INDIVIDUAL HYDROLOGIC & HYDRAULIC (IHHA) ASSESSMENT REPORT

Site Name/Facility:	Sorrento Creek-Flintkote-Soledad-Los Penasquitos Channel
Master Program Map No.:	Maps 7 & 8 (Los Penasquitos Creek Channel), Map 9 (11000 Roselle St / 11100 Flintkote Ave), Map 10 (Dunhill St. & Roselle St.), Maps 11 & 12 (Soledad Creek Channel)
Date:	June 14, 2013
Civil Engineer: (name, company, phone number):	Matt Moore URS Corporation 858-812-9292
Registered Civil Engineer Number & Expiration Date (place stamp here):	RCE No. 56780, Exp. 6/30/2013

***Instructions:** This form must be completed for each target facility following the completion of the Individual Maintenance Plan (IMP) report form and prior to any work being conducted in the facility. Attach additional sheets if needed.

EXISTING CONDITIONS

The City of San Diego (City) has developed the Master Storm Water System Maintenance Program (MMP; Master Maintenance Program) to optimize its business processes and environmental protection practices related to channel operation and maintenance activities. The Master Maintenance Program is intended to integrate operation and maintenance planning, implementation and assessment activities with its water quality protection programs. This document provides a summary of the Individual Hydrologic and Hydraulic Assessment (IHHA) activities conducted within the Soledad/Sorrento Creek Channel (**Reach 3**) and the 11000 Roselle Street/11100 Flintkote Avenue Channel (**Reach 7**) in order to comply with the MMP's Programmatic Environmental Impact Report (PEIR).

The purpose of this report is to assess whether the maintenance described in the City's MMP is needed based on a hydrologic and hydraulic assessment. To better describe and assess the channels in the Sorrento area, the channel segments were assigned reach numbers (Reach 1, Reach 2, etc.) pertinent to the hydrology and hydraulic analysis conducted for the Individual Hydrology & Hydraulic Assessment (IHHA). A number of sources were utilized in the assessment including: As-built records, previous preliminary hydraulic analyses, San-GIS topography, ESRI ArcGIS aerial imagery, field survey data from previous channel maintenance activities, a recent limited City channel cross section field survey, recent site/field reconnaissance visits by URS staff provided information regarding channel dimensions, geometry, storm flows, and vegetation within the channels. For the hydraulic design capacity of the channels, the "Maintained Condition –

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Sediment removed" section of this report best reflects the intended capacity of the channels, as it is based on the MMP channel dimension data and was revised based on the latest field data.

Based on this IHHA assessment, it has been determined that Reach 3 and Reach 7 are subject to regular sediment deposition and vegetation establishment. Sediment transport is a natural and complex phenomenon that is beyond the scope of this report. Sediment production occurs as a result of natural processes and is accelerated by the development and urbanization activities in the watershed. When a stream has an excess of energy (flow) to transport a certain amount of sediment load, degradation, or scour/erosion will occur. Conversely, when a stream has insufficient energy (flow), aggradation, or deposition will occur. Both of these processes usually occur along subsequent reaches of the same stream. In the case of Reaches 3 and 7, flatter slopes of the concrete-lined channels result in lower flow velocities, where eroded sediment particles generated from the upstream watershed settle out of the storm water runoff along the channel beds. The establishment of vegetation in the deposited material continues the reduction in flow velocities and in turn encourages more sediment to drop out. If this process is left unchecked and no corrective action on a continuous basis is taken, the conveyance capacity of Reach 3 could be significantly reduced, and for Reach 7, the channel itself could be rendered inoperable.

The results of this IHHA show Reach 3 has the capacity to convey the 10-year storm flow in its current condition; however, if no corrective action is taken to counteract the sediment deposition and vegetation establishment in the channel, the conveyance capacity within the existing channel is likely to reduce to the 5-year storm event level. In the Maintained-Sediment removed condition the channel capacity is increased to convey approximately the 15- to 20-year storm event flows. The results also show that in the current condition, Reach 7 has the capacity to contain the 1-year storm due to the low gutter flow line elevations of the curb inlets in Roselle Street. If no maintenance occurs in Reach 7, the capacity will continue to be reduced. In the Maintained-Sediment removed condition the channel capacity is increased to convey the 2-year storm event.

It is recommended that the sediment and vegetation within both channels be completely removed. If sediment deposition and vegetation growth are allowed to continue, the channels' conveyance capacities will continue to decline. This exposes the adjacent developed areas to more severe and negative impacts even during the minor storm events. Tables 1 and 2 below summarize the results for each channel.

Table 1. Reach 3 Results Summary

10-year Storm Event Flow Rate (cfs)	Calculated Design Capacity (cfs)	Current Capacity (cfs)
1500	1900[1]	1500

[1]This flow rate corresponds to approximately the 15 to 20-year storm event assuming that the downstream reaches, Reach 1 and 2 are unmaintained.

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Table 2. Reach 7 Results Summary

Storm Event	Estimated Storm Event Flow Rate (cfs)	Calculated Design Capacity (cfs)	Current Capacity (cfs)
2-year	76	80[2]	60[3]
5-year	97	80[2]	60[3]

[2]This flow corresponds to approximately the 2- to 3-year storm event.
[3]This flow corresponds to approximately <1-year storm event.

Description of creek/channel (limits of reach, surrounding land use and area, creek/channel geometry and vegetative condition):

The channels associated with this assessment report are located in the Sorrento Valley area, within the jurisdiction of the City. See Figure 1, Vicinity Map, for the project location and general overview. The major drainage facilities that serve the region consist of the Soledad Canyon Channel (commonly known as the Sorrento Creek Channel), the Los Peñasquitos Creek, the 11000 Roselle Street/11100 Flintkote Avenue Channel (commonly known as the Flintkote Channel), and the Dunhill Street @ Roselle Street Channel (commonly known as the Dunhill Street Channel). The Sorrento Creek Channel is included in Maps 7, 11, and 12 of the MMP, the Los Peñasquitos Creek is included in MMP map 7 and 8, the Flintkote Channel is included in MMP map 9, and the Dunhill Street Channel is included in MMP map 10.

The project is located in Sorrento Valley at the Interstate 5/Interstate 805 interchange within the City's Coastal Overlay Zone and Torrey Pines Community Plan and Local Coastal Program (LCP). The project area is zoned IL-3-1 (Industrial-Light) and designated for Industrial and Open Space land uses in the Torrey Pines Community Plan LCP. Reaches 3 and 7 are adjacent to the City's Multiple Species Conservation Program's Multi-Habitat Planning Area. The project area is also located within the Federal Emergency Management Agency's (FEMA) Special Flood Hazard Areas subject to inundation by the 1-percent Annual Chance Flood and 100-year floodway.

For purposes of this assessment, every drainage facility has been assigned a Reach number pertinent to the hydrology and hydraulic analysis conducted for the IHHA. The general location of every drainage facility and their assigned reach numbers are included in Figure 2, Channel Reach Number Key Map. Although brief descriptions for Reaches 1 through 7 have been included below, it is important to note that **Reach 3** and **Reach 7** are the focal drainage facilities of this assessment. The rest of the reaches are associated with the overall hydraulic analysis included herein are only incidental to the analyses and recommendations per this assessment. The assessment of Reaches 1, 2, 4, 5, 6, and 8 will be per separate IHHA(s).

Site visits were conducted by URS staff in March 2013 and April 2013. The purpose of the site visits was to evaluate the current conditions from a hydrologic and hydraulic perspective. The sections below provide a description of the reaches as they relate to their

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limits, surrounding land use, and channel geometry, followed by a description of their vegetative condition. A photo log from the site visits is included as Attachment 1 and Figures 3 through 6 are the Site Photo Log Key Map that show the location and orientation of the each photo included.

REACHES:

Sorrento Creek – Reach 1:

Reach 1

Sorrento Creek (MMP map 7-Los Peñasquitos Creek): Reach 1 is an earthen-bottom channel that extends from the southerly boundary of the Torrey Pines Preserve, which is located opposite to Estuary Way, to a point approximately 740 feet to the southeast where the Los Peñasquitos Creek's Reach 4, confluences with Sorrento Creek's Reach 2. The Reach 1 main channel top width is approximately 100 feet, and the channel bottom width varies from approximately 60 to 90 feet. The west bank of the channel is protected with rock riprap. The original channel configuration identified in the 1997 Sorrento Creek Emergency Project and the redesigned 2006 Sorrento Creek Maintenance Project included an additional 980 linear feet north into the Torrey Pines State Reserve. There will be no channel maintenance within this reach.

Soledad Creek – Reaches 2 through 3:

Soledad Creek (MMP maps 11 & 12 – Soledad Creek): The proposed maintenance in the Soledad Creek can be segmented into two distinct channel types: a) Earthen, Reach 2, and b) Concrete-lined, Reach 3.

Reach 2

Earthen-portion of Soledad Creek (MMP map 11): Reach 2 is also an earthen-bottom channel that extends to the southeast for approximately 1,590 feet from the upstream end of Reach 1 to the downstream end of Sorrento Creek's Reach 3. The Reach 2 main channel top width varies in width from approximately 10 feet at its narrowest to 20 feet for most of its length and transitions to approximately 45 feet at its upstream end. The channel bottom width varies from approximately 8 to 15 feet. The west bank of the channel is protected with rock riprap. There will be no channel maintenance within this reach.

Reach 3

Concrete-lined portion of Soledad Creek (MMP maps 11 &12-Soledad Creek): Reach 3 is a trapezoidal concrete-lined channel that extends from the southerly end of Reach 2 to the southeast for approximately 2,280 feet to a point located approximately 1,550 feet to the southeast of Sorrento Valley Boulevard, where the trapezoidal concrete-lined channel ends and transitions to an earthen-bottom channel. The trapezoidal channel geometry consists of a 63-foot wide bottom, 1.5 (H)-to-1 (V) side slope section and a minimum depth of 5 feet. Maintenance in Reach 3 will occur using a skid steer or similar type equipment to remove accumulated sediment, vegetation and other debris from the

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concrete channel bottom to the excavator located at the access points designated on the maintenance plans. The excavator, or similar equipment, will scoop the accumulated material into waiting dump trucks. The dump trucks will then dispose of the accumulated materials at an appropriate disposal facility. Access, loading, and staging areas for this channel maintenance include Access and Loading Areas 3A and 3B, Fueling Area 3A and 3B, and Staging Area 3A and 3B. Maintenance will occur within this reach. However there will be no subsurface disturbance associated with this activity as all work areas are 100% concrete-lined or asphalt paved.

Los Peñasquitos Creek – Reaches 4 through 6:

Los Peñasquitos Creek (MMP map 8-Los Peñasquitos Creek): Similar to the Sorrento Creek Channel, the Los Peñasquitos Creek was also divided into three reaches, Reach 4, 5, and 6. Reach 4 is bound by commercial complexes to the north, and by Sorrento Valley Boulevard to the south. Reach 5 is within Caltrans Right-of-Way, and it is completely below the Interstate 5/Interstate 805 interchange bridges. Reach 6 is bound by undeveloped open space to the north, and by commercial/light industrial complexes to the south. Reaches 4, 5, and 6 flow roughly in an east to west direction and confluence with Reach 2. Reach 4 extends approximately 1,350 feet from the confluence with Reach 2, to the west side of the Interstate 5 southbound bridge. Reach 5 extends approximately 635 feet from Reach 4 to the east side of Caltrans northbound on-ramp bridge. Reach 6 extends to the east approximately 1,170 feet from the east end of Reach 5. Reaches 4 and 6 consist of an earthen-bottom channel, while Reach 5 is a concrete-lined channel. Reach 4 through 6 vary in bottom width from 75 to 100 feet, with 1.5-to-1 side slopes that are protected with riprap. There will be no channel maintenance within Reach 4, Reach 5, or Reach 6.

Flintkote Channel – Reach 7:

Flintkote channel (MMP Map 9-11000 Roselle St/11100 Flintkote Ave): Reach 7 is a trapezoidal concrete-lined channel that extends for approximately 1,000 feet, from the easterly side of Flintkote Avenue to Sorrento Creek (Reach 2) near the stream confluence. Reach 7 flows roughly in a southwest to northeast direction, bisecting a light industrial park along its entire length, and crossing Roselle Street. A 2-foot high, 12-foot wide culvert conveys the storm flows under Roselle Street and a dual 36-inch Reinforced Concrete Pipe (RCP) culvert discharges the storm flows into Sorrento Creek's Reach 2. The trapezoidal geometry is described as an 8-foot wide bottom, 1-to-1 side slopes and a depth of approximately 4 feet. Access, loading, and staging areas for this channel maintenance include Access and Loading Areas 7A, 7B, and 7C, and Staging Area 7A. Maintenance in Reach 7 will occur using a skid steer or similar type equipment to remove accumulated sediment, vegetation and other debris from the concrete channel bottom to the excavator located at the access points designated on the maintenance plans. The excavator, or similar equipment, will scoop the accumulated material into waiting dump trucks. The dump trucks will then dispose of the accumulated materials at an appropriate disposal facility. Maintenance will occur within this reach. However there will be no subsurface disturbance associated with this activity as all work areas are 100%

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concrete-lined or asphalt paved.

Reach 5, Reach 6, and Reach 8 are not included in this assessment because they were eliminated from further consideration for maintenance at this time.

Reach 1 and 2 Vegetative Conditions

During the site visit in March 2013 it was observed that the main channel banks of Reaches 1 and 2 are lined mainly with Southern Riparian Forest (SRF) and patches of disturbed wetlands (see Photo No. 1 through 28). The Reach 1 and 2 easterly overbanks are densely vegetated, and they are approximately 195 feet and 130 feet in width, respectively, and both of them extend to the westerly side of the railroad tracks. The westerly banks of the Reach 1 and 2 main channels are lined with riprap. It was observed that patches of light to dense SRF have grown through the riprap, and dense SRF along the top of the banks (see Photo No. 5 through 7). The westerly overbanks of Reach 1 and 2 are occupied by the existing light industrial complexes. It was also observed that along the middle of the Reach 1 and 2 main channels there are islands, or mounds, whose peak elevations reached the water surface, or just above, at the time of the site visit (see Photo No. 8 through 11). These mounds, left behind after previous dredging operations, have likely encouraged more sediment deposition in this area since the dredging maintenance work. These mounds were observed to be lightly to densely vegetated with fresh water marsh. Along the west channel banks, near the Reach 1/Reach 2/Reach 4 confluence, a significant amount of dead vegetation, mainly SRF, was observed (see Photo No. 12 through 14) and could potentially provide a significant resistance to the Reach 2 lower storm event flows.

Reach 3 Vegetative Conditions

In Reach 3 it was observed that sediment deposited along the channel bed varied from approximately 18 inches at its downstream end where it transitions to Reach 2 to minimal elevation at the upstream end of the reach (see Photo No. 29 through 60). In some sections of Reach 3, pebbles and cobbles up to 3 inches in diameter, mixed in with silty sands were observed to a depth of 12 inches (see Photo No. 51 and 52). Ponded water, well established and dense vegetation and aquatic life were observed for a portion of the downstream channel length. At the downstream end, where the sediment deposition is the deepest, the vegetation is most dense (see Photo No. 33 through 36).

Reach 4 though Reach 6 Vegetative Conditions

The Reach 4 through 6 channel bottom was observed to be densely vegetated mainly with fresh water marsh and southern riparian forest. It was difficult to determine the amount of sediment deposition, but it was estimated to vary from approximately 6 to 18 inches in depth based on limited survey data.

Reach 7 Vegetative Conditions

During a site visit by URS in April 2013 it was observed that significant amounts of sediment have been deposited along sections of the Reach 7 channel bed (see Photo No. 61 through 80) and one section of the channel was completely clear of any sediment (see

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Photo No. 70 through 72). Starting at the upstream end of Reach 7, at Flintkote Avenue, the sediment deposition was approximately 15 inches in depth (see Photo No. 61 through 63), which then gradually diminished in a downstream direction until it was not visually observed at a location approximately 400 feet from Flintkote Avenue (see Photo No. 70). Significant amounts of sediment deposition were also observed at the entrance and outlet of the Roselle Street culvert (see Photo No. 72 through 76), and at the entrance of the dual 36-inch Reinforce Concrete Pipe (RCP) culvert that is located at the downstream end of Reach 7 (see Photo No. 76 through 80).

The level of growth and density of the fresh water marsh that has established along Reach 7 was observed to be commensurate with the amount of sediment, i.e.; in the sections where sediment is deeper, the vegetation growth and density tends to be higher. The level of vegetation growth at entrance of Roselle Street and the dual 36-inch RCP culverts is very significant, as they are blocked by vegetation by as as much as 30 to 50 percent (see Photo No. 73 through 75 and 79 through 80).

Reach 8 Vegetative Conditions

It was observed that Reach 8 was essentially clear of vegetation and ponded water along its earthen section. However, at its downstream end, at the entrance to the 54-inch RCP there is ponded water. An existing debris fence at this location is completely clogged with debris and vegetation such that storm flows during major storm events creates localized turbulence and flow diversion forcing the storm water to flow around it.

Hydrologic information (source of hydrologic information, summary of flow rates and return frequencies):

The references used in this study as sources of hydrologic information include the following:

- "Individual Hydrologic and Hydraulic Assessment Report for 11000 Roselle Street/11100 Flintkote Avenue, Map Number 9, Draft", prepared by Rick Engineering Company, dated December 3, 2010. (Reference 1); and
- "Individual Hydrologic and Hydraulic Assessment Report for Soledad Canyon, Map Numbers 7, 11 & 12", prepared by Rick Engineering Company, dated November 16, 2010. (Reference 2).

The necessary peak storm flows, in cubic feet per second (cfs), used in the hydraulic analyses of Reach 7 and 3 were extracted from Reference 1 and 2, respectively. Tables 3 and 4 below summarize the storm flows used in the hydraulic analyses of the channels.

Table 3. Reach 3 Hydrologic Data Summary

River Station	Storm Event					
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
8438.74[1]	220	730	1,500	3,100	4,500	6,700
2376.70[2]	680	2,200	4,200	9,000	13,100	19,000

[1]Peak storm flows conveyed by Reach 2 and Reach 3.

[2]Peak storm flows conveyed by Reach 1 starting at the confluence with Los Peñasquitos' Reach 4.

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Table 4. Reach 7 Hydrologic Data Summary

River Station	Storm Event					
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
1124.62[3]	69	87	101	120	131	140
392.12[4]	76	97	112	133	145	155

[3]Peak storm flows conveyed by Reach 7 from the upstream end of the reach to a point located approximately 10 feet upstream of the Roselle Street culvert.

[4]Peak storm flows conveyed by Reach 7 from a point located approximately 10 feet upstream of the Roselle Street culvert to the Reach 7 outfall.

As part of the Reference 1 study, a hydrologic analysis was prepared for Reach 7 to develop the peak storm flows since there were no available existing studies for the channel. The peak flows for the various storm events were prepared using the Rational Method in accordance with the City's "Drainage Design Manual" dated April 1984. The Drainage Design Manual still is the City's current document that establishes the guidelines for hydrologic and hydraulic studies. Therefore, the peak storm flows per Reference 1 were accepted as valid and used in the hydraulic analyses.

According to Reference 2, the 10-, 50-, and 100-year storm events were extracted from FEMA's 2006 Flood Insurance Study (FIS) for San Diego County, while the 2-, 5-, and 25-year storm event flows were developed using the FEMA flows and log-probability paper. The FEMA storm flows and the development process of the 2-, 5-, and 25-year storm flows were verified and used in the hydraulic analyses of Reach 3.

Hydraulic analyses (description of hydraulic models created for project):

The United States Army Corps of Engineers Hydrologic Engineering Center's River Analysis System (HEC-RAS) software was used for the hydraulic analysis of both channels. The HEC-RAS hydraulic model performs one-dimensional steady and unsteady flow river hydraulics calculations and is the model used by FEMA to establish water surface elevation profiles and floodplain limits within the Sorrento Valley area and through out the United States. The results of the hydrologic analyses included in Tables 2 and 3 above were used in the hydraulic analyses.

The original HEC-RAS hydraulic model developed by Rick Engineering per Reference 2, and obtained through the City, was used as the base model for the hydraulic analysis of Reach 3. The original Reference 2 HEC-RAS hydraulic model includes Reach 1 and 2, as well, and it extends for approximately 1550 feet downstream of Reach 1. The entire length of the three reaches included in the original model was kept intact. The base model was validated, and later modified, as explained below, as Reach 1 and 2 were required to establish the water surface elevations at the outfall of Reach 7 for its analysis. Additionally, the reach downstream of Reach 1, was sufficiently long to allow the model to converge to the correct water surface profile in those situations where there were no starting water surface elevations available, specifically, the 2-, the 5-, and the 25-year storm event water surface elevations.

The Reference 2 HEC-RAS hydraulic model was validated and then augmented with

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more up to date information from various sources to reflect current conditions. The sources of information, listed below in the order of precedence in which they were implemented, are as follows:

- The City's Engineering and Capital Projects Department on March 20, 2013 channel field survey data of five cross sections along Reaches 1 and 2,
- Survey done on Reach 1 and 2 after the dredging operations of 2010,
- As-built records, and
- San-GIS 1999 2-foot contour interval topography.

In 2012, FEMA updated the datum used in the FIS to North American Vertical Datum of 1988 (NAVD88) from National Geodetic Vertical Datum of 1929 (NGVD29). Because this project is based on the NGVD29 datum, FEMA's 2006 FIS study was used for boundary condition information. The downstream and upstream steady flow boundary conditions of the Reach 3 hydraulic analyses for the 10-, 50-, and 100-year storm events used to initialize the model were extracted from FEMA's 2006 FIS. The normal depth steady flow boundary conditions for the 2-, 5-, and 25-year storm events were approximated, as there were no water surface elevations available for these storm events to initialize the model. These boundary conditions were approximated based on the resulting 10-, 50-, and 100-year storm event hydraulic energy grade lines.

The Reach 7 HEC-RAS hydraulic model developed for study was based on as-built records provided by City, site visit field measurements performed by URS staff, and San-GIS 1999 2-foot contour interval topography. This topography is based on the National Geodetic Vertical Datum of 1929 (NGVD29). The development of the Reach 3 and 7 HEC-RAS models are both based on the NGVD29 datum.

The Manning's 'n' values for the Reach 3 and 7 hydraulic models were based on the site reconnaissance visits. The values range from 0.02 for plain earth/soil to 0.06 within the main channel for the areas with the thickest vegetation; however, for the ultimate condition analyses, to reflect an unmaintained condition, a Manning's 'n' value of 0.17 was assumed within the Reach 3 main channel, and 0.10 for the Reach 7 main channel. For all conditions analyzed herein, Reaches 1 and 2 were modeled as the current vegetated condition since maintenance is not proposed in these sections as part of this IHHA.

Current Vegetated Condition:

The HEC-RAS hydraulic models developed for the Reach 3 and Reach 7 current vegetated conditions reflect the conditions observed on the site visits and the additional data as discussed in the existing conditions section. In this scenario, the sediment deposition along the channel beds was included in the hydraulic models based on the field observations described in the existing conditions section. In Reach 3, the sediment deposition varies from 0 to 18 inches in depth, while in Reach 7 the sediment deposition varies from 0 to 15 inches in depth.

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The Reach 3 and Reach 7 Manning's n values for the concrete channel used in the HEC-RAS model vary from 0.016 for those sections free of sediment deposition, to 0.04 where the sediment deposition is deep and vegetation is thick.
Ultimate Vegetated Condition:
The Reach 3 hydraulic model developed for the "Ultimate Vegetated Condition" is similar to the "Current Vegetated Condition", except that the Manning´s 'n' values were increased to 0.17 within the main channel to reflect a maximum vegetation carrying capacity. The sediment deposition depth was increased to 3 feet throughout the reach. In the Reach 7 hydraulic model developed for these conditions, the sediment deposition was assumed to be a minimum of 0.5 foot along the channel bed. To reflect the anticipated maximum vegetation carrying capacity by of the sediment deposition, the Manning's 'n' values within the Reach 7 main channel were increased to 0.10.
Maintained Condition – No sediment removed:
Because Reach 3 and Reach 7 are concrete-lined channels, it is assumed that if the channels are to be maintained, the vegetation and the sediment will be removed. Results for this condition were not calculated.
Maintained Condition – Sediment removed (if applicable):
Under these conditions, it is assumed that both vegetation and sediment are removed. To reflect this level of maintenance, a Manning´s 'n' value of 0.016 was assigned to both Reach 3 and Reach 7.

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Hydraulics Results (Describe capacity of channel for each condition):
Current Vegetated Condition:
<u>Reach 3</u> In the Current Vegetated Condition, the Reach 3 capacity was calculated to be 1500 cfs , which corresponds to the 10-year storm event. Table 5 below summarizes the Reach 3 hydraulic analyses results under the Current Vegetated Condition.

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Table 5. Reach 3 Results Summary

Storm Event	Storm Event Flow Rate (cfs)	Calculated Design Capacity (cfs)	Current Condition Capacity (cfs)
10-year	1,500	1,900[1]	1,500
25-year	3,100	1,900[1]	1,500

[1] This flow corresponds to approximately the 15- to 20-yr storm event.

Reach 7

In the Current Vegetated Condition, the HEC-RAS hydraulic analyses results show that Reach 7 can contain 76 cfs, which is a storm flow produced by the 2-year storm event; however, the street gutter flowlines at the curb inlets in Roselle Street are lower than the calculated water surface elevation for the 2-year storm event. The calculated water surface elevations show that storm flows back up through the curb inlets and onto the roadway. The maximum storm flow that could be contained in the channel, without backing up onto the roadway is approximately 60 cfs, which corresponds to a storm flow produced by a high-frequency storm such as the 1-year storm event. Table 6 below summarizes the Reach 7 hydraulic analyses results under the Current Vegetated Condition.

Table 6. Reach 7 Results Summary

Storm Event	Estimated Storm Event Flow Rate (cfs)	Calculated Design Capacity (cfs)	Current Condition Capacity (cfs)
2-year	76	80[2]	60[3]
5-year	97	80[2]	60[3]

[2] This flow corresponds to approximately the 2- to 3-year storm.
[3] This flow corresponds to approximately <1-year storm event.

Note: See attached HEC-RAS model profile

Ultimate Vegetated Condition:

Reach 3

In the Ultimate Vegetated Condition, the Reach 3 capacity was calculated to be 730 cfs, which corresponds to the 5-year storm event. Table 7 below summarizes the Reach 3 hydraulic analyses results under the Ultimate Vegetated Condition.

Table 7. Reach 3 Results Summary

Storm Event	Storm Event Flow Rate (cfs)	Calculated Design Capacity (cfs)	Ultimate Vegetated Capacity (cfs)
5-year	730	1,900[1]	730
10-year	1,500	1,900[1]	730

[1] This flow rate corresponds to approximately the 15- to 20-year storm event.

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Reach 7

In the Ultimate Vegetated Condition, the HEC-RAS hydraulic analyses results show that Reach 7 will barely contain the 2-year storm event flow of 76 cfs with the water surface elevation reaching the top of the channel banks. However, as in the Current Vegetated Conditions, the storm flow would back-flow through the curb inlets in Roselle Street and onto the roadway. The maximum storm flow that could be contained in the channel, without backing up onto the roadway is approximately 45 cfs, which corresponds to a storm flow produced by a high-frequency storm such as the 1-year storm event. Table 8 below summarizes the Reach 7 hydraulic analyses results under the Ultimate Vegetated Condition.

