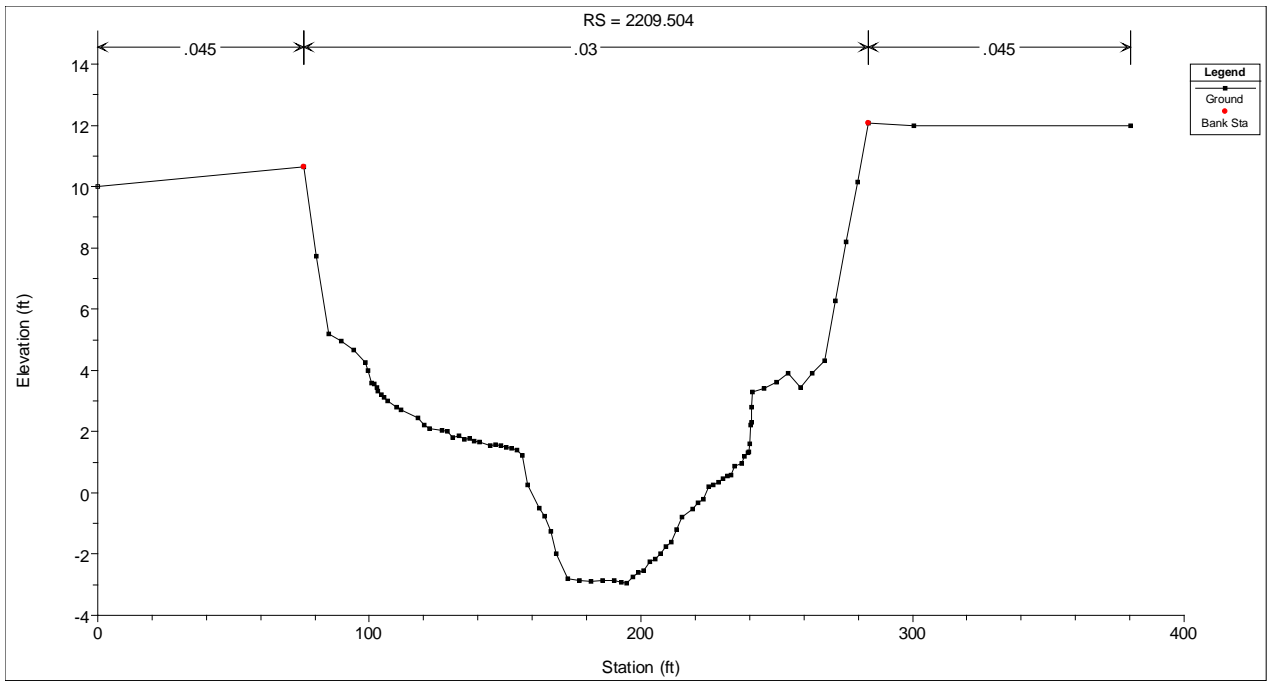


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 560.7836, 0.0

Project No. 08-1032

Created By: LA

Figure 17



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

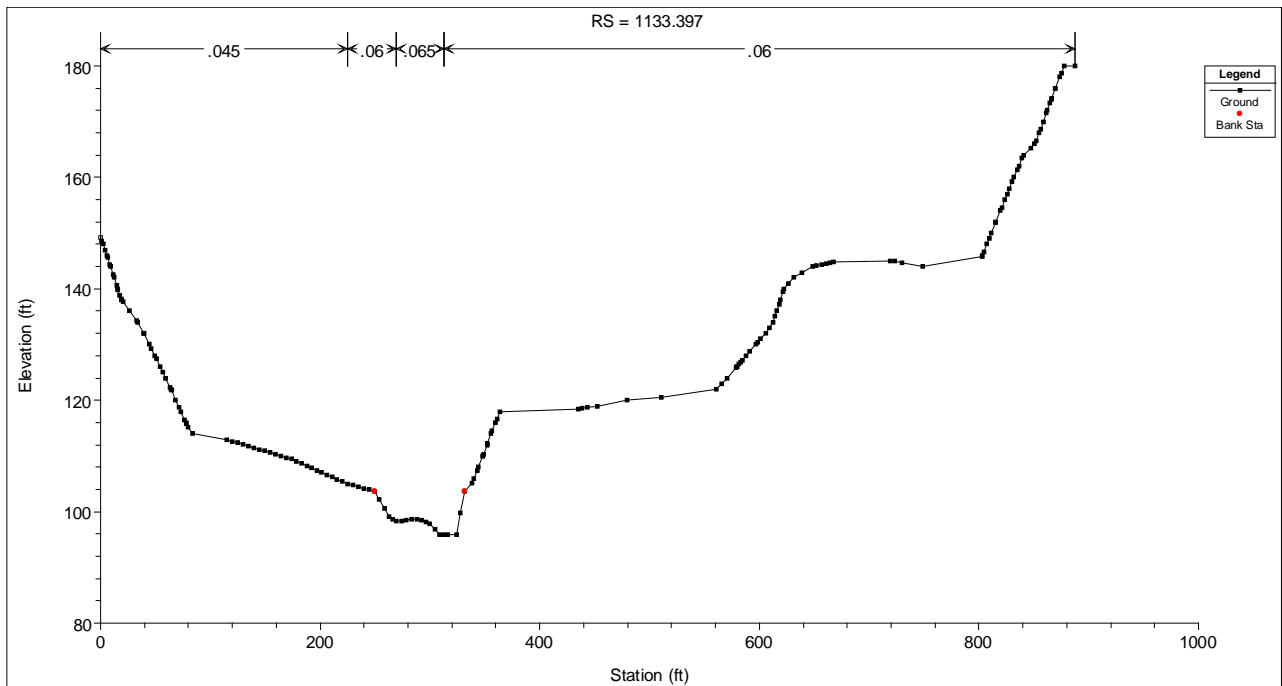
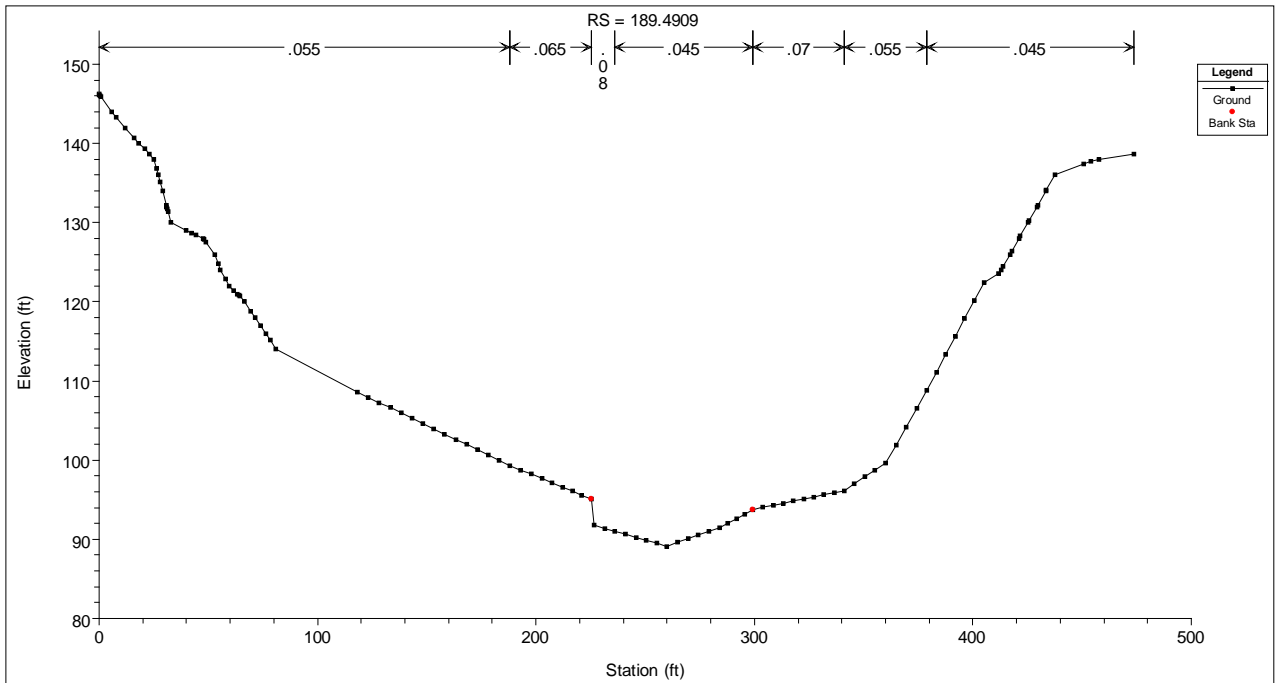


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 2209.504, 1508.603

Project No. 08-1032

Created By: LA

Figure 18



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

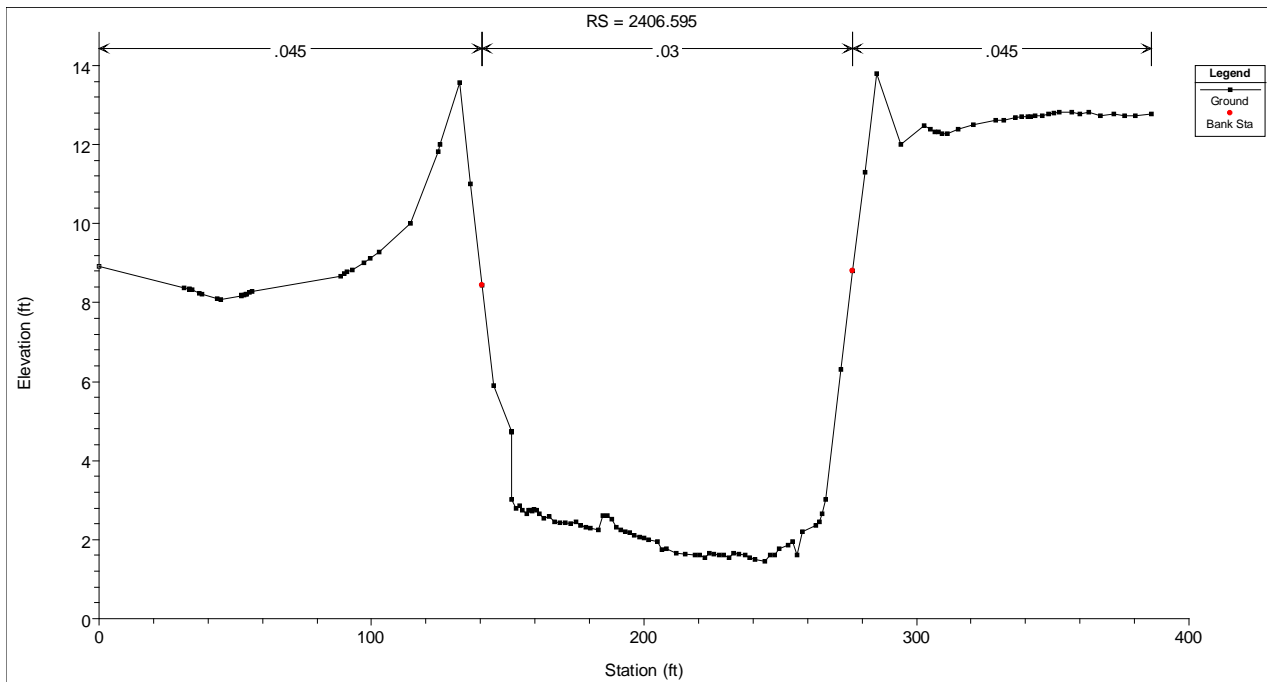
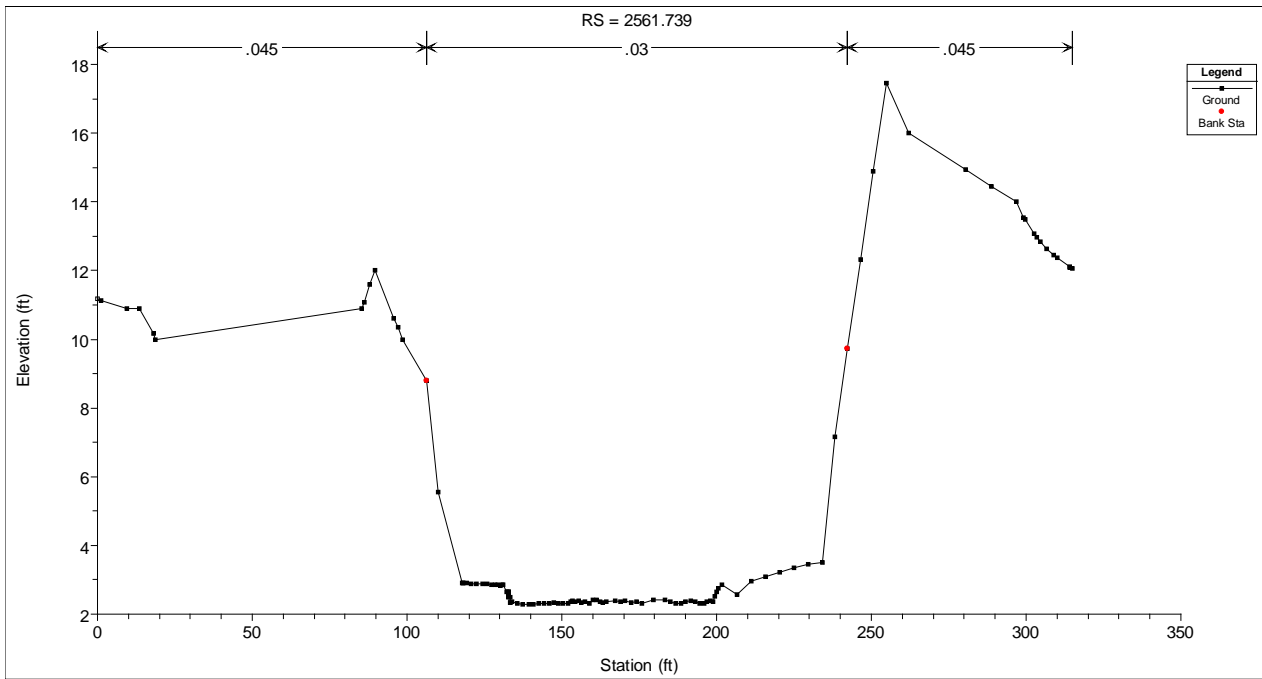


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 2349.290, 1133.397

Project No. 08-1032

Created By: LA

Figure 19



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

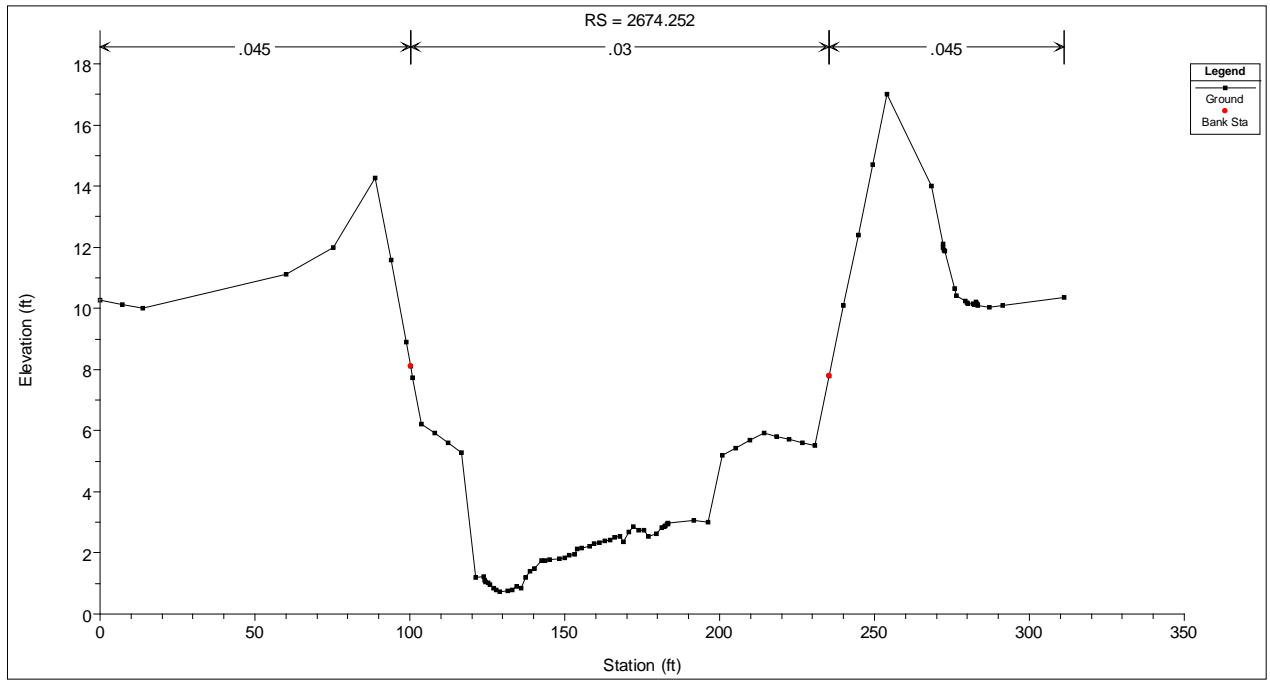
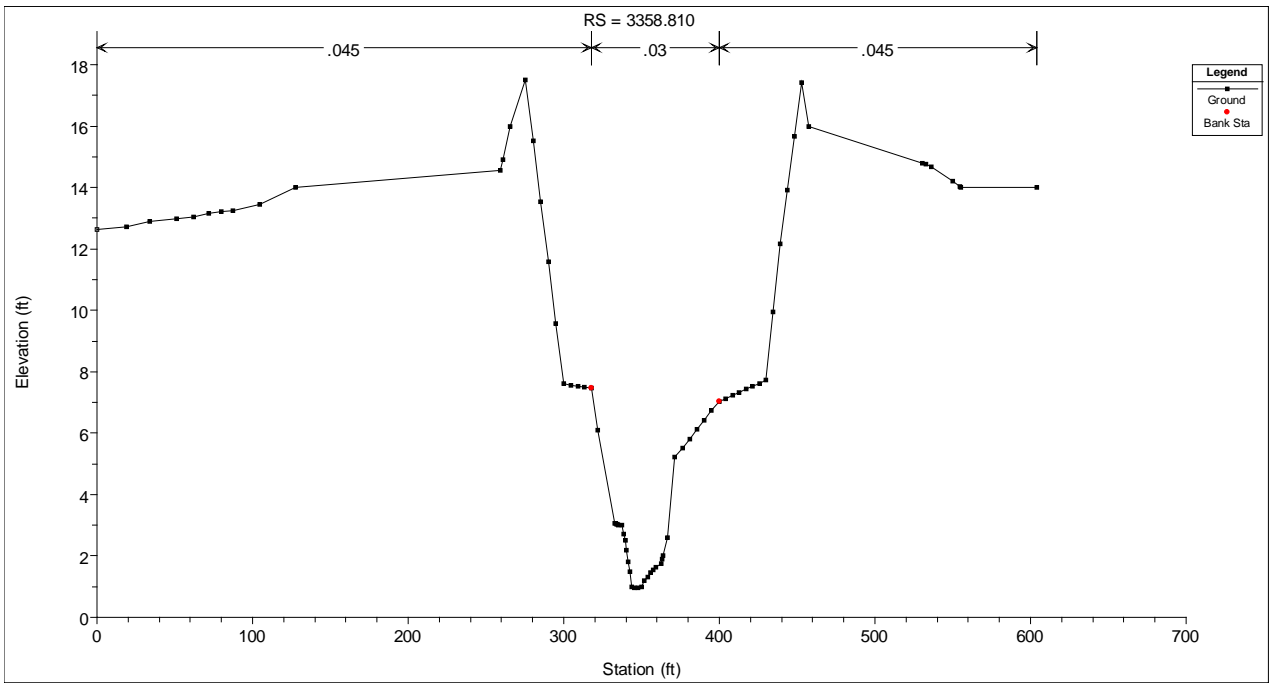


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 2561.739, 2406.595

Project No. 08-1032

Created By: LA

Figure 20



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

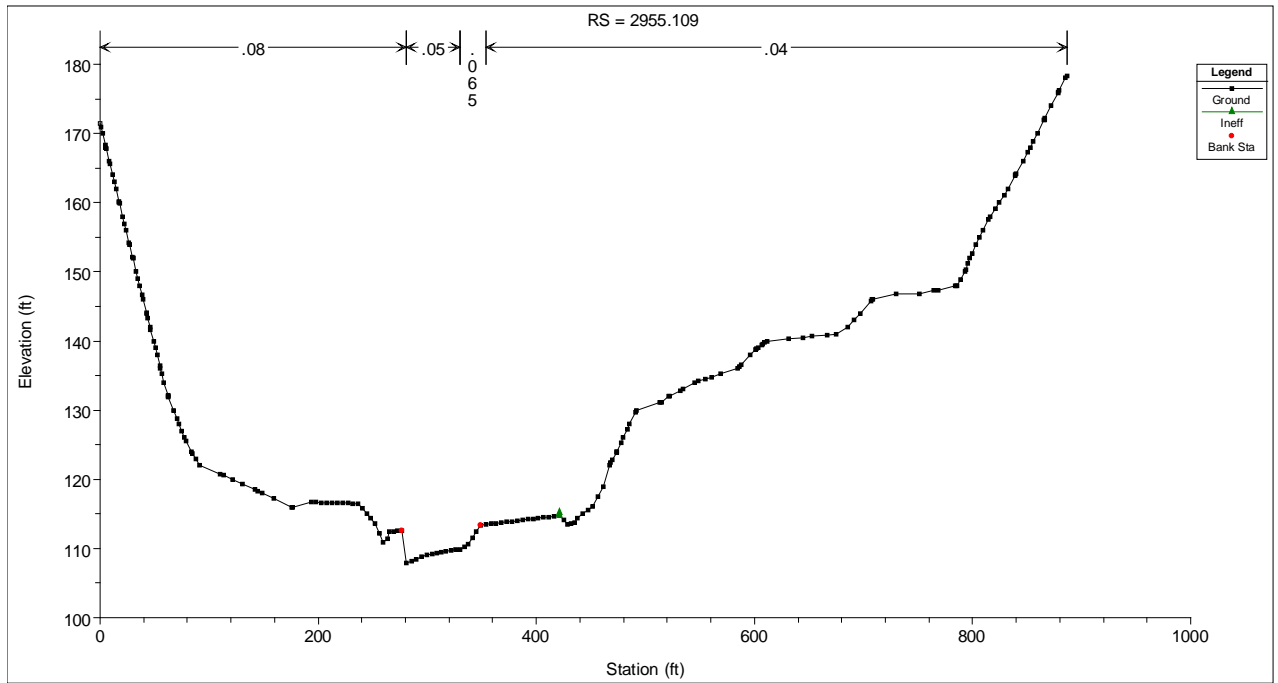
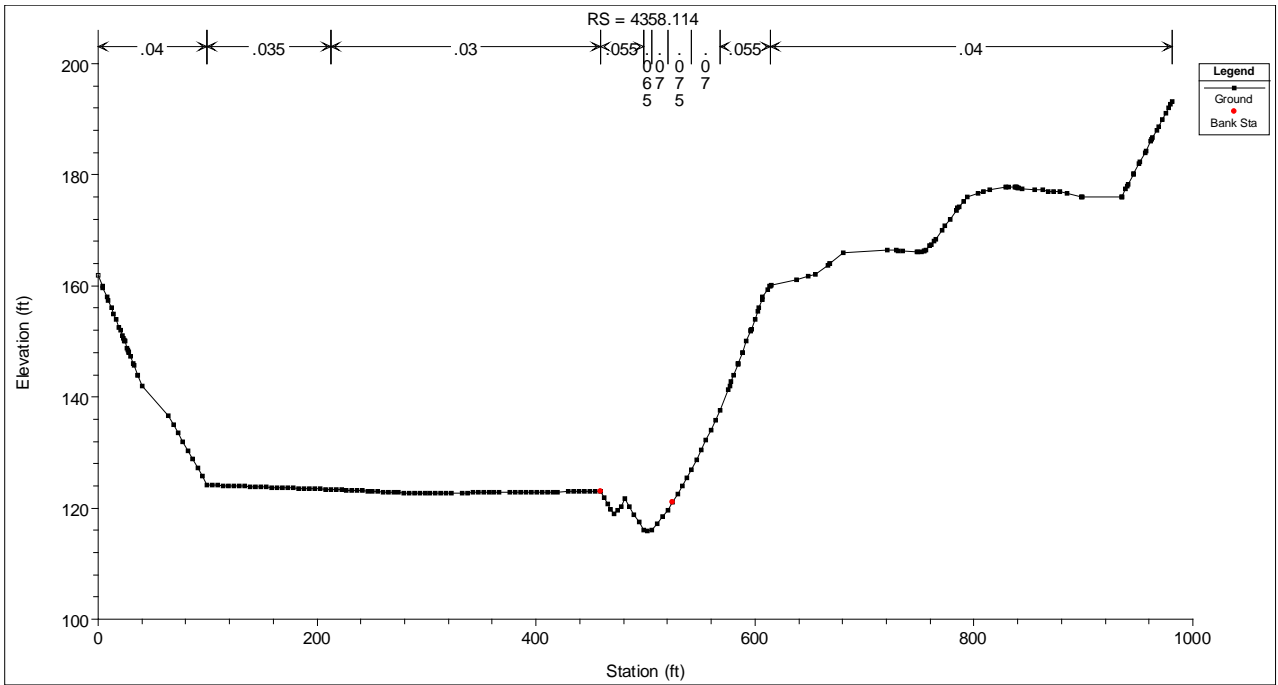


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 3358.810, 2674.252

Project No. 08-1032

Created By: LA

Figure 21



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

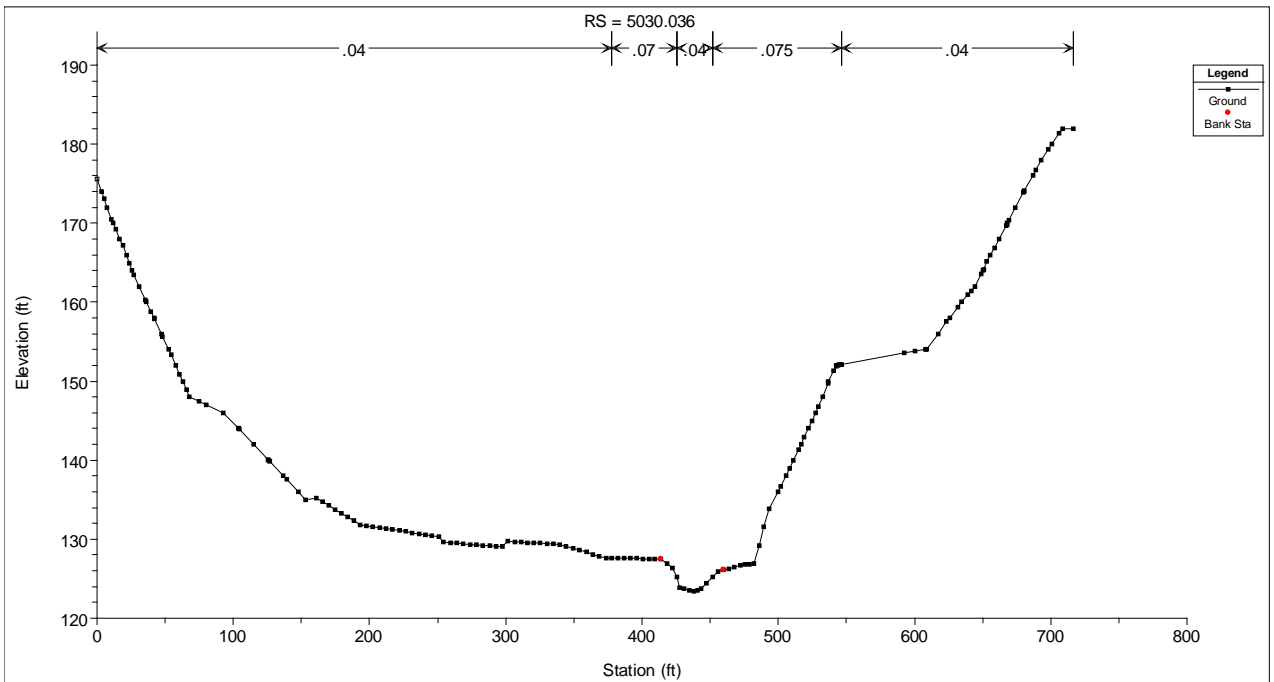
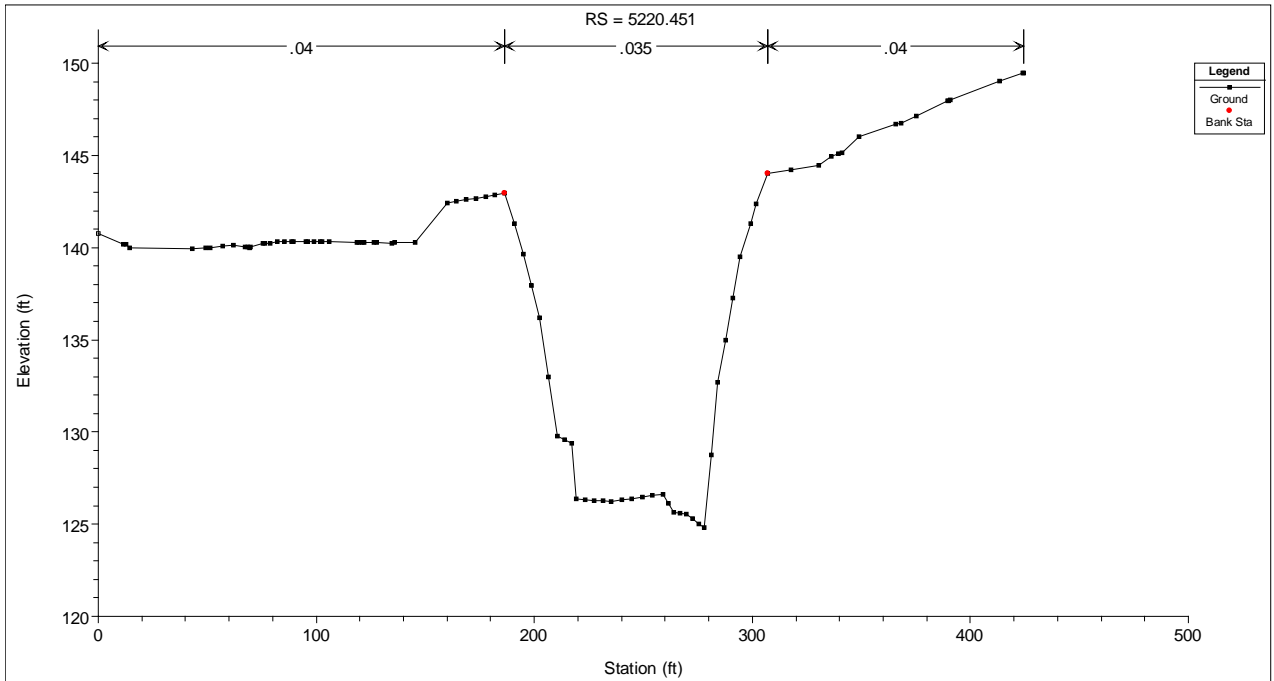


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 4358.114, 2955.109

Project No. 08-1032

Created By: LA

Figure 22



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

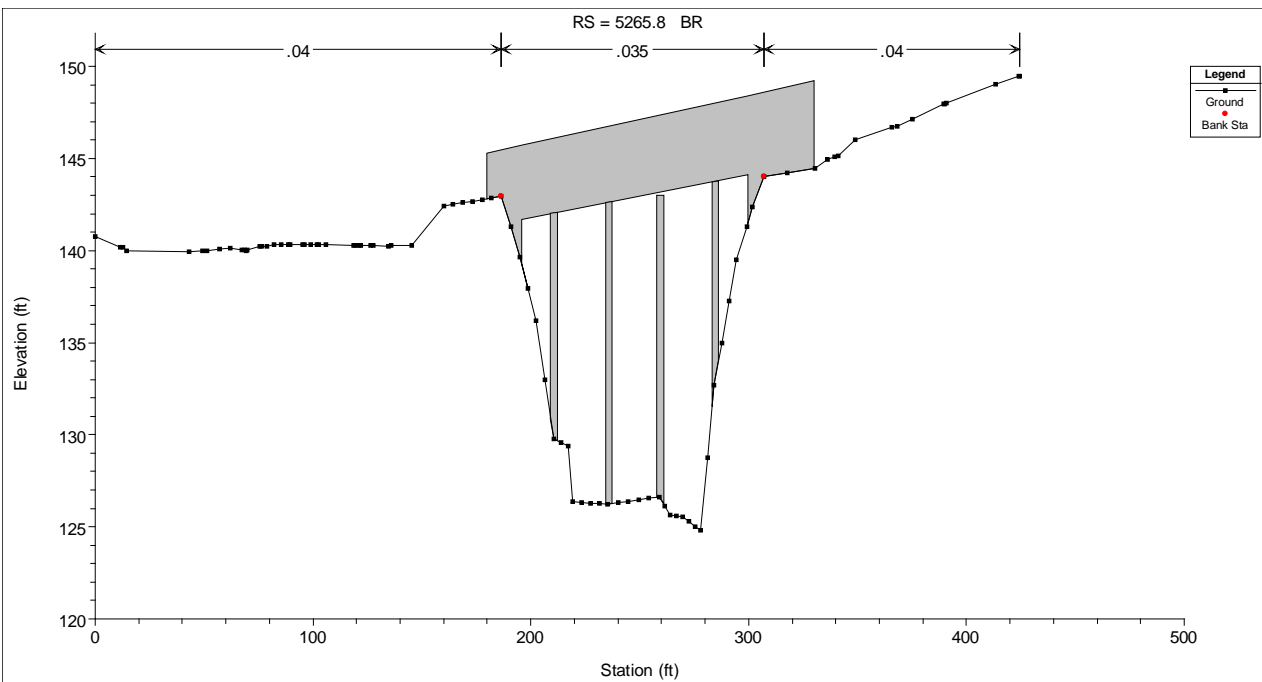
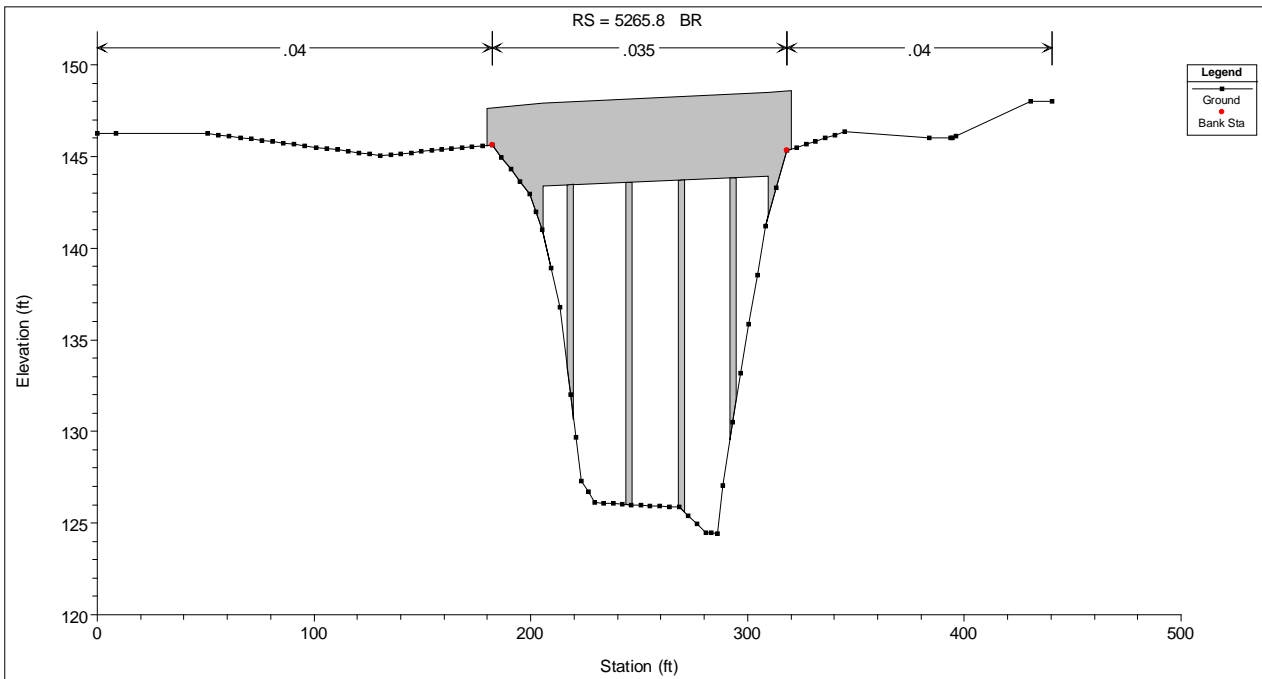


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 5220.451, 5030.036

Project No. 08-1032

Created By: LA

Figure 23



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

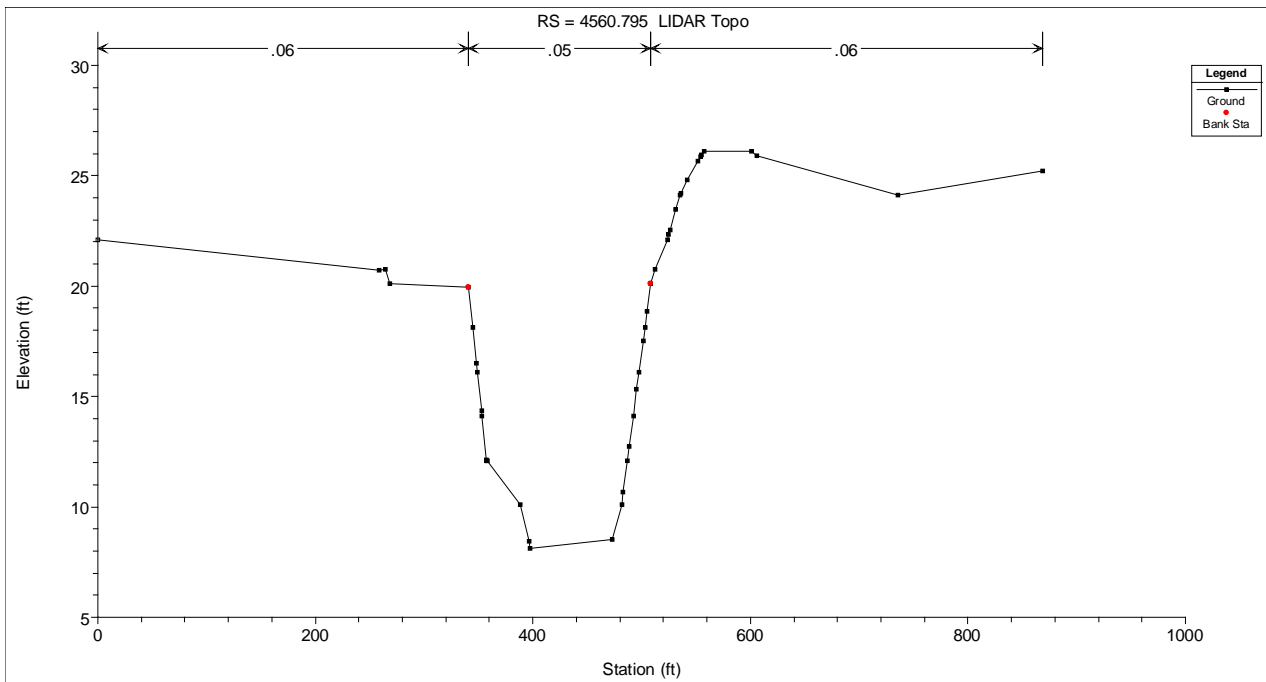
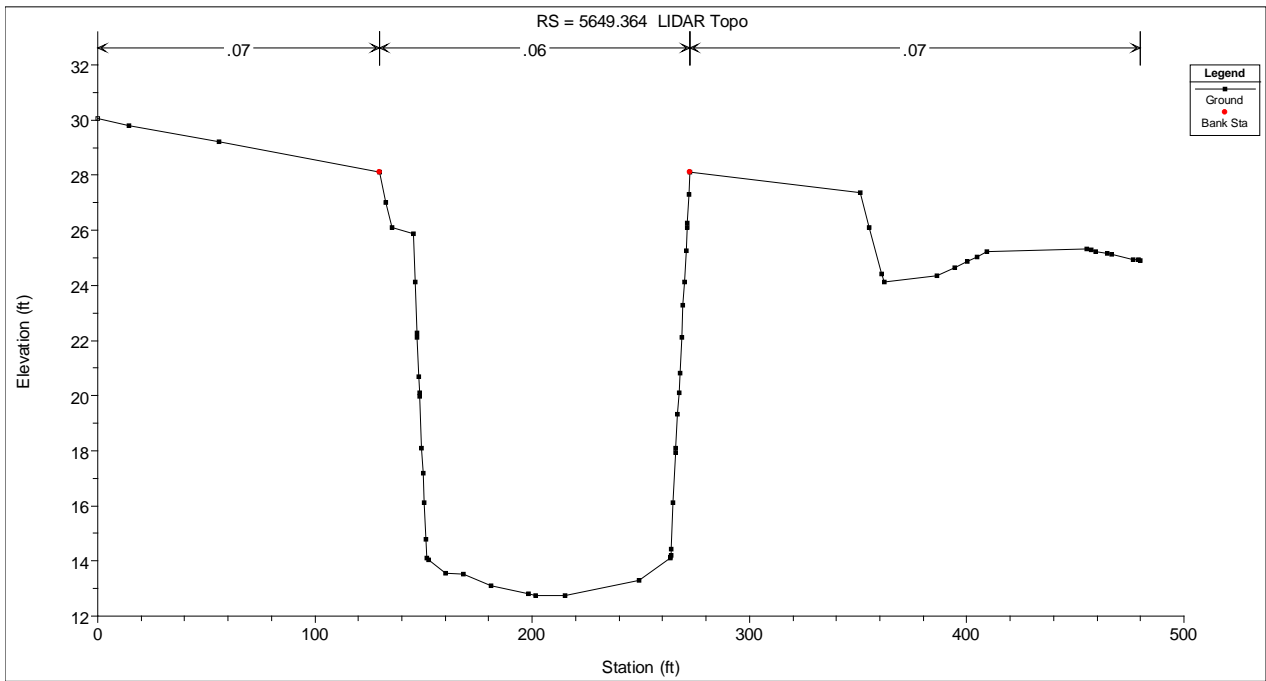


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 5265.8, 5265.8

Project No. 08-1032

Created By: LA

Figure 24



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

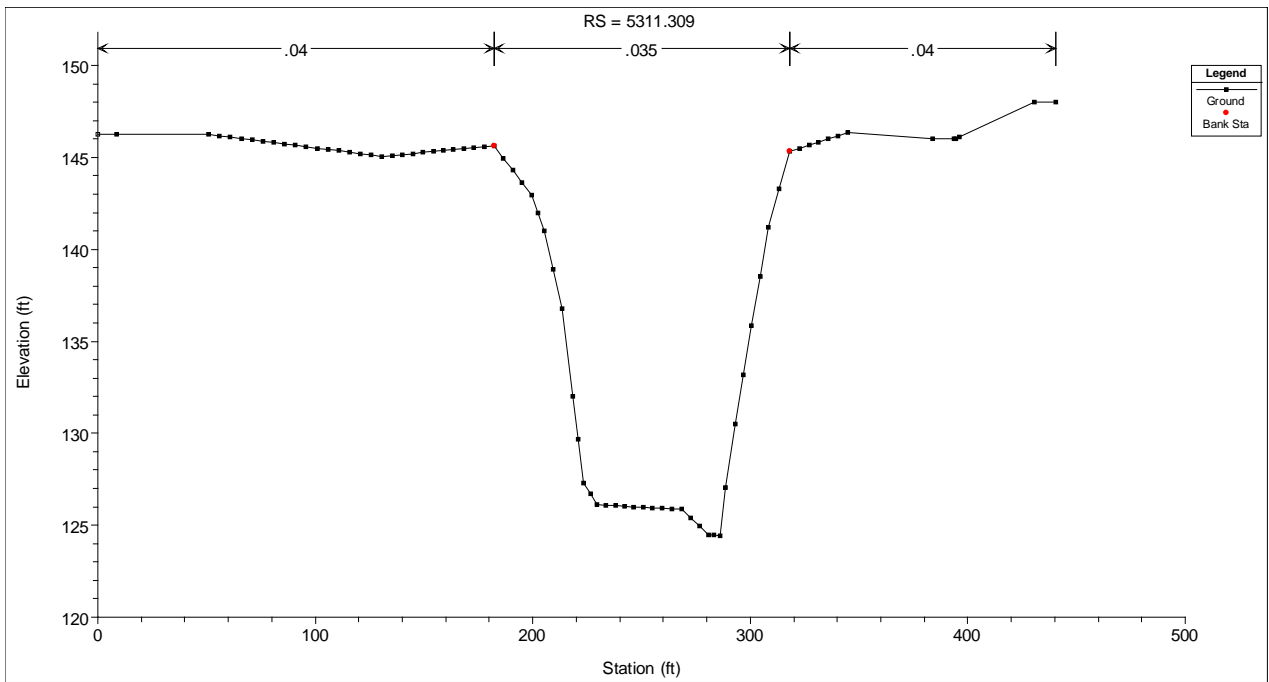
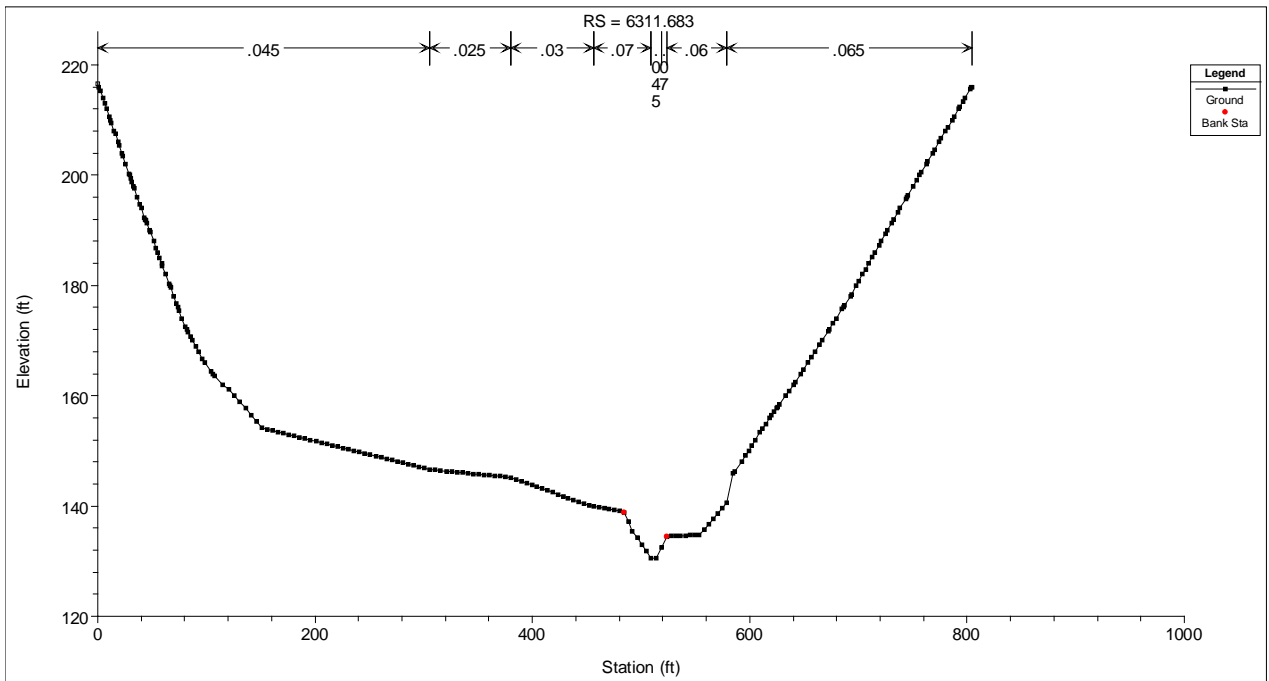


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 5649.364, 4560.795

Project No. 08-1032

Created By: LA

Figure 25



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

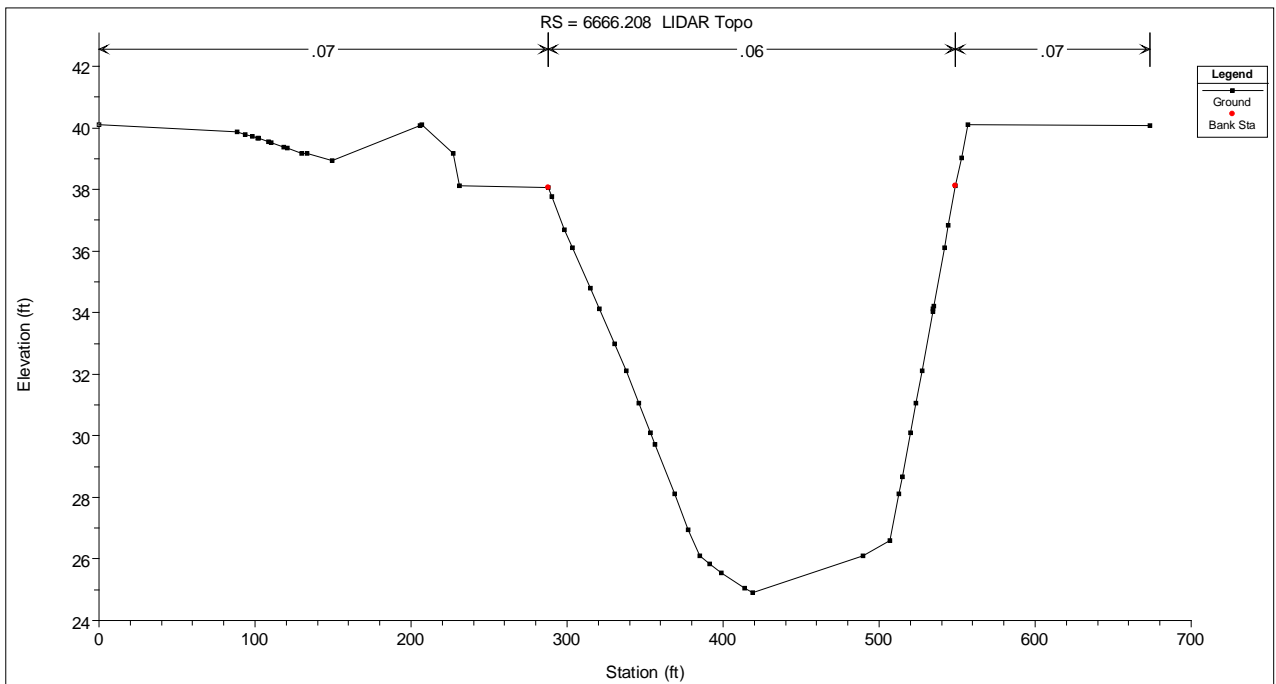
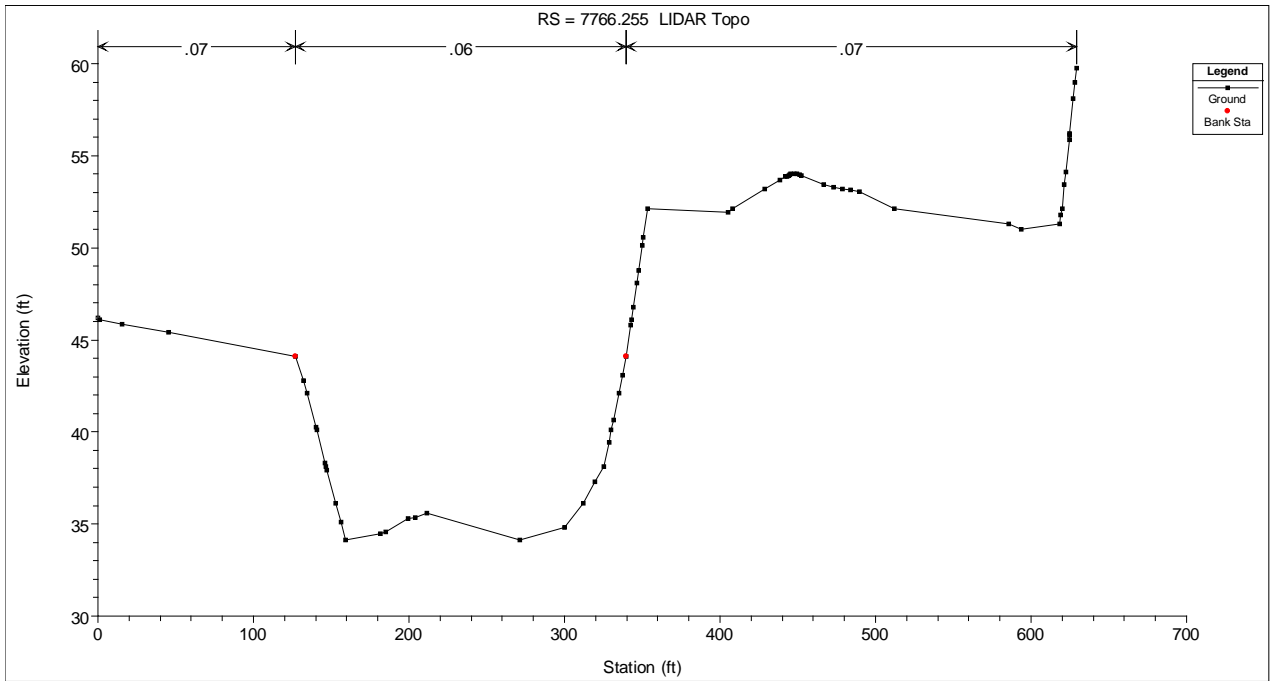


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 6311.683, 5311.309

Project No. 08-1032

Created By: LA

Figure 26



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

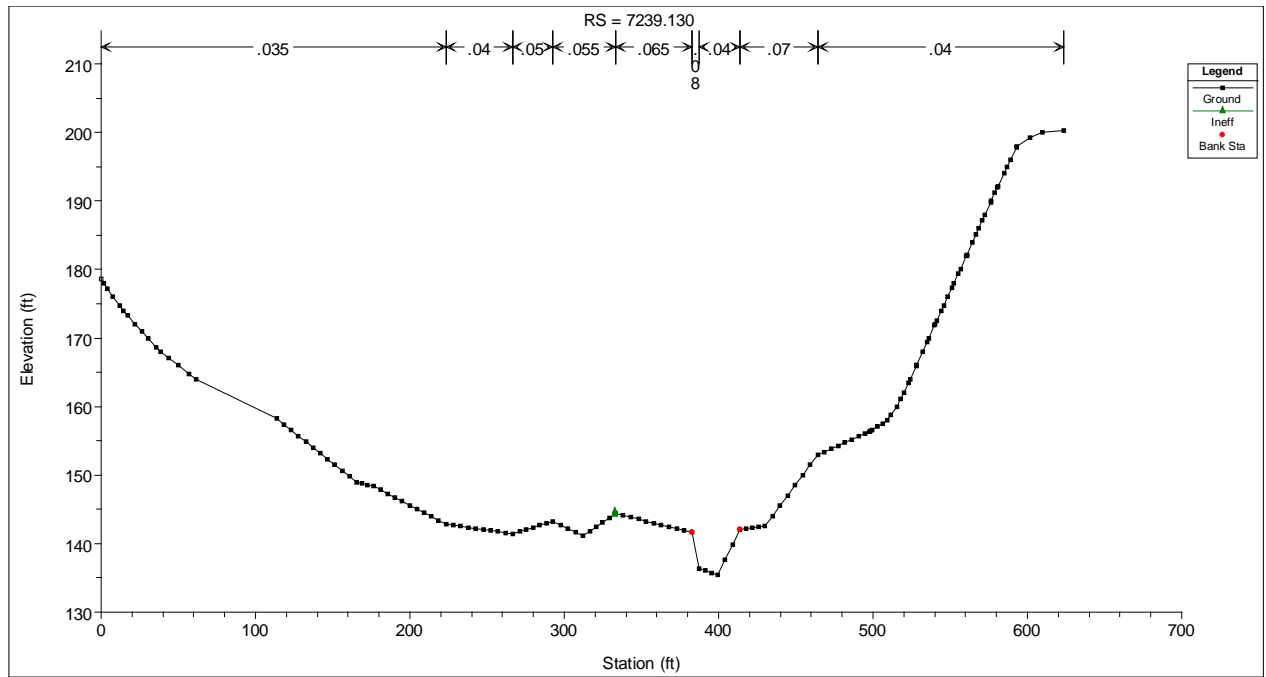
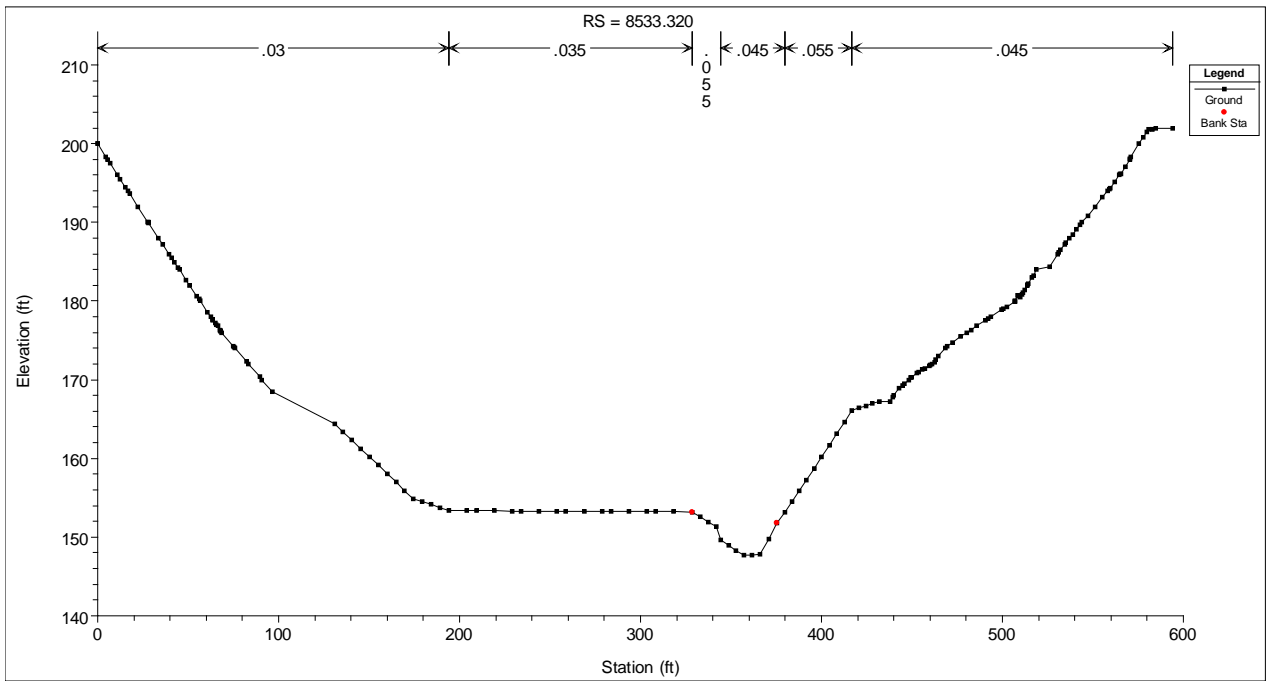


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 7766.255, 6666.208

Project No. 08-1032

Created By: LA

Figure 27



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

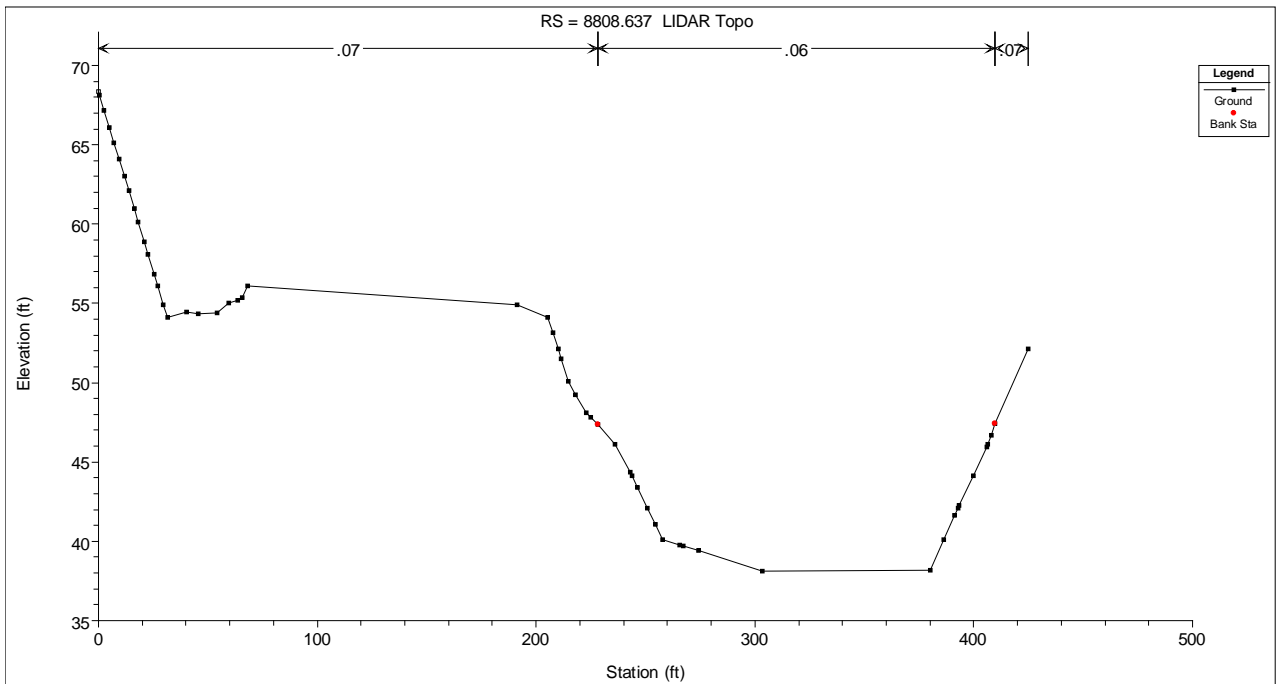
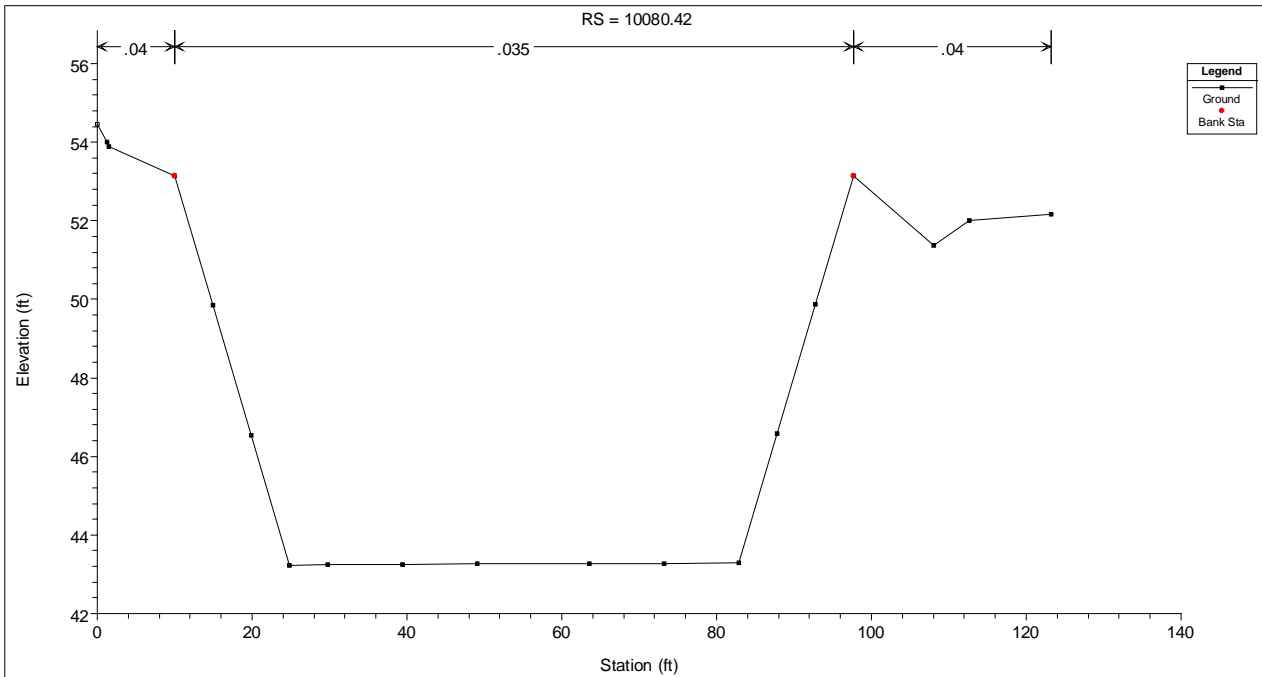


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 8533.320, 7239.130

Project No. 08-1032

Created By: LA

Figure 28



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

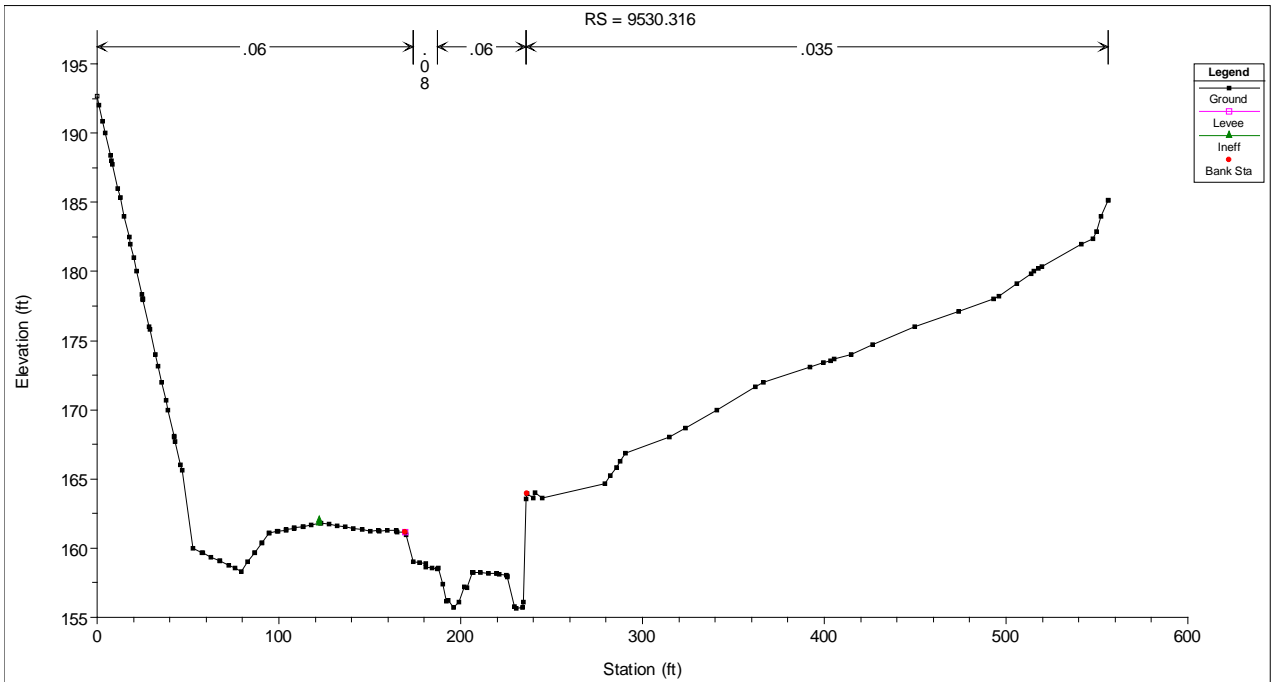
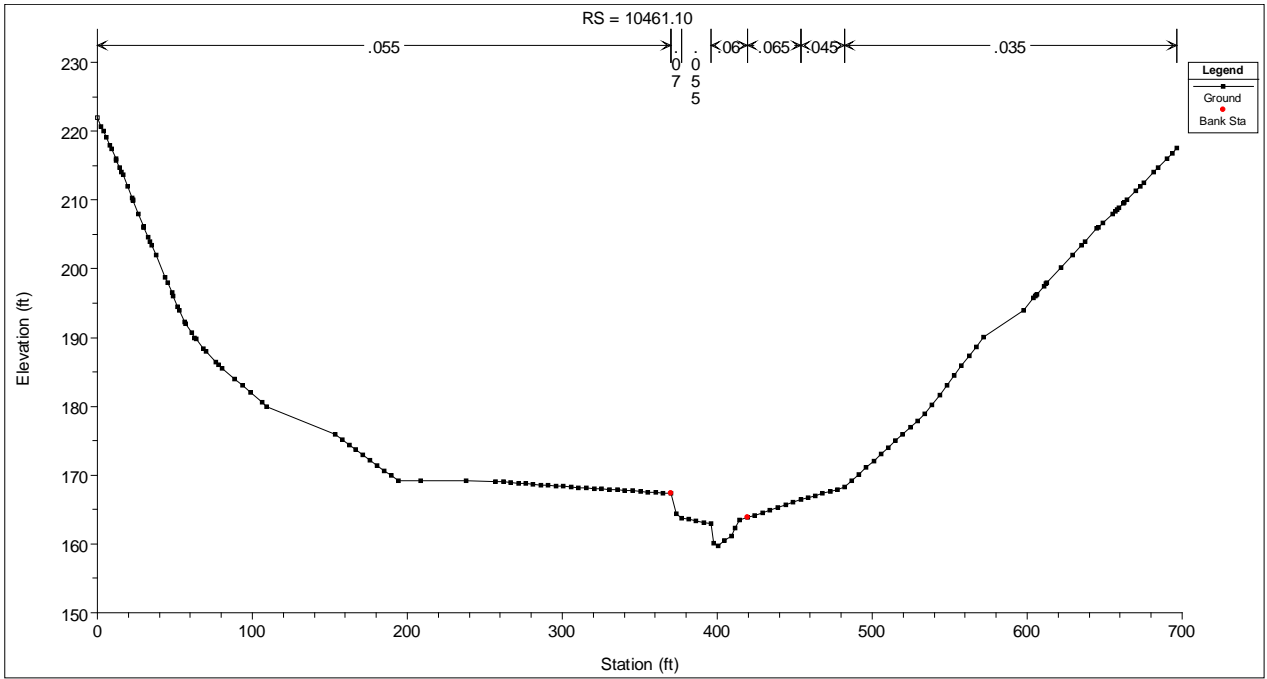


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 10080.42, 8808.637

Project No. 08-1032

Created By: LA

Figure 29



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

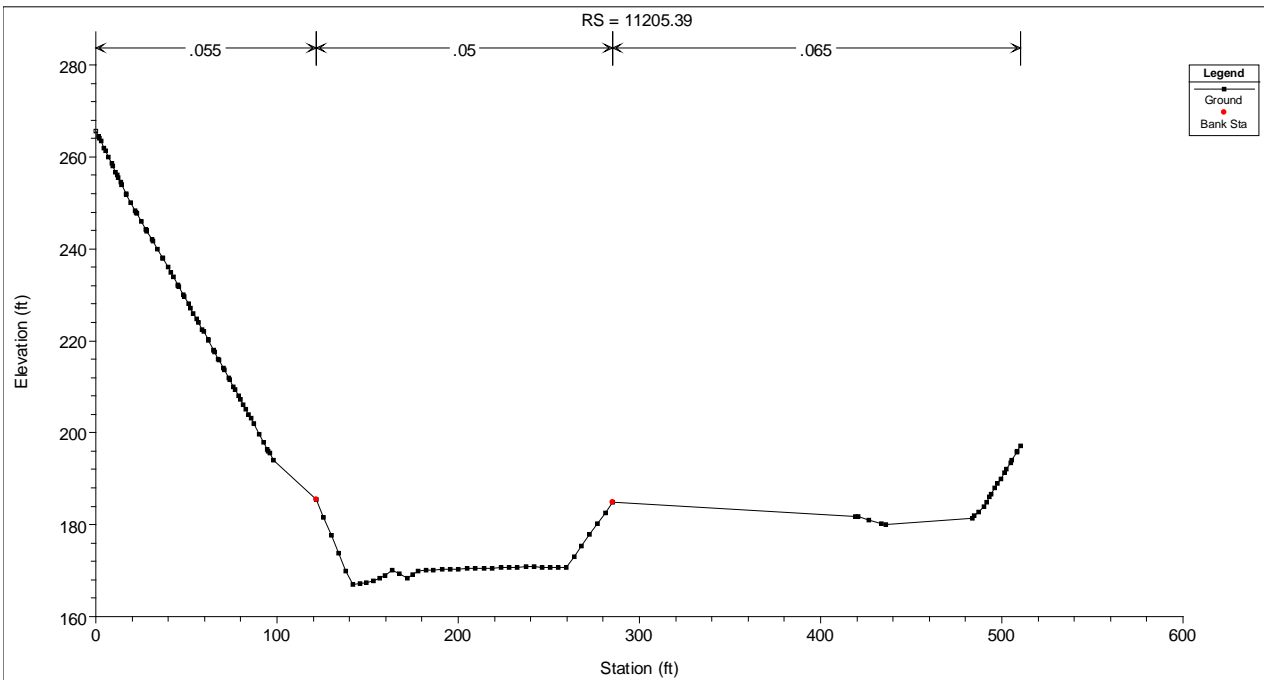
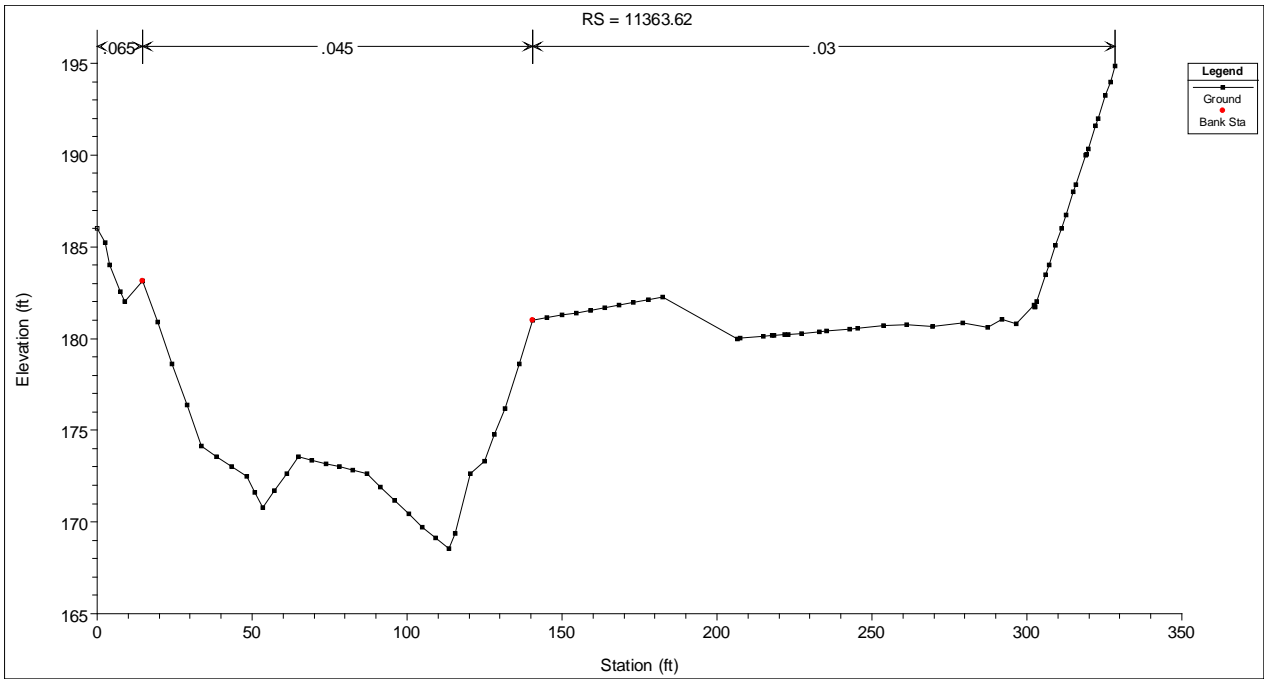


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 10461.10, 9530.316

Project No. 08-1032

Created By: LA

Figure 30



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

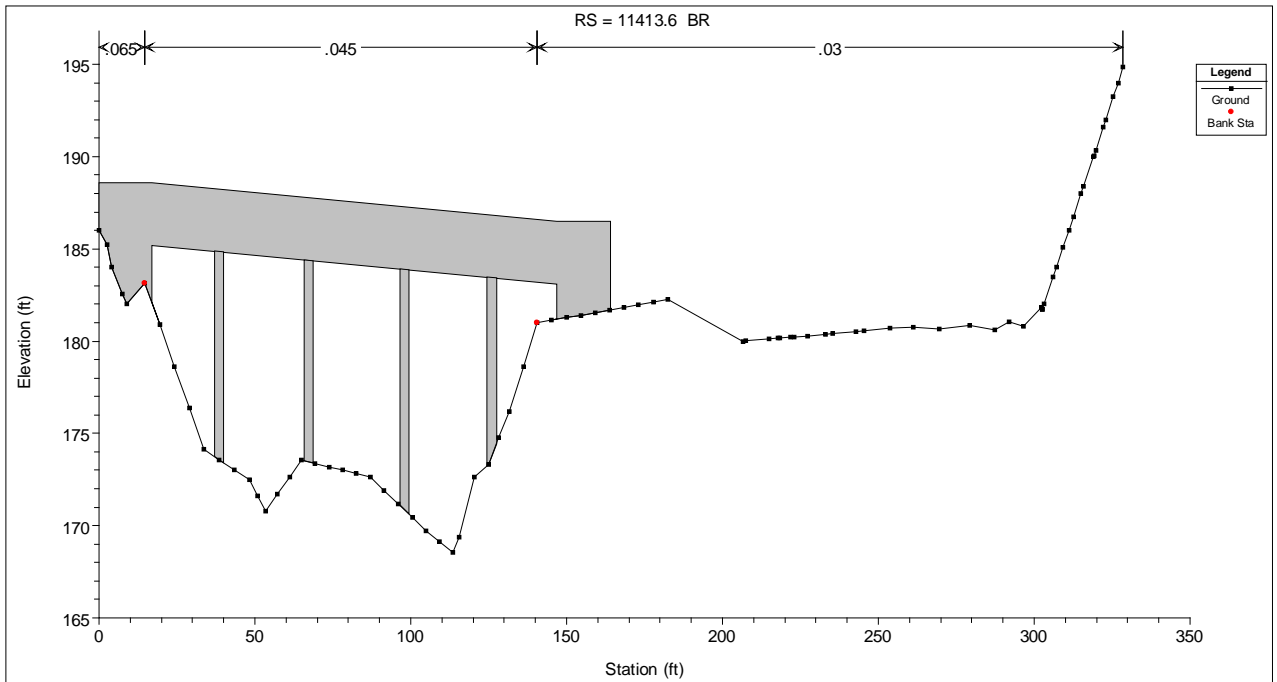
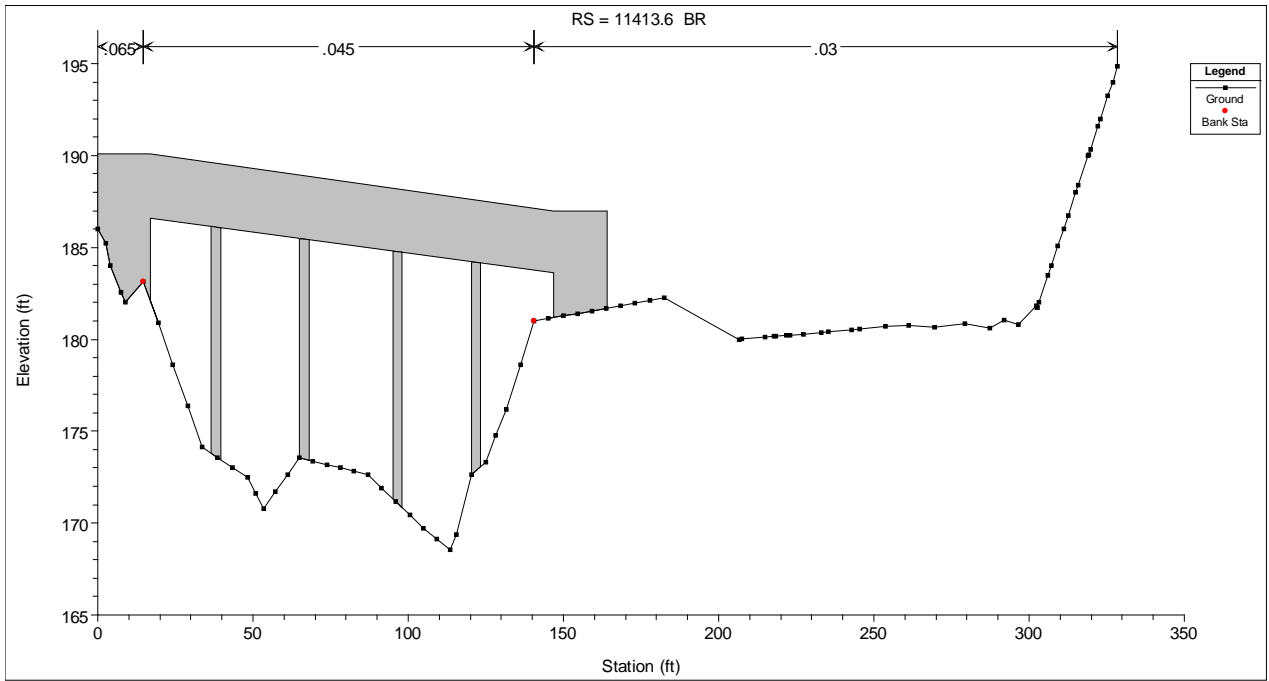


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 11363.62, 11205.39

Project No. 08-1032

Created By: LA

Figure 31



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

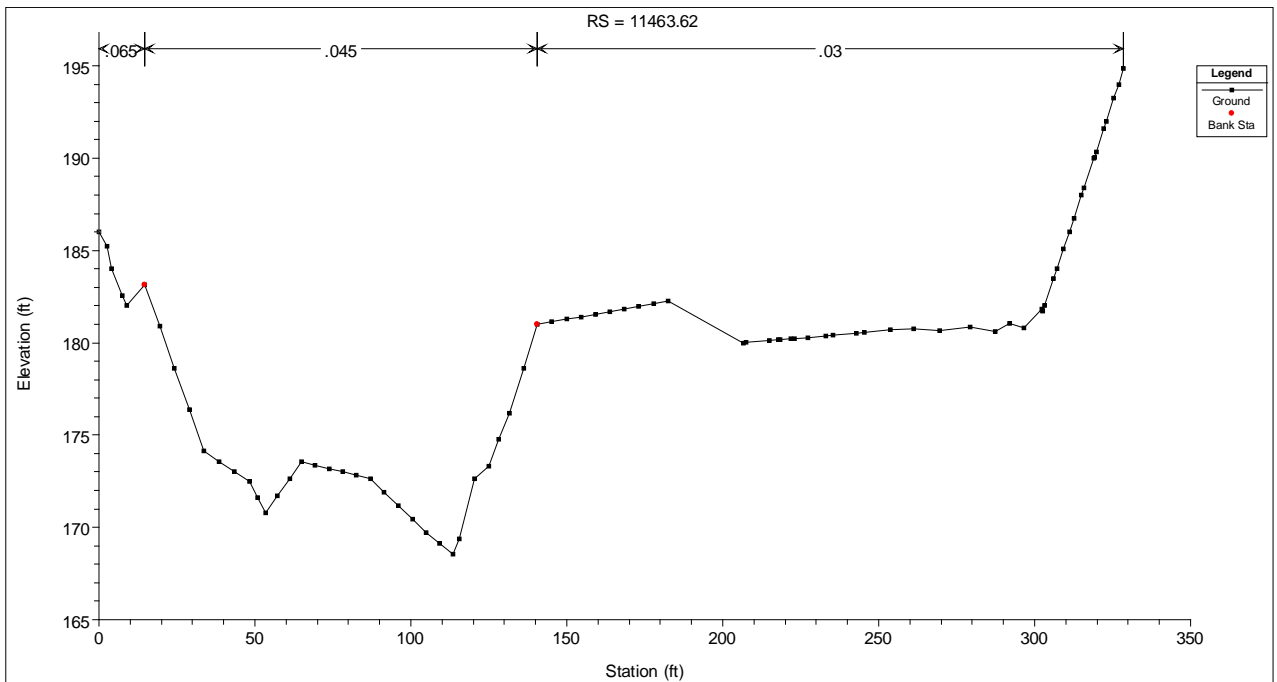
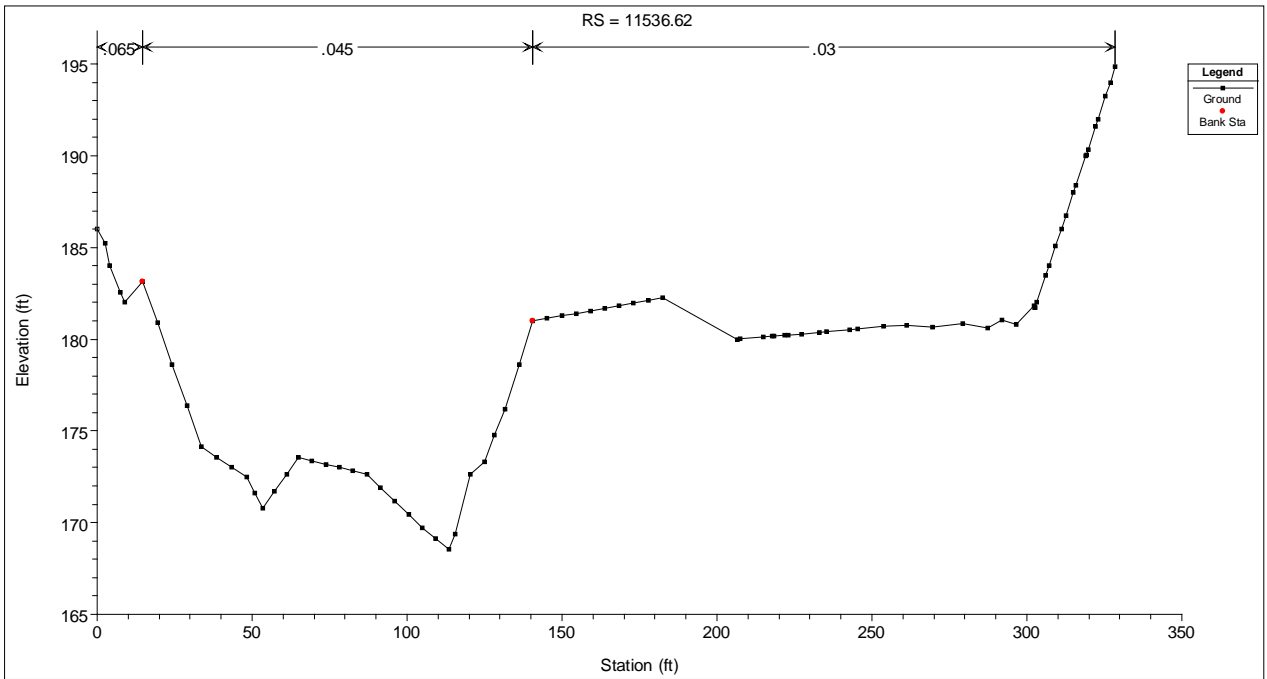


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 11413.6, 11413.6

Project No. 08-1032

Created By: LA

Figure 32



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

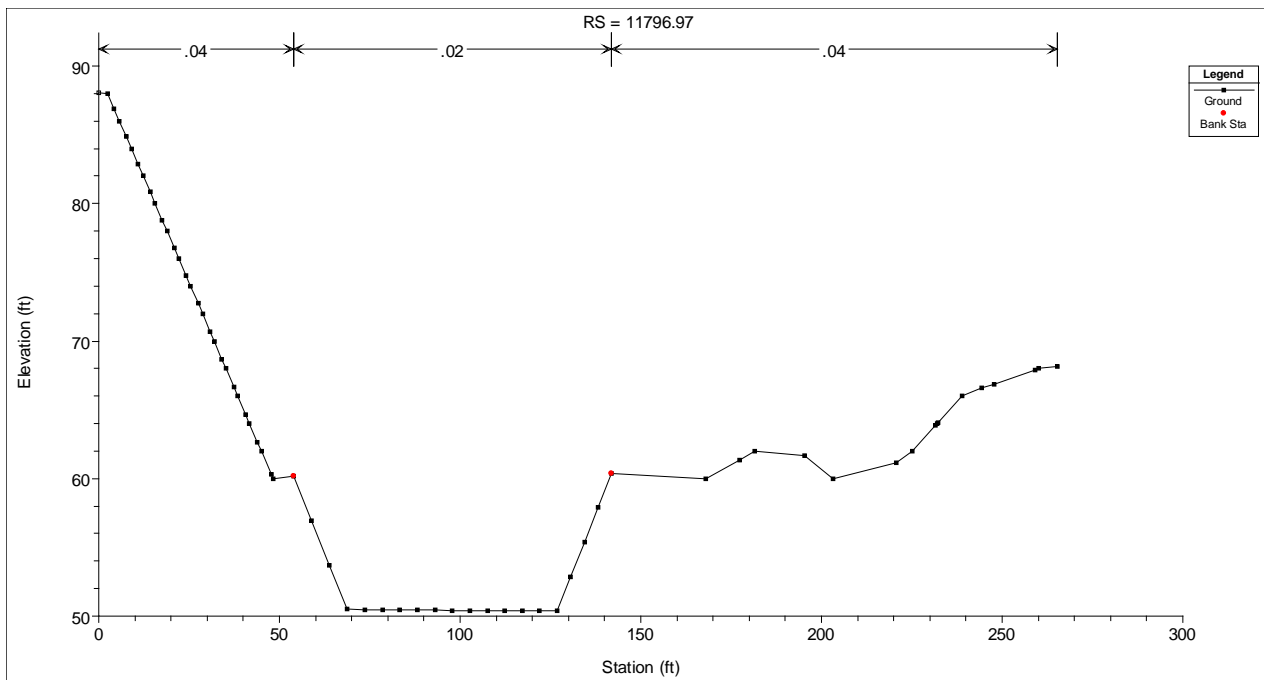
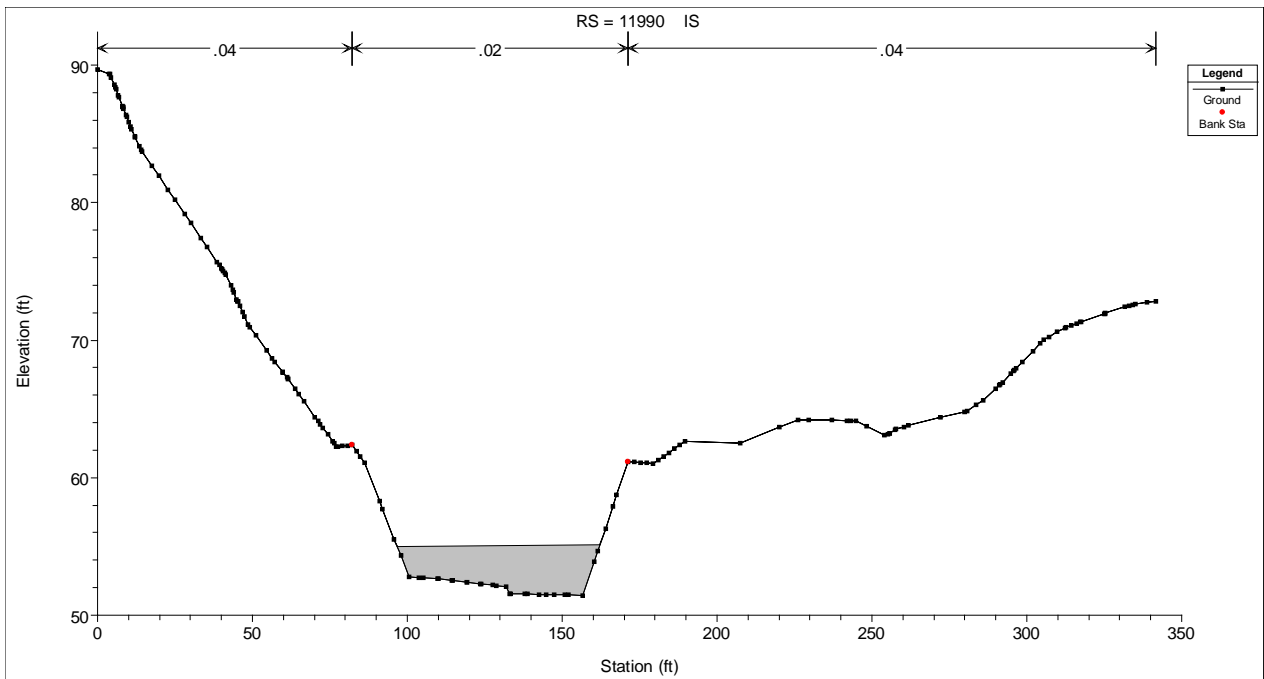


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 11536.62, 11463.62

Project No. 08-1032

Created By: LA

Figure 33



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

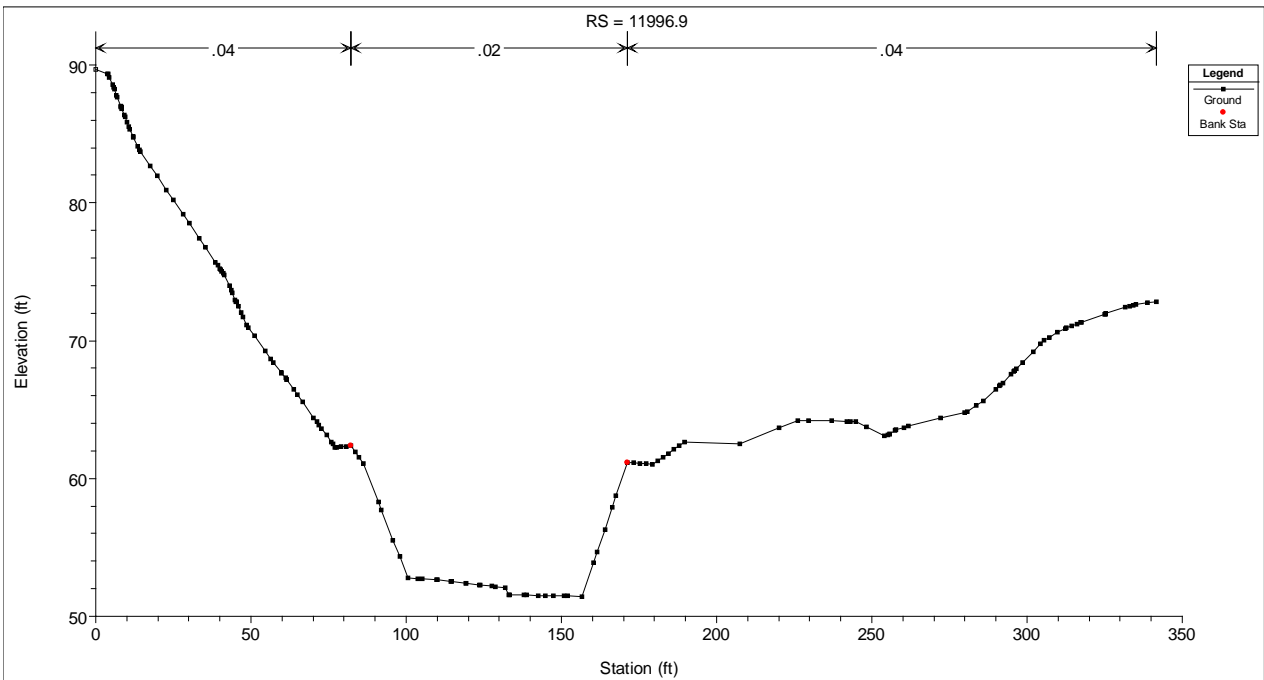
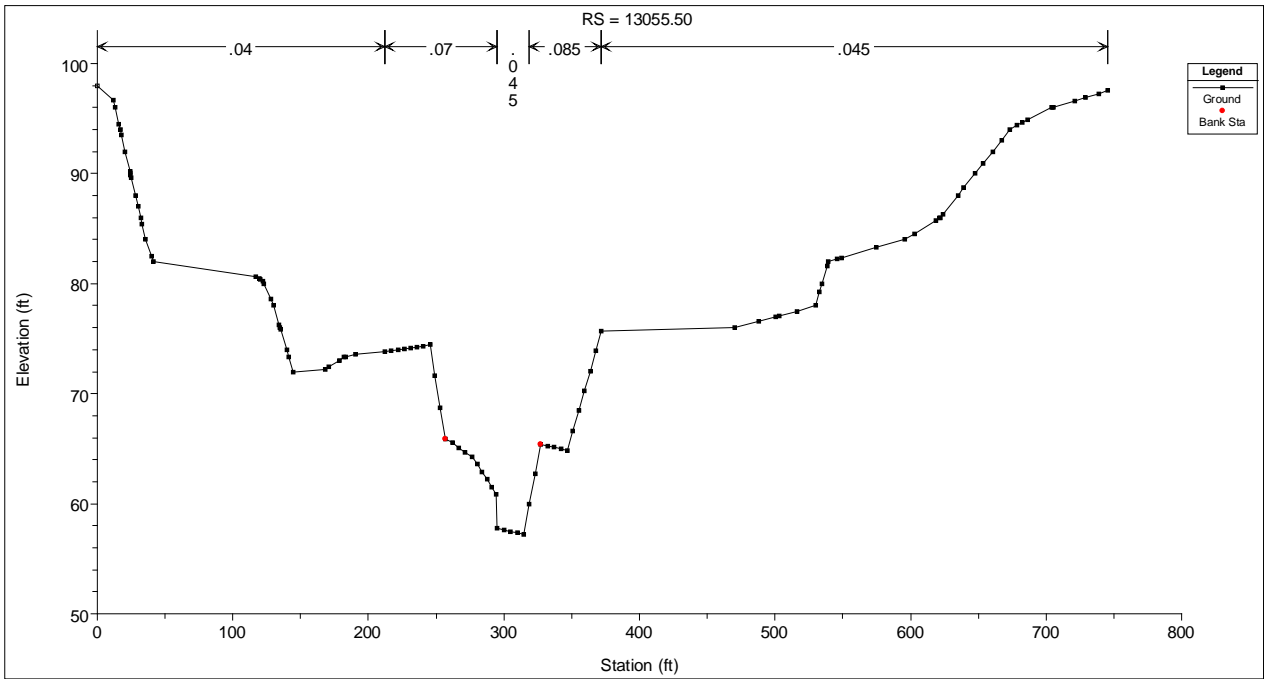


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 11990 IS, 11796.97

Project No. 08-1032

Created By: LA

Figure 34



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

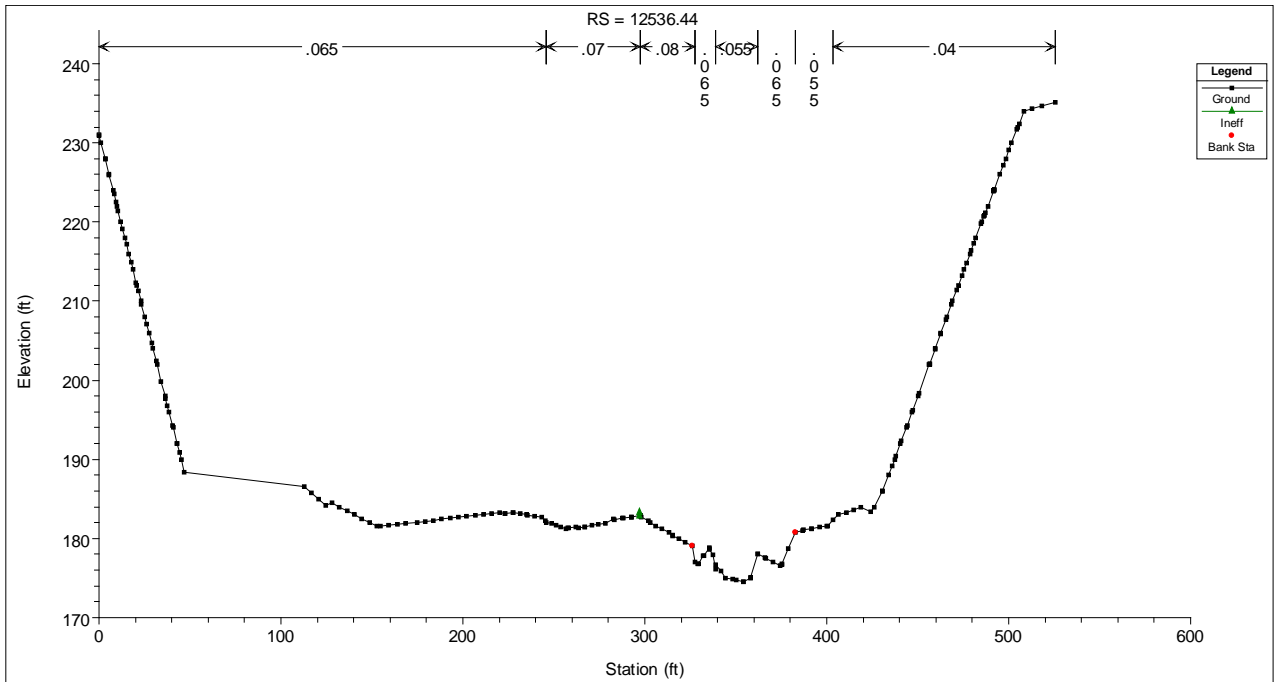
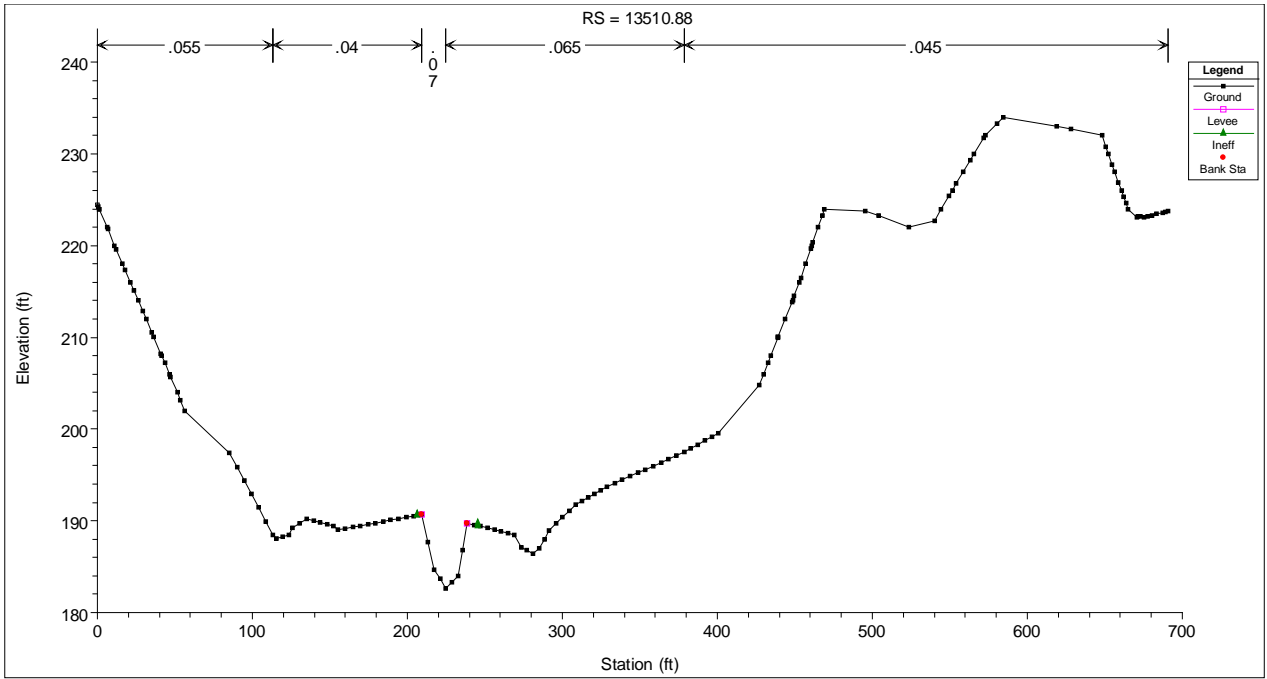


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 13055.50, 11996.9

Project No. 08-1032

Created By: LA

Figure 35



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

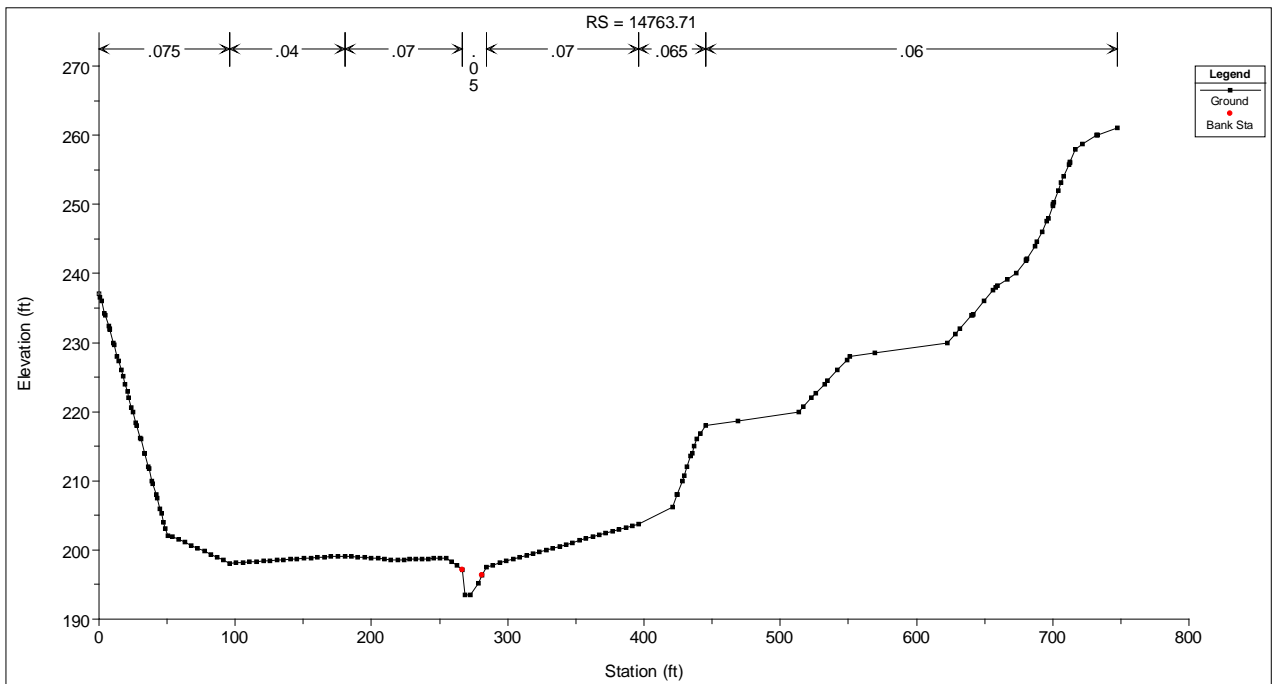
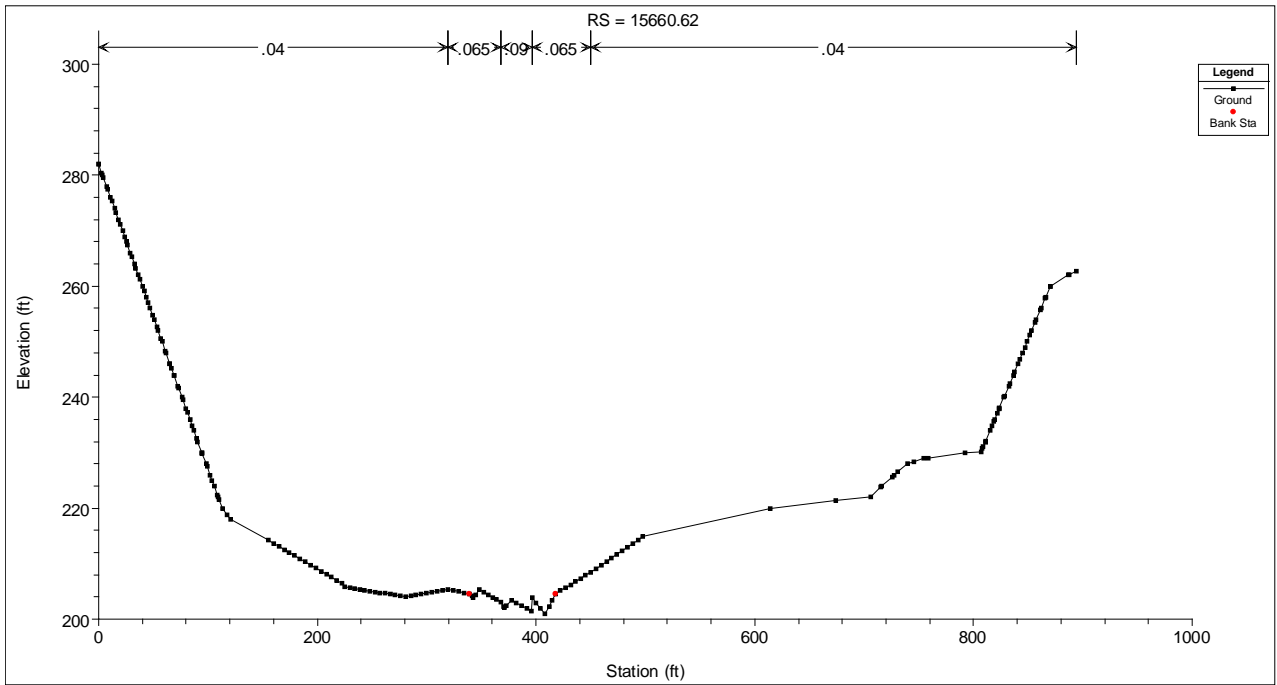


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 13510.88, 12536.44

Project No. 08-1032

Created By: LA

Figure 36



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

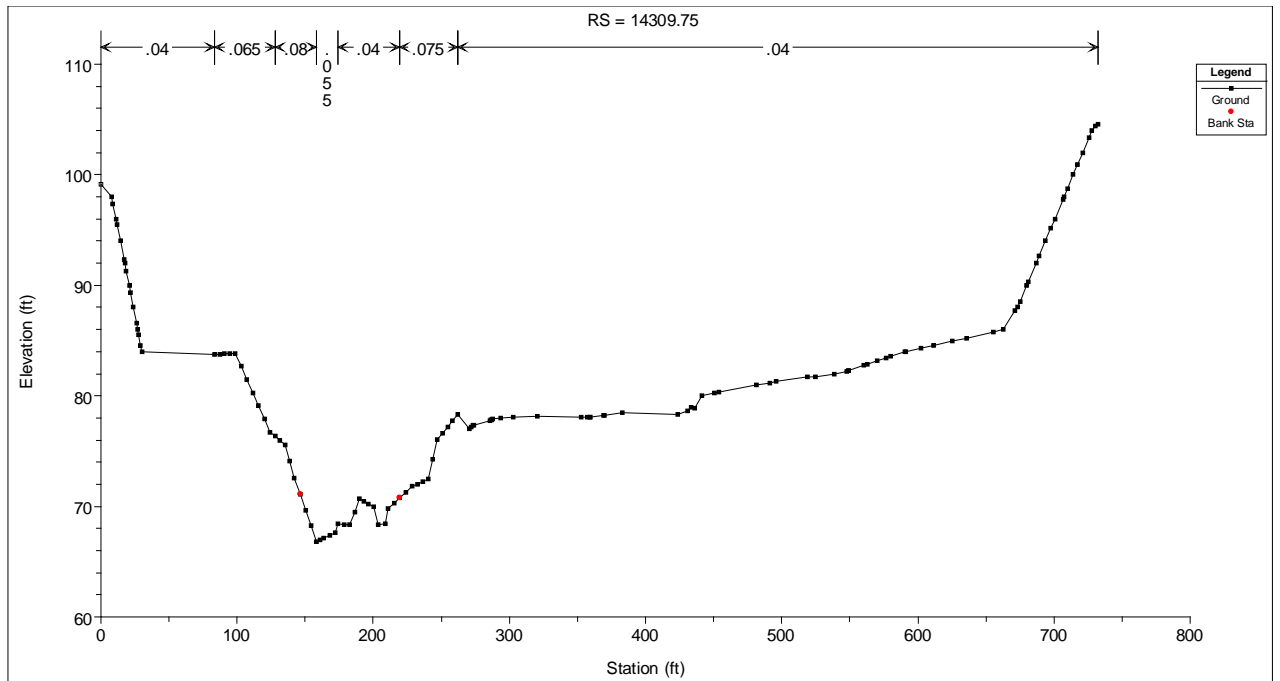
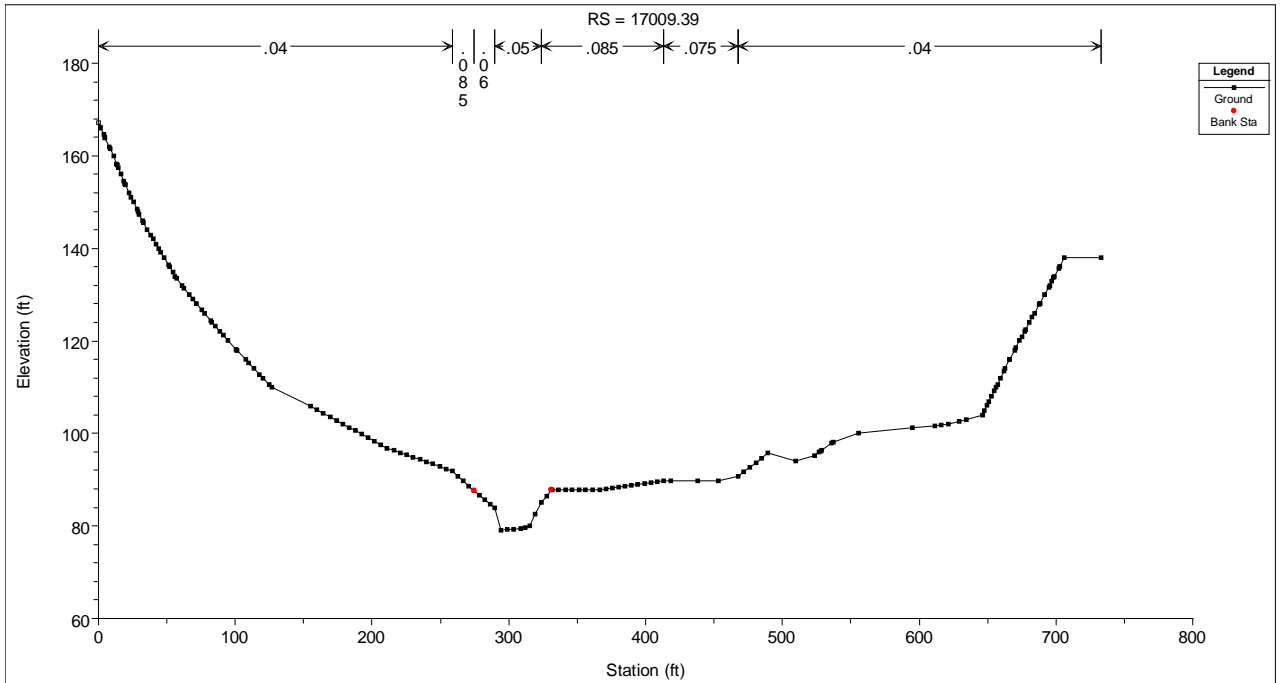


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 15660.62, 14763.71

Project No. 08-1032

Created By: LA

Figure 37



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

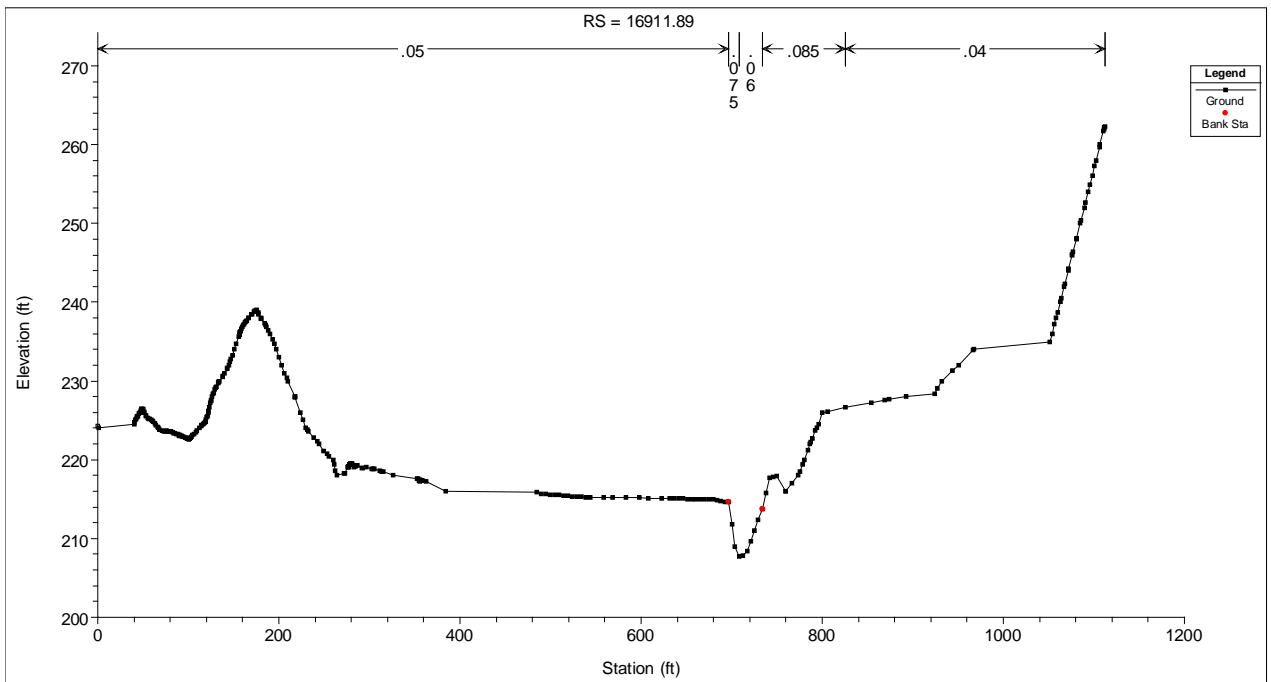
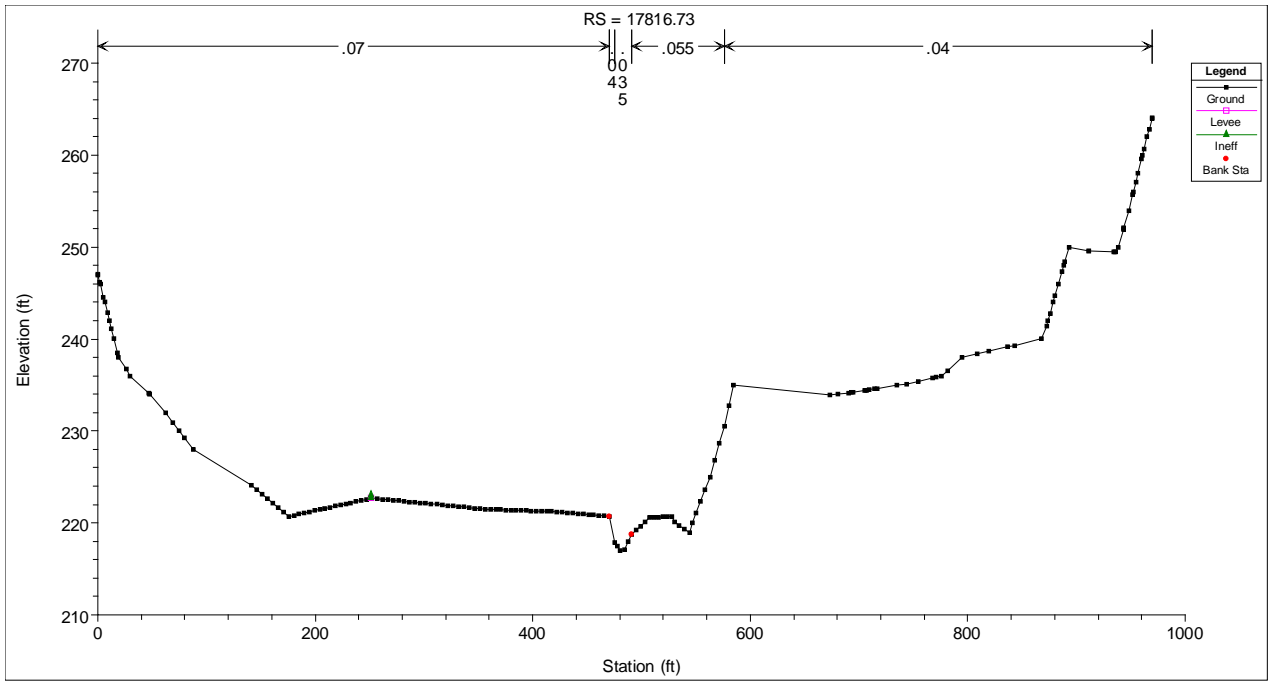


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 17009.39, 14309.75

Project No. 08-1032

Created By: LA

Figure 38



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

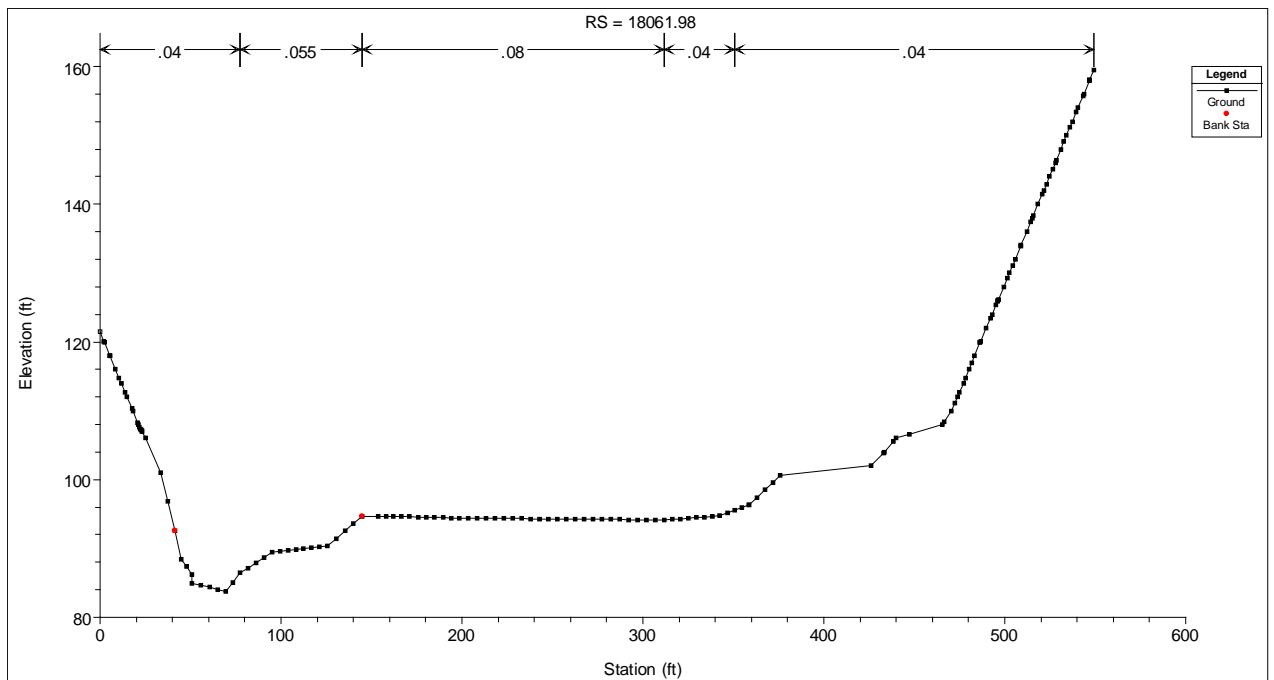
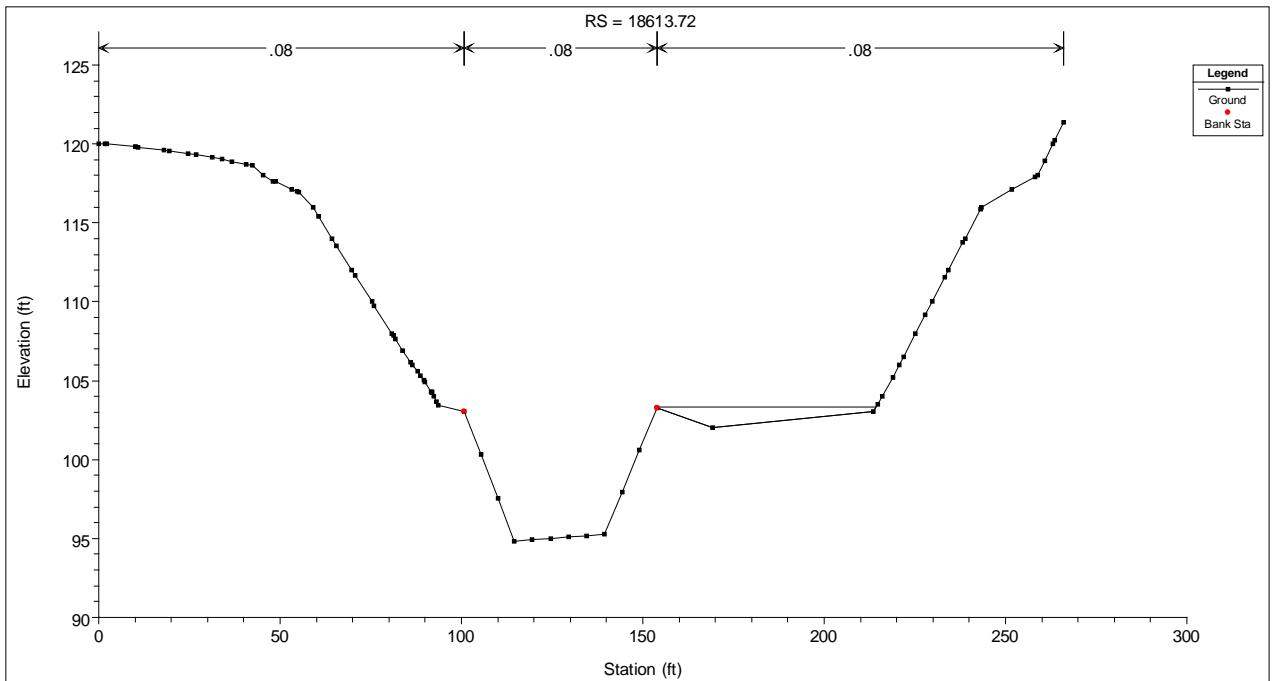


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 17816.73, 16911.89

Project No. 08-1032

Created By: LA

Figure 39



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

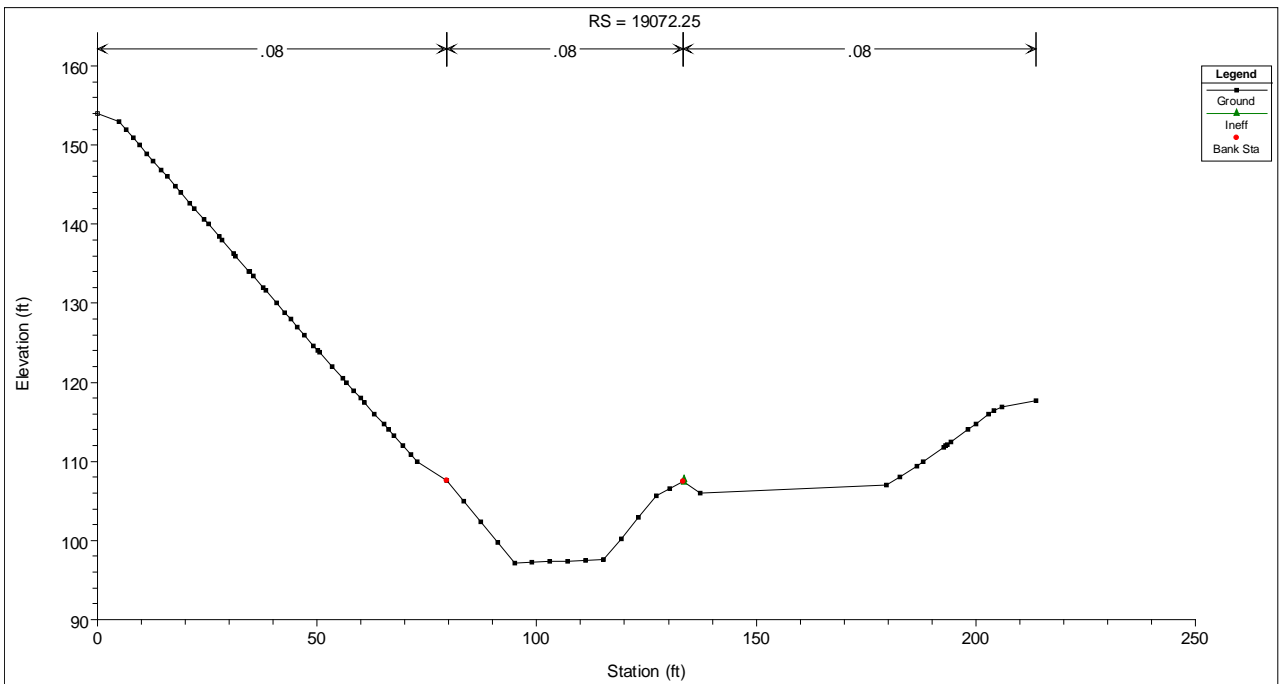
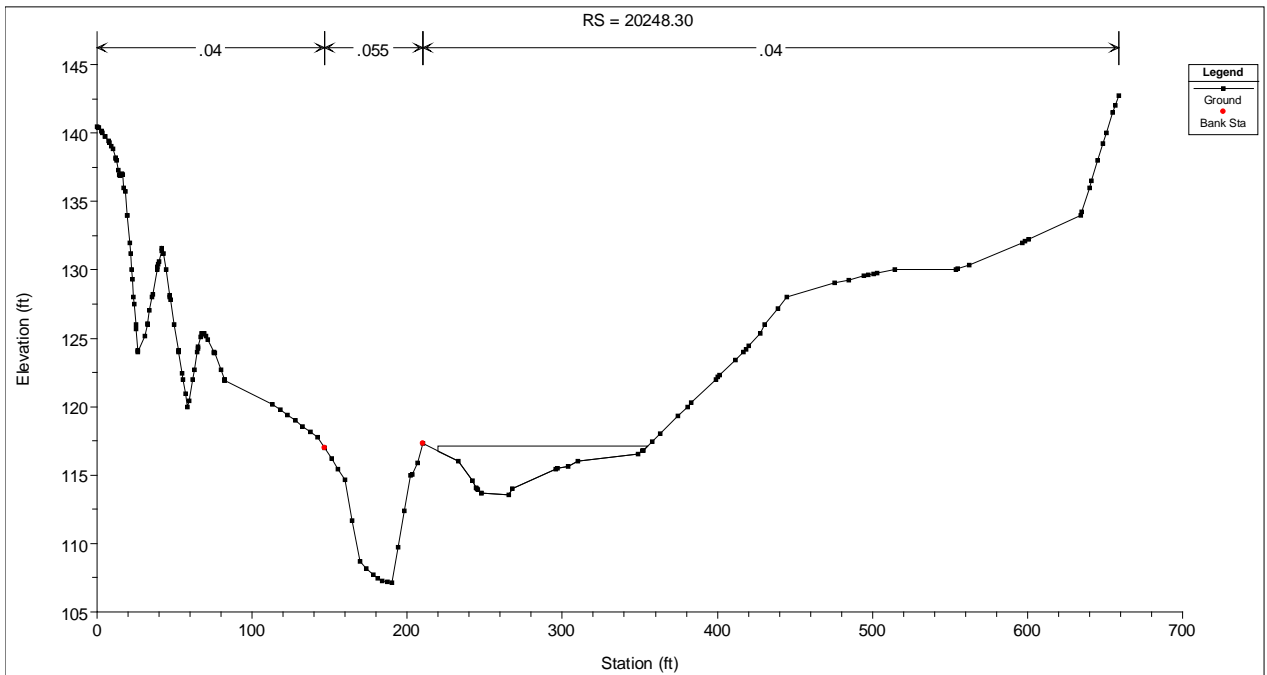


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 18613.72, 18061.98

Project No. 08-1032

Created By: LA

Figure 40



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

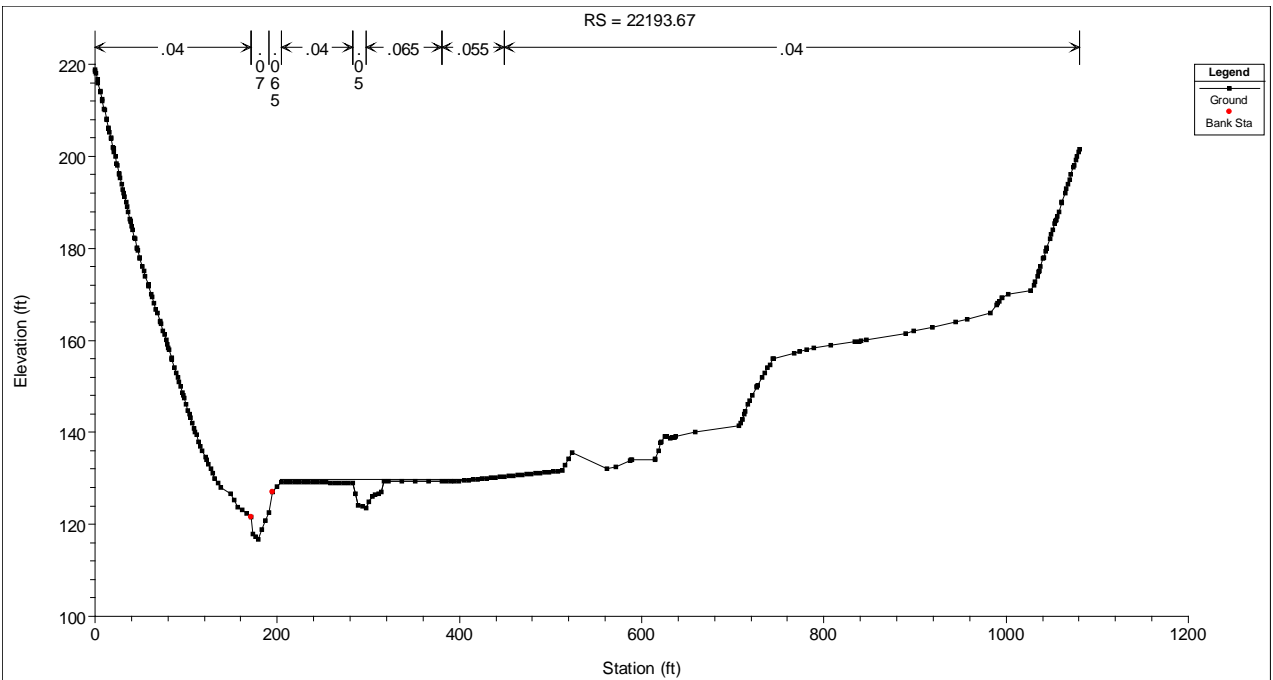
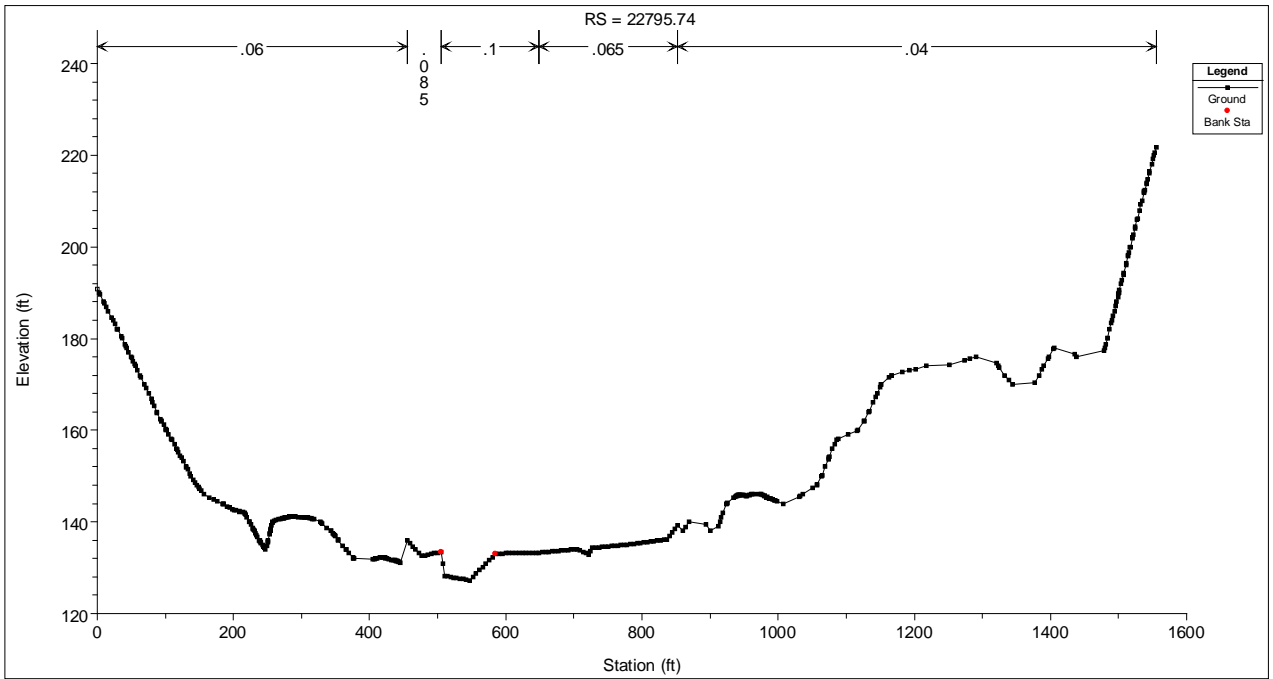


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 20248.30, 19072.25

Project No. 08-1032

Created By: LA

Figure 41



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

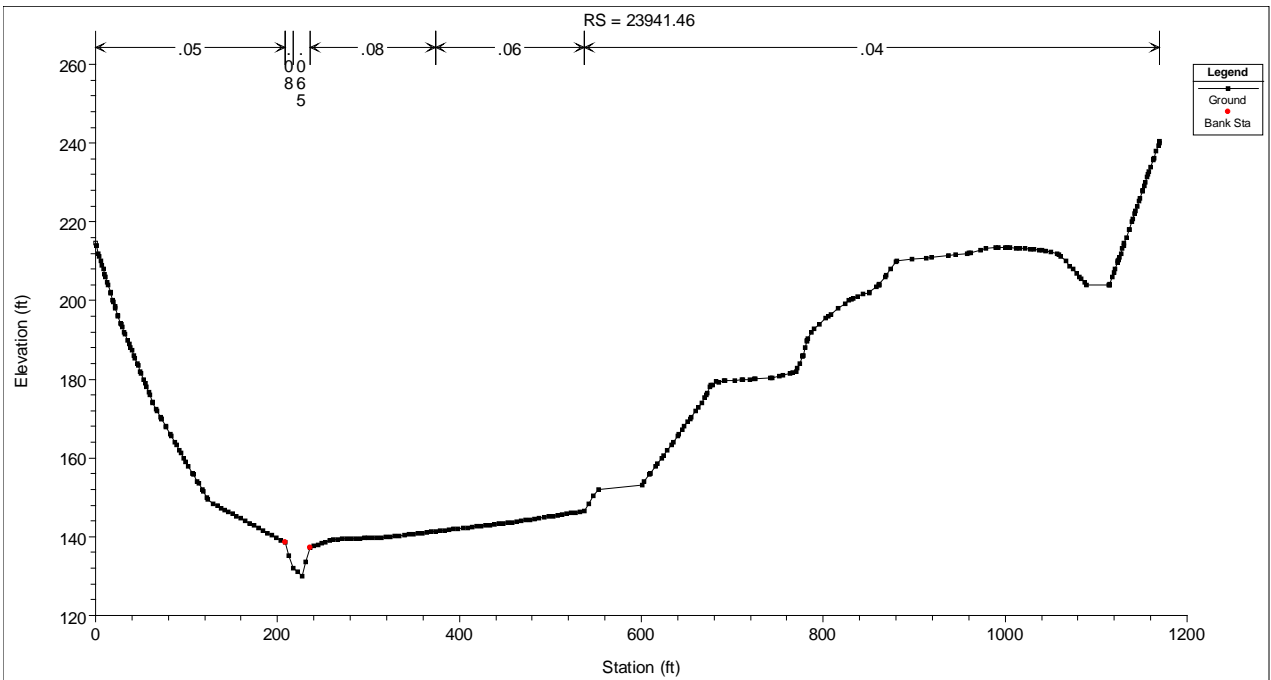
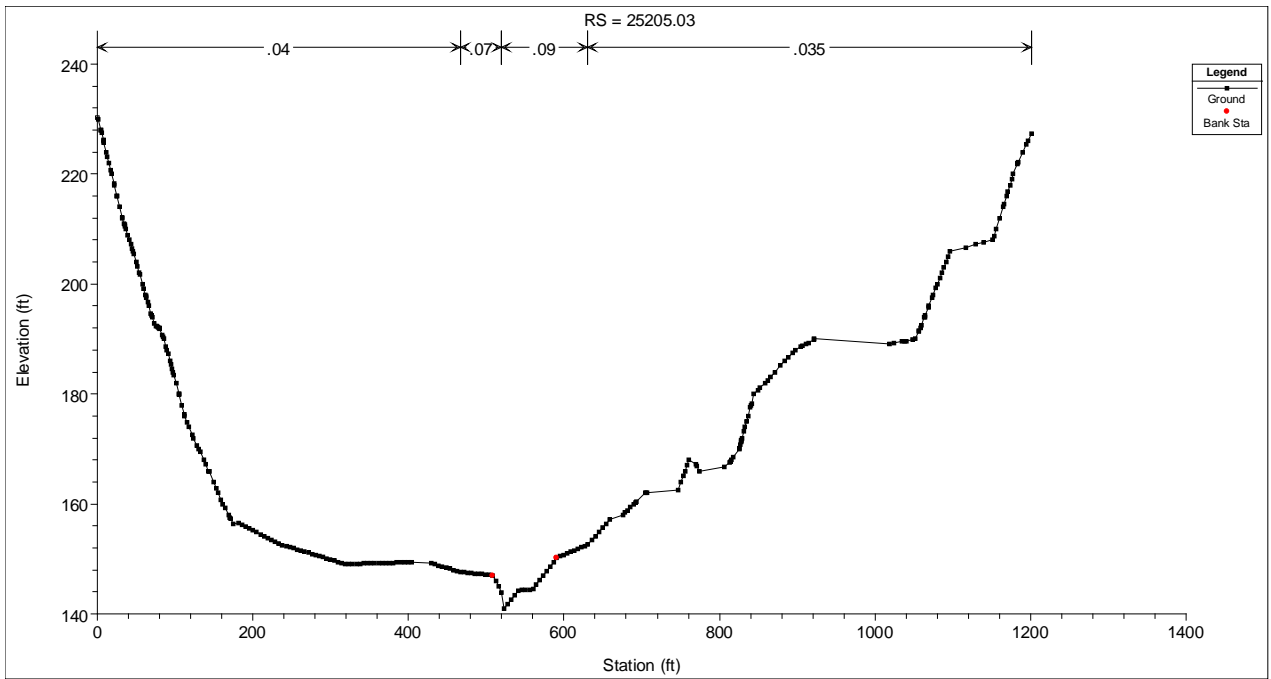


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 22795.74, 22193.67

Project No. 08-1032

Created By: LA

Figure 42



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

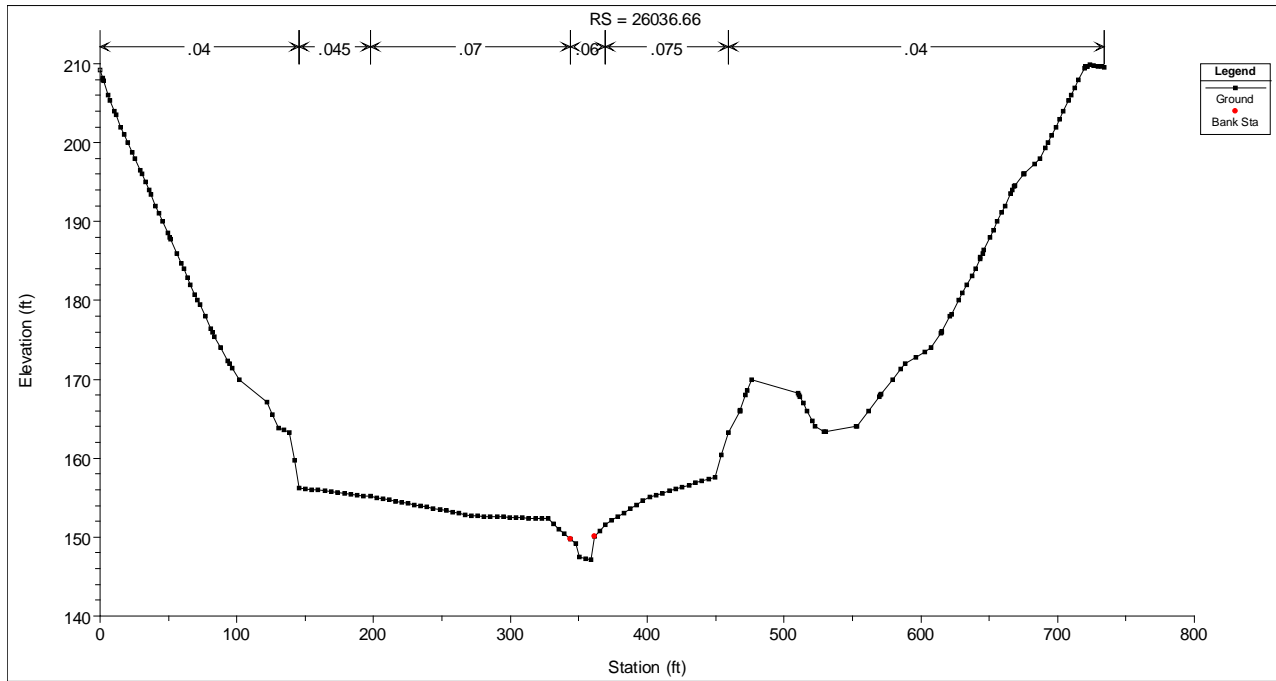
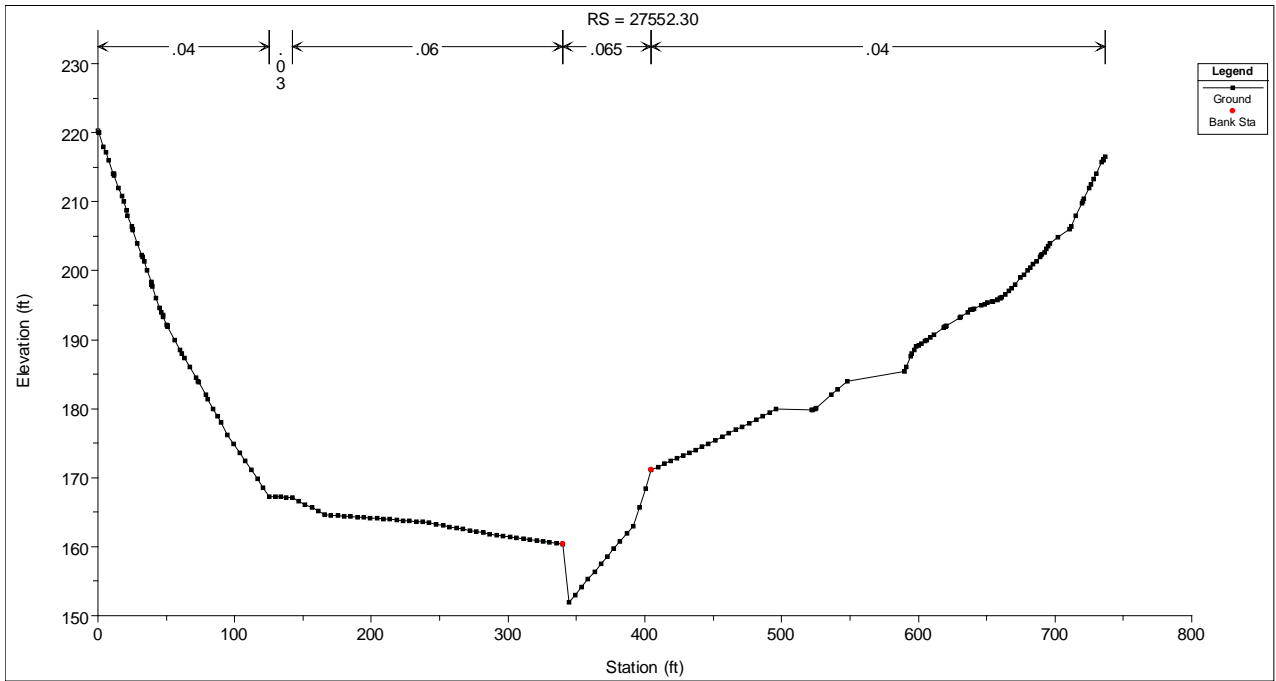


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 25205.03, 23941.46

Project No. 08-1032

Created By: LA

Figure 43



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

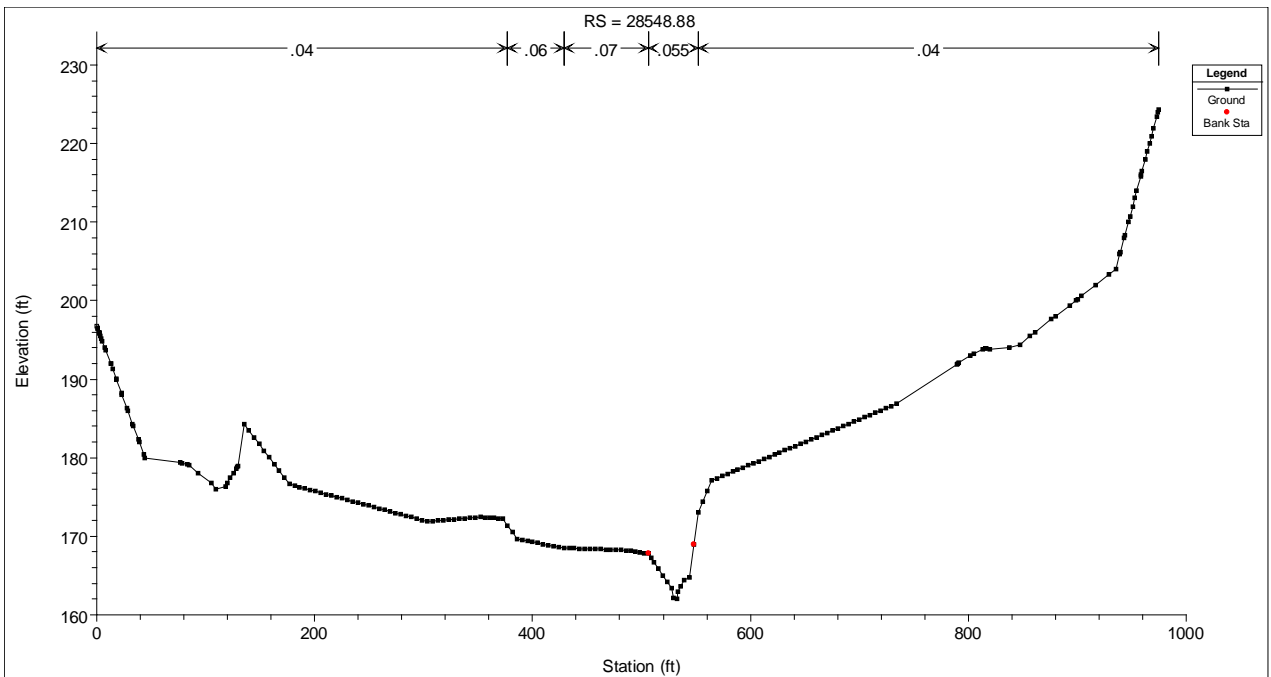
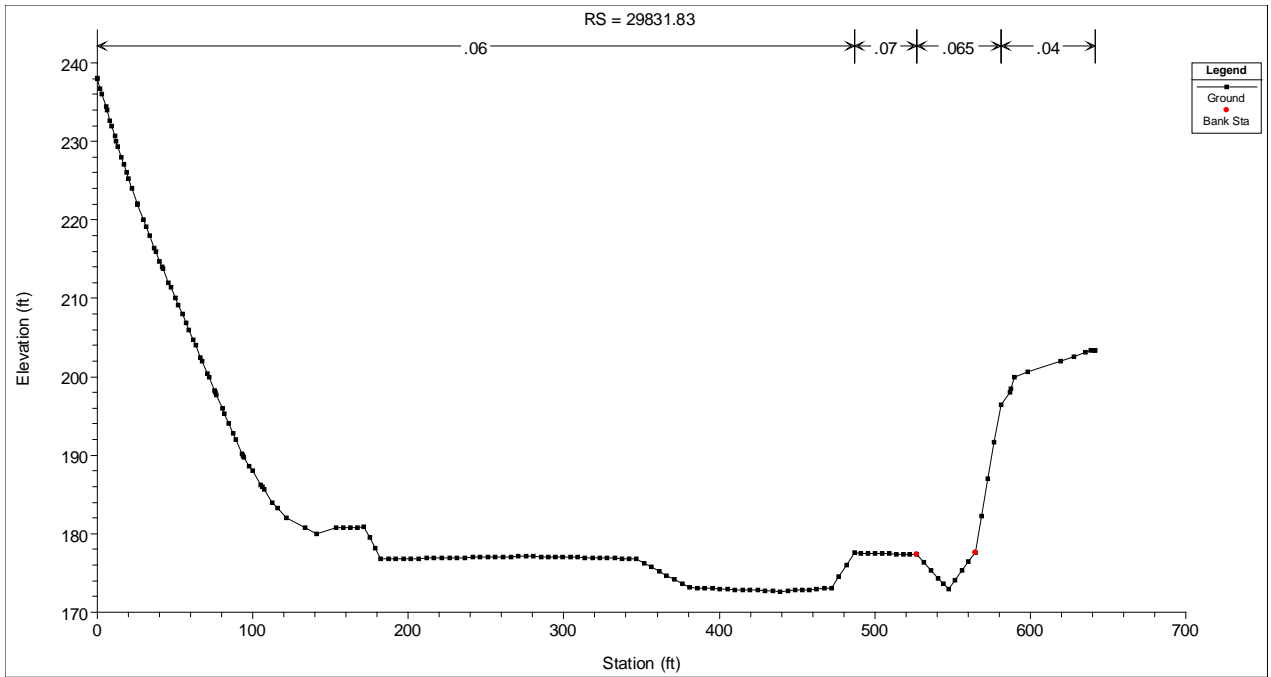


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 27552.30, 26036.66

Project No. 08-1032

Created By: LA

Figure 44



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

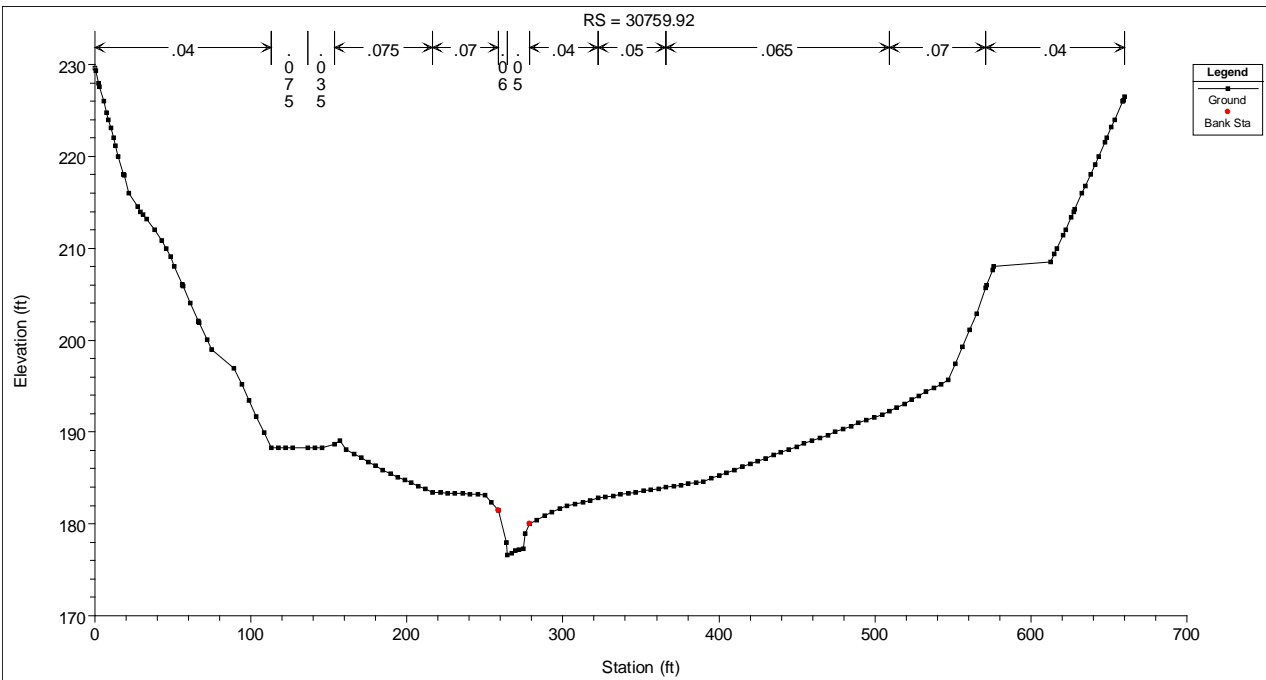
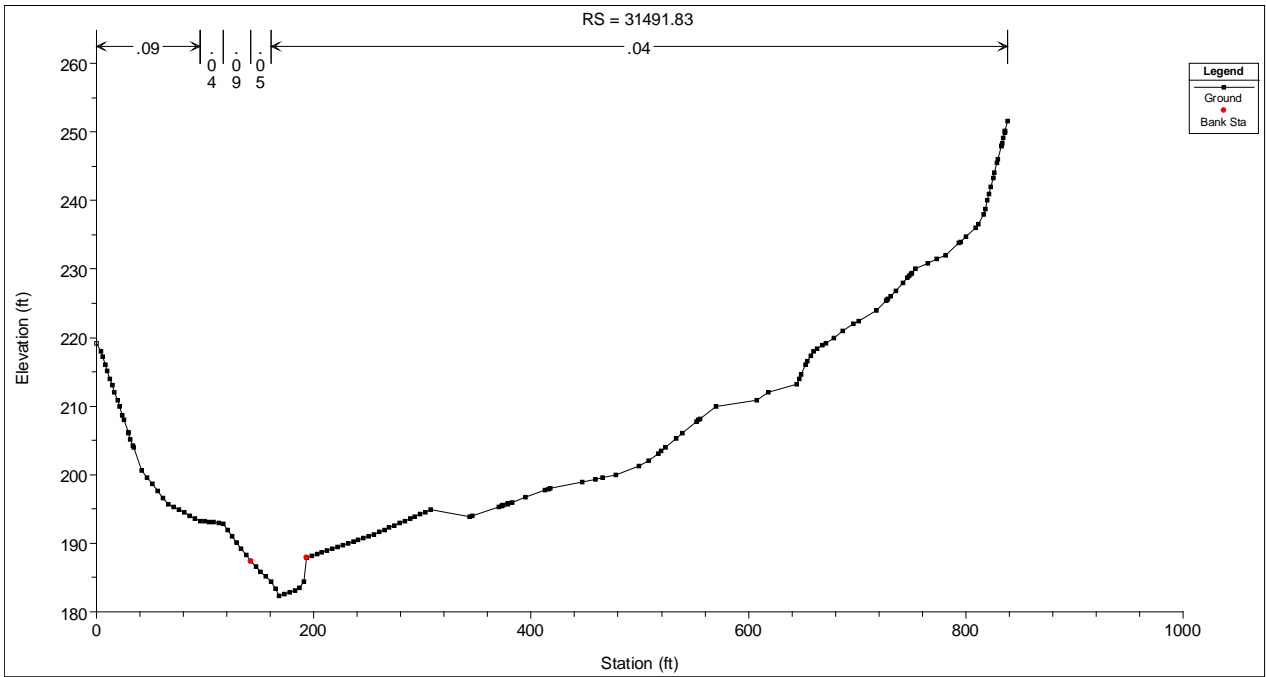


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 29831.83, 28548.88

Project No. 08-1032

Created By: LA

Figure 45



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

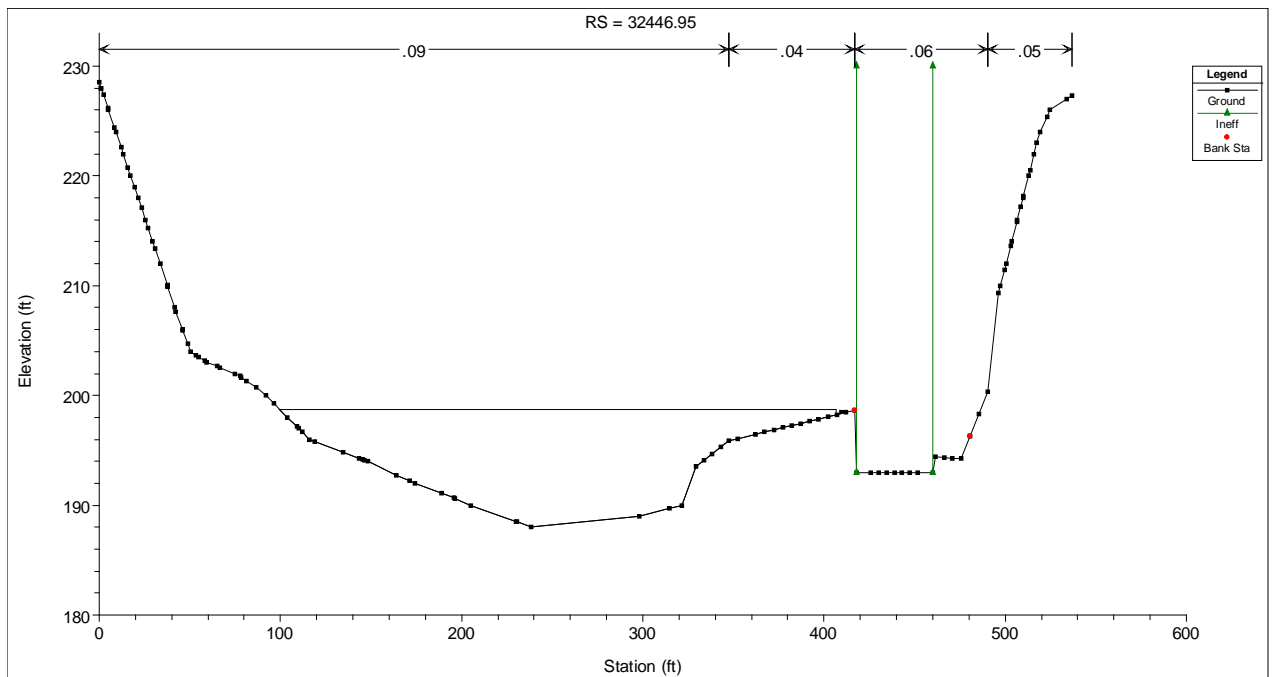
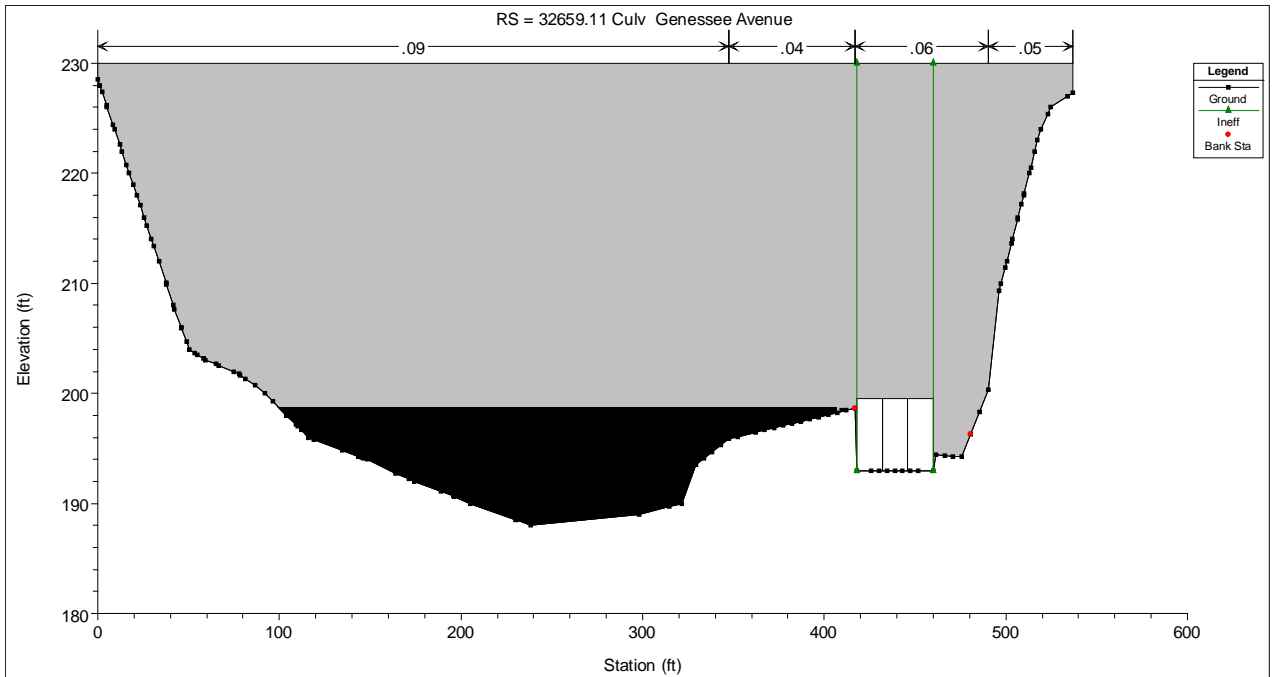


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 31491.83, 30759.92

Project No. 08-1032

Created By: LA

Figure 46



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

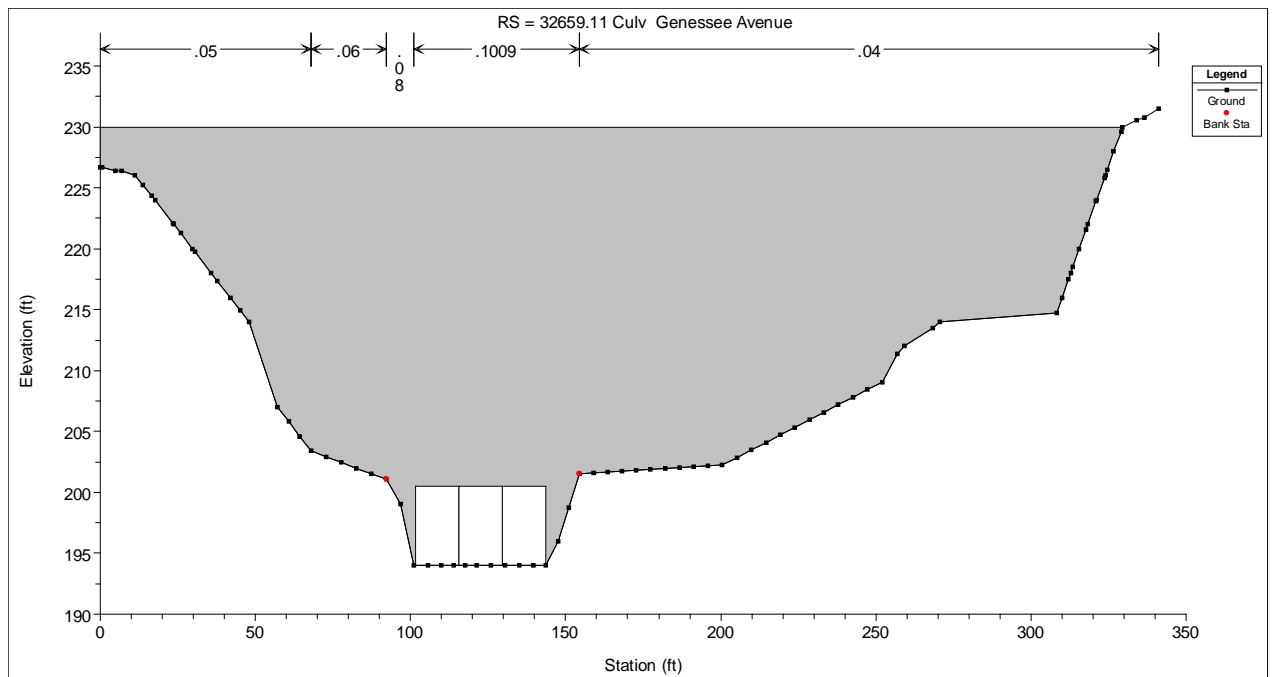
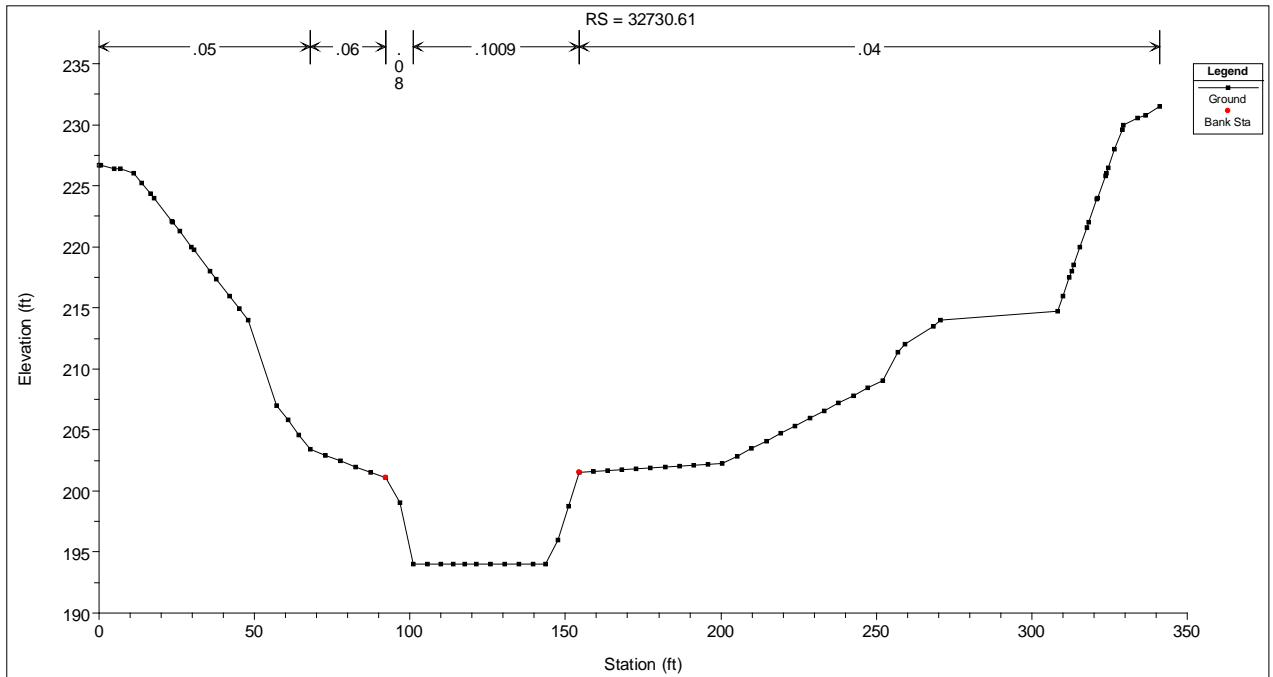