Table 8. Reach 7 Results Summary

Storm Event	Estimated Storm Event Flow Rate (cfs)	Calculated Design Capacity (cfs)	Ultimate Vegetated Capacity (cfs)
2-year	76	80[2]	45
5-year	97	80[2]	45

[2] This flow corresponds to approximately the 2- to 3-year storm.

Note: See attached HEC-RAS model profile

Maintained Condition – No Sediment removed:

Because Reach 3 and Reach 7 are concrete-lined channels, it is assumed that if the channels are to be maintained, the vegetation and the sediment will be removed to the level of the existing concrete. Therefore, it is assumed that the Maintained Condition – No Sediment removed is the same as the Maintained Condition – Sediment removed.

Note: See attached HEC-RAS model profile

Maintained Condition – Sediment removed:

Reach 3

In the Maintained Condition – Sediment removed, the Reach 3 maximum design capacity was calculated to be 1900 cfs, which corresponds to the storm flow produced by the 18-year storm event. Additionally, the HEC-RAS hydraulic analysis shows that the Reach 3 can also contain the 25-year storm flow of 3100 cfs except at the downstream end where an approximately 400-foot long channel section of the concrete channel is overtopped. Table 11 below summarizes the Reach 3 hydraulic analyses results under the Maintained Condition – Sediment removed.

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Table 11. Reach 3 Results Summary

Storm Event	Storm Event Flow Rate (cfs)	Calculated Design Capacity (cfs)	Sediment Removed Capacity (cfs)
10-year	1500	1900[1]	1900
25-year[2]	3100	1900[1]	3100

[1] This flow rate corresponds to approximately the 15- to 20-year storm event.
[2] This flow overtops a 400-foot long channel section at the downstream end of the Reach 3.

Reach 7

In the Maintained Condition – Sediment removed, the HEC-RAS hydraulic analyses results show that Reach 7 will contain slightly more than the 2-year storm event flow and no storm flow will back up onto Roselle Street. Even though the storm flows should not impact the roadway, the results show that the water surface elevations will reach the gutter flow lines at the curb inlets. Table 8 below summarizes the Reach 7 hydraulic analyses results under the Ultimate Vegetated Condition.

Table 8. Reach 7 Results Summary

Storm Event	Estimated Storm Event Flow Rate (cfs)	Calculated Design Capacity (cfs)	Sediment Removed Capacity (cfs)
2-year	76	80[2]	80
5-year	97	80[2]	80

[2] This flow corresponds to approximately the 2- to 3-year storm event.

Note: See attached HEC-RAS model profile

Areas within channel that can be avoided (this section can be completed upon completion of Individual Biological Assessment Form):

There are no areas within the concrete lined channels that can be avoided by the maintenance activities. During the maintenance activities in Reach 3, the earthen channels upstream and downstream will be avoided.

Would the velocity of storm water during a "bank-full" storm event exceed the velocities identified for unlined channels per Table 1-104.108 of the City's Design Manual? If so, describe the appropriate form of erosion control (e.g., check dam or comparable mechanism). ~~Is a downstream check dam or comparably mechanism required?~~

Table 1-104.10A does not apply as both Reach 3 and Reach 7 are concrete-lined channels and can sustain higher velocities.

MITIGATION

Conclusion/Recommendations (Describe the limits of recommended maintenance, degree to which native vegetation within the facility can be retained, and capacity of maintained channel):

Reach 3

The HEC-RAS hydraulic analysis results indicate that Reach 3 will convey the 10-year storm flow in its current condition; however if the Maintained – Sediment removed option is implemented, the channel conveyance capacity is increased to the 15- to 20-year storm event, which equates to a capacity increase of approximately 400 cfs. Reach 3 also shows an increase in capacity in the Maintained – Sediment removed condition to contain the 25-year storm event flows with the exception of 400 feet at the downstream end. If no corrective action is taken to counteract the current trend of sediment deposition and vegetation growth within the channel, the conveyance capacity of Reach 3 could be diminished to the 5-year storm event. Therefore, it is recommended that the **"Maintained Condition – Sediment removed"** option be implemented.

Reach 7

The HEC-RAS hydraulic analysis results indicate that Reach 7 under its current conditions contains the 2-year storm event flows within its banks; however, storm water will back up into Roselle Street through the curb inlets. The results also show that in the Maintained-Sediment removed condition, Reach 7 will increase its capacity to between the 2- to 3-year storm event and the storm water will be contained in the Roselle Street culvert. As a result, it is recommended that the **"Maintained Condition – Sediment removed"** option be implemented.

ADDITIONAL COMMENTS OR RECOMMENDATIONS

The Recirculated Program Environmental Impact Report (PEIR) for the Master Maintenance Program lists four alternatives that would reduce the need for regular maintenance of the storm water facilities. The list of those alternatives is summarized below followed by a brief discussion as to how they apply to Reach 3 and Reach 7. The feasbility of these alternatives is based solely on the hydrologic and hydraulic assessment conducted for Reaches 3 and 7 as part of this IHHA. Additional studies may be necessary to fully assess the feasbility of these alternatives.

- Raising the channel banks by constructing walls or berms along the top of the channels - Raising the channel banks in Reaches 3 and 7 to allow for sediment deposition and vegetation growth is not anticipated to be a feasible option. The accumulation of sediment and vegetation in the concrete channel may cause flooding impacts upstream by raising the water surface elevation and negatively impacting upstream properties. Also, the existing storm drainpipe systems that discharge into the channel will likely be blocked by the build up of sediment and vegetation and may cause additional flooding impacts to the surrounding businesses. Because of the flat topography of the surrounding area and relatively

ADDITIONAL COMMENTS OR RECOMMENDATIONS

low ground elevations within portions of the business park relative to the bottom of the channel, it is unlikely the existing storm drainpipe elevations can be raised to allow for the accumulation of sediment and vegetation.

- Diverting storm water in pipes around constrained segments –
  - For Reach 3 is impractical, as the flat and low lying topography of the area and the proximity to the ocean does not lend itself for retrofitting to an underground storm drain system. The size of the underground culvert would need a similar cross-sectional area as the channel, if not larger due to the changes in the hydraulic condition. Locating a large culvert in the street would likely result in the relocation of the other utilities as well as re-routing the existing storm drainpipes that discharge into the channel.
  - For Reach 7, this alternative may be technically feasibly to re-route the offsite upstream flows that discharge into this channel and further analysis is necessary to fully evaluate the alternative.
- Widening channels to accommodate vegetation – This alternative is likely infeasible for both Reach 3 and Reach 7 as the areas adjacent to these reaches are fully developed and there are no City owned parcels or easements to widen the channels. Roselle Street and the railroad tracks run parallel on either side of Reach 3 along its entire length. Reach 7 is located between commercial buildings and their associated parking lots along its entire length.
- Off-site runoff reduction – The City's LID program, while outside the scope of the Master Maintenance Program, may reduce the need or frequency for future channel maintenance as it is implemented over time. While the City does not expect to see appreciable reductions in maintenance needs over the term of the current MMP, any reductions in maintenance needs resulting from the City's LID program would be captured by the annual hydrology studies, and channel maintenance activities would be adjusted accordingly. Additionaly, in flood control analysis, LID BMP features, such as impermeable area reduction, redirecting runoff to pervious areas, etc., are usually considered neglibile. LID BMP design is based on the 85^{th} percentile rainfall event which is a considerably lower precipitation amount than the flood control design standard requirements of 10-, 50- or 100-year storm return events.

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- Hydraulic Profiles for Reach 7 Current Vegetated Condition Model
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- Hydraulic Profiles for Reach 7 Maintained Condition Model (Sediment Removed)
- Hydraulic Profiles for Reach 7 Maintained Condition Model (Sediment Removed) Maximum Flow
- Detailed Hydraulic Results for Reach 7 Current Vegetated Condition Model
- Detailed Hydraulic Results for Reach 7 Current Vegetated Condition Model, Maximum Flow
- Log-Log Probability Graph – Reach 7 Current Vegetated Condition, Maximum Flow
- Detailed Hydraulic Results for Reach 7 Ultimate Vegetated Condition Model
- Detailed Hydraulic Results for Reach 7 Maintained Condition Model (Sediment Removed)
- Detailed Hydraulic Results for Reach 7 Maintained Condition Model (Sediment Removed) Maximum Flow
- Log-Log Probability Graph – Reach 7 Maintained Condition (Sediment Removed), Maximum Flow

ATTACHMENT 1 - SITE PHOTOS

SITE PHOTOS

These photographs were taken during two site visits that were conducted on March 21, 2013, and on April 5, 2013. See Figures 3 through 7, Photo Log Key Maps, for the photograph numbers, locations, and orientation. Photograph numbers 1 through 28 pertain to Reach 1 and 2, Photograph numbers 29 through 60 pertain to Reach 3, Photograph numbers 61 through 80 pertain to Reach 4 through Reach 6, Photographs numbers 81 through 100 pertain to Reach 7, and Photograph numbers 101 through 104 pertain to Reach 8.

1. Reach 1 – Looking east across Reach 1 from the west bank at its downstream end.

2. Reach 1 – Looking south at westerly bank from downstream end of Reach 1.

3. Reach 1 – Looking south across Reach 1 from its downstream end.

4. Reach 1 – Looking east at vegetation on the west bank of Reach 1.

5. Reach 1 – Light to dense vegetation is visible along the westerly bank of Reaches 1 and 2. Although not completely visible in this photo, riprap is barely visible at the lower left corner of this photo.

6. Reach 1 – Vegetation is visible along the westerly bank growing through the riprap, typical of Reaches 1 and 2.

7. Reach 1 – Light to dense vegetation is visible along the westerly bank of Reaches 1 and 2.

8. Reach 1 – Dense fresh water marsh is visible on the "island" or mound in Reach 1.

9. Reach 1 – Dense fresh water marsh is visible on the "island" or mound in Reach 1.

10. Reach 1 – An "island" or mound near the upstream end of Reach 1 is visible just below the water surface without vegetation.

11. Reach 1 – Dense fresh water marsh is visible on the "island" or mound in Reach 1.

12. Reach 1 and 2 – Dead vegetation debris near the Reach1/Reach 2/Reach 4 confluence.

13. Reach 1 and 2 – Dead vegetation debris near the Reach1/ Reach 2/Reach 4 confluence.

14. Reach 1 and 2 – Dead vegetation debris near the Reach1/ Reach 2/Reach 4 confluence.

15. Reach 2 – Looking north at the downstream end of Reach 2 immediately upstream of the confluence with Reach 4.

16. Reach 2 – Looking south near the downstream end of Reach 2.

17. Reach 2 – Dense vegetation growth through riprap along the west bank.

18. Reach 2 – Dense vegetation growth through riprap along the west bank.

19. Reach 2 – Dense vegetation growth along the east bank.

20. Reach 2 – Vegetation growth through riprap along the west bank.

21. Reach 2 – Looking east, the Dunhill Street 54-inch RCP headwall is visible at the lower side of the photo. Notice the narrow channel top width.

22. Reach 2 – Channel bottom view. Notice the narrow channel top width.

23. Reach 2 – Looking east, towards the east bank. The Trolley Station is visible in the background through the dense vegetation.

24. Reach 2 – Looking south near the upstream end of the reach.

25. Reach 2 - Looking south at the north end of the reach where Reach 2 begins to widen as it transitions to the concrete-lined channel Reach 3.

26. Reach 2 - Looking east near the north end of the reach, where Reach 2 begins to widen as it transitions to meet the concrete-lined channel Reach 3.

27. Reach 2 - Looking northeast near the north end of the reach, where Reach 2 begins to widen as it transitions to meet the concrete-lined channel Reach 3.

28. Reach 2 – Looking east across the Reach 2/Reach 3 transition.

29. Reach 3 – Looking southeast across Reach 3 from its downstream end.

30. Reach 3 – Looking southeast across Reach 3 from its downstream end.

31. Reach 3 – Looking south from the channel access ramp located at the downstream end of Reach 3.

32. Reach 3 – Looking south from the channel access ramp located at the downstream end of Reach 3, close up view.

33. Reach 3 – Looking north from the top of the pedestrian bridge that crosses Reach 3 near its downstream end.

34. Reach 3 – Looking north from the top of the pedestrian bridge that crosses Reach 3 near its downstream end.

35. Reach 3 – Looking north from the top of the pedestrian bridge that crosses Reach 3 near its downstream end.

36. Reach 3 – Looking at the downstream side of the Reach 3 pedestrian bridge in a westerly direction.

37. Reach 3 – Looking south from the top the of pedestrian bridge that crosses Reach 3 near its downstream end.

38. Reach 3 – Looking south from the top the of pedestrian bridge that crosses Reach 3 near its downstream end.

39. Reach 3 – Looking southwest from the top of the pedestrian bridge that crosses Reach 3 near its downstream end.

40. Reach 3 – Looking at the upstream side of the Reach 3 pedestrian bridge in a westerly direction.

41. Reach 3 – Looking south from the top of the Sorrento Valley Blvd bridge.

42. Reach 3 – Looking southeast from the top of the Sorrento Valley Blvd bridge.

43. Reach 3 – Looking east at the upstream side of the Sorrento Valley Blvd bridge from the top of the bridge.

44. Reach 3 – Looking east just upstream of the Sorrento Valley Blvd bridge from Roselle Street.

45. Reach 3 – Looking northeast at the upstream side of the Sorrento Valley Blvd bridge.

46. Reach 3 - Looking north at the upstream side of the Sorrento Valley Blvd bridge from within the west side of the channel.

47. Reach 3 - Looking northeast from within the west side of the channel bed at point approximately 450 feet south of the Sorrento Valley Blvd bridge.

48. Reach 3 - Looking east from within the west side of the channel bed at point approximately 450 feet south of the Sorrento Valley Blvd bridge.

49. Reach 3 - Looking southeast from within the west side of the channel bed at point approximately 450 feet south of the Sorrento Valley Blvd bridge.

50. Reach 3 - Looking southeast from within the west side of the channel bed at point approximately 450 feet south of the Sorrento Valley Blvd bridge.

51. Reach 3 – Sediment depostion close up view - pebbles and cobbles mixed in with sand. The sediment depth of approximately 12 inches is visible in this photograph.

52. Reach 3 – A close up view of the pebble/cobble rock size that has been deposited on the channel bed. A one-cent coin, in the middle of the photo, provides a reference object in relation to the rock size.

53. Reach 3 - Looking northeast from the west side channel bank near Roselle Street and approximately 600 feet to the southeast of the Sorrento Valley Blvd bridge.

54. Reach 3 - Looking northeast from the west side channel bank near Roselle Street and approximately 600 feet to the southeast of the Sorrento Valley Blvd bridge.

55. Reach 3 - Looking southeast from the west side channel bank near Roselle Street and approximately 600 feet to the southeast of the Sorrento Valley Blvd bridge.

56. Reach 3 - Looking south from the west side channel bank near Roselle Street and approximately 600 feet to the southeast of the Sorrento Valley Blvd bridge.

57. Reach 3 - Looking north from within the channel from a point approximately 920 feet south of the Sorrento Valley Blvd bridge.

58. Reach 3 - Looking south from within the channel from a point approximately 920 feet south of the Sorrento Valley Blvd bridge.

59. Reach 3 – Looking east at sediment deposition located at the upstream end of Reach 3.

60. Reach 3 – Looking southeast at sediment deposition located at the upstream end of Reach 3.

61. Reach 7 – Looking east in a downstream direction from the upstream end (Flintkote Avenue).

62. Reach 7 - Looking west at the upstream end of Reach 7 where it receives the flow from a 24-inch and a 30-inch RCP.

63. Reach 7 – Close up view of the measuring tape over the 30-inch RCP. The measuring tape shows that the sediment depostion depth at this location is 14-inches (30" – 16" = 14").

64. Reach 7 - Looking west towards the upstream end of the reach from the channel access ramp.

65. Reach 7 – Looking north across Reach 7, near the upstream end from the channel access ramp.

66. Reach 7 - Looking east in a downstream direction from the channel access ramp.

67. Reach 7 – Looking west in an upstream direction. The sediment depostion along this section of the reach is approximately 4 to 6 inches.

68. Reach 7 – Looking west in an upstream direction. The sediment depostion along this section of the reach is approximately 4 to 6 inches.

69. Reach 7 – Looking west from the wooden pedestrian bridge that is located approximately 400 feet east of Flintkote Avenue. The sediment deposition decreases in a downstream direction, and it disappears at the bridge.

70. Reach 7 – Looking east from the wooden pedestrian bridge that is located approximately 400 feet east of Flintkote Avenue. There is vely little to no sediment deposition downstream from the bridge; however, there is minimal vegetation growth, which if left unchecked could encourage more sediment depostion. This photo also shows a sprouting palm tree on the south bank, which could potentially damage the structural integrity of the concrete channel in the future.

71. Reach 7 – Looking east in a downstream direction along the south bank. At a location approximately 100 feet from the wooden pedestrian bridge, a juvenile palm tree is visible in this photo on the south bank, which could potentially damage the structural integrity of the concrete channel in the near future.

72. Reach 7 – Looking east in downstream direction. Although along this section of the reach, sediment is approximately 0 to 0.5 inch deep, the vegetation starts to get denser starting at a location 170 feet upstream from the Roselle Street culrvet.

73. Reach 7 – Looking east at the upstream (west) side of the Roselle Street culvert. The high density of the vegetation blocking nearly 40% to 50% of the cross sectional area of the culvert can be appreciated in this photo.

74. Reach 7 – Close up view of the Roselle Street culvert entrance (west side). The high vegetation density blocking the entrance of the culvert and ponded water within the culvert are visible this photo.

75. Reach 7 – Looking south at the outlet of the Roselle Street culvert. Vegetation, sediment deposition, debris, and ponded water are visible.

76. Reach 7 – Looking southeast in a downstream direction. The vegetation density in the channel is clearly visible.

77. Reach 7 – Looking east in a downstream direction. Most of Reach 7, downstream from Roselle Street is visible.

78. Reach 7 – Looking in an upstream direction from the downstream end.

79. Reach 7 – Looking at the dual 36-inch RCP culvert entrance that discharges into the Sorrento Creek Channel. The vegetation, sediment deposition, and other debris are visible.

80. Reach 7 – Looking at the dual 36-inch RCP culvert entrance that discharges into the Sorrento Creek Channel. The vegetation, sediment deposition, and other debris are visible.

ATTACHMENT 2 - FIGURES

FIGURE 1. VICINTIY MAP

SOURCES:
Project Site (City of SD, 2013). Cities (ESRI, 2007). Counties (U.S. Bureau of Reclamation, et al, 2007). Freeways (SanGIS, 11/2011). Topographic Quadrangle Maps, Del Mar and La Jolla (NGS, 2011).

VICINITY MAP
SORRENTO CREEK/FLINTKOTE/SOLEDAD CHANNEL (REACH 3 & 7)
MMP MAP NO. 9, 11, & 12
CITY OF SAN DIEGO

URS

0.5 0 0.5 1 Miles

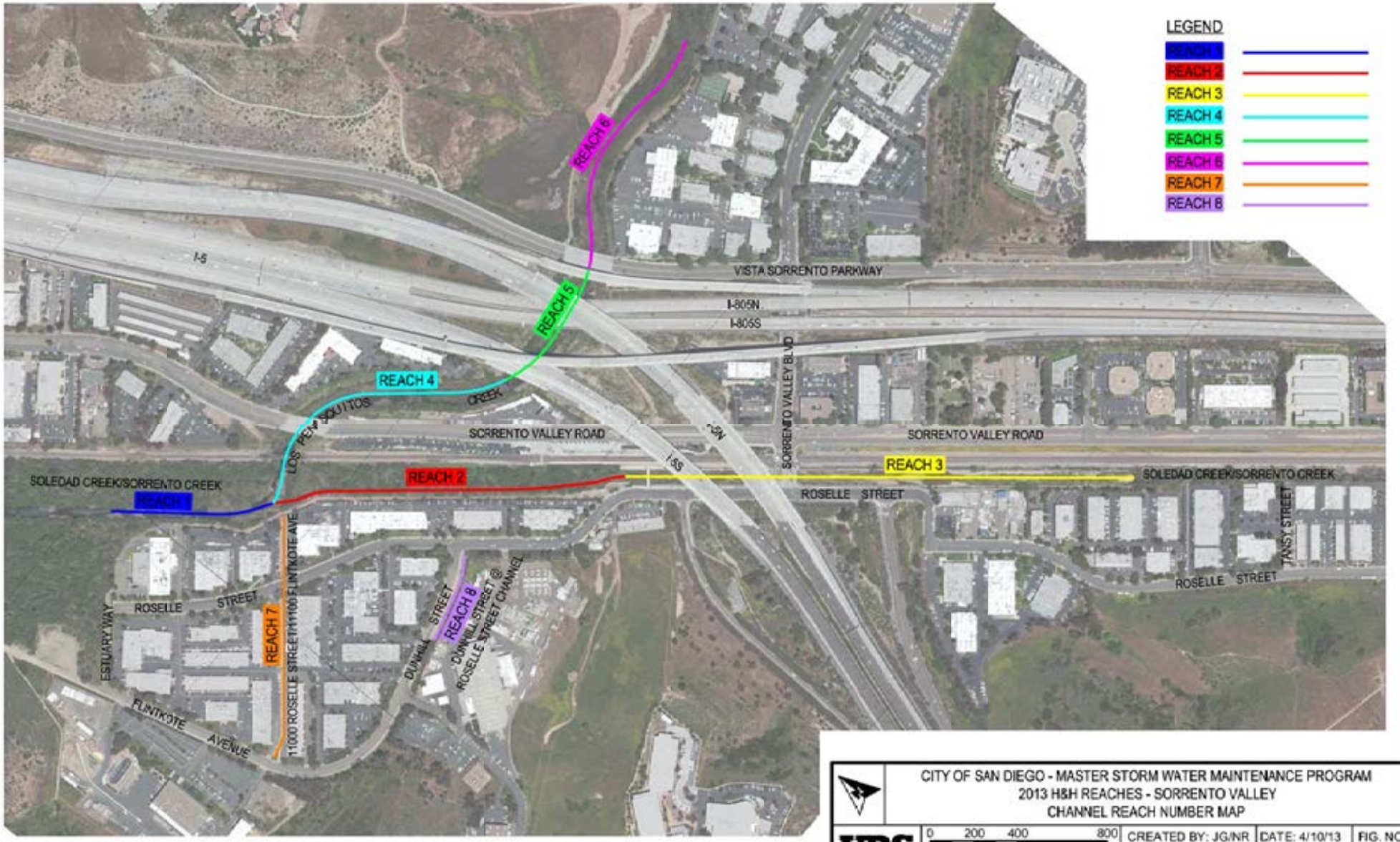
SCALE: 1" = 1 mi (1:63,360)

SCALE CORRECT WHEN PRINTED AT 8.5X11

CREATED BY: LR	DATE: 10/23/2013	FIG. NO: 1
PM: BE	PROJ. NO: 27679954.11300	

Path: G:\gis\projects\27679951.mxp_docs\mxd\Sorrento\Overview\Sorrento_VicinityMap_ReachAnd7.mxd patel_anavana, 10/23/2013, 11:01:13 AM

FIGURE 2. CHANNEL REACH NUMBER KEY MAP



CITY OF SAN DIEGO - MASTER STORM WATER MAINTENANCE PROGRAM
2013 H&H REACHES - SORRENTO VALLEY
CHANNEL REACH NUMBER MAP

URS

0 200 400 800
SCALE: 1"=400'

CREATED BY: JG/NR	DATE: 4/10/13	FIG. NO:
PM: MM	PROJ. NO: 27679954.11400	2

FIGURE 3. SITE PHOTO LOG KEY MAP


REACH 4
SORRENTO VALLEY ROAD
A.T. & S.F. RAILROAD TRACKS
SOLEDAD CREEK/SORRENTO CREEK
REACH 2
SOLEDAD CREEK/SORRENTO CREEK
REACH 1
REACH 7
FOR REACH 7 SEE FIGURE 7
FOR REACH 2 CONTINUATION SEE FIGURE 4
ESTUARY WAY
ROSELLE
STREET
LEGEND
PHOTO LOCATION & ORIENTATION
CITY OF SAN DIEGO - MASTER STORM WATER MAINTENANCE PROGRAM
INDIVIDUAL HYDROLOGIC & HYDRAULIC ASSESSMENT - SORRENTO VALLEY
SITE PHOTO LOG KEY MAP - REACH 1, 2, & 3
URS
0 50 100 200
SCALE: 1"=100'
CREATED BY: JG/NR
DATE: 5/10/13
FIG. NO: 3
PM: MM
PROJ. NO: 27679954.11400

FIGURE 4. SITE PHOTO LOG KEY MAP


SORRENTO VALLEY ROAD
COASTER SORRENTO VALLEY STATION
A.T. & S.F. RAILROAD TRACKS
I-5N
I-5S
SORRENTO VALLEY BLVD
SOLEDAD CREEK/SORRENTO CREEK
REACH 2
REACH 3
ROSELLE STREET
ROSELLE STREET
FOR REACH 2 CONTINUATION SEE FIGURE 3
FOR REACH 3 CONTINUATION SEE FIGURE 5
DUNHILL STREET
DUNHILL STREET @ ROSELLE STREET CHANNEL
REACH 8
LEGEND
PHOTO LOCATION & ORIENTATION
CITY OF SAN DIEGO - MASTER STORM WATER MAINTENANCE PROGRAM
INDIVIDUAL HYDROLOGIC & HYDRAULIC ASSESSMENT - SORRENTO VALLEY
SITE PHOTO LOG KEY MAP - REACH 1, 2, & 3
URS
0 50 100 200
SCALE: 1"=100'
CREATED BY: JG/NR
DATE: 5/10/13
FIG. NO: 4
PM: MM
PROJ. NO: 27679954.11400

FIGURE 5. SITE PHOTO LOT KEY MAP


SORRENTO VALLEY ROAD
REACH 3
FOR REACH 3 CONTINUATION SEE FIGURE 4
ROSELLE STREET
ROSELLE
STREET
I-5N
I-5S
LEGEND
PHOTO LOCATION & ORIENTATION
CITY OF SAN DIEGO - MASTER STORM WATER MAINTENANCE PROGRAM
INDIVIDUAL HYDROLOGIC & HYDRAULIC ASSESSMENT - SORRENTO VALLEY
SITE PHOTO LOG KEY MAP - REACH 1, 2, & 3
URS
0 50 100 200
SCALE: 1"=100'
CREATED BY: JG/NR
DATE: 5/10/13
FIG. NO: 5
PM: MM
PROJ. NO: 27679954.11400

FIGURE 6. SITE PHOTO LOG KEY MAP


FLINTKOTE AVENUE
ROSELLE STREET
SOLEDAD CREEK/SORRENTO CREEK
A.T. & S.F. RAILROAD TRACKS
REACH 7
REACH 1
REACH 2
FOR REACH 1 & 2 SEE FIGURE 3
LEGEND
PHOTO LOCATION & ORIENTATION
CITY OF SAN DIEGO - MASTER STORM WATER MAINTENANCE PROGRAM
INDIVIDUAL HYDROLOGIC & HYDRAULIC ASSESSMENT - SORRENTO VALLEY
SITE PHOTO LOG KEY MAP - REACH 7
URS
0 50 100 200
SCALE: 1"=100'
CREATED BY: JG/NR
DATE: 5/10/13
FIG. NO: 6
PM: MM
PROJ. NO: 27679954.11400

FIGURE 7. REACH 1, 2, AND 3 HYDRAULIC WORKMAP

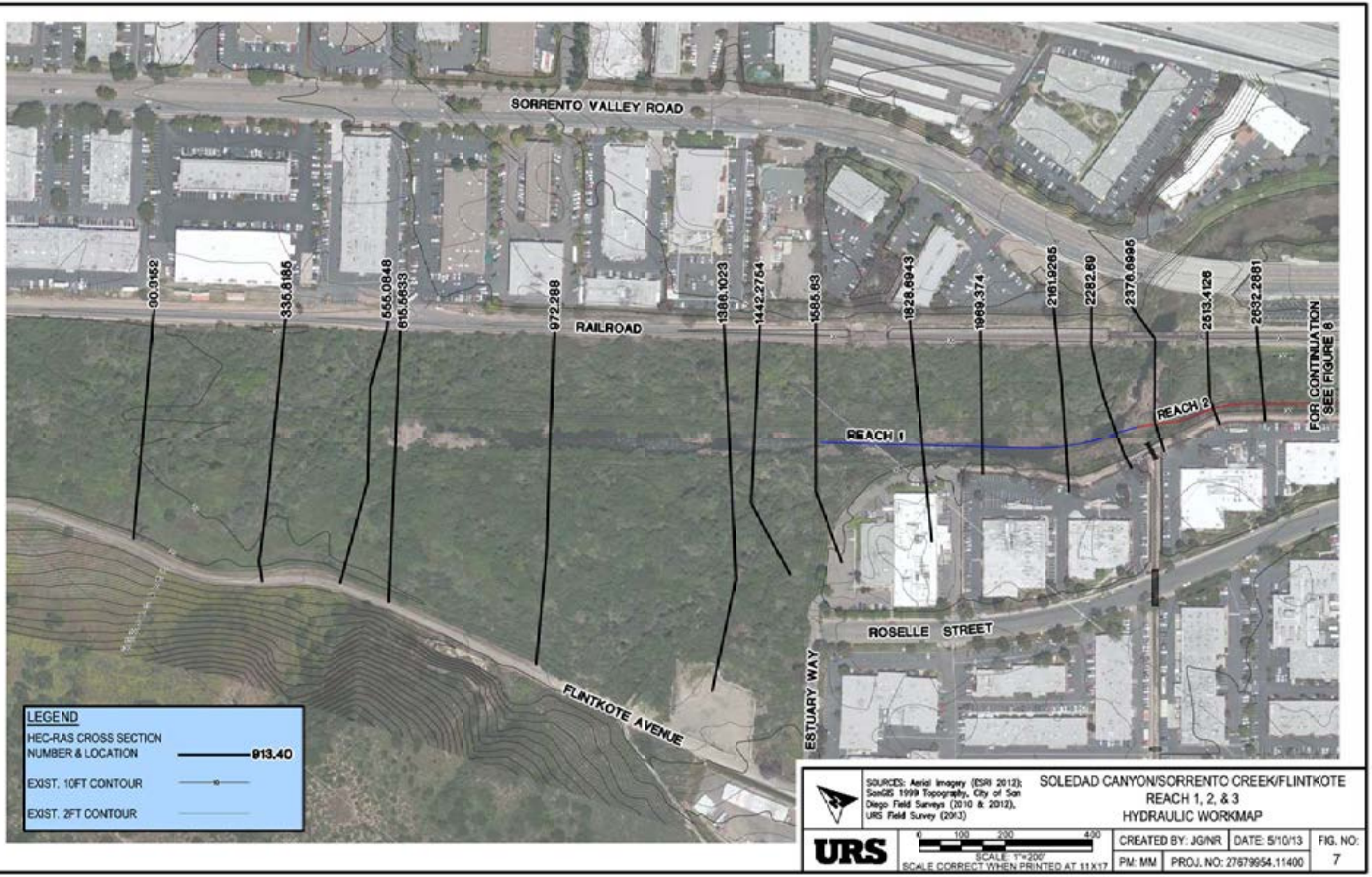
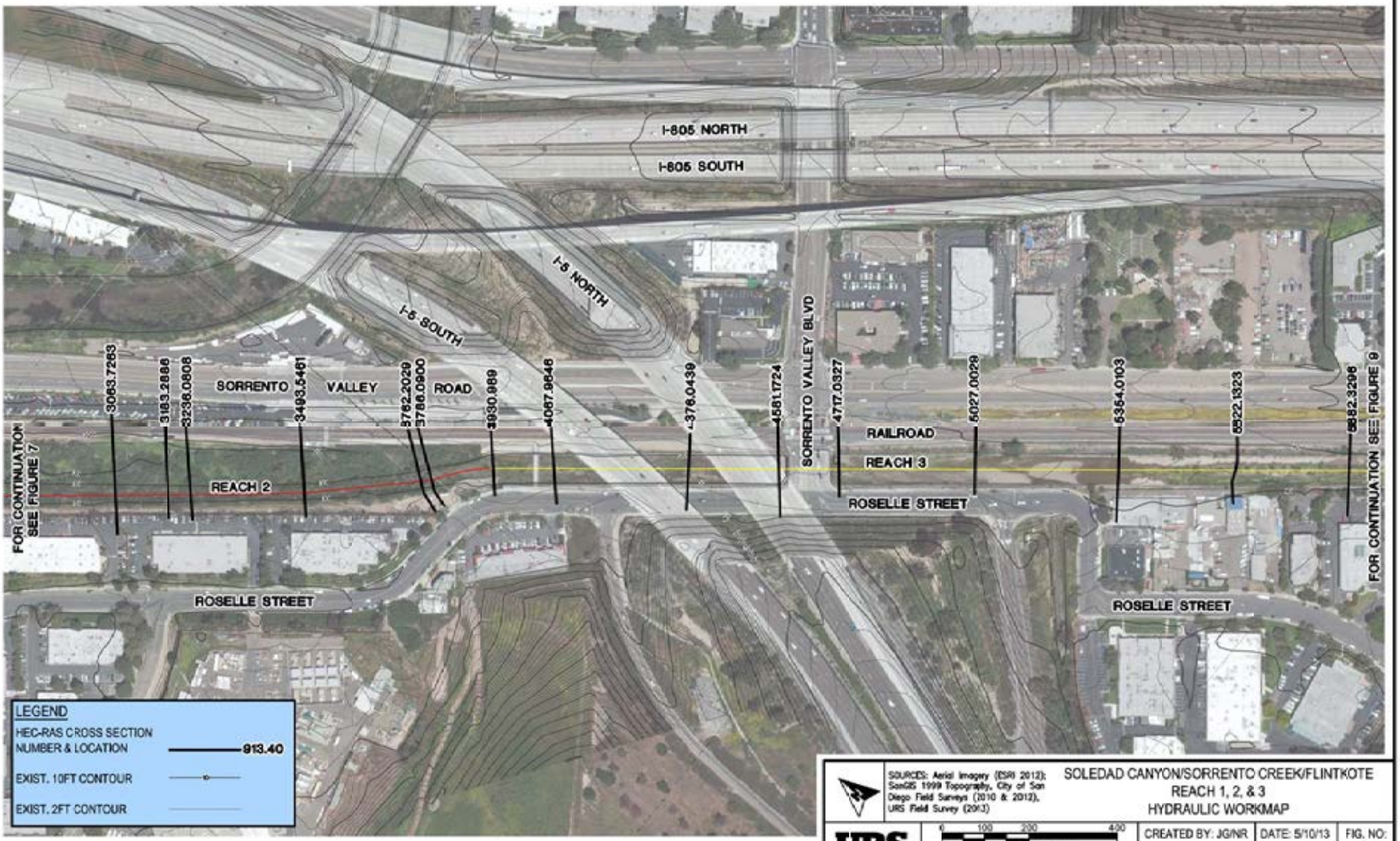

SORRENTO VALLEY ROAD
RAILROAD
FLINTKOTE AVENUE
ESTUARY WAY
ROSELLE STREET
REACH 1
REACH 2
FOR CONTINUATION SEE FIGURE 8
30.3162
335.8185
555.0848
615.5633
972.288
1386.1023
1442.2764
1585.63
1828.6943
1969.374
2161.9265
2282.89
2376.6995
2513.4126
2632.2681
LEGEND
HEC-RAS CROSS SECTION NUMBER & LOCATION
913.40
EXIST. 10FT CONTOUR
EXIST. 2FT CONTOUR
SOURCES: Aerial Imagery (ESRI 2012); SanGIS 1999 Topography, City of San Diego Field Surveys (2010 & 2012), URS Field Survey (2013)
SOLEDAD CANYON/SORRENTO CREEK/FLINTKOTE
REACH 1, 2, & 3
HYDRAULIC WORKMAP
URS
0 100 200 400
SCALE: 1"=200'
SCALE CORRECT WHEN PRINTED AT 11X17
CREATED BY: JG/NR
DATE: 5/10/13
PM: MM
PROJ. NO: 27679954.11400
FIG. NO: 7

FIGURE 8. REACH 1, 2, AND 3 HYDRAULIC WORKMAP



SOURCES: Aerial Imagery (ESRI 2012); SanGIS 1999 Topography, City of San Diego Field Surveys (2010 & 2012), URS Field Survey (2013)

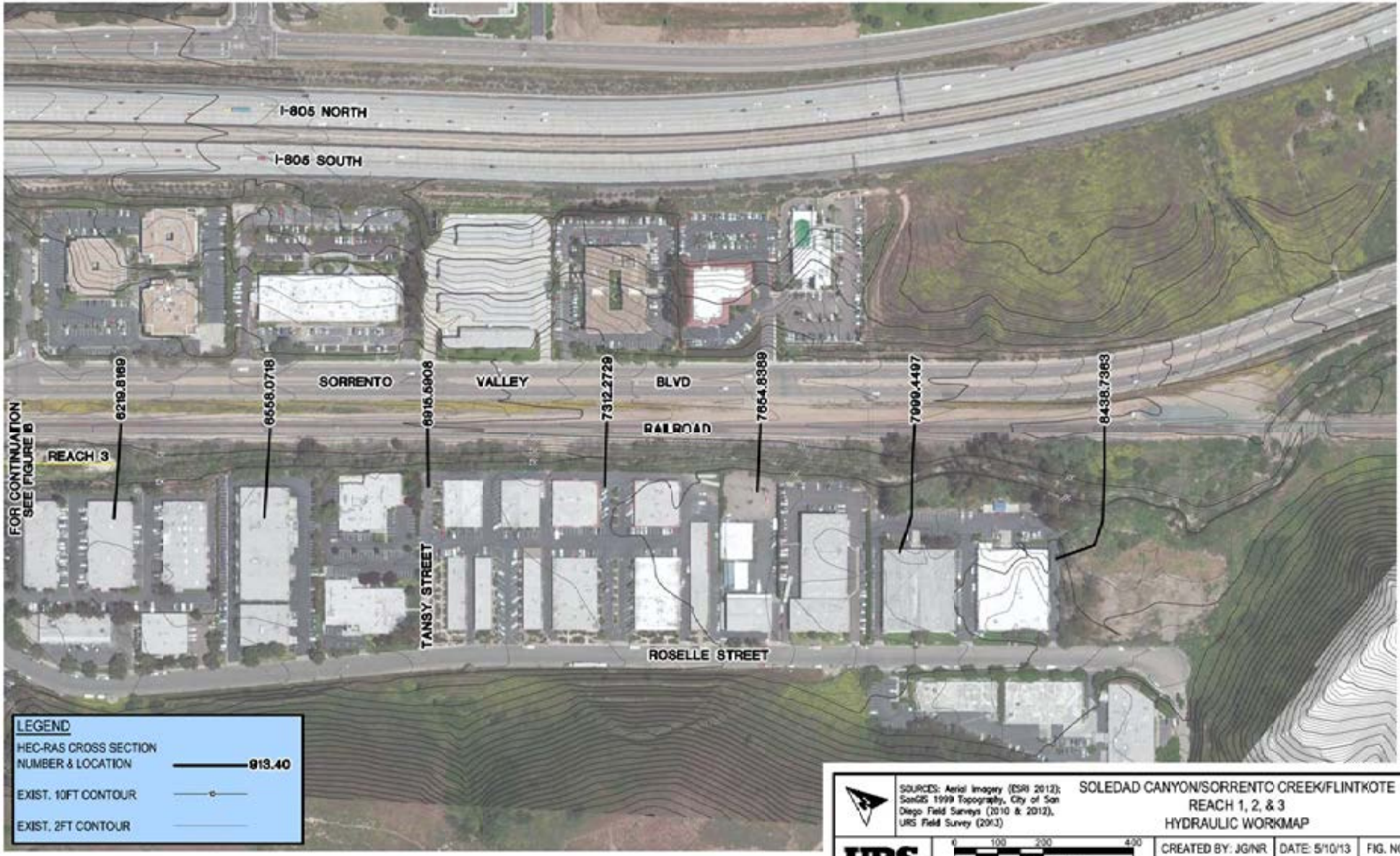
SOLEDAD CANYON/SORRENTO CREEK/FLINTKOTE REACH 1, 2, & 3 HYDRAULIC WORKMAP

URS

0 100 200 400
SCALE: 1"=200'
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: JG/NR	DATE: 5/10/13	FIG. NO:
PM: MM	PROJ. NO: 27679954.11400	8

FIGURE 9. REACH 1, 2, AND 3 HYDRAULIC WORKMAP



SOURCES: Aerial Imagery (ESRI 2012); SanGIS 1999 Topography, City of San Diego Field Surveys (2010 & 2012), URS Field Survey (2013)

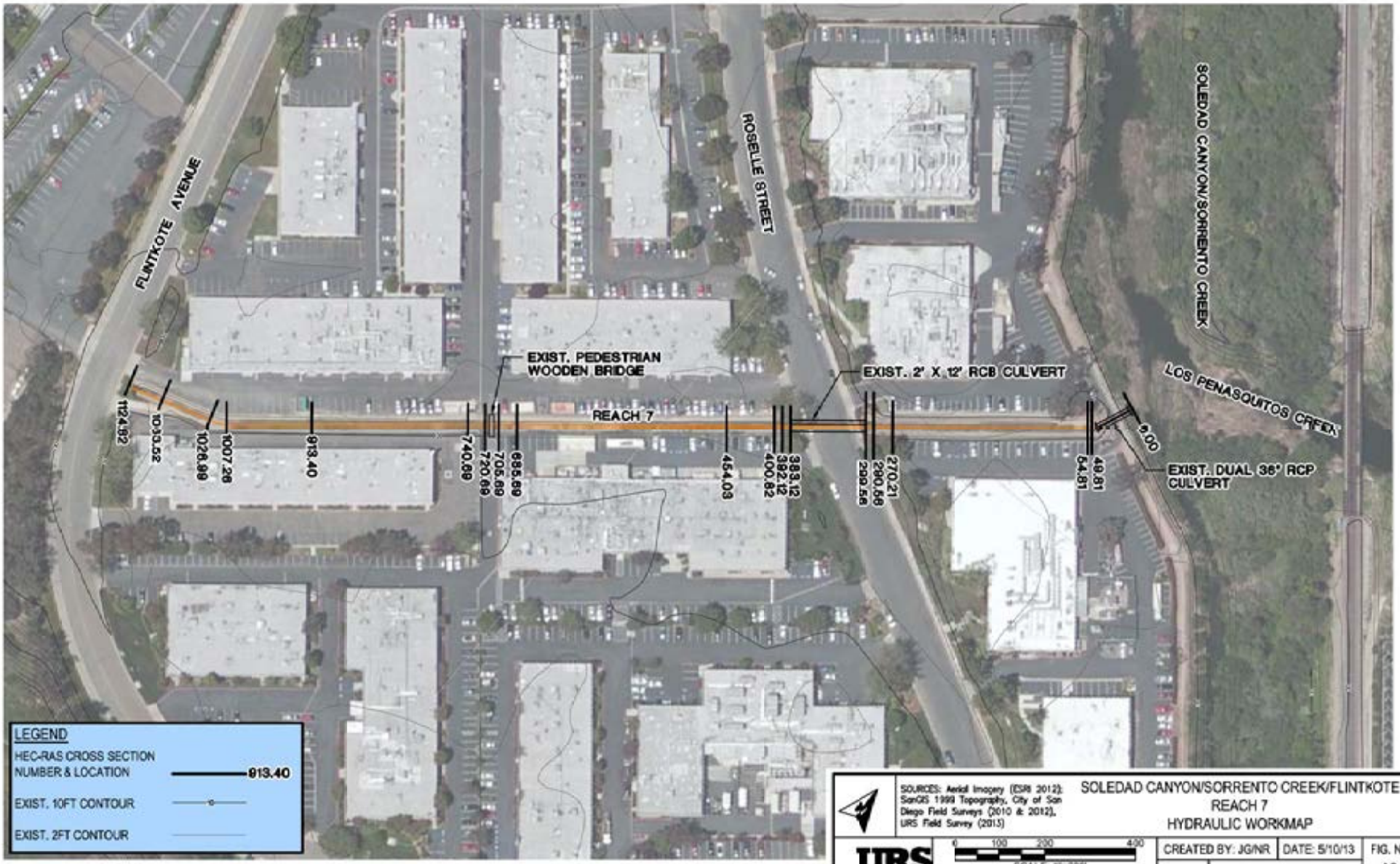
SOLEDAD CANYON/SORRENTO CREEK/FLINTKOTE REACH 1, 2, & 3 HYDRAULIC WORKMAP

URS

0 100 200 400
SCALE: 1"=200'
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: JG/NR	DATE: 5/10/13	FIG. NO:
PM: MM	PROJ. NO: 27679954.11400	9

FIGURE 10. REACH 7 HYDRAULIC WORKMAP



SOURCES: Aerial Imagery (ESRI 2012); SanGIS 1999 Topography, City of San Diego Field Surveys (2010 & 2012), URS Field Survey (2013)

SOLEDAD CANYON/SORRENTO CREEK/FLINTKOTE REACH 7 HYDRAULIC WORKMAP

URS

0 100 200 400

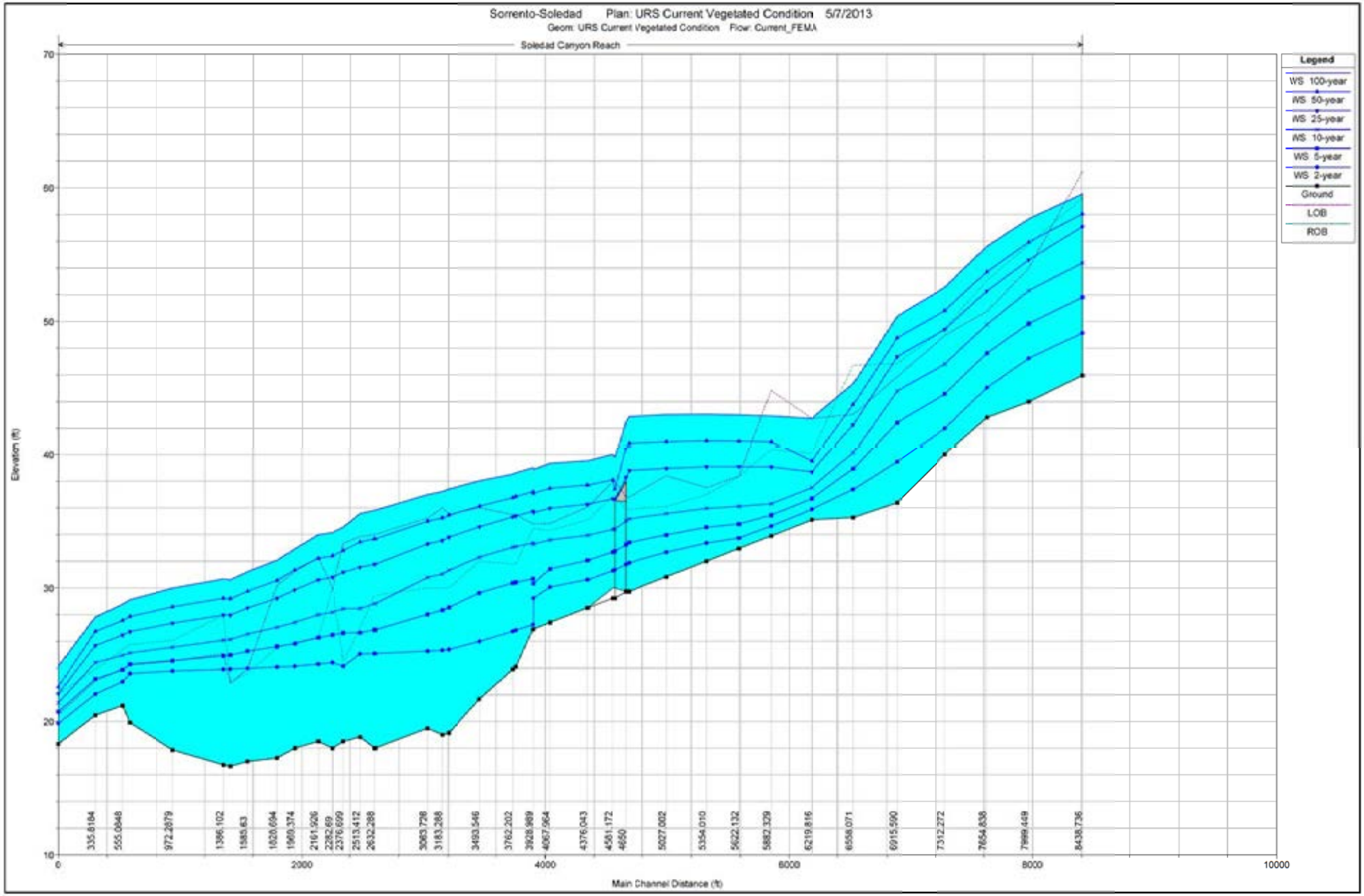
SCALE: 1"=200'

SCALE CORRECT WHEN PRINTED AT 11X17

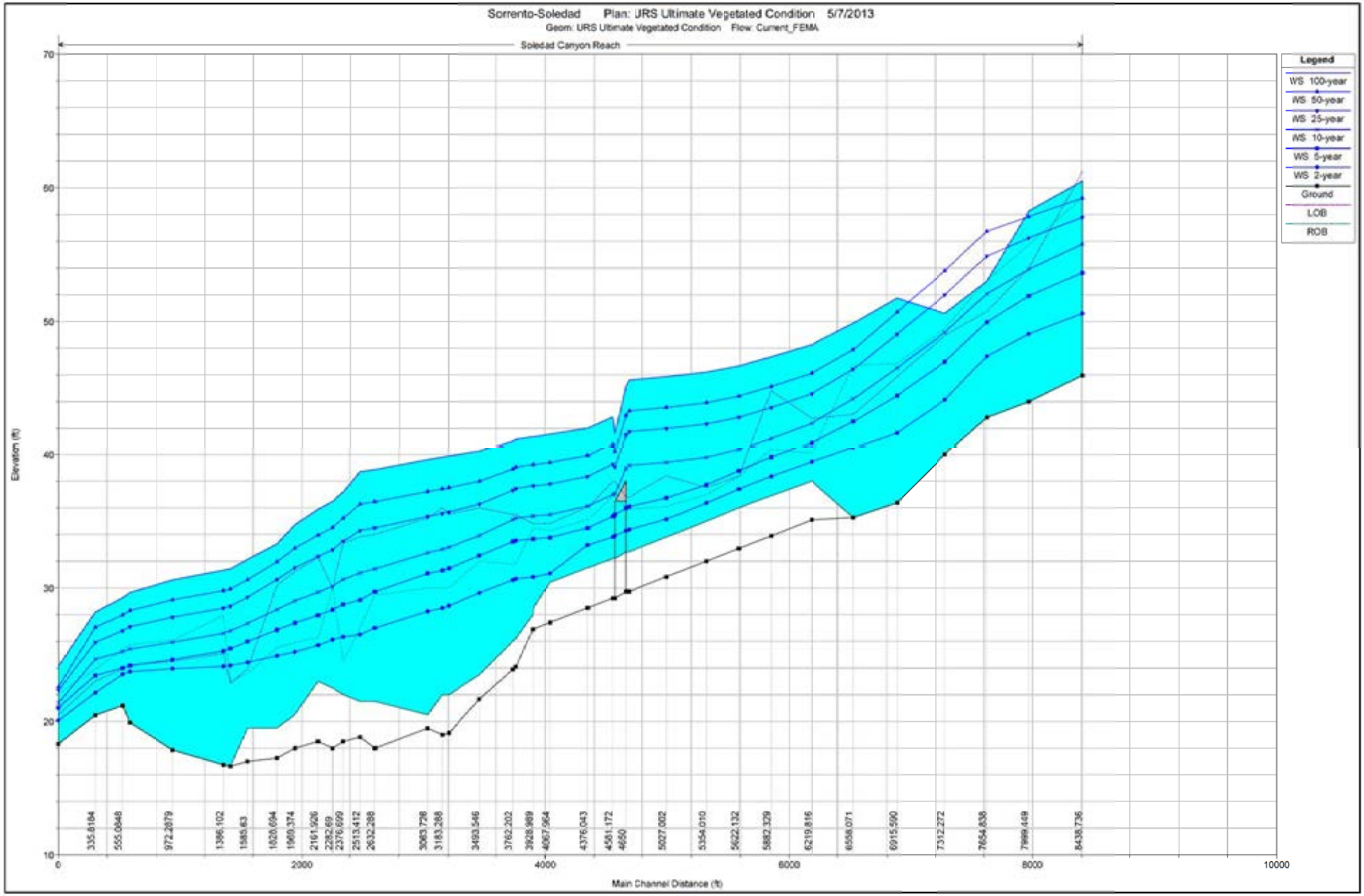
CREATED BY: JG/NR	DATE: 5/10/13	FIG. NO:
PM: MM	PROJ. NO: 27679954.11400	10