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 32730.61, 32446.95

Project No. 08-1032

Created By: LA

Figure 47



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

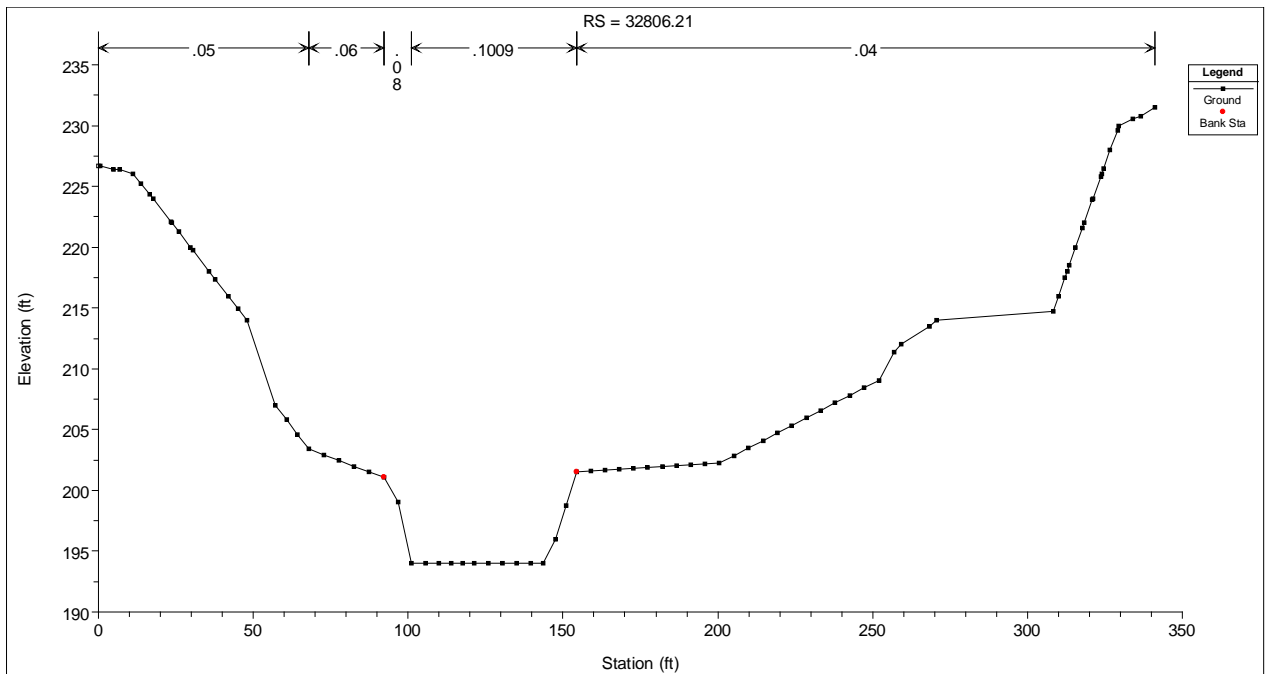
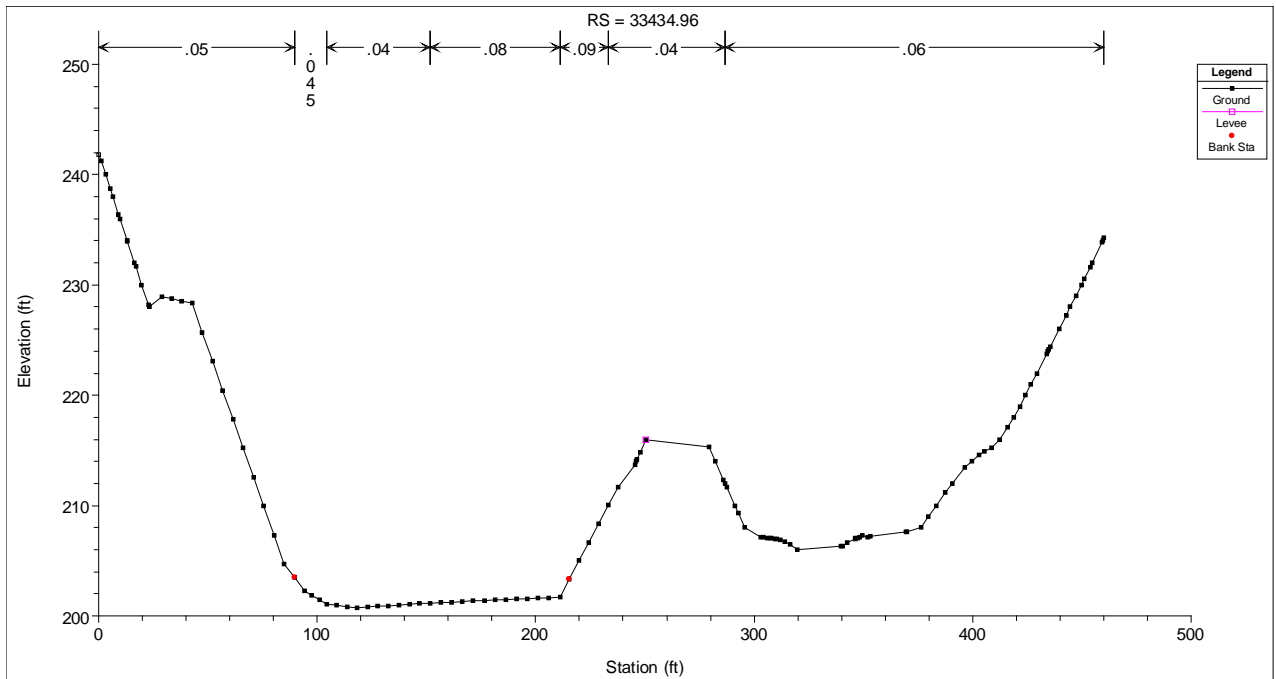


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 32730.61, 32659.11

Project No. 08-1032

Created By: LA

Figure 48



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

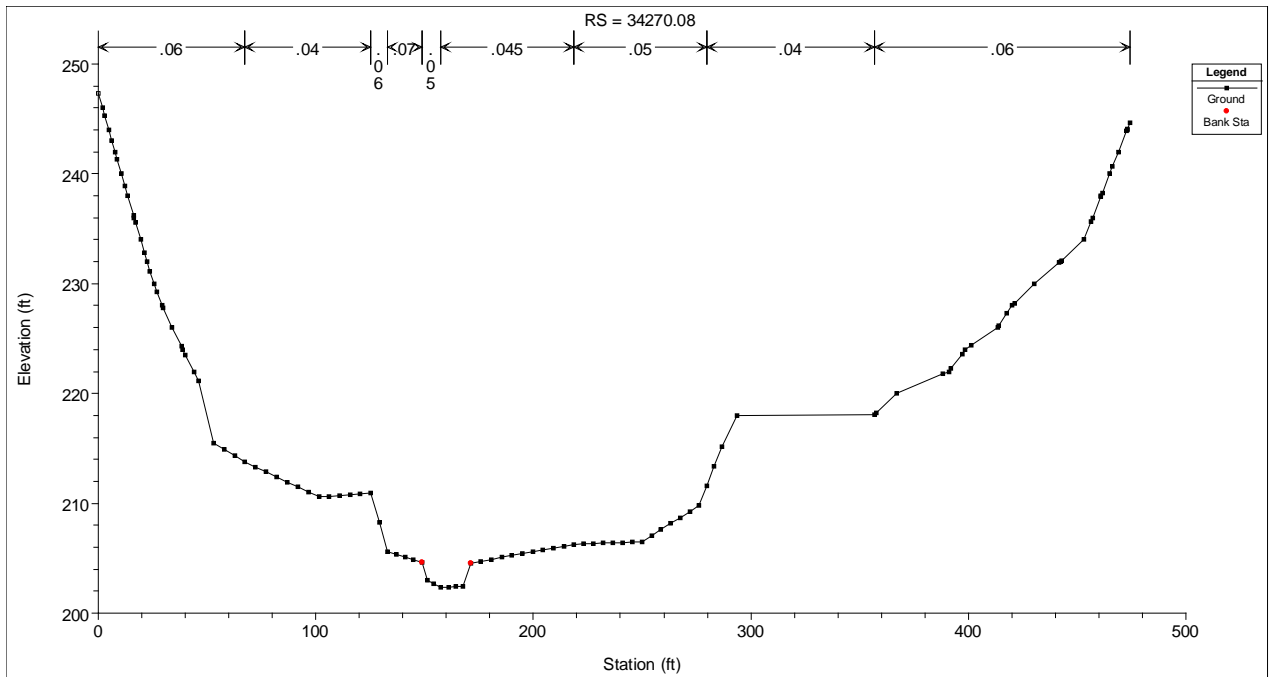
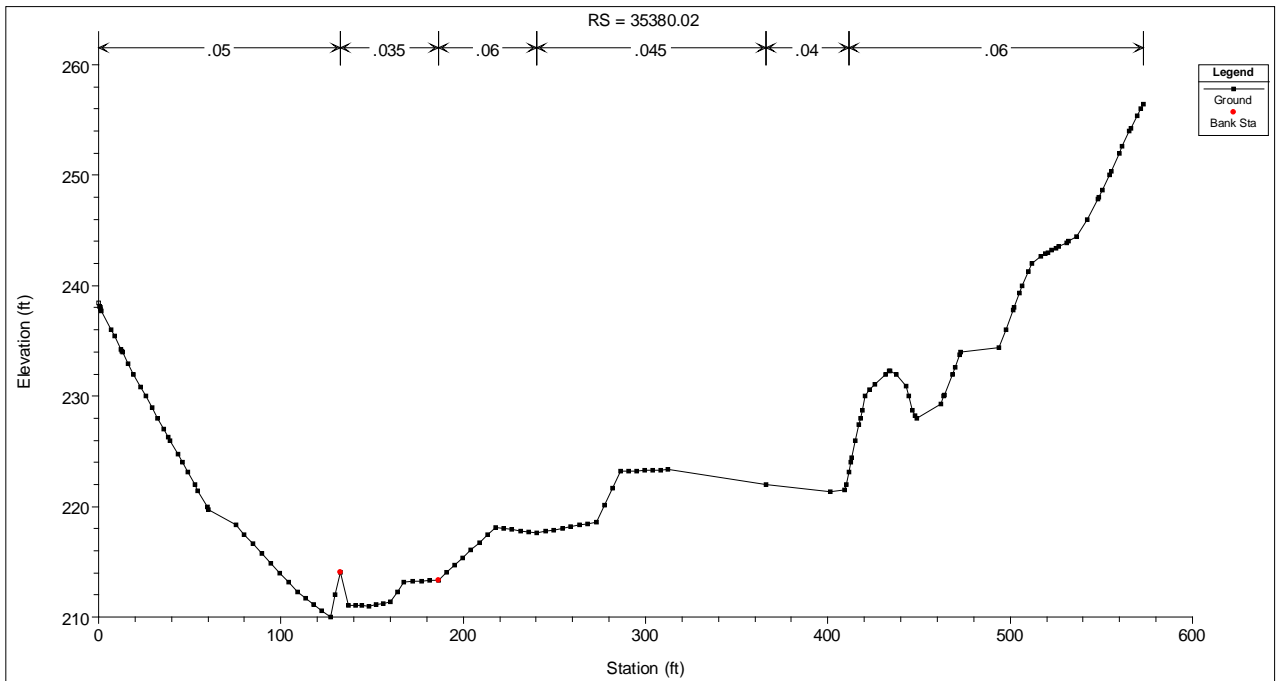


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 33434.96, 32806.21

Project No. 08-1032

Created By: LA

Figure 49



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

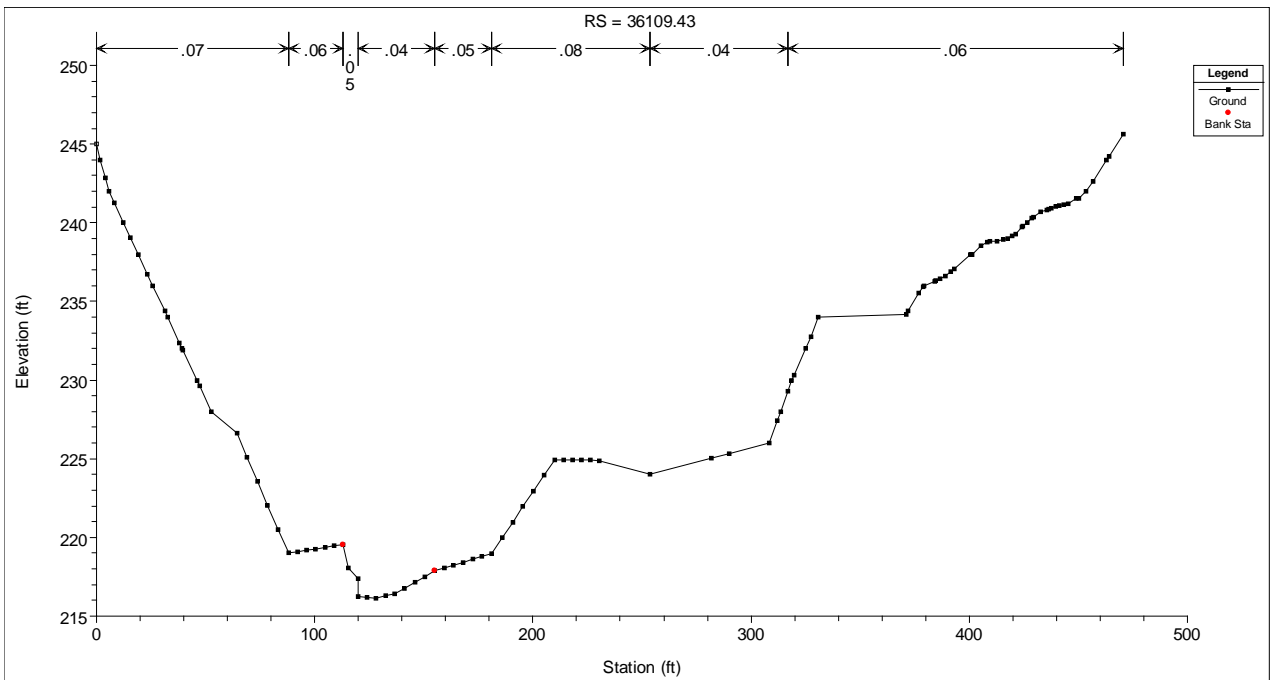
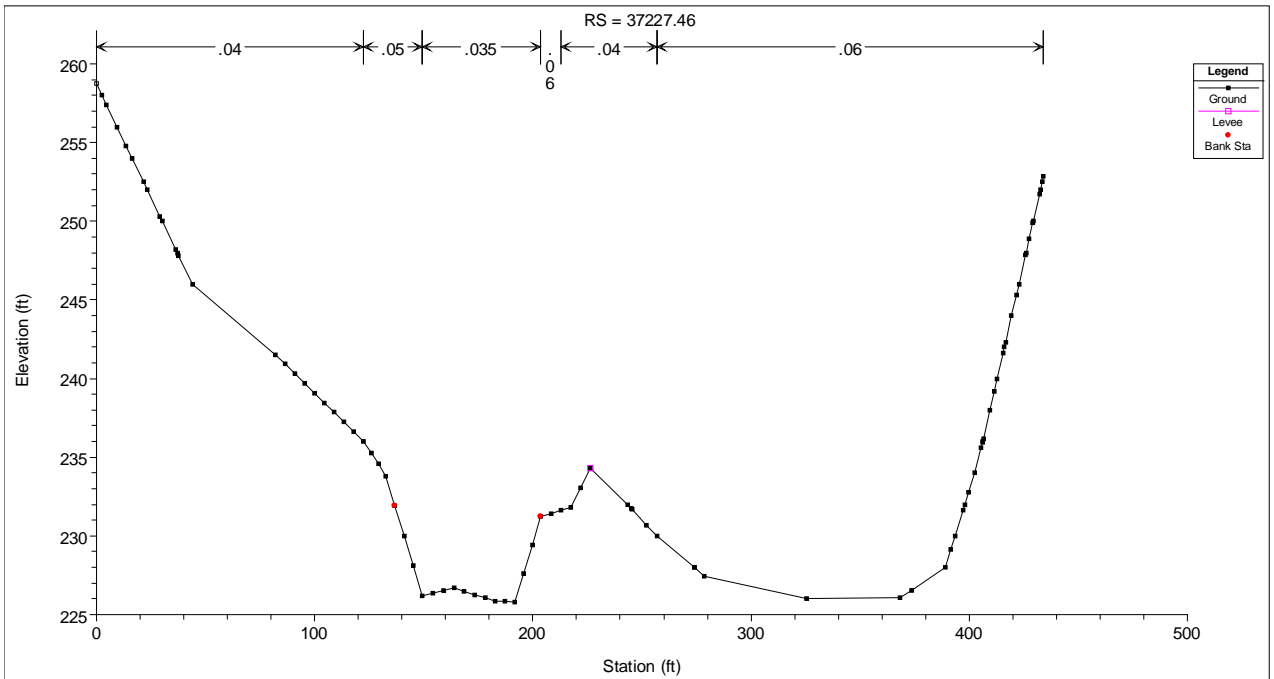


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 35380.02, 34270.08

Project No. 08-1032

Created By: LA

Figure 50



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

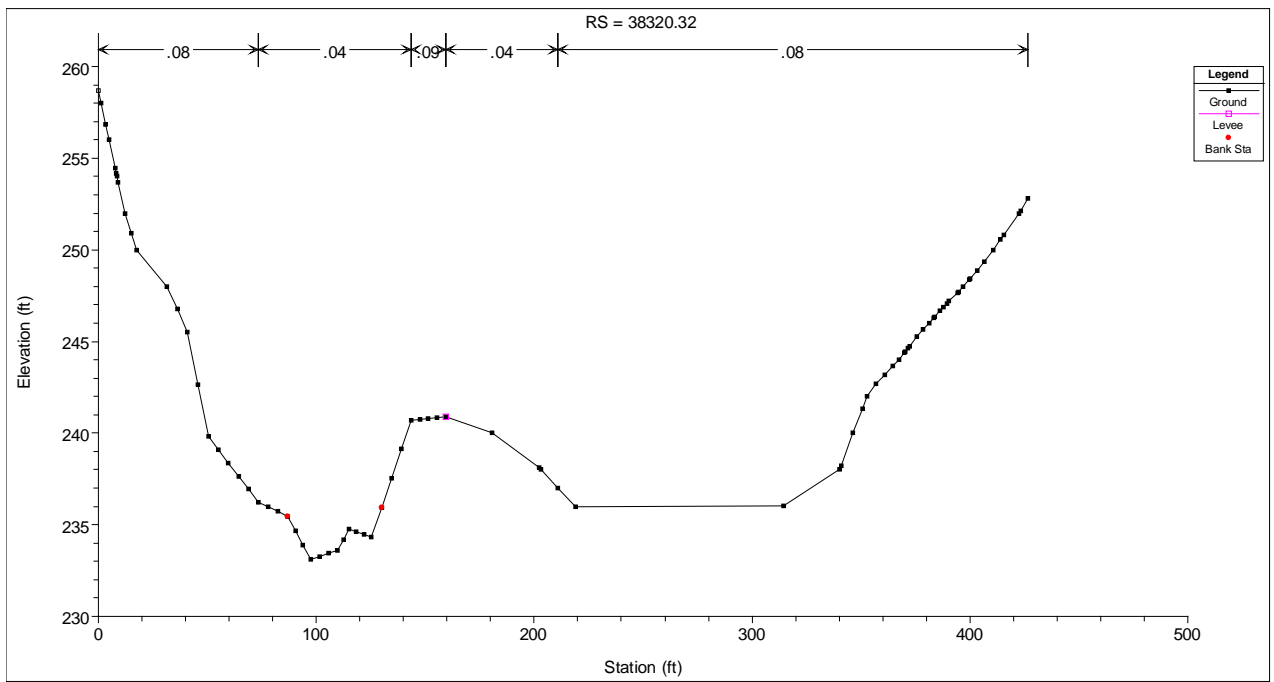
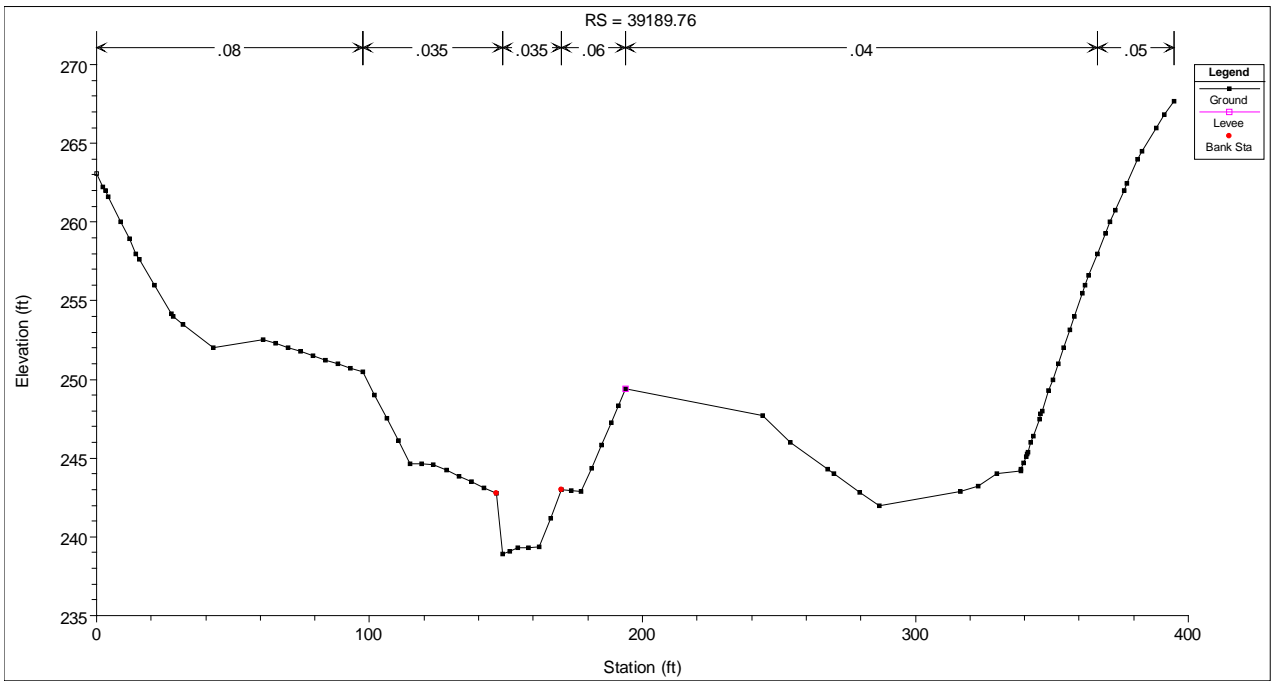


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 37227.46, 36109.43

Project No. 08-1032

Created By: LA

Figure 51



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

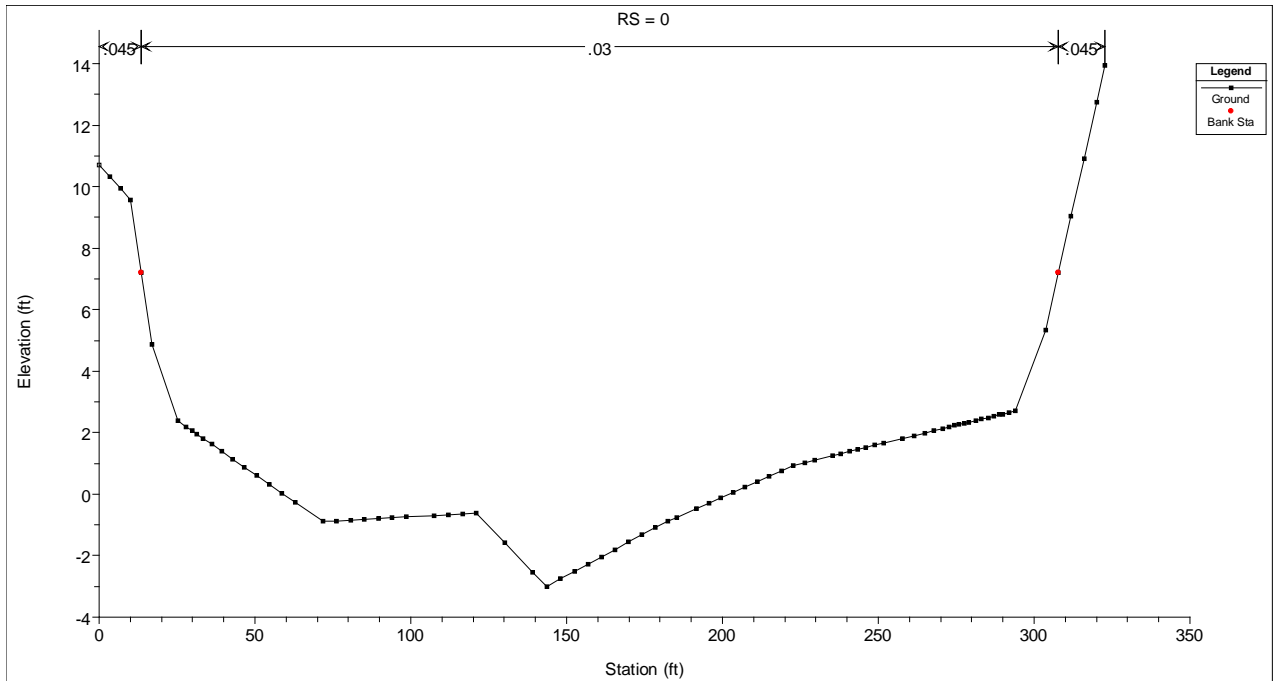


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 39189.76, 38320.32

Project No. 08-1032

Created By: LA

Figure 52



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

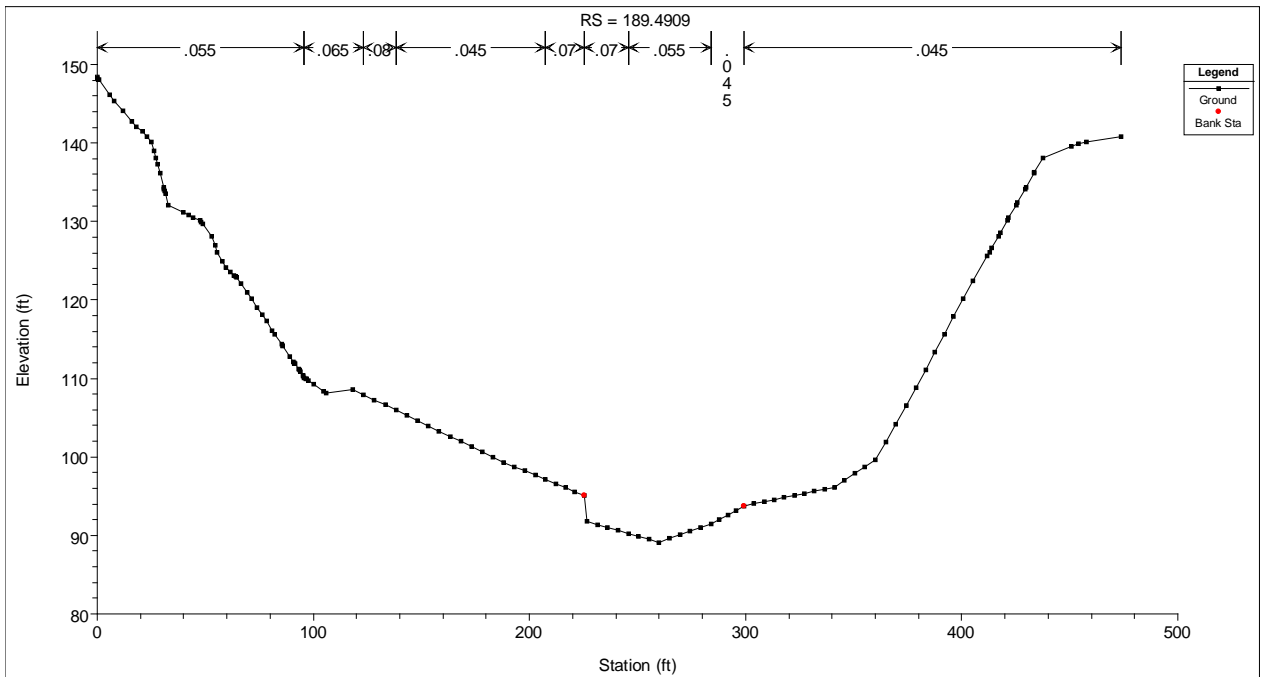
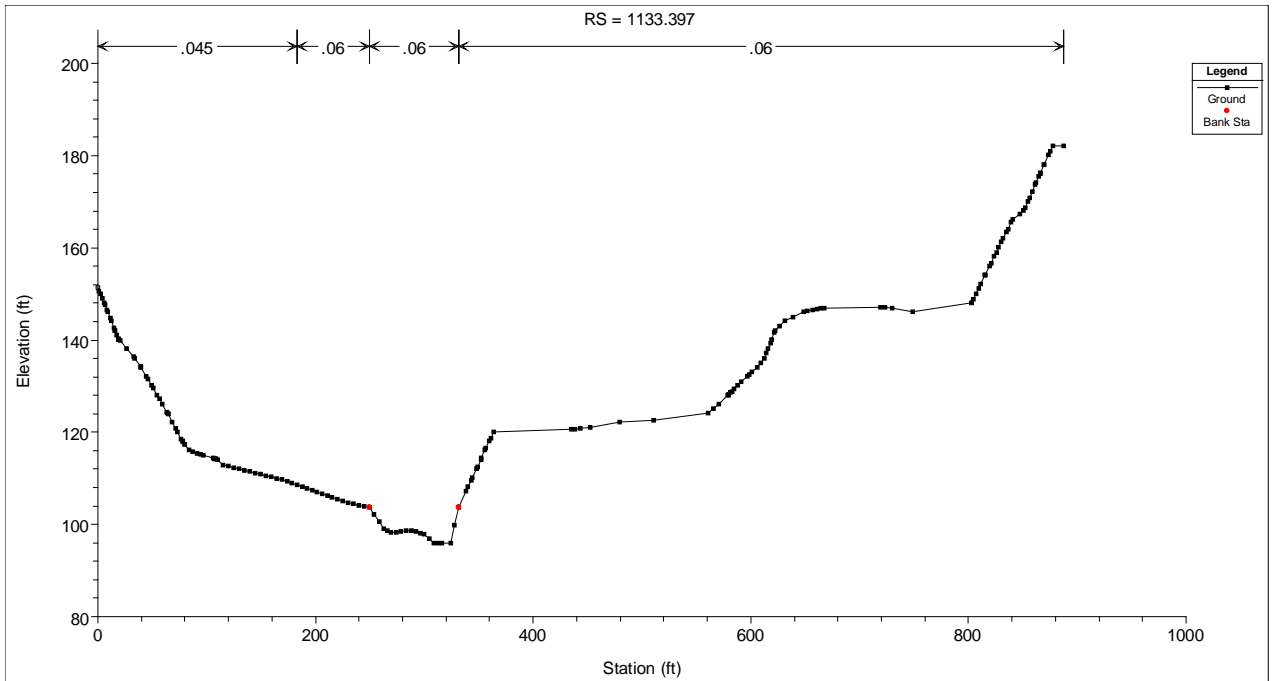


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – RS 560.7836, 0.0

Project No. 08-1032

Created By: LA

Figure 53



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

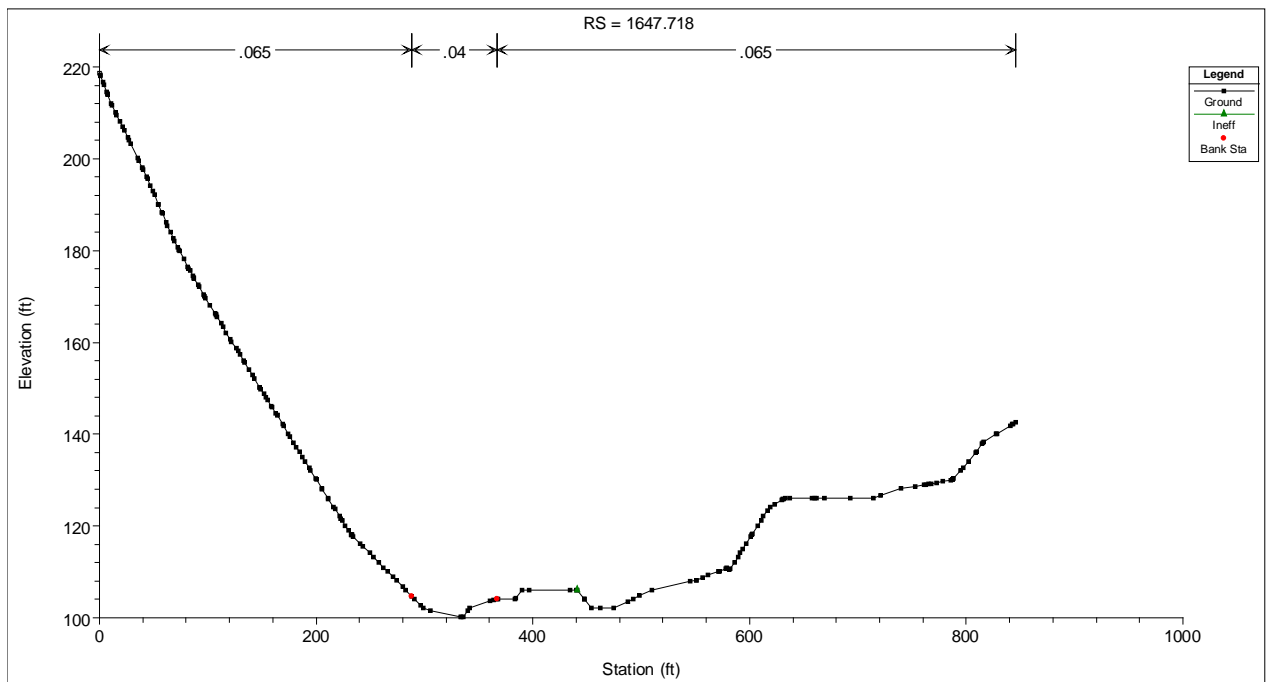
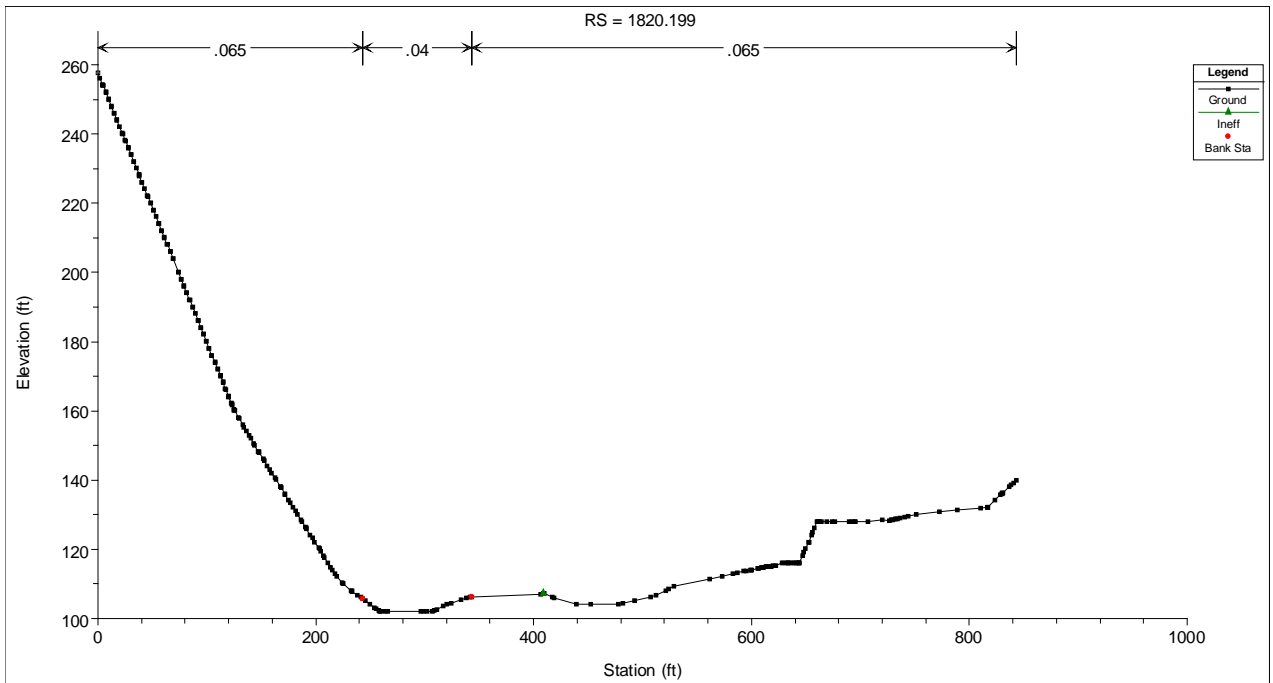


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 1133.397, 189.4909

Project No. 08-1032

Created By: LA

Figure 54



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

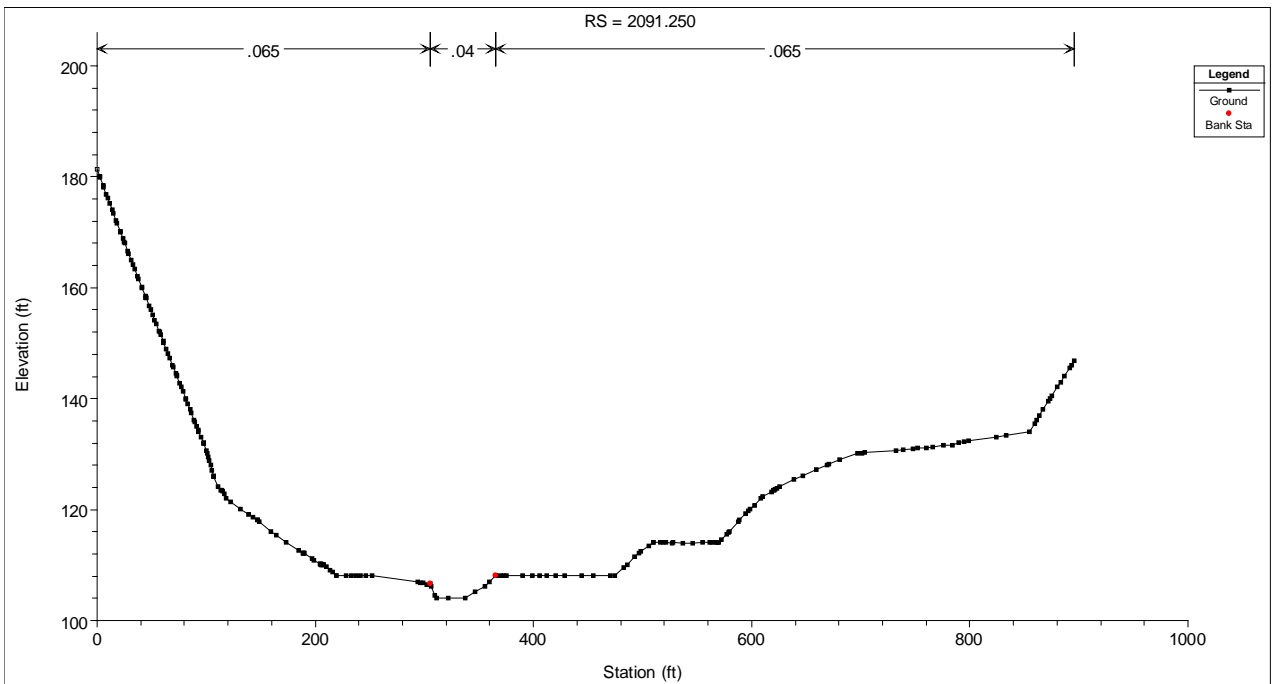
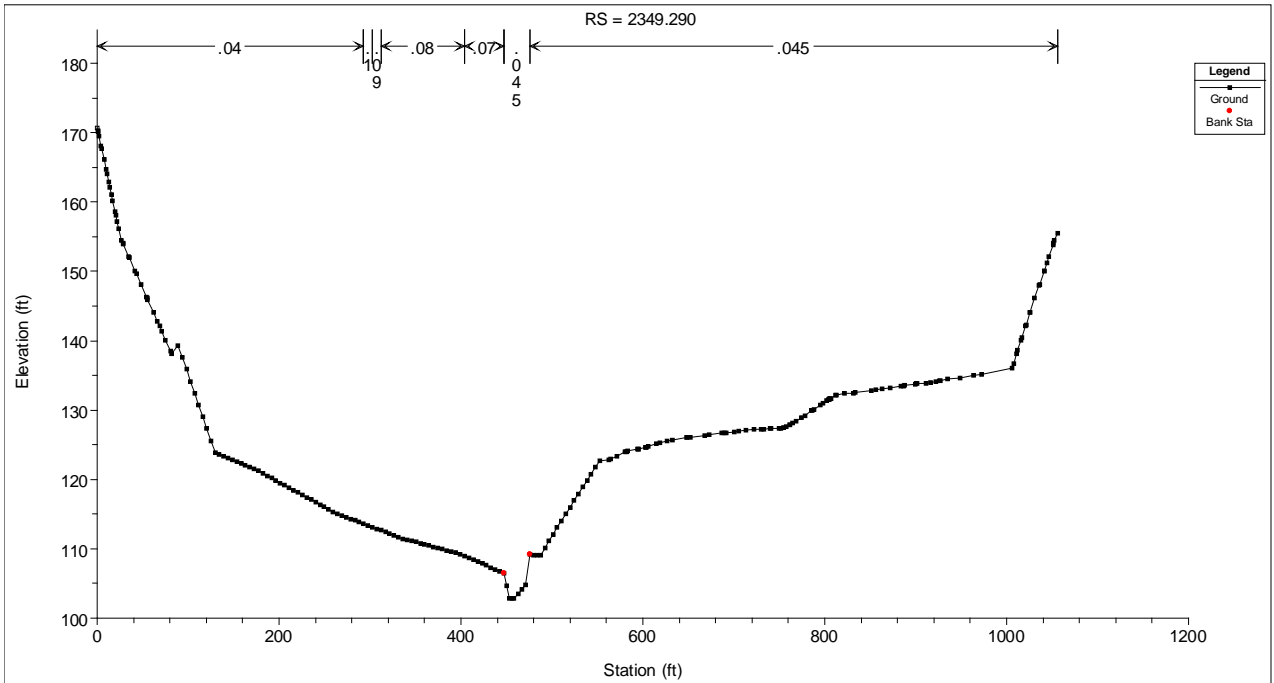


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 1820.199, 1647.718

Project No. 08-1032

Created By: LA

Figure 55



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

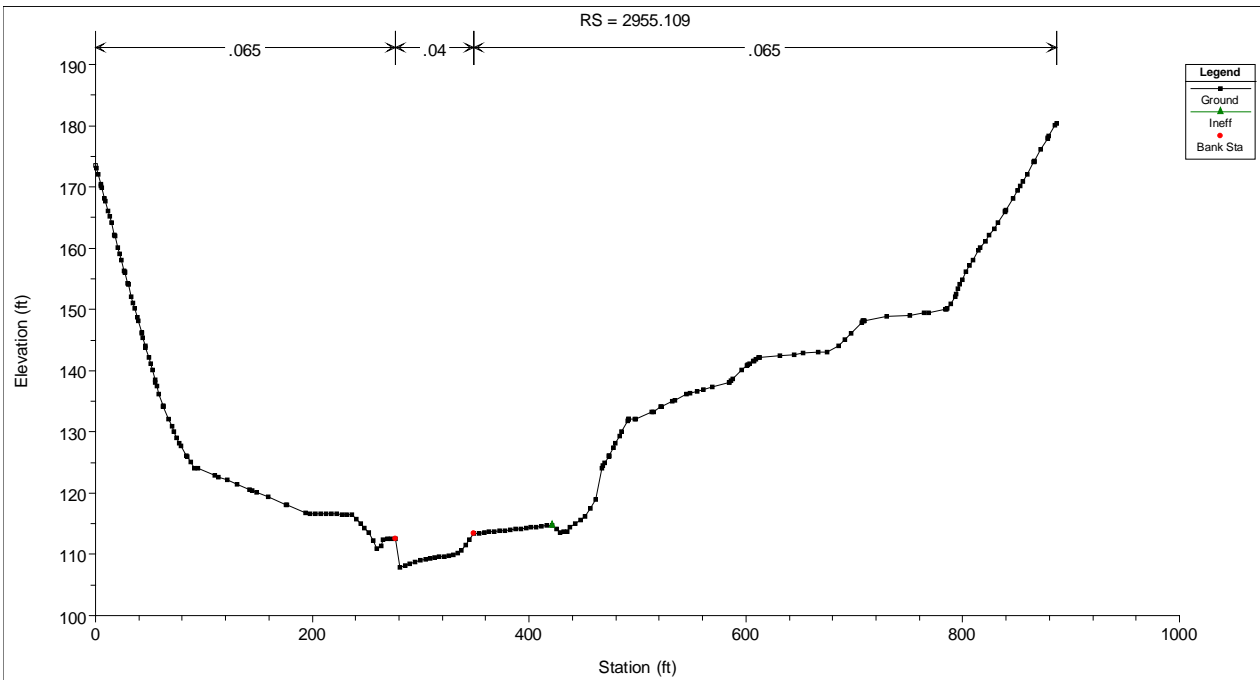
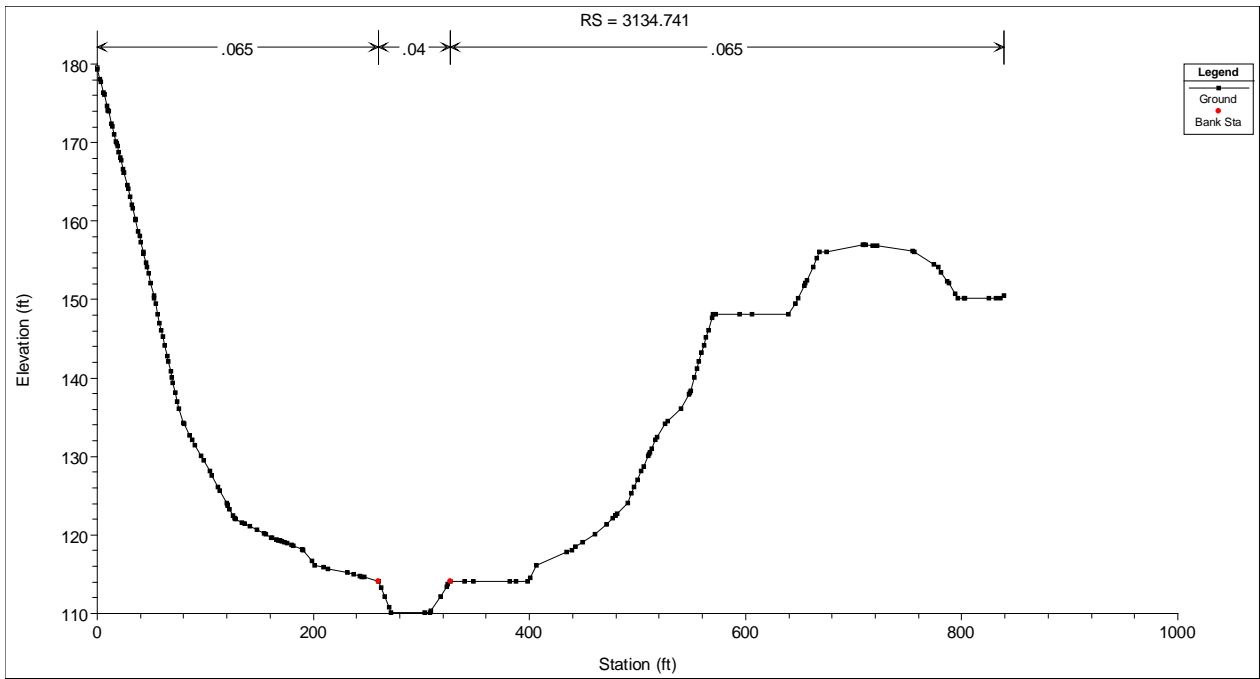


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 2349.290, 2019.250

Project No. 08-1032

Created By: LA

Figure 56



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

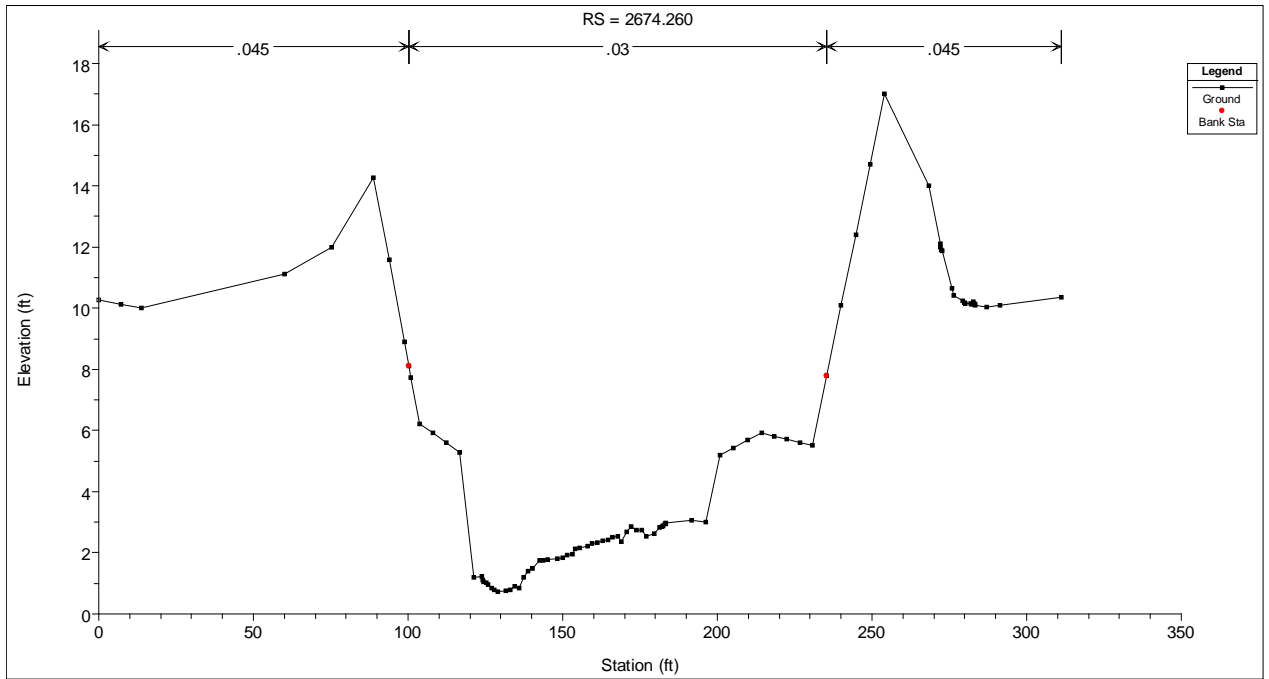
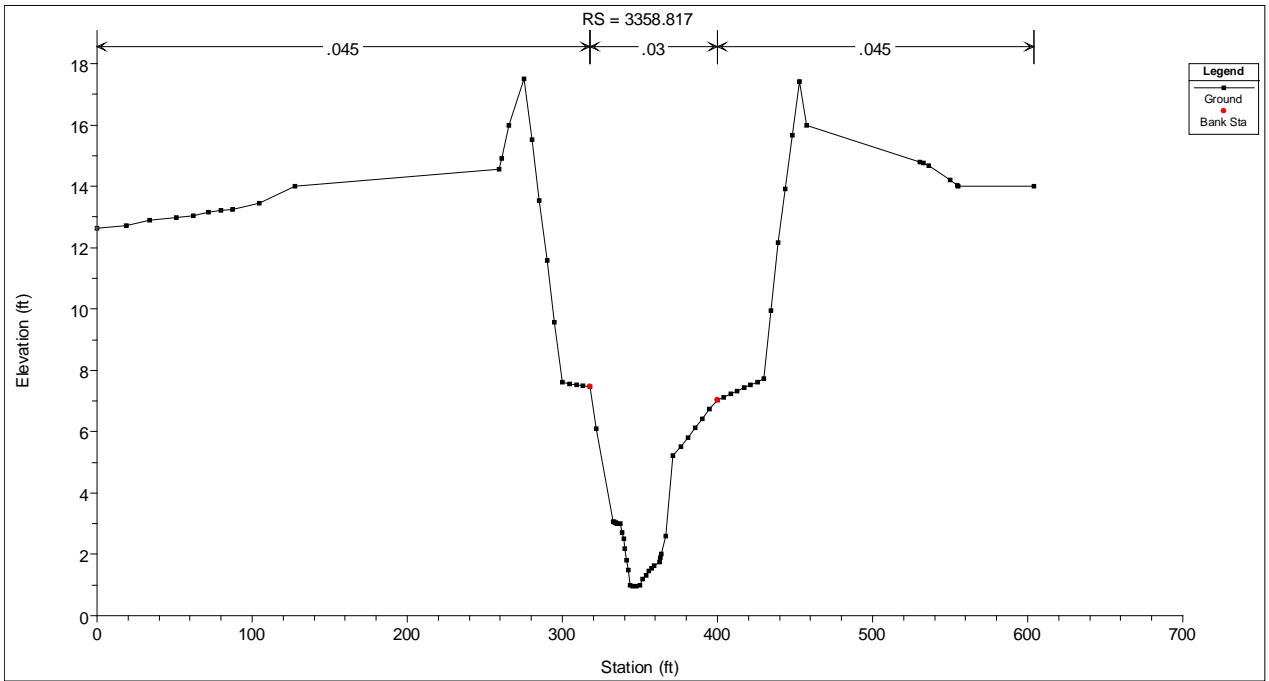


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 3134.741,2955.109

Project No. 08-1032

Created By: LA

Figure 57



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

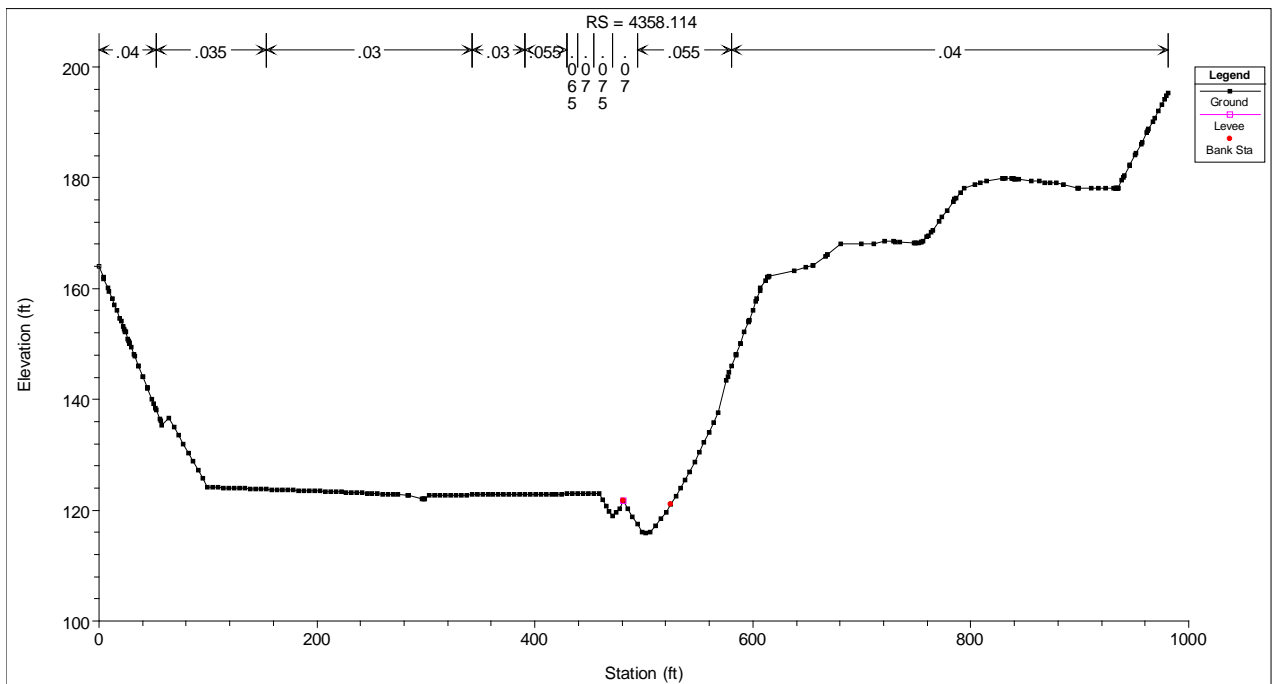
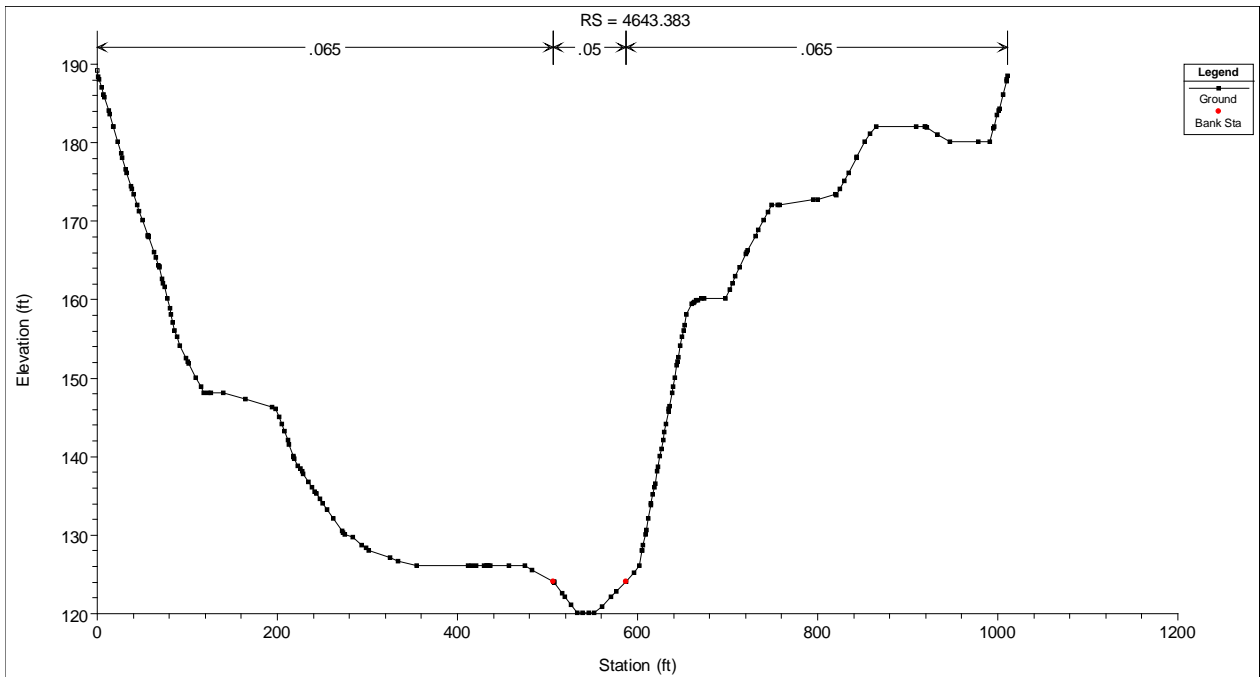


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 3358.817, 2674.260

Project No. 08-1032

Created By: LA

Figure 58



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

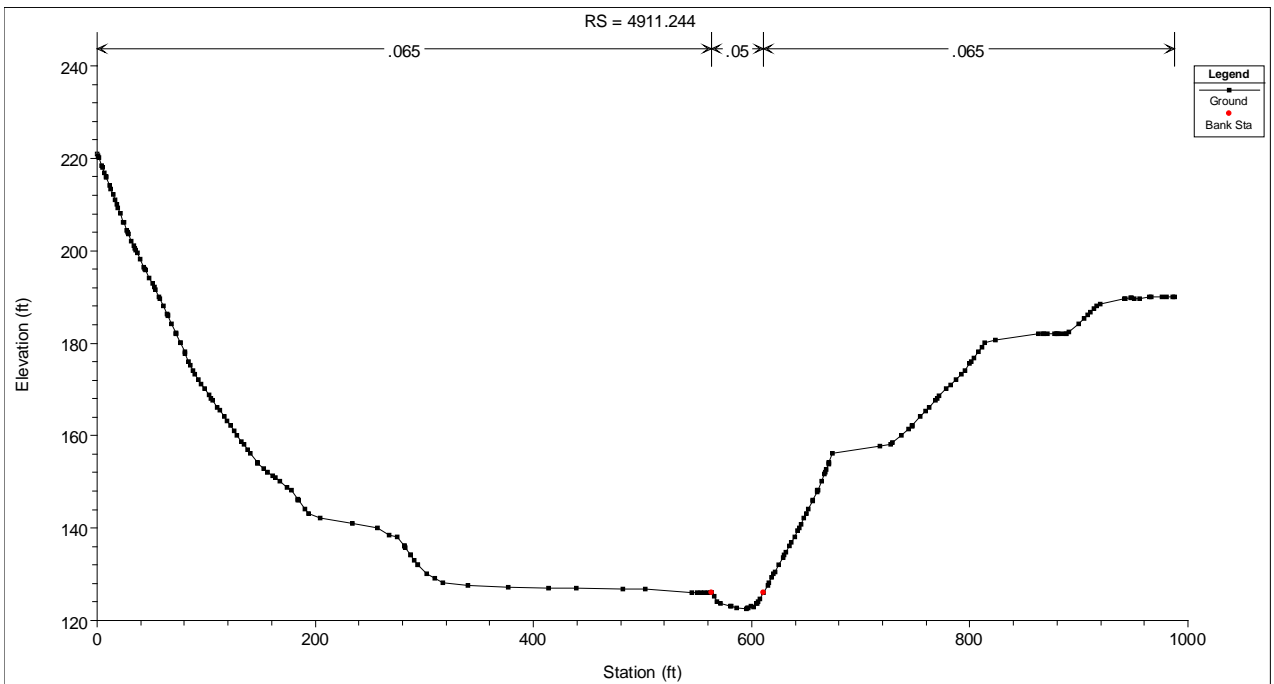
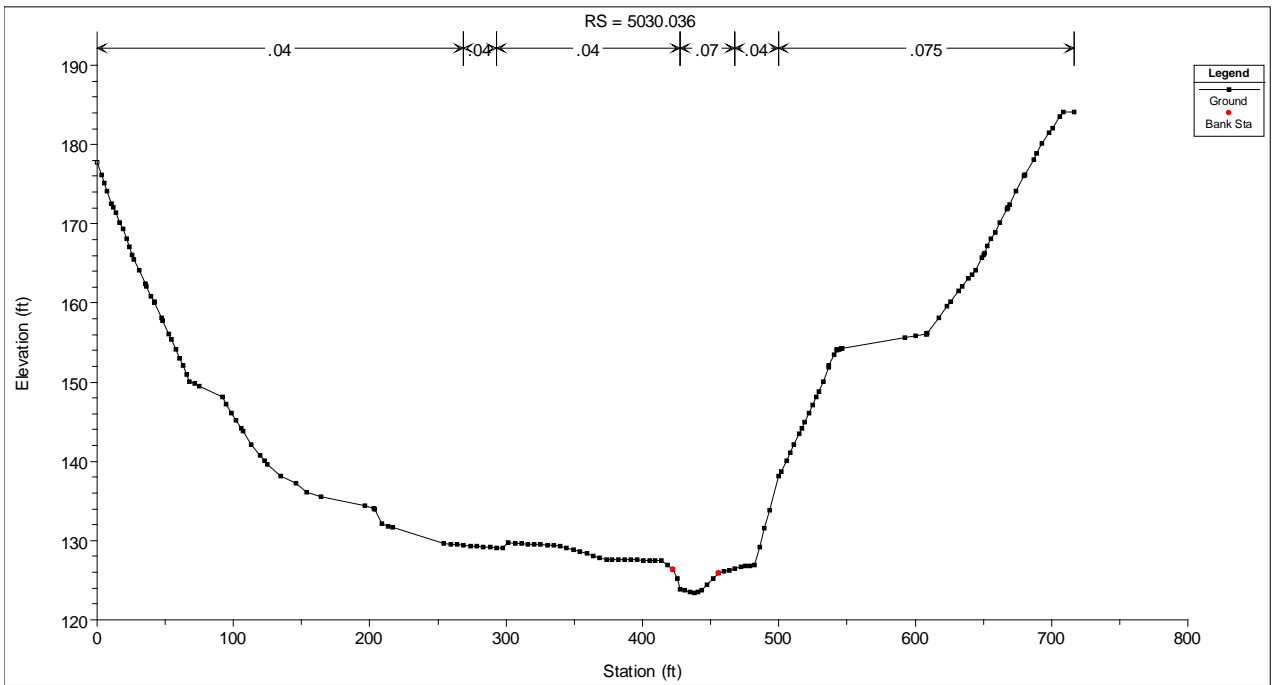


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 4643.383, 4358.114

Project No. 08-1032

Created By: LA

Figure 59



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

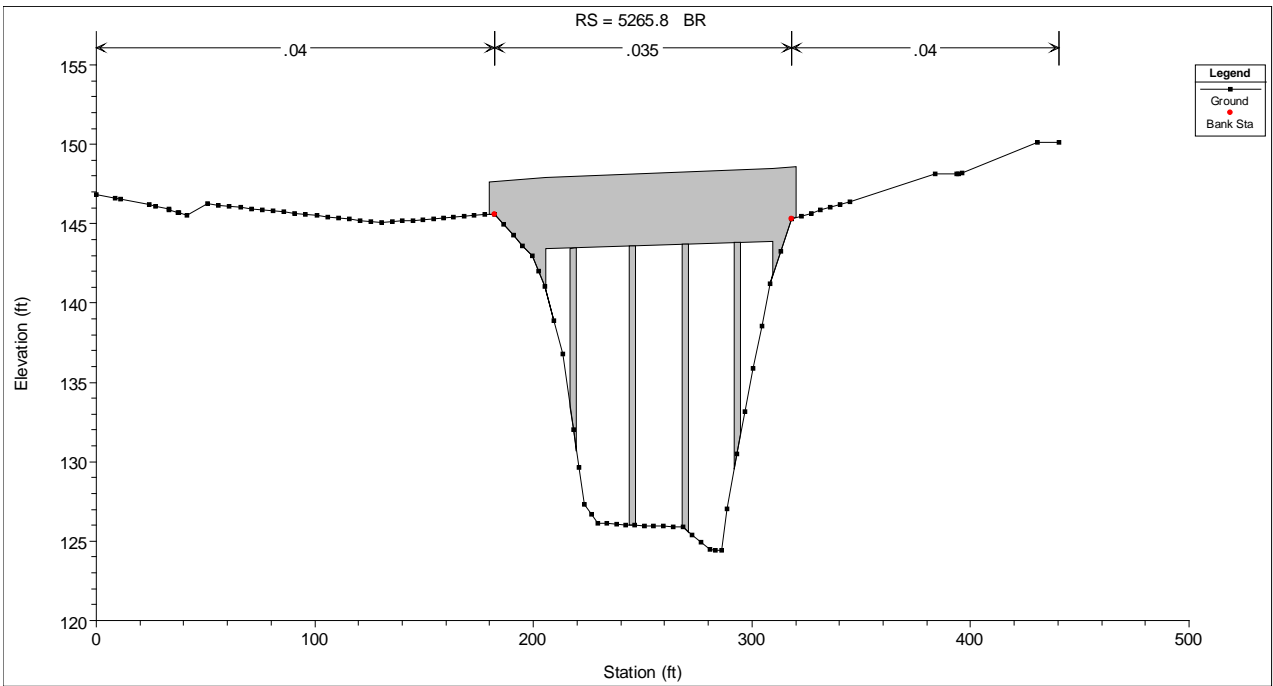
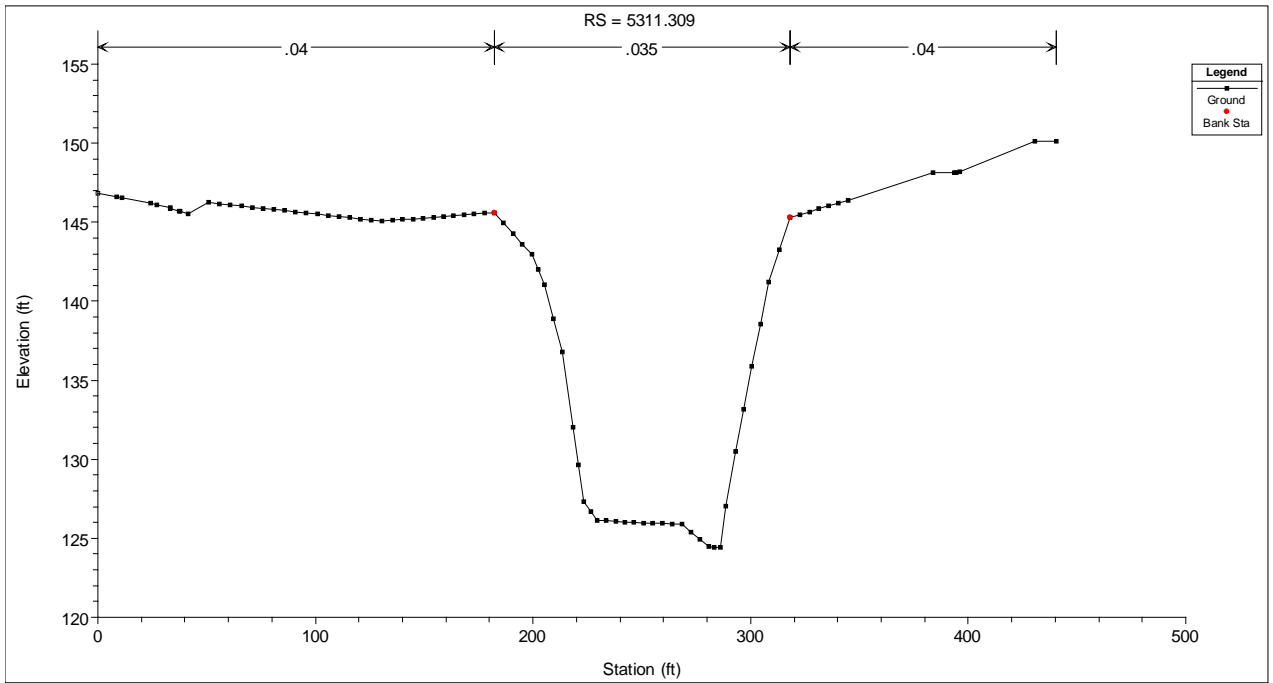


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 5030.036, 4911.244

Project No. 08-1032

Created By: LA

Figure 60



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

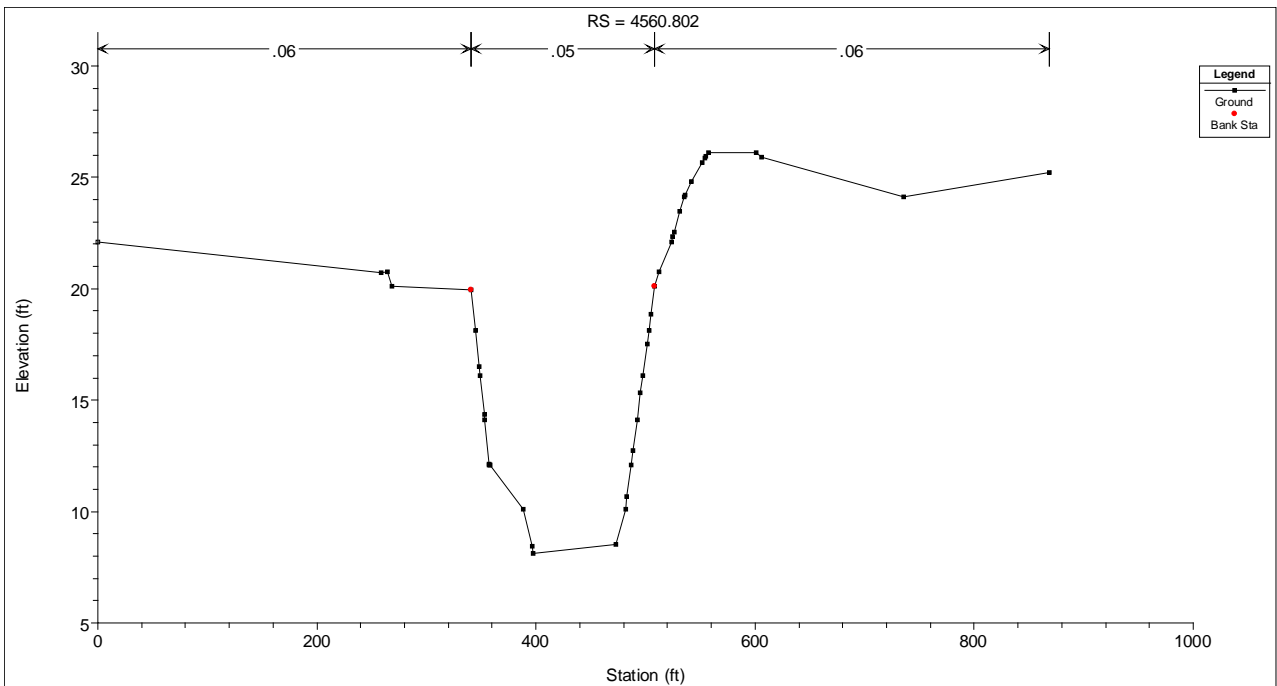
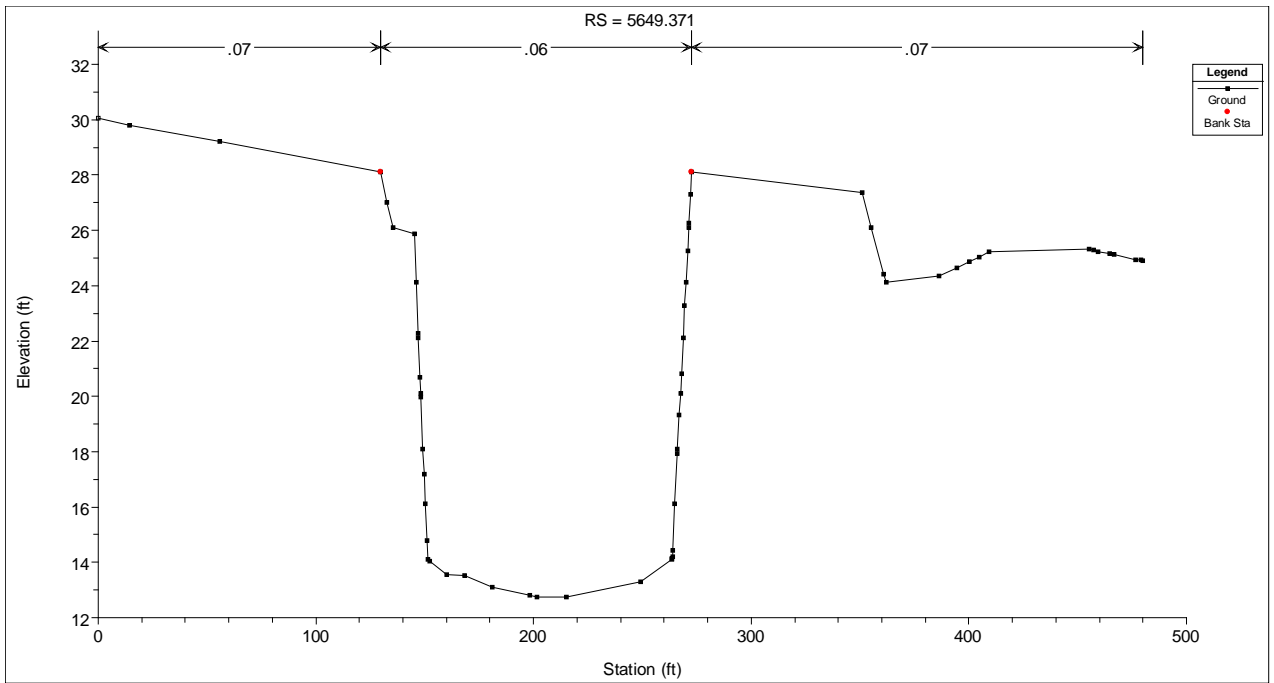


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 5311.309, 5265.8

Project No. 08-1032

Created By: LA

Figure 61



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

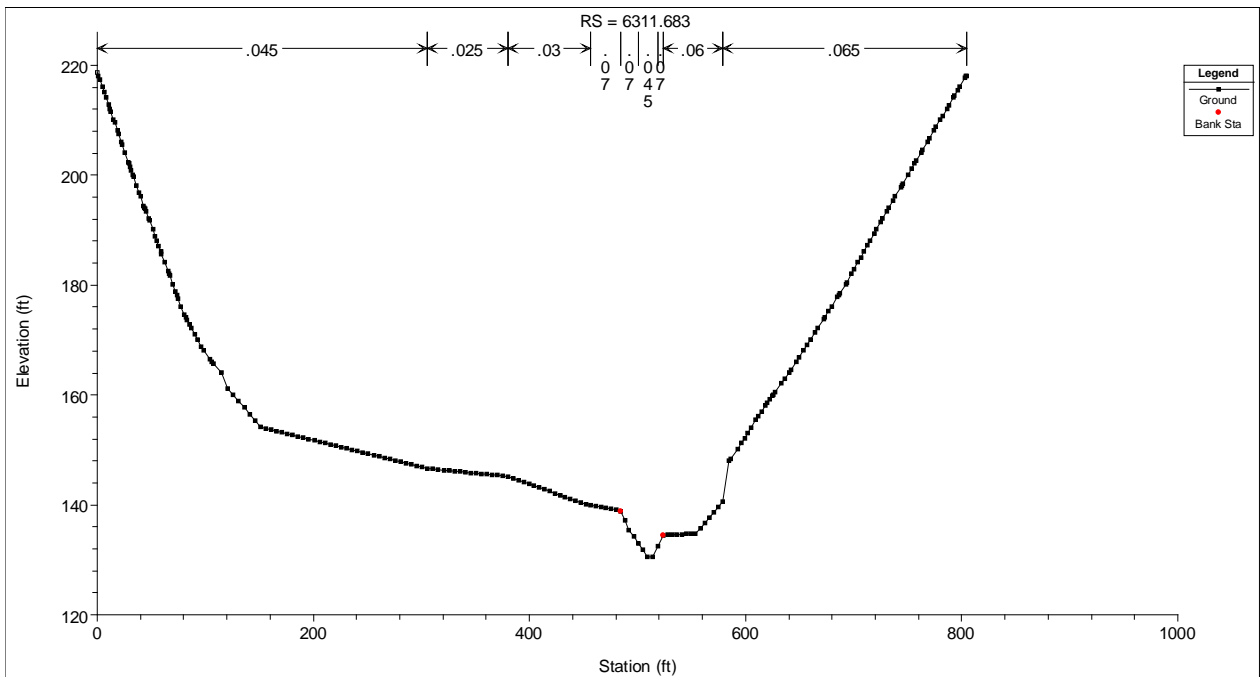
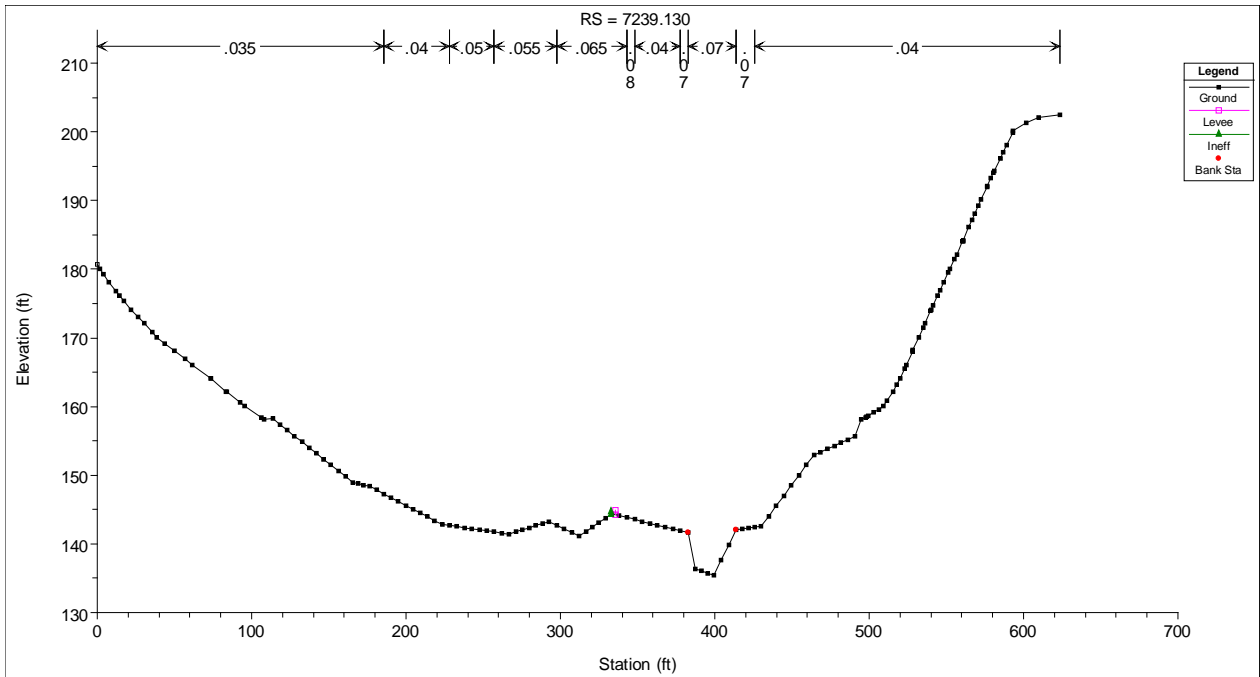


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 5649.371, 4560.802

Project No. 08-1032

Created By: LA

Figure 62



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

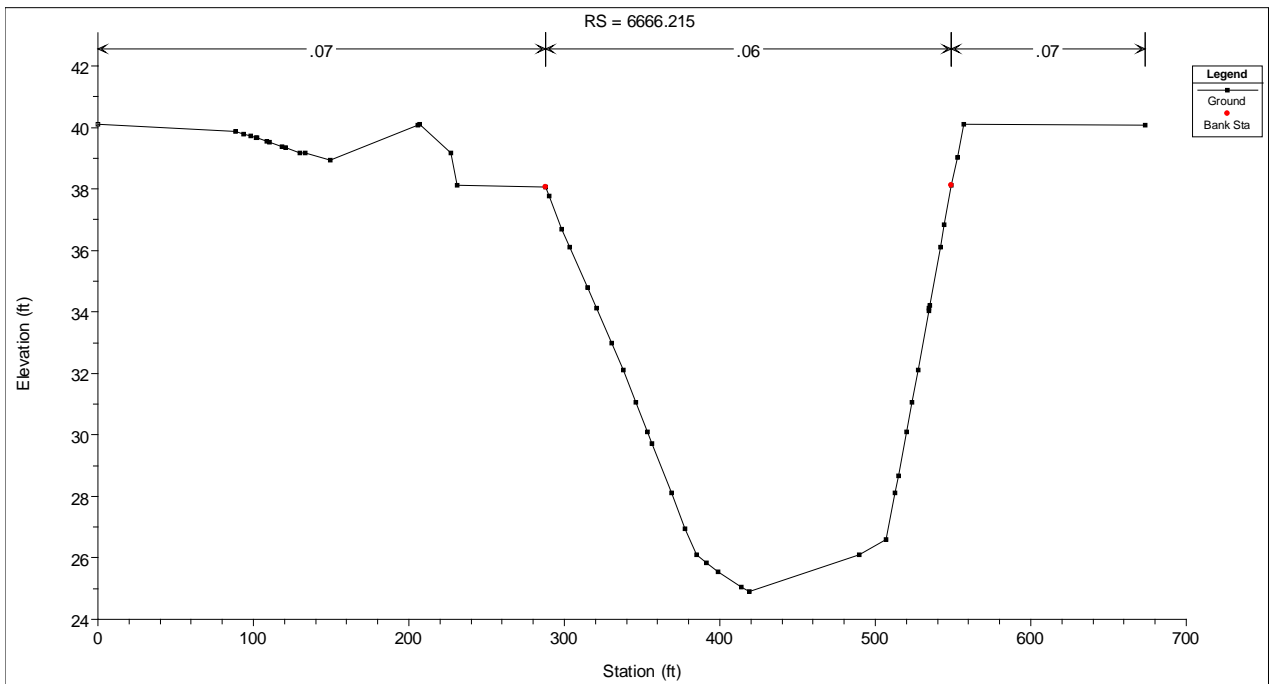
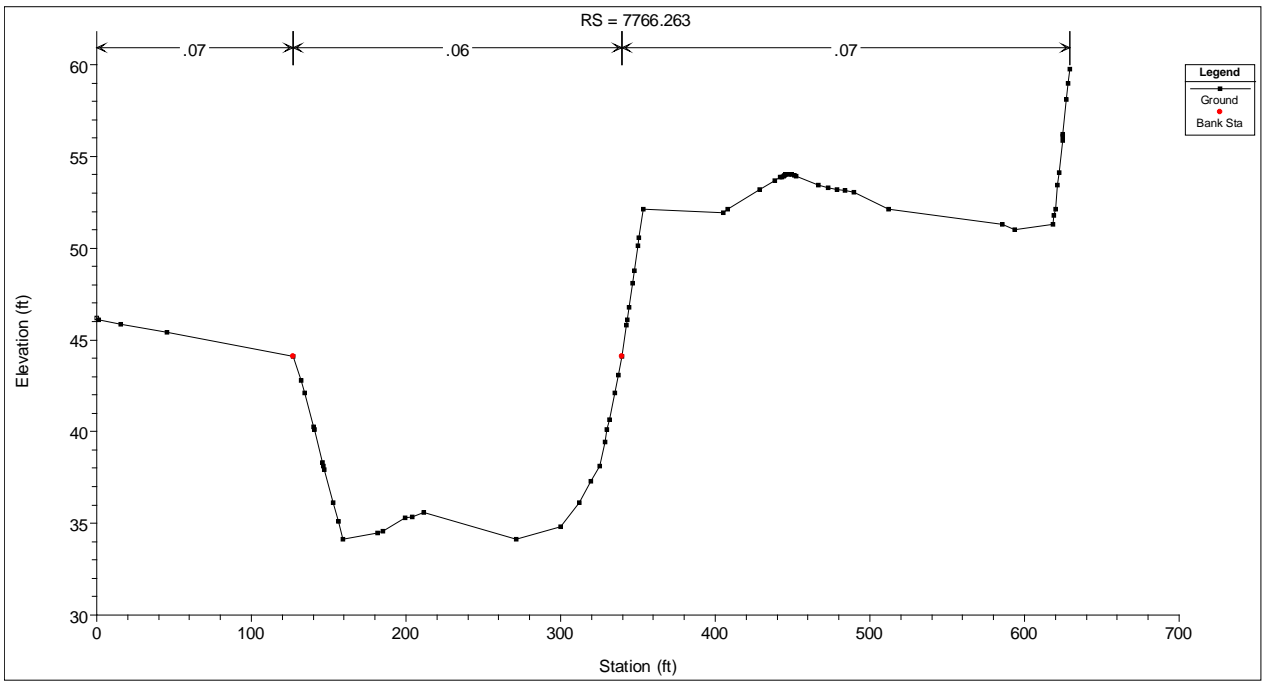


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 7239.130, 6311.683

Project No. 08-1032

Created By: LA

Figure 63



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

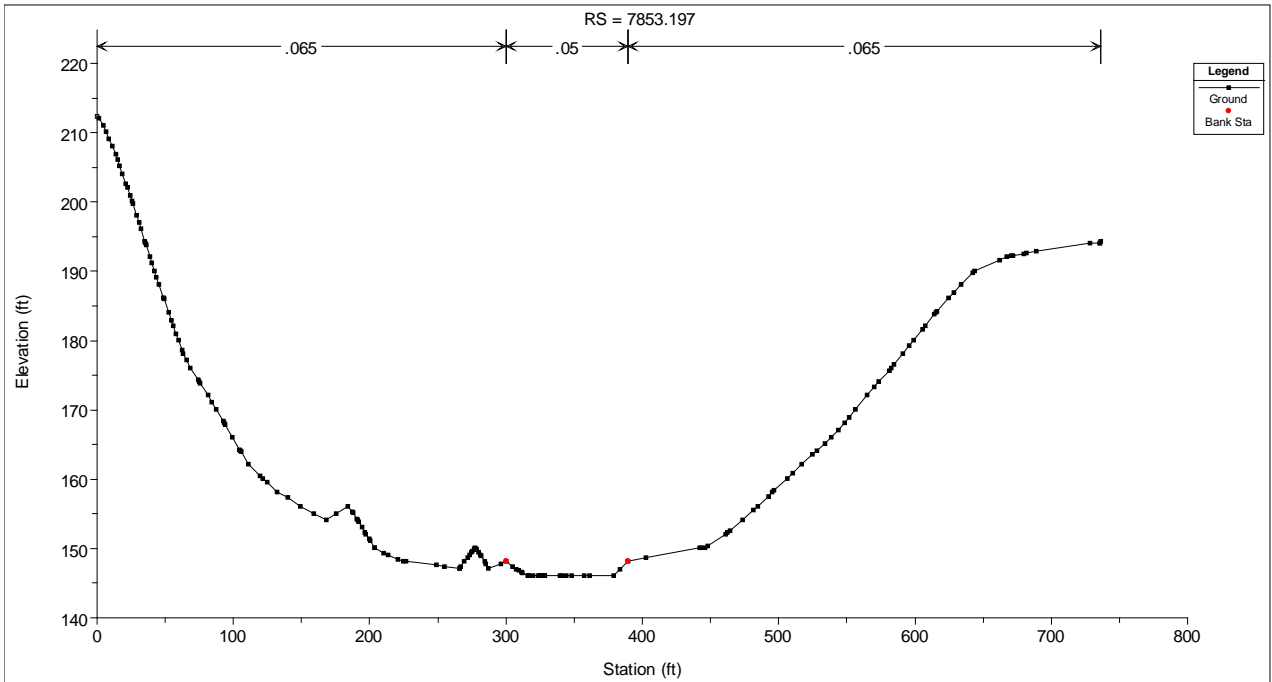
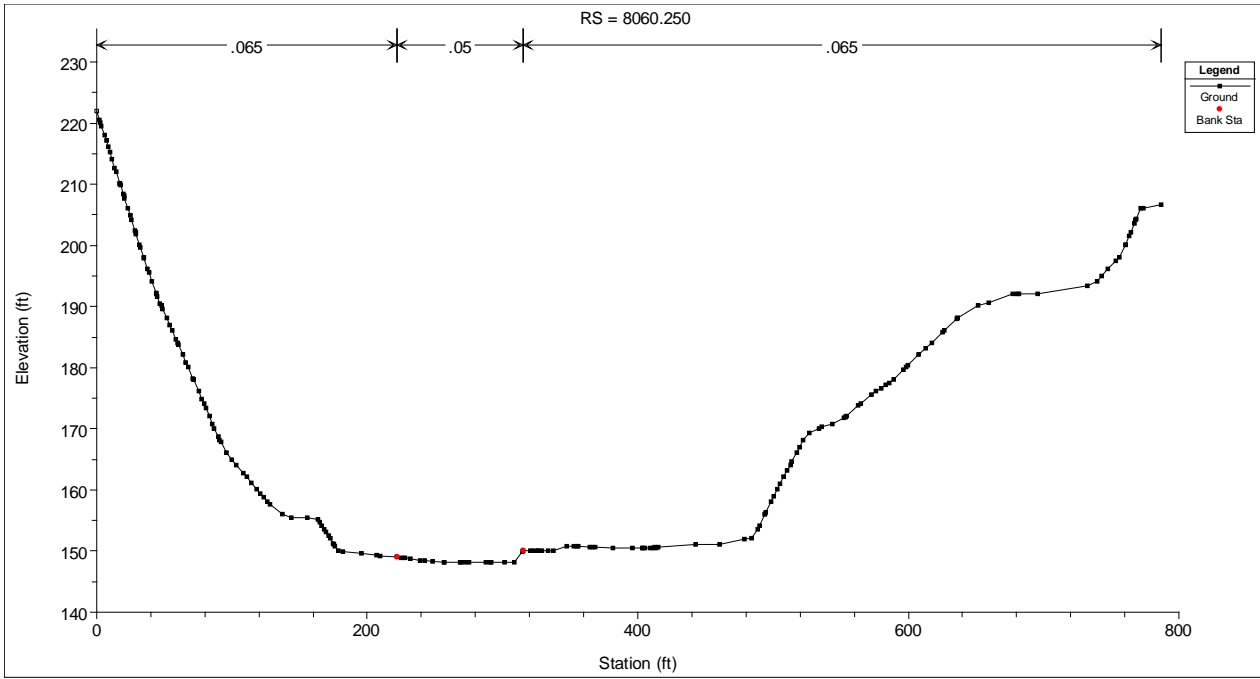


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 7766.263, 6666.215

Project No. 08-1032

Created By: LA

Figure 64



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

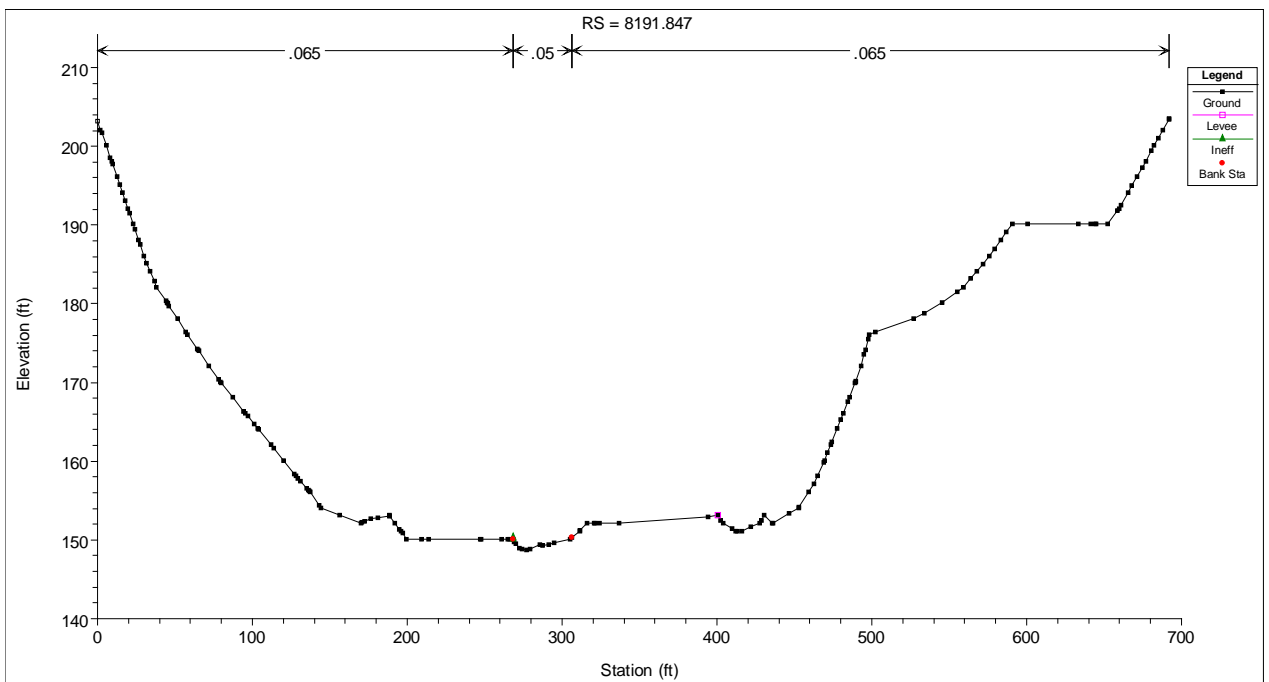
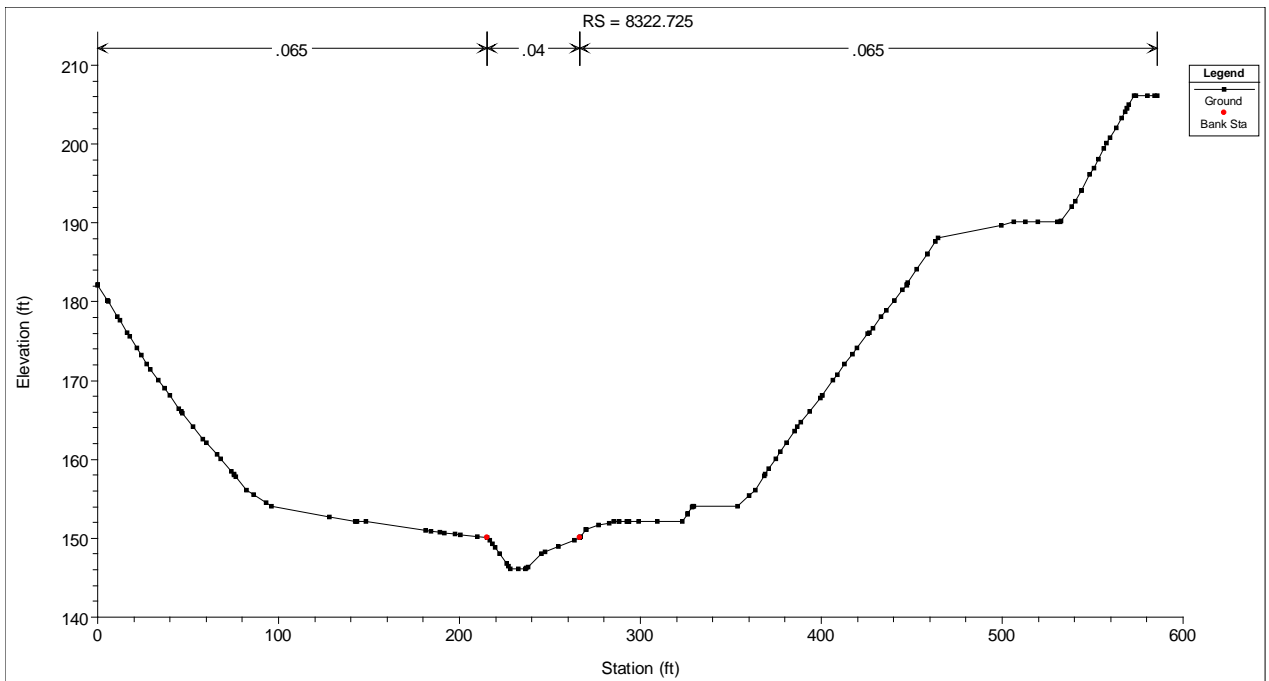


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 8060.250, 7853.197

Project No. 08-1032

Created By: LA

Figure 65



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

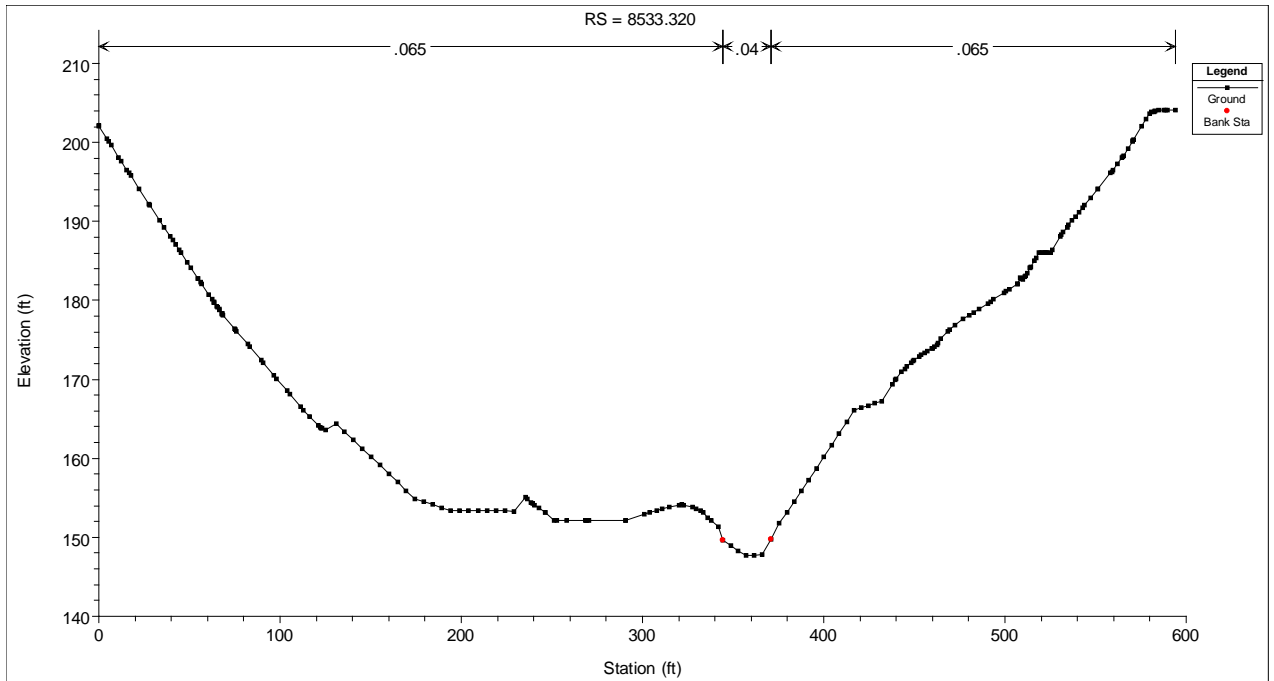
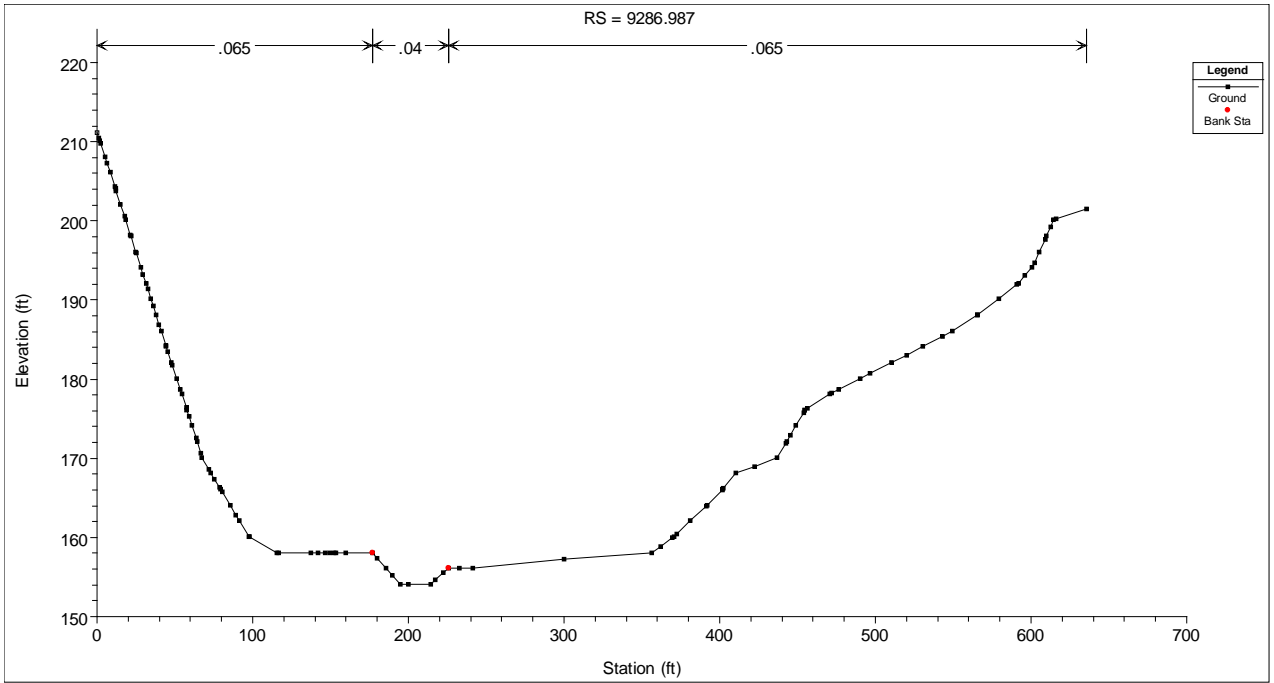


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 8322.725, 8191.847

Project No. 08-1032

Created By: LA

Figure 66



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

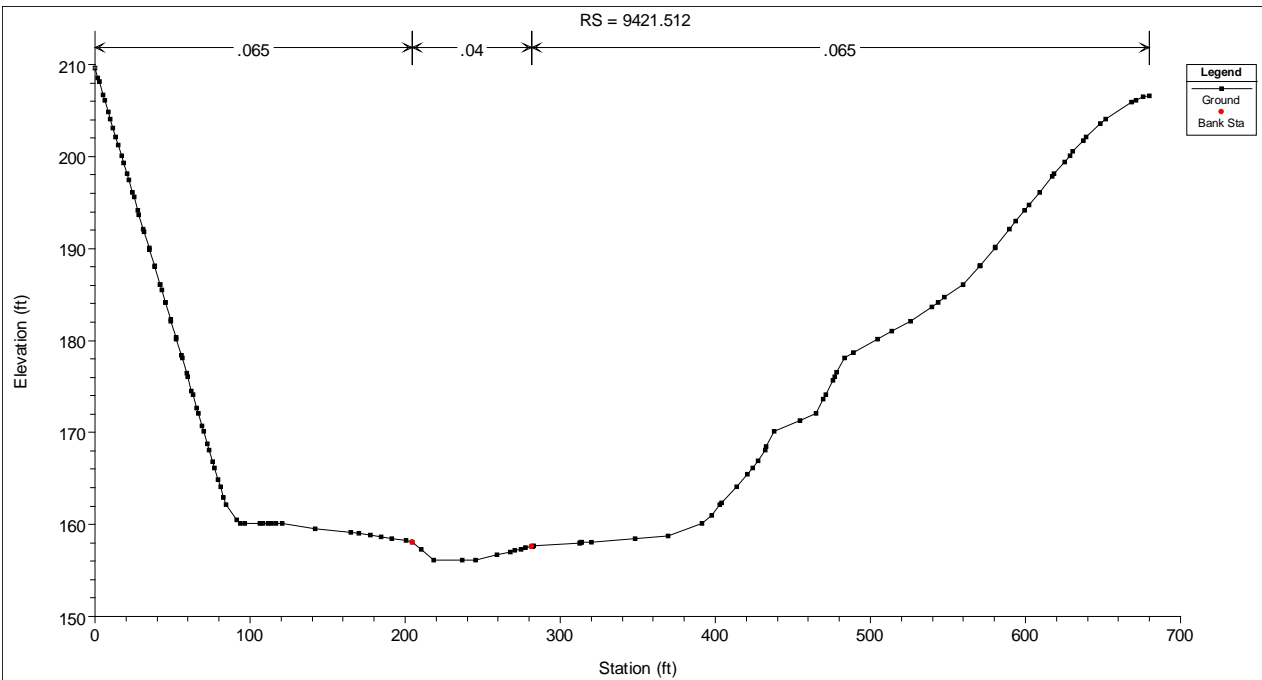
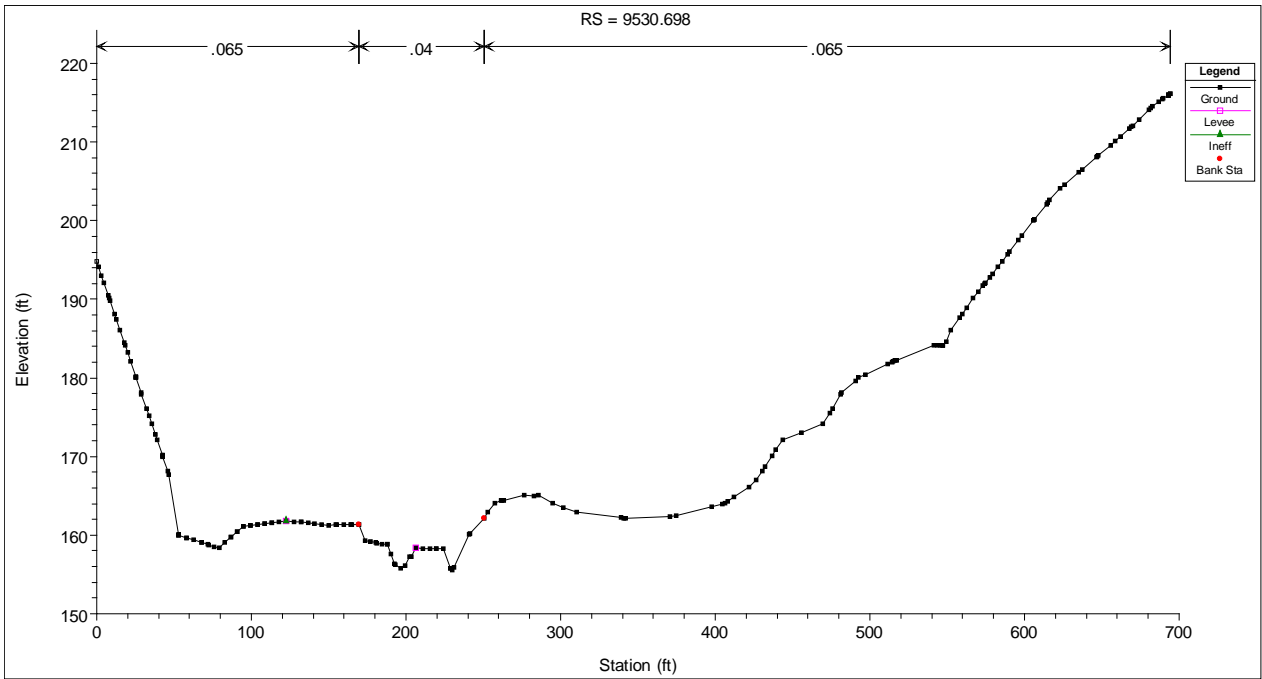


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 9286.987, 8533.320

Project No. 08-1032

Created By: LA

Figure 67



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

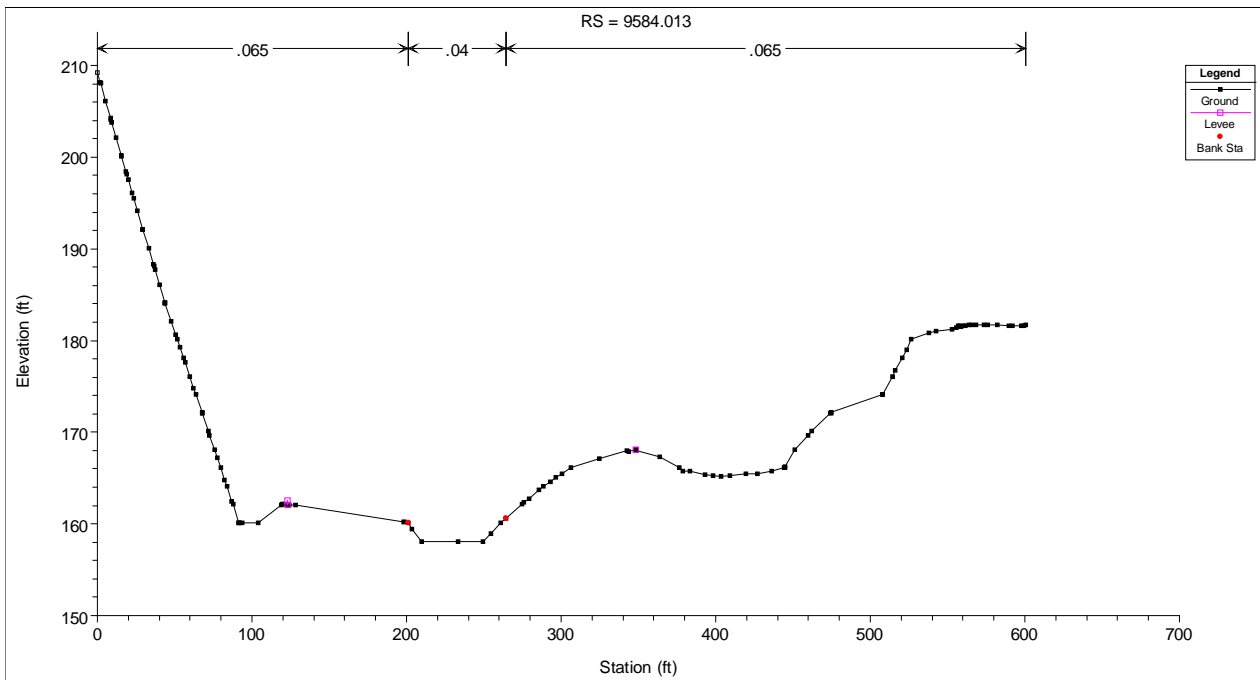
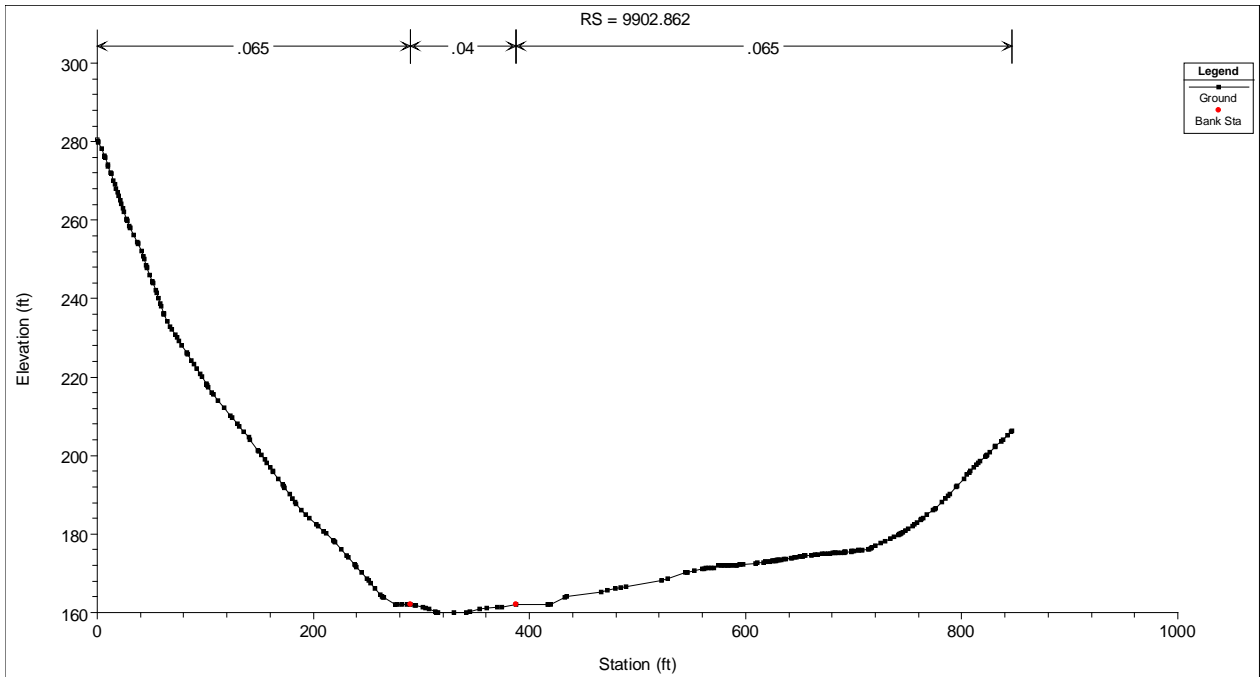


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 9530.698, 9421.512

Project No. 08-1032

Created By: LA

Figure 68



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

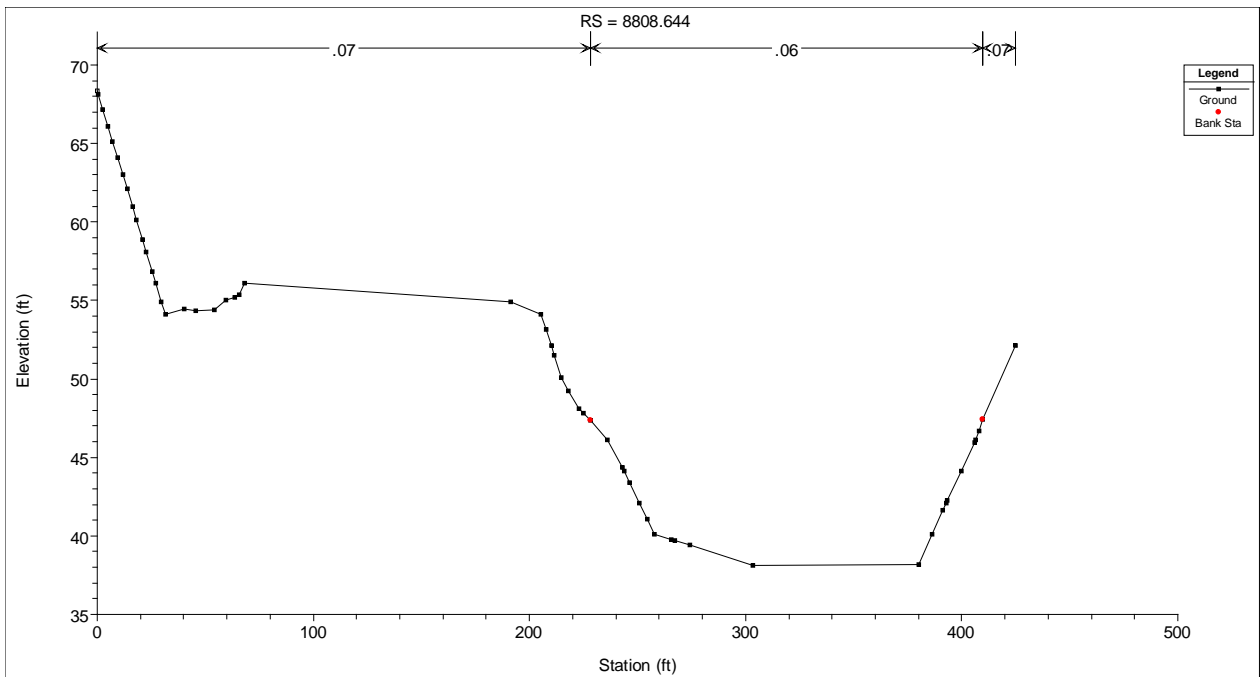
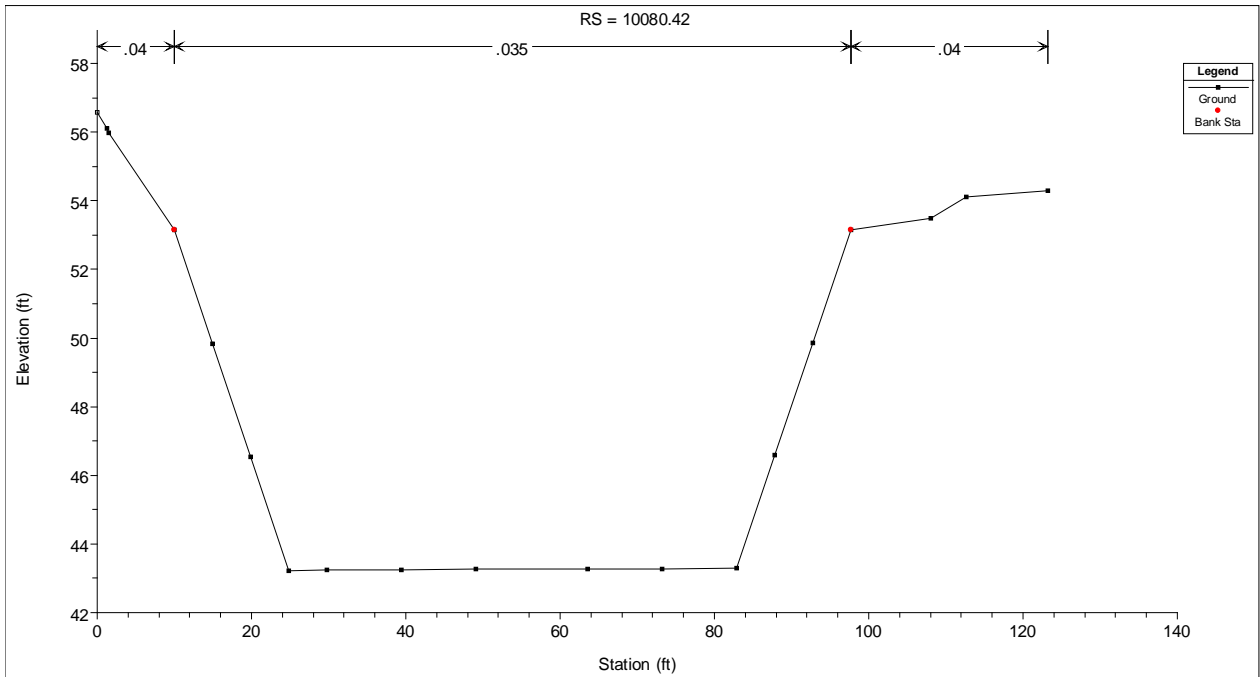


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 9902.862, 9584.013

Project No. 08-1032

Created By: LA

Figure 69



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

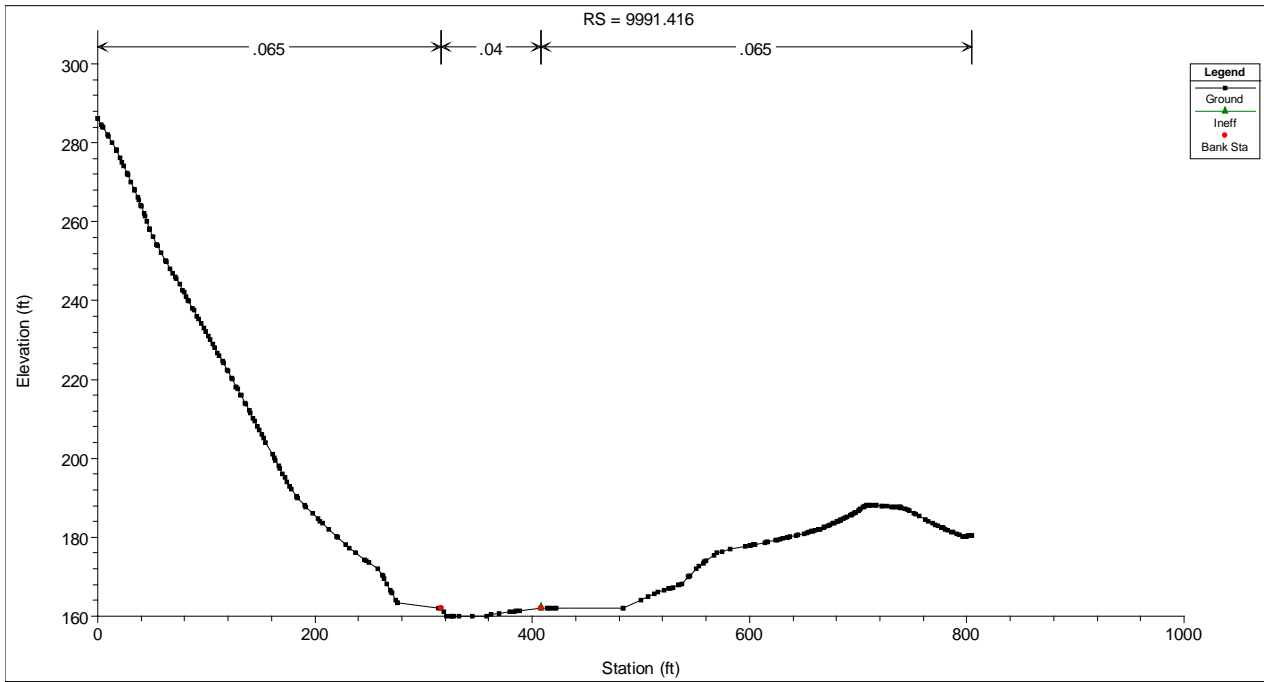
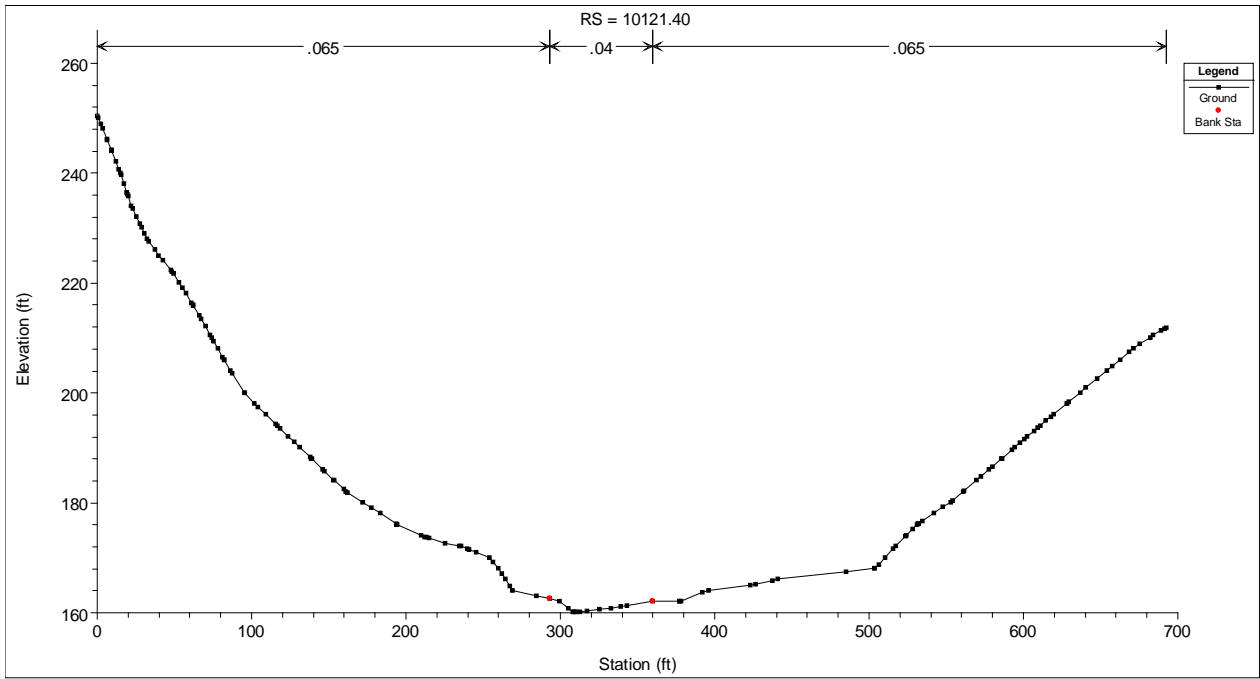


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 10080.42, 8808.644

Project No. 08-1032

Created By: LA

Figure 70



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

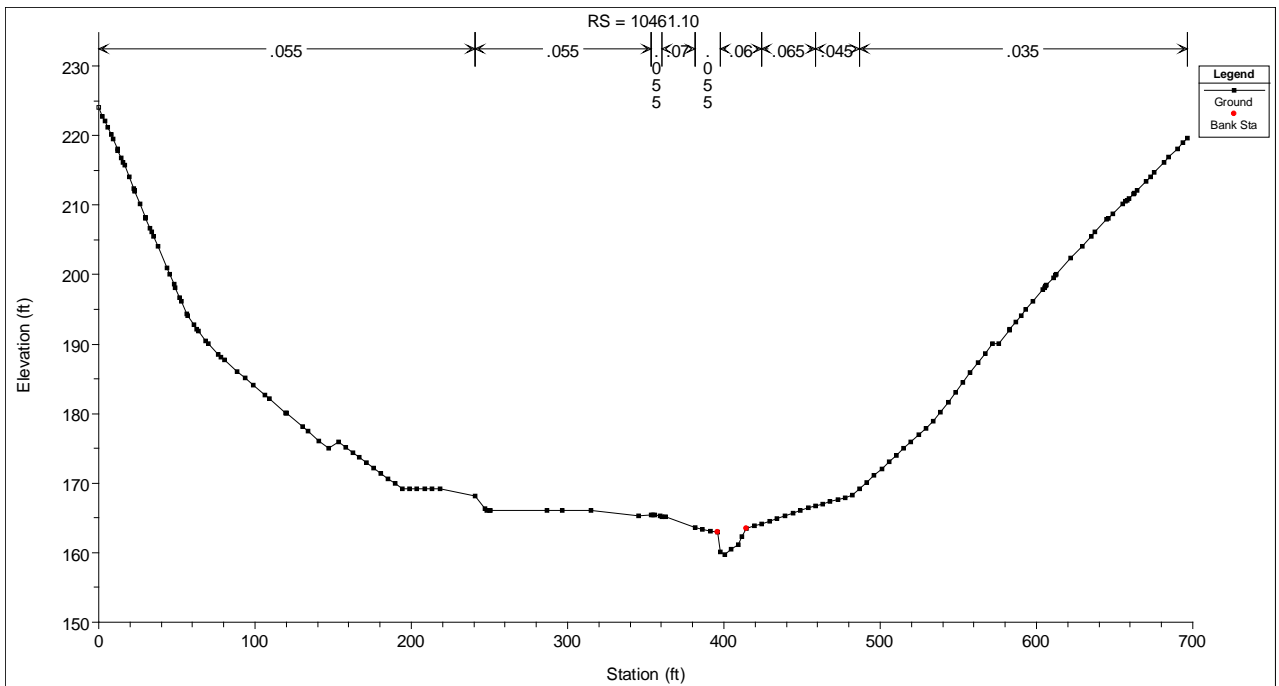
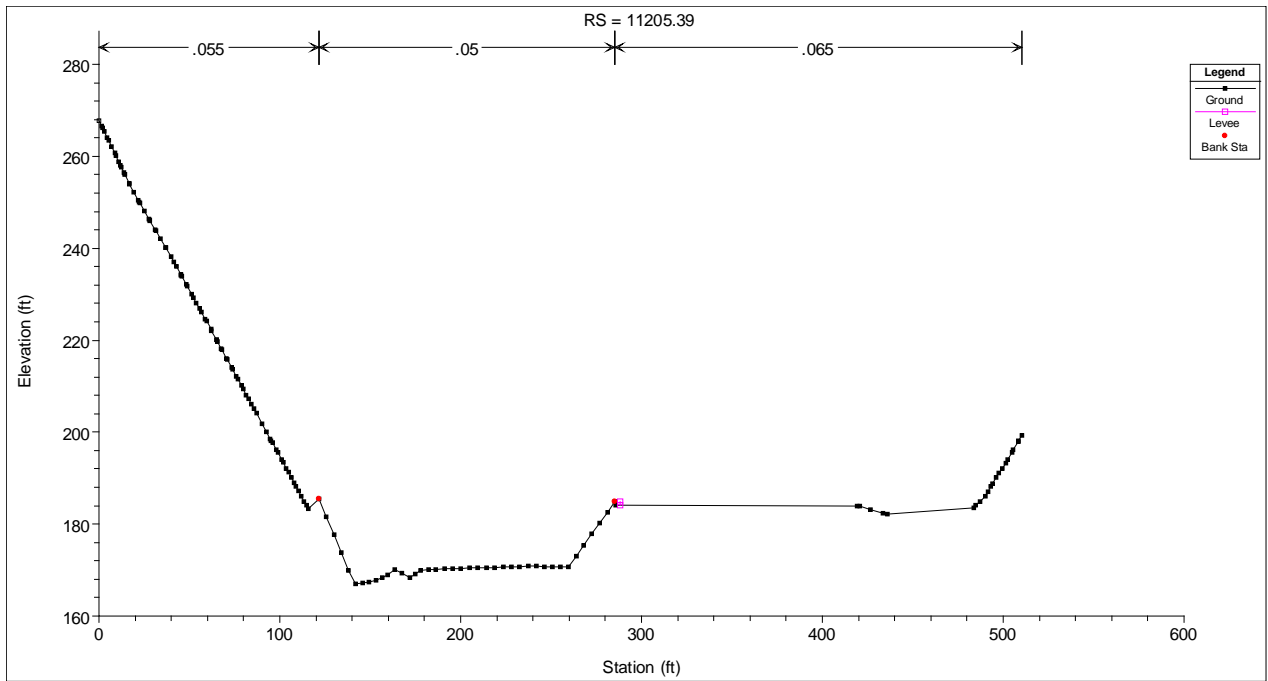


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 10121.40, 9991.416

Project No. 08-1032

Created By: LA

Figure 71



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

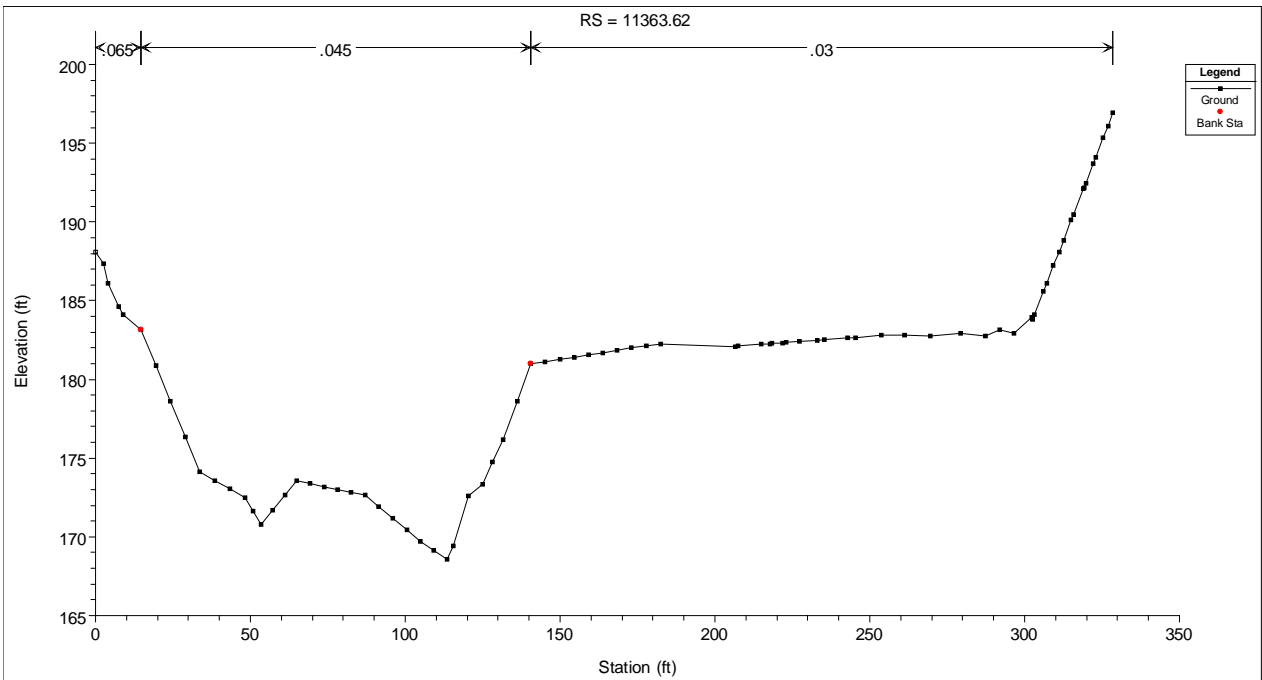
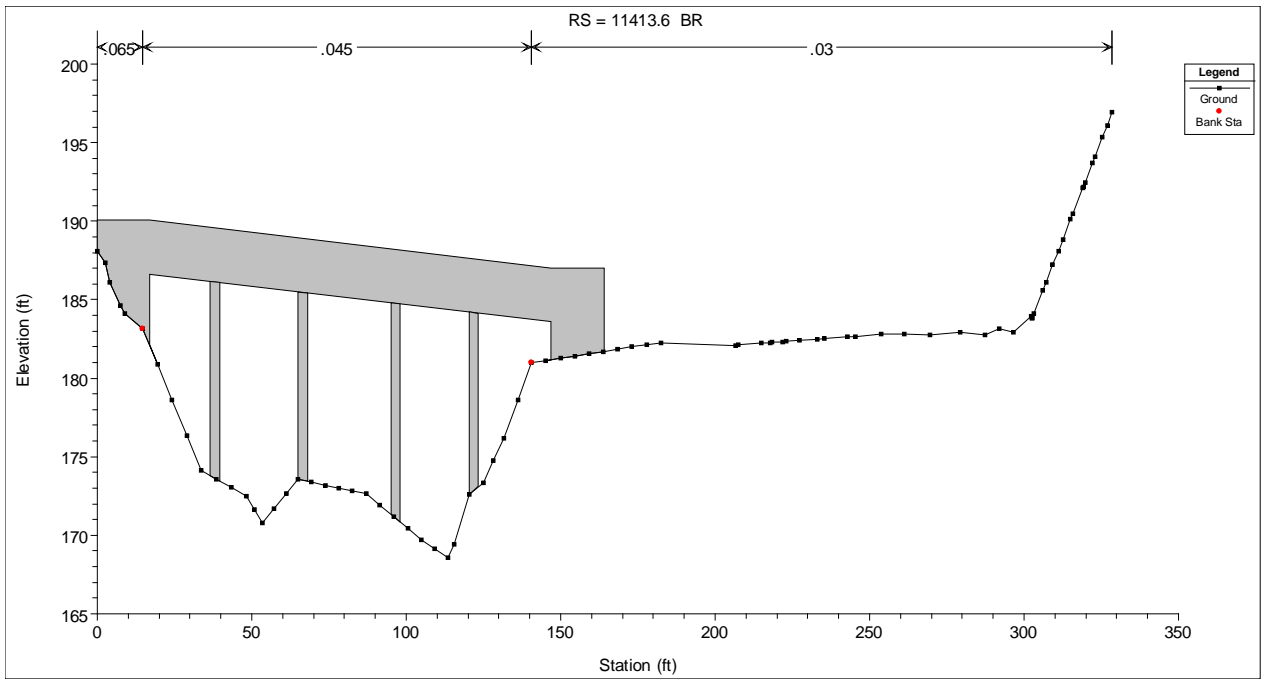


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 11205.39, 10461.10

Project No. 08-1032

Created By: LA

Figure 72



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

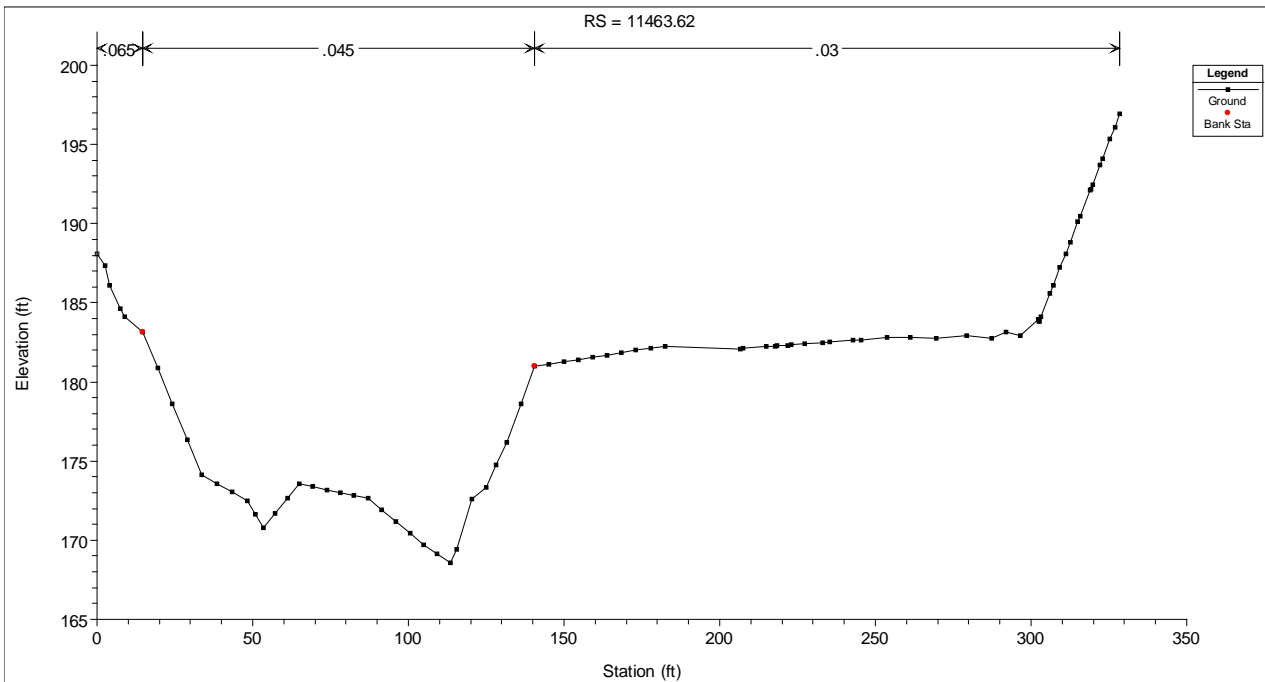
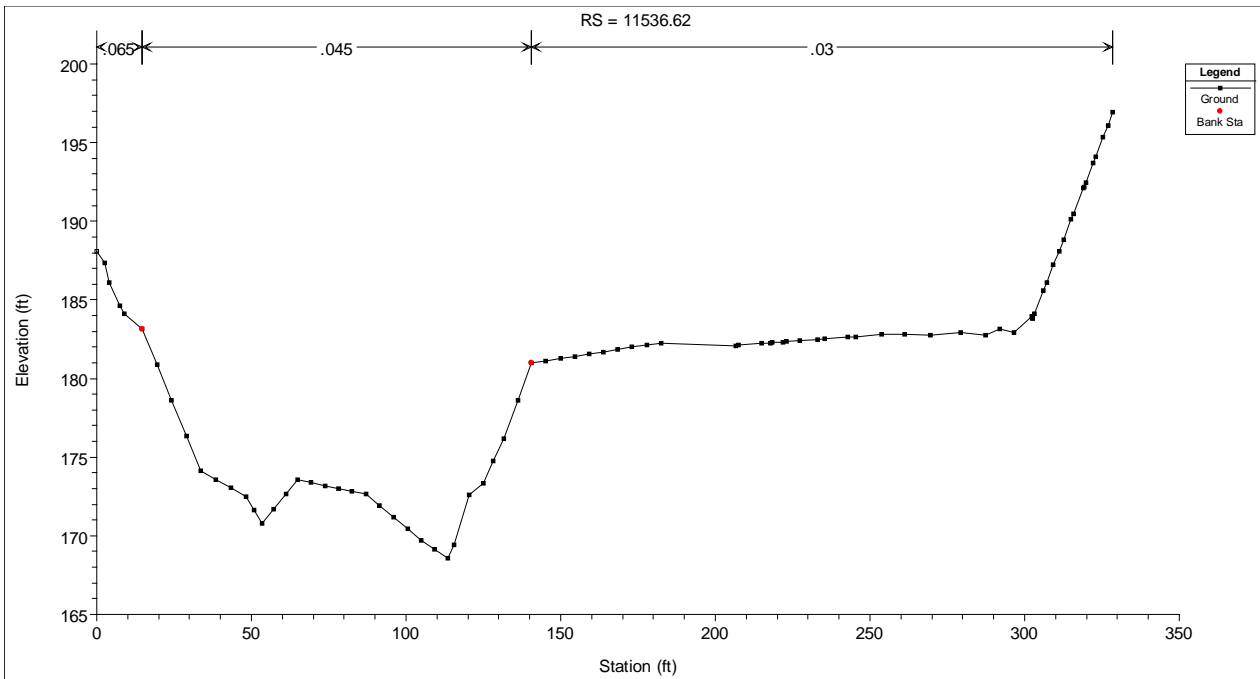


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 11413.6, 11363.62

Project No. 08-1032

Created By: LA

Figure 73



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

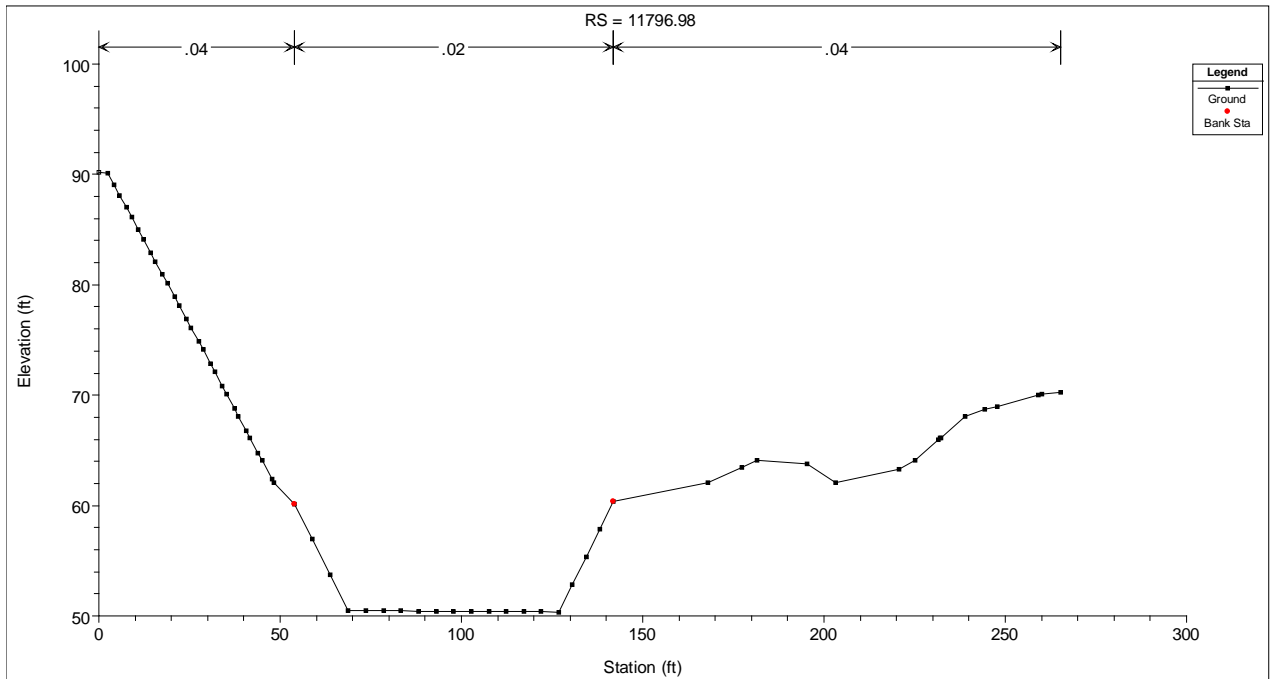
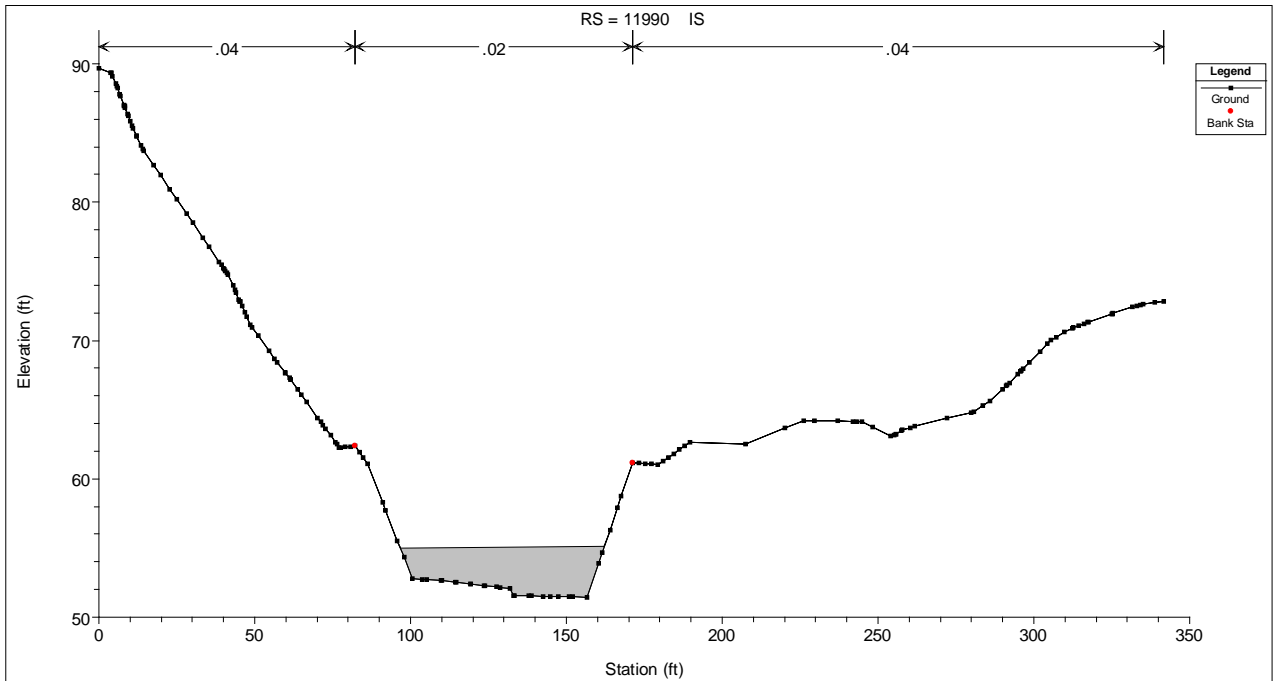


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 11536.62, 11463.62

Project No. 08-1032

Created By: LA

Figure 74



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

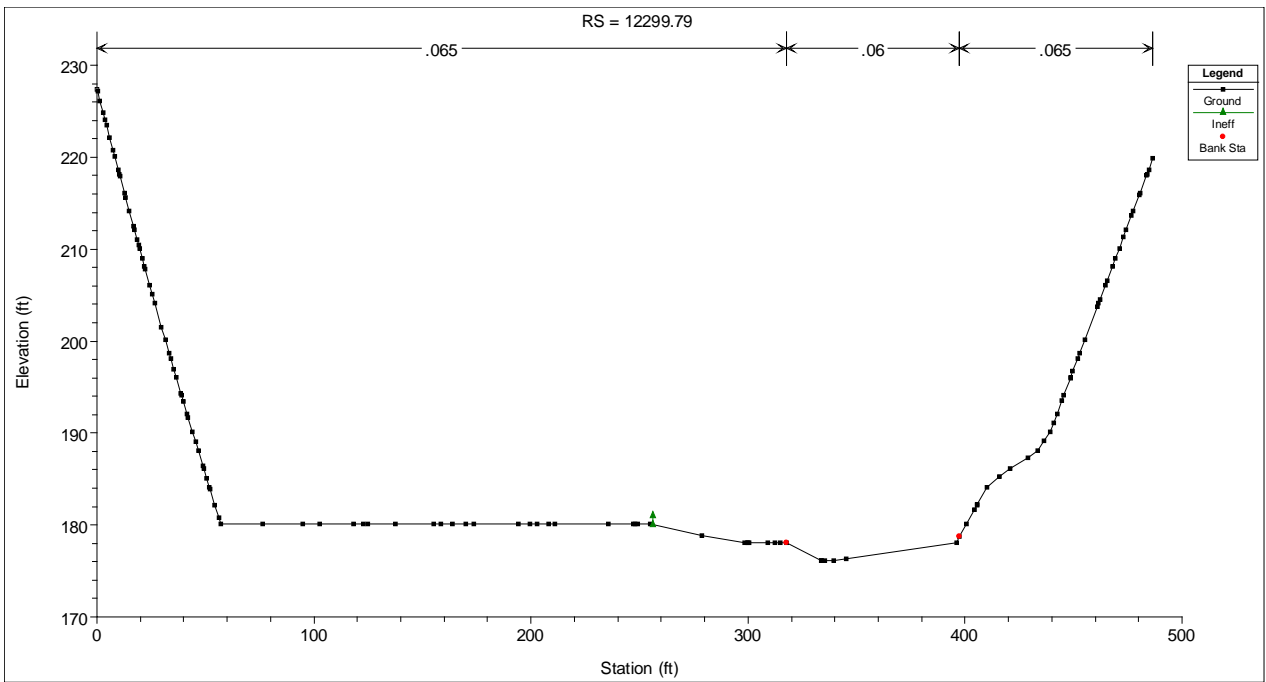
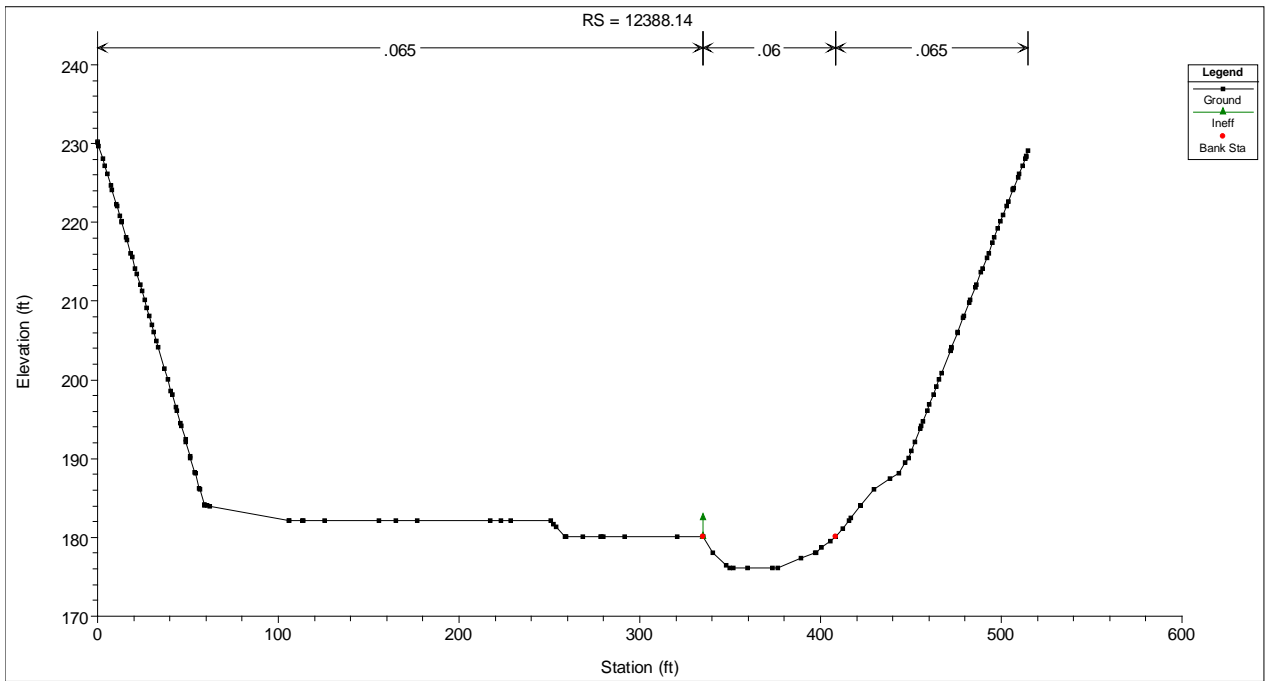


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 11990, 11796.98

Project No. 08-1032

Created By: LA

Figure 75



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

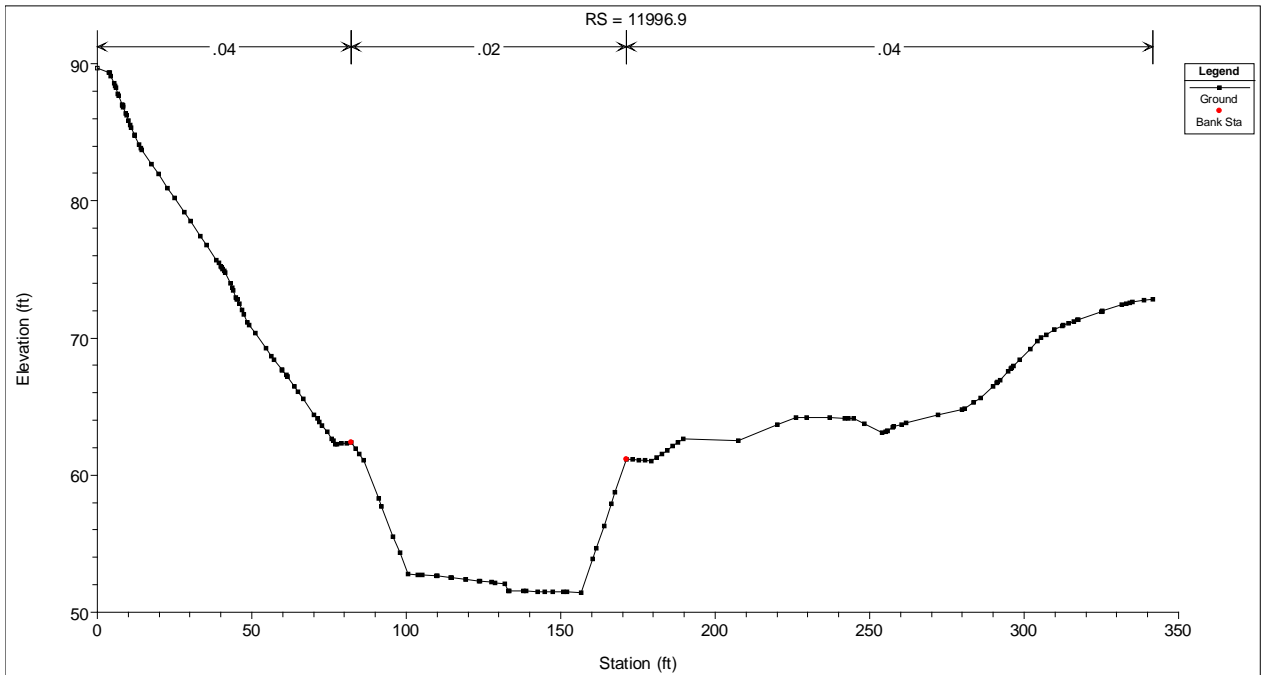
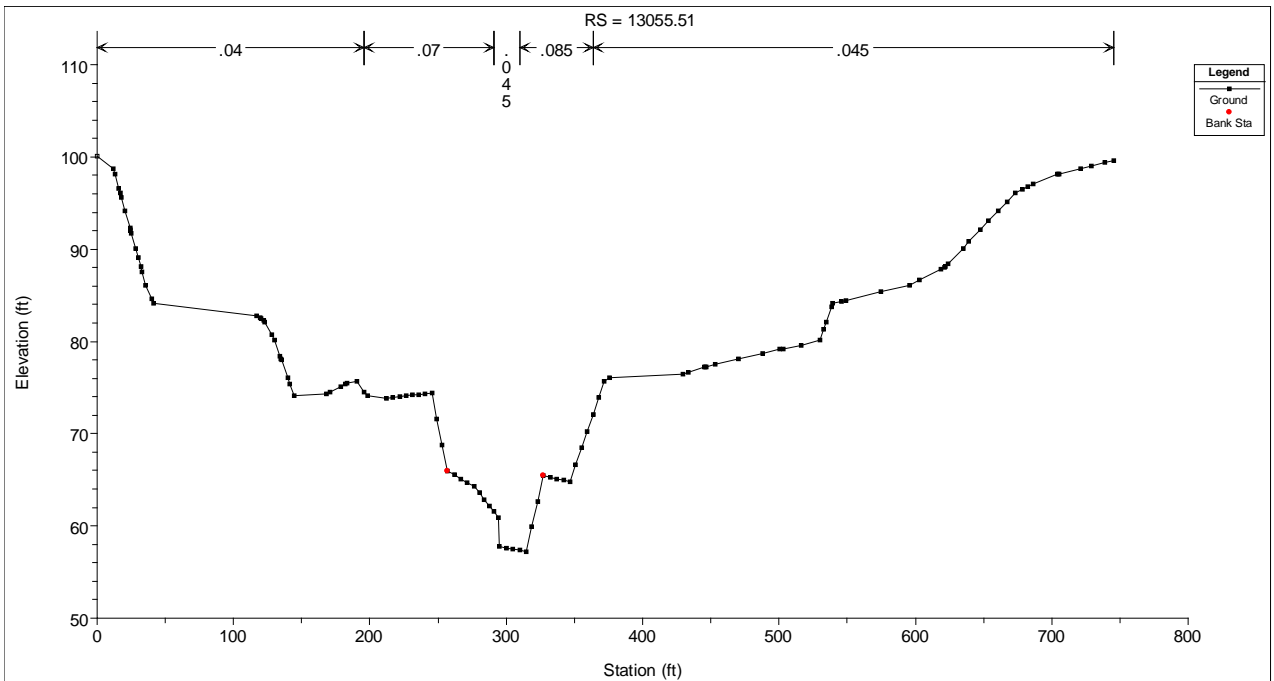


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 12388.14, 12299.79

Project No. 08-1032

Created By: LA

Figure 76



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

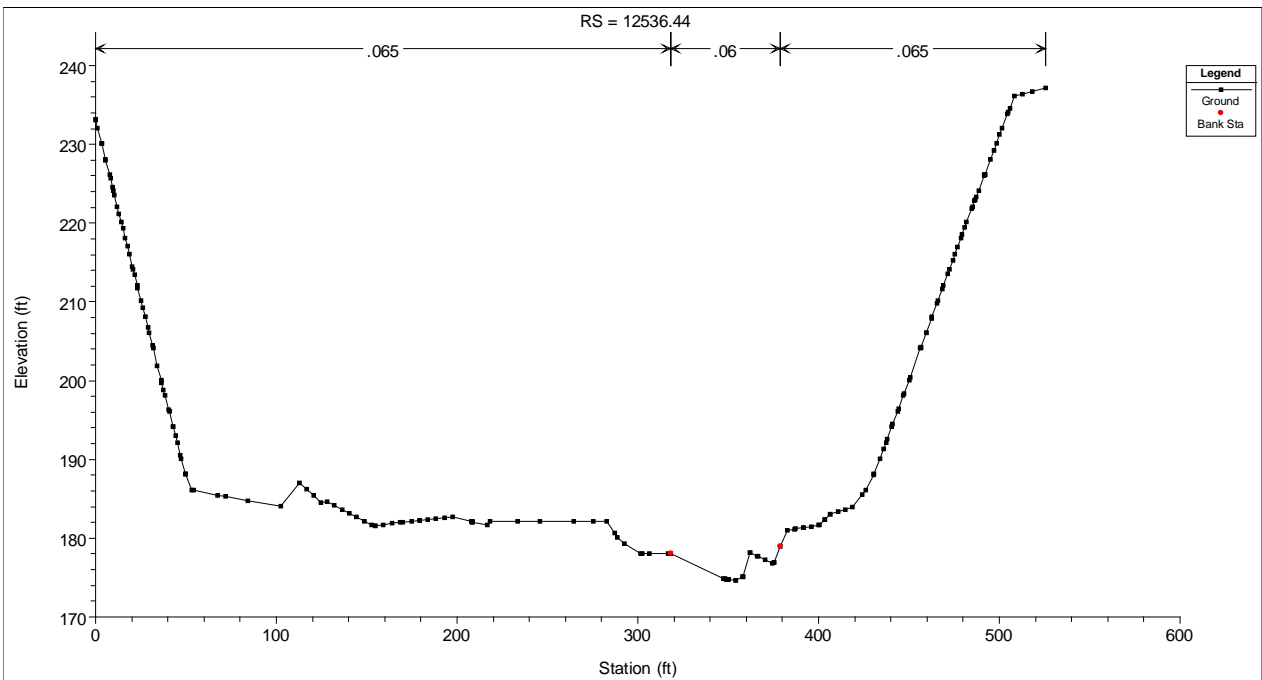
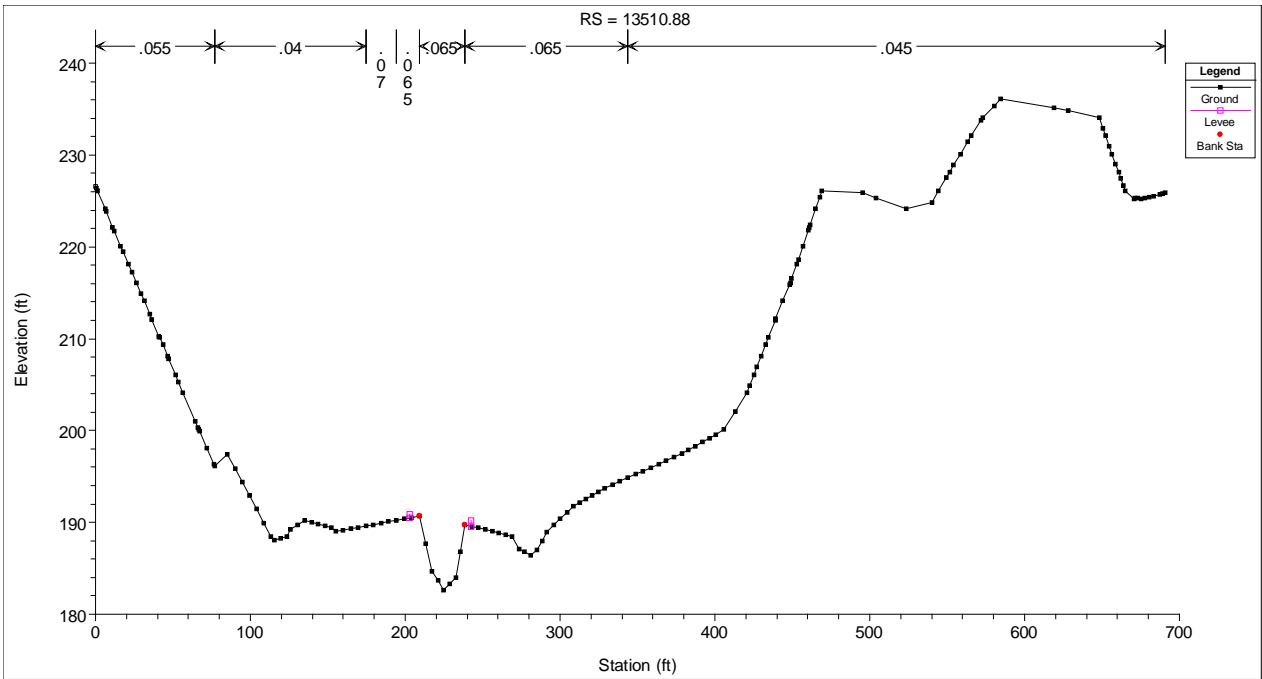


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 13055.51, 11996.9

Project No. 08-1032

Created By: LA

Figure 77



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

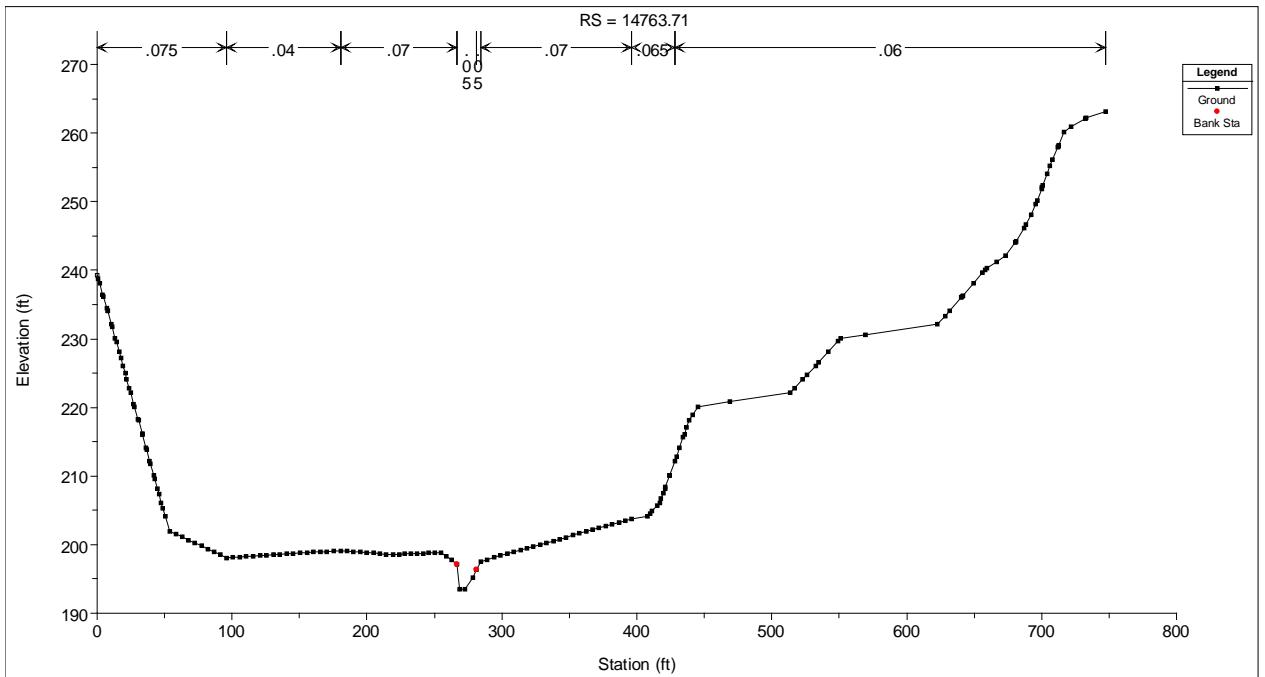
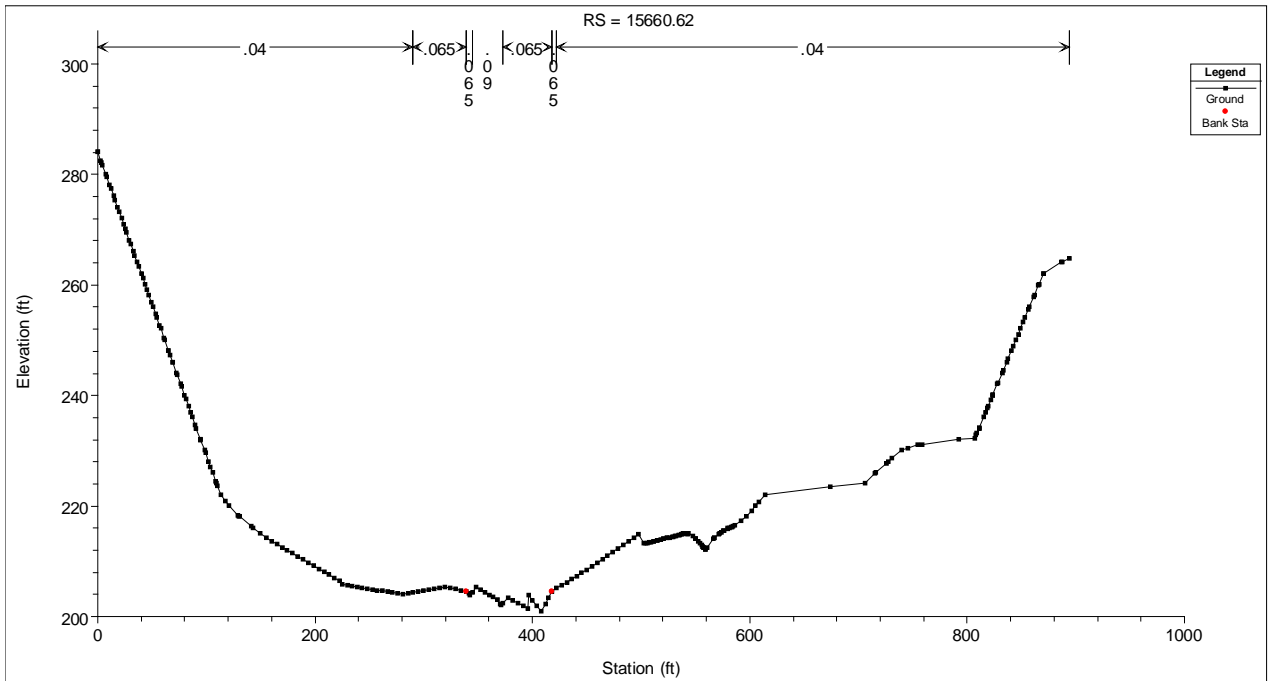


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 13510.88, 12536.44

Project No. 08-1032

Created By: LA

Figure 78



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

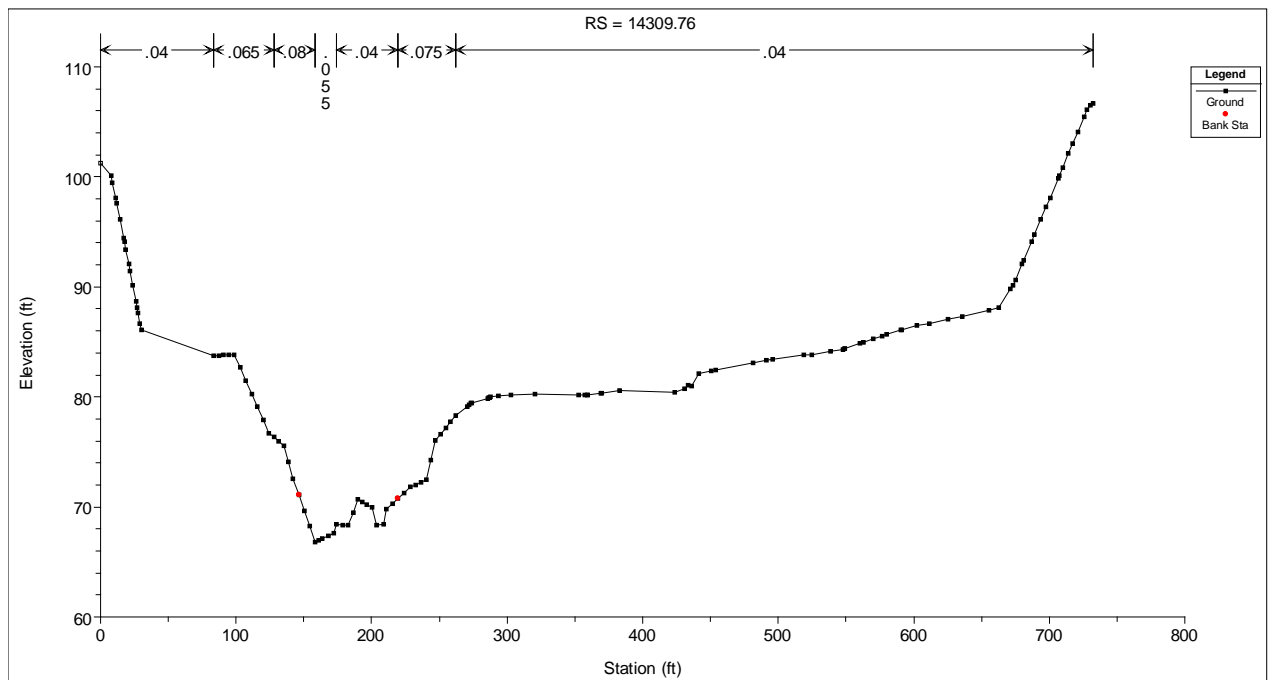
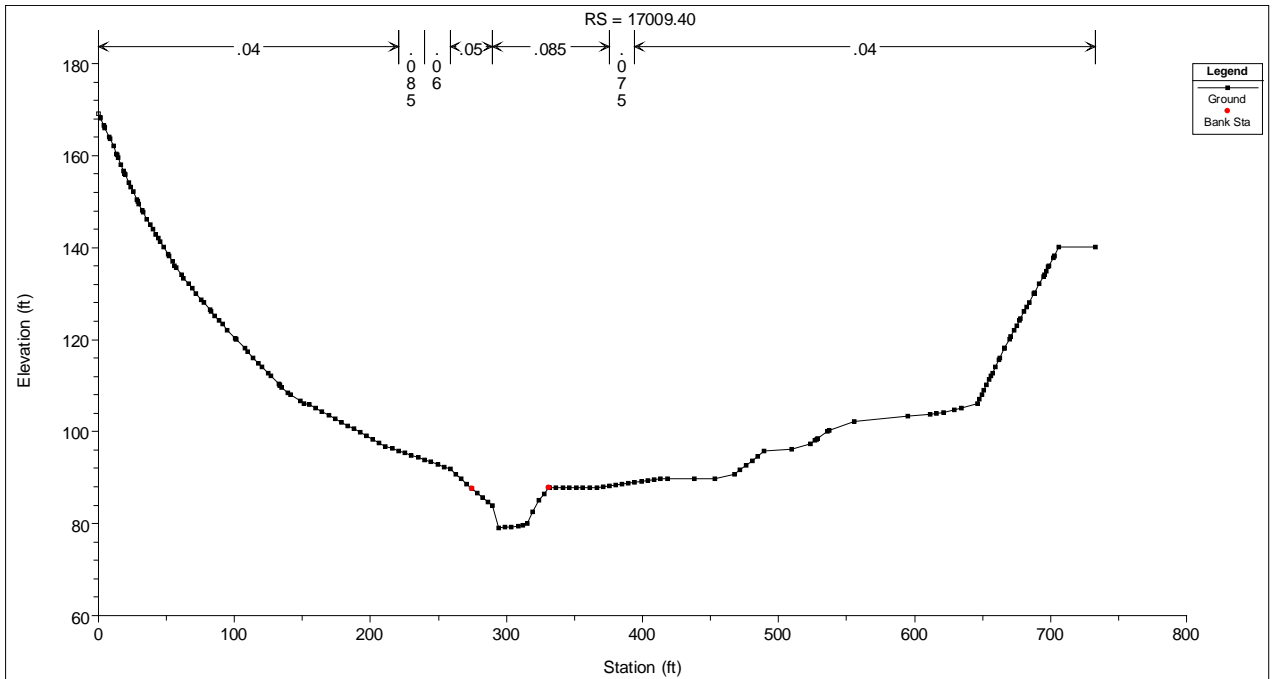


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 15660.62, 14763.71

Project No. 08-1032

Created By: LA

Figure 79



Notes: Modeled cross section for lower Rose Creek. Elevations reference the NAVD88 datum.