ATTACHMENT 3 – HYDRAULIC PROFILES AND DETAILED RESULTS FOR REACH 3

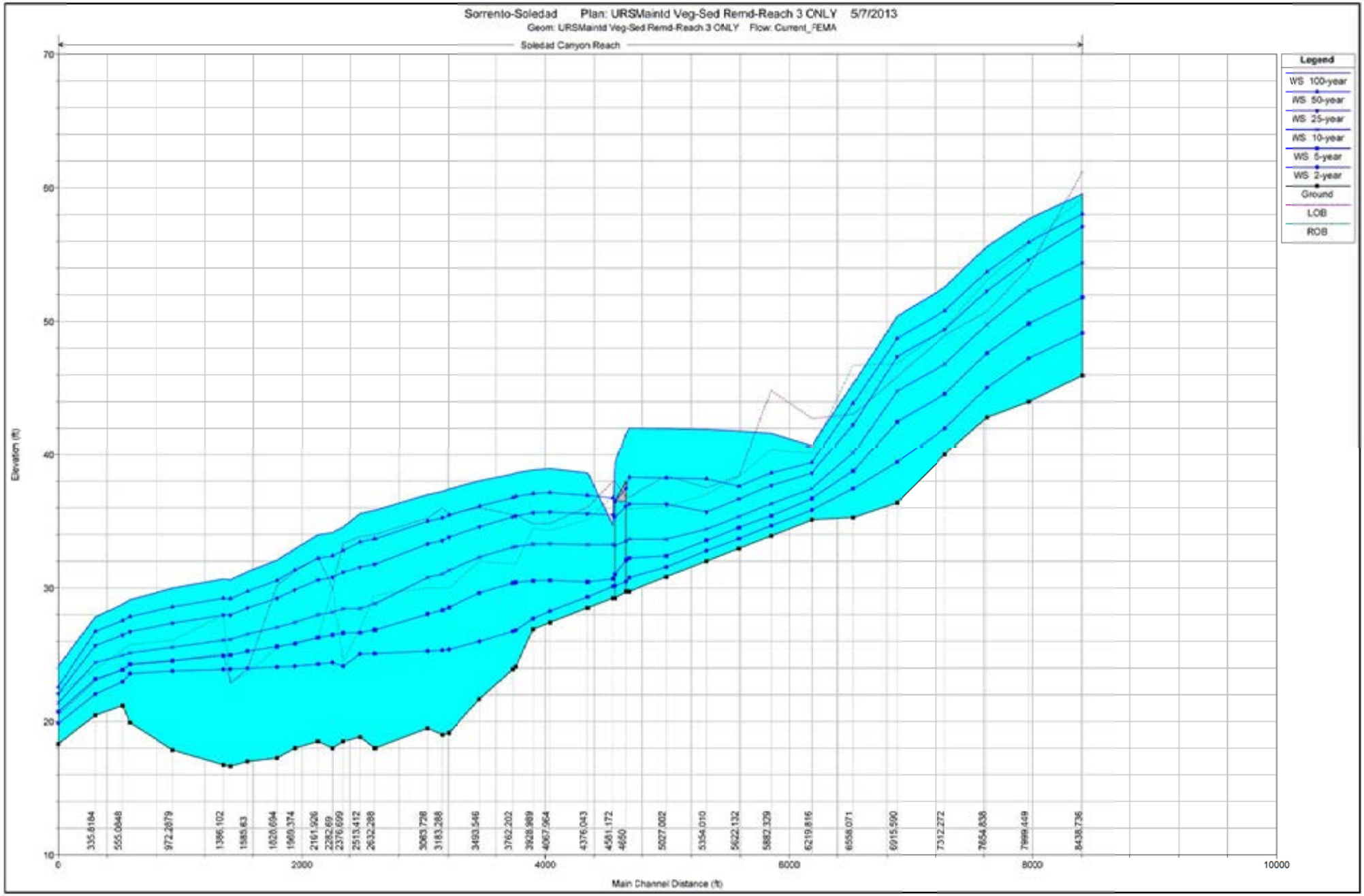
HYDRAULIC PROFILES FOR REACH 3 CURRENT VEGETATED CONDTION


Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
Soledad Canyon Reach
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
LOB
ROB
Elevation (ft)
Main Channel Distance (ft)
70
60
50
40
30
20
10
0
2000
4000
6000
8000
10000
335.6184
555.0848
972.2879
1396.102
1585.63
1820.694
1960.374
2161.926
2282.69
2376.699
2513.412
2632.288
3063.728
3183.288
3493.546
3762.202
3928.989
4067.964
4376.043
4581.172
4650
5027.002
5354.010
5622.132
5882.329
6219.816
6558.071
6915.590
7312.272
7654.838
7999.449
8438.736

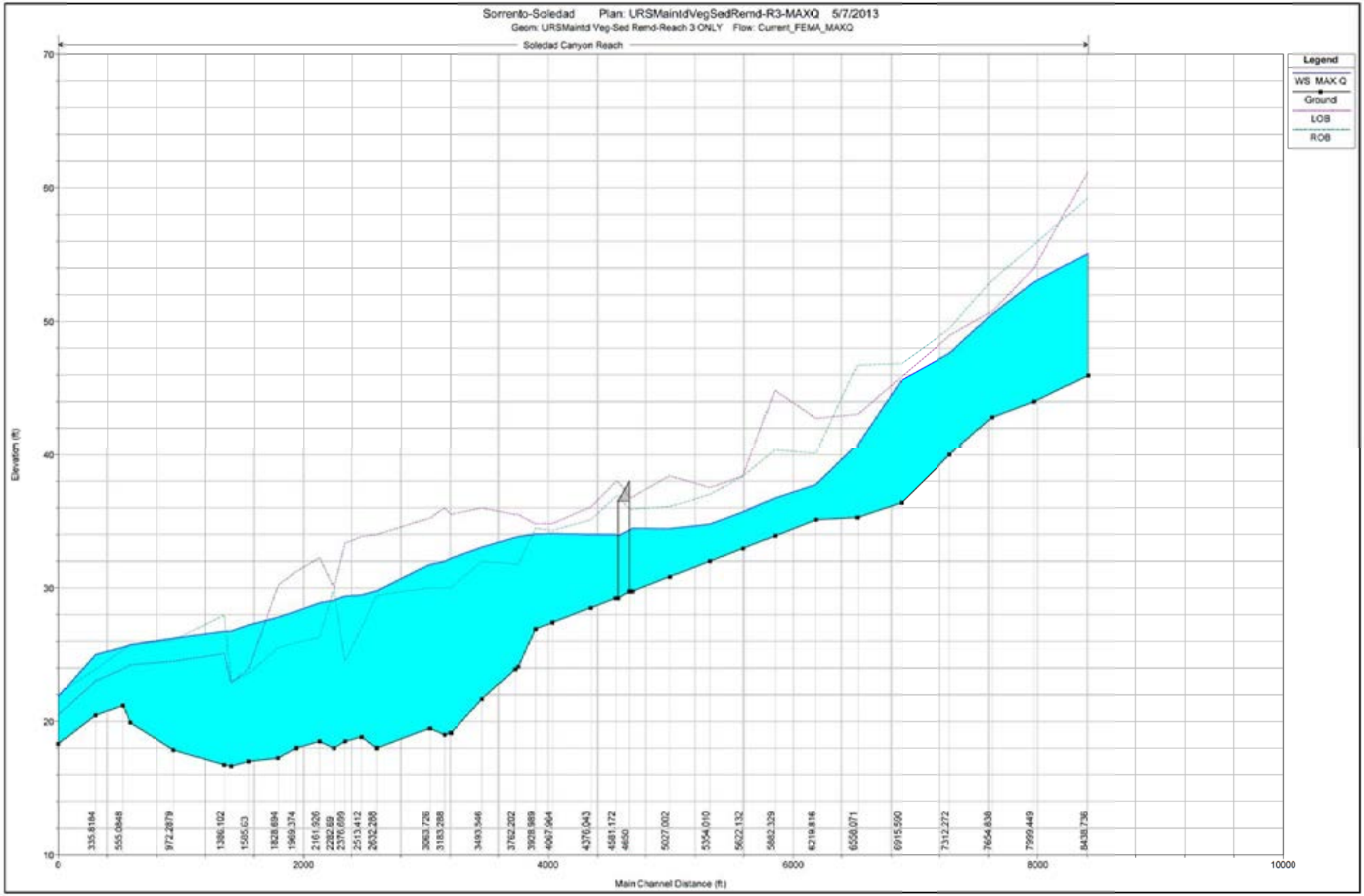
HYDRAULIC PROFILES FOR REACH 3 ULTIMATE VEGETATED CONDTION


Sorrento-Soledad Plan: JRS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
Soledad Canyon Reach
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
LOB
ROB
Elevation (ft)
Main Channel Distance (ft)
70
60
50
40
30
20
10
0
2000
4000
6000
8000
10000
335.8184
555.0848
972.2879
1396.102
1585.63
1820.694
1960.374
2161.926
2282.69
2376.699
2513.412
2632.288
3063.728
3183.288
3493.546
3762.202
3928.989
4067.964
4376.043
4581.172
4650
5027.002
5354.010
5622.132
5882.329
6219.816
6558.071
6915.590
7312.272
7654.838
7999.449
8438.736

HYDRAULIC PROFILES FOR REACH 3 MAINTAINED CONDTION (SEDIMENT REMOVED)


Sorrento-Soledad Plan: URSMaintd Veg-Sed Remd-Reach 3 ONLY 5/7/2013
Geom: URSMaintd Veg-Sed Remd-Reach 3 ONLY Flow: Current_FEMA
Soledad Canyon Reach
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
LOB
ROB
Elevation (ft)
Main Channel Distance (ft)
70
60
50
40
30
20
10
0
2000
4000
6000
8000
10000
335.6184
555.0848
972.2879
1396.102
1585.63
1820.694
1960.374
2161.926
2282.69
2376.699
2513.412
2632.288
3063.728
3183.288
3493.546
3762.202
3928.989
4067.964
4376.043
4581.172
4650
5027.002
5354.010
5622.132
5882.329
6219.816
6558.071
6915.590
7312.272
7654.838
7999.449
8438.736

HYDRAULIC PROFILES FOR REACH 3 MAINTAINED CONDTION (SEDIMENT REMOVED), MAXIMUM FLOW


Sorrento-Soledad Plan: URSMaintdVegSedRemd-R3-MAXQ 5/7/2013
Geom: URSMaintd Veg-Sed Remd-Reach 3 ONLY Flow: Current_FEMA_MAXQ
Soledad Canyon Reach
Legend
WS MAX Q
Ground
LOB
ROB
Elevation (ft)
Main Channel Distance (ft)
70
60
50
40
30
20
10
0
2000
4000
6000
8000
10000
335.8184
555.0848
972.2879
1386.102
1585.63
1828.694
1969.374
2161.926
2282.69
2376.699
2513.412
2632.288
3063.726
3183.288
3493.546
3762.202
3928.989
4067.964
4376.043
4581.172
4650
5027.002
5354.010
5622.132
5882.329
6219.816
6556.071
6915.590
7312.272
7654.836
7999.449
8438.736

DETAILED HYDRAULIC RESULTS FOR REACH 3 CURRENT VEGETATED CONDITION

HEC-RAS Plan: URSCurrentVeg River: Soledad Canyon Reach: Reach

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	8438.736	100-year	6700.00	45.96	59.55	56.00	59.85	0.003995	4.43	1512.43	315.63	0.36
Reach	8438.736	50-year	4500.00	45.96	58.05	54.16	58.33	0.005540	4.26	1056.06	294.82	0.40
Reach	8438.736	25-year	3100.00	45.96	57.10	52.79	57.34	0.006478	3.94	786.34	272.61	0.41
Reach	8438.736	10-year	1500.00	45.96	54.38	50.75	54.64	0.004115	4.10	365.97	69.71	0.32
Reach	8438.736	5-year	730.00	45.96	51.80	49.35	52.00	0.004357	3.56	205.24	54.87	0.32
Reach	8438.736	2-year	220.00	45.96	49.13	47.86	49.25	0.004806	2.77	79.28	39.39	0.34
Reach	7999.449	100-year	6700.00	43.99	57.68	54.66	58.43	0.002552	5.51	1092.07	272.26	0.35
Reach	7999.449	50-year	4500.00	43.99	55.93	53.04	56.45	0.003346	5.31	804.94	252.28	0.38
Reach	7999.449	25-year	3100.00	43.99	54.61	52.08	55.03	0.004297	5.22	595.95	229.53	0.42
Reach	7999.449	10-year	1500.00	43.99	52.30	49.36	52.64	0.005050	4.63	323.78	93.92	0.44
Reach	7999.449	5-year	730.00	43.99	49.83	47.76	50.14	0.004054	4.46	163.69	44.32	0.41
Reach	7999.449	2-year	220.00	43.99	47.24	46.03	47.41	0.003659	3.35	65.60	30.81	0.41
Reach	7654.838	100-year	6700.00	42.81	55.62	53.01	57.01	0.006601	9.51	708.51	148.49	0.57
Reach	7654.838	50-year	4500.00	42.81	53.71	51.44	54.78	0.007024	8.29	543.57	120.53	0.57
Reach	7654.838	25-year	3100.00	42.81	52.27	50.15	53.58	0.007266	7.28	425.72	114.45	0.55
Reach	7654.838	10-year	1500.00	42.81	49.76	48.11	50.35	0.008915	6.15	244.01	63.83	0.55
Reach	7654.838	5-year	730.00	42.81	47.62	46.55	48.13	0.008907	5.71	127.87	44.48	0.59
Reach	7654.838	2-year	220.00	42.81	45.04	44.84	45.56	0.008281	5.81	37.86	25.24	0.84
Reach	7312.272	100-year	6700.00	40.02	52.55	50.58	54.44	0.008247	11.07	616.21	132.34	0.67
Reach	7312.272	50-year	4500.00	40.02	50.81	48.96	52.18	0.008033	9.39	481.53	107.18	0.63
Reach	7312.272	25-year	3100.00	40.02	49.40	47.54	50.44	0.008163	8.15	380.35	102.50	0.61
Reach	7312.272	10-year	1500.00	40.02	46.81	45.34	47.54	0.007488	6.86	218.81	53.98	0.60
Reach	7312.272	5-year	730.00	40.02	44.57	43.73	45.21	0.008084	6.41	113.80	39.71	0.67
Reach	7312.272	2-year	220.00	40.02	41.99	41.99	42.70	0.008345	6.73	32.70	23.11	1.00
Reach	6915.590	100-year	6700.00	36.38	50.38	47.18	51.63	0.005418	9.00	753.34	124.99	0.52
Reach	6915.590	50-year	4500.00	36.38	48.77	45.61	49.62	0.004732	7.40	611.83	109.95	0.47
Reach	6915.590	25-year	3100.00	36.38	47.37	44.29	47.98	0.004417	6.26	495.76	105.00	0.44
Reach	6915.590	10-year	1500.00	36.38	44.79	41.79	45.18	0.004488	4.98	301.22	68.06	0.42
Reach	6915.590	5-year	730.00	36.38	42.44	40.10	42.73	0.004623	4.31	169.53	44.61	0.39
Reach	6915.590	2-year	220.00	36.38	39.45	38.28	39.65	0.004508	3.58	61.46	28.03	0.43
Reach	6558.071	100-year	6700.00	35.28	45.34	45.34	47.94	0.023753	13.09	520.71	110.03	0.92
Reach	6558.071	50-year	4500.00	35.28	43.78	43.78	46.07	0.028035	12.16	375.04	89.90	0.94
Reach	6558.071	25-year	3100.00	35.28	42.27	42.27	44.38	0.035431	11.65	266.04	63.07	1.00
Reach	6558.071	10-year	1500.00	35.28	40.12	40.12	41.72	0.029932	10.14	147.94	46.40	1.00
Reach	6558.071	5-year	730.00	35.28	38.92	38.58	39.80	0.017293	7.52	97.06	38.36	0.83
Reach	6558.071	2-year	220.00	35.28	37.38	36.95	37.74	0.006296	4.82	45.60	28.61	0.67

HEC-RAS Plan: URSCurrentVeg River: Soledad Canyon Reach: Reach (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	6219.816	100-year	6700.00	35.10	42.75	41.72	44.96	0.001394	11.94	578.09	124.34	0.79
Reach	6219.816	50-year	4500.00	35.10	39.51	40.27	42.85	0.004518	14.67	306.82	76.22	1.29
Reach	6219.816	25-year	3100.00	35.10	38.70	39.18	41.16	0.004254	12.60	246.00	73.79	1.22
Reach	6219.816	10-year	1500.00	35.10	37.52	37.65	38.86	0.003773	9.31	161.16	70.26	1.08
Reach	6219.816	5-year	730.00	35.10	36.69	36.69	37.46	0.003620	7.01	104.11	67.78	1.00
Reach	6219.816	2-year	220.00	35.10	35.89	35.82	36.18	0.003441	4.35	50.57	65.36	0.87
Reach	5882.329	100-year	6700.00	33.89	42.94	40.49	44.39	0.000753	9.71	719.62	115.91	0.59
Reach	5882.329	50-year	4500.00	33.89	40.99	39.06	42.14	0.000835	8.58	529.10	103.15	0.59
Reach	5882.329	25-year	3100.00	33.89	39.06	37.96	40.16	0.001190	8.42	368.05	79.32	0.69
Reach	5882.329	10-year	1500.00	33.89	36.31	36.44	37.65	0.003453	9.28	161.64	70.66	1.08
Reach	5882.329	5-year	730.00	33.89	35.45	35.48	36.24	0.003552	7.16	102.01	67.93	1.03
Reach	5882.329	2-year	220.00	33.89	34.63	34.61	34.96	0.003811	4.61	47.68	65.35	0.95
Reach	5622.132	100-year	6700.00	32.96	43.02	39.66	44.14	0.000456	8.62	824.33	135.01	0.49
Reach	5622.132	50-year	4500.00	32.96	41.05	38.16	41.88	0.000457	7.46	656.51	123.71	0.48
Reach	5622.132	25-year	3100.00	32.96	39.08	37.04	39.84	0.000612	7.00	449.01	105.82	0.53
Reach	5622.132	10-year	1500.00	32.96	36.11	35.51	36.88	0.001412	7.04	213.04	72.44	0.72
Reach	5622.132	5-year	730.00	32.96	34.79	34.55	35.36	0.002039	6.05	120.64	68.51	0.80
Reach	5622.132	2-year	220.00	32.96	33.74	33.68	34.04	0.003267	4.41	49.86	65.33	0.89
Reach	5354.010	100-year	6700.00	32.01	43.06	38.87	43.96	0.000418	7.73	930.34	155.20	0.43
Reach	5354.010	50-year	4500.00	32.01	41.07	37.46	41.71	0.000397	6.52	735.39	122.03	0.40
Reach	5354.010	25-year	3100.00	32.01	39.08	36.27	39.63	0.000489	6.02	540.48	118.08	0.42
Reach	5354.010	10-year	1500.00	32.01	35.96	34.75	36.48	0.001001	5.78	259.54	74.86	0.55
Reach	5354.010	5-year	730.00	32.01	34.55	33.79	34.88	0.001191	4.67	156.38	70.61	0.55
Reach	5354.010	2-year	220.00	32.01	33.37	32.93	33.50	0.001156	2.92	75.35	67.07	0.49
Reach	5027.002	100-year	6700.00	30.84	43.04	38.26	43.72	0.000685	6.77	1031.93	156.78	0.36
Reach	5027.002	50-year	4500.00	30.84	41.00	36.81	41.50	0.000667	5.81	810.48	156.78	0.35
Reach	5027.002	25-year	3100.00	30.84	38.95	35.66	39.40	0.000826	5.42	592.89	119.04	0.37
Reach	5027.002	10-year	1500.00	30.84	35.56	34.17	36.02	0.001930	5.42	276.78	77.13	0.50
Reach	5027.002	5-year	730.00	30.84	33.98	33.22	34.31	0.002821	4.61	158.19	72.10	0.55
Reach	5027.002	2-year	220.00	30.84	32.68	32.37	32.84	0.004245	3.27	67.38	67.99	0.58
Reach	4717.032	100-year	6700.00	29.73	42.89	37.11	43.48	0.000659	6.26	1104.59	162.16	0.33
Reach	4717.032	50-year	4500.00	29.73	40.87	35.63	41.28	0.000586	5.18	894.17	162.16	0.30
Reach	4717.032	25-year	3100.00	29.73	38.80	34.50	39.13	0.000665	4.66	677.77	155.43	0.31
Reach	4717.032	10-year	1500.00	29.73	35.17	32.99	35.48	0.001356	4.45	337.35	80.10	0.38
Reach	4717.032	5-year	730.00	29.73	33.39	32.04	33.60	0.001710	3.63	201.08	73.64	0.39

HEC-RAS Plan: URSCurrentVeg River: Soledad Canyon Reach: Reach (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	4717.032	2-year	220.00	29.73	31.88	31.18	31.97	0.001910	2.35	93.70	68.71	0.35
Reach	4650		Bridge									
Reach	4581.172	100-year	6700.00	30.00	40.02	37.82	41.60	0.004204	10.42	699.28	177.52	0.59
Reach	4581.172	50-year	4500.00	30.00	38.09	35.69	39.44	0.004195	9.35	500.99	159.88	0.59
Reach	4581.172	25-year	3100.00	30.00	36.67	34.43	37.65	0.003713	7.95	389.69	75.61	0.55
Reach	4581.172	10-year	1500.00	30.00	34.39	32.74	34.92	0.003191	5.86	256.18	58.38	0.49
Reach	4581.172	5-year	730.00	30.00	32.70	31.69	33.03	0.003552	4.63	157.75	58.38	0.50
Reach	4581.172	2-year	220.00	30.00	31.29	30.76	31.42	0.003544	2.91	75.49	58.38	0.45
Reach	4376.043	100-year	6700.00	28.51	39.53	36.55	40.82	0.002748	9.26	756.73	153.75	0.53
Reach	4376.043	50-year	4500.00	28.51	37.71	34.90	38.68	0.002469	7.96	583.87	144.47	0.51
Reach	4376.043	25-year	3100.00	28.51	36.27	33.72	36.99	0.002224	6.82	458.51	133.22	0.48
Reach	4376.043	10-year	1500.00	28.51	33.95	32.06	34.37	0.002060	5.21	288.01	68.48	0.45
Reach	4376.043	5-year	730.00	28.51	32.06	31.01	32.37	0.002901	4.46	163.86	62.89	0.49
Reach	4376.043	2-year	220.00	28.51	30.82	30.65	30.75	0.003562	2.87	76.66	58.18	0.44
Reach	4067.964	100-year	6700.00	27.41	39.34	35.14	40.08	0.001335	7.06	987.99	171.88	0.40
Reach	4067.964	50-year	4500.00	27.41	37.46	33.54	38.01	0.001290	6.03	775.75	171.88	0.38
Reach	4067.964	25-year	3100.00	27.41	35.97	32.44	36.39	0.001291	5.24	606.55	171.88	0.36
Reach	4067.964	10-year	1500.00	27.41	33.59	30.92	33.84	0.001186	4.02	373.40	80.15	0.33
Reach	4067.964	5-year	730.00	27.41	31.43	29.96	31.62	0.001911	3.52	207.40	73.05	0.37
Reach	4067.964	2-year	220.00	27.41	30.07	29.10	30.13	0.001343	1.98	111.37	68.63	0.27
Reach	3930.989	100-year	6700.00	26.92	38.87	35.39	39.84	0.001970	7.94	854.36	145.27	0.47
Reach	3930.989	50-year	4500.00	26.92	37.09	34.02	37.79	0.001883	6.71	678.78	145.27	0.44
Reach	3930.989	25-year	3100.00	26.92	35.64	32.94	36.17	0.001917	5.83	535.43	145.27	0.43
Reach	3930.989	10-year	1500.00	26.92	33.27	31.20	33.62	0.002221	4.72	317.67	100.69	0.43
Reach	3930.989	5-year	730.00	26.92	30.34	30.16	31.01	0.014021	6.57	111.07	71.11	0.86
Reach	3930.989	2-year	220.00	26.92	29.23	29.23	29.61	0.026327	4.93	44.62	68.55	1.00
Reach	3928.989	100-year	6700.00	26.91	39.00	34.38	39.78	0.001108	7.11	956.04	145.27	0.39
Reach	3928.989	50-year	4500.00	26.91	37.21	32.85	37.73	0.000974	5.85	778.66	145.27	0.36
Reach	3928.989	25-year	3100.00	26.91	35.74	31.43	36.12	0.000892	4.92	634.34	145.27	0.33
Reach	3928.989	10-year	1500.00	26.91	33.37	29.71	33.57	0.000744	3.62	414.47	101.58	0.29
Reach	3928.989	5-year	730.00	26.91	30.68	28.64	30.85	0.001104	3.31	220.43	73.00	0.31
Reach	3928.989	2-year	220.00	26.91	27.25	27.69	29.31	0.312602	11.52	19.10	56.04	3.48
Reach	3786.09	100-year	6700.00	24.10	38.63	35.11	39.50	0.003918	8.50	1086.51	195.57	0.44
Reach	3786.09	50-year	4500.00	24.10	36.84	33.39	37.48	0.003432	7.14	863.46	195.57	0.40

HEC-RAS Plan: URSCurrentVeg River: Soledad Canyon Reach: Reach (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	3786.09	25-year	3100.00	24.10	35.40	31.32	35.89	0.003084	6.12	682.33	195.08	0.37
Reach	3786.09	10-year	1500.00	24.10	33.10	28.92	33.39	0.002188	4.48	414.07	107.60	0.30
Reach	3786.09	5-year	730.00	24.10	30.42	27.38	30.63	0.002218	3.73	195.92	40.56	0.30
Reach	3786.09	2-year	220.00	24.10	26.83	25.86	27.01	0.004544	3.41	64.47	32.21	0.43
Reach	3762.202	100-year	6700.00	23.90	38.52	35.01	39.40	0.003955	8.52	1082.01	195.57	0.43
Reach	3762.202	50-year	4500.00	23.90	36.76	33.25	37.40	0.003436	7.14	861.09	195.57	0.39
Reach	3762.202	25-year	3100.00	23.90	35.33	31.11	35.82	0.003048	6.10	681.49	194.73	0.36
Reach	3762.202	10-year	1500.00	23.90	33.06	28.71	33.34	0.002094	4.41	417.51	107.29	0.29
Reach	3762.202	5-year	730.00	23.90	30.38	27.17	30.58	0.002027	3.61	202.35	40.65	0.28
Reach	3762.202	2-year	220.00	23.90	26.75	25.66	26.91	0.003819	3.21	68.51	32.84	0.39
Reach	3493.546	100-year	6700.00	21.68	38.02	34.58	38.47	0.002455	6.10	1291.50	216.10	0.32
Reach	3493.546	50-year	4500.00	21.68	36.13	33.32	36.52	0.002801	5.76	956.63	216.10	0.33
Reach	3493.546	25-year	3100.00	21.68	34.58	31.20	34.96	0.003197	5.66	697.11	183.60	0.35
Reach	3493.546	10-year	1500.00	21.68	32.30	28.34	32.65	0.003245	4.91	340.55	147.95	0.34
Reach	3493.546	5-year	730.00	21.68	29.83	26.15	29.92	0.002551	4.36	168.86	34.56	0.34
Reach	3493.546	2-year	220.00	21.68	26.00	24.08	26.16	0.002127	3.21	68.60	22.38	0.32
Reach	3236.080	100-year	6700.00	19.14	37.41	33.10	37.77	0.002765	5.19	1409.59	211.76	0.27
Reach	3236.080	50-year	4500.00	19.14	35.45	32.21	35.74	0.003004	4.82	1071.39	177.98	0.27
Reach	3236.080	25-year	3100.00	19.14	33.80	31.31	34.07	0.003469	4.75	803.29	175.54	0.28
Reach	3236.080	10-year	1500.00	19.14	31.32	27.27	31.62	0.004850	4.76	407.83	152.67	0.32
Reach	3236.080	5-year	730.00	19.14	28.55	24.86	28.86	0.006061	4.45	163.97	31.99	0.35
Reach	3236.080	2-year	220.00	19.14	25.39	21.68	25.51	0.002907	2.81	78.17	21.30	0.26
Reach	3183.288	100-year	6700.00	19.00	37.22	33.13	37.62	0.003257	6.01	1434.84	210.30	0.31
Reach	3183.288	50-year	4500.00	19.00	35.24	31.99	35.57	0.003363	5.49	1097.89	181.05	0.30
Reach	3183.288	25-year	3100.00	19.00	33.55	29.52	33.88	0.003747	5.31	814.37	179.03	0.31
Reach	3183.288	10-year	1500.00	19.00	31.05	26.46	31.38	0.004306	4.84	404.04	156.85	0.32
Reach	3183.288	5-year	730.00	19.00	28.34	23.93	28.59	0.003896	4.03	181.13	33.31	0.30
Reach	3183.288	2-year	220.00	19.00	25.33	21.43	25.41	0.001132	2.30	95.79	22.19	0.19
Reach	3063.726	100-year	6700.00	19.49	36.99	32.13	37.29	0.001915	5.06	1568.45	273.75	0.29
Reach	3063.726	50-year	4500.00	19.49	34.99	30.98	35.23	0.002041	4.55	1196.73	252.24	0.27
Reach	3063.726	25-year	3100.00	19.49	33.30	28.86	33.52	0.002030	4.46	905.81	206.61	0.26
Reach	3063.726	10-year	1500.00	19.49	30.79	25.68	30.99	0.002121	3.96	491.31	185.45	0.26
Reach	3063.726	5-year	730.00	19.49	28.03	23.61	28.25	0.002035	3.80	192.12	54.96	0.28
Reach	3063.726	2-year	220.00	19.49	25.26	21.56	25.32	0.000446	1.97	111.63	25.59	0.17
Reach	2632.288	100-year	6700.00	18.00	35.82	31.89	36.23	0.003172	6.14	1448.17	215.82	0.33

HEC-RAS Plan: URSCurrentVeg River: Soledad Canyon Reach: Reach (Continued)

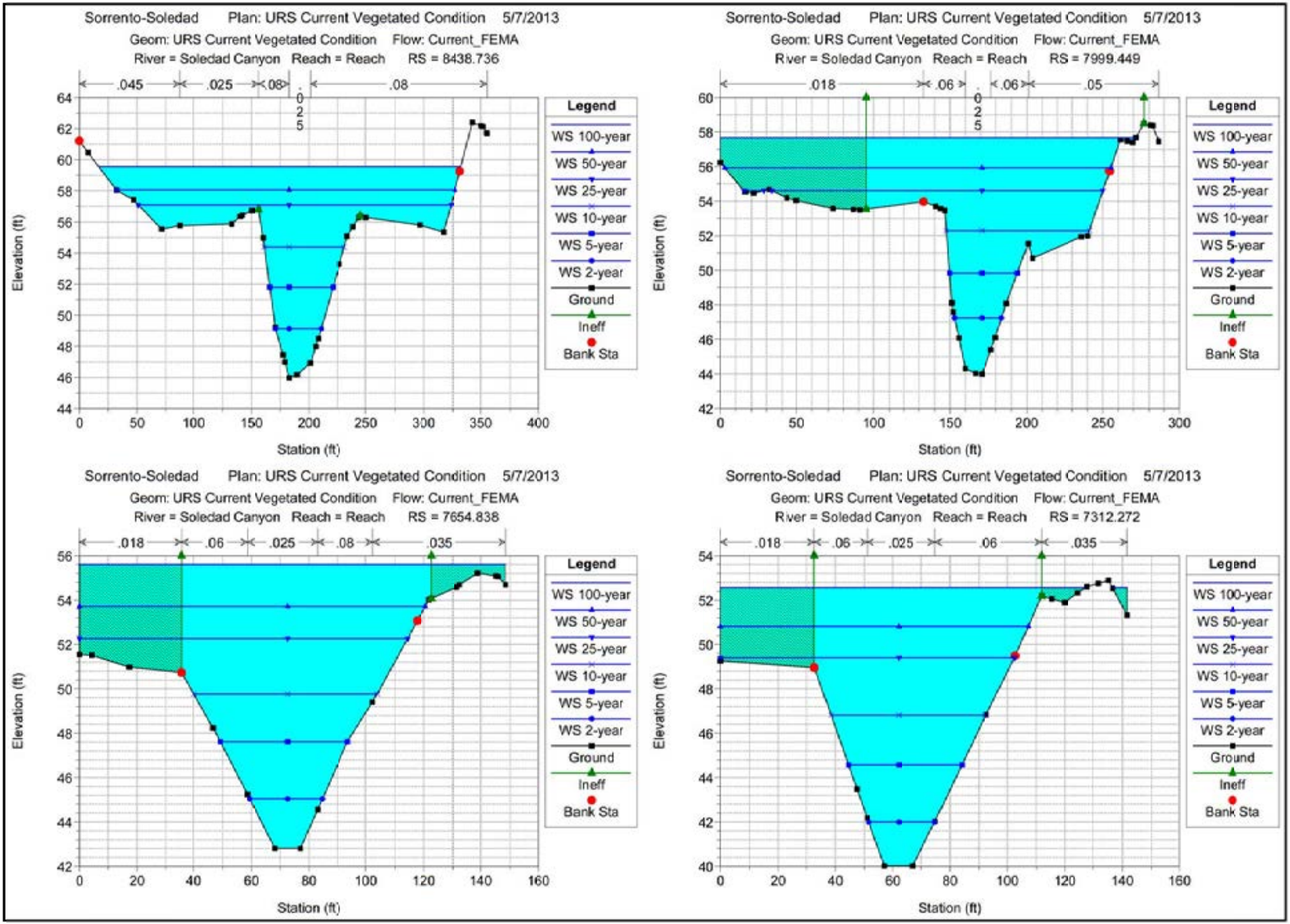
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	2632.288	50-year	4500.00	18.00	33.68	30.15	34.05	0.003683	5.82	1058.96	200.10	0.34
Reach	2632.288	25-year	3100.00	18.00	31.77	28.46	32.20	0.004841	5.98	726.66	196.39	0.38
Reach	2632.288	10-year	1500.00	18.00	28.82	25.08	29.40	0.007340	6.13	244.75	79.51	0.45
Reach	2632.288	5-year	730.00	18.00	26.86	22.52	27.14	0.003341	4.28	170.51	46.38	0.33
Reach	2632.288	2-year	220.00	18.00	25.09	20.22	25.14	0.000400	1.84	119.59	24.35	0.15
Reach	2513.412	100-year	6700.00	18.84	35.57	30.48	35.93	0.001892	6.08	1736.88	214.82	0.30
Reach	2513.412	50-year	4500.00	18.84	33.45	29.28	33.73	0.001823	5.33	1350.89	193.76	0.29
Reach	2513.412	25-year	3100.00	18.84	31.54	27.69	31.82	0.001908	5.03	1008.98	191.17	0.29
Reach	2513.412	10-year	1500.00	18.84	28.46	24.29	28.84	0.002734	5.08	369.17	153.26	0.33
Reach	2513.412	5-year	730.00	18.84	26.65	22.34	26.84	0.001647	3.47	211.52	74.33	0.25
Reach	2513.412	2-year	220.00	18.84	25.06	20.54	25.09	0.000344	1.42	154.87	45.19	0.12
Reach	2376.699	100-year	19000.00	18.50	34.56	27.93	35.49	0.003441	6.12	2496.51	340.89	0.32
Reach	2376.699	50-year	13100.00	18.50	32.80	26.33	33.39	0.002570	4.77	2161.70	313.61	0.27
Reach	2376.699	25-year	9000.00	18.50	31.18	25.08	31.55	0.001928	3.78	1863.90	308.09	0.23
Reach	2376.699	10-year	4200.00	18.50	28.44	24.50	28.58	0.001096	2.55	1376.46	295.58	0.16
Reach	2376.699	5-year	2200.00	18.50	26.63	24.50	26.70	0.000675	1.56	1049.21	294.13	0.12
Reach	2376.699	2-year	680.00	18.50	24.14	22.28	24.69	0.012679	5.94	114.39	268.68	0.53
Reach	2282.69	100-year	19000.00	17.99	34.15	29.90	35.11	0.003596	8.86	2903.92	387.14	0.43
Reach	2282.69	50-year	13100.00	17.99	32.41	27.80	33.08	0.003001	7.36	2402.04	381.52	0.38
Reach	2282.69	25-year	9000.00	17.99	30.81	26.24	31.30	0.002589	6.18	1942.41	375.54	0.35
Reach	2282.69	10-year	4200.00	17.99	28.19	23.29	28.44	0.001627	4.27	1252.38	255.86	0.27
Reach	2282.69	5-year	2200.00	17.99	26.48	21.78	26.61	0.000995	3.00	880.57	202.05	0.21
Reach	2282.69	2-year	680.00	17.99	24.42	20.20	24.45	0.000316	1.41	510.70	149.66	0.11
Reach	2161.926	100-year	19000.00	18.50	33.98	28.89	34.57	0.003976	7.16	3332.95	418.99	0.37
Reach	2161.926	50-year	13100.00	18.50	32.22	27.72	32.64	0.003550	6.06	2752.61	414.02	0.34
Reach	2161.926	25-year	9000.00	18.50	30.61	26.77	30.92	0.003269	5.21	2228.02	354.51	0.32
Reach	2161.926	10-year	4200.00	18.50	27.99	25.01	28.17	0.002932	3.92	1409.35	318.08	0.28
Reach	2161.926	5-year	2200.00	18.50	26.28	24.03	26.42	0.003106	3.25	892.44	297.75	0.28
Reach	2161.926	2-year	680.00	18.50	24.30	22.68	24.36	0.002542	2.10	390.88	214.41	0.23
Reach	1969.374	100-year	19000.00	18.00	32.92	28.94	33.75	0.004623	8.68	2921.67	328.70	0.45
Reach	1969.374	50-year	13100.00	18.00	31.35	27.61	31.93	0.003877	7.23	2446.04	315.30	0.40
Reach	1969.374	25-year	9000.00	18.00	29.86	26.12	30.29	0.003329	6.18	2005.90	307.66	0.36
Reach	1969.374	10-year	4200.00	18.00	27.42	23.86	27.67	0.002420	4.48	1307.01	280.23	0.29
Reach	1969.374	5-year	2200.00	18.00	25.84	21.99	25.98	0.001743	3.33	876.59	238.91	0.24
Reach	1969.374	2-year	680.00	18.00	24.13	20.29	24.17	0.000501	1.58	518.27	177.77	0.13

HEC-RAS Plan: URSCurrentVeg River: Soledad Canyon Reach: Reach (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	1828.694	100-year	19000.00	17.25	32.08	28.65	33.01	0.005347	9.09	2908.71	404.77	0.46
Reach	1828.694	50-year	13100.00	17.25	30.56	27.25	31.28	0.004872	7.95	2342.69	382.71	0.43
Reach	1828.694	25-year	9000.00	17.25	29.22	25.78	29.75	0.003999	6.67	1912.07	303.92	0.38
Reach	1828.694	10-year	4200.00	17.25	27.05	22.82	27.31	0.002436	4.51	1295.25	278.92	0.29
Reach	1828.694	5-year	2200.00	17.25	25.61	21.22	25.75	0.001511	3.16	904.48	239.88	0.22
Reach	1828.694	2-year	680.00	17.25	24.08	19.57	24.11	0.000362	1.37	577.71	185.39	0.11
Reach	1585.63	100-year	19000.00	17.00	31.21	27.71	31.77	0.004283	7.56	3733.19	560.78	0.38
Reach	1585.63	50-year	13100.00	17.00	29.76	26.54	30.18	0.003777	6.53	3042.18	547.58	0.35
Reach	1585.63	25-year	9000.00	17.00	28.50	25.55	28.82	0.003308	5.62	2455.44	532.53	0.32
Reach	1585.63	10-year	4200.00	17.00	26.55	22.67	26.73	0.002251	3.98	1583.83	420.54	0.25
Reach	1585.63	5-year	2200.00	17.00	25.26	21.06	25.37	0.001560	2.93	1066.76	382.38	0.21
Reach	1585.63	2-year	680.00	17.00	23.99	19.38	24.01	0.000436	1.33	606.07	333.63	0.10
Reach	1442.275	100-year	19000.00	16.64	30.61	27.65	31.13	0.004611	8.03	4058.02	590.27	0.40
Reach	1442.275	50-year	13100.00	16.64	29.19	26.70	29.61	0.004243	7.11	3253.67	575.63	0.37
Reach	1442.275	25-year	9000.00	16.64	27.97	25.75	28.52	0.003855	6.28	2565.56	557.96	0.35
Reach	1442.275	10-year	4200.00	16.64	26.14	22.71	26.37	0.002780	4.66	1592.57	528.76	0.29
Reach	1442.275	5-year	2200.00	16.64	24.97	20.98	25.12	0.001903	3.48	1013.06	454.55	0.23
Reach	1442.275	2-year	680.00	16.64	23.92	19.21	23.95	0.000421	1.47	586.76	307.12	0.11
Reach	1386.102	100-year	19000.00	16.74	30.68	26.58	30.85	0.001706	4.19	6058.35	838.99	0.23
Reach	1386.102	50-year	13100.00	16.74	29.23	25.81	29.36	0.001701	3.79	4859.44	826.12	0.22
Reach	1386.102	25-year	9000.00	16.74	27.97	25.14	28.08	0.001758	3.49	3831.22	819.04	0.22
Reach	1386.102	10-year	4200.00	16.74	26.08	22.66	26.19	0.002011	3.32	2082.35	734.53	0.23
Reach	1386.102	5-year	2200.00	16.74	24.92	21.01	25.00	0.001525	2.67	1356.19	680.09	0.20
Reach	1386.102	2-year	680.00	16.74	23.90	19.18	23.93	0.000376	1.36	618.53	580.76	0.11
Reach	972.2879	100-year	19000.00	17.86	29.98	24.98	30.15	0.001570	4.11	6047.61	755.04	0.23
Reach	972.2879	50-year	13100.00	17.86	28.58	24.40	28.70	0.001390	3.51	4989.19	755.04	0.21
Reach	972.2879	25-year	9000.00	17.86	27.36	23.93	27.45	0.001264	3.03	4065.82	755.04	0.19
Reach	972.2879	10-year	4200.00	17.86	25.56	22.59	25.61	0.000947	2.22	2719.15	739.76	0.16
Reach	972.2879	5-year	2200.00	17.86	24.56	21.07	24.58	0.000646	1.65	1984.92	723.14	0.13
Reach	972.2879	2-year	680.00	17.86	23.78	19.46	23.79	0.000283	1.05	841.95	682.05	0.09
Reach	615.5682	100-year	19000.00	19.90	29.12	24.76	29.40	0.002827	4.94	4656.90	616.16	0.32
Reach	615.5682	50-year	13100.00	19.90	27.86	24.01	28.05	0.002406	4.11	3879.13	616.16	0.29
Reach	615.5682	25-year	9000.00	19.90	26.73	23.93	26.87	0.002122	3.46	3183.16	616.16	0.27
Reach	615.5682	10-year	4200.00	19.90	25.13	23.65	25.20	0.001422	2.36	2204.76	604.65	0.22
Reach	615.5682	5-year	2200.00	19.90	24.29	23.35	24.32	0.000841	1.60	1702.07	590.96	0.16
Reach	615.5682	2-year	680.00	19.90	23.58	21.97	23.61	0.001091	1.62	581.73	560.85	0.18

HEC-RAS Plan: URSCurrentVeg River: Soledad Canyon Reach: Reach (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	555.0848	100-year	19000.00	21.19	28.77	25.11	29.13	0.004265	5.71	4091.99	603.81	0.39
Reach	555.0848	50-year	13100.00	21.19	27.56	24.34	27.82	0.003783	4.70	3380.12	603.81	0.36
Reach	555.0848	25-year	9000.00	21.19	26.47	23.93	26.65	0.003564	3.93	2732.31	603.81	0.33
Reach	555.0848	10-year	4200.00	21.19	24.95	23.90	25.04	0.002679	2.61	1842.32	590.78	0.27
Reach	555.0848	5-year	2200.00	21.19	23.86	23.35	24.15	0.017531	5.14	554.74	548.36	0.65
Reach	555.0848	2-year	680.00	21.19	22.97	22.78	23.40	0.031163	5.24	129.89	493.78	0.81
Reach	335.8184	100-year	19000.00	20.47	27.83	24.61	28.22	0.004341	5.54	3928.29	609.87	0.38
Reach	335.8184	50-year	13100.00	20.47	26.75	23.86	27.01	0.003777	4.58	3269.04	609.87	0.35
Reach	335.8184	25-year	9000.00	20.47	25.68	23.35	25.88	0.003669	3.92	2621.74	609.87	0.33
Reach	335.8184	10-year	4200.00	20.47	24.41	22.42	24.50	0.002446	2.55	1846.45	608.65	0.26
Reach	335.8184	5-year	2200.00	20.47	23.17	21.72	23.28	0.004191	2.50	823.72	555.06	0.32
Reach	335.8184	2-year	680.00	20.47	22.05	20.86	22.09	0.002284	1.21	450.55	423.59	0.21
Reach	30.31517	100-year	19000.00	18.32	24.15	23.41	25.39	0.029698	12.31	2294.00	528.92	0.98
Reach	30.31517	50-year	13100.00	18.32	22.80	22.58	24.61	0.058145	13.18	1488.55	505.75	1.26
Reach	30.31517	25-year	9000.00	18.32	22.08	22.08	23.07	0.048952	10.99	1237.03	500.09	1.14
Reach	30.31517	10-year	4200.00	18.32	21.40	21.40	22.40	0.055242	10.04	558.66	481.87	1.17
Reach	30.31517	5-year	2200.00	18.32	20.73	20.67	21.34	0.050036	7.83	378.89	462.00	1.06
Reach	30.31517	2-year	680.00	18.32	19.86	19.85	20.20	0.050017	5.77	163.66	371.09	0.98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Station (ft)
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WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
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Elevation (ft)
Station (ft)
Legend
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WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
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Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 7654.838
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Station (ft)
Legend
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WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
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Geom: URS Current Vegetated Condition Flow: Current_FEMA
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Ground
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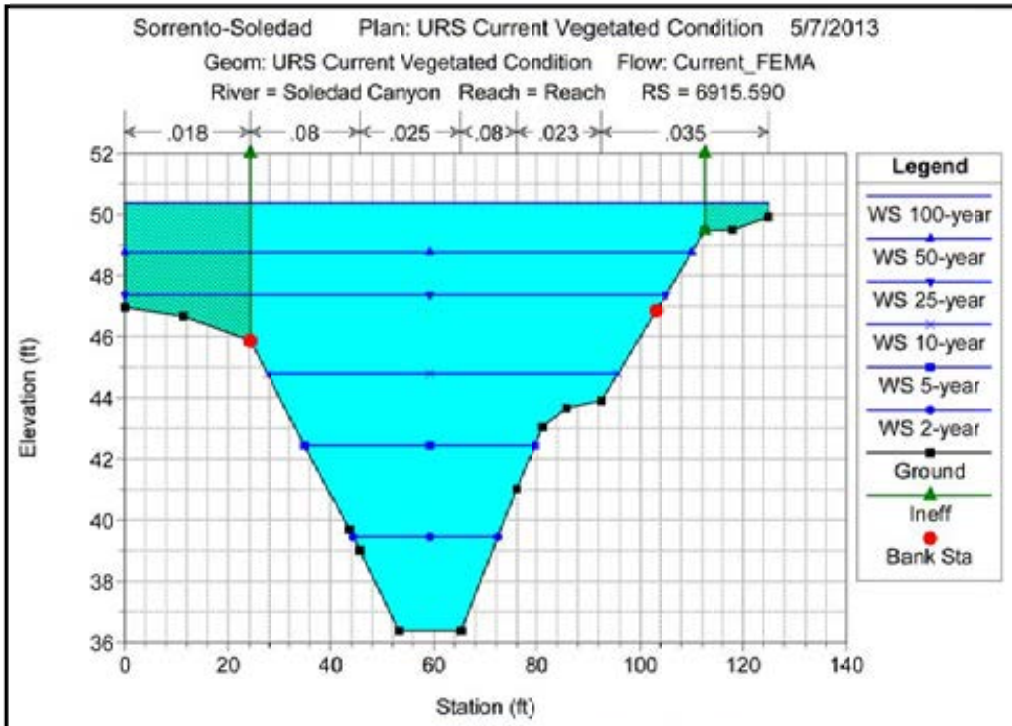
Bank Sta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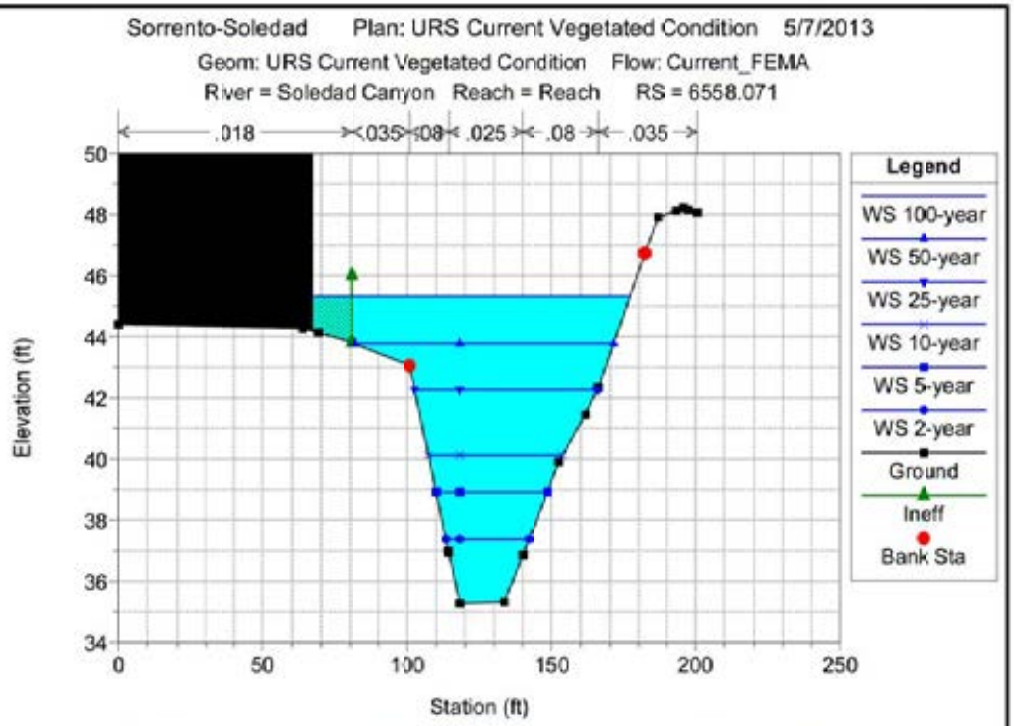
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta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Elevation (ft)
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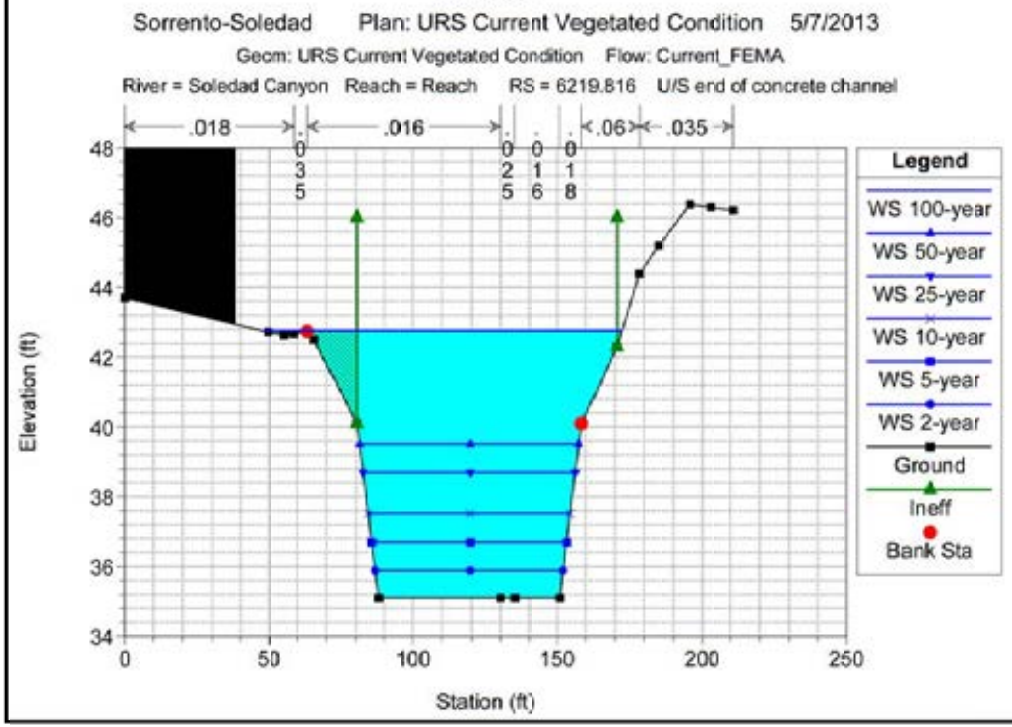
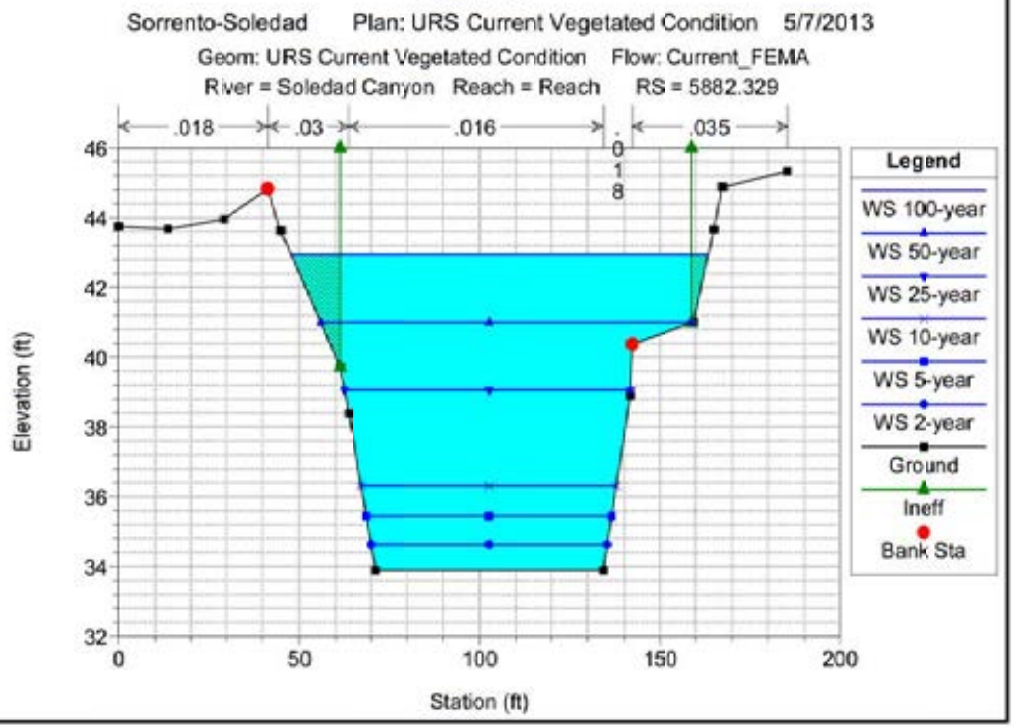
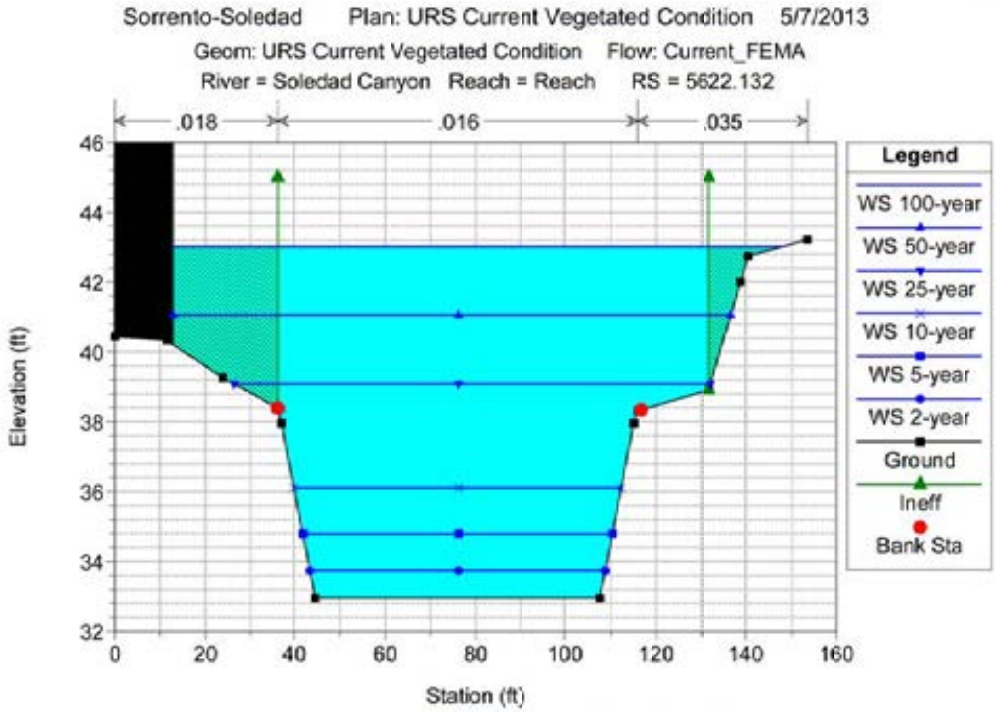
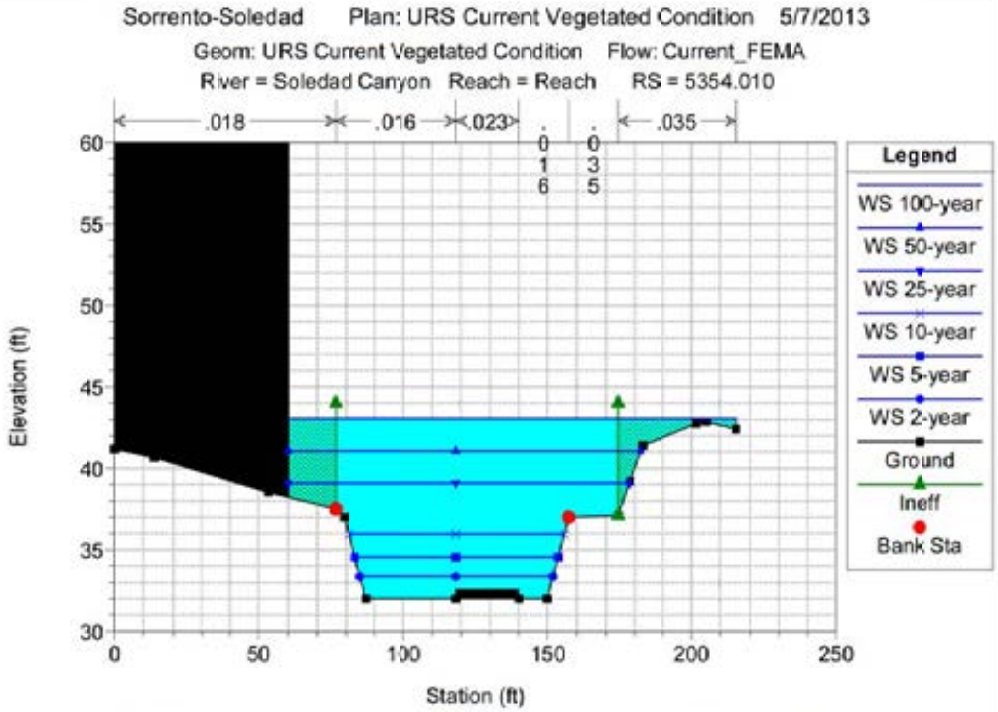
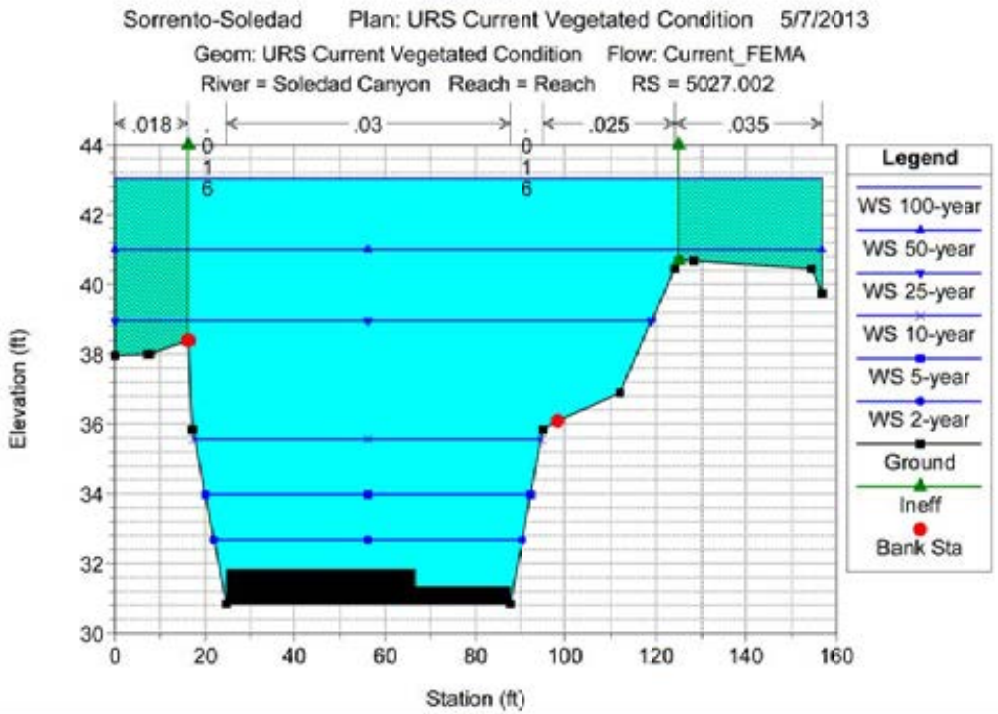
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta