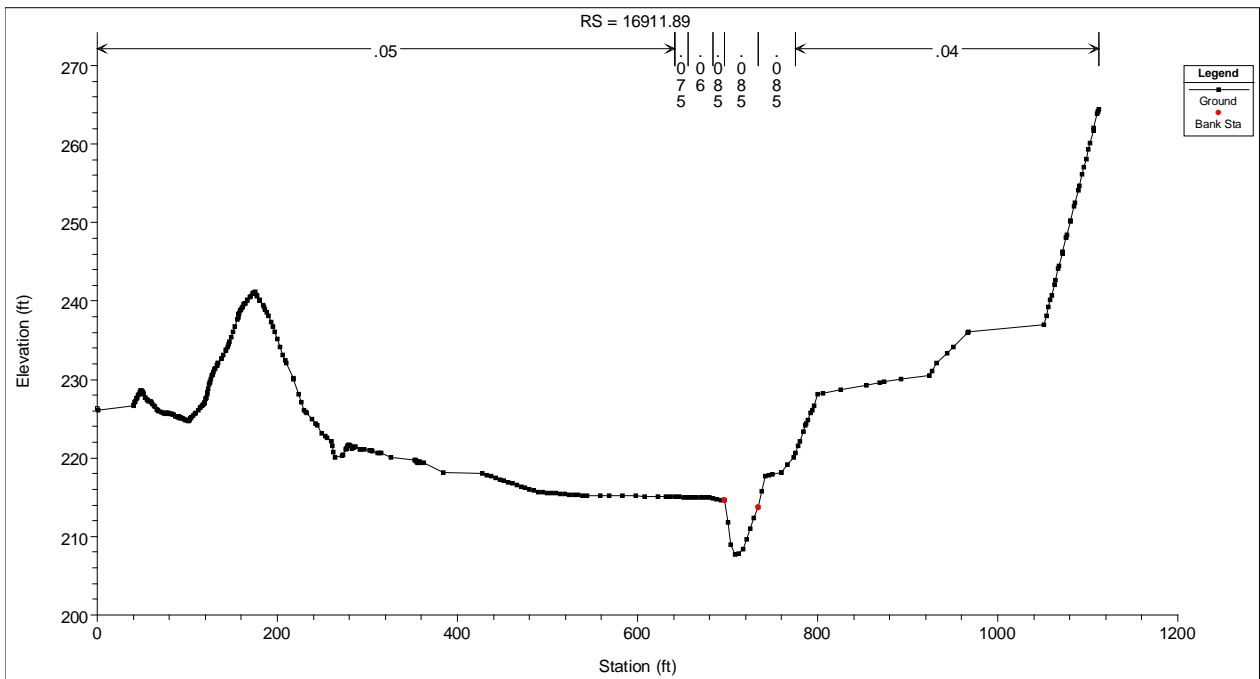
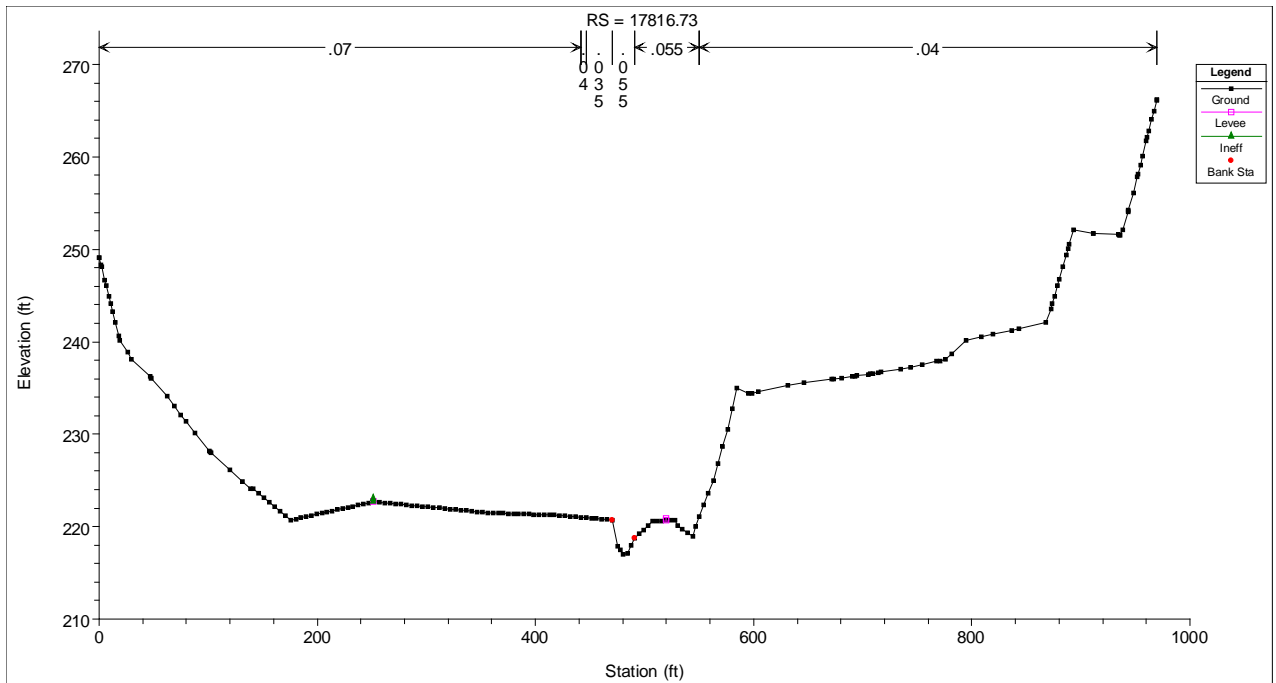


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 17009.40, 14309.76

Project No. 08-1032

Created By: LA

Figure 80



Notes: Modeled cross section for San Clemente Creek. Elevations reference the NAVD88 datum.

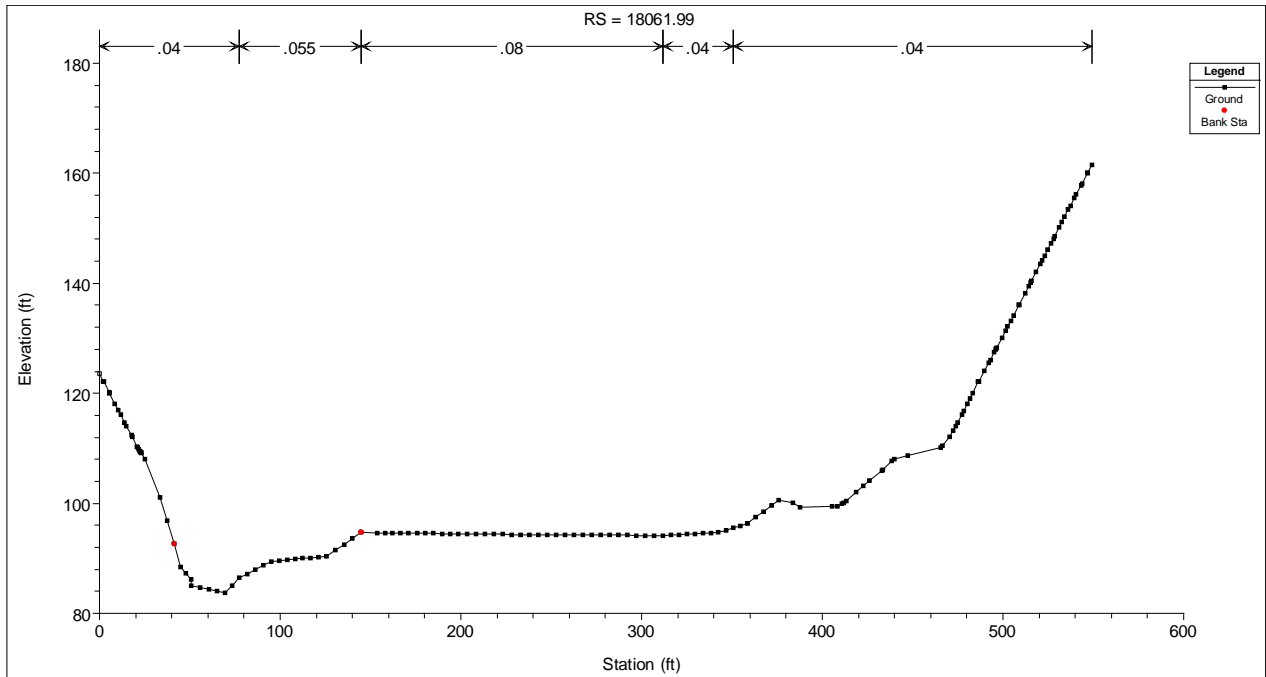
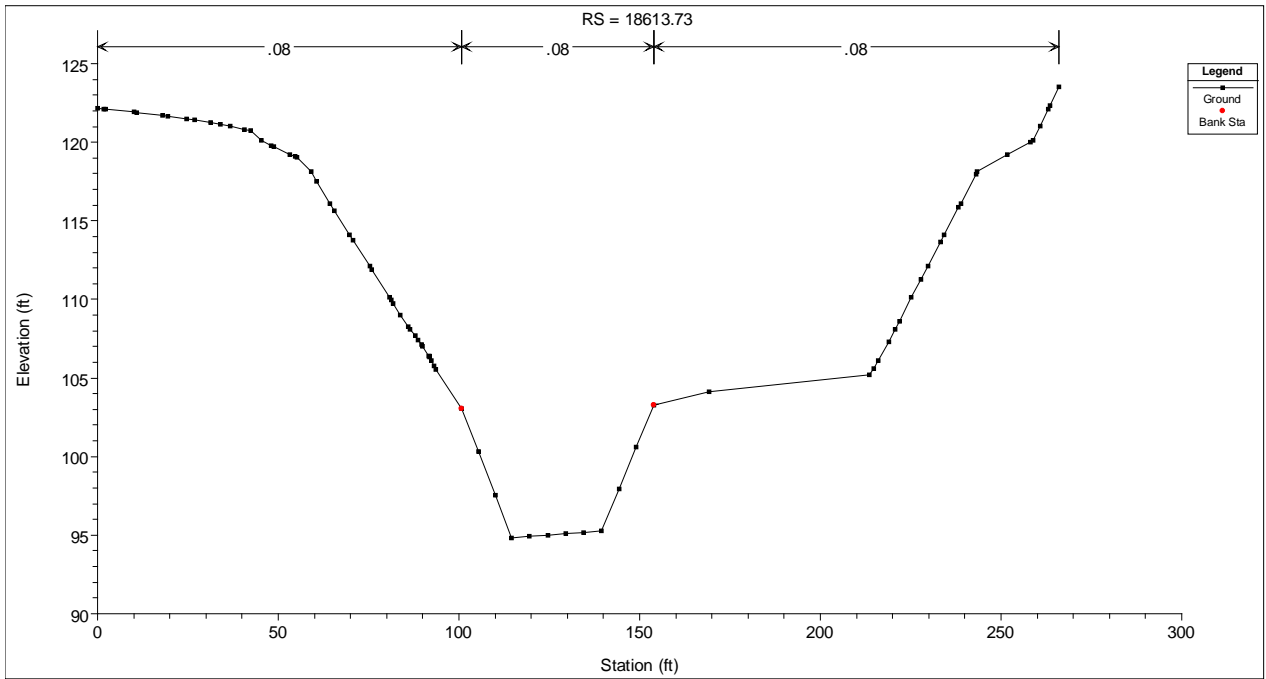


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 17816.73, 16911.89

Project No. 08-1032

Created By: LA

Figure 81



Notes: Modeled cross section for upper and lower Rose Creek. Elevations reference the NAVD88 datum.

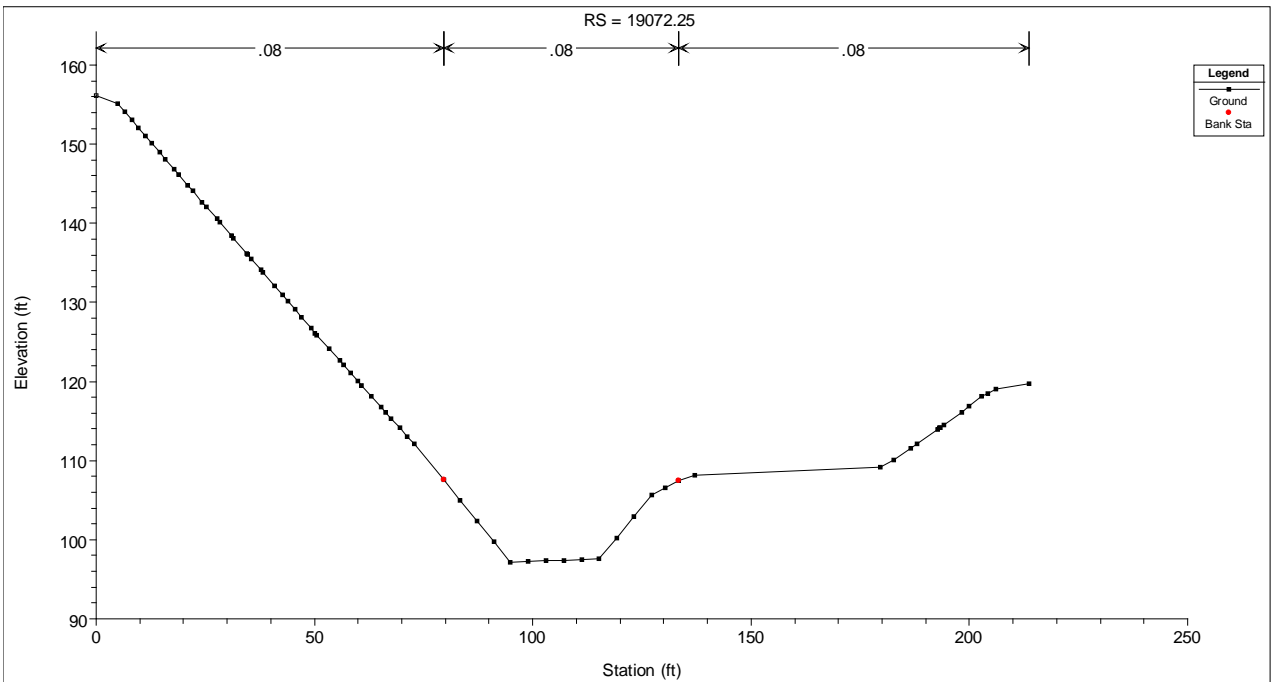
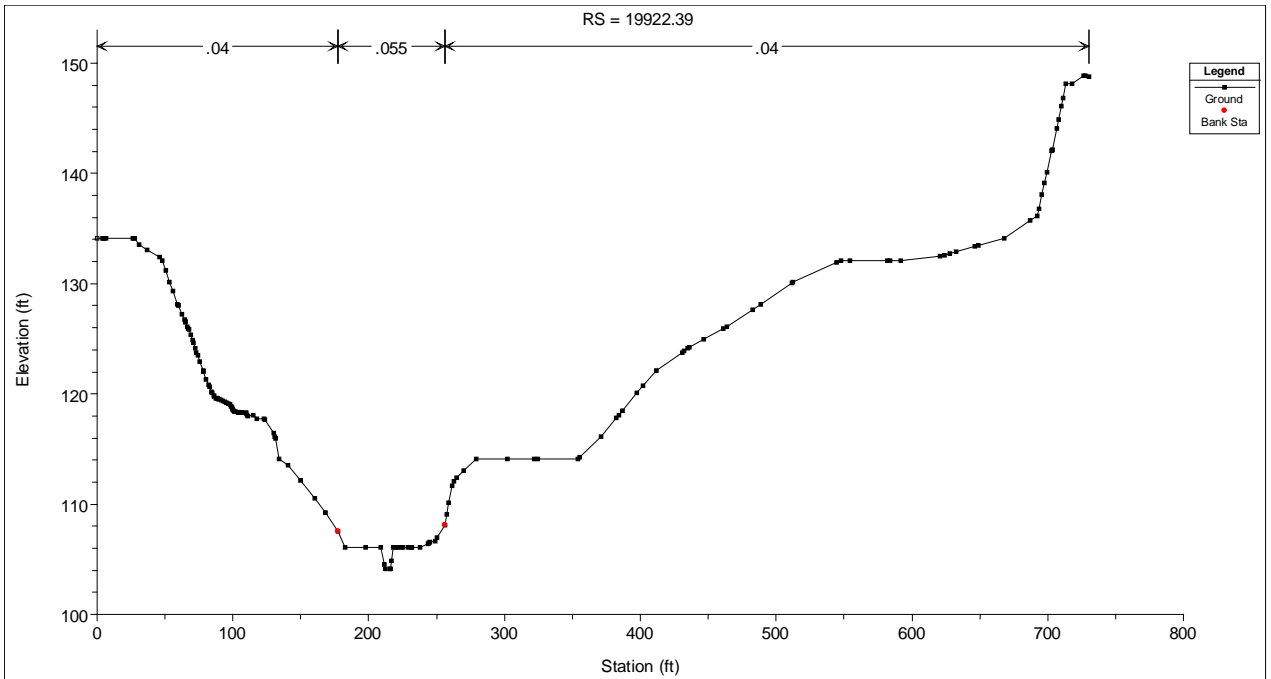


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 18613.73, 18061.99

Project No. 08-1032

Created By: LA

Figure 82



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

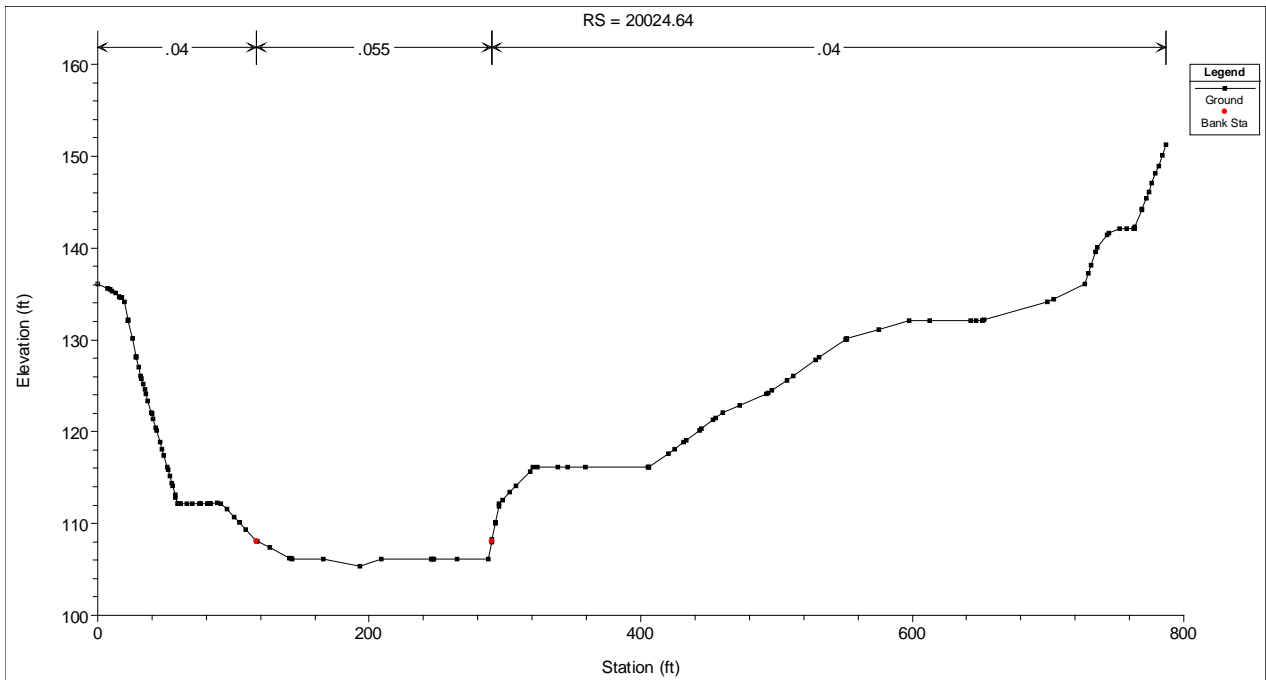
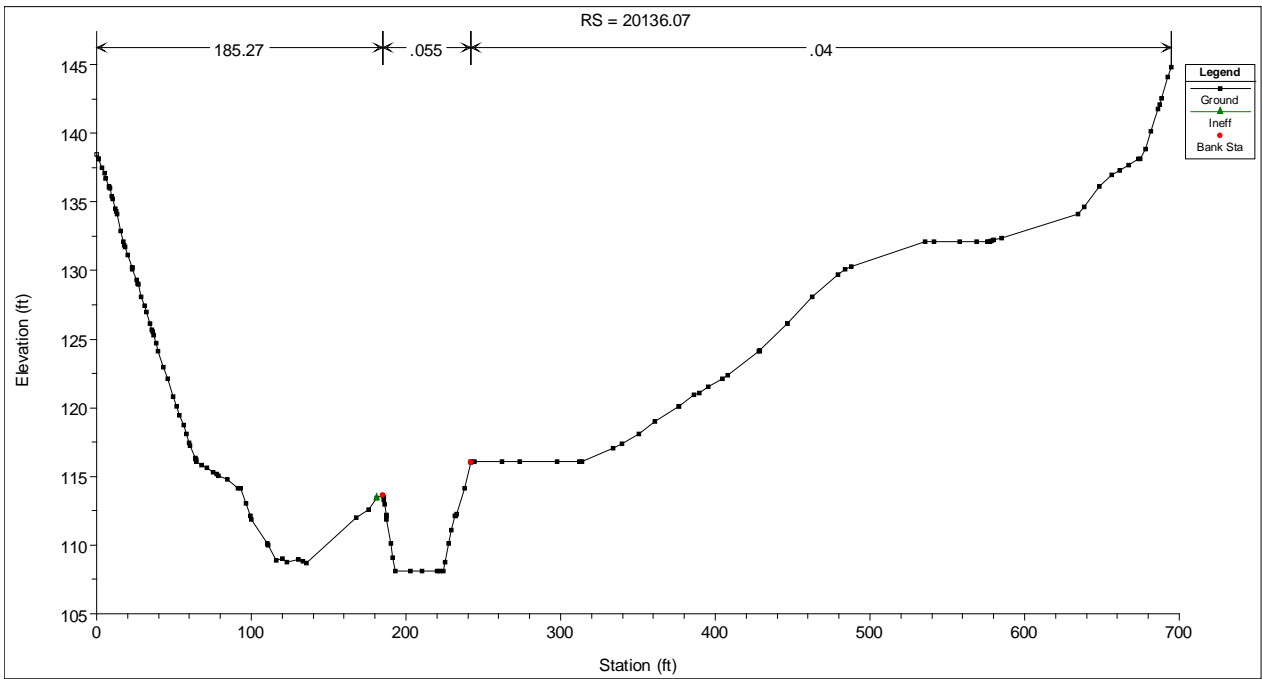


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 19922.39, 19072.25

Project No. 08-1032

Created By: LA

Figure 83



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

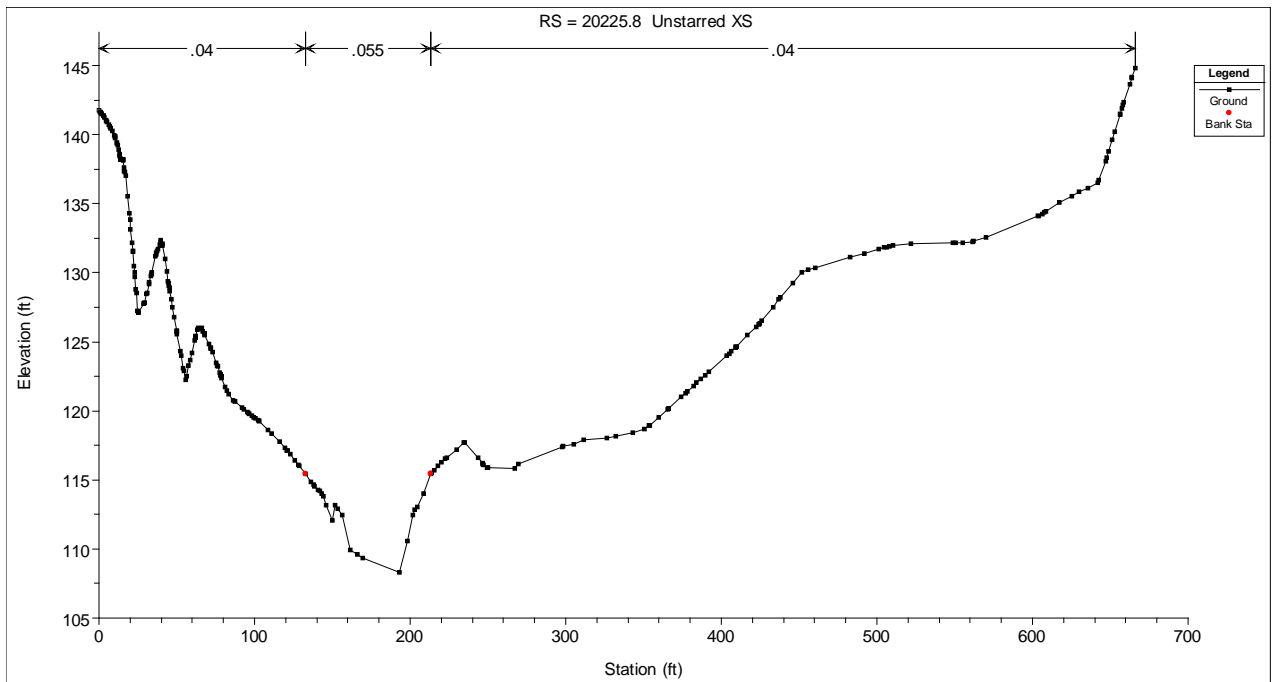
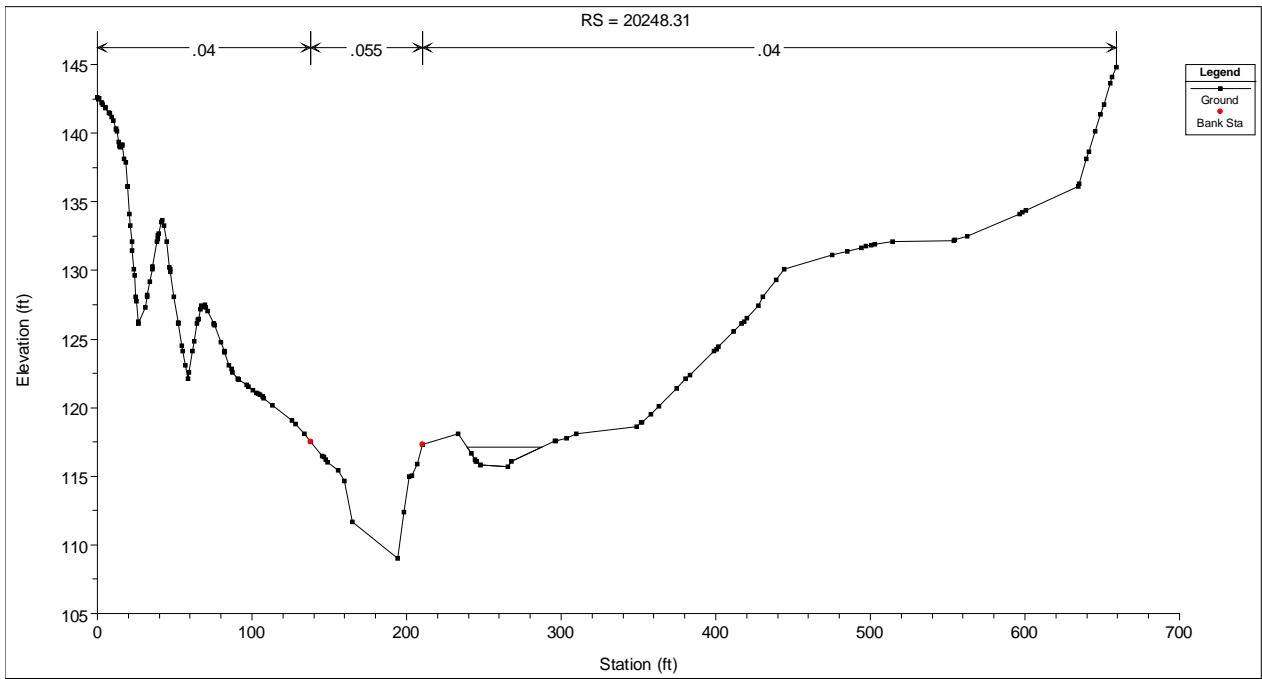


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 20136.07, 20024.64

Project No. 08-1032

Created By: LA

Figure 84



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

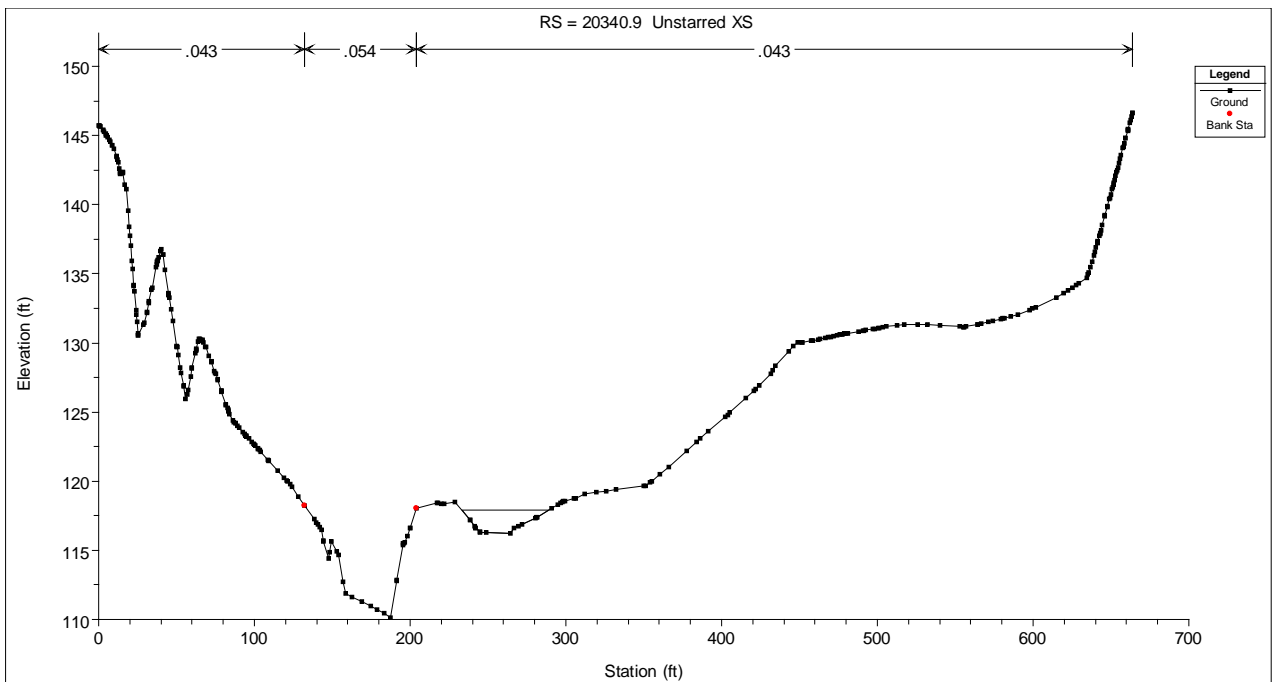
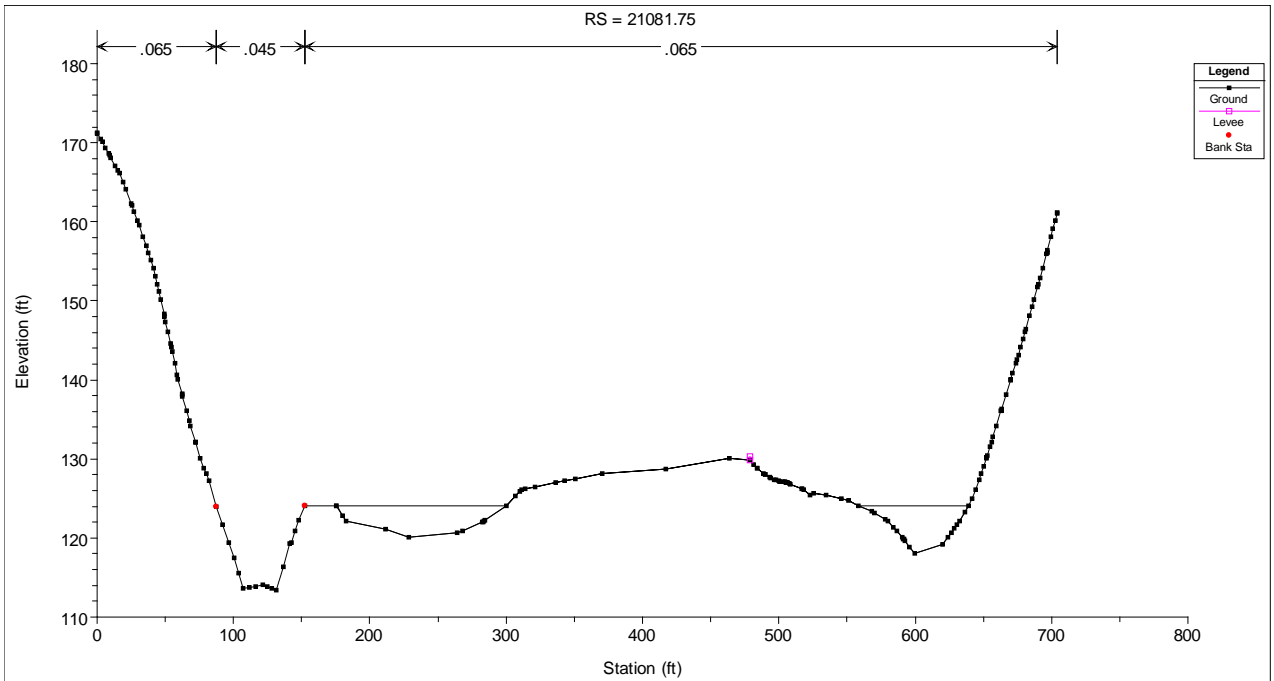


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 20248.31, 20225.8

Project No. 08-1032

Created By: LA

Figure 85



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

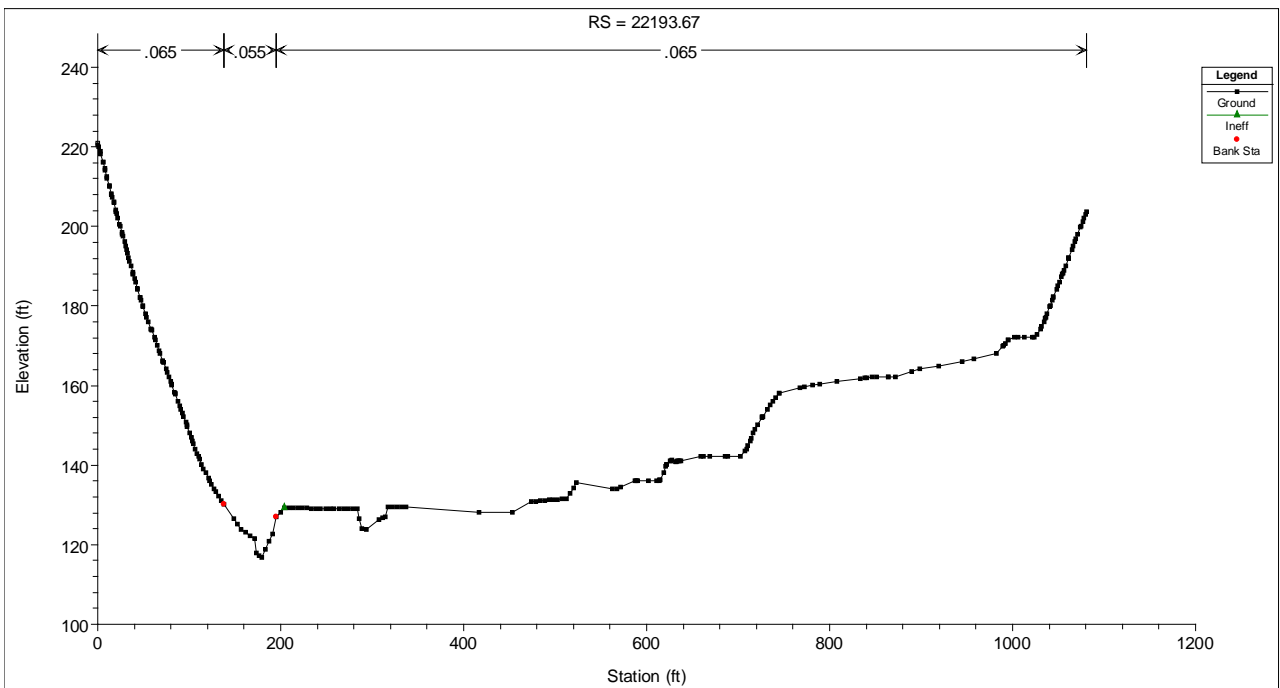
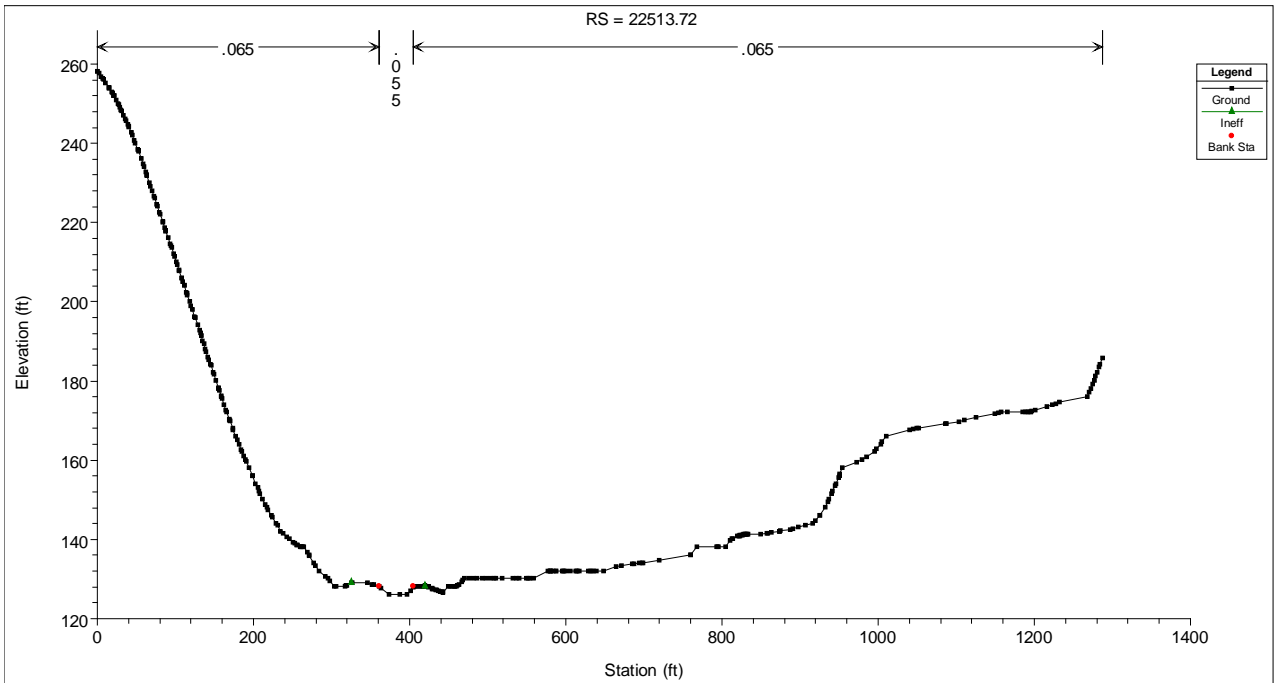


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 21081.57, 20340.9

Project No. 08-1032

Created By: LA

Figure 86



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

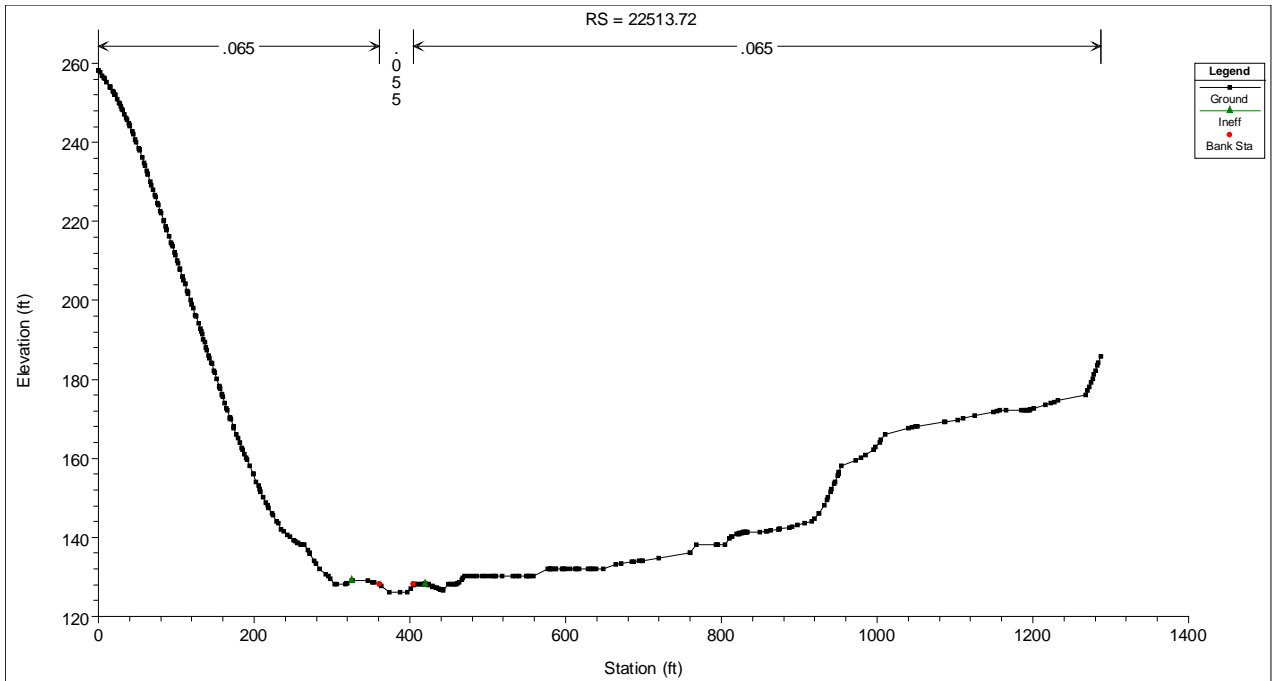
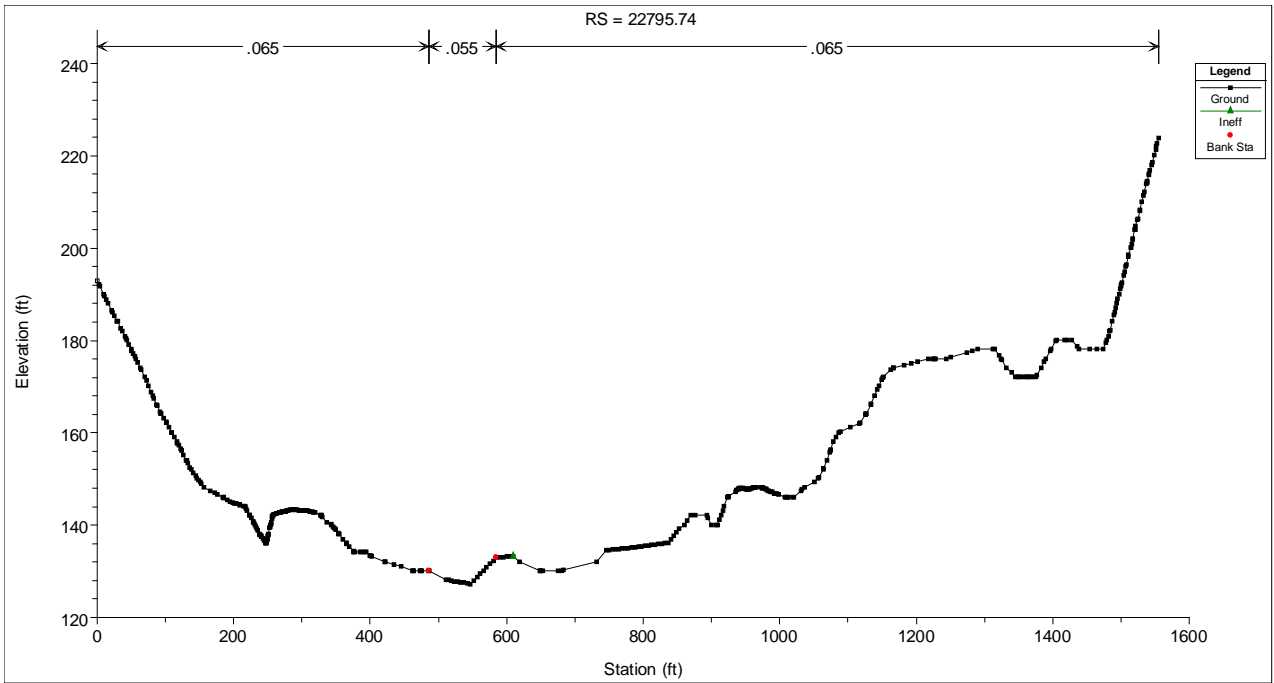


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 22513.72, 22193.67

Project No. 08-1032

Created By: LA

Figure 87



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

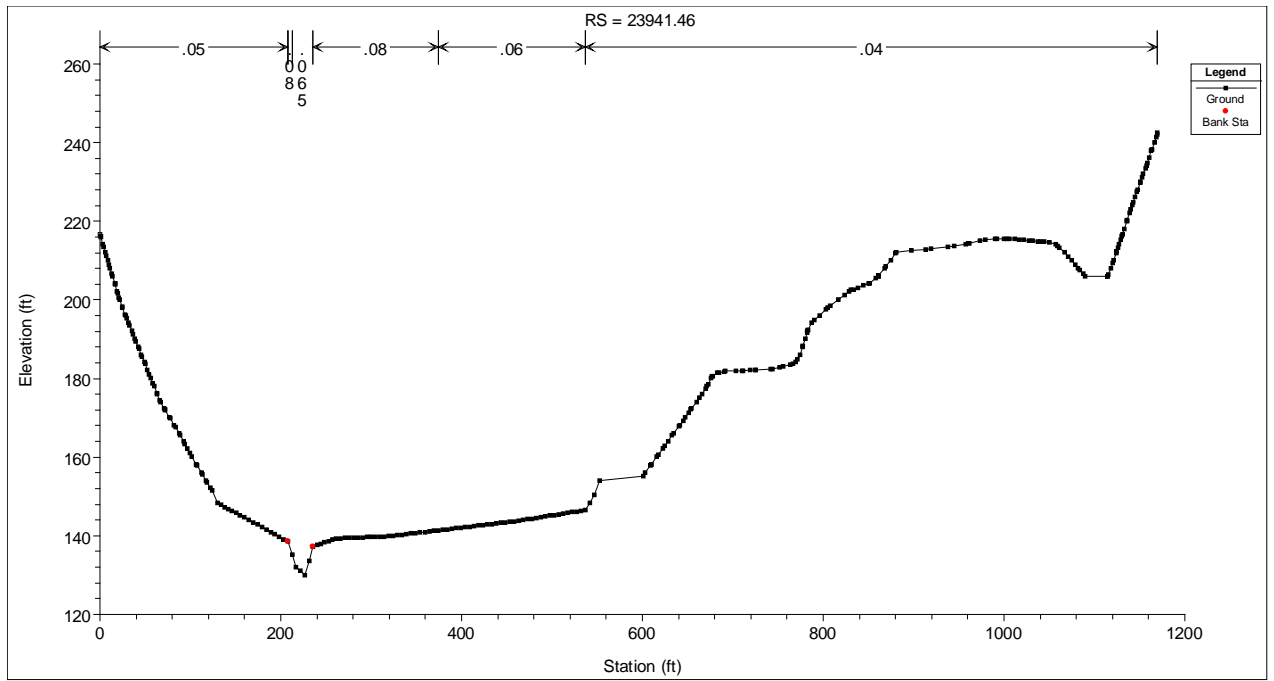
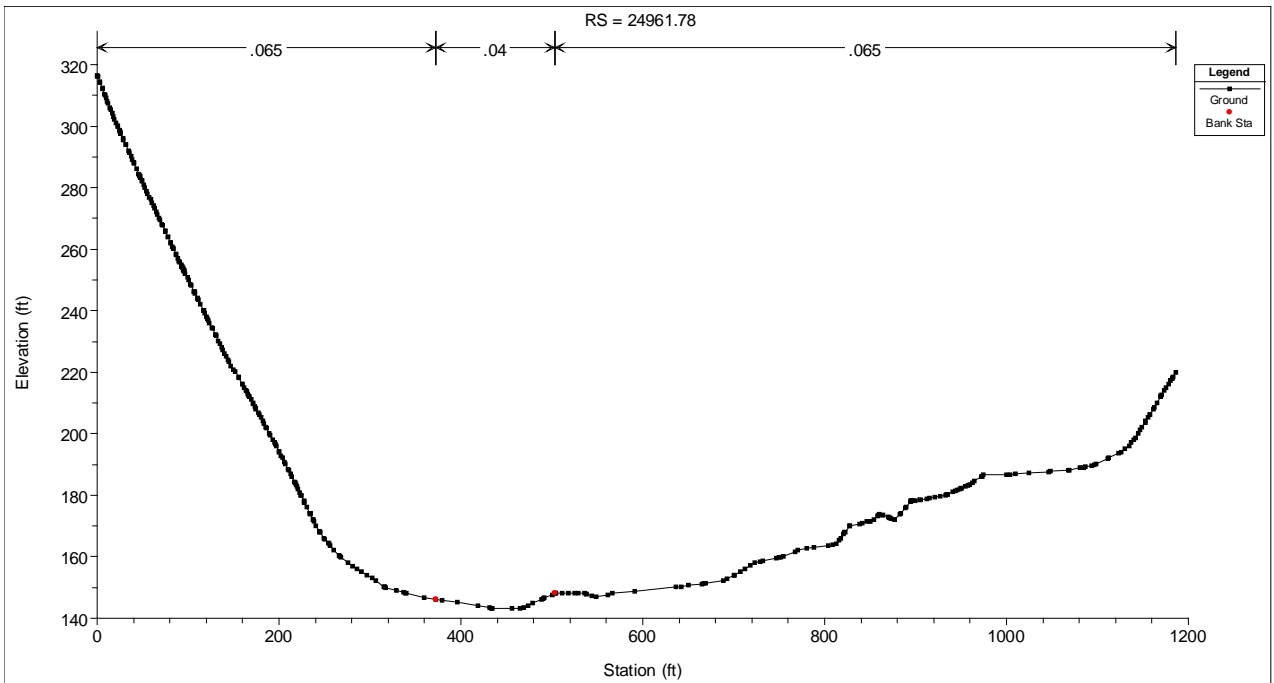


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 22795.74, 22513.72

Project No. 08-1032

Created By: LA

Figure 88



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

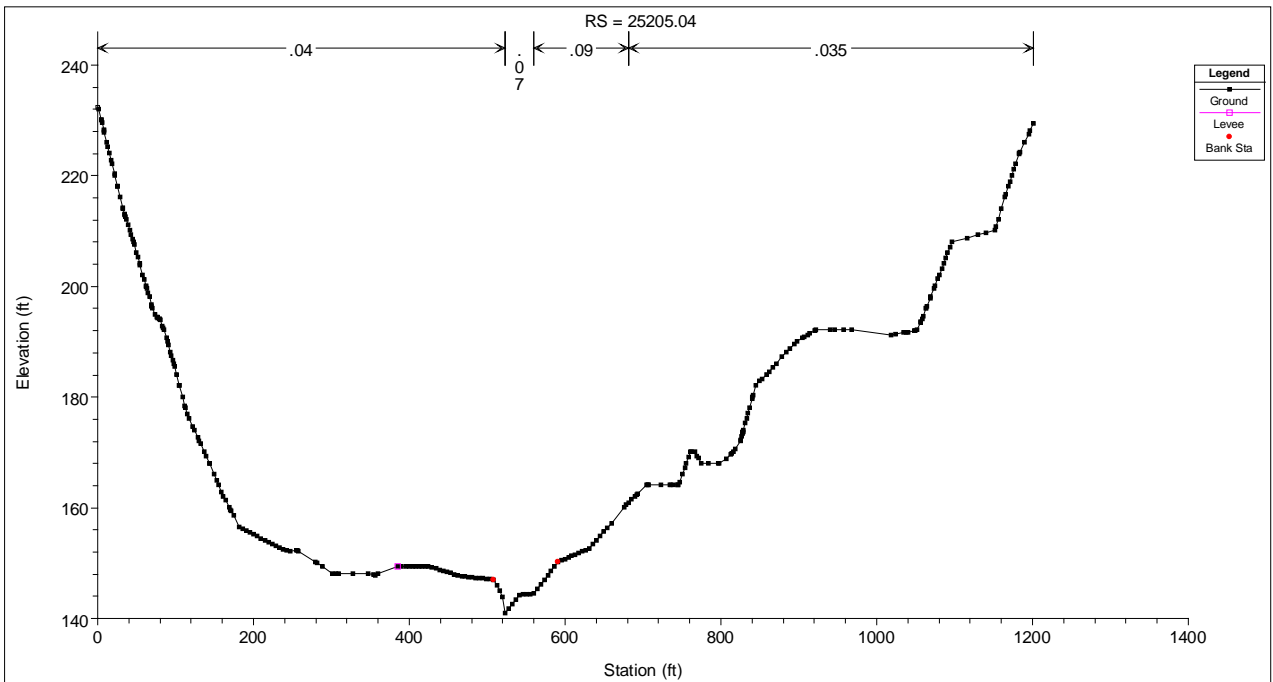
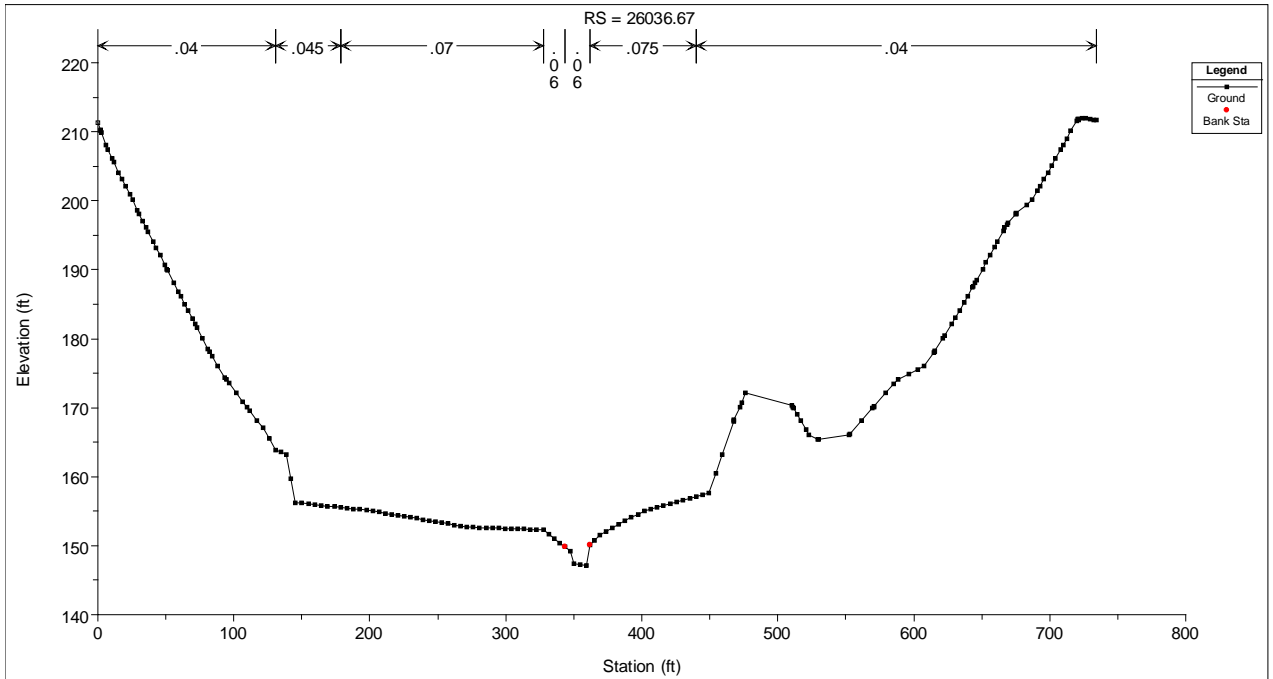


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 24961.78, 23941.46

Project No. 08-1032

Created By: LA

Figure 89



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

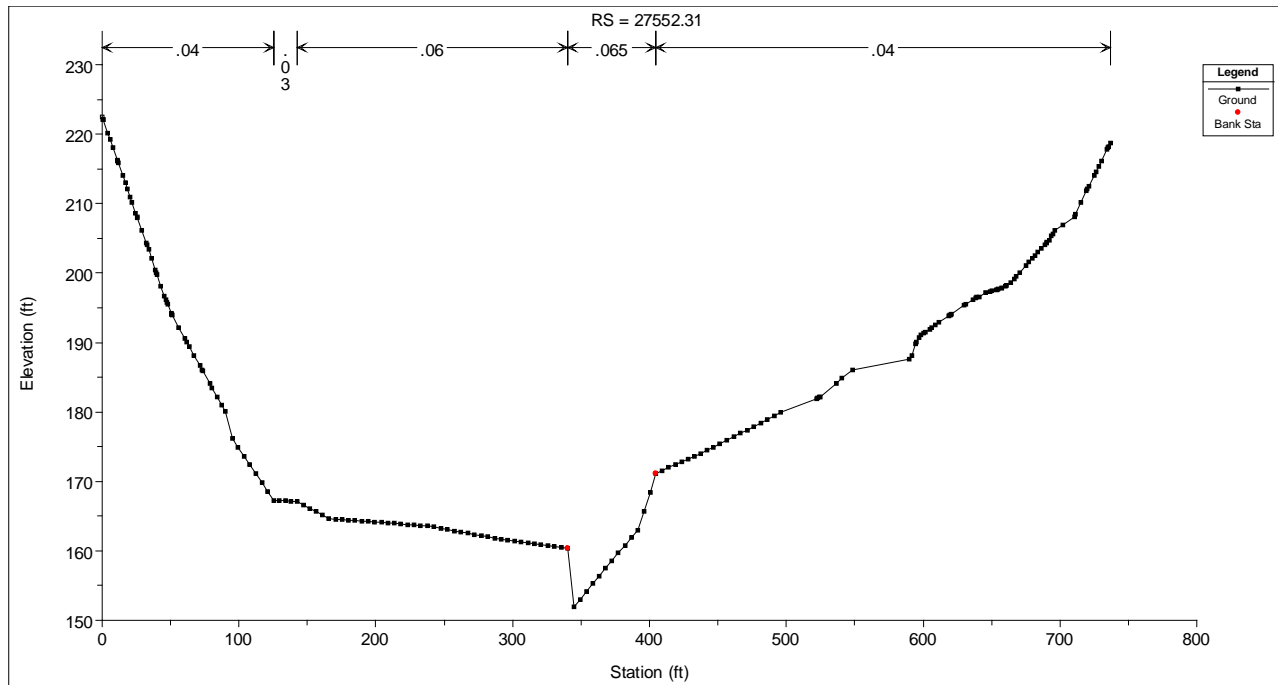
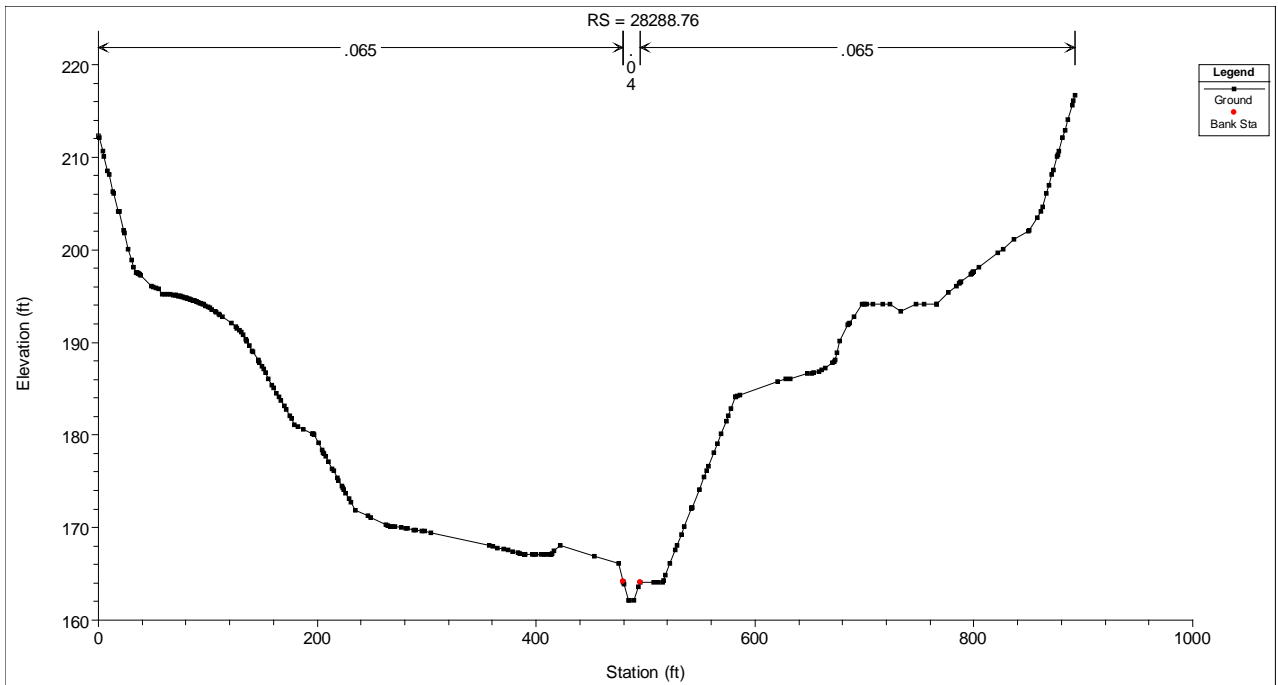


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 26036.67, 25205.04

Project No. 08-1032

Created By: LA

Figure 90



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

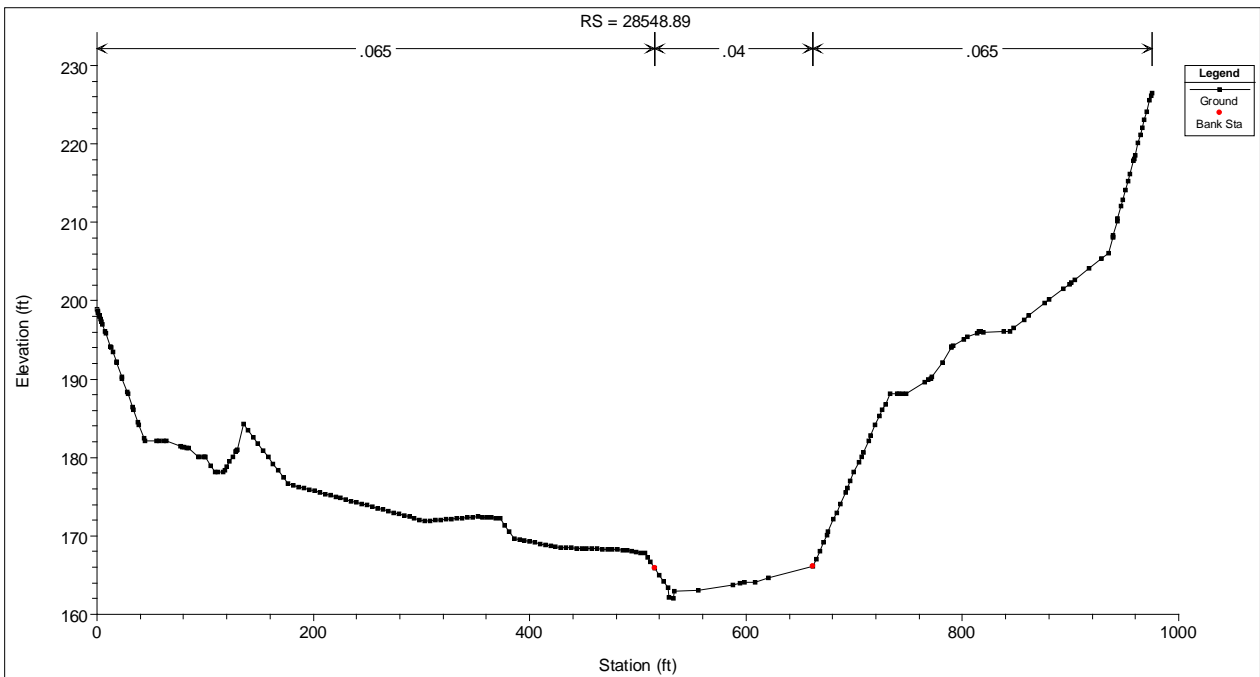
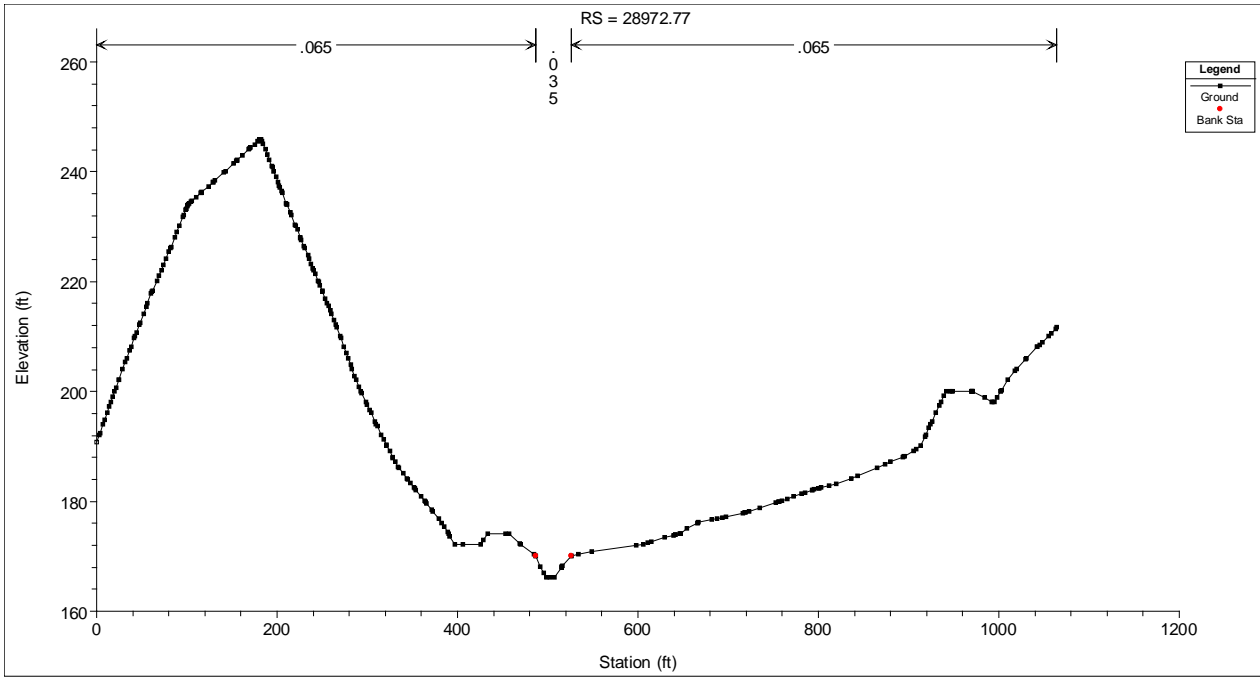


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 28288.76, 27552.31

Project No. 08-1032

Created By: LA

Figure 91



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

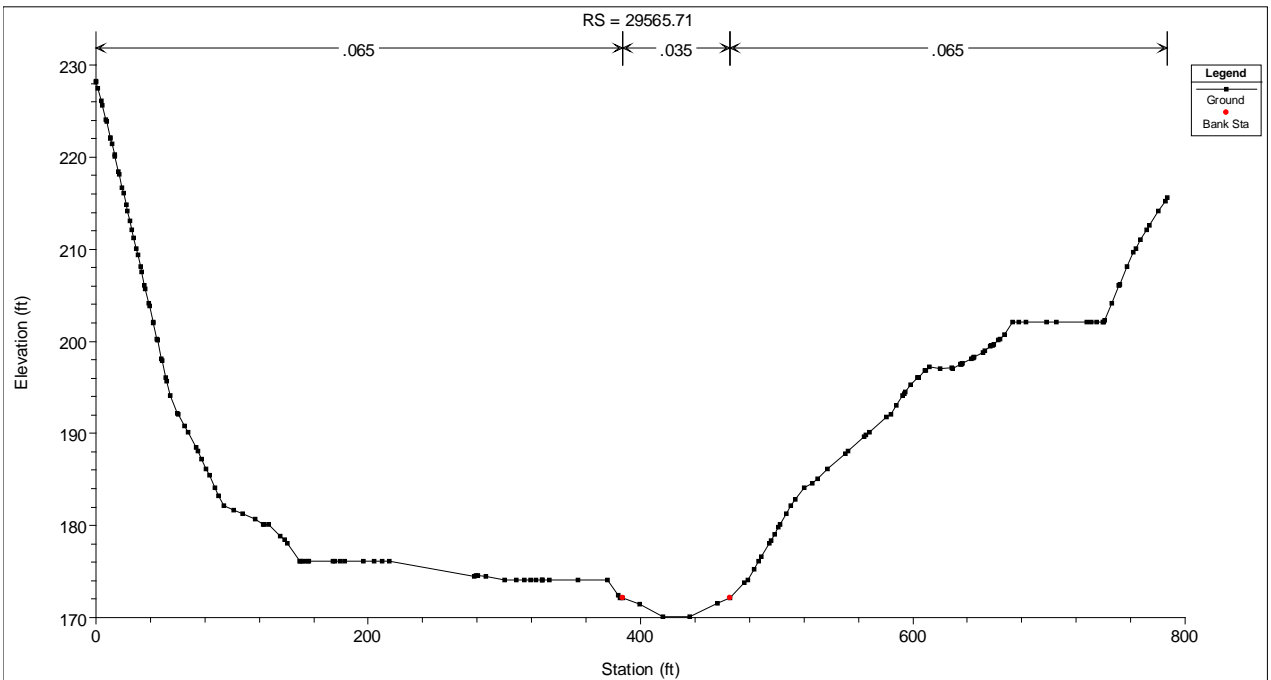
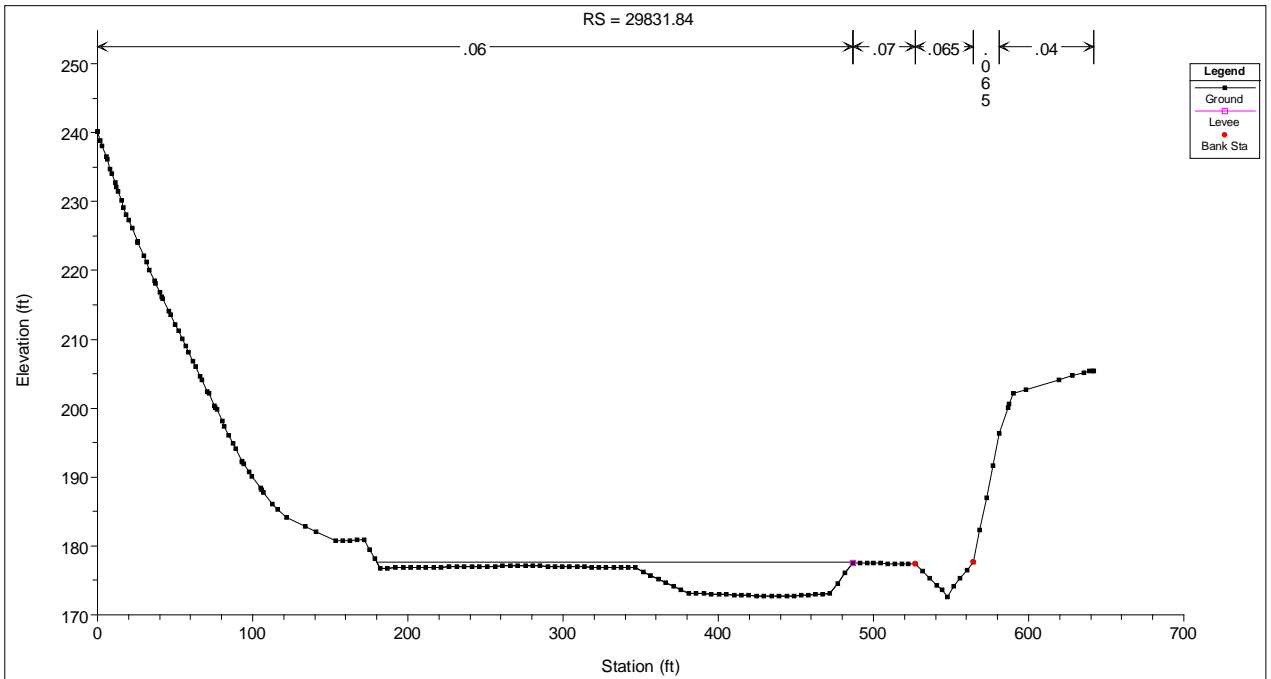


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 28972.77, 28548.89

Project No. 08-1032

Created By: LA

Figure 92



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

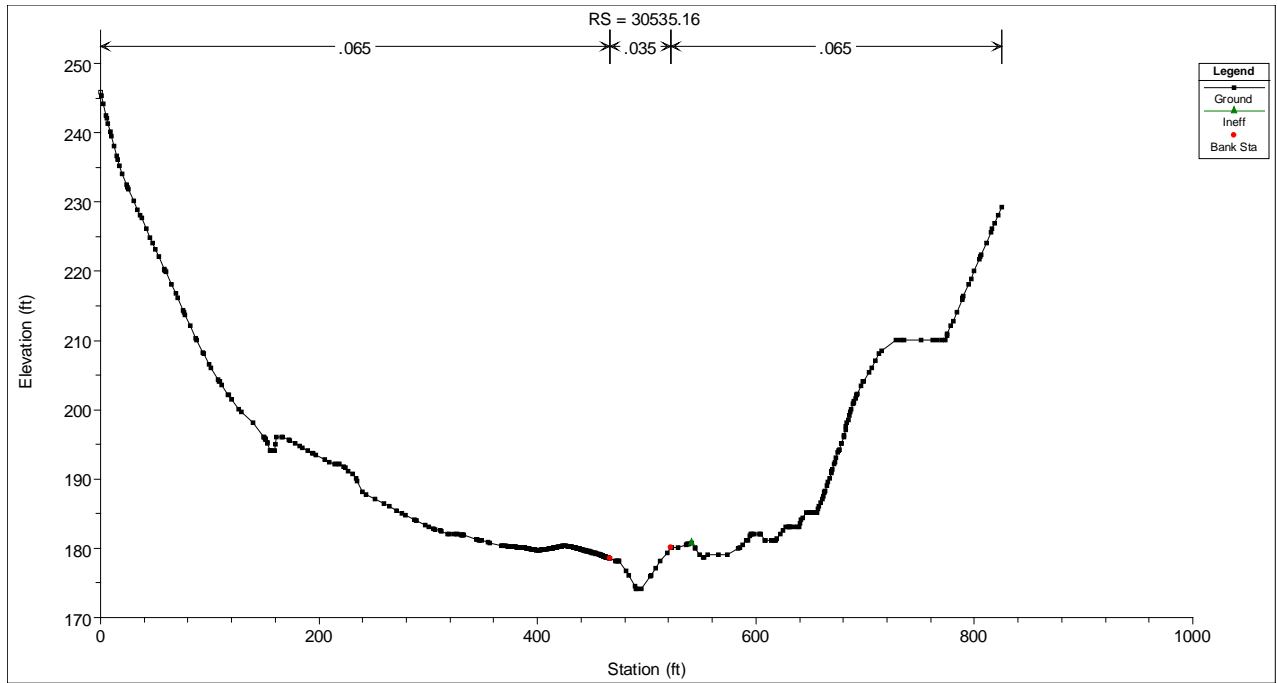
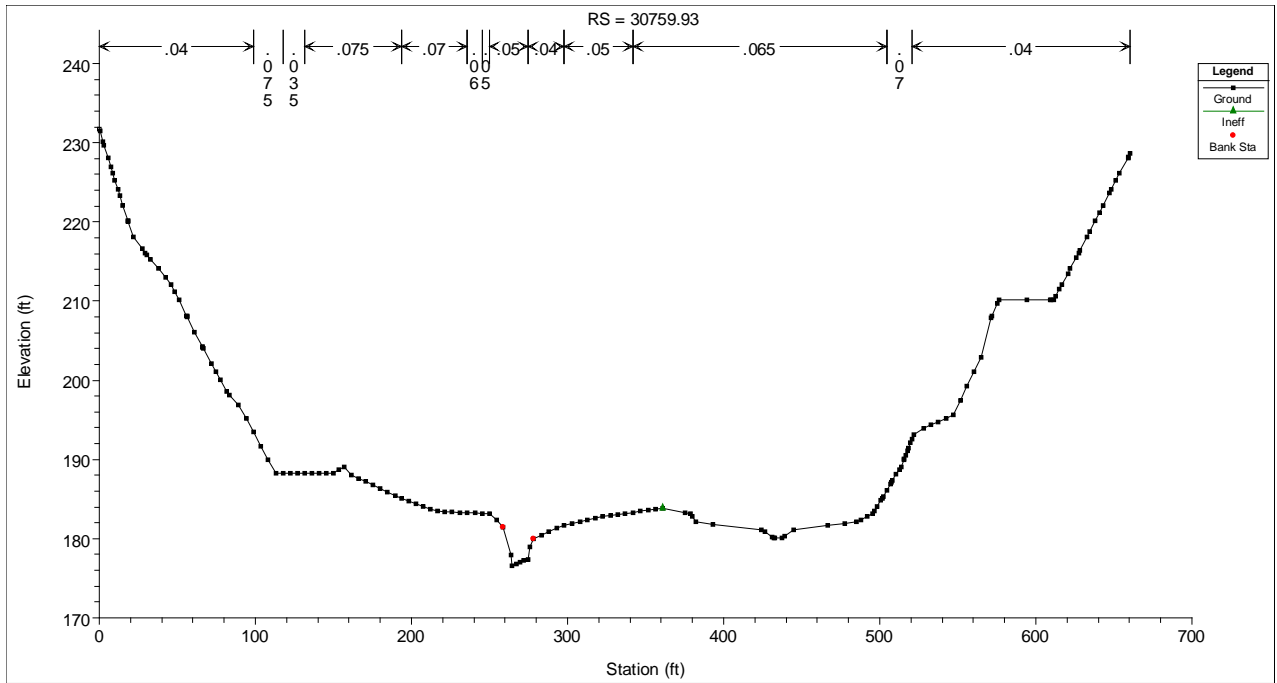


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 29831.84, 29565.71

Project No. 08-1032

Created By: LA

Figure 93



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

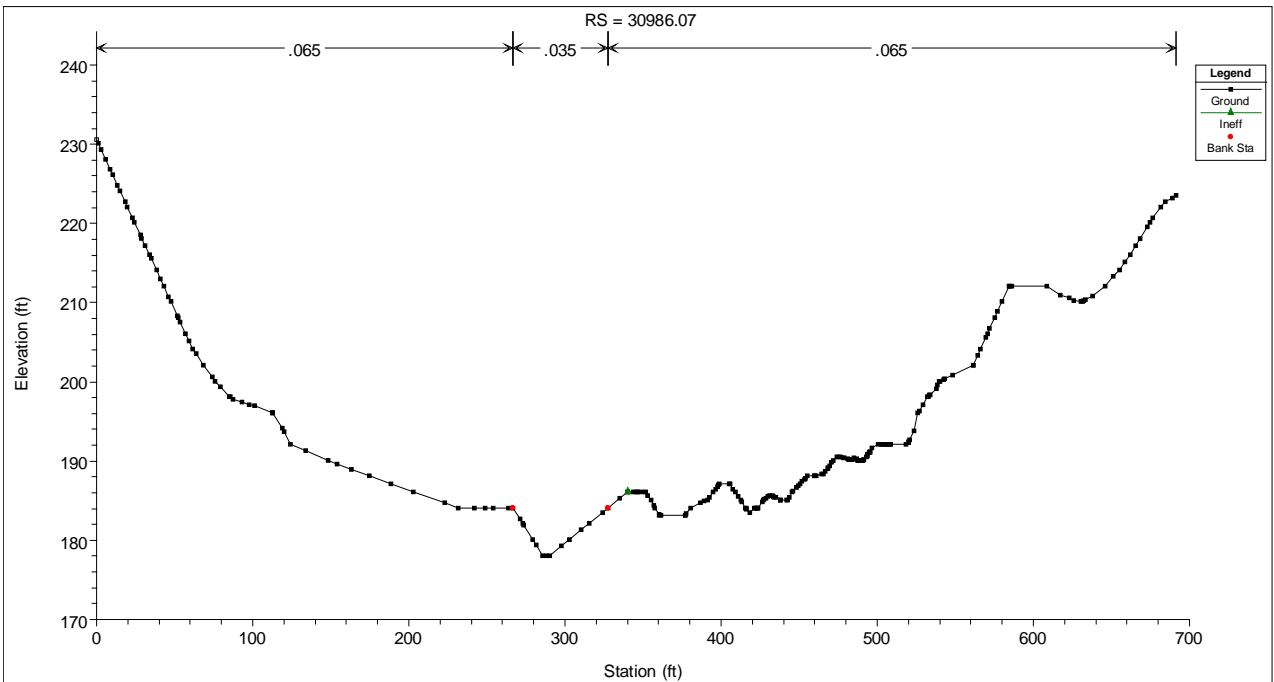
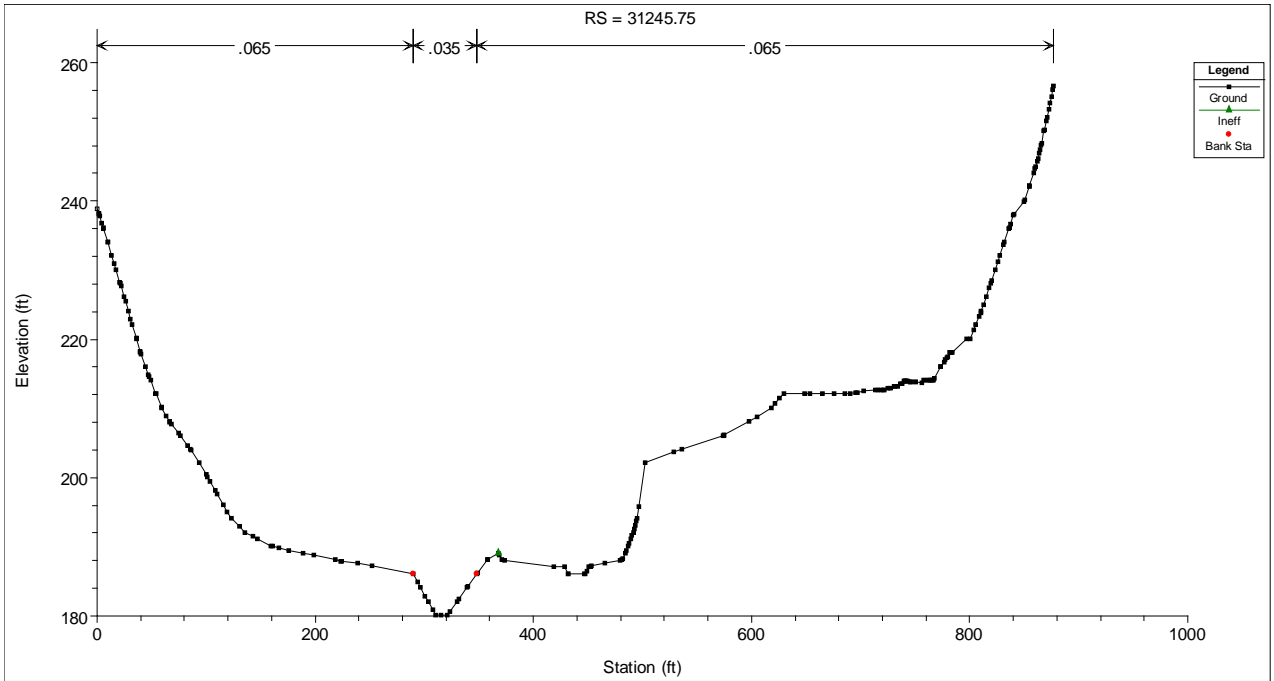


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 30759.93, 30535.16

Project No. 08-1032

Created By: LA

Figure 94



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

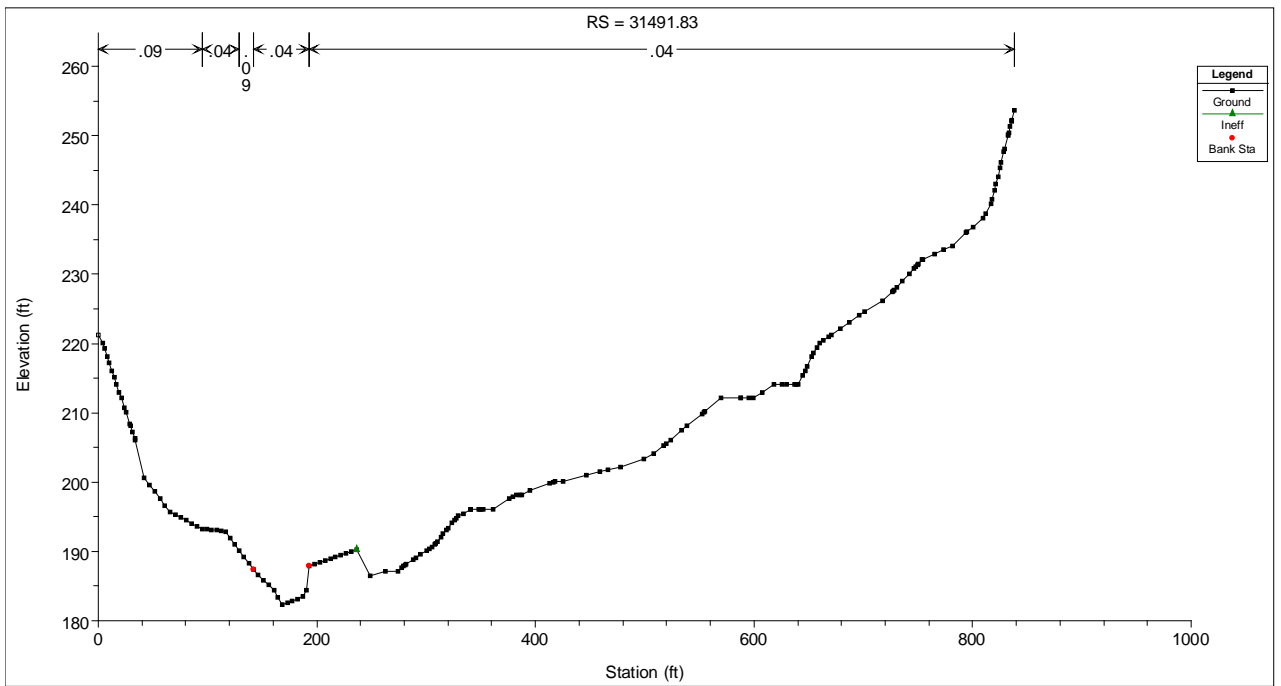
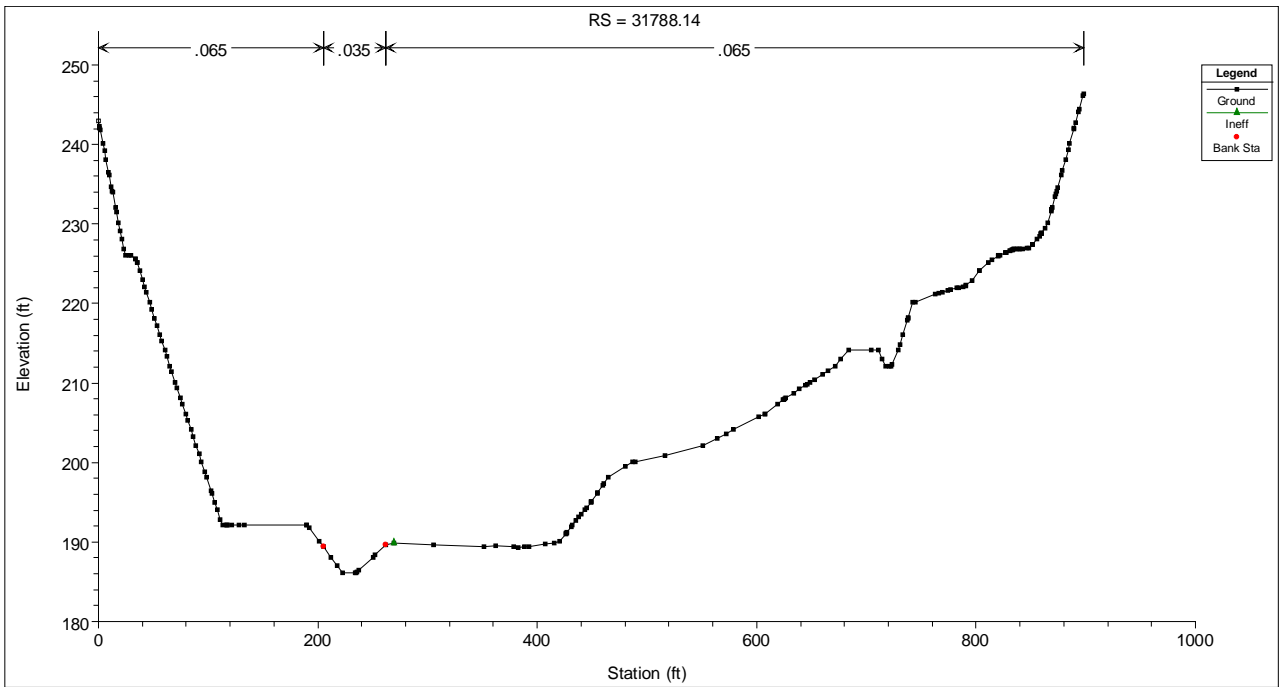


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 31245.75, 30986.07

Project No. 08-1032

Created By: LA

Figure 95



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

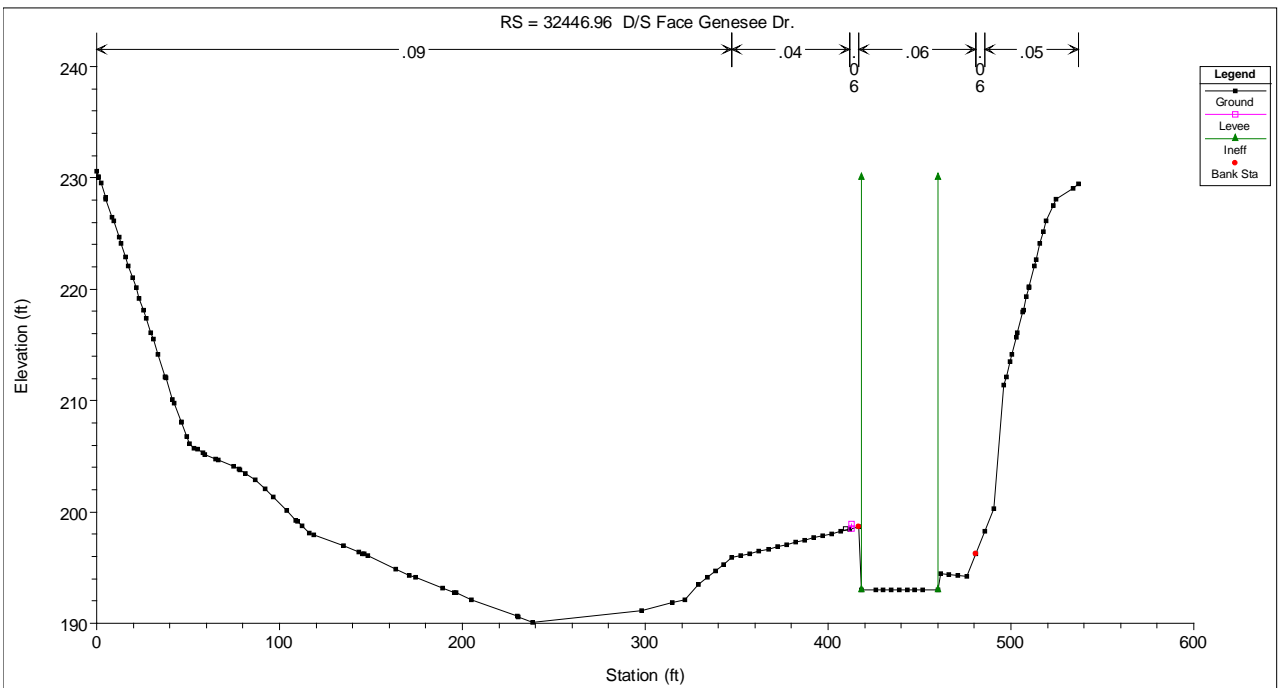
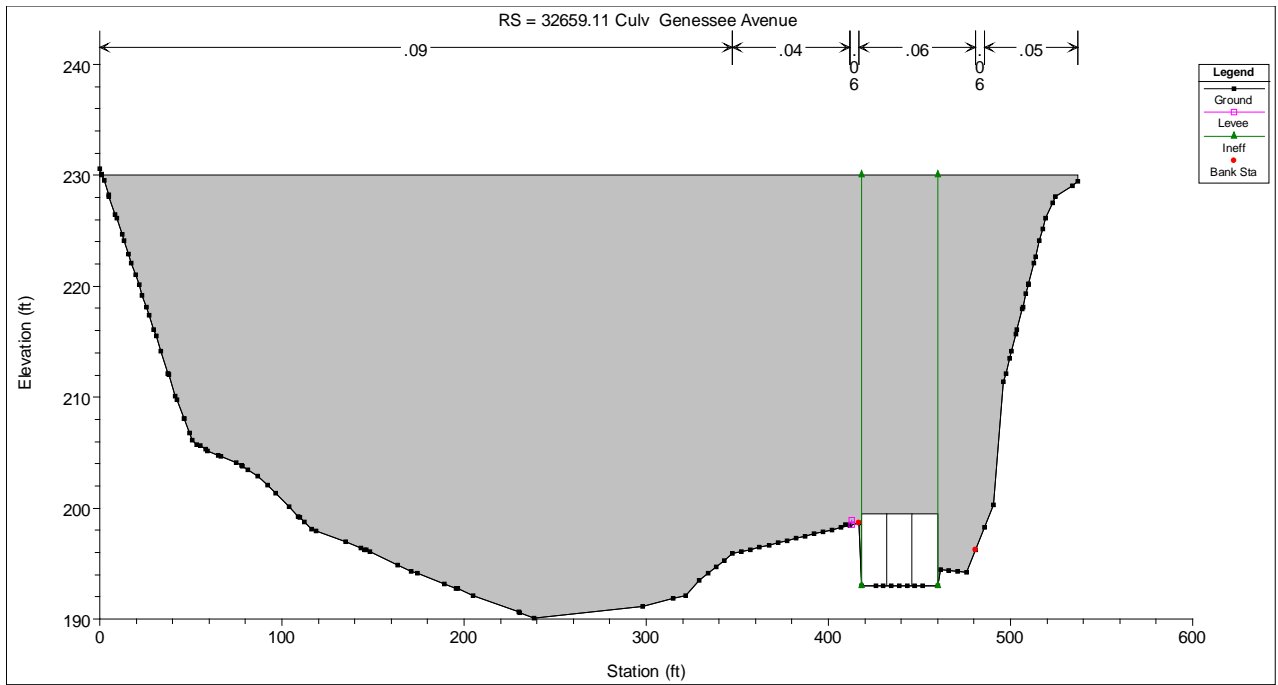


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 31788.14, 31491.83

Project No. 08-1032

Created By: LA

Figure 96



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

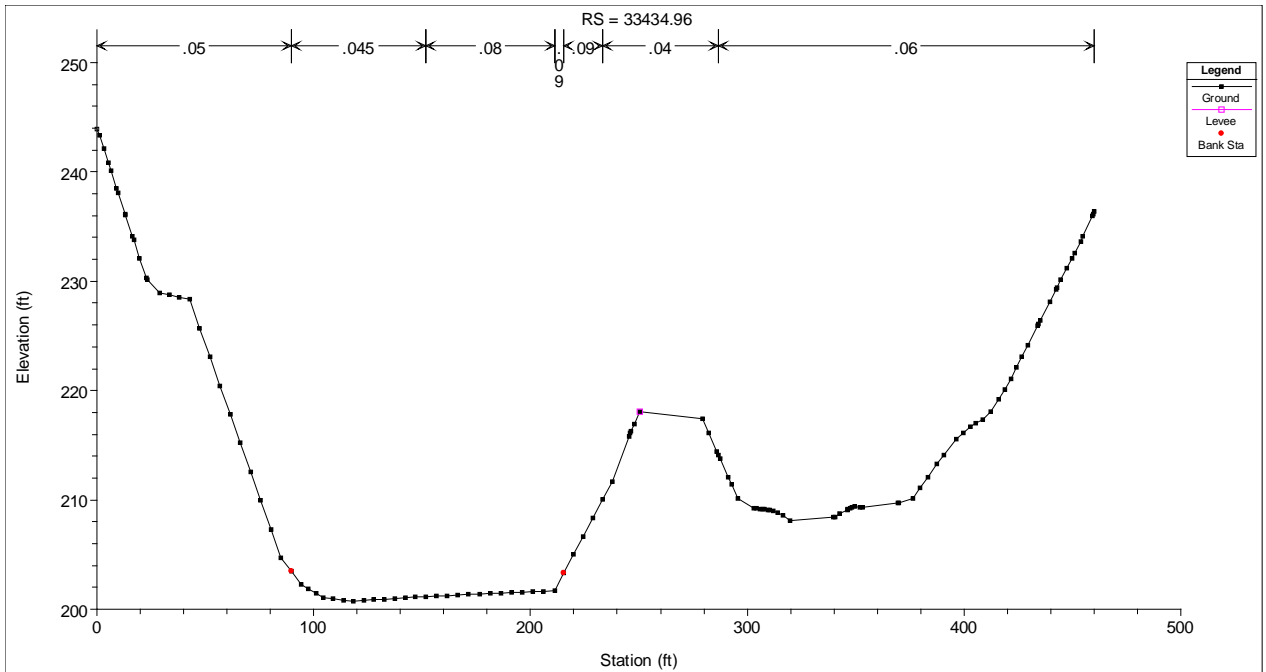
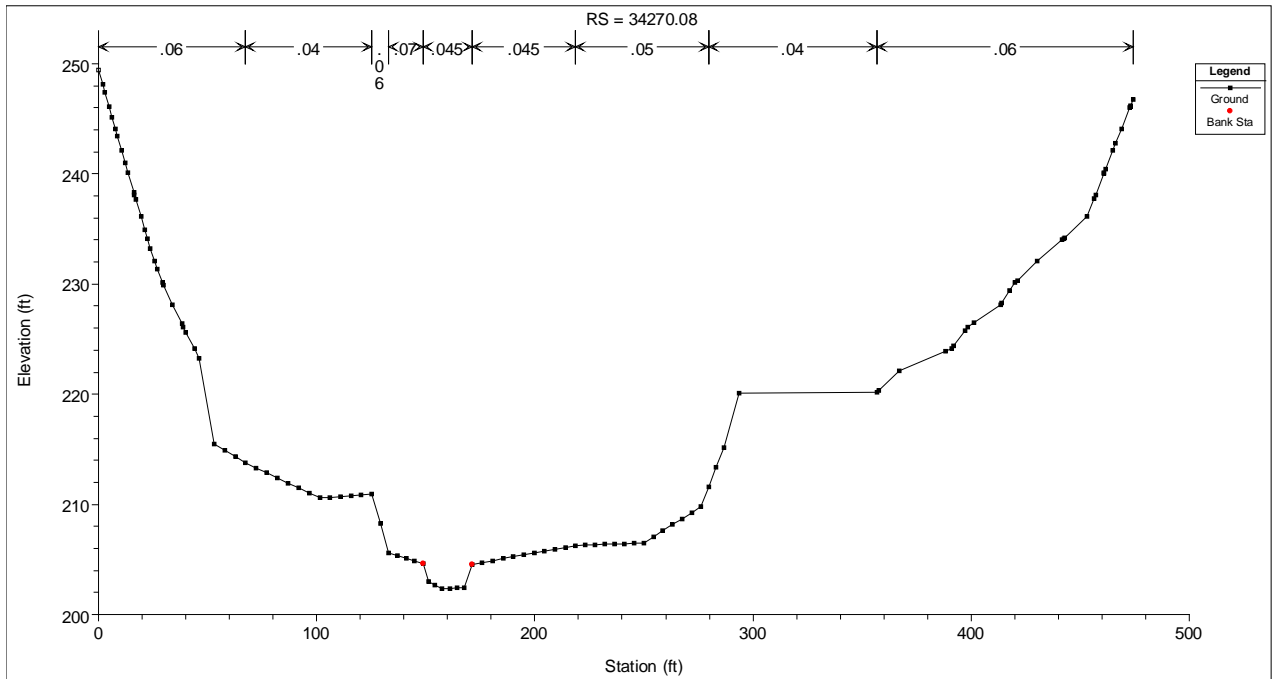


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 32659.11, 32446.96

Project No. 08-1032

Created By: LA

Figure 97



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

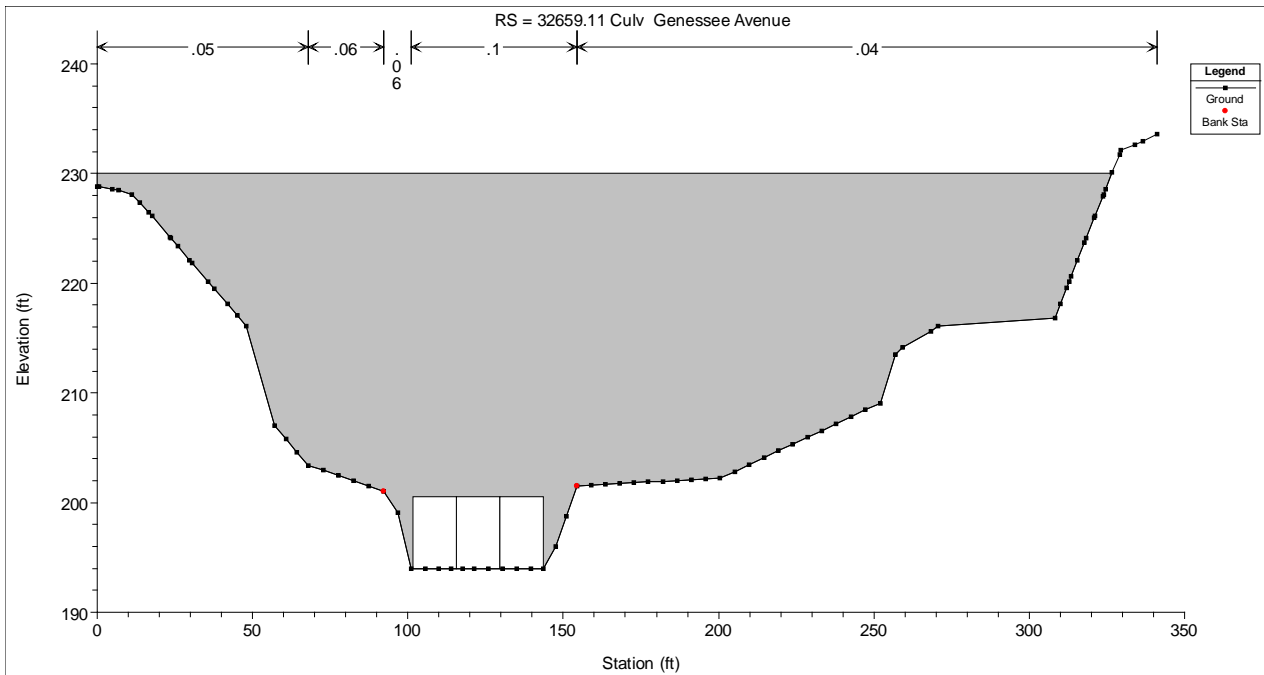
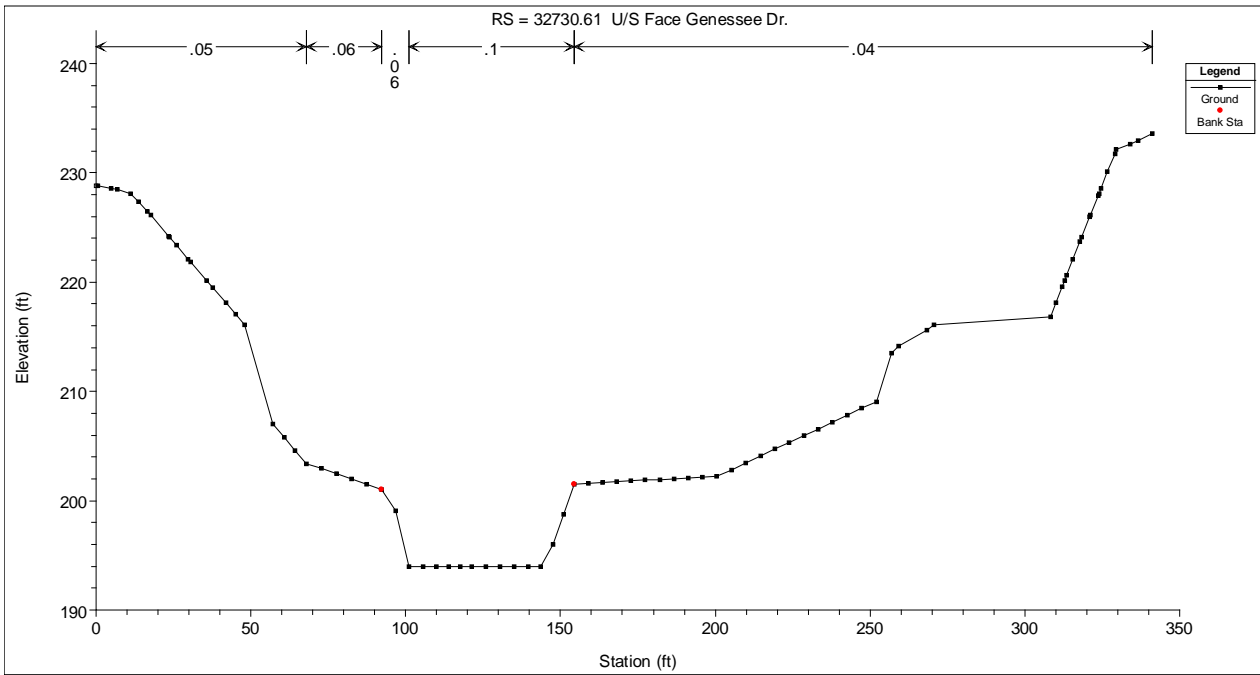


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – 34270.08, 33434.96

Project No. 08-1032

Created By: LA

Figure 98



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

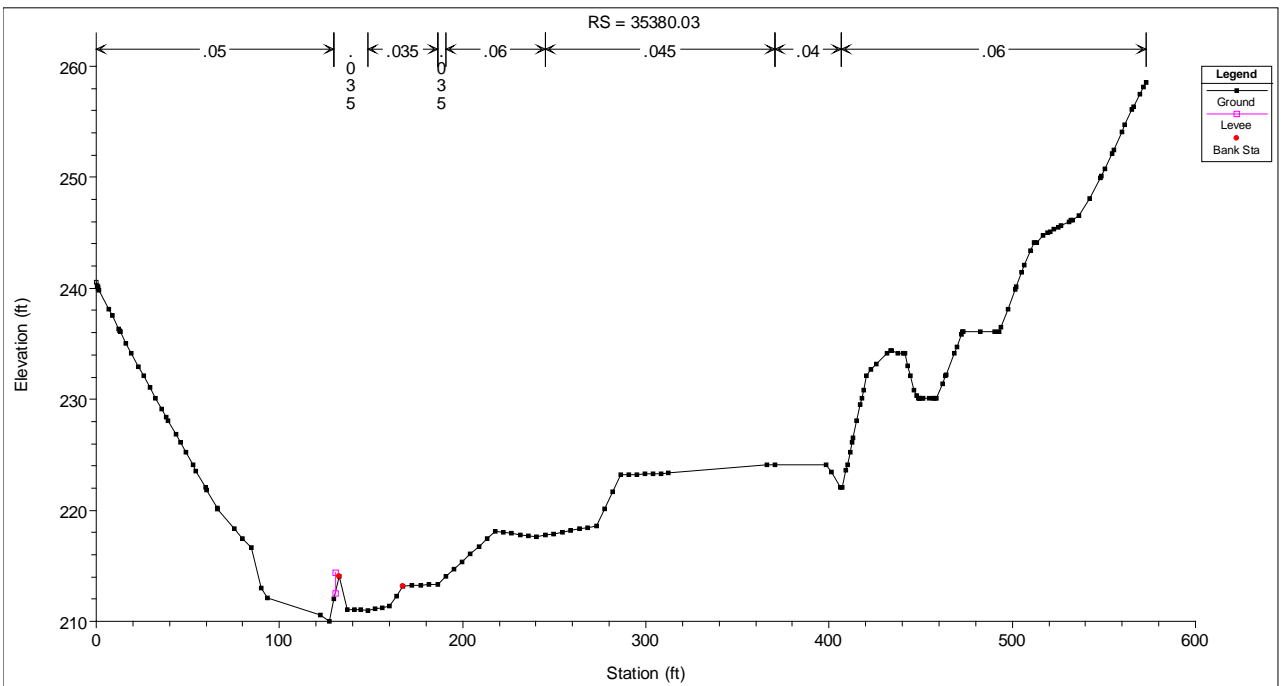
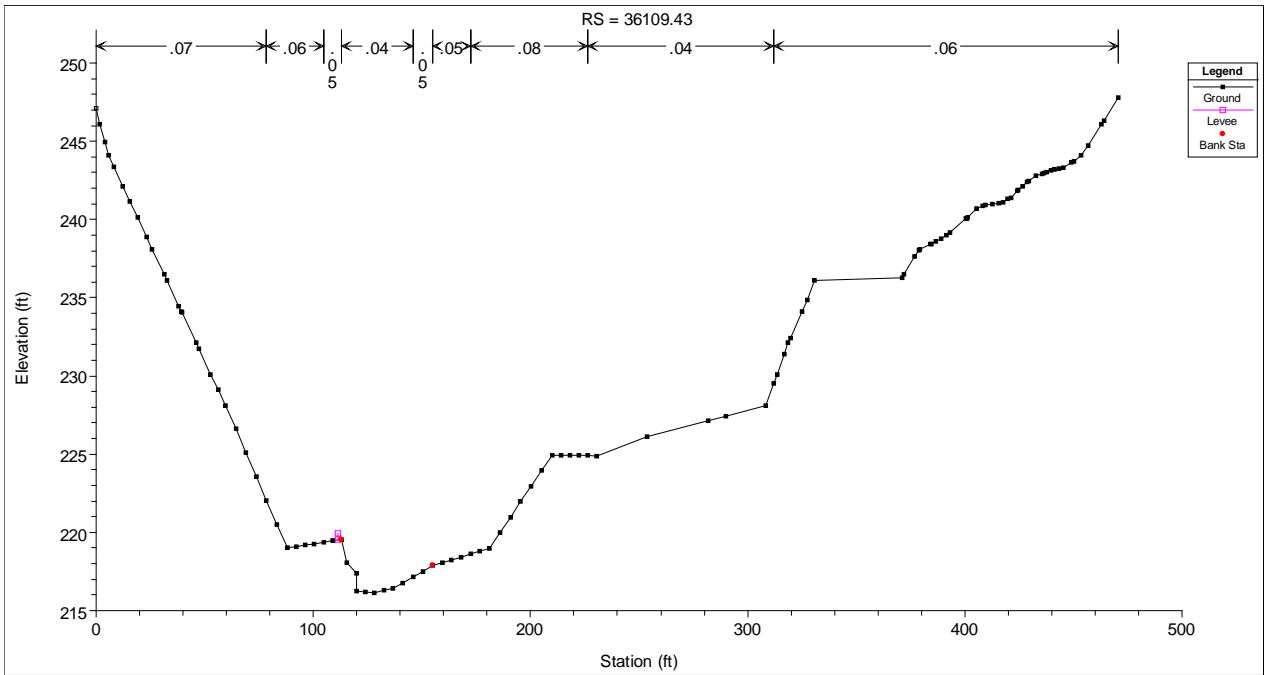


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 32730.61, 32659.11

Project No. 08-1032

Created By: LA

Figure 99



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

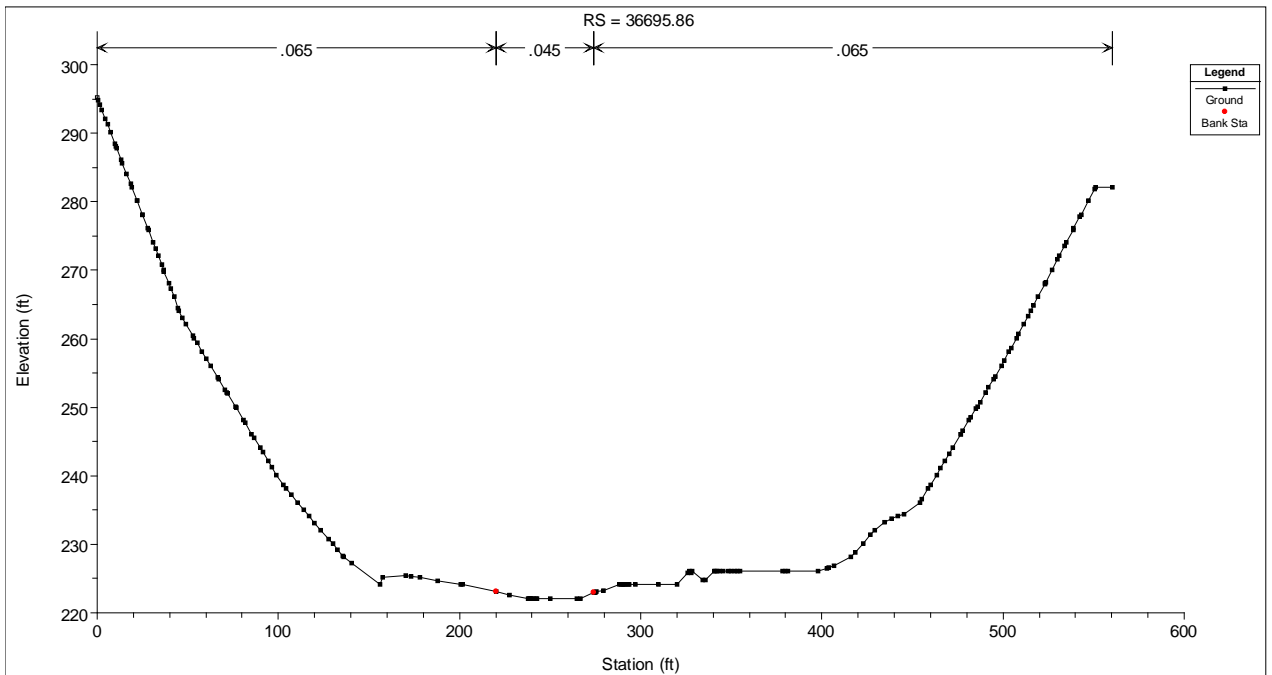
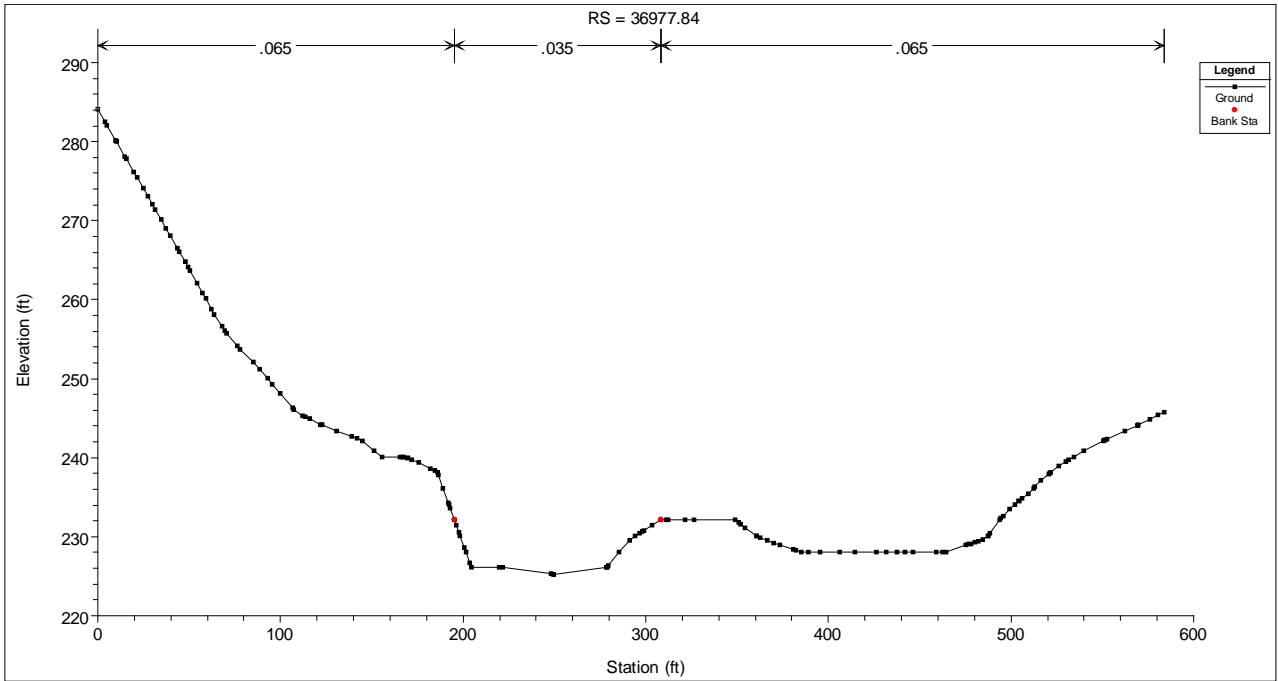


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – 36109.43, 35380.03

Project No. 08-1032

Created By: LA

Figure 100



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

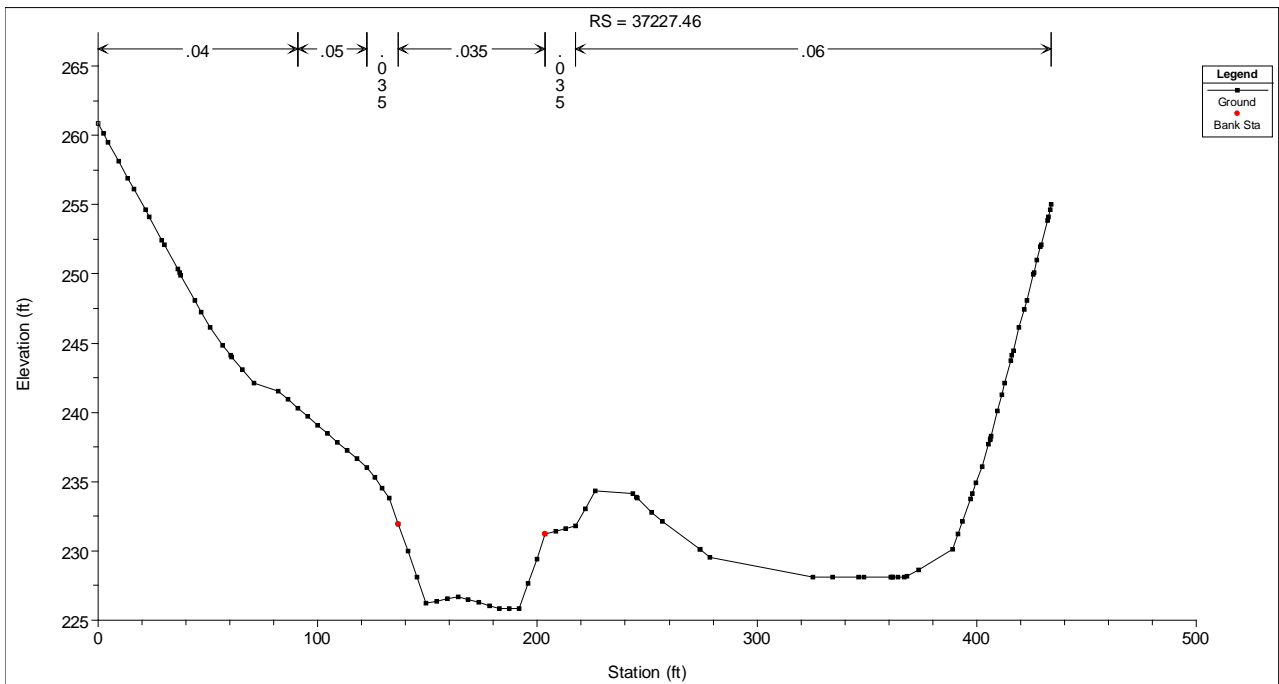
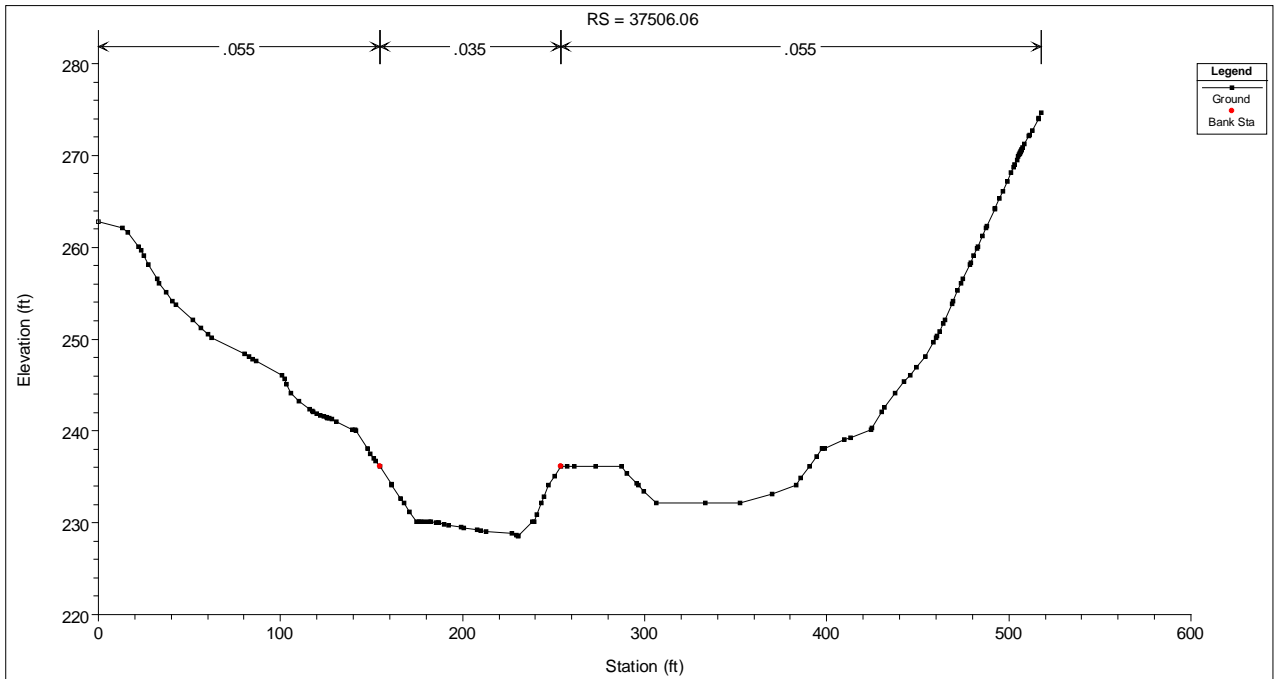


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Cross Section – 36977.84, 36695.86

Project No. 08-1032

Created By: LA

Figure 101



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

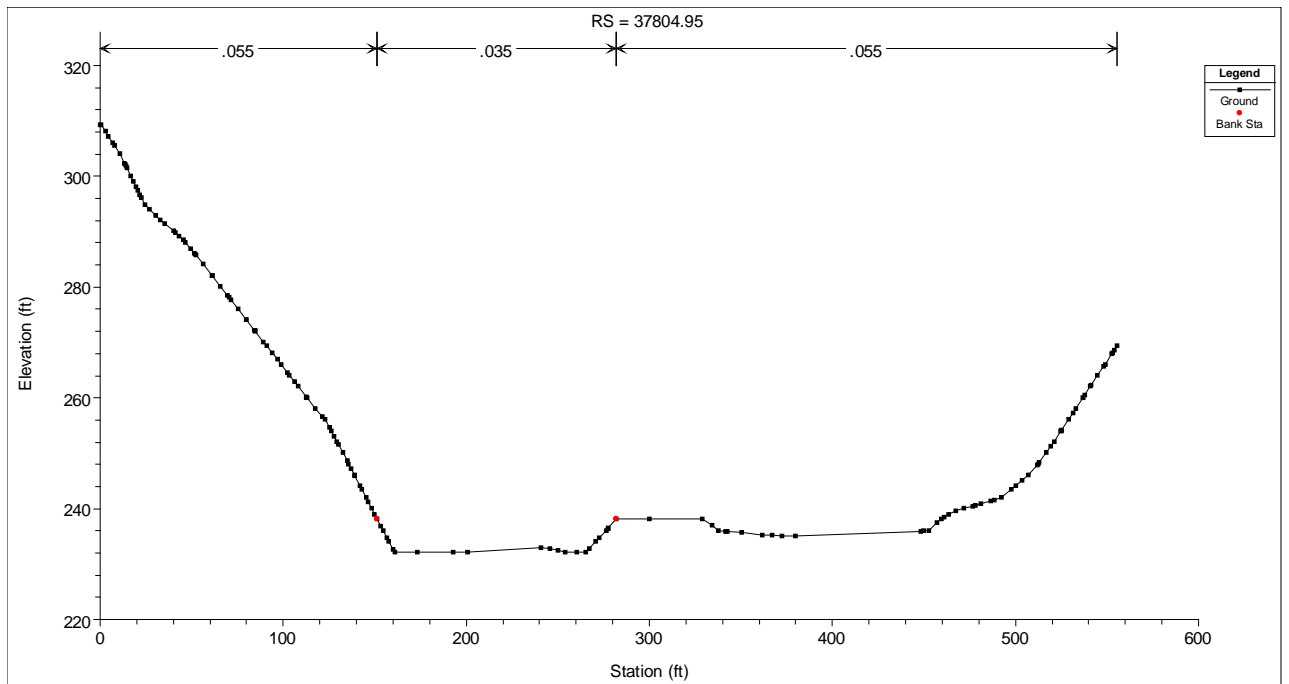
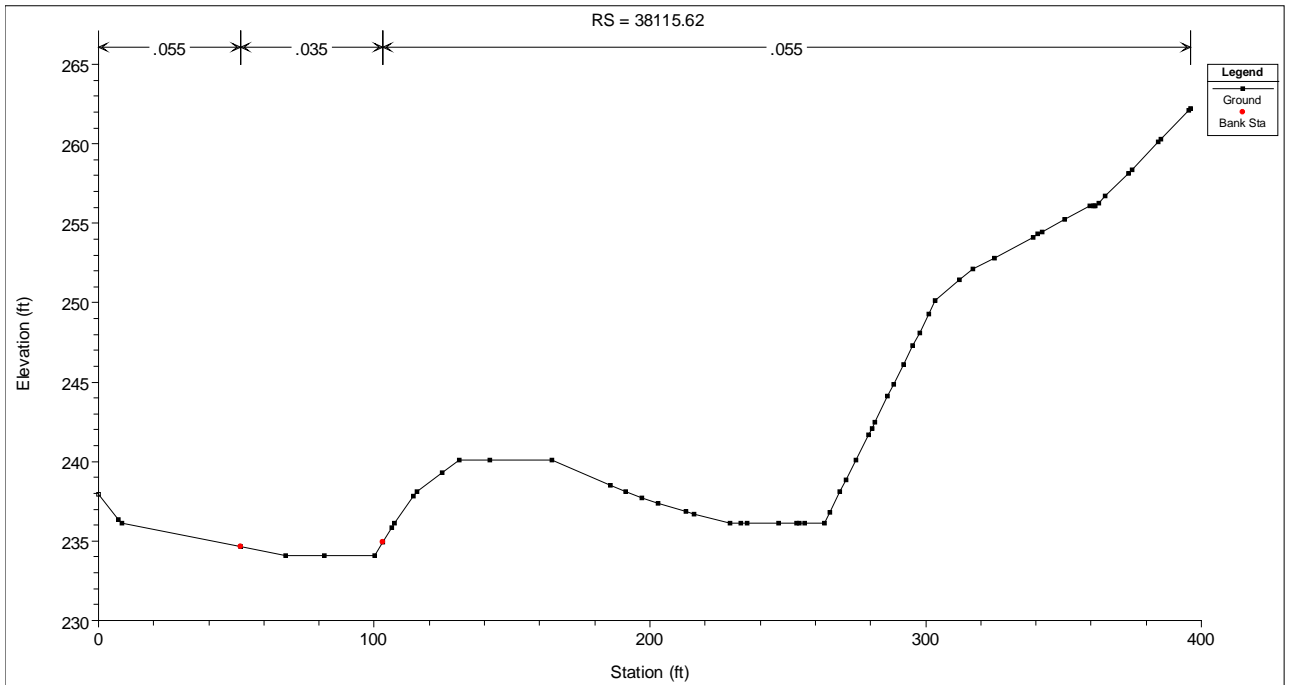


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – 37506.06, 37227.46

Project No. 08-1032

Created By: LA

Figure 102



Notes: Modeled cross section for upper Rose Creek. Elevations reference the NAVD88 datum.

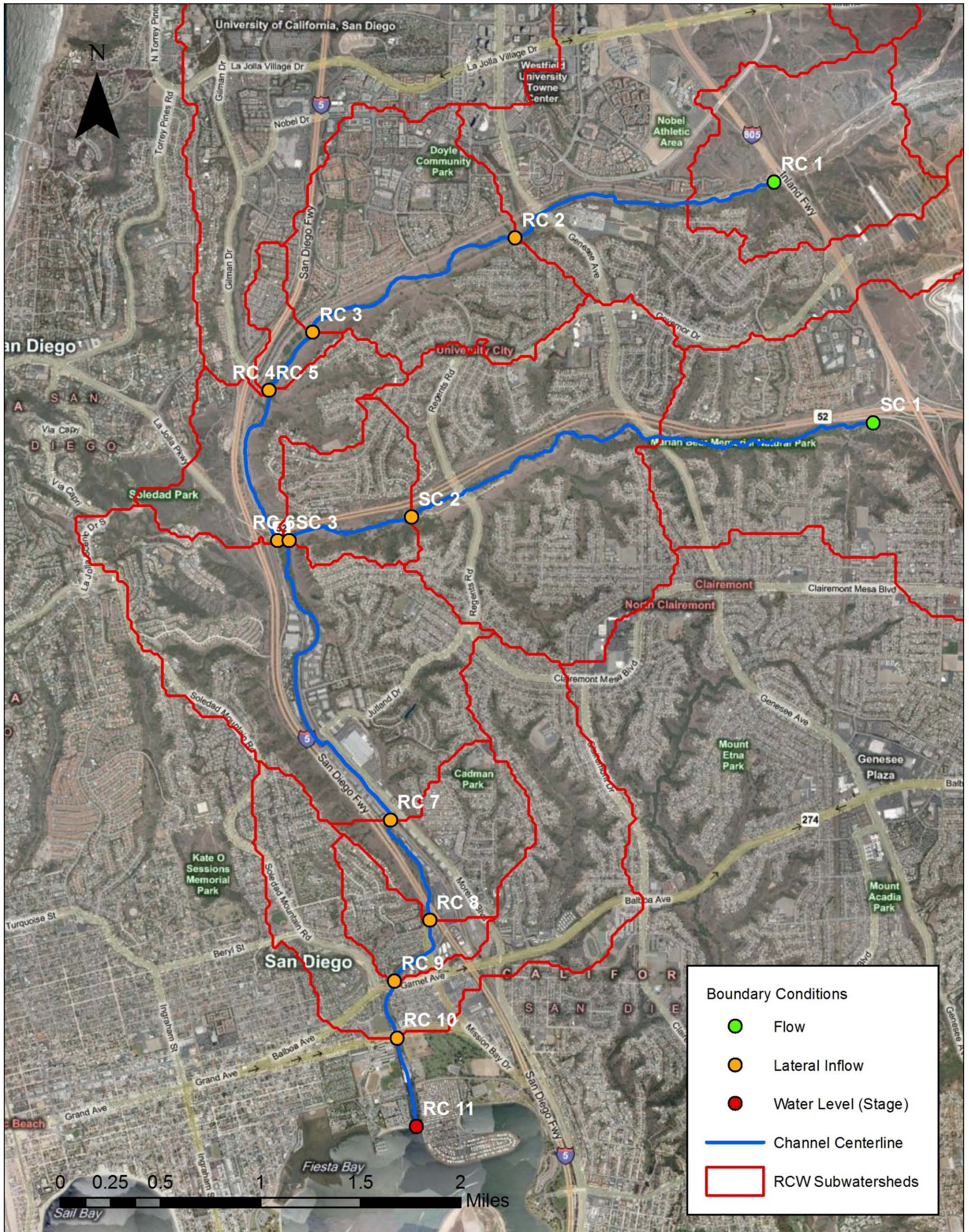


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Proposed Conditions Cross Section – RS 38115.62, 37804.95

Project No. 08-1032

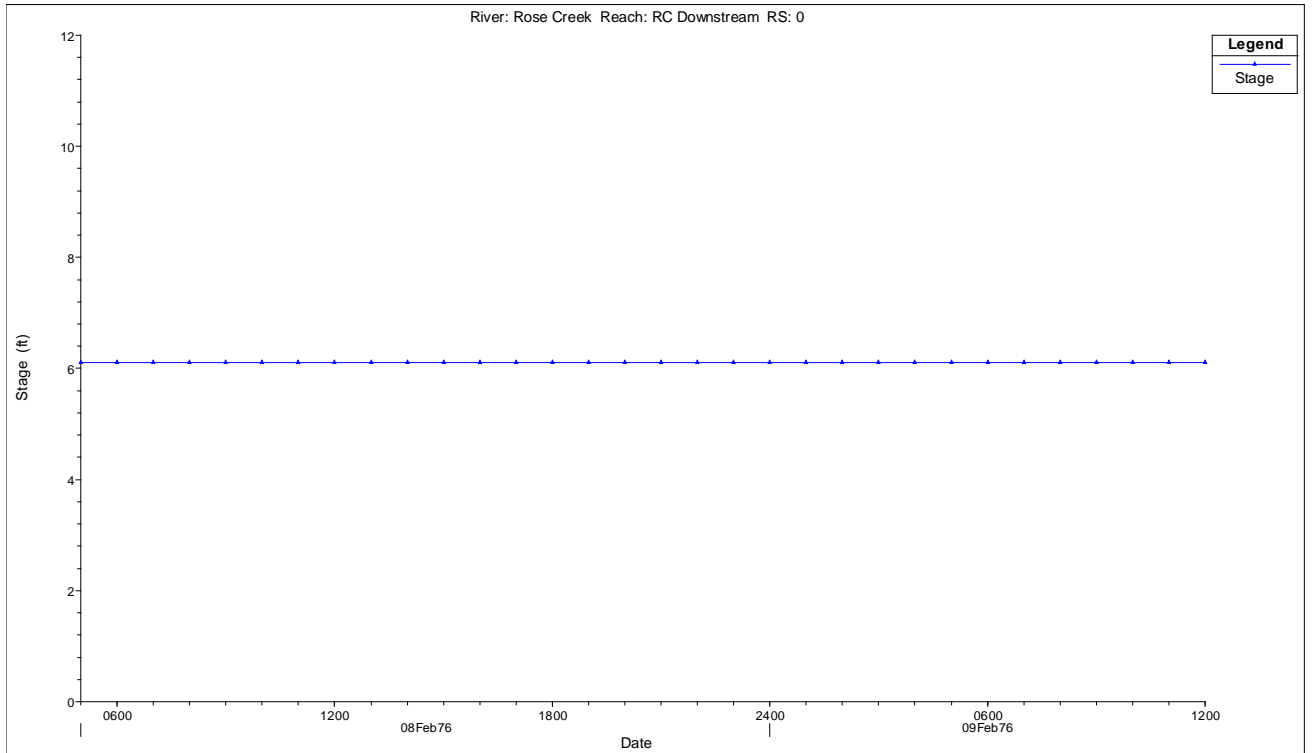
Created By: LA

Figure 103



Notes: Uniform lateral inflow boundaries are distributed along the entire channel length within the subwatershed to allow for gradual flow increase. Aerial image from Bing maps.





Notes: Unsteady Stage
Boundary Condition for Rose
Creek. Vertical Datum
References NAVD 88.

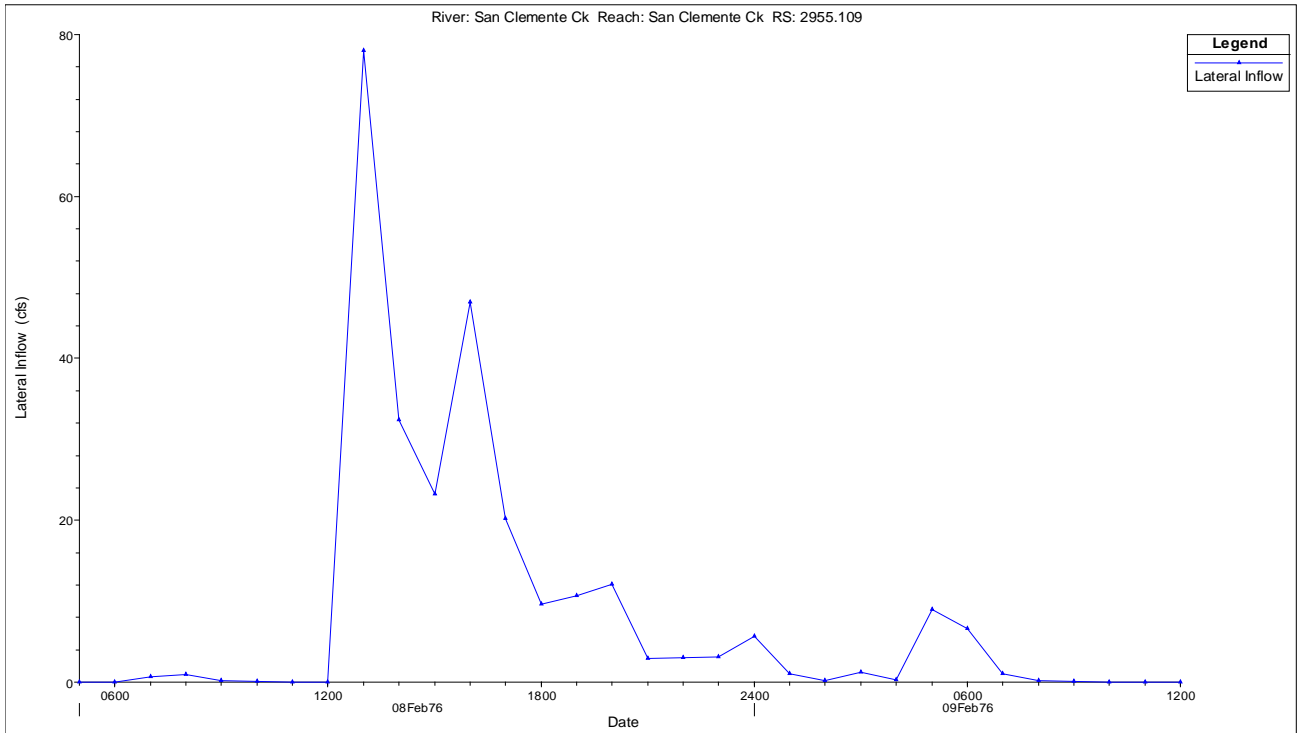


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 2-yr Boundary Condition – RS 0

Project No. 08-1032

Created By: JS

Figure 105



Notes: Unsteady Flow
Boundary Condition for San Clemente Creek.

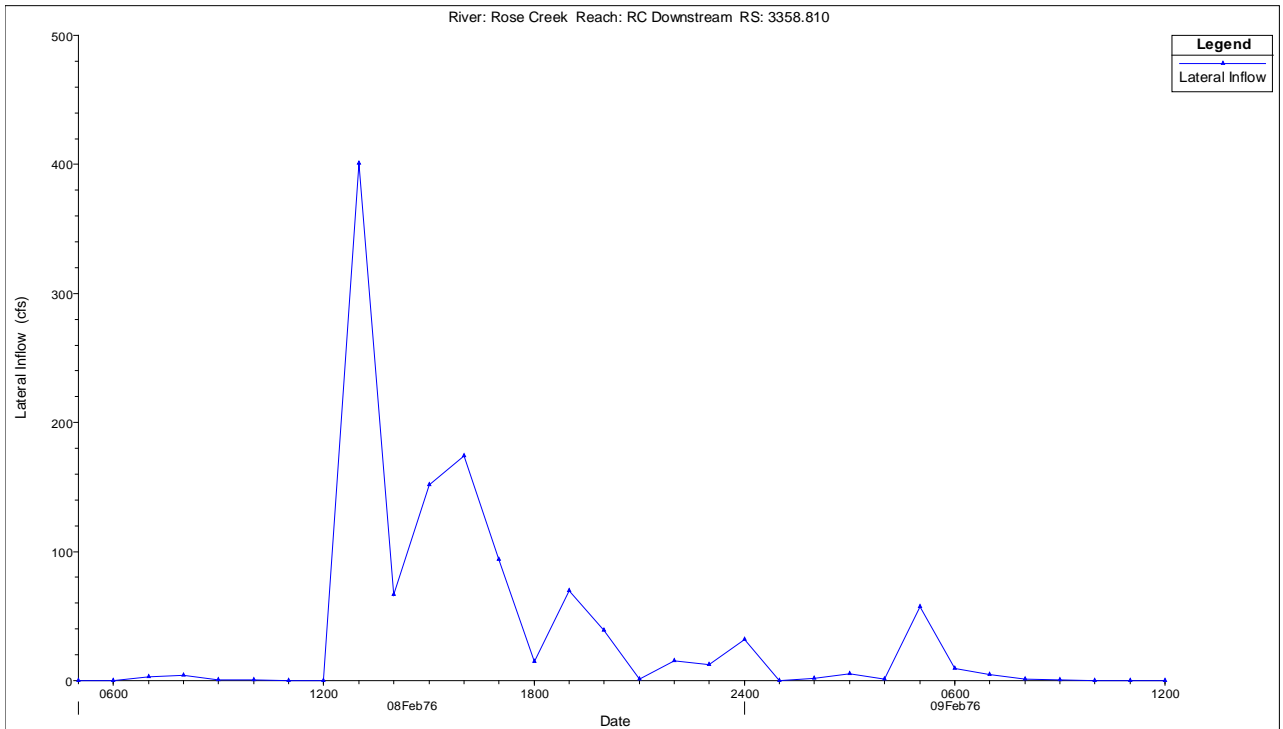
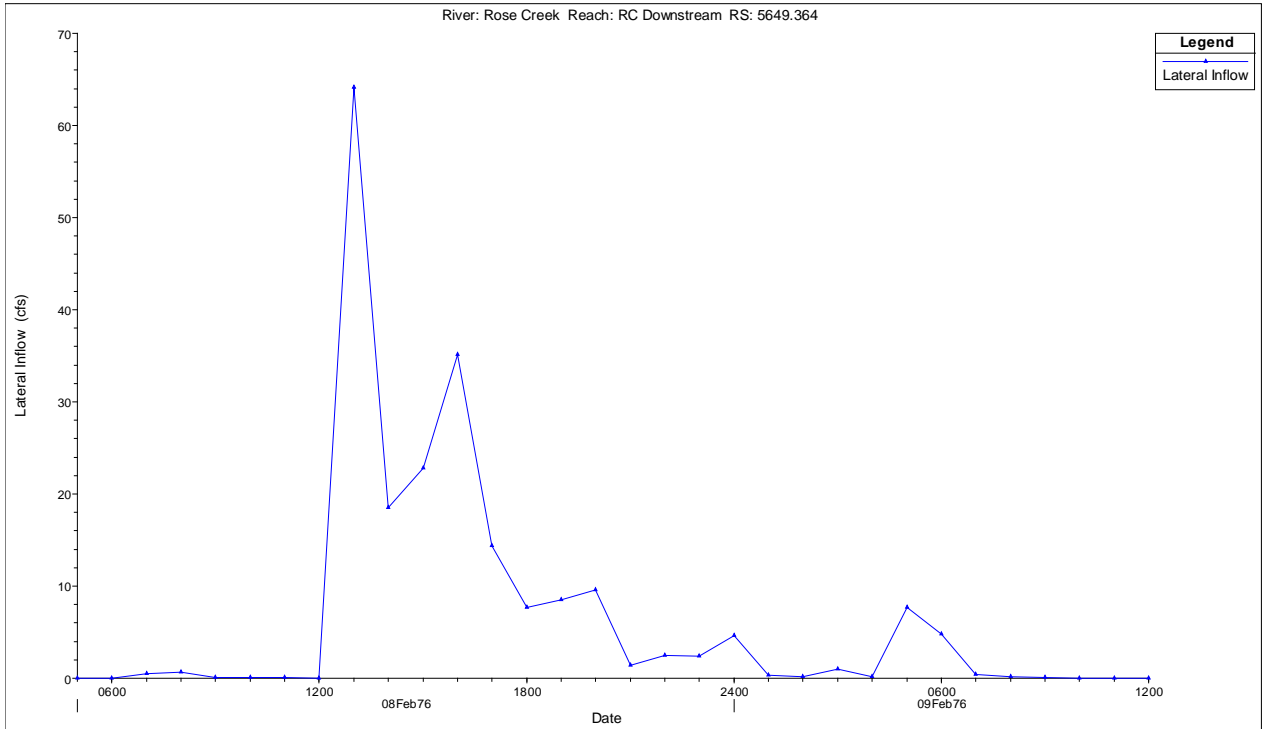


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
San Clemente 2-yr Boundary Condition – RS 2955.1

Project No. 08-1032

Created By: JS

Figure 106



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.

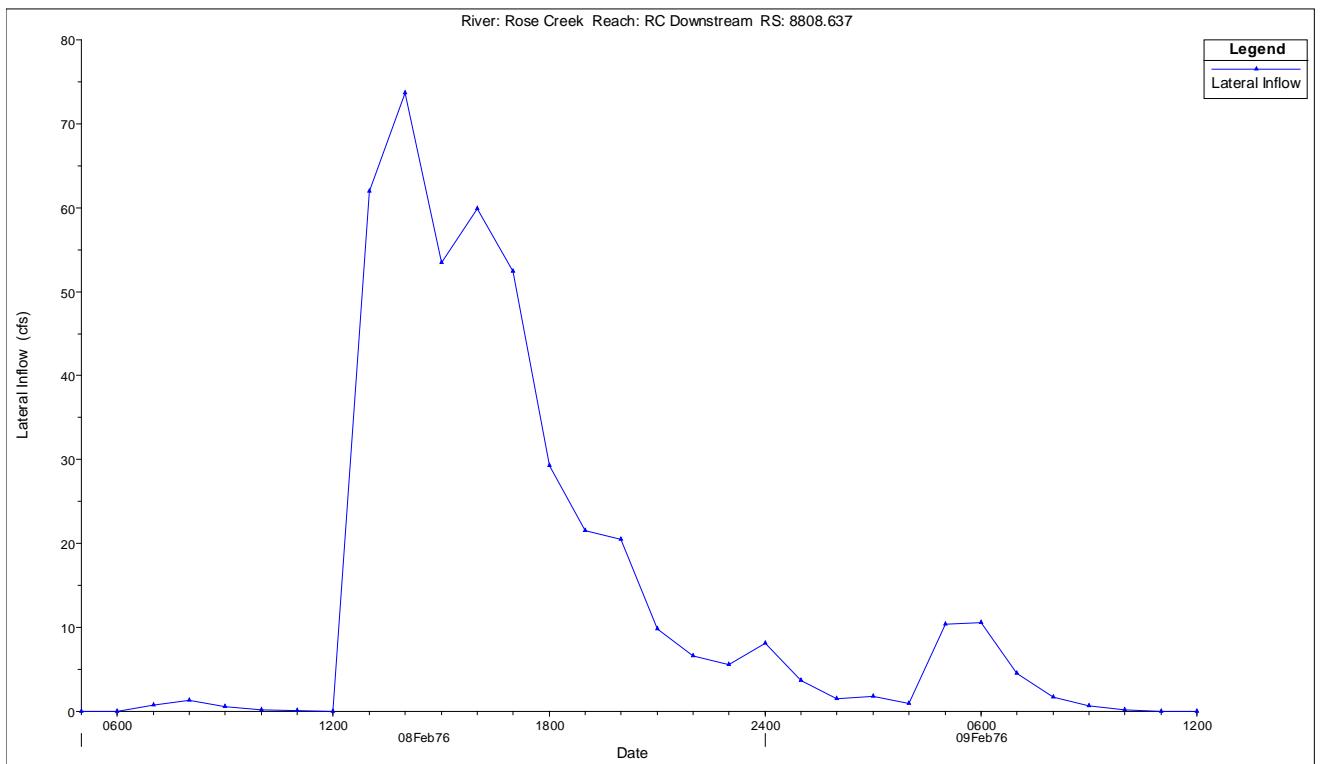
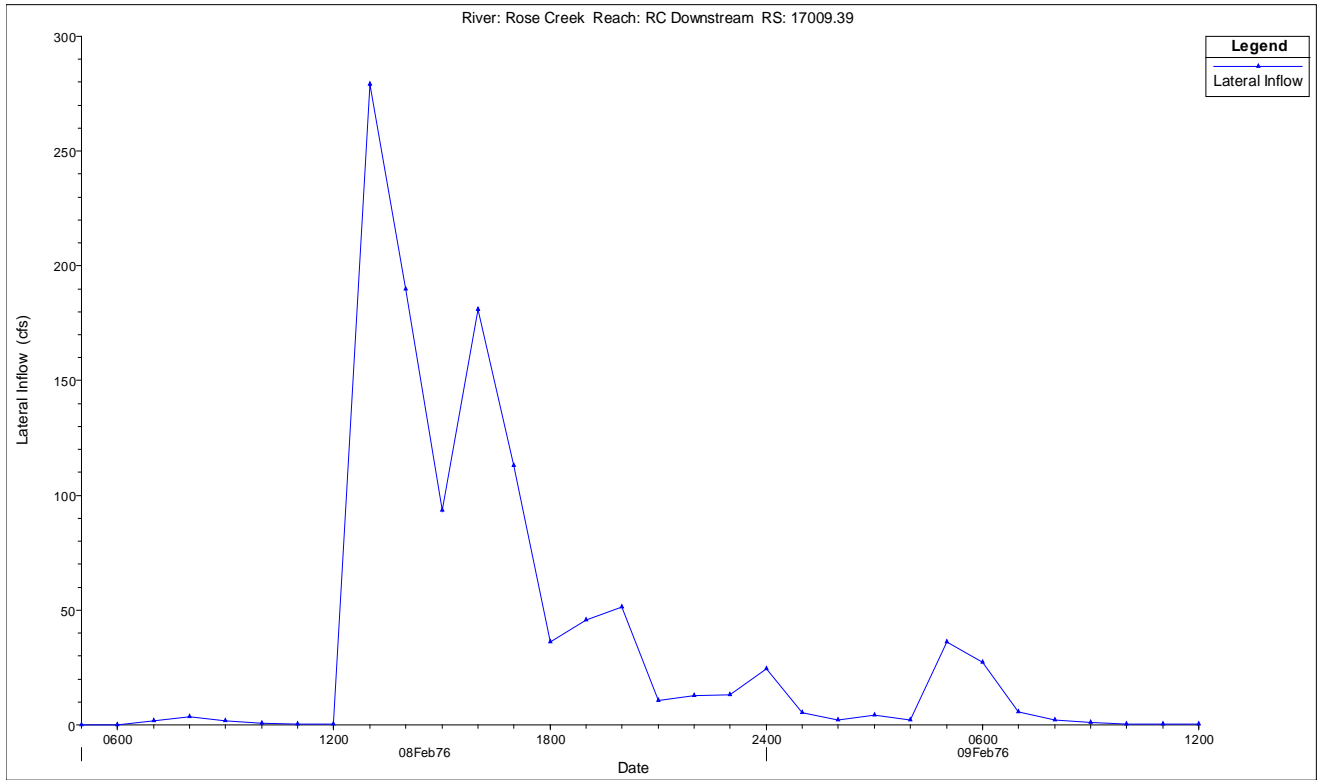


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 2-yr Boundary Condition – RS 5649.4, 3358.8

Project No. 08-1032

Created By: JS

Figure 107



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.

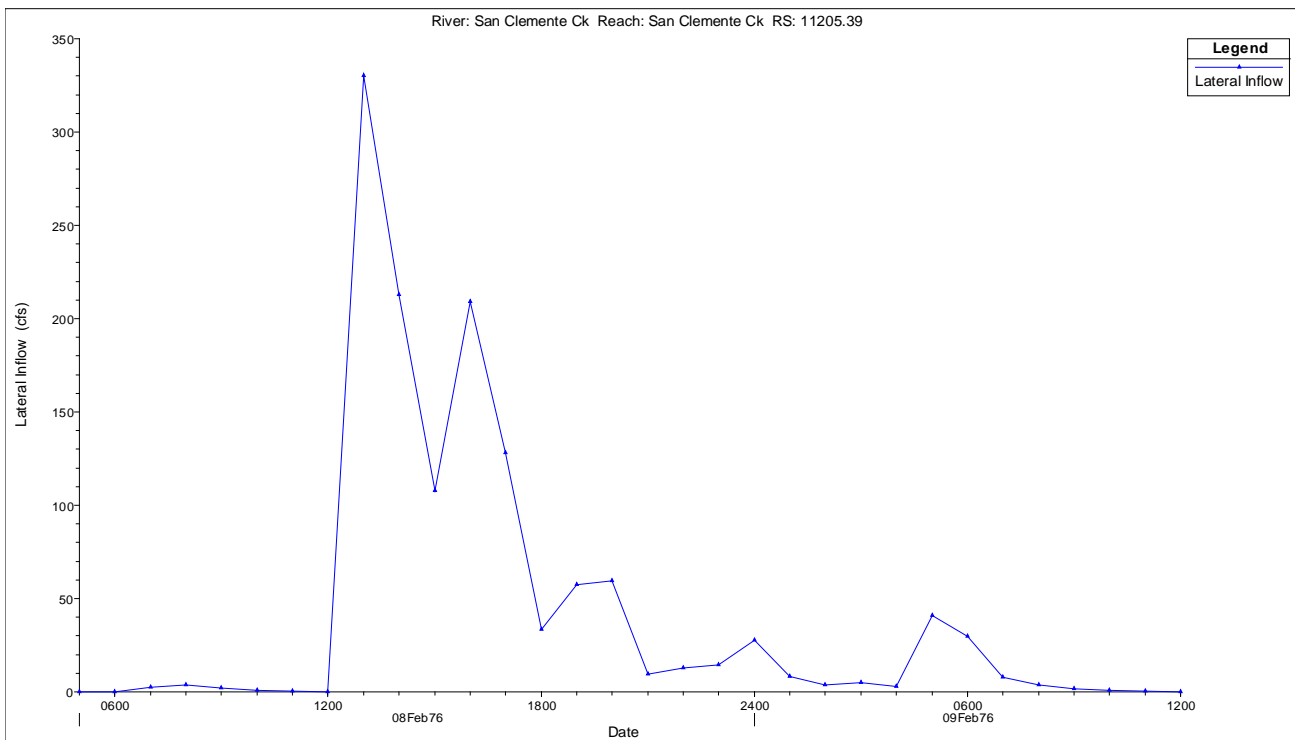
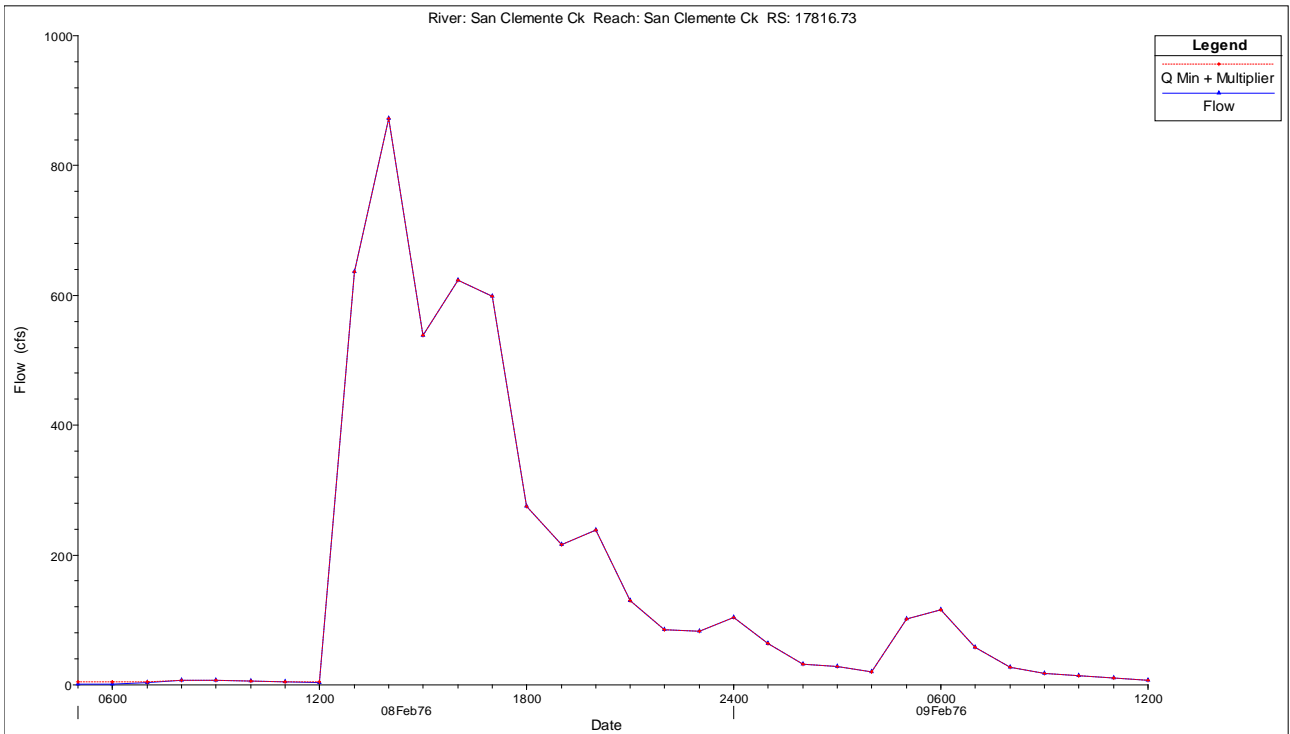


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 2-yr Boundary Condition – RS 17009.4, 8808.6

Project No. 08-1032

Created By: JS

Figure 108



Notes: Unsteady Flow
Boundary Condition for San
Clemente Creek.

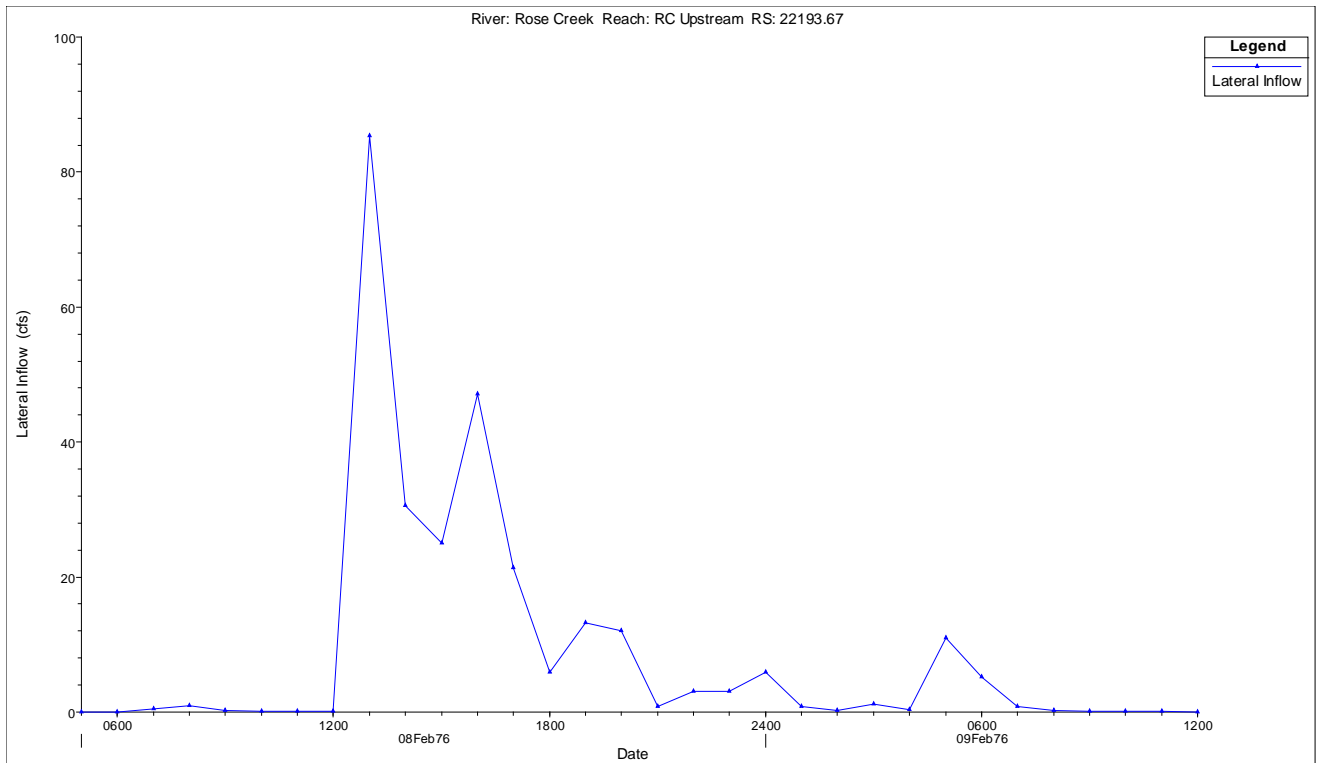
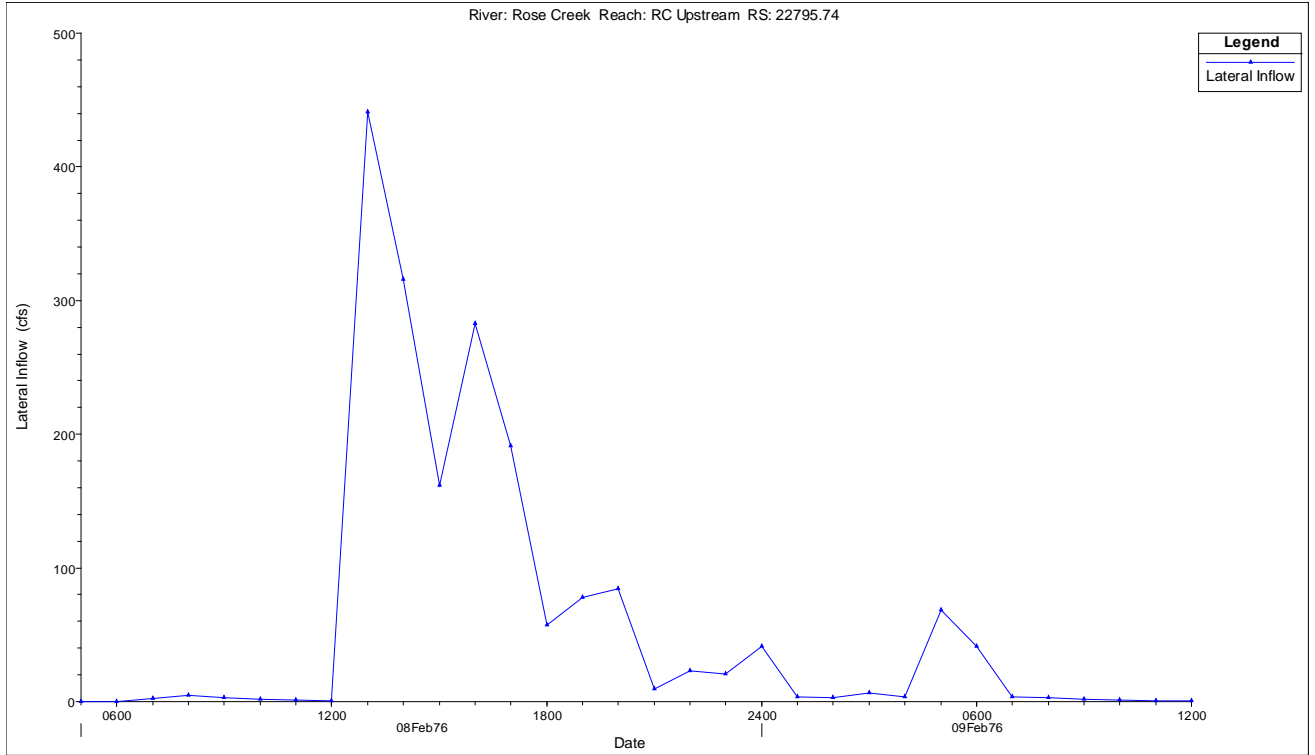


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
San Clemente 2-yr Boundary Condition – RS 17816.7, 11205.4

Project No. 08-1032

Created By: JS

Figure 109



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.

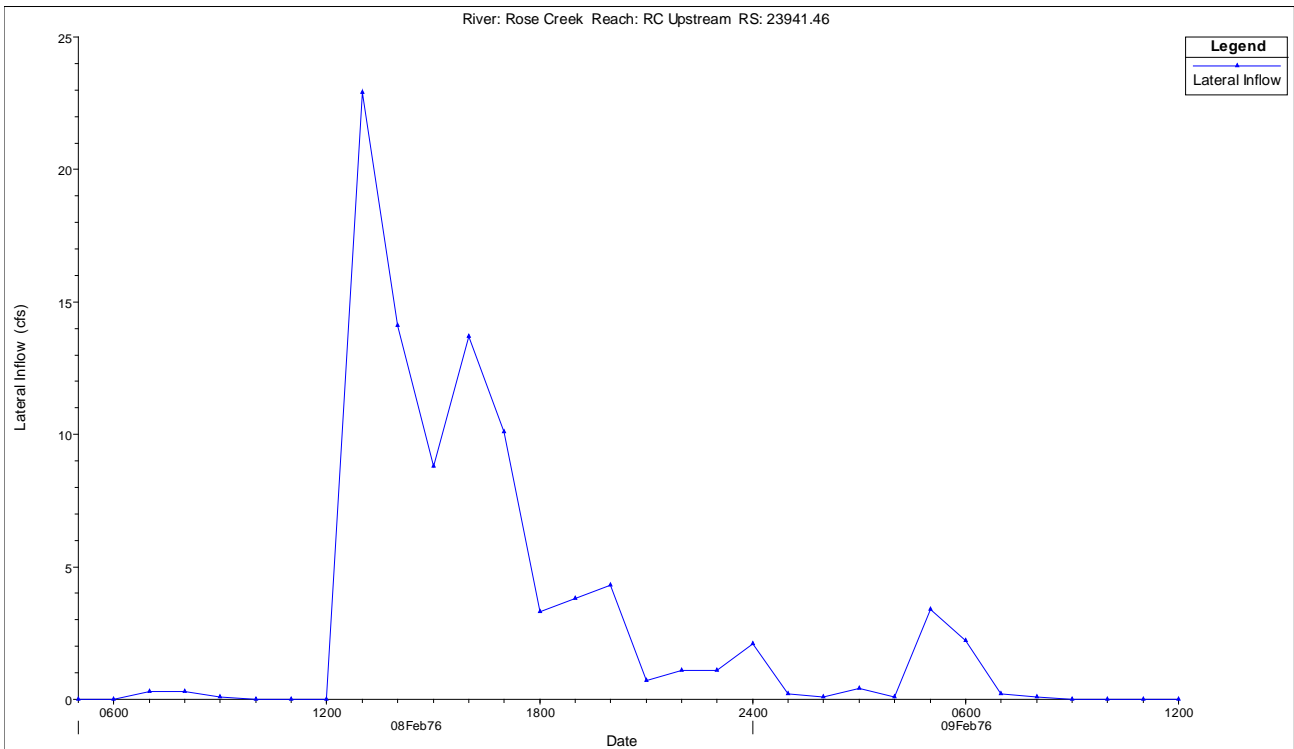
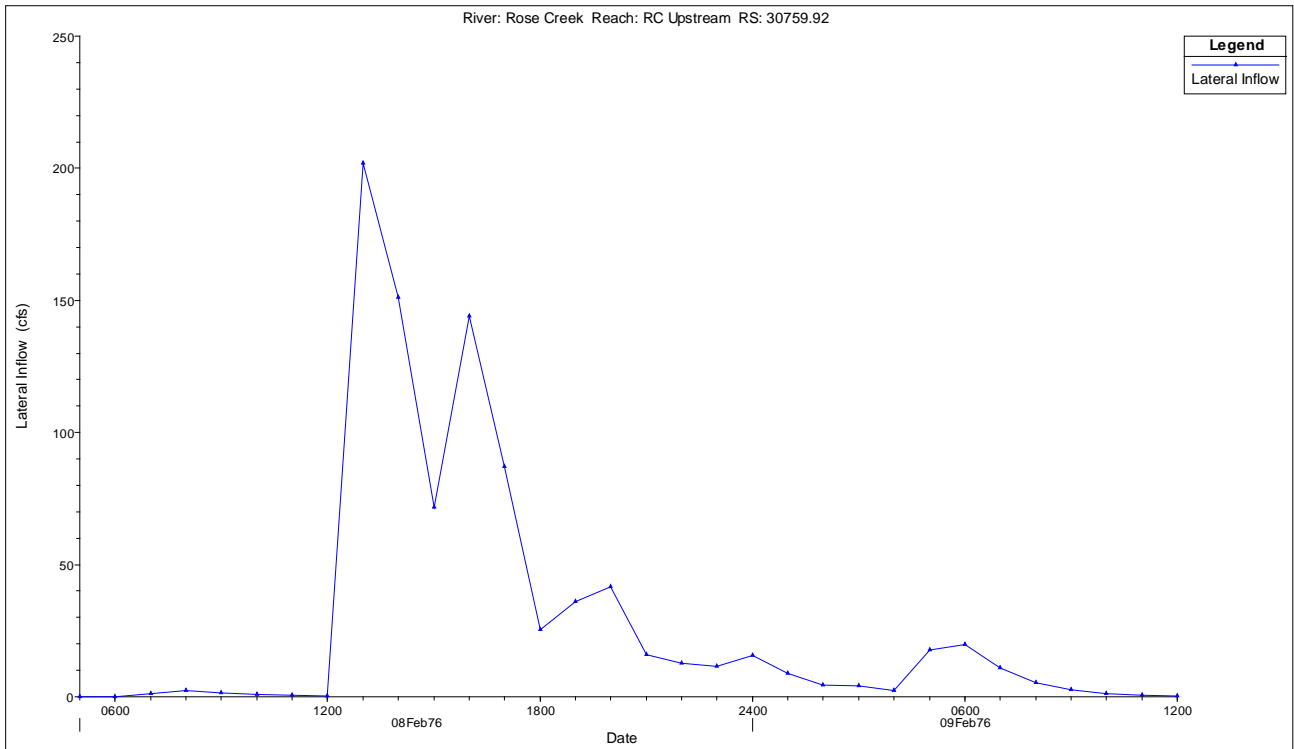


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 2-yr Boundary Condition – RS 22795.7, 22193.6

Project No. 08-1032

Created By: JS

Figure 110



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.