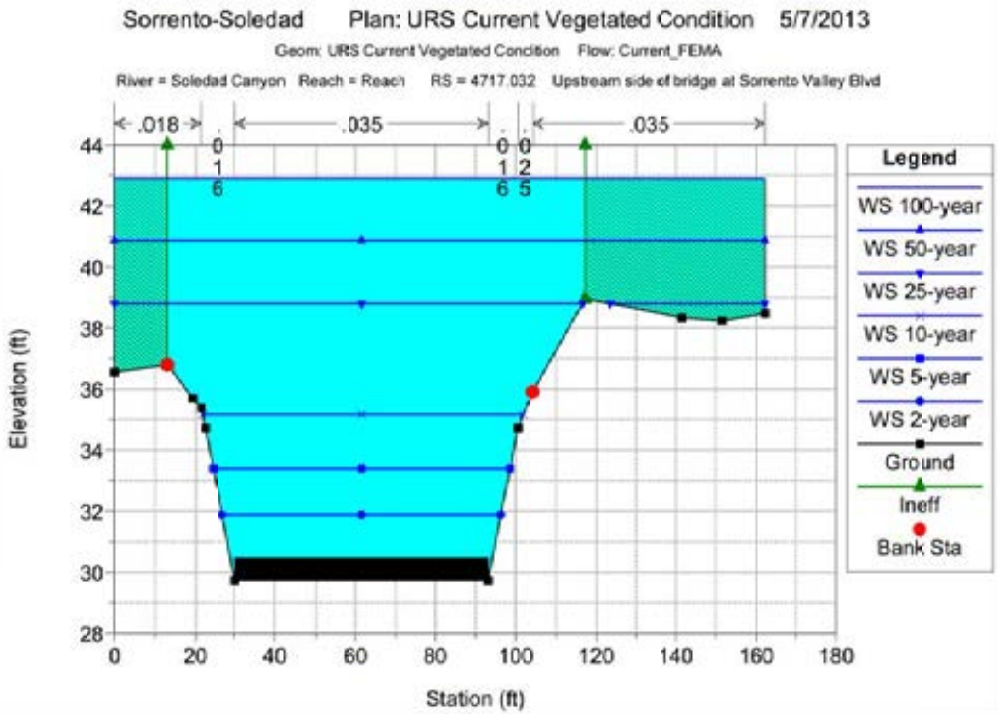

Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 6219.816 U/S end of concrete channel
.018 .016 .06 .035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta

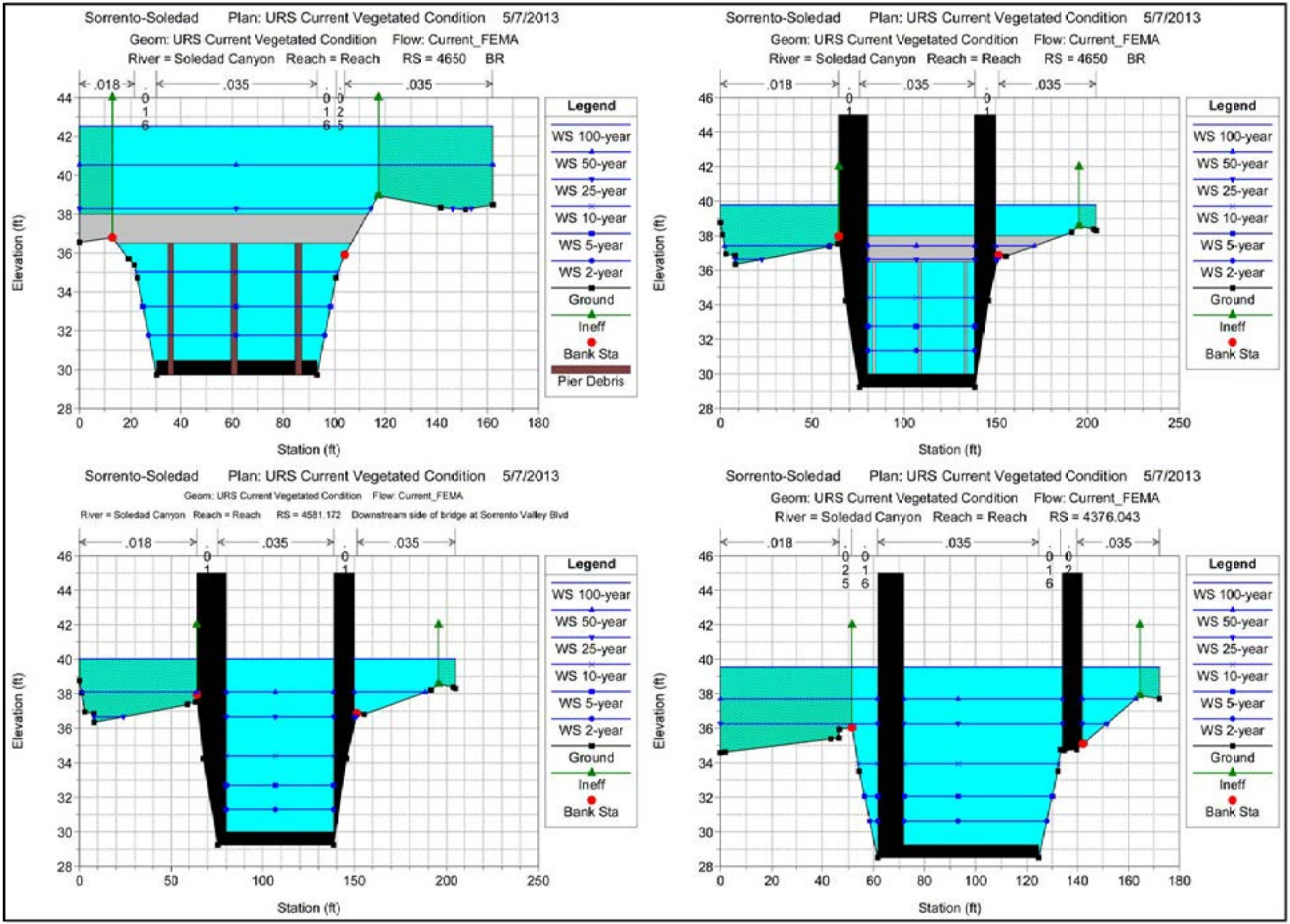

Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 5882.329
.018 .03 .016 .035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta

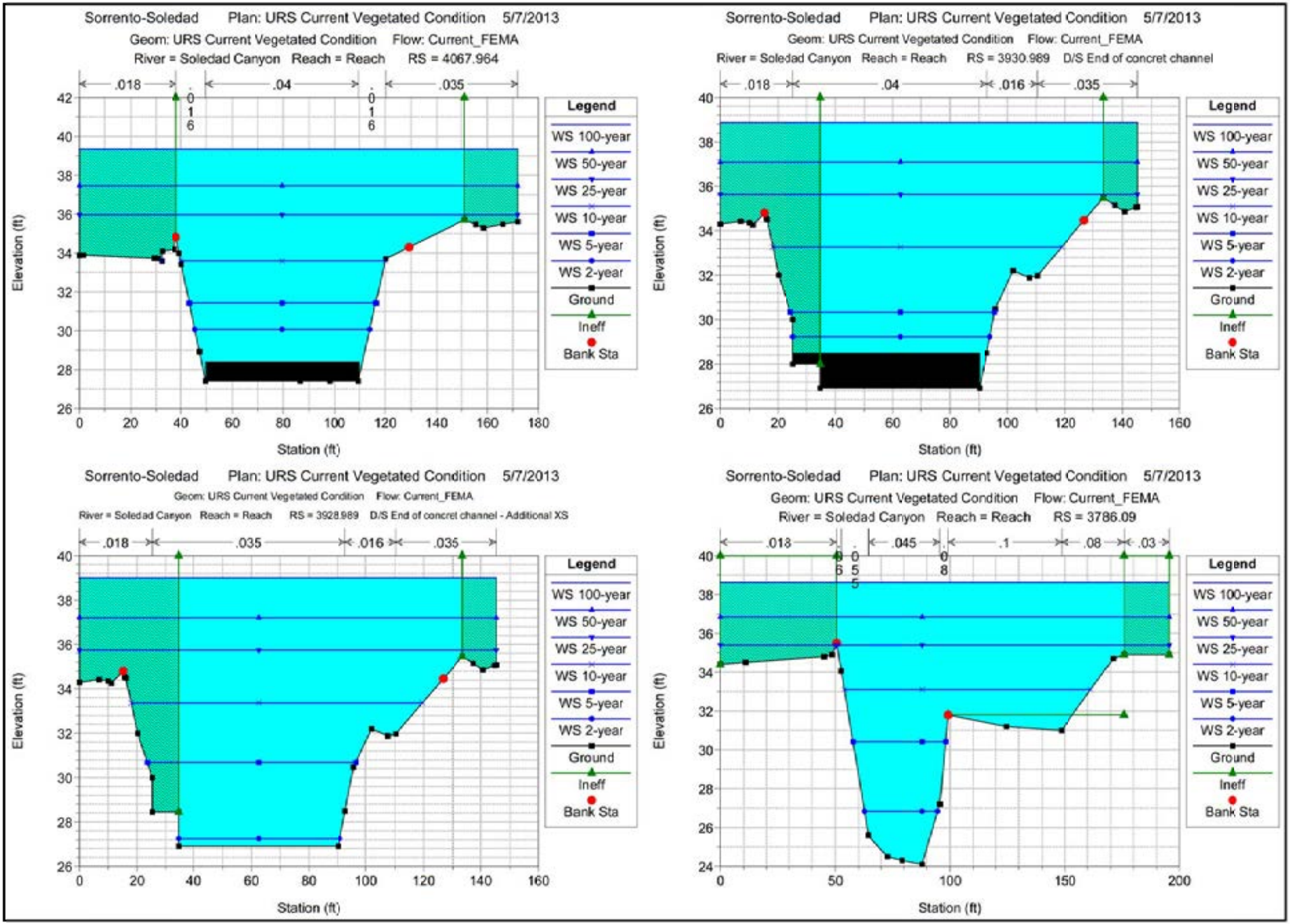

Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 5622.132
.018
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta

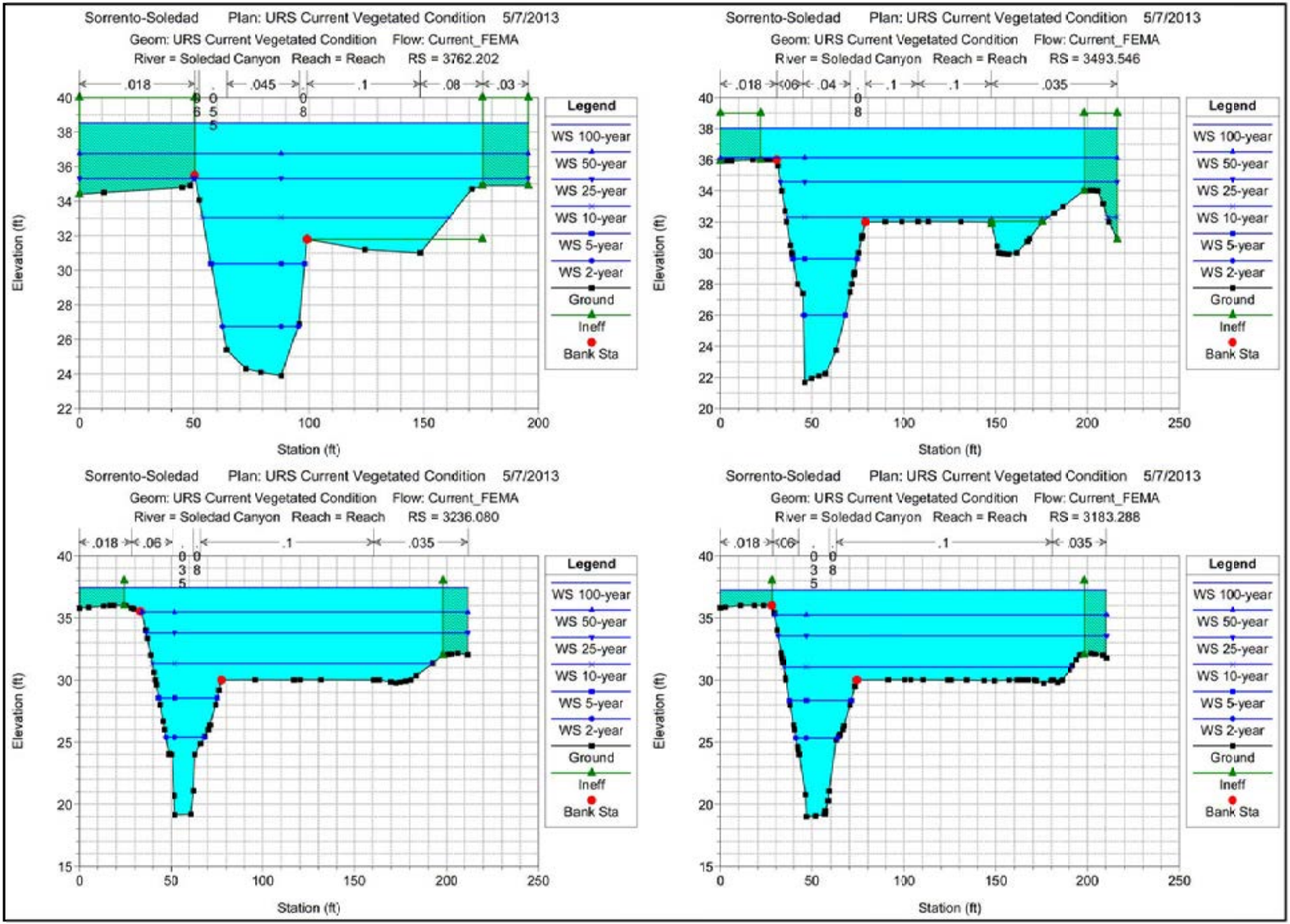

Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 5354.010
.018
.016
.023
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta

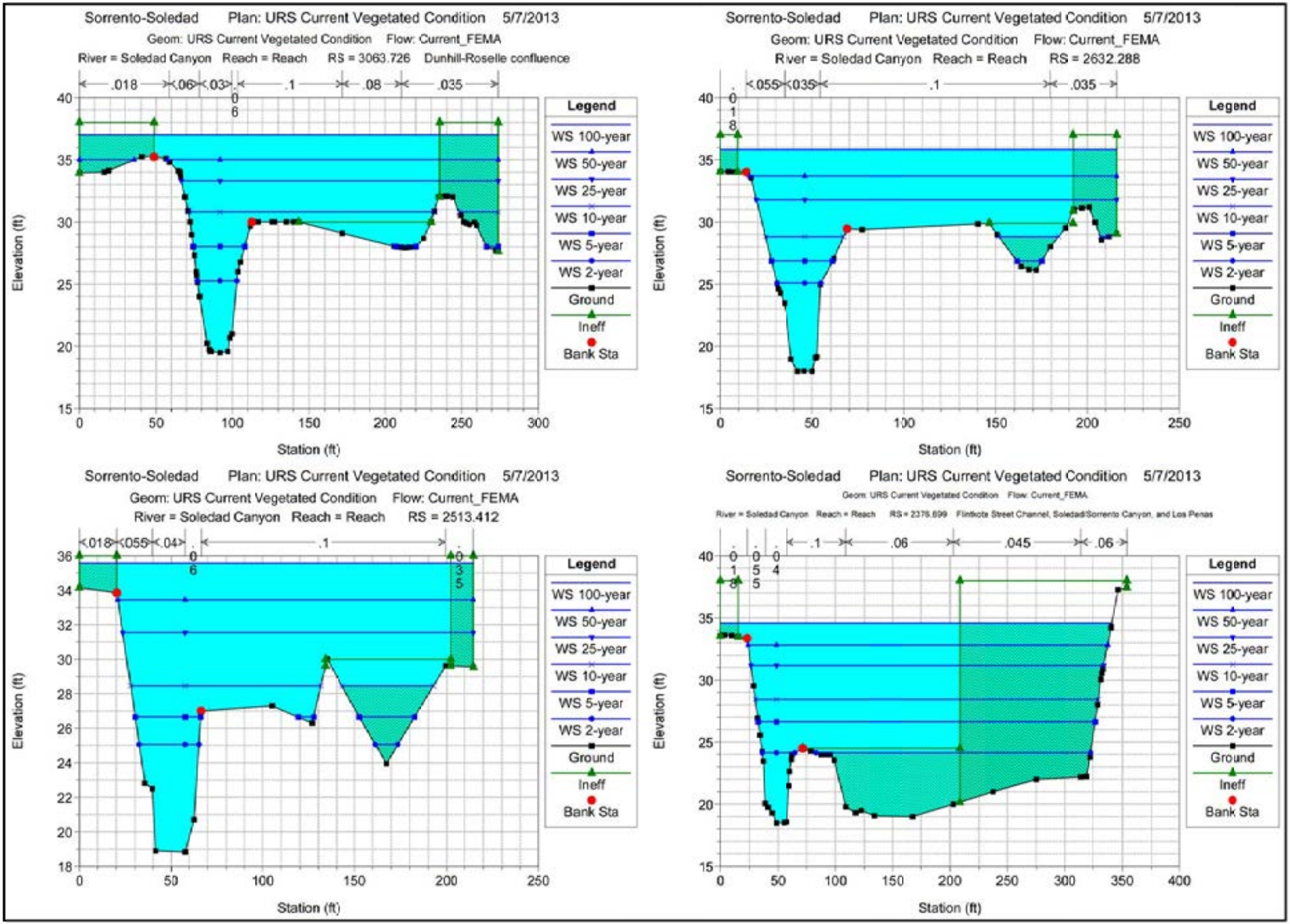

Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 5027.002
.018
.03
.025
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta

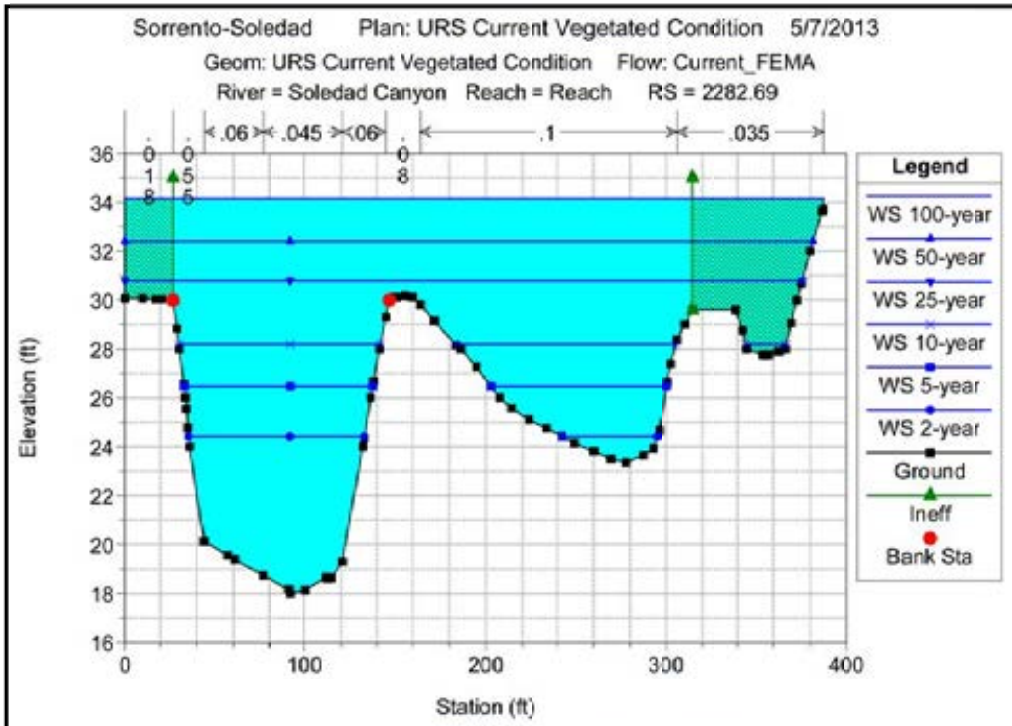

Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 4717.032 Upstream side of bridge at Sorrento Valley Blvd
.018
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta

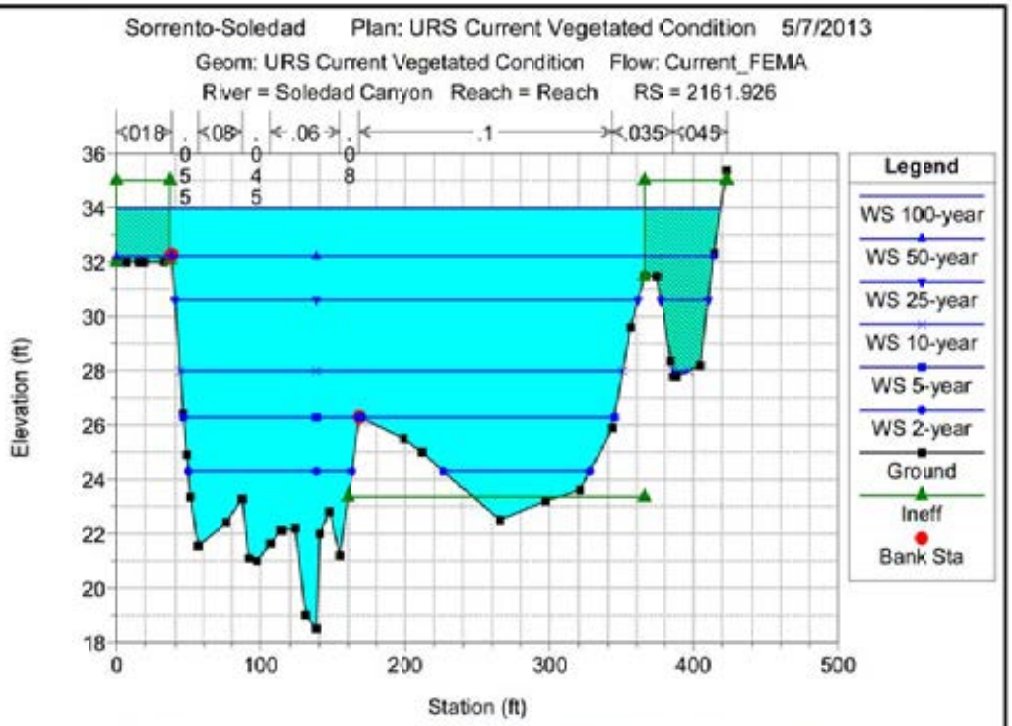

Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 4650 BR
.018
.035
.035
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Pier Debris
Elevation (ft)
Station (ft)
Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 4650 BR
.018
.035
.035
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 4581.172 Downstream side of bridge at Sorrento Valley Blvd
.018
.035
.035
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 4376.043
.018
.035
.035
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