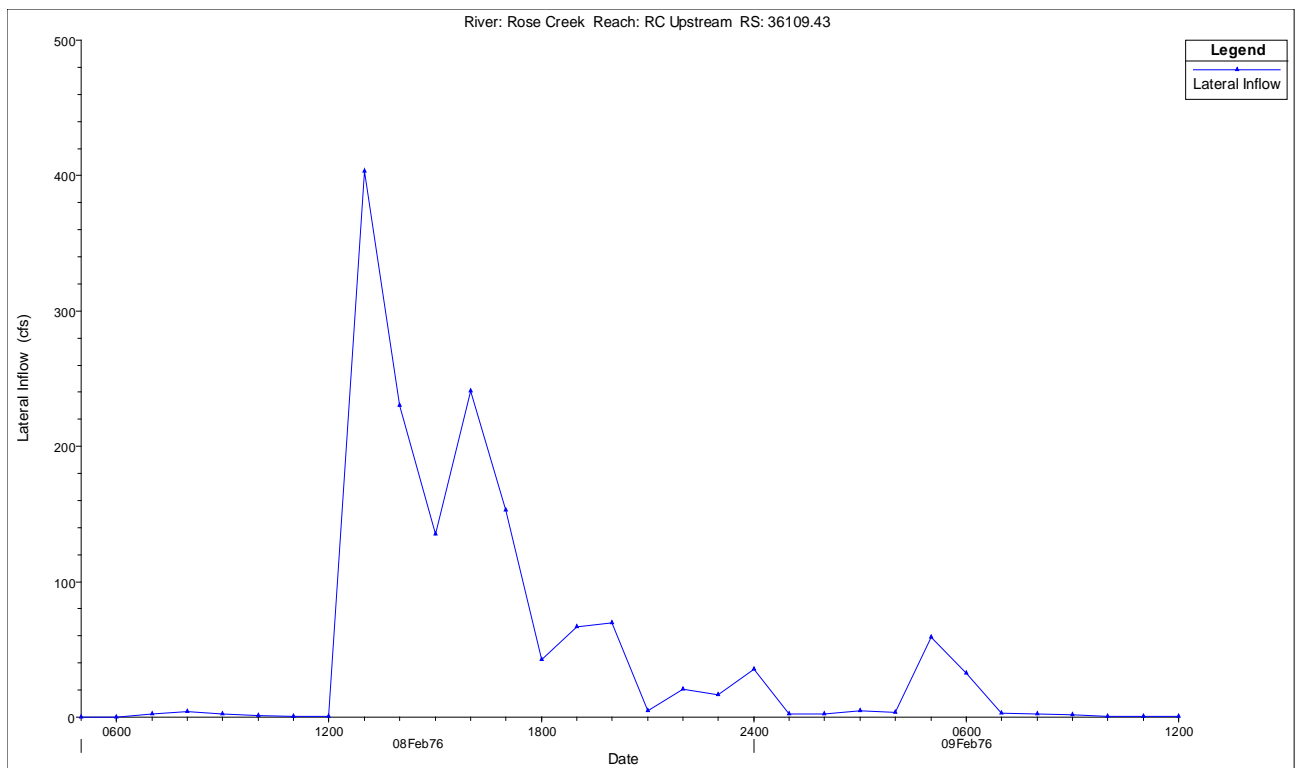
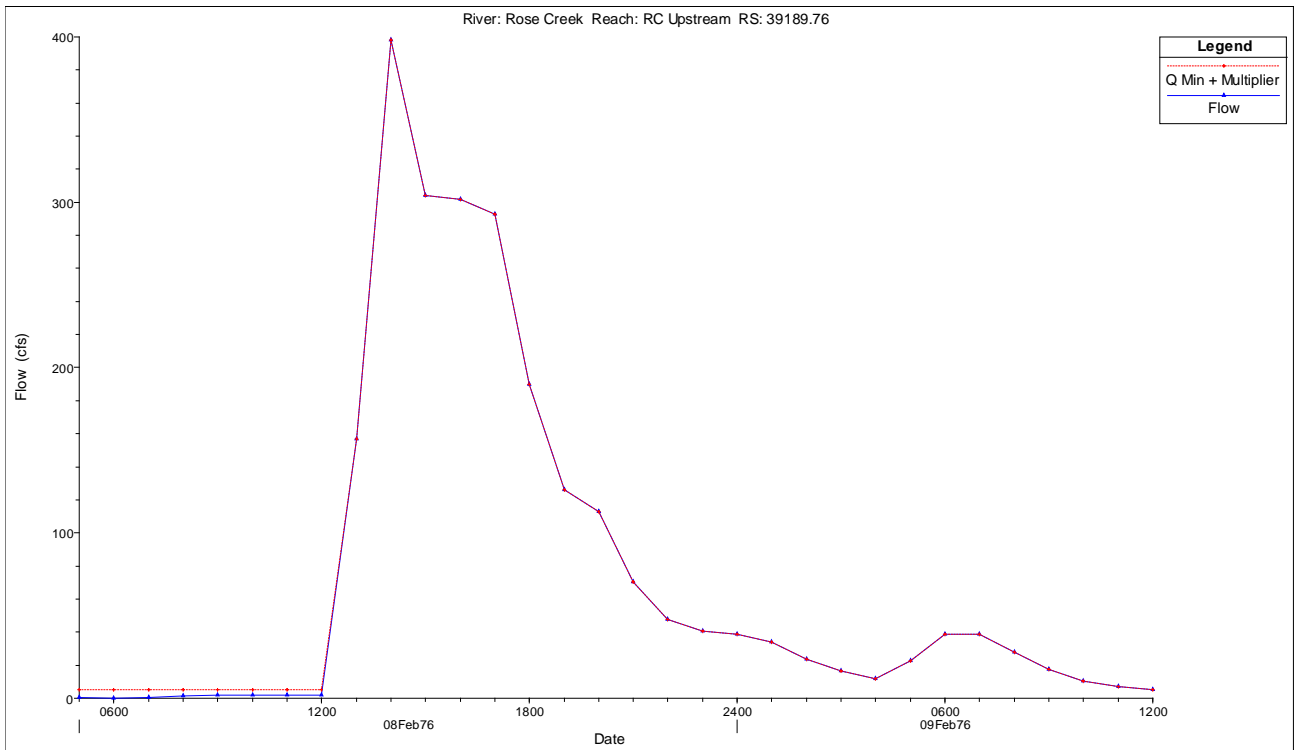


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 2-yr Boundary Condition – RS 30759.9, 23941.5

Project No. 08-1032

Created By: JS

Figure 111



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.

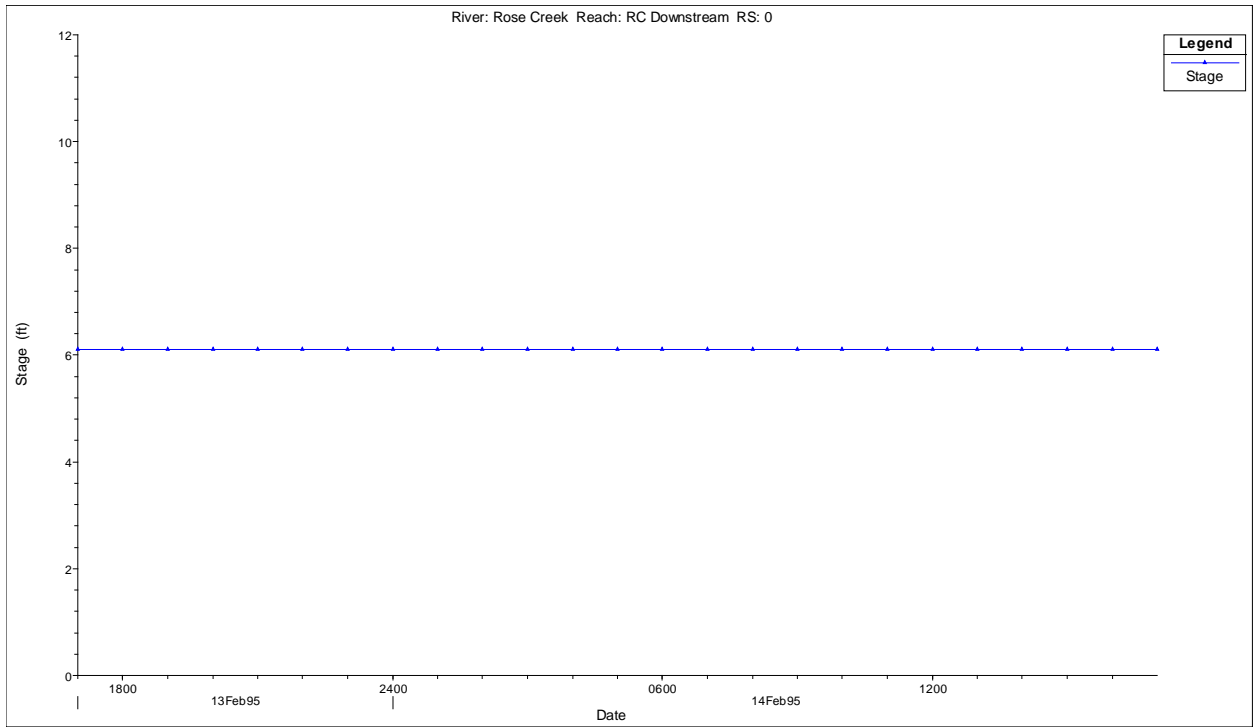


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 2-yr Boundary Condition – RS 39189.8, 36109.4

Project No. 08-1032

Created By: JS

Figure 112



Notes: Unsteady Stage
Boundary Condition for Rose
Creek. Vertical Datum
References NAVD 88.

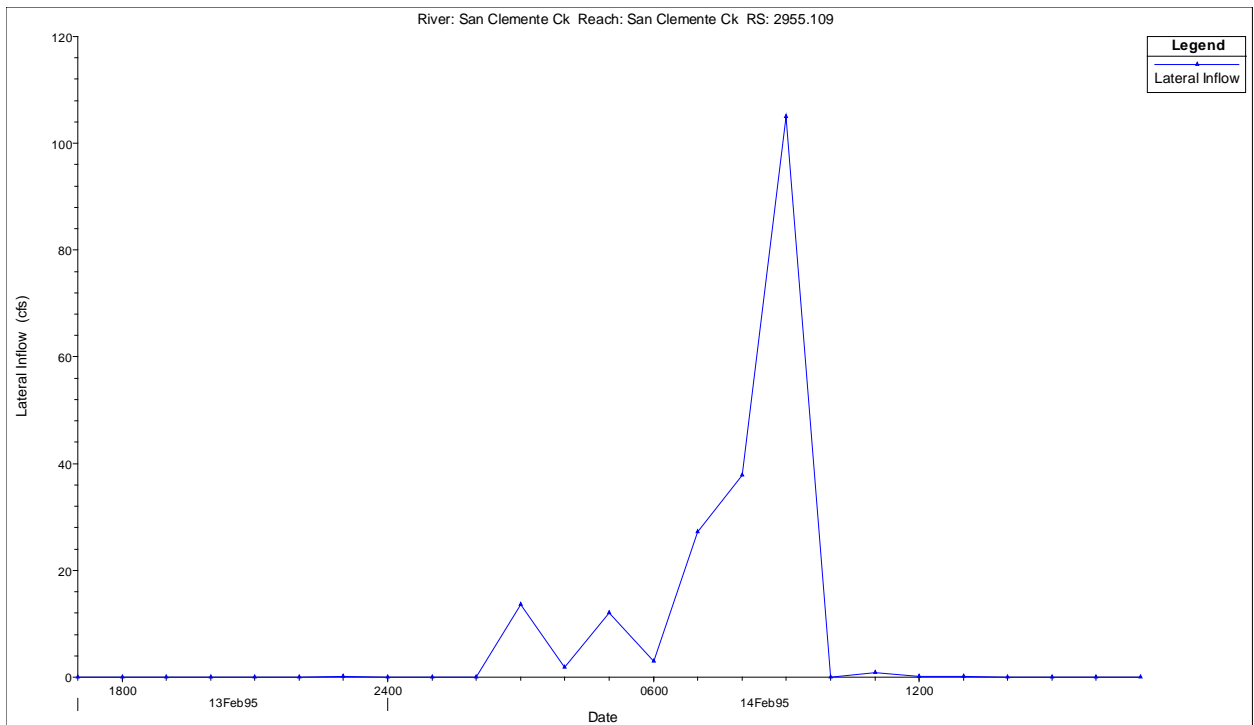


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 5-yr Boundary Condition – RS 0

Project No. 08-1032

Created By: JS

Figure 113



Notes: Unsteady Flow
Boundary Condition for San Clemente Creek.

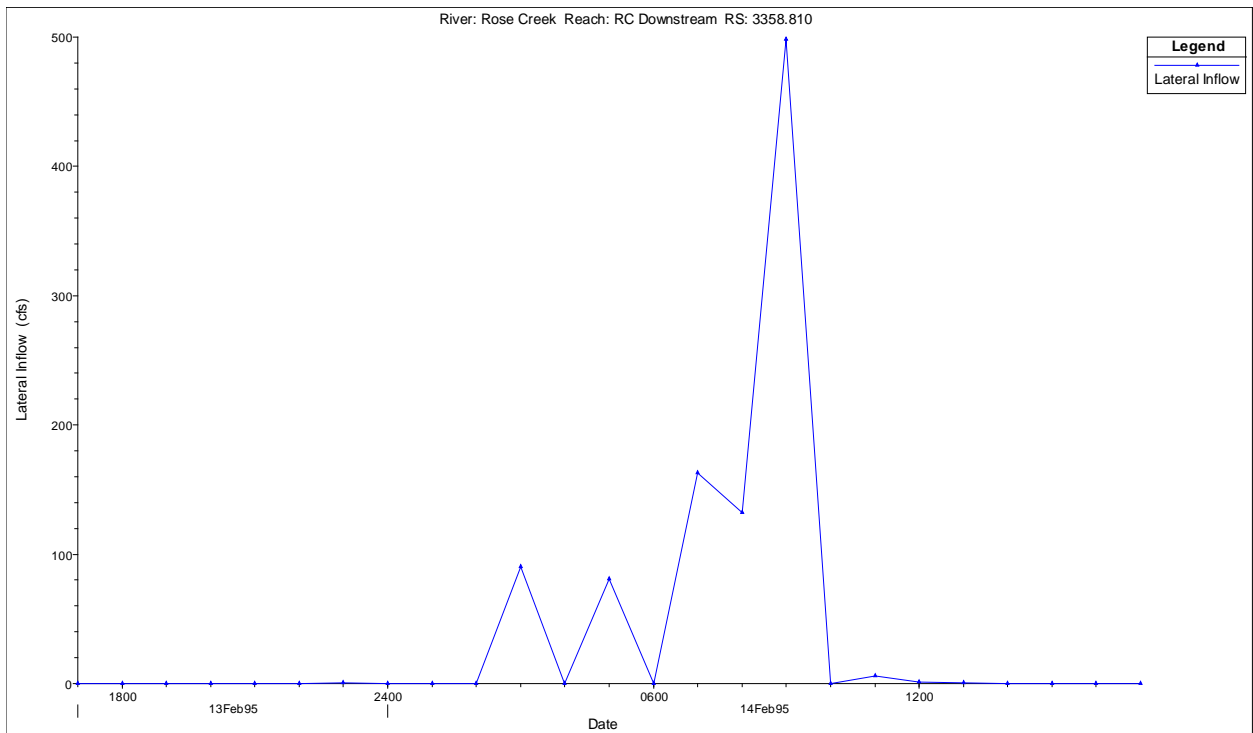
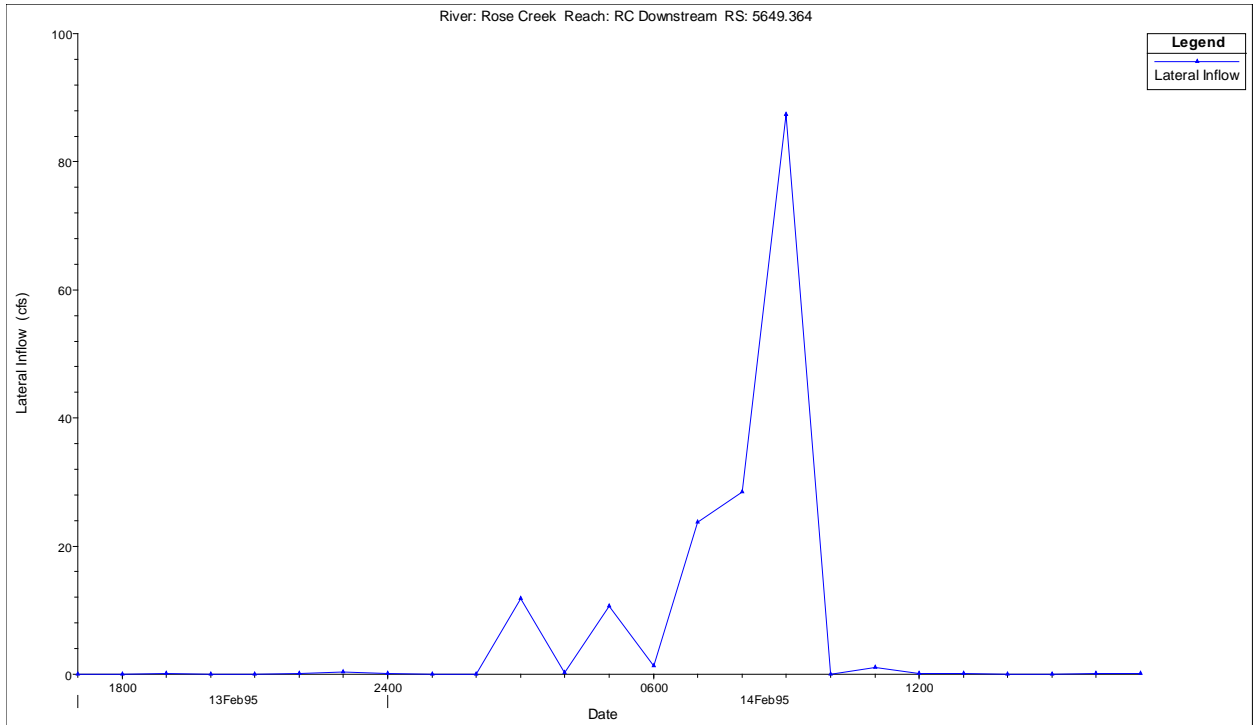


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
San Clemente 5-yr Boundary Condition – RS 2955.1

Project No. 08-1032

Created By: JS

Figure 114



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.

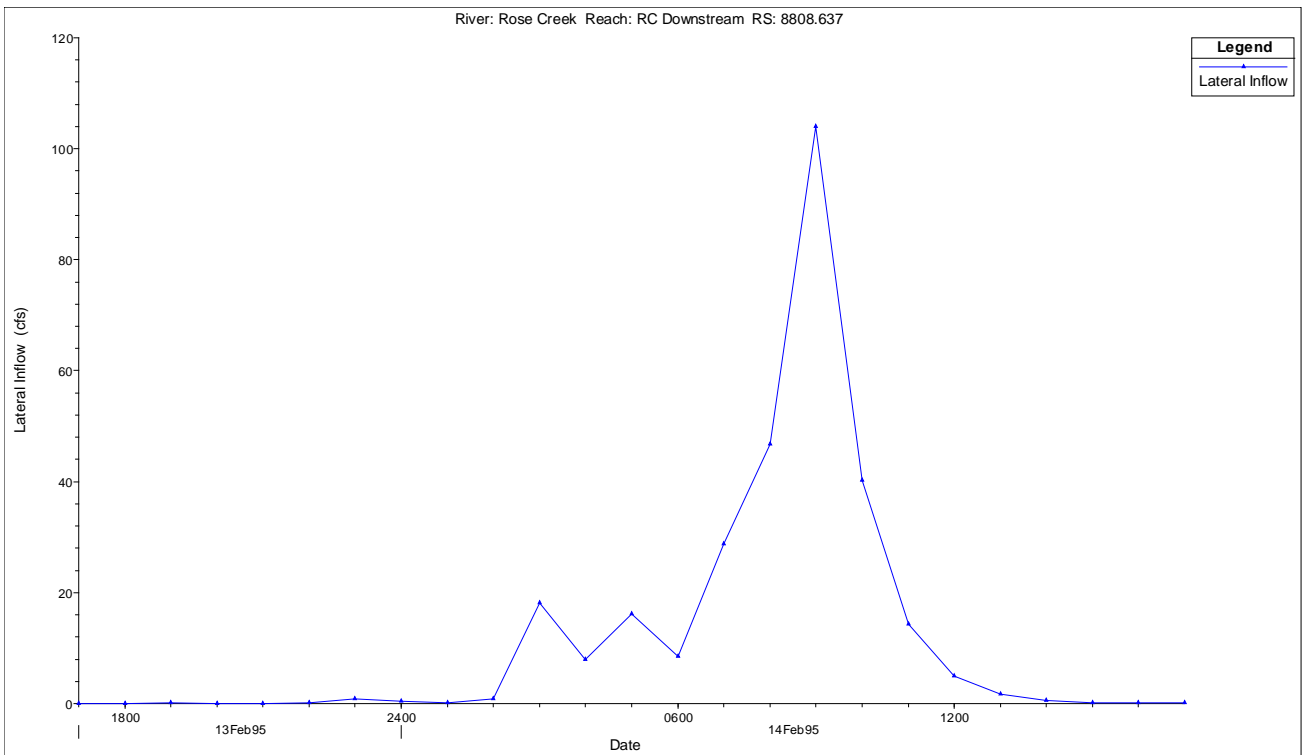
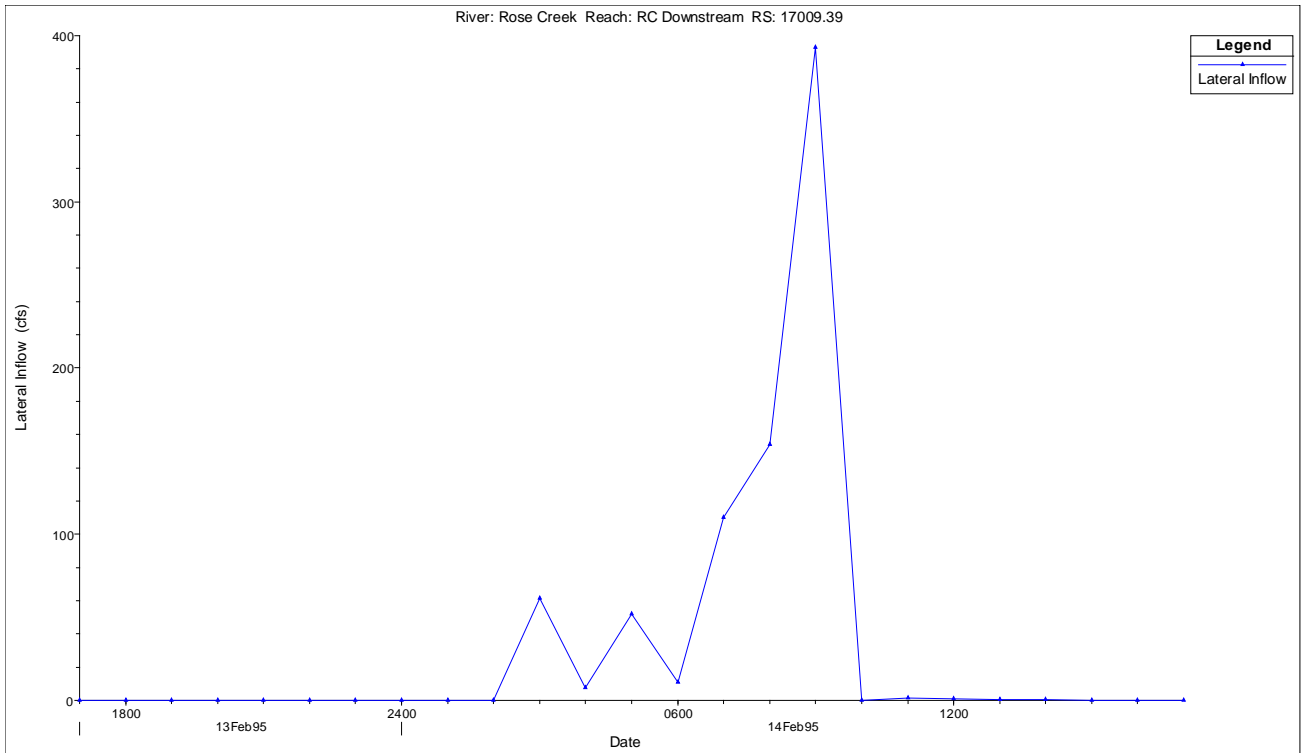


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 5-yr Boundary Condition – RS 5649.4, 3358.8

Project No. 08-1032

Created By: JS

Figure 115



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.

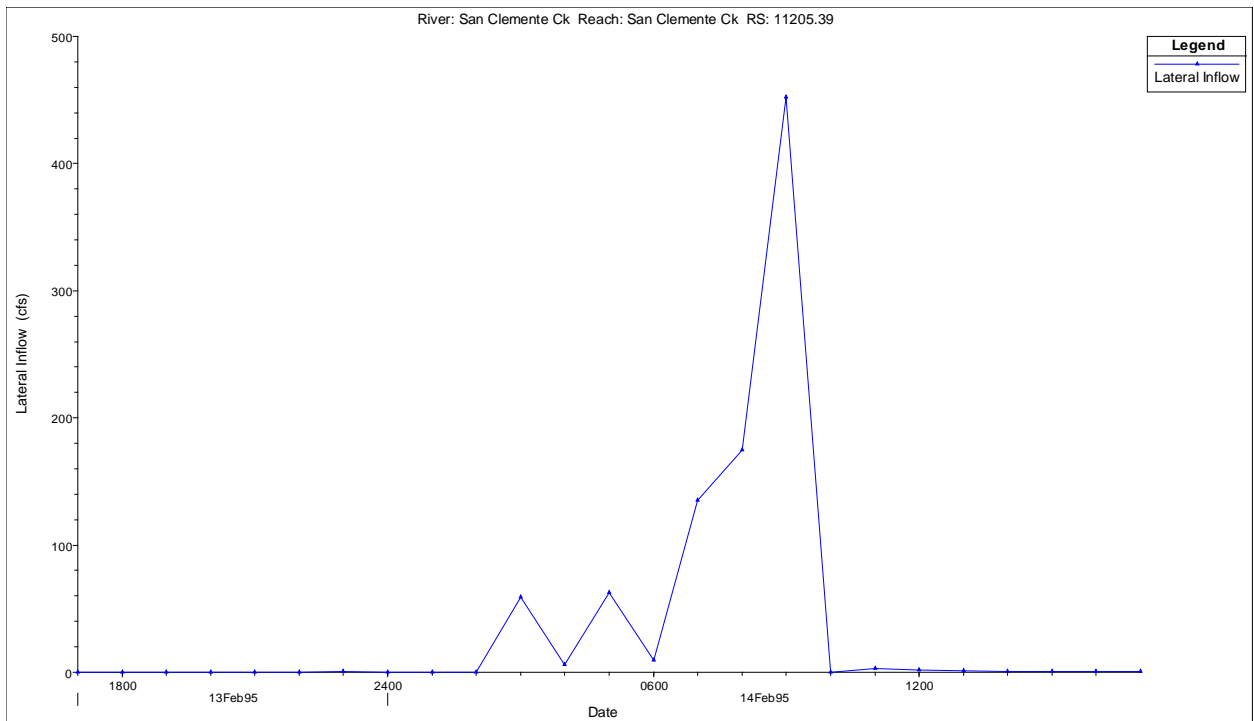
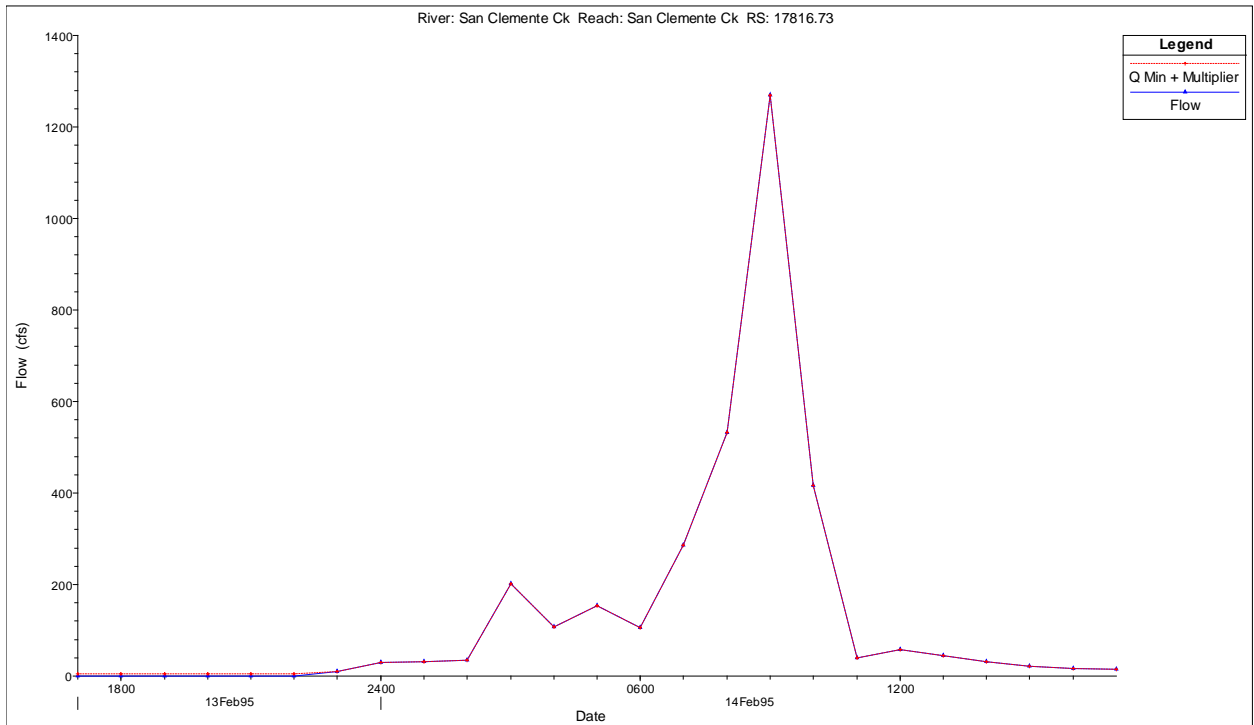


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 5-yr Boundary Condition – RS 17009.4, 8808.6

Project No. 08-1032

Created By: JS

Figure 116



Notes: Unsteady Flow
Boundary Condition for San
Clemente Creek.

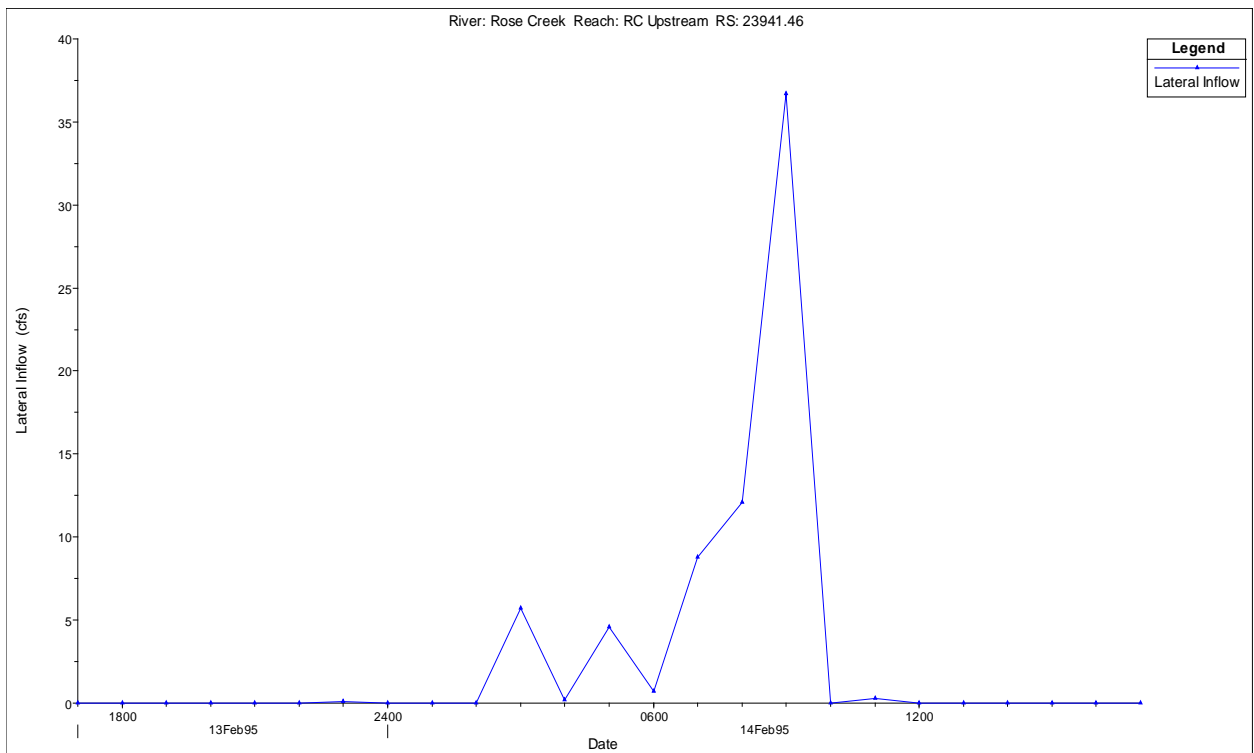
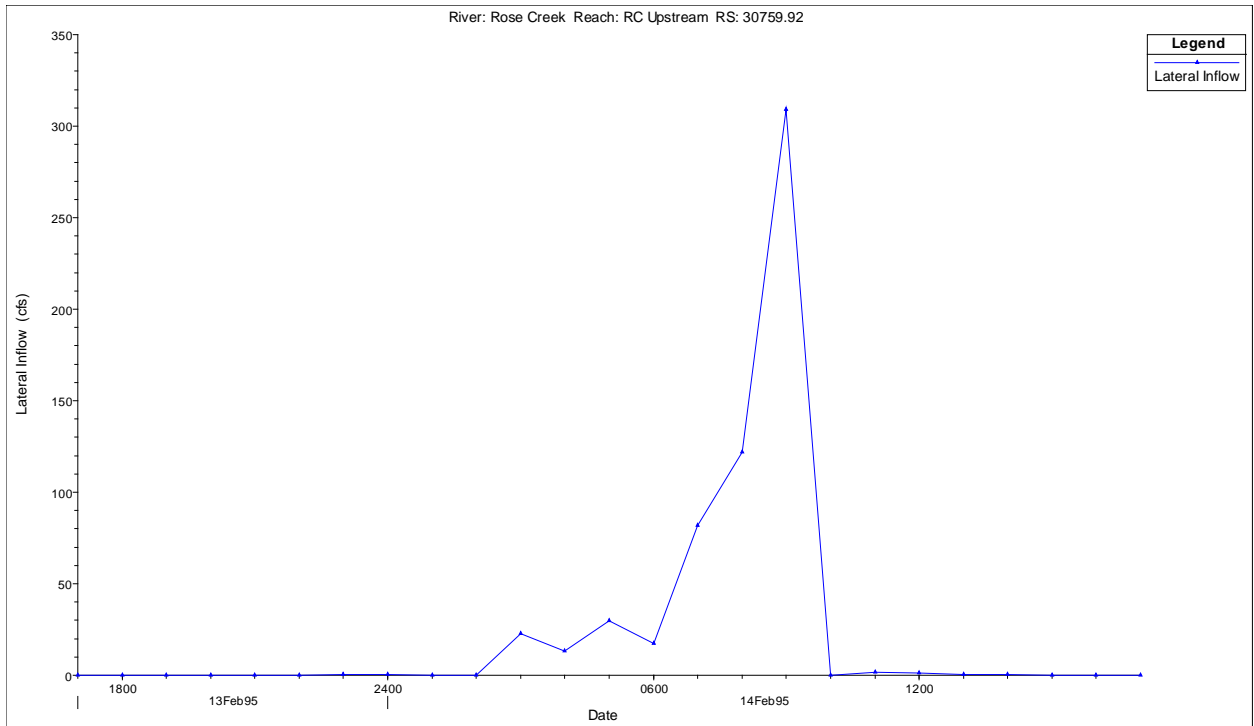


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
San Clemente 5-yr Boundary Condition – RS 17816.7, 11205.4

Project No. 08-1032

Created By: JS

Figure 117



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.

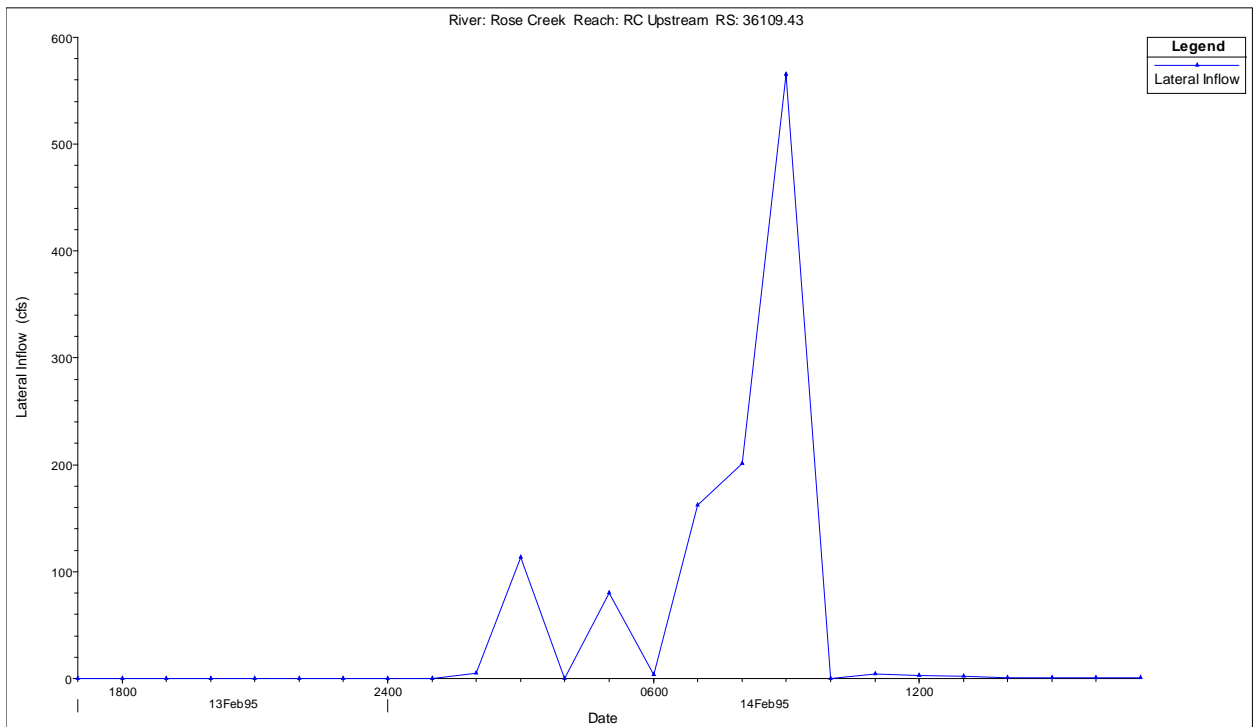
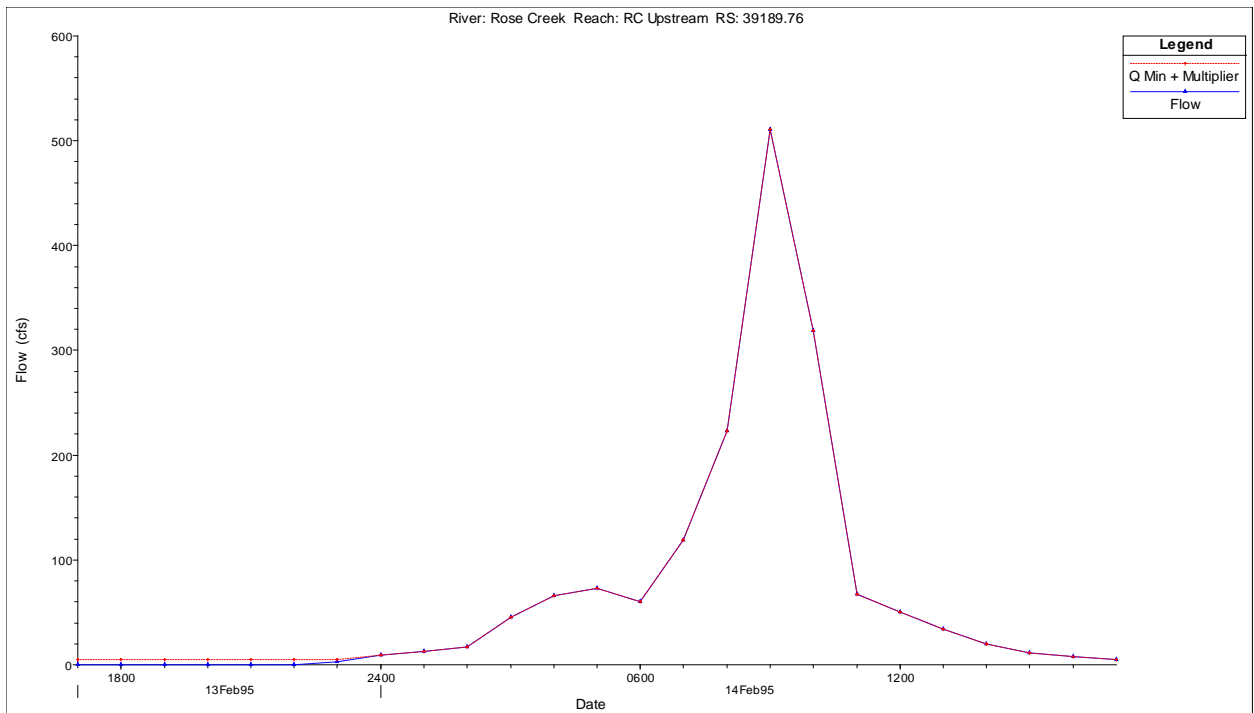


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 5-yr Boundary Condition – RS 30759.9, 23941.5

Project No. 08-1032

Created By: JS

Figure 119



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.

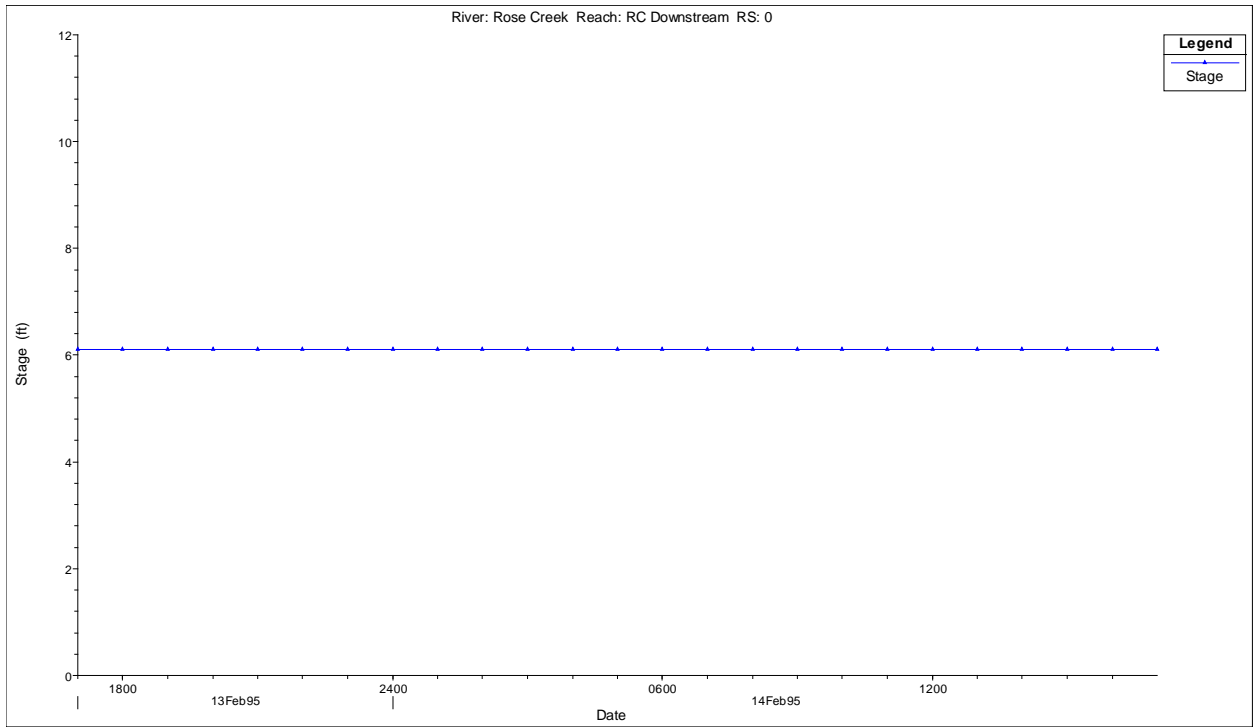


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 5-yr Boundary Condition – RS 39189.8, 36109.4

Project No. 08-1032

Created By: JS

Figure 120



Notes: Unsteady Stage
Boundary Condition for Rose
Creek. Vertical Datum
References NAVD 88.

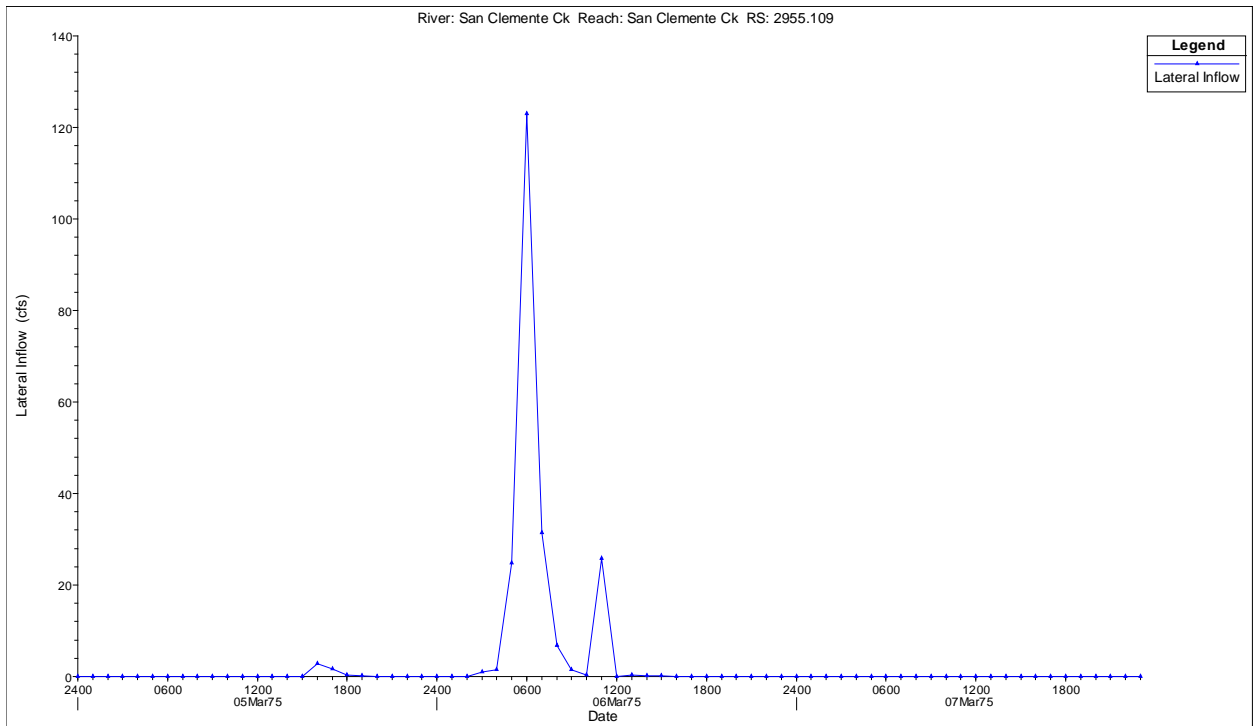


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 5-yr Boundary Condition – RS 0

Project No. 08-1032

Created By: JS

Figure 121



Notes: Unsteady Flow
Boundary Condition for San Clemente Creek.

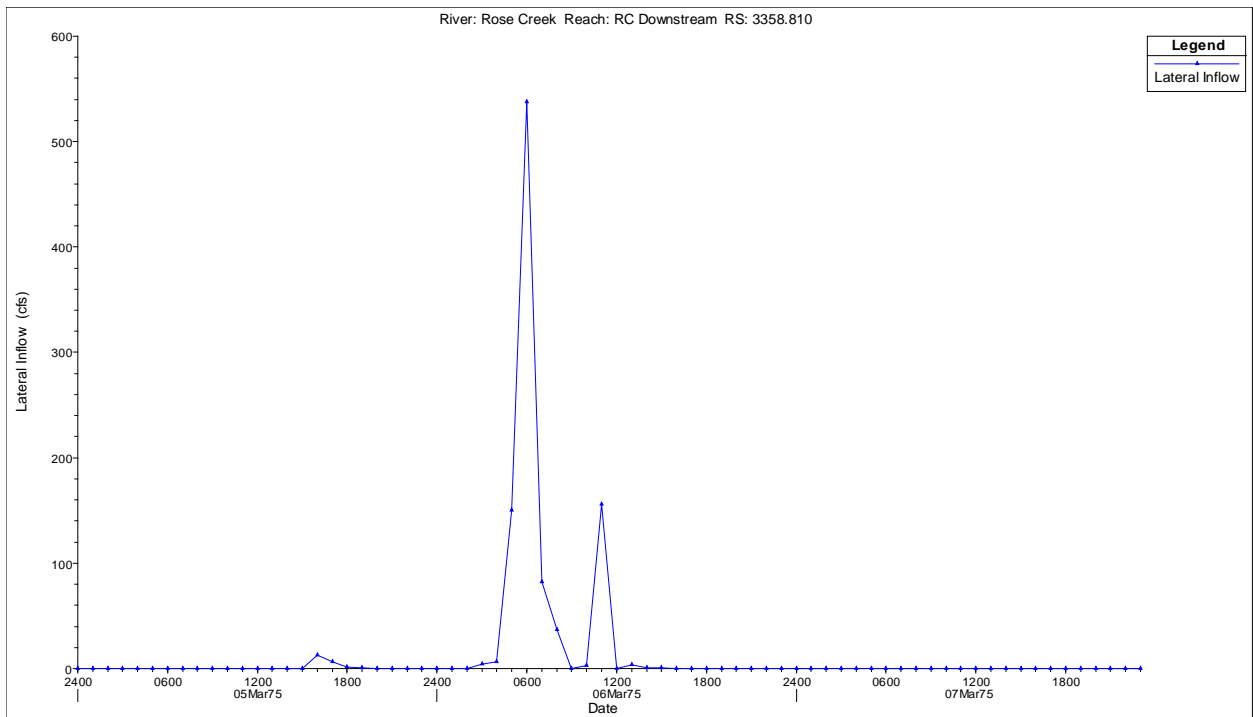
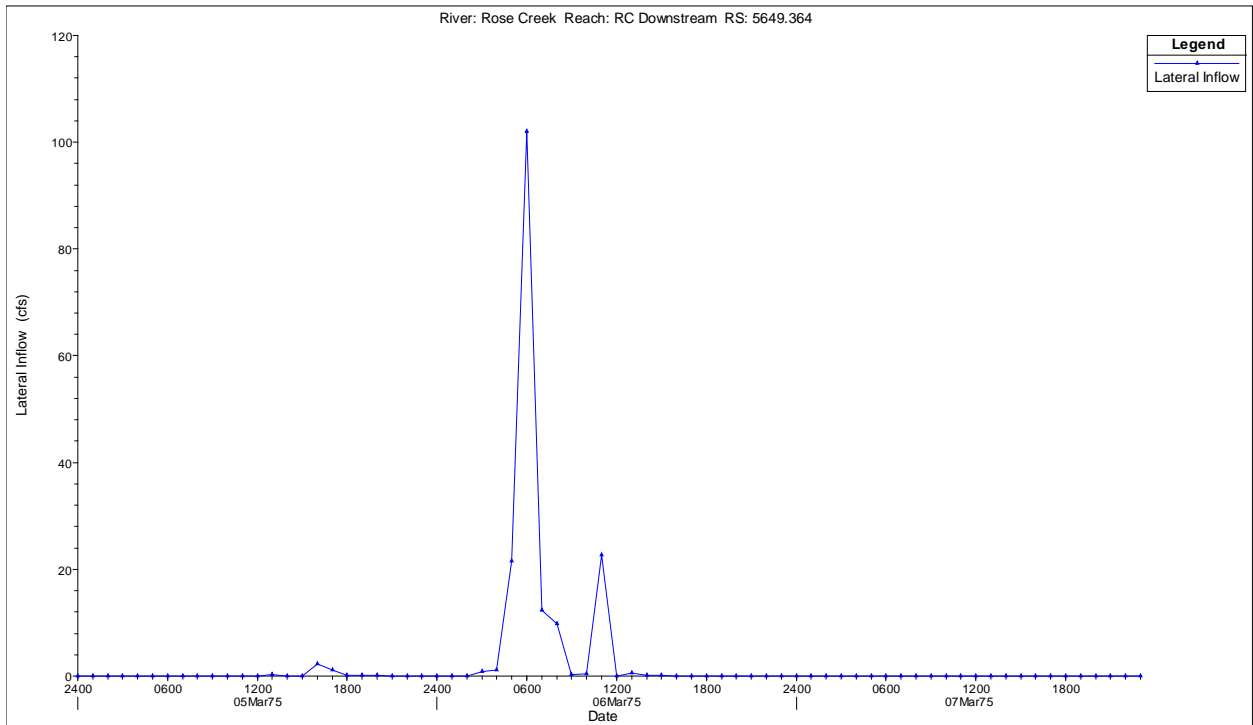


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
San Clemente 10-yr Boundary Condition – RS 2955.1

Project No. 08-1032

Created By: JS

Figure 122



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.

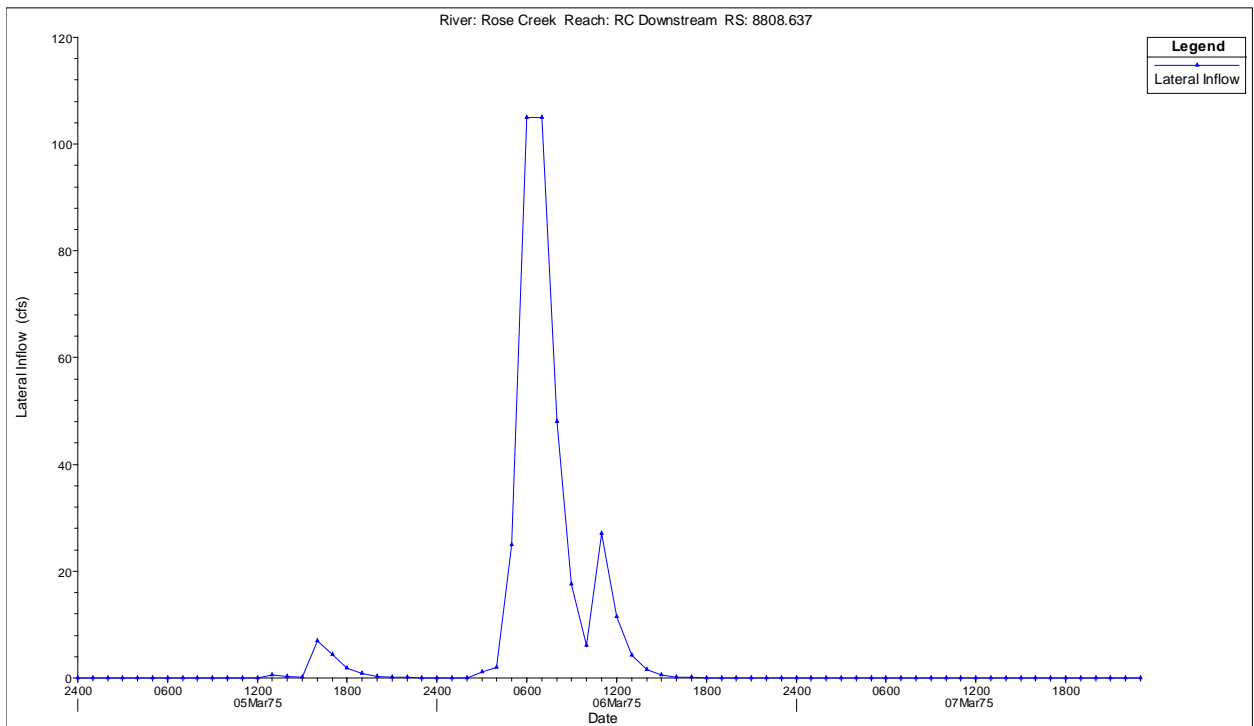
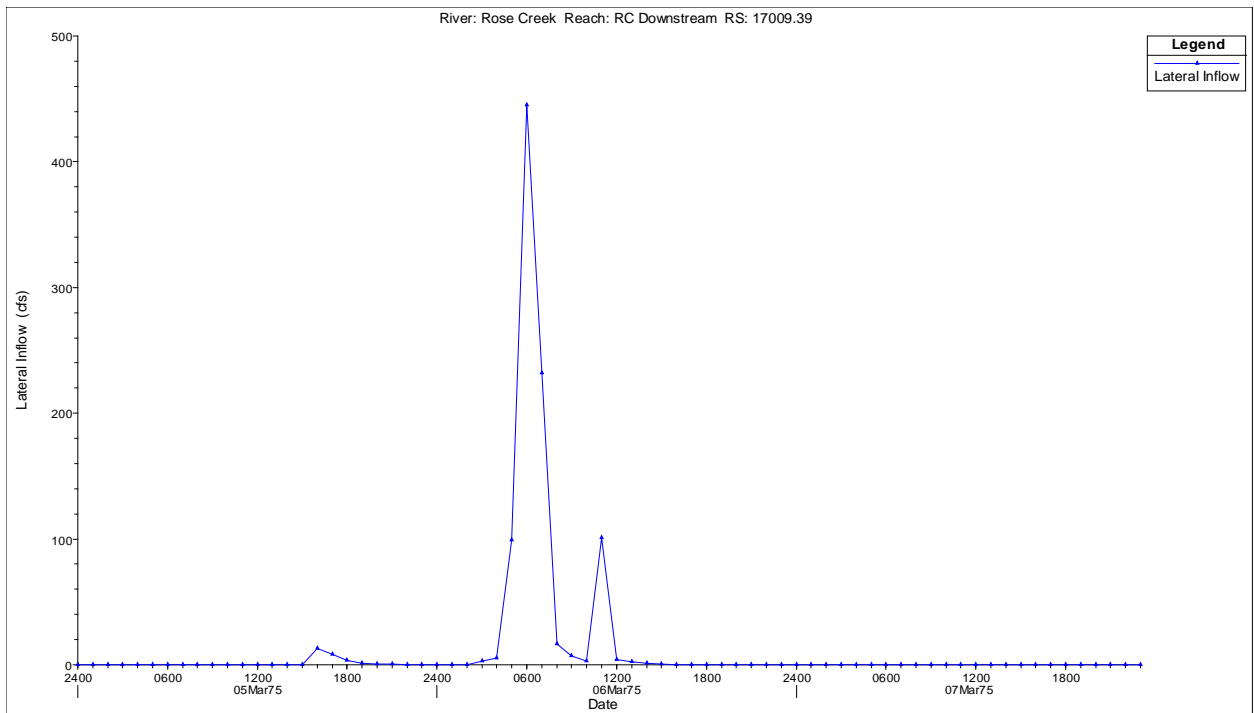


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 10-yr Boundary Condition – RS 5649.4, 3358.8

Project No. 08-1032

Created By: JS

Figure 123



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.

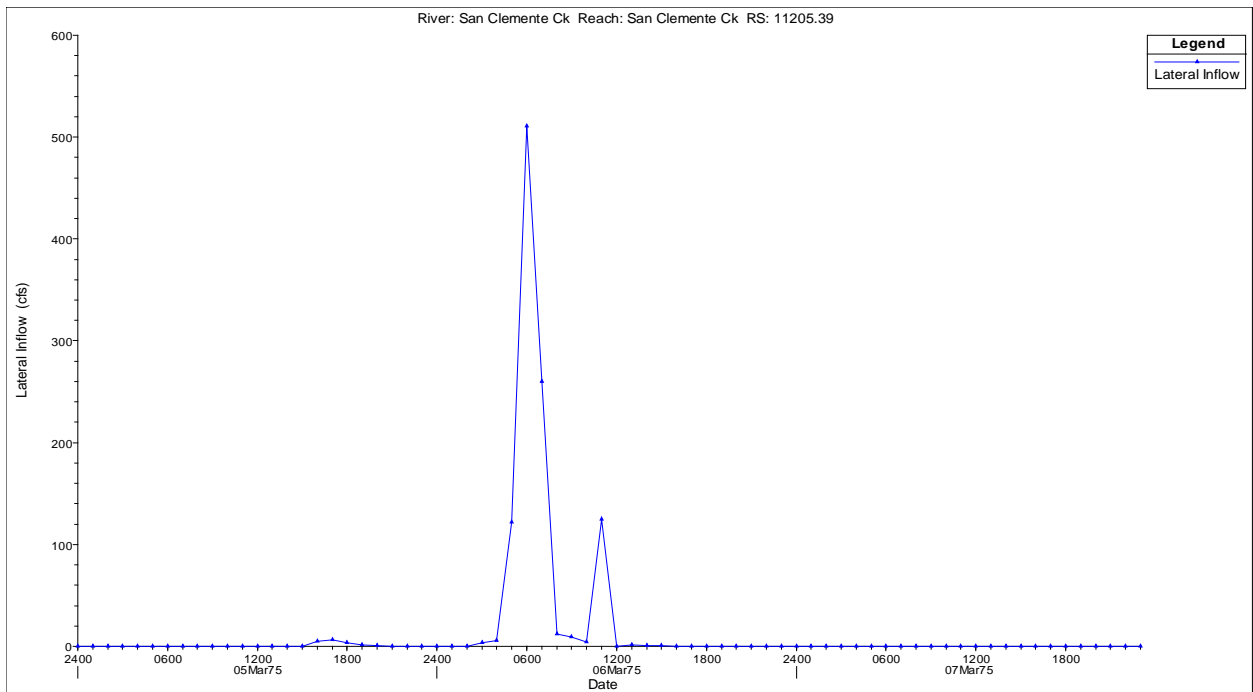
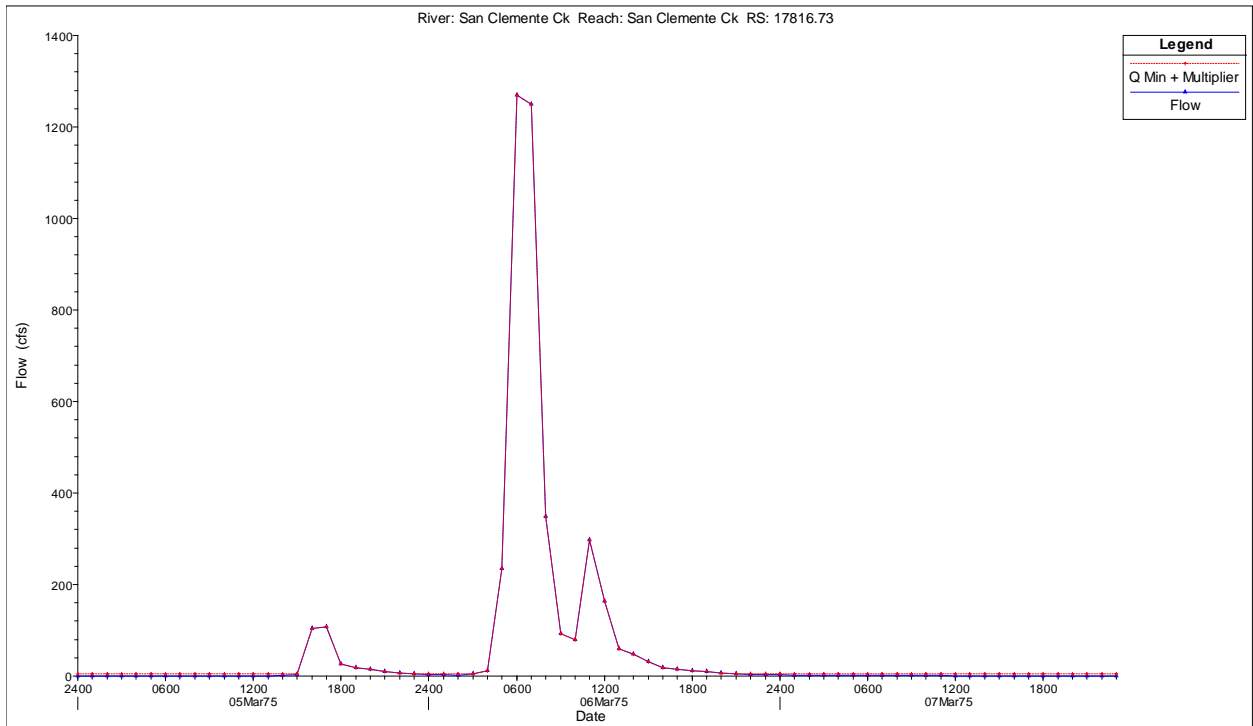


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 10-yr Boundary Condition – RS 17009.4, 8808.64

Project No. 08-1032

Created By: JS

Figure 124



Notes: Unsteady Flow
Boundary Condition for San
Clemente Creek.

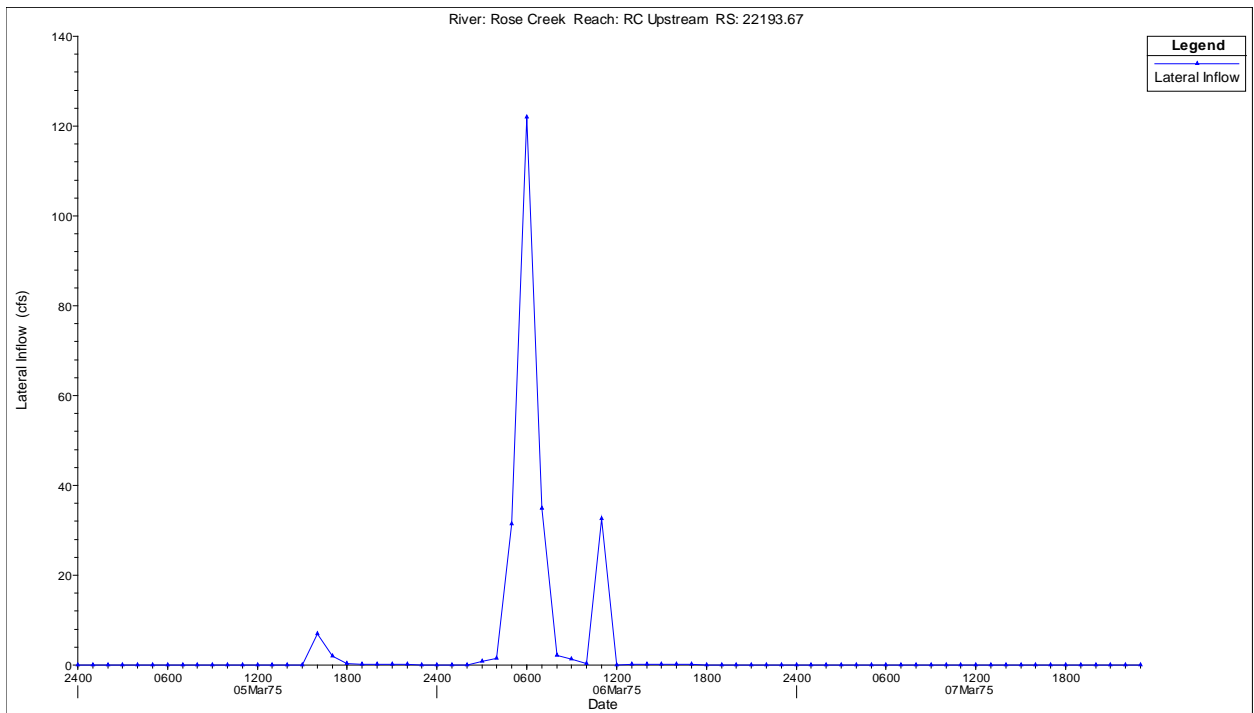
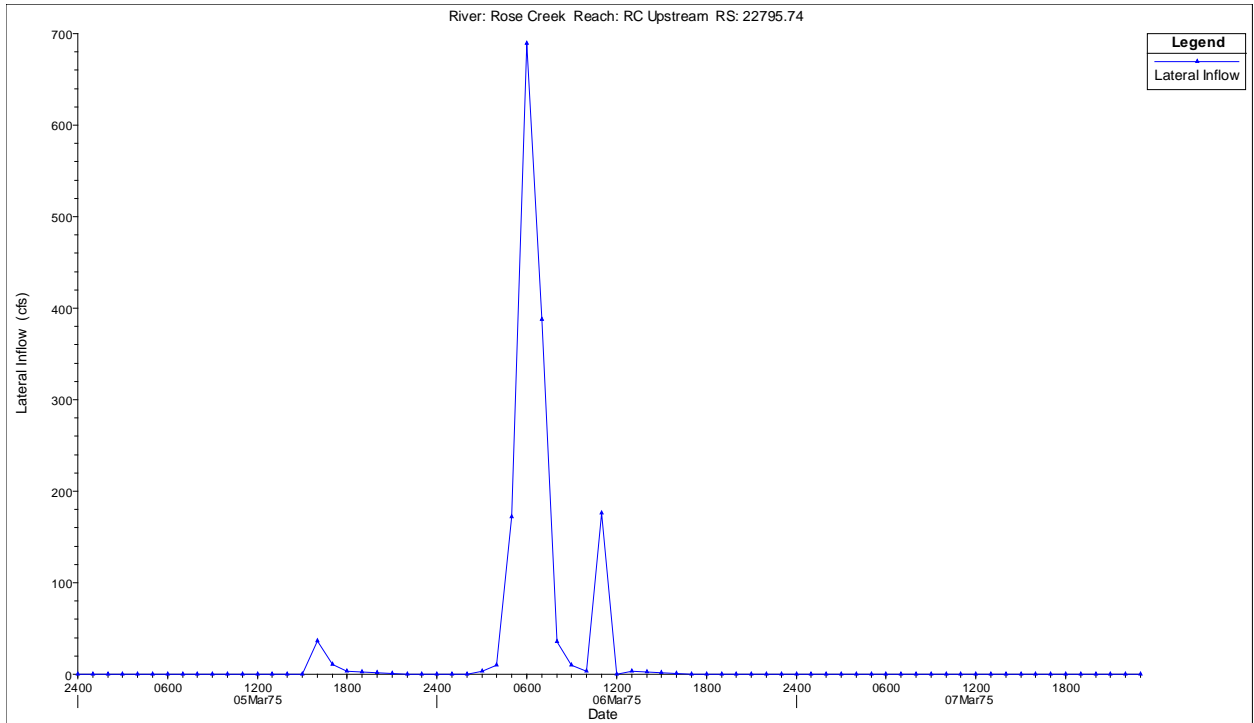


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
San Clemente 10-yr Boundary Condition – RS 17816.7, 11205.4

Project No. 08-1032

Created By: JS

Figure 125



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.

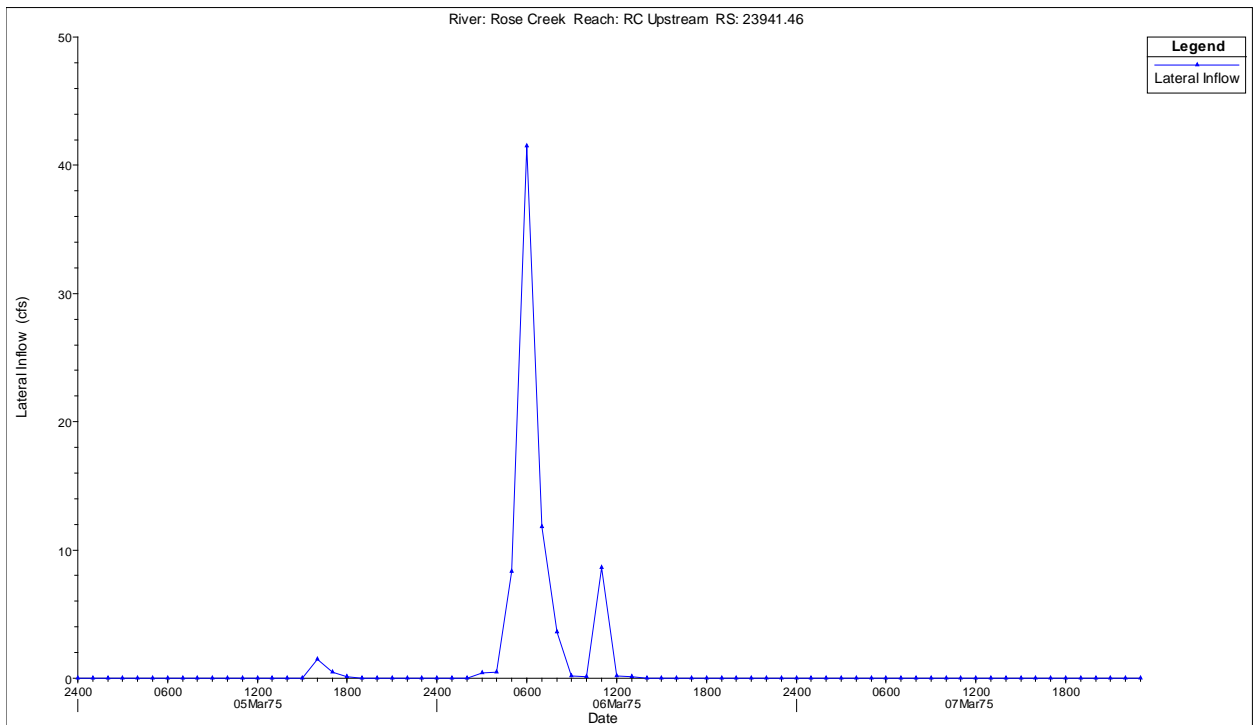
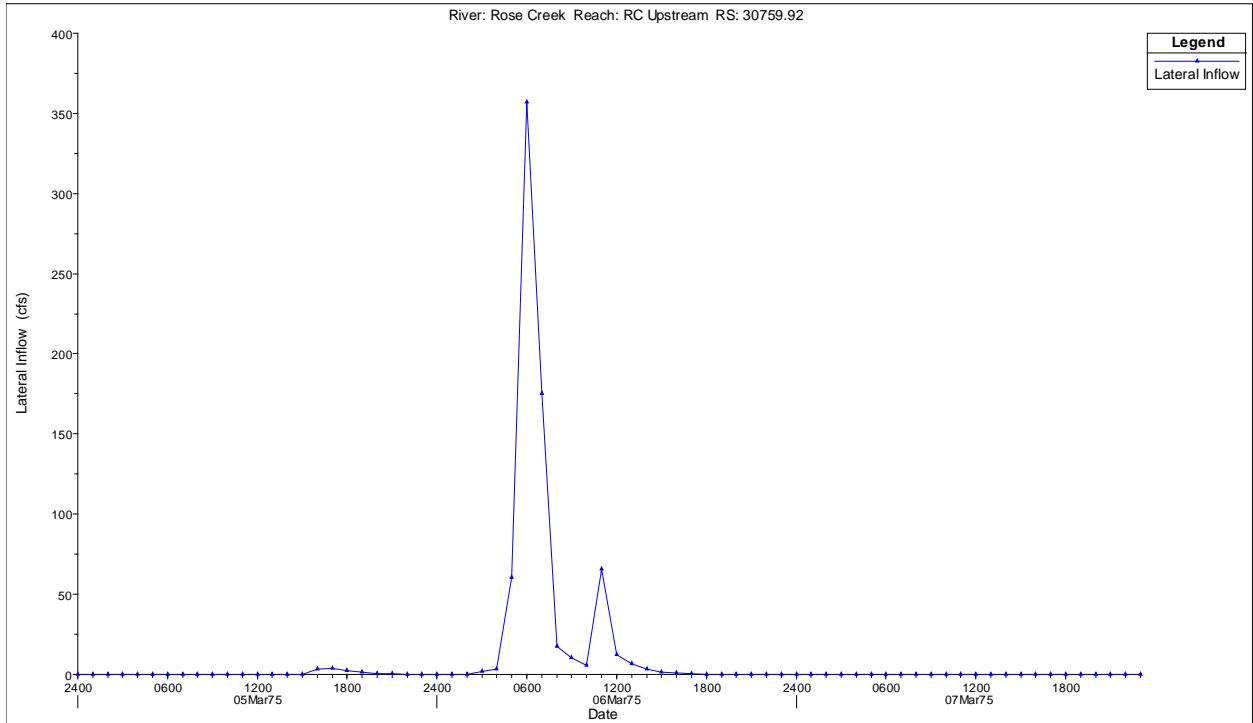


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 10-yr Boundary Condition – RS 22795.7, 22193.6

Project No. 08-1032

Created By: JS

Figure 126



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.

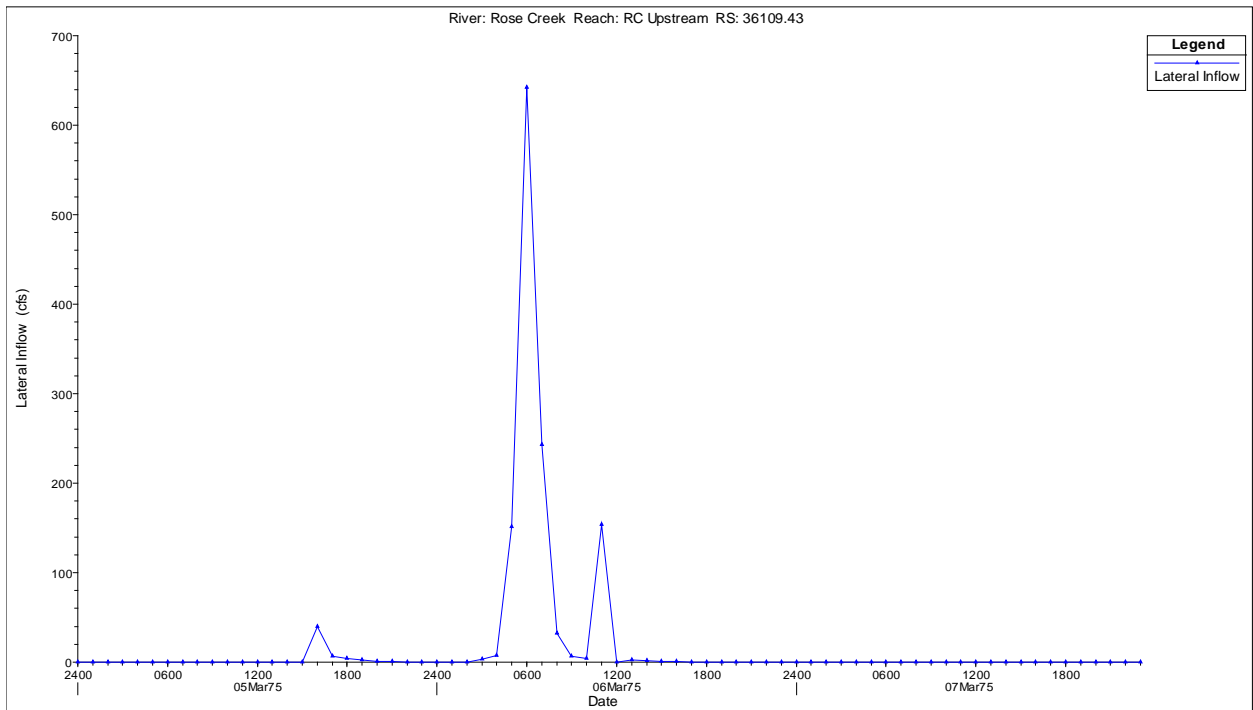
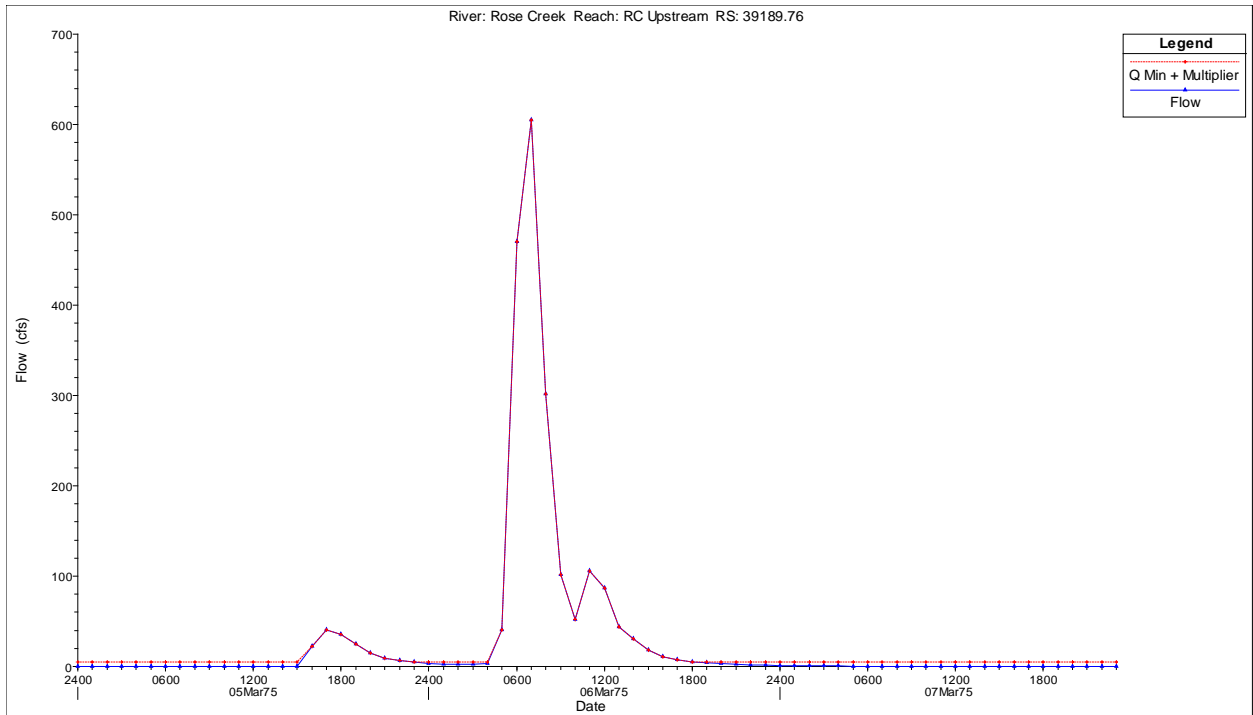


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 10-yr Boundary Condition – RS 30759.9, 23941.5

Project No. 08-1032

Created By: JS

Figure 127



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.