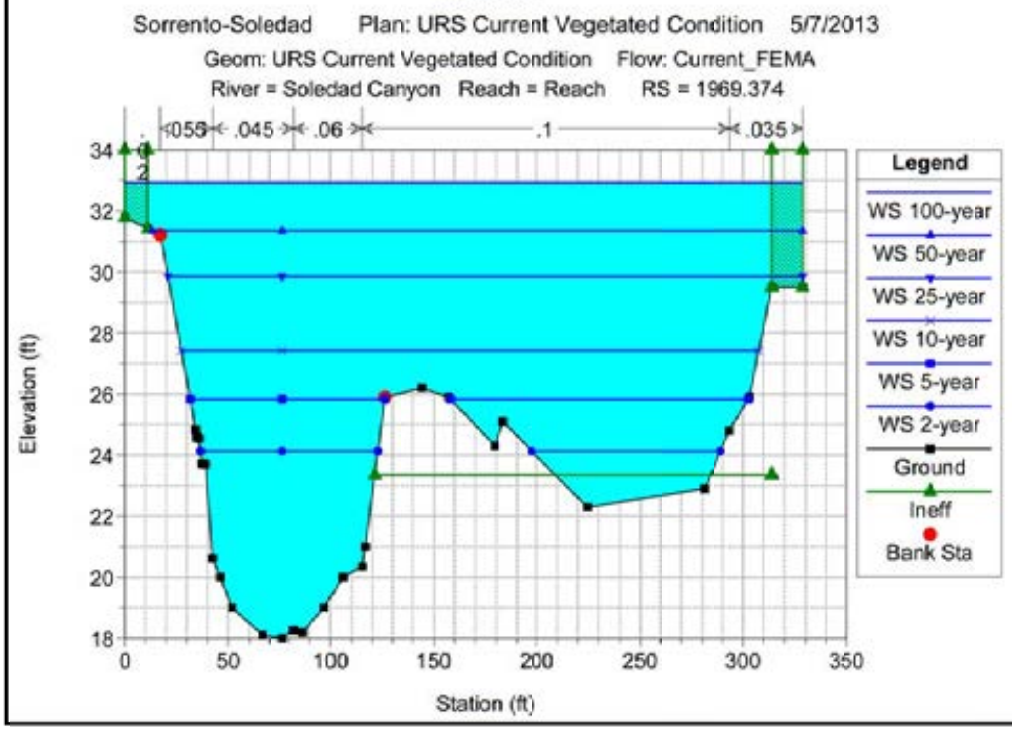

Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 4067.964
.018
.04
.035
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 3930.989 D/S End of concret channel
.018
.04
.016
.035
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 3928.989 D/S End of concret channel - Additional XS
.018
.035
.016
.035
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 3786.09
.018
.045
.1
.08
.03
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

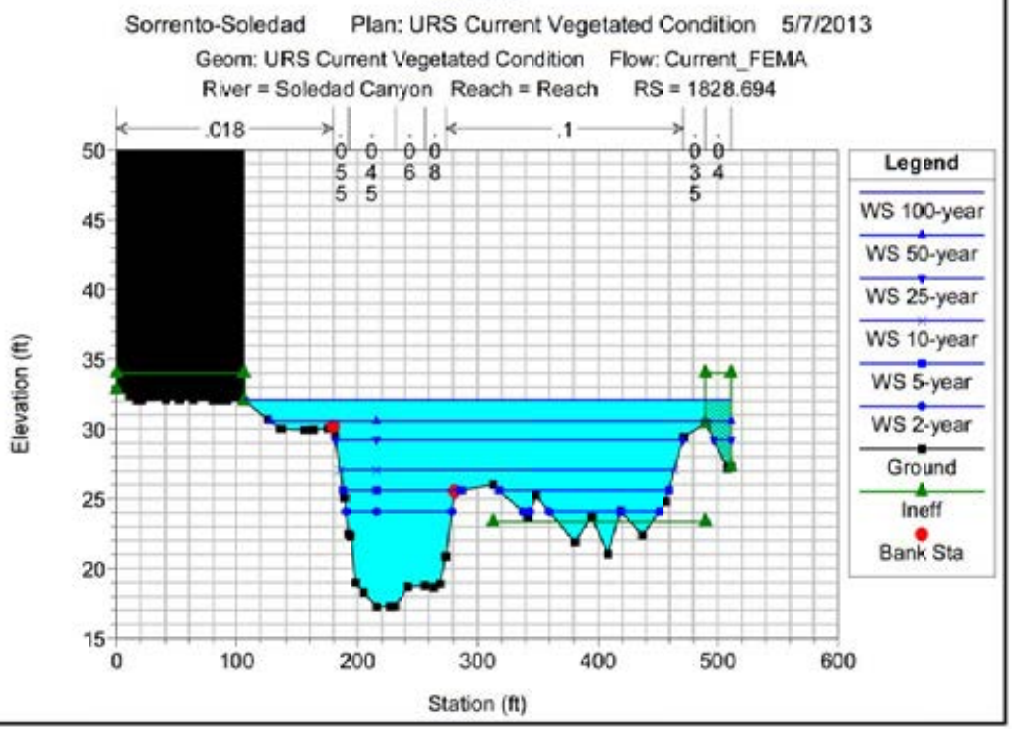

Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 3762.202
.018 .045 .1 .08 .03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 3493.546
.018 .06 .04 .1 .1 .035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 3236.080
.018 .06 .1 .035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 3183.288
.018 .06 .1 .035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta

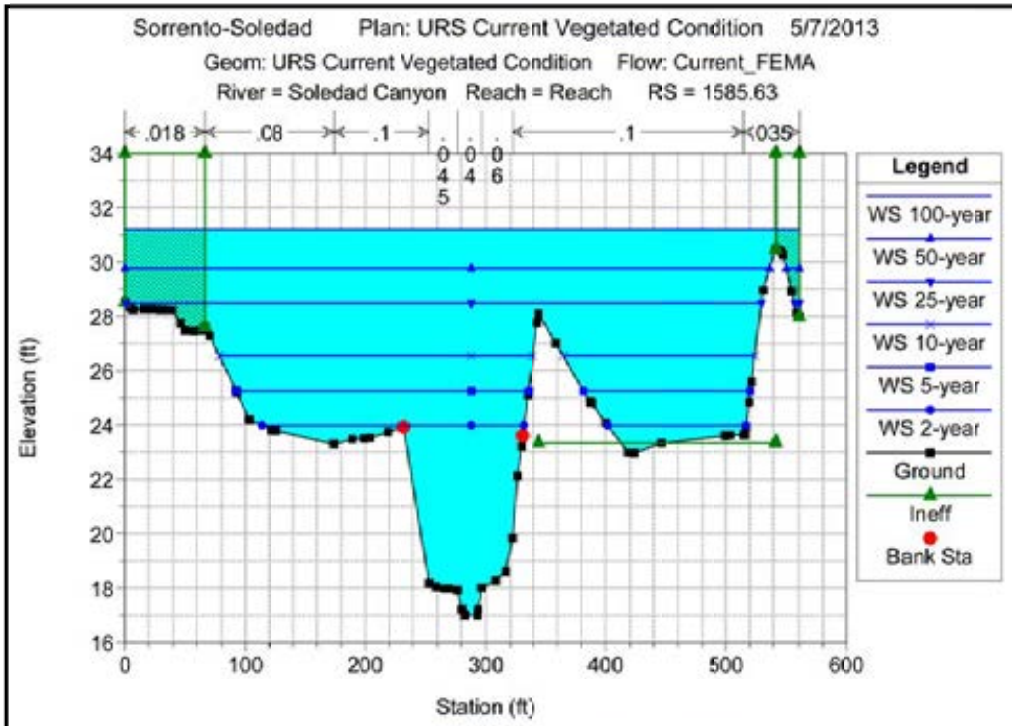

Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 3063.726 Dunhill-Roselle confluence
.018 .06 .03 .06 .1 .08 .035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 2632.288
.055 .035 .1 .035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 2513.412
.018 .055 .04 .06 .1 .035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 2375.699 Flintkote Street Channel, Soledad/Sorrento Canyon, and Los Penas
.018 .055 .04 .1 .06 .045 .06
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta

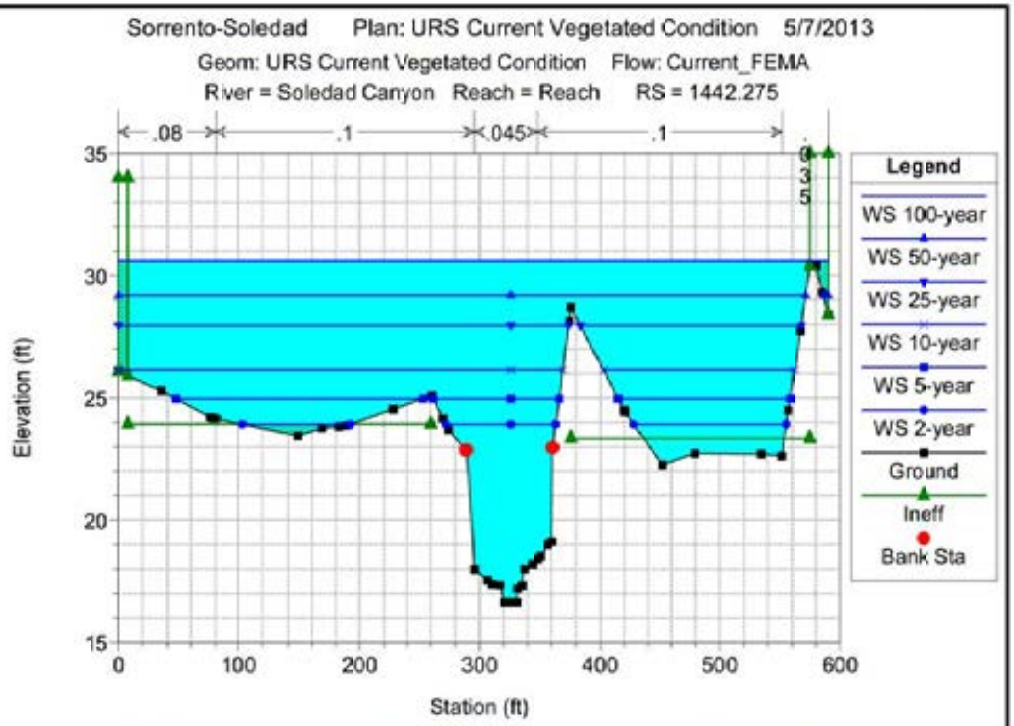

Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 2282.69
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta

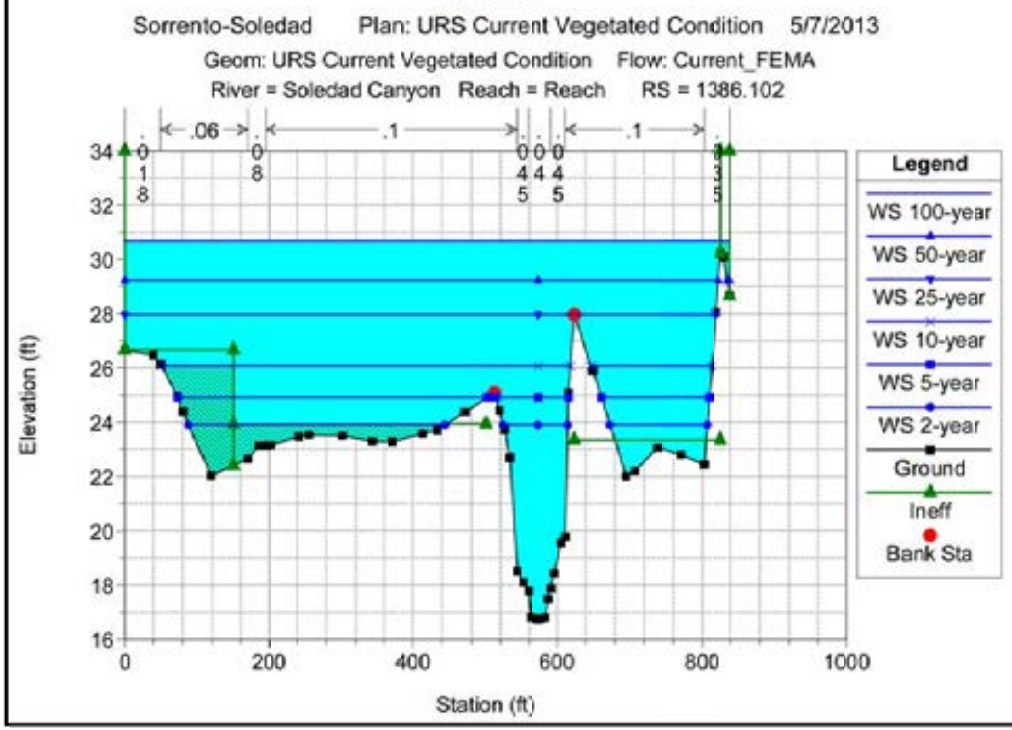

Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 2161.926
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta

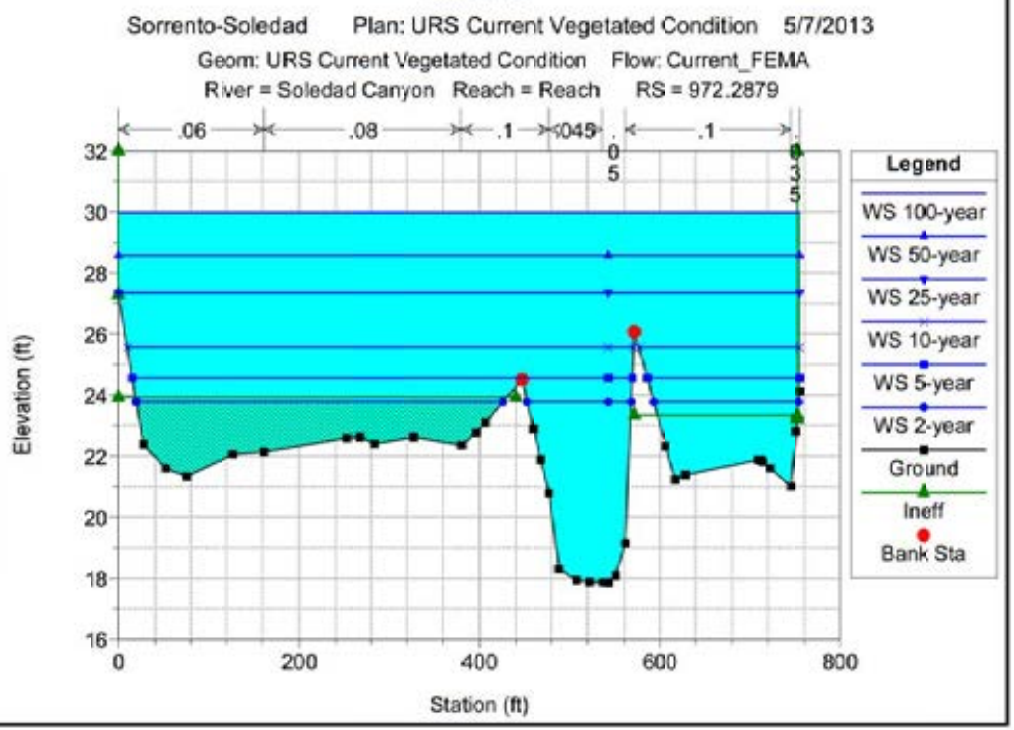

Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 1969.374
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta

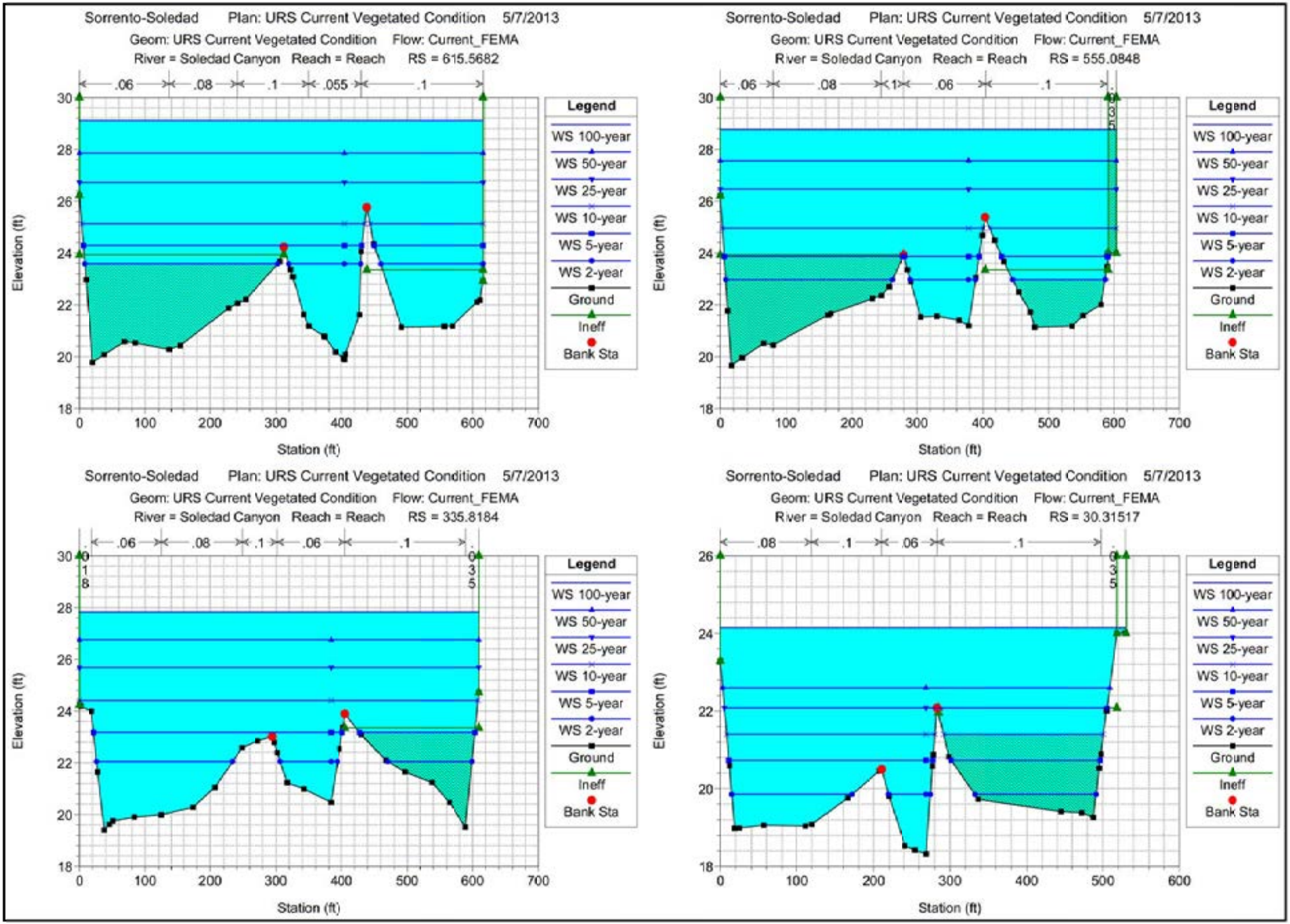

Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 1828.694
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta


Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 1585.63
.018
.08
.1
.1
.035
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 1442.275
.08
.1
.045
.1
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 1386.102
.06
.1
.1
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 972.2879
.06
.08
.1
.045
.1
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 615.5682
.06 .08 .1 .055 .1
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 555.0848
.06 .08 .1 .06 .1
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 335.8184
.06 .08 .1 .06 .1
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Current Vegetated Condition 5/7/2013
Geom: URS Current Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 30.31517
.08 .1 .06 .1
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta

DETAILED HYDRAULIC RESULTS FOR REACH 3 ULTIMATE VEGETATED CONDITION

HEC-RAS Plan: URSUltimate River: Soledad Canyon Reach: Reach

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	8438.736	100-year	6700.00	45.96	60.51	56.00	60.72	0.002991	3.68	1822.21	328.86	0.27
Reach	8438.736	50-year	4500.00	45.96	59.23	54.16	59.38	0.003049	3.19	1412.51	311.23	0.26
Reach	8438.736	25-year	3100.00	45.96	57.79	52.79	57.95	0.004546	3.16	981.33	287.98	0.30
Reach	8438.736	10-year	1500.00	45.96	55.79	50.75	55.95	0.004882	3.18	471.22	136.09	0.23
Reach	8438.736	5-year	730.00	45.96	53.65	49.35	53.73	0.003602	2.31	316.18	65.46	0.19
Reach	8438.736	2-year	220.00	45.96	50.60	47.86	50.63	0.003535	1.54	143.29	47.94	0.16
Reach	7999.449	100-year	6700.00	43.99	58.26	54.46	59.28	0.003205	4.47	1195.08	278.56	0.27
Reach	7999.449	50-year	4500.00	43.99	57.84	53.04	58.34	0.001810	3.25	1120.80	274.03	0.20
Reach	7999.449	25-year	3100.00	43.99	56.24	52.08	56.55	0.002338	3.17	854.58	256.34	0.22
Reach	7999.449	10-year	1500.00	43.99	53.90	49.36	54.05	0.003851	3.09	487.49	182.17	0.26
Reach	7999.449	5-year	730.00	43.99	51.91	47.76	52.01	0.004259	2.54	287.23	87.30	0.25
Reach	7999.449	2-year	220.00	43.99	49.07	46.03	49.11	0.003415	1.68	131.30	40.57	0.16
Reach	7654.838	100-year	6700.00	42.81	53.00	53.00	55.97	0.083211	13.82	484.69	117.60	1.00
Reach	7654.838	50-year	4500.00	42.81	56.75	51.44	57.23	0.006962	5.54	806.69	148.49	0.31
Reach	7654.838	25-year	3100.00	42.81	54.88	50.15	55.24	0.006854	4.82	644.76	136.15	0.30
Reach	7654.838	10-year	1500.00	42.81	52.06	48.10	52.27	0.007224	3.66	409.37	113.60	0.28
Reach	7654.838	5-year	730.00	42.81	49.94	46.55	50.07	0.007751	2.86	255.66	65.38	0.25
Reach	7654.838	2-year	220.00	42.81	47.39	44.84	47.44	0.007411	1.87	117.72	42.74	0.20
Reach	7312.272	100-year	6700.00	40.02	50.60	50.60	53.82	0.085209	14.42	466.11	106.48	0.99
Reach	7312.272	50-year	4500.00	40.02	53.79	48.96	54.41	0.009814	6.36	713.96	141.75	0.36
Reach	7312.272	25-year	3100.00	40.02	51.99	47.54	52.45	0.009532	5.47	571.62	117.64	0.34
Reach	7312.272	10-year	1500.00	40.02	49.19	45.34	49.45	0.009409	4.10	365.45	94.01	0.31
Reach	7312.272	5-year	730.00	40.02	46.99	43.74	47.15	0.009451	3.20	228.33	55.12	0.28
Reach	7312.272	2-year	220.00	40.02	44.14	41.99	44.22	0.012288	2.26	97.30	36.97	0.25
Reach	6915.590	100-year	6700.00	36.38	51.76	47.18	52.68	0.010004	7.58	874.24	124.99	0.41
Reach	6915.590	50-year	4500.00	36.38	50.70	45.61	51.22	0.006589	5.74	781.57	124.99	0.33
Reach	6915.590	25-year	3100.00	36.38	49.05	44.29	49.42	0.006149	4.89	636.21	110.95	0.31
Reach	6915.590	10-year	1500.00	36.38	46.52	41.79	46.71	0.005221	3.50	428.32	88.19	0.26
Reach	6915.590	5-year	730.00	36.38	44.45	40.10	44.56	0.004723	2.62	278.60	65.78	0.22
Reach	6915.590	2-year	220.00	36.38	41.66	38.28	41.70	0.003843	1.61	136.63	40.18	0.15
Reach	6558.071	100-year	6700.00	35.28	49.87	44.99	50.93	0.007830	5.81	988.95	200.60	0.32
Reach	6558.071	50-year	4500.00	35.28	47.89	43.98	48.57	0.008254	5.18	778.05	186.69	0.31
Reach	6558.071	25-year	3100.00	35.28	46.43	42.26	46.86	0.008366	4.61	627.46	180.99	0.31
Reach	6558.071	10-year	1500.00	35.28	44.20	40.12	44.41	0.008181	3.64	413.41	106.53	0.27
Reach	6558.071	5-year	730.00	35.28	42.51	38.58	42.62	0.006333	2.59	281.69	64.60	0.22
Reach	6558.071	2-year	220.00	35.28	40.52	36.95	40.55	0.002755	1.32	166.95	49.64	0.13