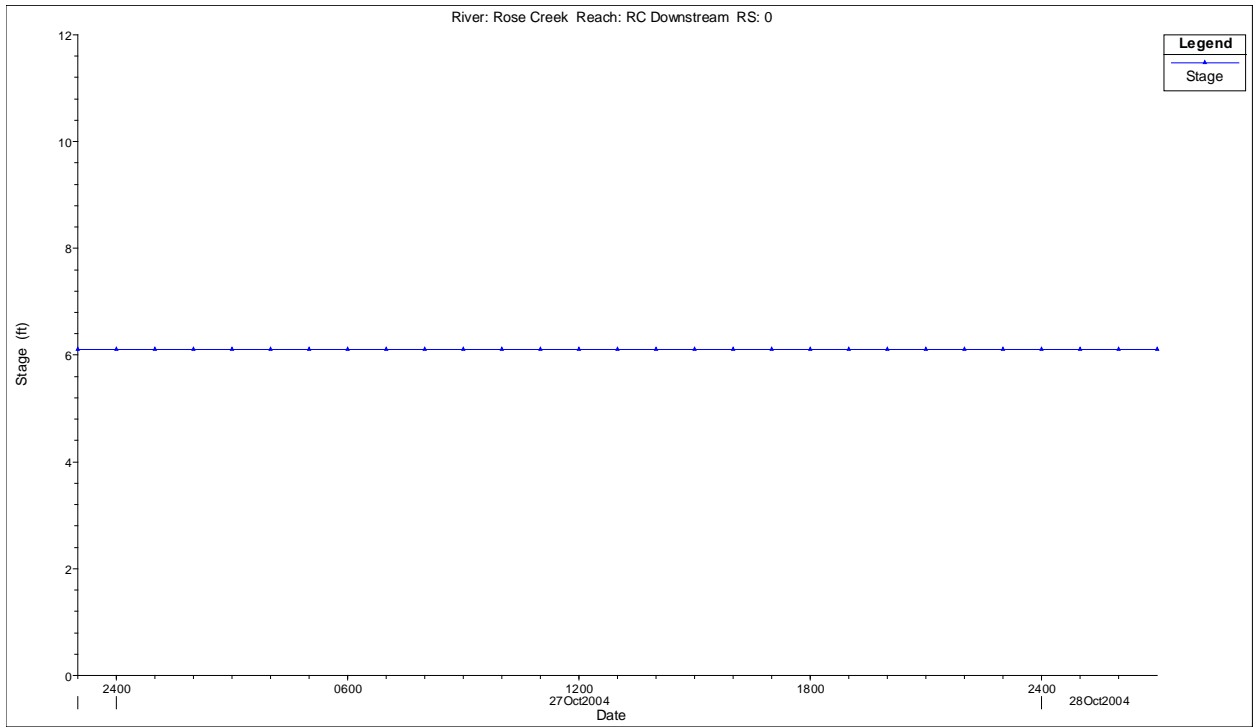


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 10-yr Boundary Condition – RS 39189.8, 36109.4

Project No. 08-1032

Created By: JS

Figure 128



Notes: Unsteady Stage
Boundary Condition for Rose
Creek. Vertical Datum
References NAVD 88.

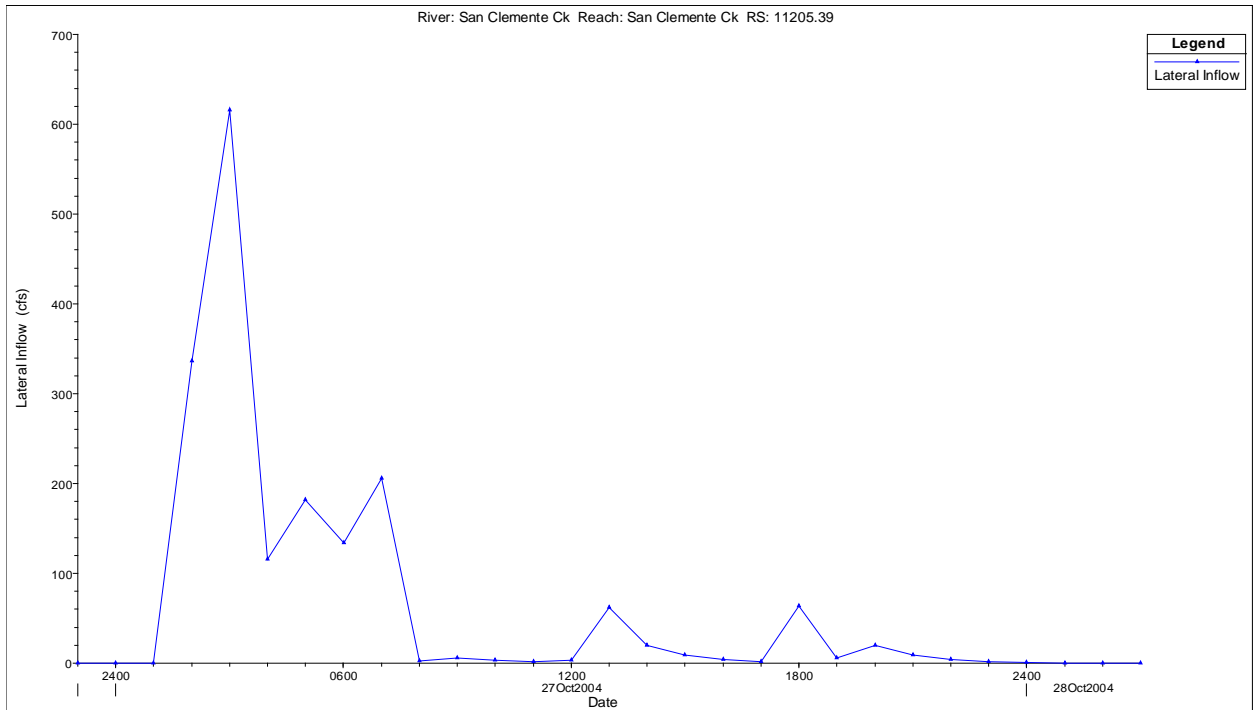
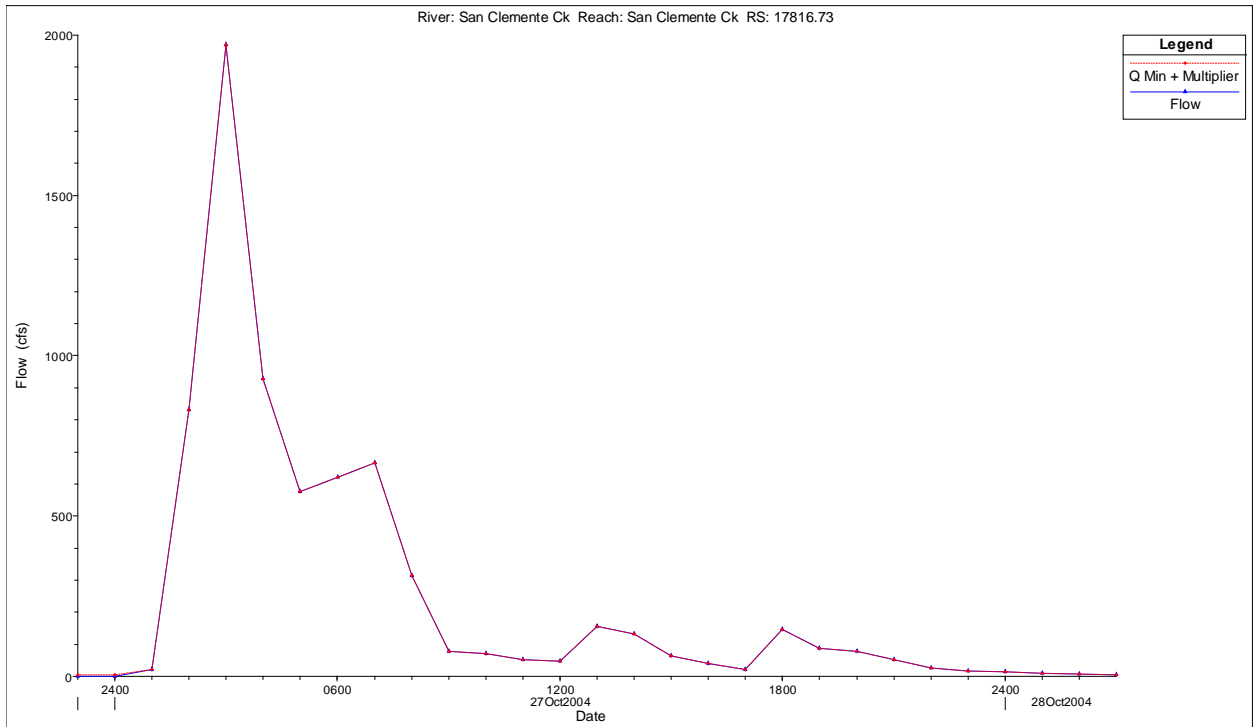


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 5-yr Boundary Condition – RS 0

Project No. 08-1032

Created By: JS

Figure 129



Notes: Unsteady Flow
Boundary Condition for San
Clemente Creek.

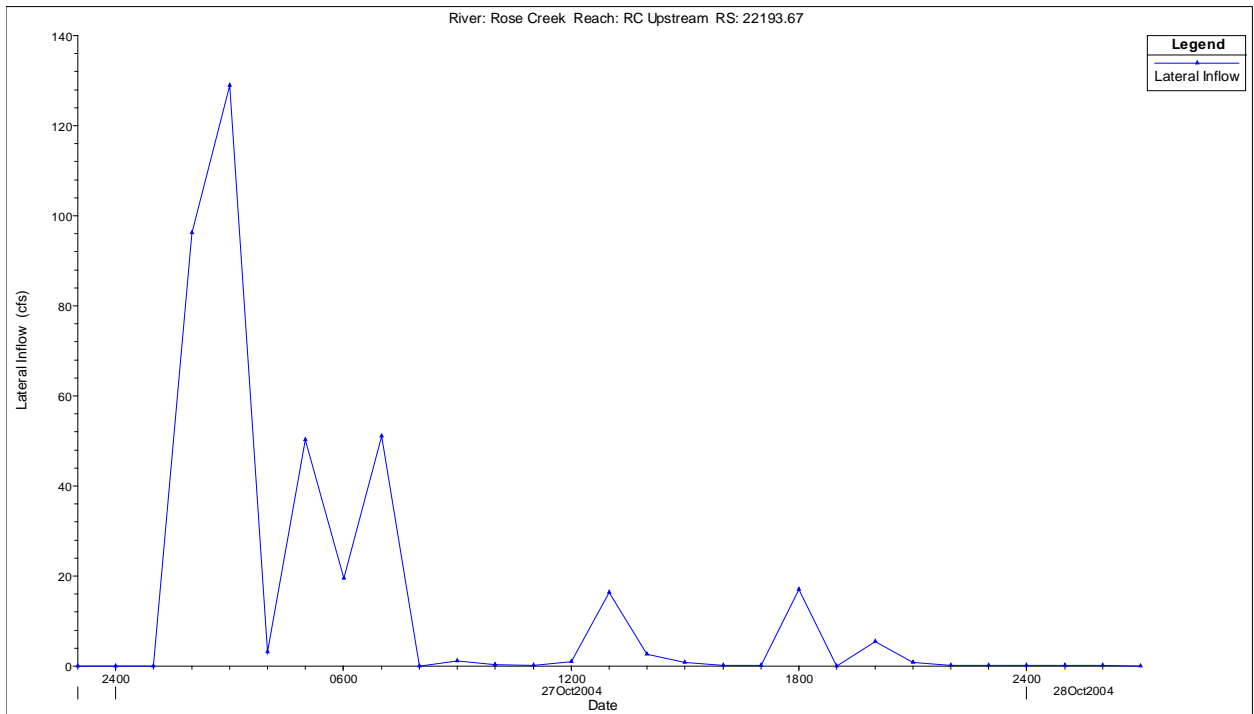
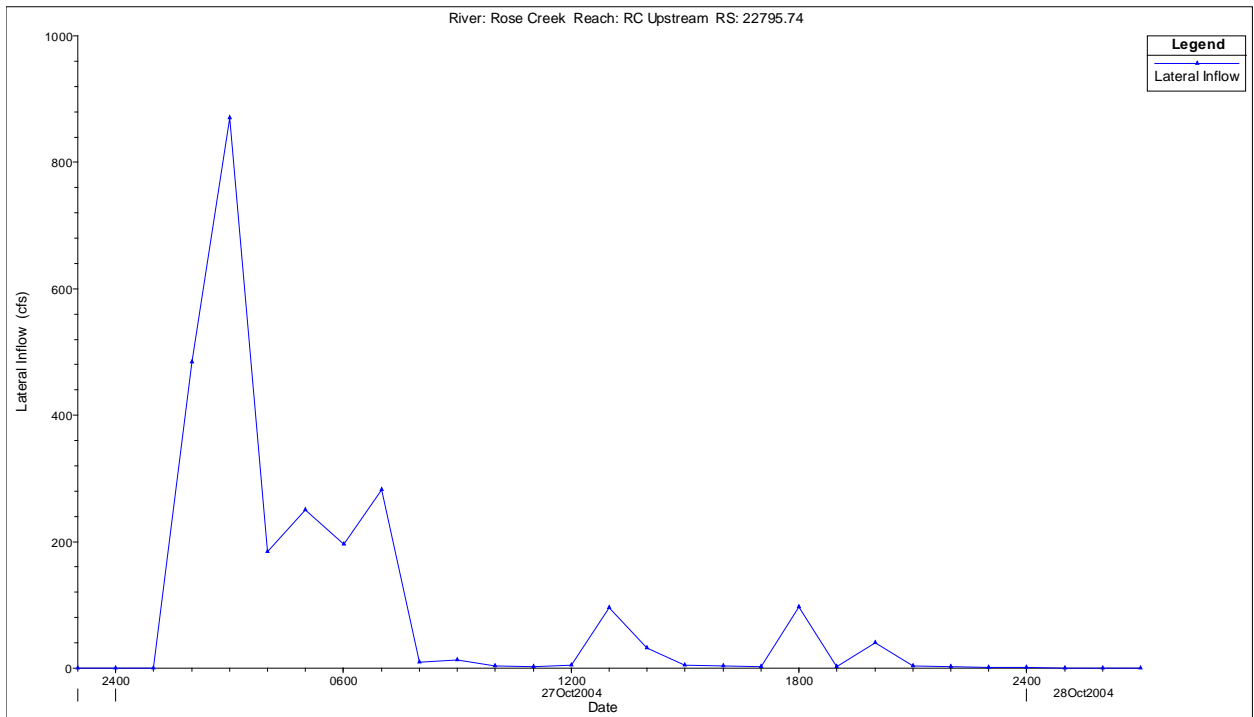


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
San Clemente 25-yr Boundary Condition – RS 17816.7, 11205.4

Project No. 08-1032

Created By: JS

Figure 130



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.

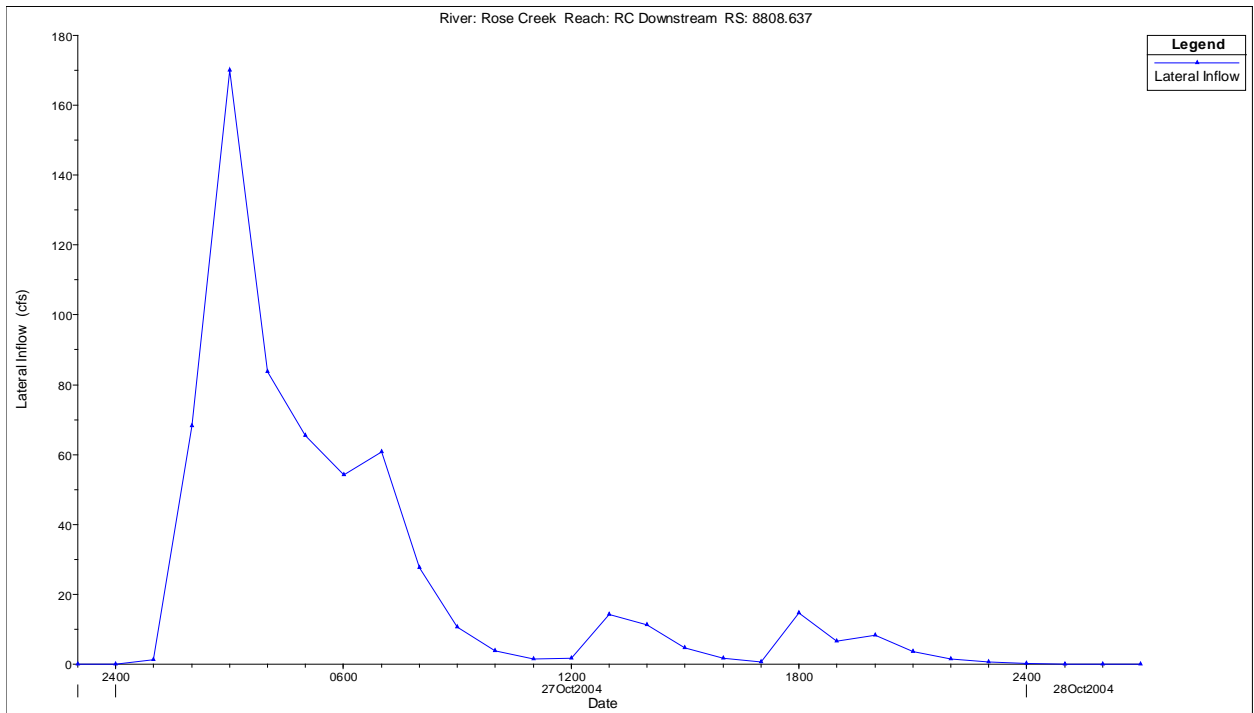
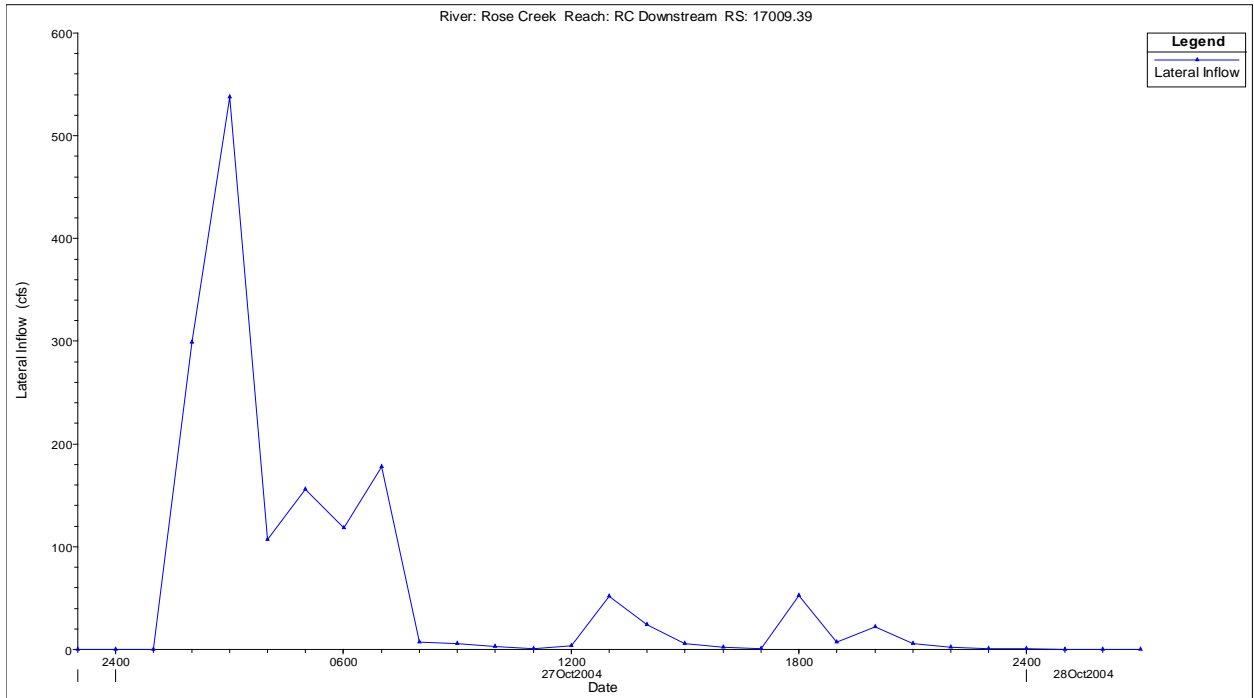


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 25-yr Boundary Condition – RS 22795.7, 22193.6

Project No. 08-1032

Created By: JS

Figure 131



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.

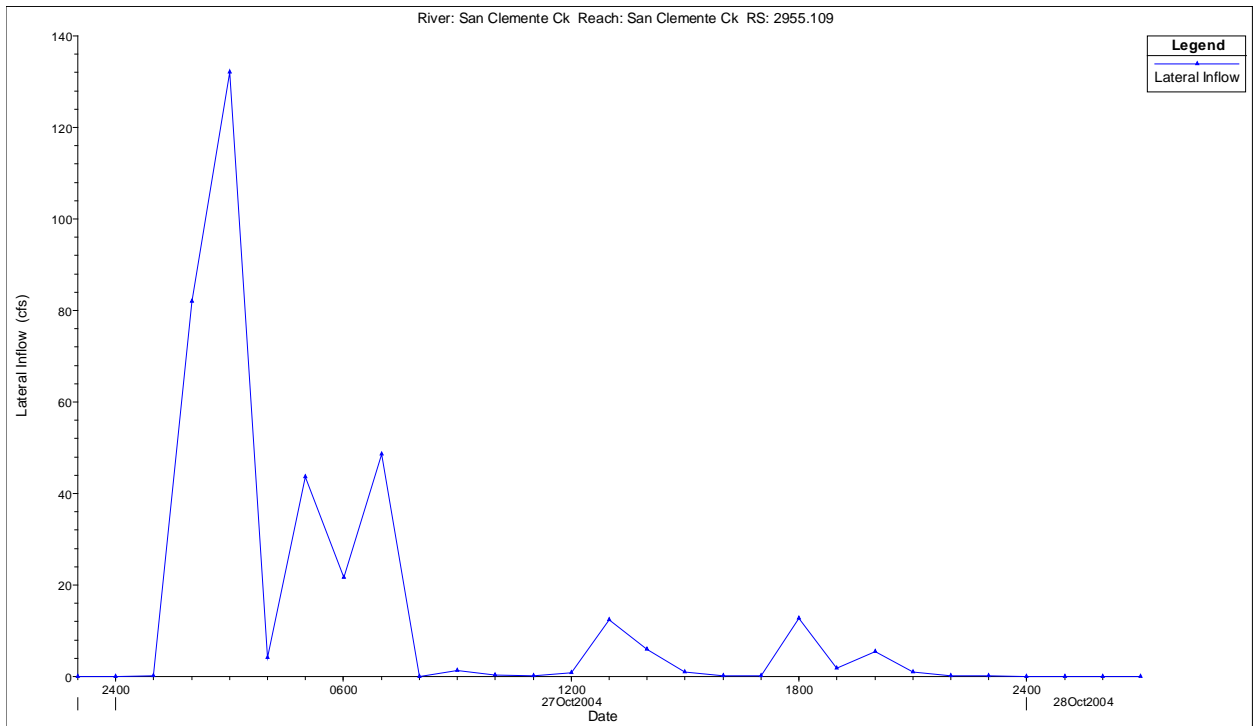


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 25-yr Boundary Condition – RS 17009.4, 8808.64

Project No. 08-1032

Created By: JS

Figure 132



Notes: Unsteady Flow
Boundary Condition for San
Clemente Creek.

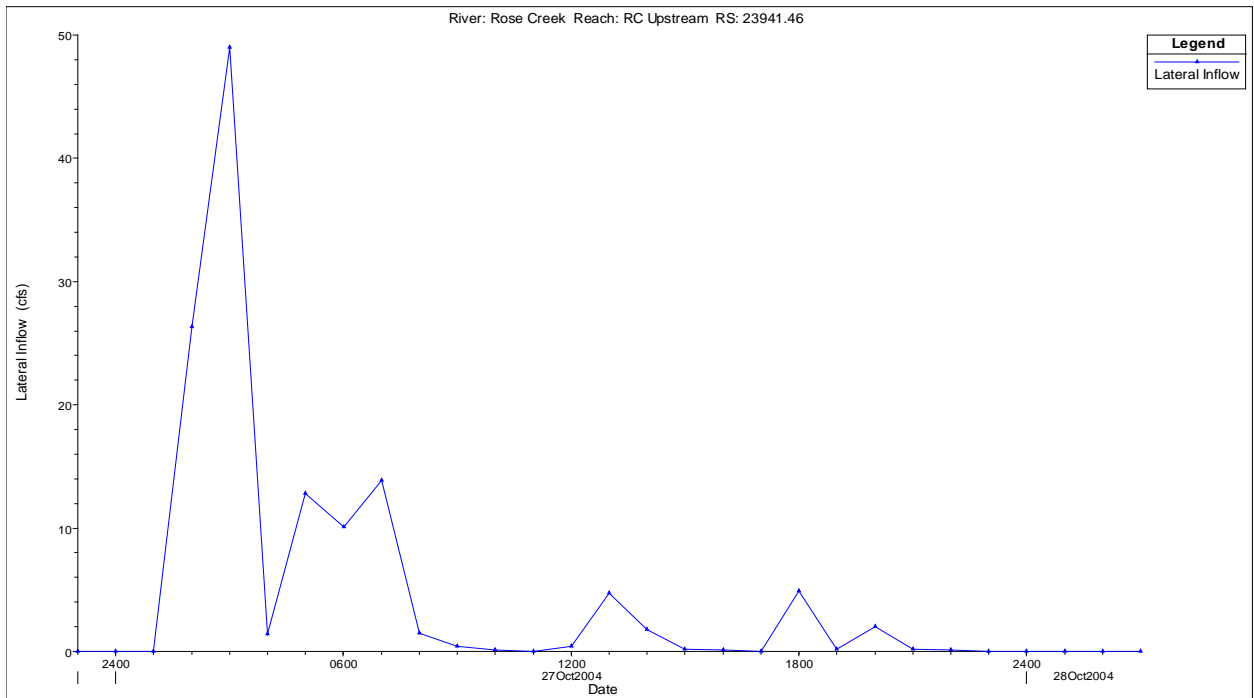
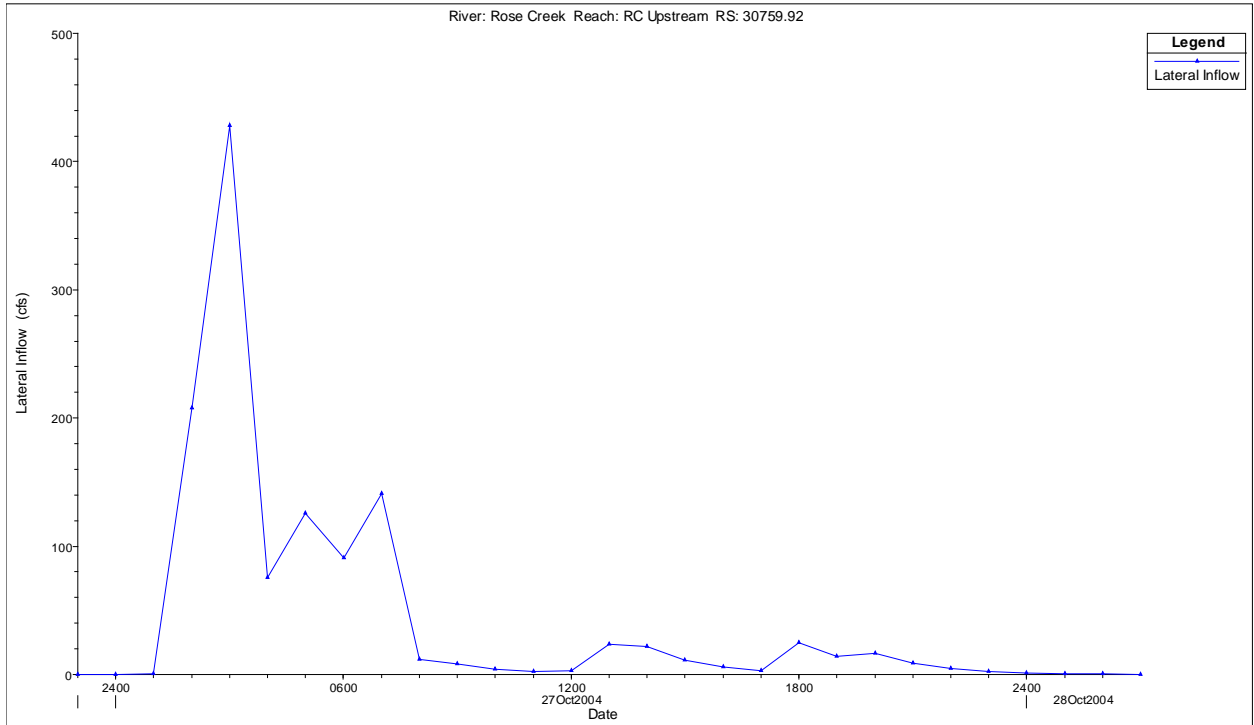


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
San Clemente 25-yr Boundary Condition – RS 2955.1

Project No. 08-1032

Created By: JS

Figure 133



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.

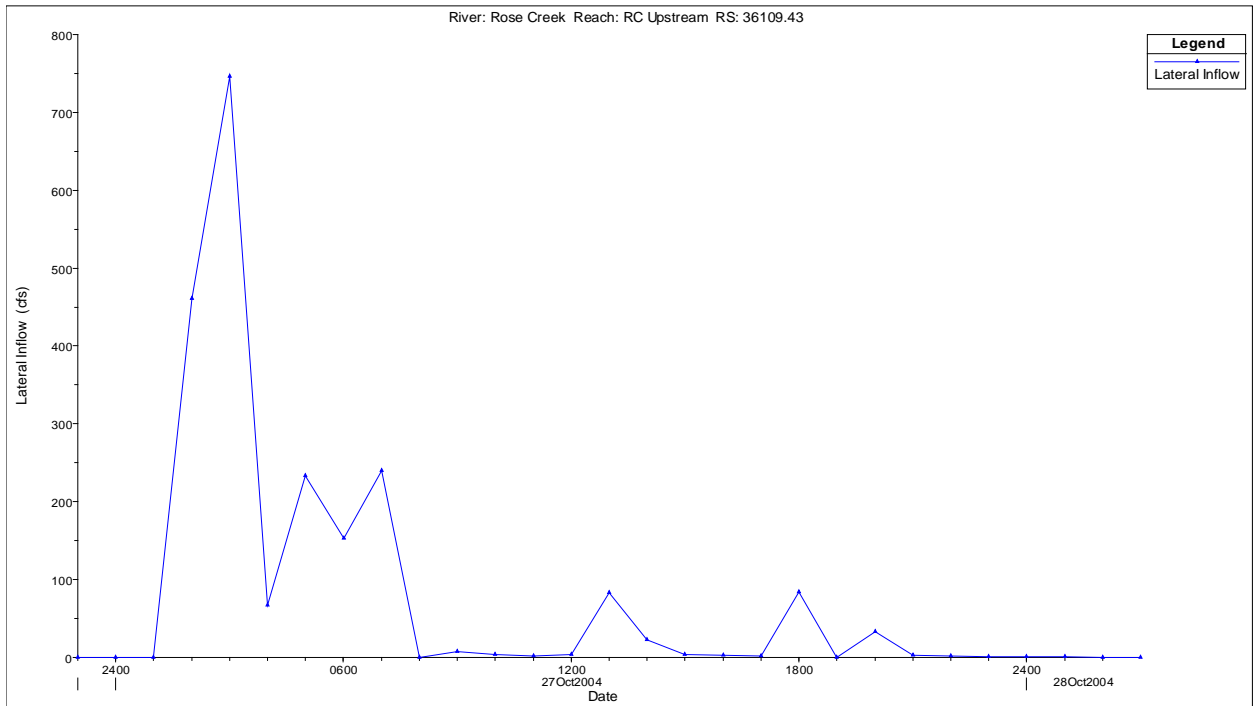
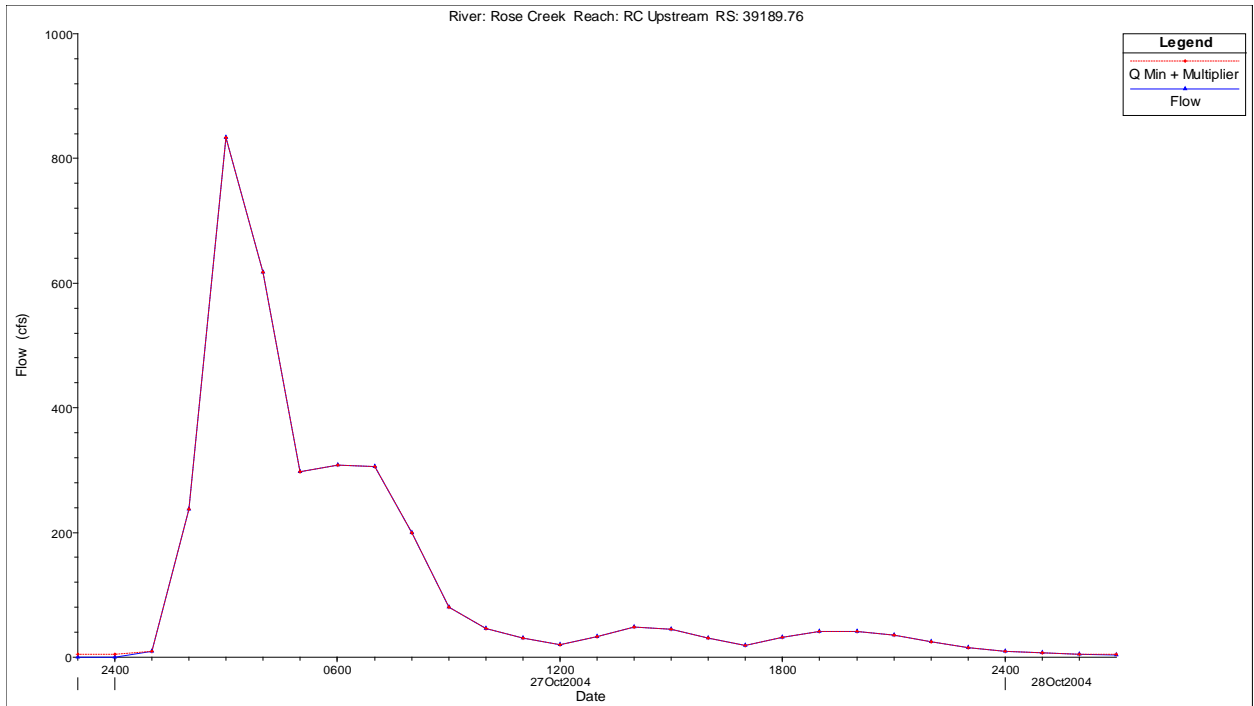


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 25-yr Boundary Condition – RS 30759.9, 23941.5

Project No. 08-1032

Created By: JS

Figure 135



Notes: Unsteady Flow
Boundary Condition for Rose
Creek.



Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Rose Creek 25-yr Boundary Condition – RS 39189.8, 36109.4

Project No. 08-1032

Created By: JS

Figure 136



Notes: Inundation extents for the 2-, 10-, 25-, and 100-year recurrence interval flows on Rose Creek. Aerial image from Bing maps.



Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Inundation Extents – Rose Creek

Project No. 08-1032

Created By: JS

Figure 137



Notes: Inundation extents for the 2-, 10-, 25-, and 100-year recurrence interval flows on Rose Creek. Aerial image from Bing maps.

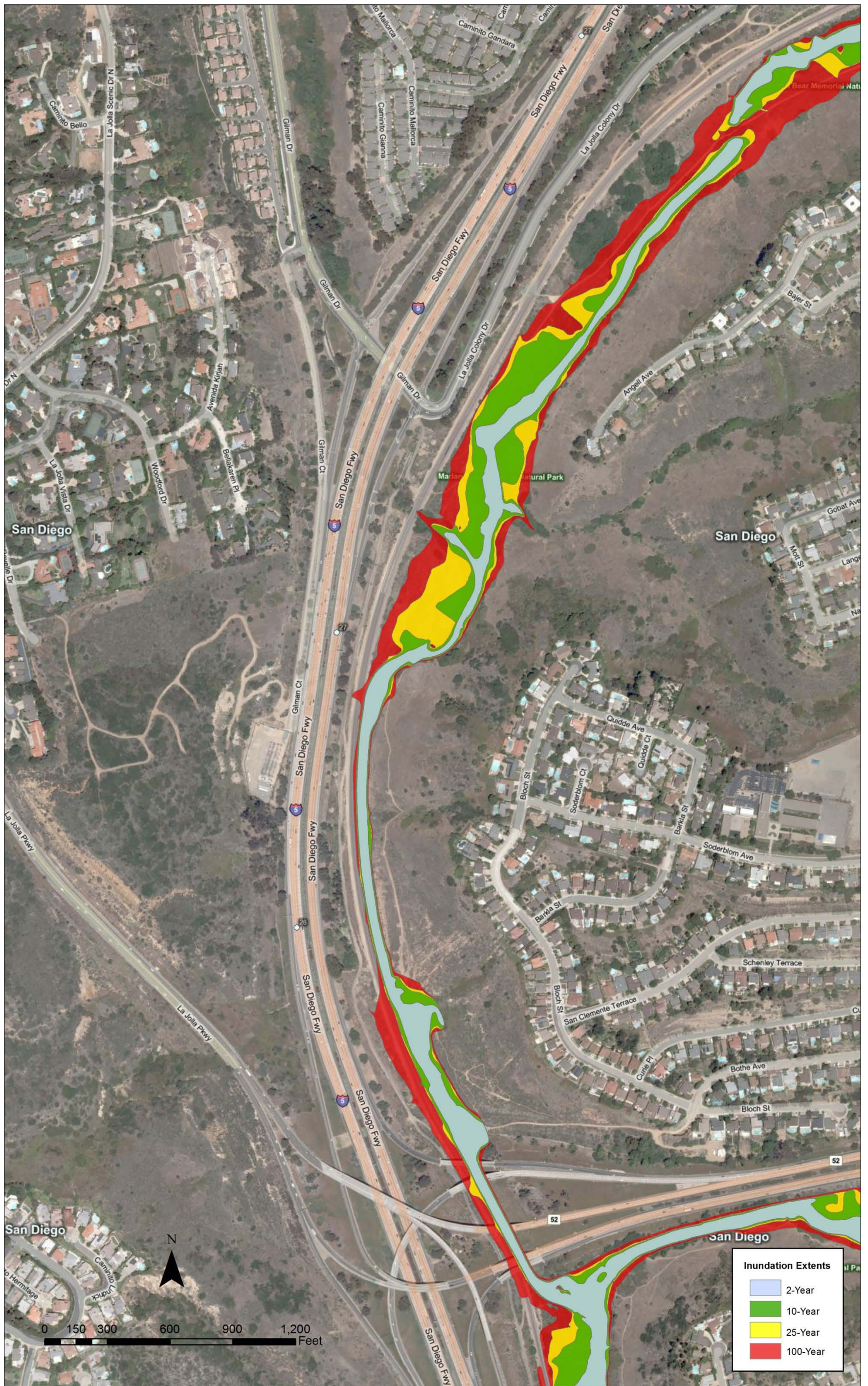


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Inundation Extents – Rose Creek

Project No. 08-1032

Created By: JS

Figure 138



Notes: Inundation extents for the 2-, 10-, 25-, and 100-year recurrence interval flows on Rose Creek. Aerial image from Bing maps.



Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Inundation Extents – Rose Creek

Project No. 08-1032

Created By: JS

Figure 139



Notes: Inundation extents for the 2-, 10-, 25-, and 100-year recurrence interval flows on Rose Creek. Aerial image from Bing maps.

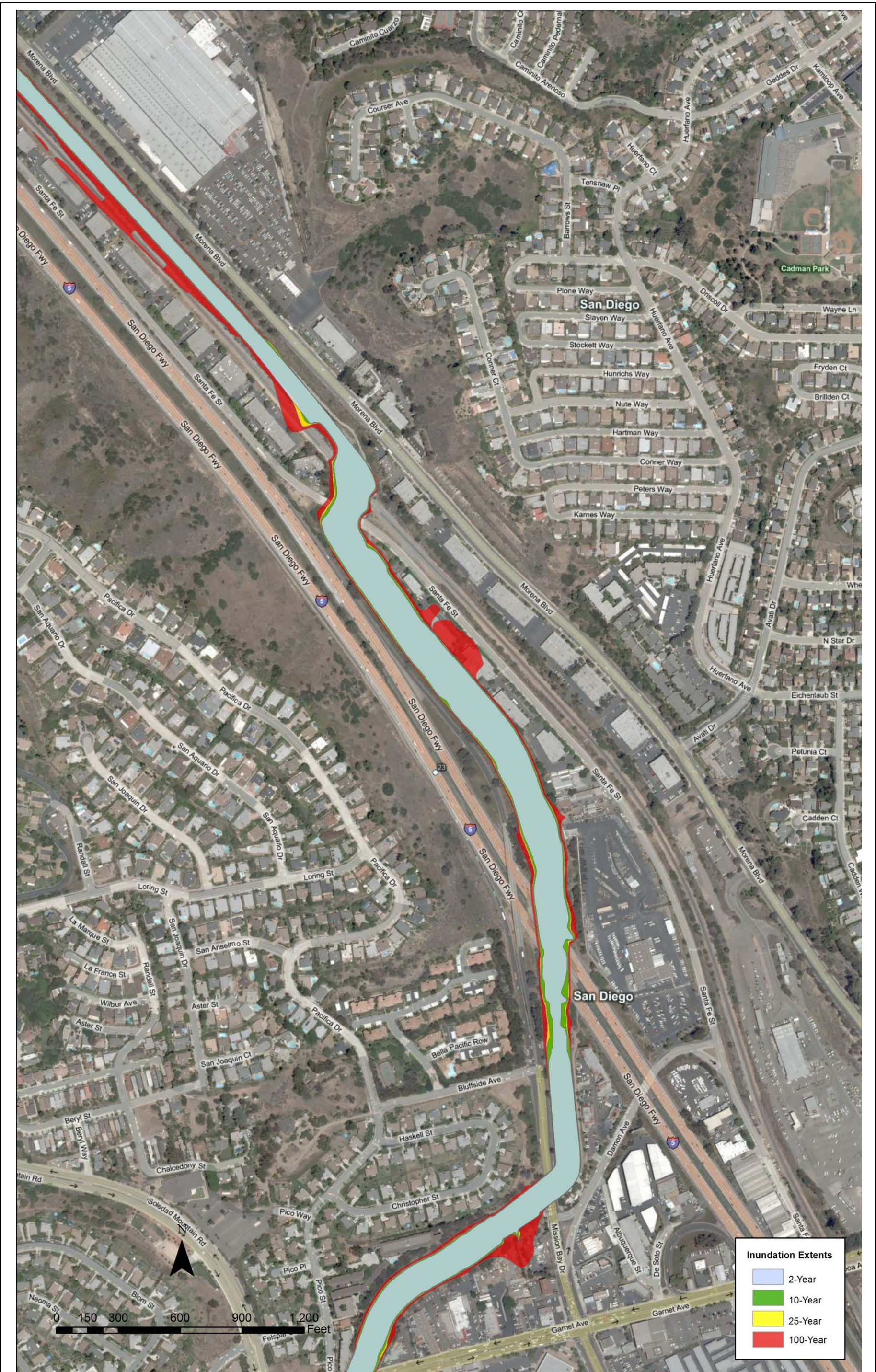


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Inundation Extents – Rose Creek

Project No. 08-1032

Created By: JS

Figure 140



Notes: Inundation extents for the 2-, 10-, 25-, and 100-year recurrence interval flows on Rose Creek. Aerial image from Bing maps.



Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Inundation Extents – Rose Creek

Project No. 08-1032

Created By: JS

Figure 141



Notes: Inundation extents for the 2-, 10-, 25-, and 100-year recurrence interval flows on Rose Creek. Aerial image from Bing maps.

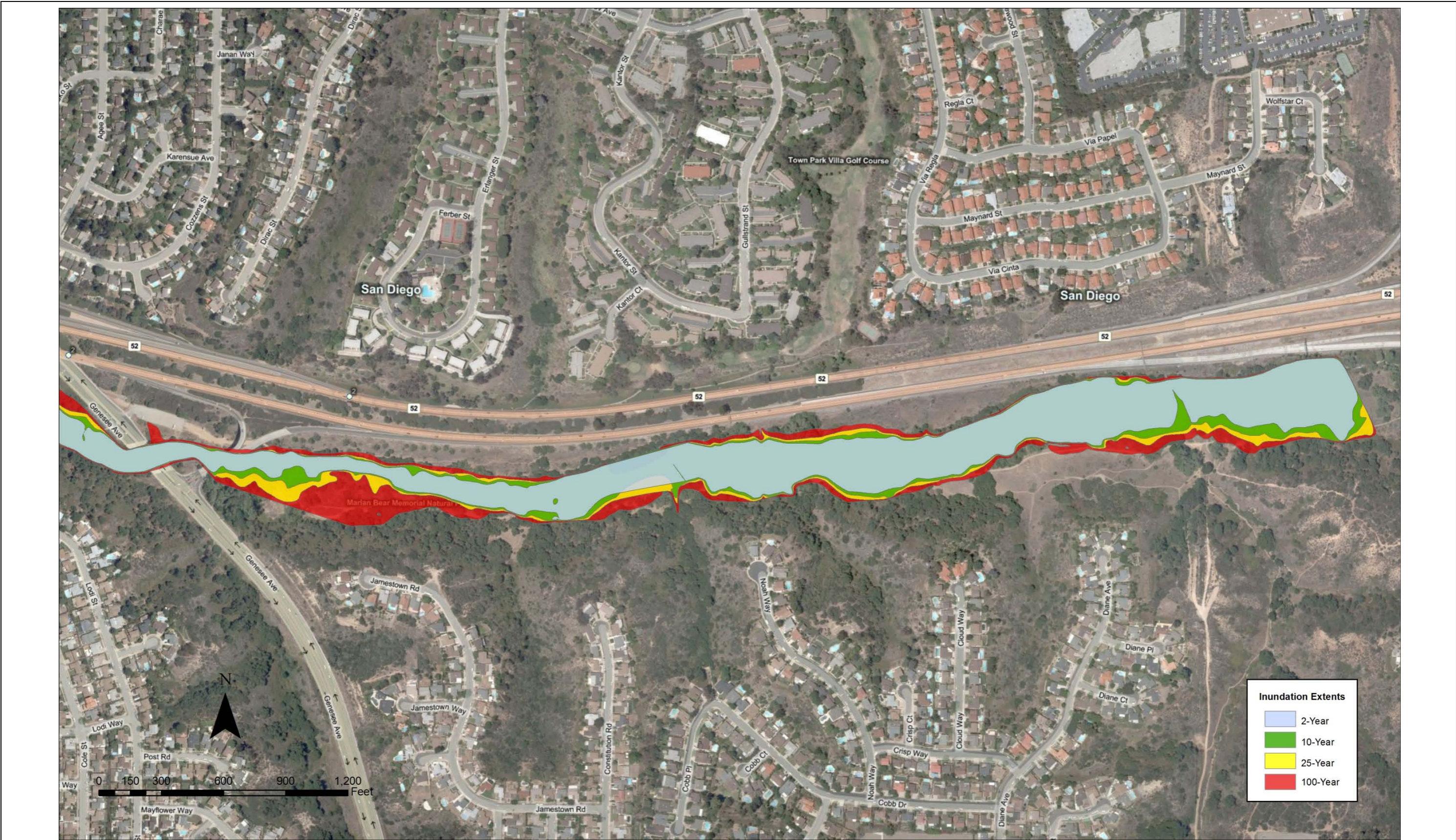


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Inundation Extents – Rose Creek

Project No. 08-1032

Created By: JS

Figure 142



Notes: Inundation extents for the 2-, 10-, 25-, and 100-year recurrence interval flows on San Clemente Creek. Aerial image from Bing maps.

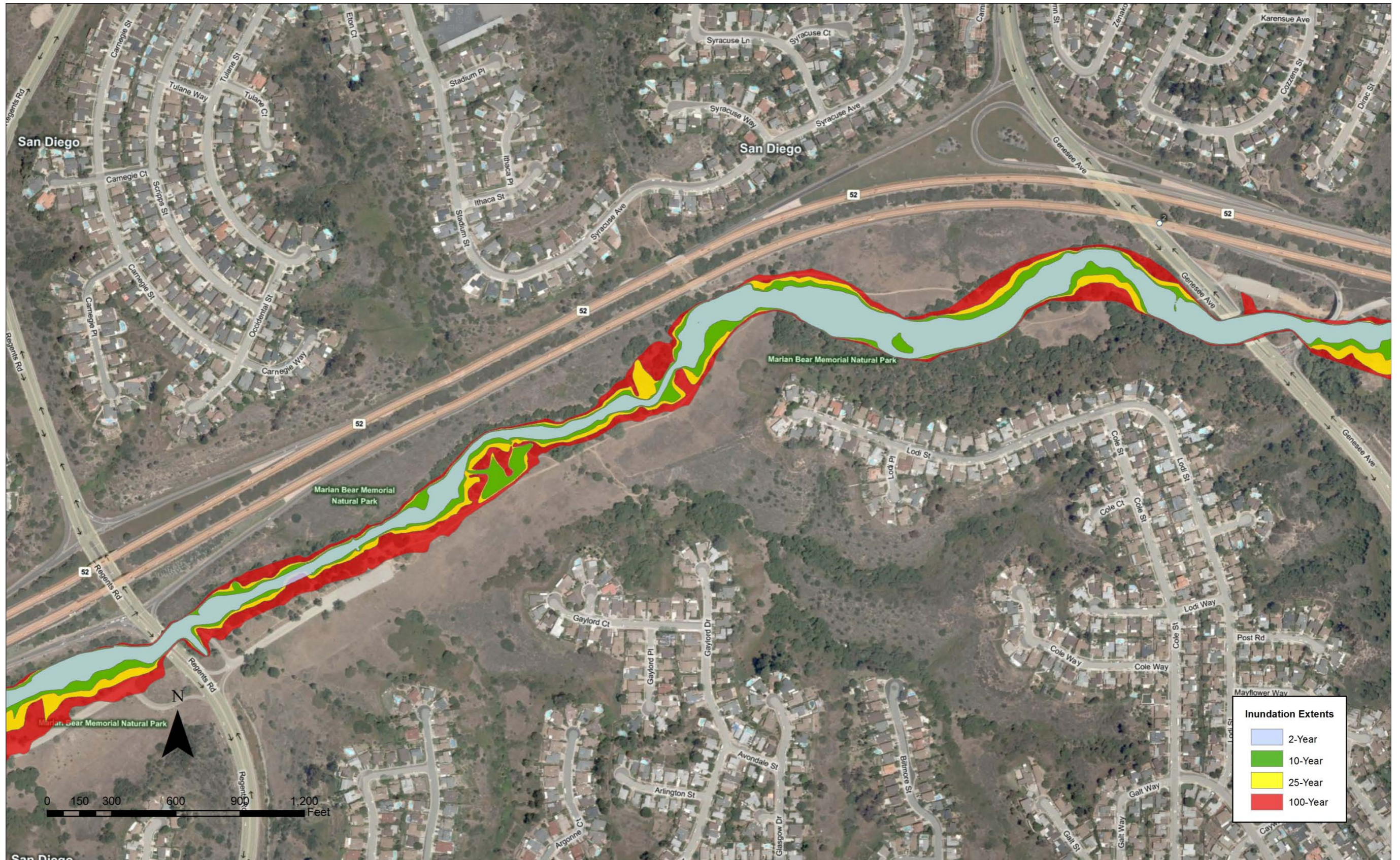


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Inundation Extents – San Clemente Creek

Project No. 08-1032

Created By: JS

Figure 143



Notes: Inundation extents for the 2-, 10-, 25-, and 100-year recurrence interval flows on San Clemente Creek. Aerial image from Bing maps.

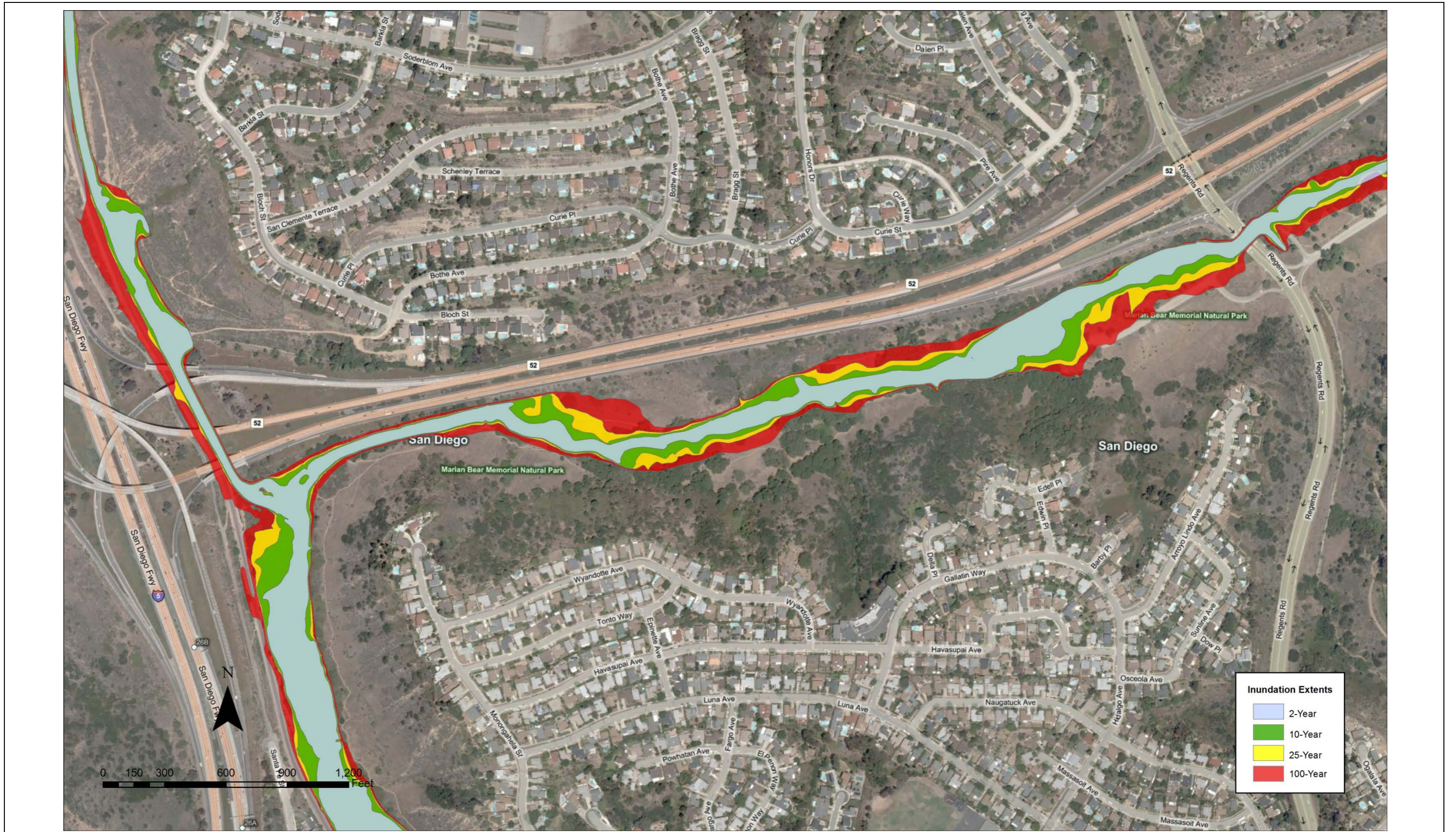


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Inundation Extents – San Clemente Creek

Project No. 08-1032

Created By: JS

Figure 144



Notes: Inundation extents for the 2-, 10-, 25-, and 100-year recurrence interval flows on San Clemente Creek. Aerial image from Bing maps.

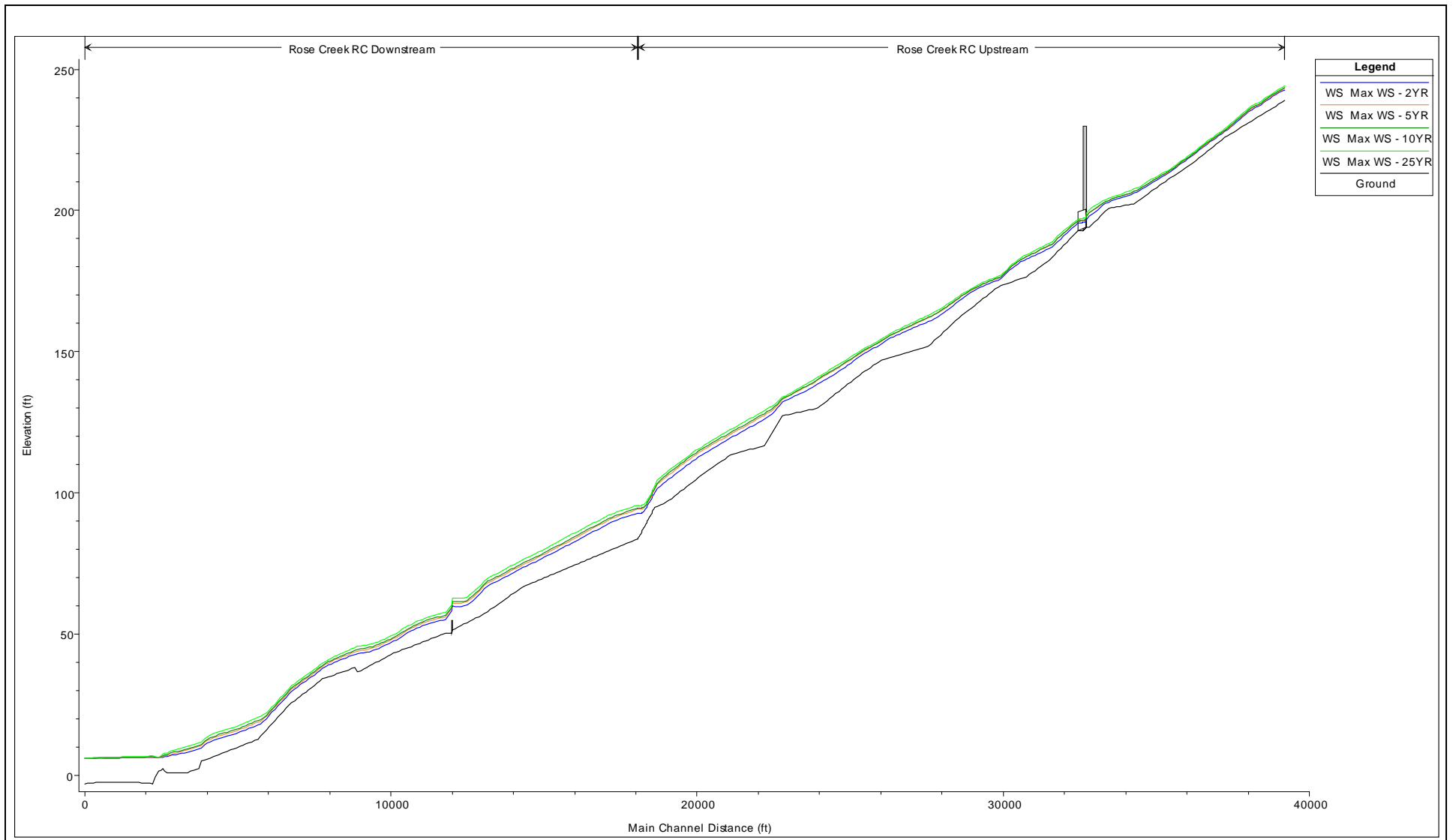


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Conditions Inundation Extents – San Clemente Creek

Project No. 08-1032

Created By: JS

Figure 145



Notes: Elevation references the NAVD 88 vertical datum.

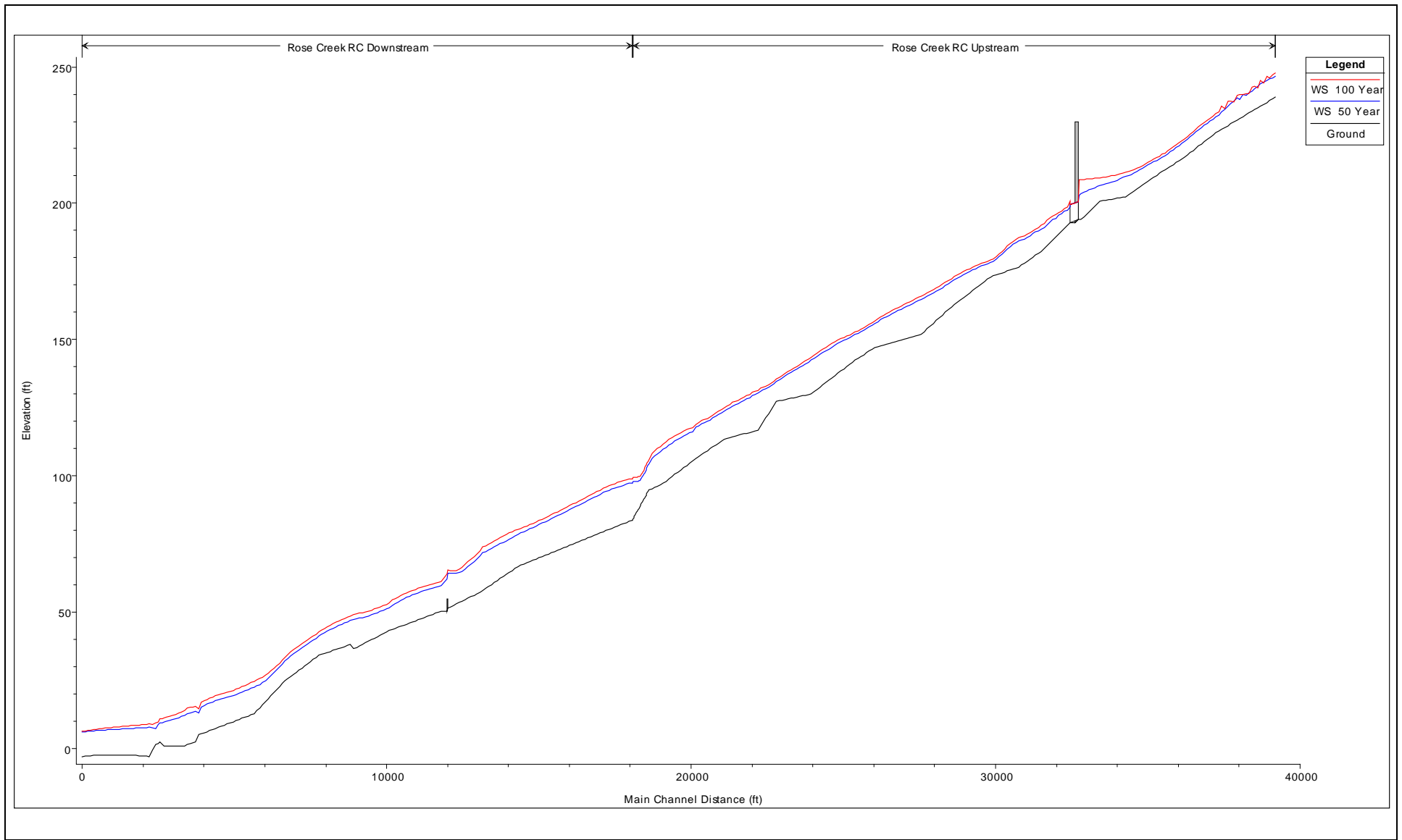


Rose Creek Watershed Restoration Opportunities Analysis – Appendix C
Existing Water Surface Elevation: Rose Creek (2-25 Yr)

Project No. 08-1032

Created By: JS

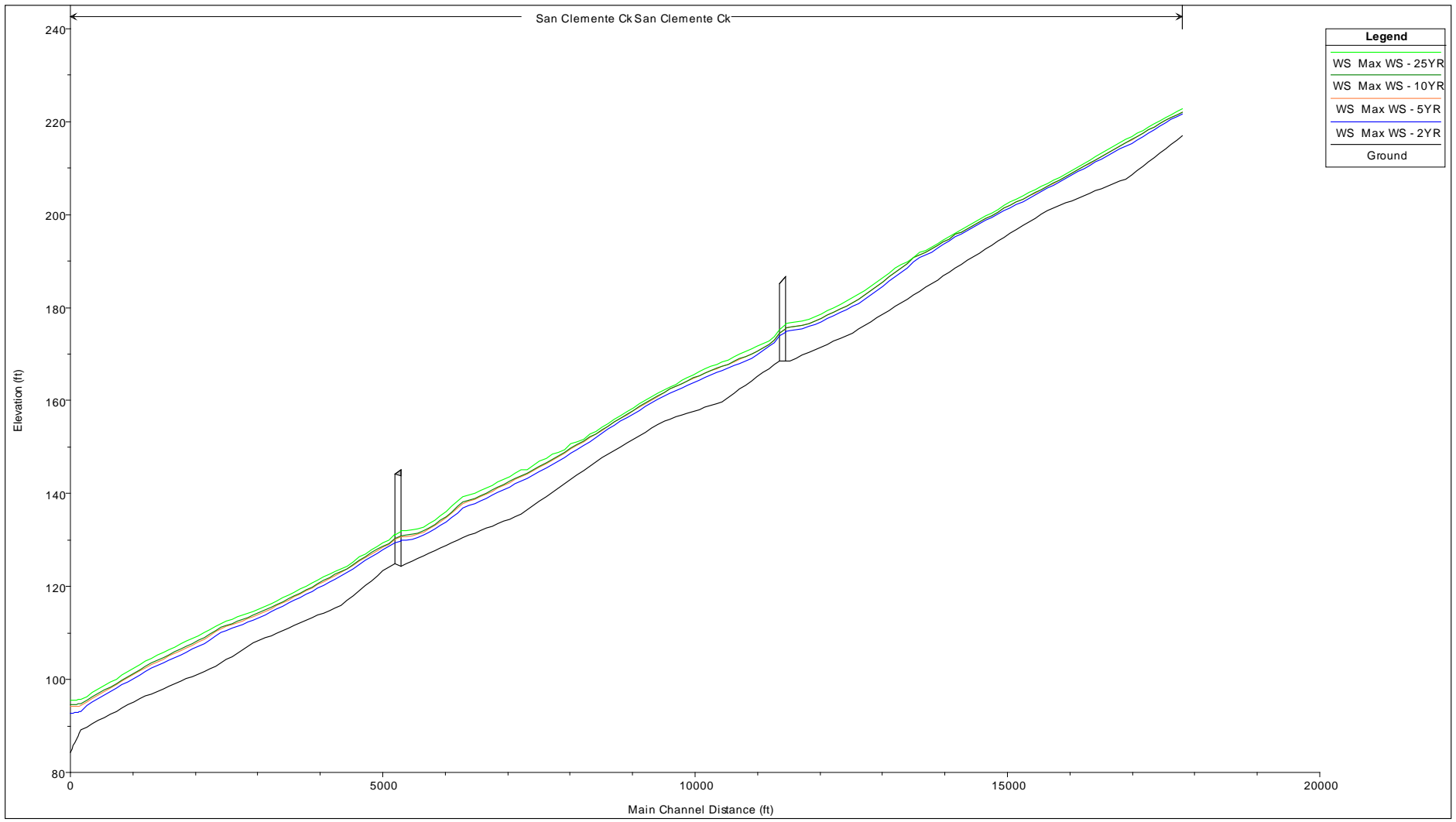
Figure 146



Notes: Elevation references the NAVD 88 vertical datum.



<i>Rose Creek Watershed Restoration Opportunities Analysis</i>		
Existing Water Surface Elevation: Rose Creek (50, 100-yr)		
Project No. 08-1032	Created By: JS	Figure 147



Notes: Elevation references the NAVD 88 vertical datum.

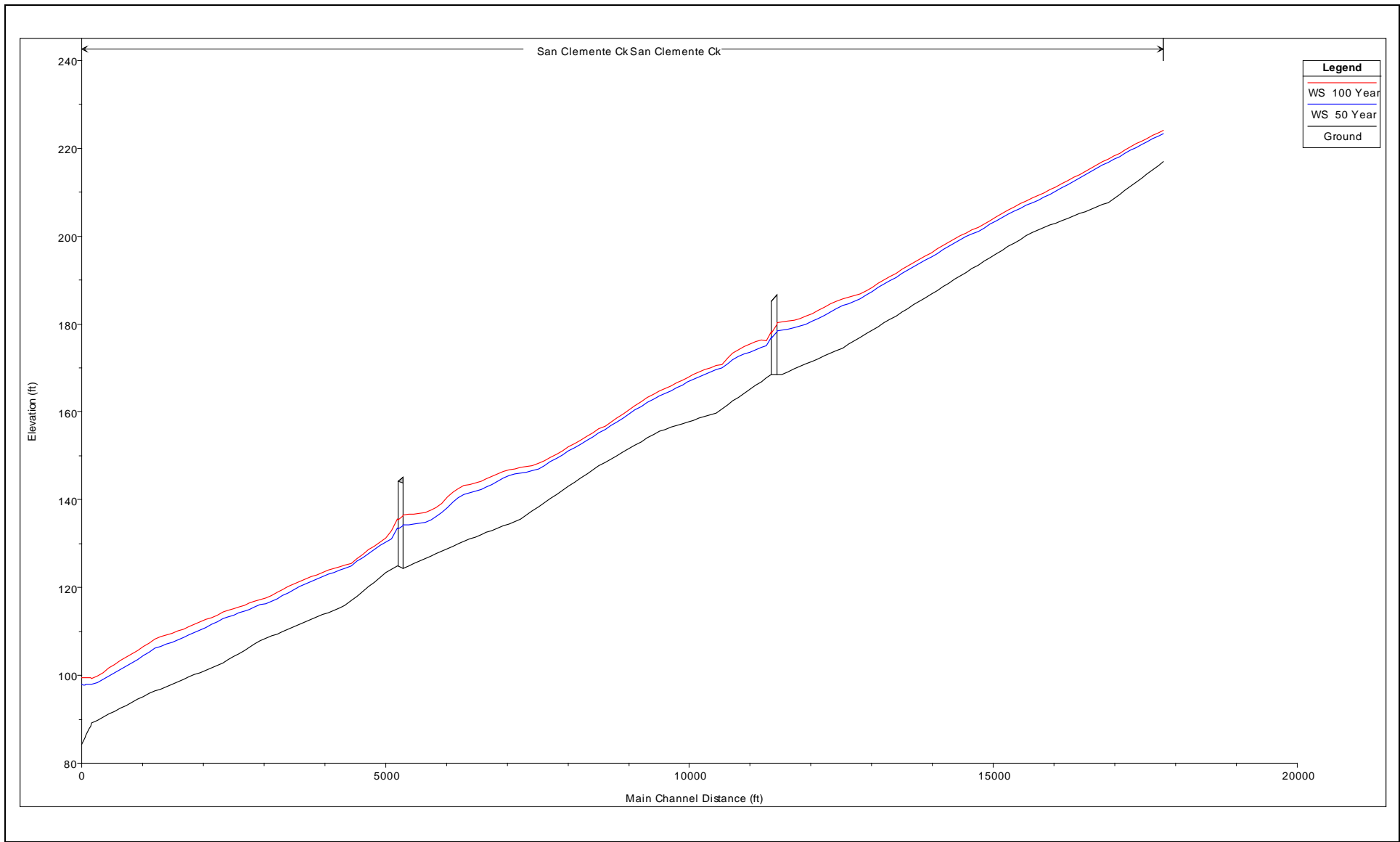


Rose Creek Watershed Restoration Opportunities Analysis
Existing Water Surface Elevation: San Clemente (2-25 YR)

Project No. 08-1032

Created By: JS

Figure 148



Notes: Elevation references the NAVD 88 vertical datum.

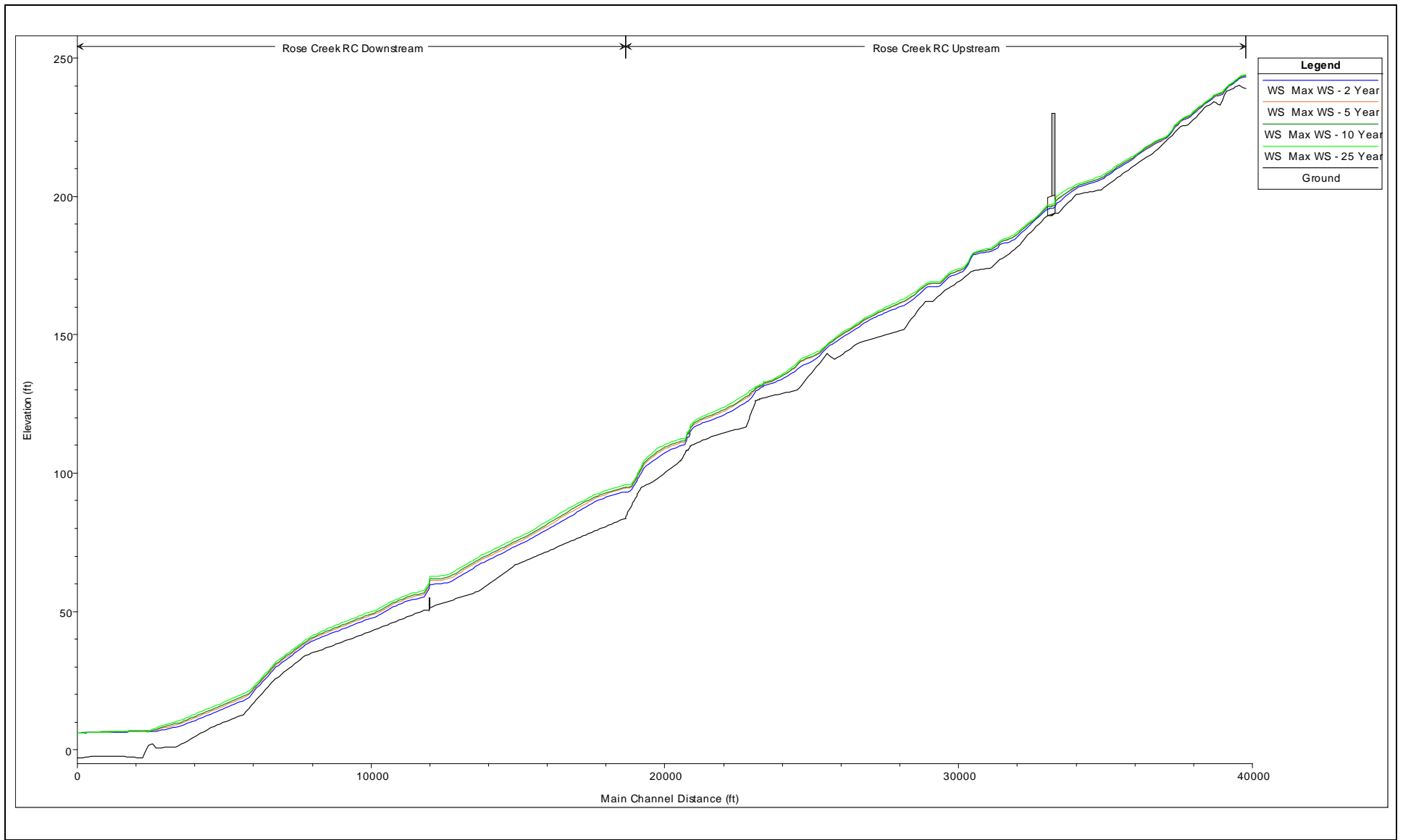


Rose Creek Watershed Restoration Opportunities Analysis
Existing Water Surface Elevation: San Clemente (50, 100-yr)

Project No. 08-1032

Created By: JS

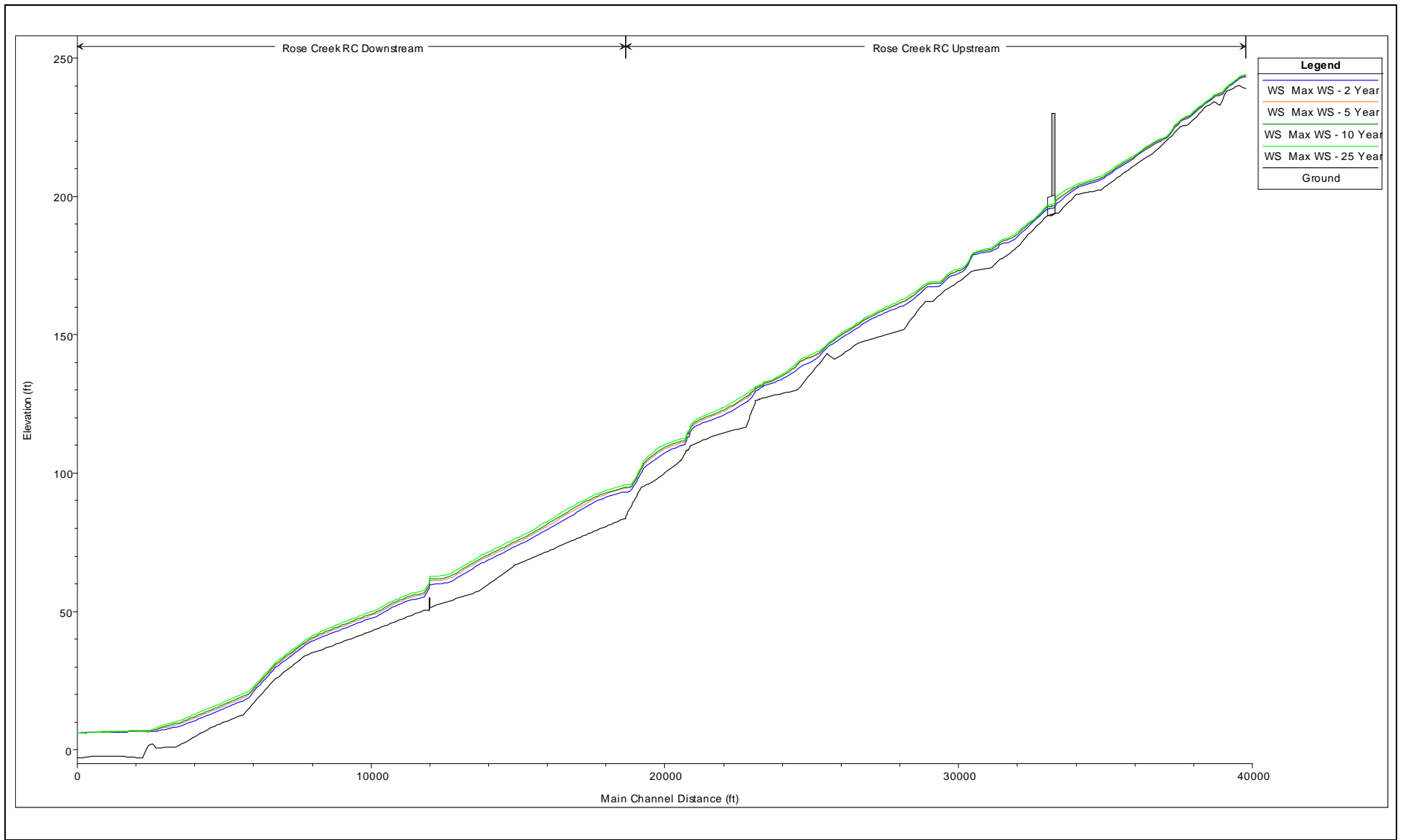
Figure 149



Notes: Elevation references the NAVD 88 vertical datum.



<i>Rose Creek Watershed Restoration Opportunities Analysis</i>		
Proposed Water Surface Elevation: Rose Creek (2-25 Yr)		
Project No. 08-1032	Created By: JS	Figure 150



Notes: Elevation references the NAVD 88 vertical datum.

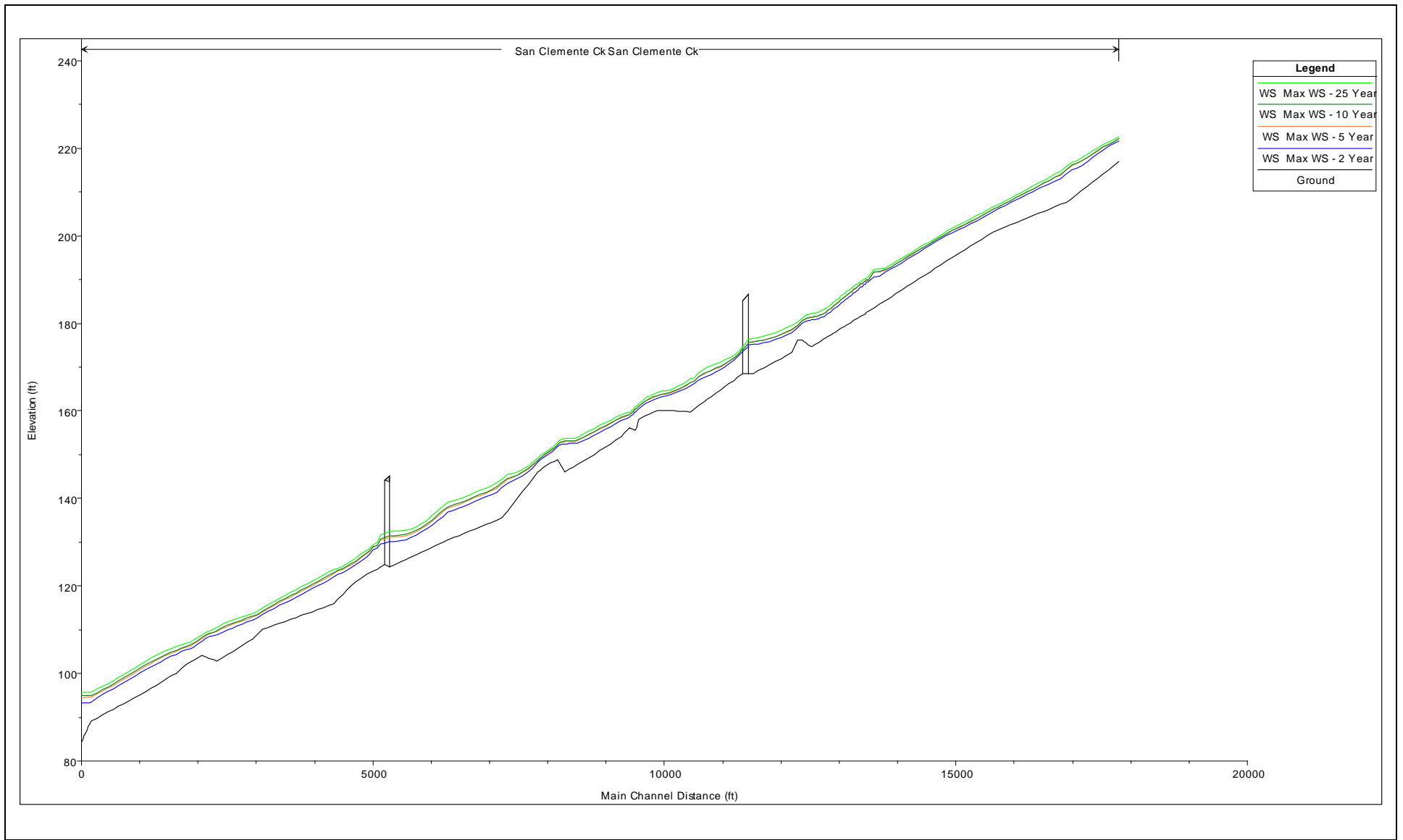


Rose Creek Watershed Restoration Opportunities Analysis
Proposed Water Surface Elevation: Rose Creek (50, 100 Yr)

Project No. 08-1032

Created By: JS

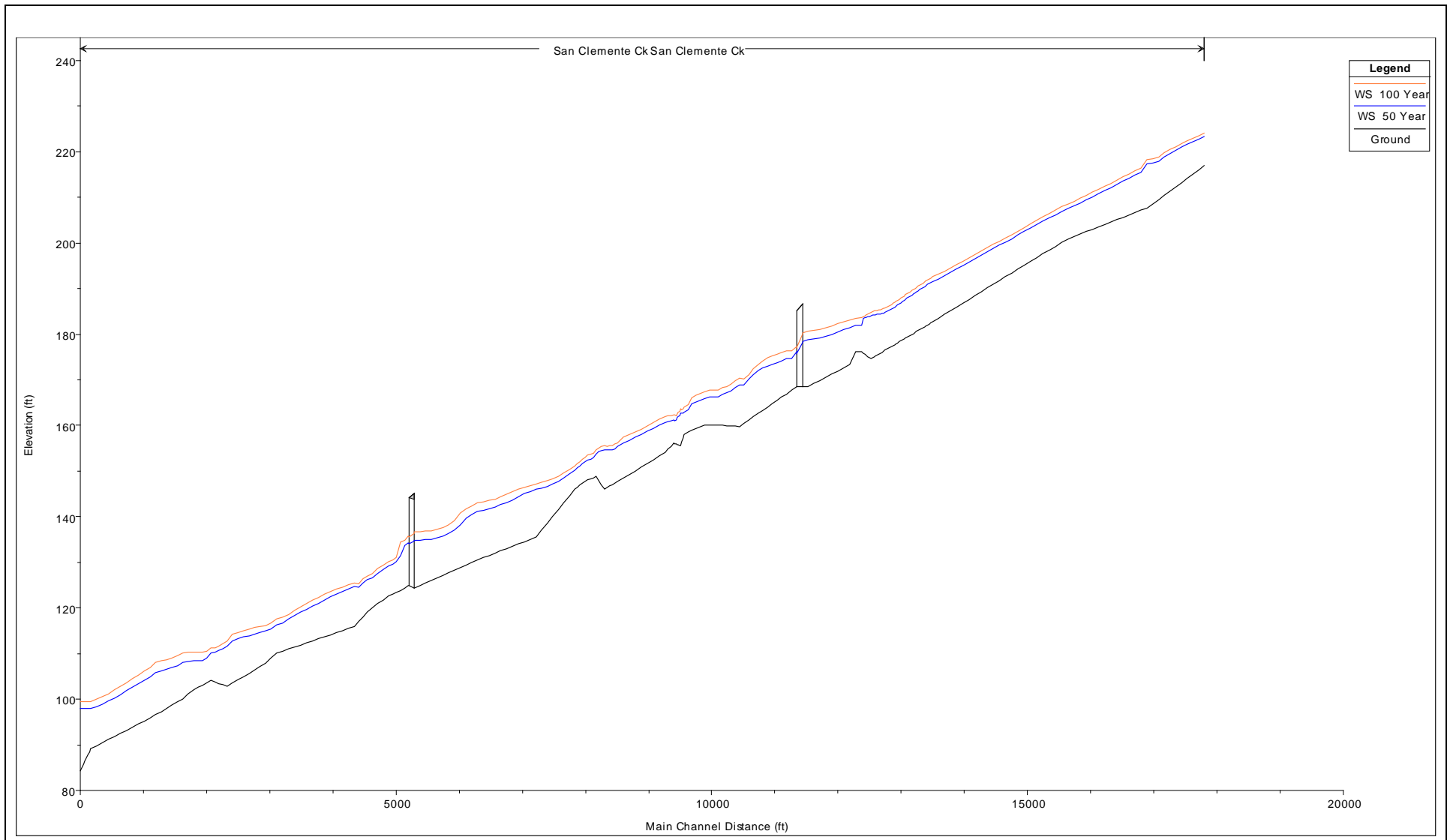
Figure 151



Notes: Elevation references the NAVD 88 vertical datum.



<i>Rose Creek Watershed Restoration Opportunities Analysis</i> Proposed Water Surface Elevation: San Clemente (2-25 Yr)		
Project No. 08-1032	Created By: JS	Figure 152



Notes: Elevation references the NAVD 88 vertical datum.



Rose Creek Watershed Restoration Opportunities Analysis
Proposed Water Surface Elevation: San Clemente (50, 100 Yr)

Project No. 08-1032	Created By: JS	Figure 153
---------------------	----------------	-------------------