HEC-RAS Plan: URSUltimate River: Soledad Canyon Reach: Reach (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	6219.816	100-year	6700.00	38.00	48.27	44.15	49.19	0.003483	7.86	880.52	172.93	0.43
Reach	6219.816	50-year	4500.00	38.00	46.13	42.82	46.82	0.003538	6.77	687.61	155.40	0.42
Reach	6219.816	25-year	3100.00	38.00	44.60	41.77	45.11	0.003491	5.84	549.26	142.12	0.40
Reach	6219.816	10-year	1500.00	38.00	42.39	40.34	42.69	0.003434	4.39	350.50	104.58	0.37
Reach	6219.816	5-year	730.00	38.00	40.93	39.46	41.09	0.003349	3.29	223.46	87.63	0.34
Reach	6219.816	2-year	220.00	38.00	39.45	38.67	39.52	0.003329	2.05	107.39	76.06	0.30
Reach	5882.329	100-year	6700.00	36.90	47.35	42.99	48.13	0.002634	6.99	947.03	185.39	0.38
Reach	5882.329	50-year	4500.00	36.90	45.13	41.76	45.72	0.002838	6.17	729.90	177.54	0.38
Reach	5882.329	25-year	3100.00	36.90	43.56	40.64	44.01	0.002951	5.45	576.03	119.81	0.38
Reach	5882.329	10-year	1500.00	36.90	41.24	39.23	41.54	0.003396	4.36	349.79	105.19	0.37
Reach	5882.329	5-year	730.00	36.90	39.80	38.35	39.96	0.003356	3.27	223.02	81.18	0.35
Reach	5882.329	2-year	220.00	36.90	38.35	37.56	38.42	0.003240	2.02	108.81	77.14	0.30
Reach	5622.132	100-year	6700.00	36.00	46.67	41.86	47.44	0.002663	6.65	968.20	140.54	0.36
Reach	5622.132	50-year	4500.00	36.00	44.42	40.84	44.98	0.002864	5.81	752.86	140.54	0.36
Reach	5622.132	25-year	3100.00	36.00	42.83	39.77	43.25	0.002831	5.07	601.58	130.09	0.35
Reach	5622.132	10-year	1500.00	36.00	40.38	38.35	40.64	0.003440	4.12	367.40	122.17	0.35
Reach	5622.132	5-year	730.00	36.00	38.77	37.46	38.95	0.004505	3.44	214.20	97.11	0.37
Reach	5622.132	2-year	220.00	36.00	37.40	36.66	37.47	0.004108	2.11	104.09	76.33	0.32
Reach	5354.010	100-year	6700.00	35.00	46.21	40.74	46.85	0.001624	6.19	1049.91	155.20	0.33
Reach	5354.010	50-year	4500.00	35.00	43.92	39.53	44.39	0.001638	5.33	825.67	155.20	0.32
Reach	5354.010	25-year	3100.00	35.00	42.34	38.66	42.67	0.001560	4.55	670.69	135.97	0.30
Reach	5354.010	10-year	1500.00	35.00	39.79	37.43	39.98	0.001730	3.58	420.96	119.49	0.29
Reach	5354.010	5-year	730.00	35.00	37.73	36.46	37.91	0.003422	3.40	219.68	104.09	0.37
Reach	5354.010	2-year	220.00	35.00	36.37	35.66	36.44	0.003621	2.18	101.03	76.07	0.33
Reach	5027.002	100-year	6700.00	33.80	45.87	39.71	46.41	0.001024	5.15	1194.02	156.78	0.26
Reach	5027.002	50-year	4500.00	33.80	43.57	38.48	43.94	0.001032	4.48	943.67	156.78	0.26
Reach	5027.002	25-year	3100.00	33.80	42.00	37.58	42.25	0.000967	3.85	773.06	156.78	0.24
Reach	5027.002	10-year	1500.00	33.80	39.40	36.16	39.55	0.001001	3.02	494.17	120.57	0.23
Reach	5027.002	5-year	730.00	33.80	36.73	35.26	36.89	0.002819	3.22	228.27	92.41	0.34
Reach	5027.002	2-year	220.00	33.80	35.14	34.45	35.22	0.003843	2.22	99.23	75.91	0.34
Reach	4717.032	100-year	6700.00	32.70	45.62	38.78	46.07	0.000958	5.42	1239.01	162.16	0.27
Reach	4717.032	50-year	4500.00	32.70	43.31	37.48	43.63	0.000887	4.55	997.93	162.16	0.25
Reach	4717.032	25-year	3100.00	32.70	41.76	36.50	41.98	0.000755	3.75	836.39	162.16	0.23
Reach	4717.032	10-year	1500.00	32.70	39.18	35.05	39.29	0.000626	2.69	567.44	162.16	0.19
Reach	4717.032	5-year	730.00	32.70	36.08	34.16	36.20	0.001725	2.77	263.31	87.86	0.28

HEC-RAS Plan: URSUltimate River: Soledad Canyon Reach: Reach (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	4717.032	2-year	220.00	32.70	34.37	33.36	34.42	0.001815	1.77	124.42	76.93	0.25
Reach	4650		Bridge									
Reach	4581.172	100-year	6700.00	32.20	42.87	39.73	43.82	0.004710	7.30	867.13	177.52	0.40
Reach	4581.172	50-year	4500.00	32.20	40.80	38.47	41.54	0.005258	6.93	652.85	177.52	0.42
Reach	4581.172	25-year	3100.00	32.20	39.27	36.67	39.90	0.005847	6.58	492.91	177.52	0.44
Reach	4581.172	10-year	1500.00	32.20	37.00	34.94	37.44	0.005936	5.34	281.90	120.25	0.43
Reach	4581.172	5-year	730.00	32.20	35.38	33.89	35.62	0.005221	3.94	185.41	58.38	0.39
Reach	4581.172	2-year	220.00	32.20	33.82	32.96	33.90	0.004200	2.33	94.49	58.38	0.32
Reach	4376.043	100-year	6700.00	31.50	42.02	38.40	42.96	0.003763	7.70	863.90	153.75	0.42
Reach	4376.043	50-year	4500.00	31.50	39.91	36.84	40.63	0.003801	6.89	664.09	153.75	0.43
Reach	4376.043	25-year	3100.00	31.50	38.35	35.64	38.92	0.003845	6.19	515.94	153.75	0.43
Reach	4376.043	10-year	1500.00	31.50	36.13	34.08	36.48	0.003613	4.75	318.22	132.08	0.40
Reach	4376.043	5-year	730.00	31.50	34.49	33.12	34.71	0.003756	3.70	197.30	69.55	0.39
Reach	4376.043	2-year	220.00	31.50	33.22	32.23	33.28	0.002272	2.66	116.12	88.74	0.27
Reach	4067.964	100-year	6700.00	30.41	41.58	36.66	42.15	0.001499	6.10	1106.87	171.88	0.33
Reach	4067.964	50-year	4500.00	30.41	39.40	35.36	39.83	0.001559	5.33	859.80	171.88	0.32
Reach	4067.964	25-year	3100.00	30.41	37.78	34.32	38.12	0.001613	4.70	677.15	171.88	0.32
Reach	4067.964	10-year	1500.00	30.41	35.49	32.80	35.70	0.001696	3.65	418.03	158.67	0.30
Reach	4067.964	5-year	730.00	30.41	33.77	31.89	33.90	0.001837	2.89	252.51	90.98	0.29
Reach	4067.964	2-year	220.00	30.41	31.08	31.08	31.41	0.040925	4.60	47.81	71.94	0.99
Reach	3930.989	100-year	6700.00	28.50	41.38	35.41	41.95	0.001358	6.12	1099.78	145.27	0.32
Reach	3930.989	50-year	4500.00	28.50	39.23	34.04	39.63	0.001247	5.11	887.49	145.27	0.29
Reach	3930.989	25-year	3100.00	28.50	37.64	32.97	37.92	0.001123	4.28	730.49	145.27	0.27
Reach	3930.989	10-year	1500.00	28.50	35.38	31.23	35.52	0.000853	2.97	507.77	143.43	0.22
Reach	3930.989	5-year	730.00	28.50	33.67	30.19	33.74	0.000653	2.09	349.85	103.98	0.18
Reach	3930.989	2-year	220.00	28.50	30.82	29.26	30.86	0.001102	1.59	138.43	73.77	0.19
Reach	3928.989	100-year	6700.00	28.00	41.40	35.08	41.94	0.001074	5.97	1130.82	145.27	0.31
Reach	3928.989	50-year	4500.00	28.00	39.24	33.68	39.62	0.000964	4.95	918.23	145.27	0.28
Reach	3928.989	25-year	3100.00	28.00	37.65	32.57	37.91	0.000848	4.12	760.99	145.27	0.26
Reach	3928.989	10-year	1500.00	28.00	35.39	30.75	35.51	0.000608	2.80	537.83	143.78	0.20
Reach	3928.989	5-year	730.00	28.00	33.68	29.70	33.73	0.000428	1.92	379.44	104.12	0.16
Reach	3928.989	2-year	220.00	28.00	30.82	28.77	30.85	0.000488	1.31	167.71	73.87	0.14
Reach	3786.09	100-year	6700.00	26.20	41.20	34.73	41.59	0.006013	4.34	1364.18	195.57	0.21
Reach	3786.09	50-year	4500.00	26.20	39.04	33.64	39.30	0.005768	3.79	1093.18	195.57	0.20

HEC-RAS Plan: URSUltimate River: Soledad Canyon Reach: Reach (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	3786.09	25-year	3100.00	26.20	37.45	32.78	37.64	0.005406	3.32	894.27	195.57	0.19
Reach	3786.09	10-year	1500.00	26.20	35.22	30.17	35.32	0.004361	2.51	615.43	194.23	0.16
Reach	3786.09	5-year	730.00	26.20	33.55	28.71	33.60	0.003343	1.89	417.93	110.96	0.13
Reach	3786.09	2-year	220.00	26.20	30.68	27.36	30.70	0.003464	1.36	161.56	41.11	0.12
Reach	3762.202	100-year	6700.00	26.00	41.05	34.70	41.44	0.006216	4.40	1353.34	195.57	0.21
Reach	3762.202	50-year	4500.00	26.00	38.89	33.58	39.16	0.005987	3.85	1083.19	195.57	0.20
Reach	3762.202	25-year	3100.00	26.00	37.31	32.70	37.50	0.005620	3.37	885.49	195.57	0.19
Reach	3762.202	10-year	1500.00	26.00	35.12	29.96	35.21	0.004487	2.55	610.17	193.71	0.16
Reach	3762.202	5-year	730.00	26.00	33.47	28.50	33.52	0.003338	1.90	417.21	110.37	0.13
Reach	3762.202	2-year	220.00	26.00	30.60	27.15	30.62	0.003163	1.32	166.33	41.11	0.12
Reach	3493.546	100-year	6700.00	23.50	40.25	34.08	40.61	0.001951	2.32	1664.64	216.10	0.11
Reach	3493.546	50-year	4500.00	23.50	37.99	33.25	38.24	0.002390	2.26	1265.22	216.10	0.12
Reach	3493.546	25-year	3100.00	23.50	36.28	31.77	36.47	0.003020	2.27	963.31	216.10	0.13
Reach	3493.546	10-year	1500.00	23.50	33.92	29.09	34.04	0.004516	2.31	568.95	174.04	0.15
Reach	3493.546	5-year	730.00	23.50	32.42	27.07	32.48	0.004568	2.01	337.12	148.75	0.14
Reach	3493.546	2-year	220.00	23.50	29.63	25.19	29.66	0.004068	1.47	150.00	34.50	0.12
Reach	3236.080	100-year	6700.00	22.00	39.88	32.76	40.12	0.001610	2.63	1807.77	211.76	0.13
Reach	3236.080	50-year	4500.00	22.00	37.51	31.98	37.68	0.001786	2.44	1396.33	211.76	0.13
Reach	3236.080	25-year	3100.00	22.00	35.68	31.36	35.82	0.002038	2.31	1080.50	181.78	0.13
Reach	3236.080	10-year	1500.00	22.00	33.05	28.41	33.13	0.002734	2.22	652.42	174.50	0.14
Reach	3236.080	5-year	730.00	22.00	31.48	26.50	31.53	0.003041	2.04	402.91	154.23	0.14
Reach	3236.080	2-year	220.00	22.00	28.66	24.31	28.70	0.003457	1.59	138.10	32.30	0.14
Reach	3183.288	100-year	6700.00	22.00	39.80	32.75	40.02	0.002248	3.06	1838.96	210.30	0.15
Reach	3183.288	50-year	4500.00	22.00	37.42	31.94	37.57	0.002390	2.78	1432.68	210.30	0.15
Reach	3183.288	25-year	3100.00	22.00	35.58	31.28	35.70	0.002645	2.61	1119.15	181.45	0.15
Reach	3183.288	10-year	1500.00	22.00	32.90	27.87	32.98	0.003462	2.47	669.14	178.23	0.16
Reach	3183.288	5-year	730.00	22.00	31.31	25.94	31.37	0.003454	2.15	409.68	158.43	0.15
Reach	3183.288	2-year	220.00	22.00	28.50	23.83	28.53	0.002877	1.46	151.11	33.79	0.12
Reach	3063.726	100-year	6700.00	20.50	39.61	31.57	39.80	0.001354	2.38	2045.50	273.75	0.12
Reach	3063.726	50-year	4500.00	20.50	37.22	30.70	37.35	0.001401	2.09	1597.60	273.75	0.12
Reach	3063.726	25-year	3100.00	20.50	35.35	30.04	35.46	0.001519	1.88	1249.36	273.75	0.12
Reach	3063.726	10-year	1500.00	20.50	32.63	26.22	32.69	0.001714	1.69	780.40	205.54	0.10
Reach	3063.726	5-year	730.00	20.50	31.08	24.22	31.11	0.001402	1.35	525.21	187.74	0.09
Reach	3063.726	2-year	220.00	20.50	28.24	22.26	28.26	0.001749	1.18	186.75	64.98	0.09
Reach	2632.288	100-year	6700.00	21.50	38.86	31.60	39.09	0.001977	2.95	1955.77	215.82	0.14

HEC-RAS Plan: URSUltimate River: Soledad Canyon Reach: Reach (Continued)

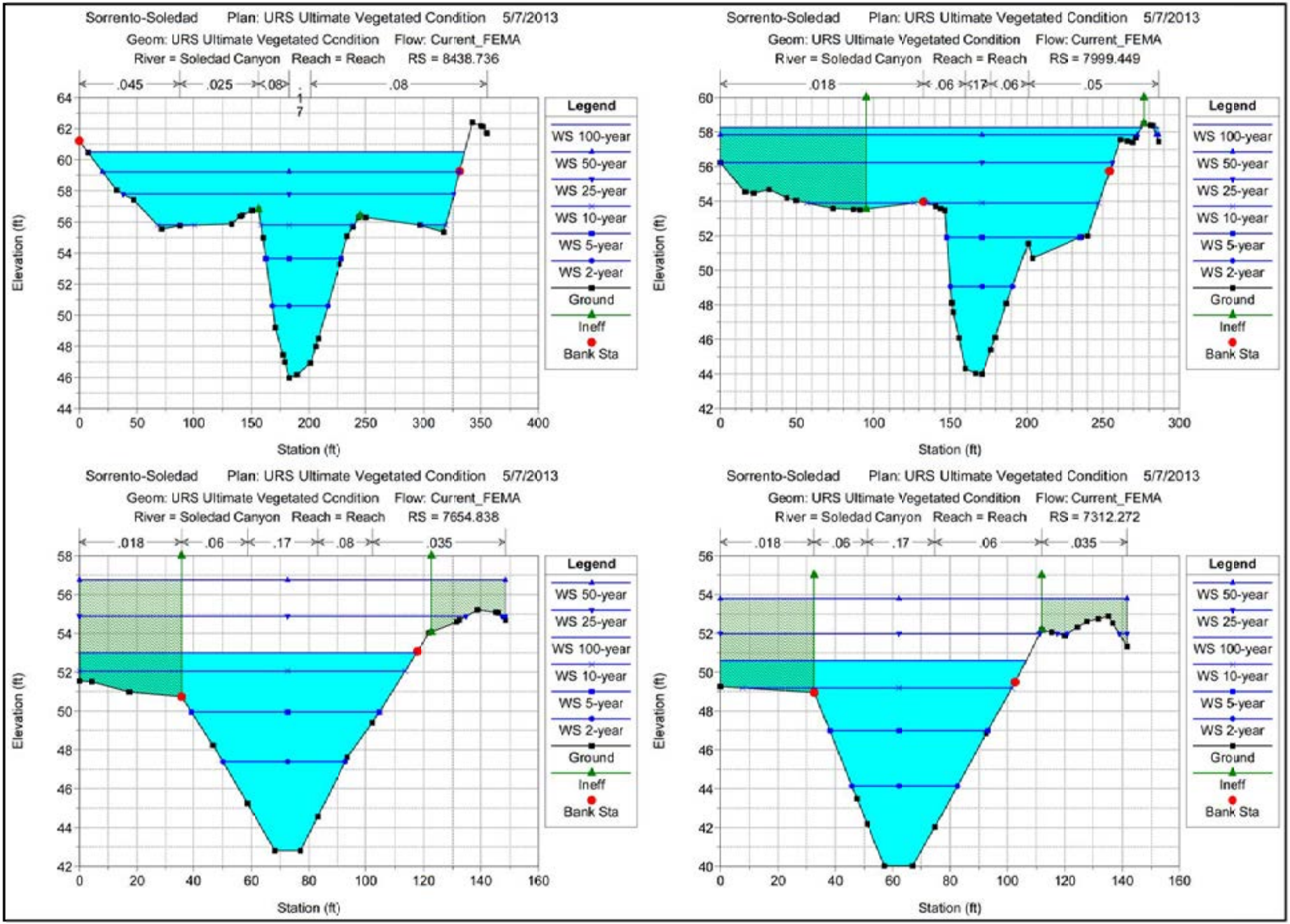
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	2632.288	50-year	4500.00	21.50	36.46	30.13	36.60	0.002155	2.69	1516.59	215.82	0.15
Reach	2632.288	25-year	3100.00	21.50	34.50	30.13	34.61	0.002577	2.57	1158.06	215.82	0.15
Reach	2632.288	10-year	1500.00	21.50	31.43	27.25	31.52	0.004701	2.71	618.08	195.81	0.19
Reach	2632.288	5-year	730.00	21.50	29.72	25.25	29.87	0.008721	3.07	246.44	153.89	0.24
Reach	2632.288	2-year	220.00	21.50	27.00	23.21	27.05	0.005270	1.74	126.31	48.41	0.16
Reach	2513.412	100-year	6700.00	21.50	38.71	30.00	38.85	0.001646	2.56	2253.90	214.82	0.12
Reach	2513.412	50-year	4500.00	21.50	36.28	29.51	36.38	0.001554	2.20	1811.91	214.82	0.11
Reach	2513.412	25-year	3100.00	21.50	34.29	28.67	34.37	0.001564	1.97	1451.15	214.82	0.11
Reach	2513.412	10-year	1500.00	21.50	31.12	26.05	31.17	0.001945	1.76	880.49	190.60	0.11
Reach	2513.412	5-year	730.00	21.50	29.10	24.43	29.16	0.004079	2.13	382.11	162.56	0.15
Reach	2513.412	2-year	220.00	21.50	26.50	22.92	26.53	0.003540	1.46	151.16	68.68	0.13
Reach	2376.699	100-year	19000.00	22.00	37.20	29.87	38.13	0.008918	5.40	2672.19	346.36	0.27
Reach	2376.699	50-year	13100.00	22.00	35.23	28.28	35.77	0.007147	4.32	2292.19	342.28	0.23
Reach	2376.699	25-year	9000.00	22.00	33.50	27.02	33.85	0.005653	3.43	1958.59	324.98	0.20
Reach	2376.699	10-year	4200.00	22.00	30.84	25.24	30.78	0.003361	2.12	1432.41	305.55	0.14
Reach	2376.699	5-year	2200.00	22.00	28.76	24.50	28.82	0.002216	1.42	1093.05	300.24	0.11
Reach	2376.699	2-year	680.00	22.00	26.34	24.50	26.36	0.001032	0.68	664.90	293.28	0.06
Reach	2282.69	100-year	19000.00	22.50	36.49	30.23	37.06	0.008080	4.70	3279.44	387.14	0.23
Reach	2282.69	50-year	13100.00	22.50	34.51	28.78	34.91	0.007379	4.03	2711.00	387.14	0.21
Reach	2282.69	25-year	9000.00	22.50	32.86	27.61	33.13	0.006735	3.45	2235.73	383.45	0.20
Reach	2282.69	10-year	4200.00	22.50	30.14	25.92	30.28	0.006191	2.64	1454.42	366.03	0.18
Reach	2282.69	5-year	2200.00	22.50	28.38	24.93	28.45	0.005412	2.07	999.55	260.85	0.16
Reach	2282.69	2-year	680.00	22.50	26.13	23.75	26.16	0.003967	1.31	513.90	196.38	0.13
Reach	2161.926	100-year	19000.00	23.00	35.90	28.93	36.35	0.005278	3.65	3810.17	422.87	0.18
Reach	2161.926	50-year	13100.00	23.00	33.96	27.78	34.26	0.004736	3.09	3174.12	418.93	0.17
Reach	2161.926	25-year	9000.00	23.00	32.35	26.87	32.55	0.004207	2.60	2645.13	414.46	0.15
Reach	2161.926	10-year	4200.00	23.00	29.68	25.57	29.78	0.003477	1.87	1783.66	343.44	0.13
Reach	2161.926	5-year	2200.00	23.00	27.95	24.73	28.00	0.003207	1.46	1246.01	316.15	0.12
Reach	2161.926	2-year	680.00	23.00	25.71	23.84	25.73	0.003694	1.04	577.68	269.86	0.11
Reach	1969.374	100-year	19000.00	20.50	34.73	28.38	35.30	0.006317	4.49	3356.79	328.70	0.22
Reach	1969.374	50-year	13100.00	20.50	32.98	27.22	33.34	0.005500	3.79	2825.06	328.70	0.20
Reach	1969.374	25-year	9000.00	20.50	31.51	26.35	31.75	0.004703	3.18	2381.11	320.32	0.18
Reach	1969.374	10-year	4200.00	20.50	29.03	24.53	29.13	0.003612	2.30	1651.04	289.34	0.15
Reach	1969.374	5-year	2200.00	20.50	27.38	23.52	27.43	0.003081	1.82	1180.26	279.98	0.13
Reach	1969.374	2-year	680.00	20.50	25.21	21.88	25.22	0.002130	1.15	616.79	221.68	0.10

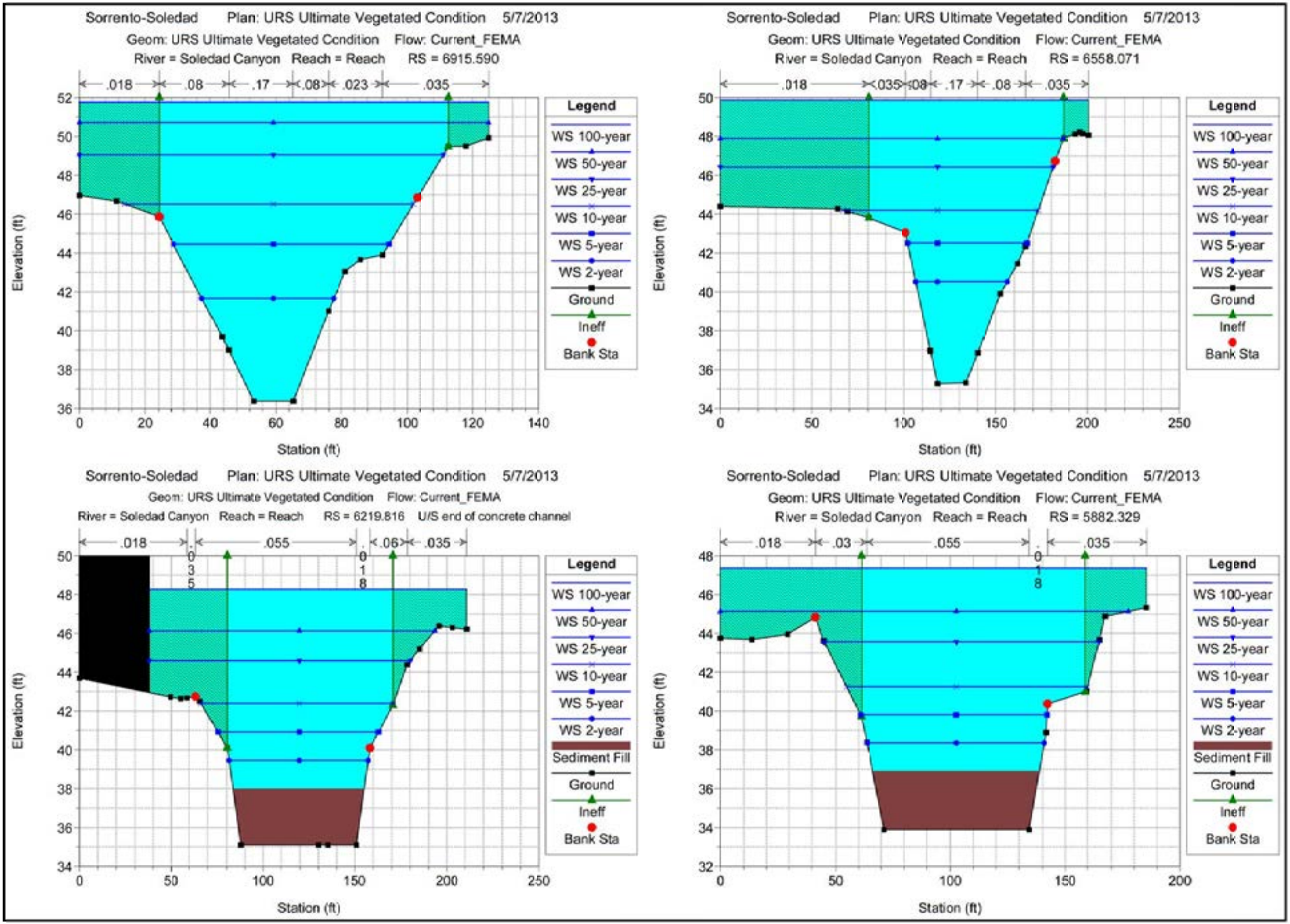
HEC-RAS Plan: URSUltimate River: Soledad Canyon Reach: Reach (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	1828.694	100-year	19000.00	19.50	33.30	28.02	34.20	0.007606	4.47	3279.48	404.77	0.22
Reach	1828.694	50-year	13100.00	19.50	31.95	26.89	32.37	0.007205	4.04	2763.24	403.28	0.21
Reach	1828.694	25-year	9000.00	19.50	30.63	25.90	30.88	0.006903	3.63	2270.15	383.70	0.20
Reach	1828.694	10-year	4200.00	19.50	28.38	24.05	28.49	0.004968	2.61	1573.00	295.03	0.16
Reach	1828.694	5-year	2200.00	19.50	26.86	22.47	26.91	0.003842	2.00	1143.36	277.90	0.14
Reach	1828.694	2-year	680.00	19.50	24.92	20.87	24.93	0.001831	1.11	649.17	217.30	0.09
Reach	1585.63	100-year	19000.00	19.50	32.14	27.09	32.49	0.005807	3.93	4063.97	560.78	0.20
Reach	1585.63	50-year	13100.00	19.50	30.62	26.18	30.86	0.005434	3.48	3340.93	560.78	0.19
Reach	1585.63	25-year	9000.00	19.50	29.31	25.46	29.48	0.005086	3.08	2723.93	542.15	0.18
Reach	1585.63	10-year	4200.00	19.50	27.35	24.39	27.43	0.004090	2.35	1819.59	444.36	0.15
Reach	1585.63	5-year	2200.00	19.50	25.99	22.44	26.04	0.003605	1.92	1243.07	403.91	0.14
Reach	1585.63	2-year	680.00	19.50	24.43	20.87	24.45	0.002212	1.23	652.05	356.57	0.10
Reach	1442.275	100-year	19000.00	16.64	31.43	26.75	31.70	0.005203	3.86	4519.47	590.27	0.19
Reach	1442.275	50-year	13100.00	16.64	29.92	26.02	30.12	0.005029	3.51	3665.66	581.82	0.18
Reach	1442.275	25-year	9000.00	16.64	28.83	25.33	28.78	0.004816	3.22	2837.34	565.86	0.17
Reach	1442.275	10-year	4200.00	16.64	26.79	22.71	26.87	0.003924	2.53	1932.79	539.11	0.15
Reach	1442.275	5-year	2200.00	16.64	25.47	20.98	25.52	0.003709	2.21	1248.34	490.58	0.14
Reach	1442.275	2-year	680.00	16.64	24.19	19.21	24.21	0.001365	1.18	696.84	358.04	0.08
Reach	1386.102	100-year	19000.00	16.74	31.33	25.89	31.47	0.001690	2.09	6597.29	838.99	0.11
Reach	1386.102	50-year	13100.00	16.74	29.80	25.24	29.90	0.001711	1.91	5332.98	831.30	0.11
Reach	1386.102	25-year	9000.00	16.74	28.49	24.69	28.56	0.001804	1.78	4252.74	820.58	0.11
Reach	1386.102	10-year	4200.00	16.74	26.60	22.66	26.65	0.002497	1.79	2415.01	780.89	0.12
Reach	1386.102	5-year	2200.00	16.74	25.28	21.01	25.31	0.002537	1.59	1581.38	704.69	0.12
Reach	1386.102	2-year	680.00	16.74	24.12	19.18	24.13	0.001059	0.93	903.09	603.14	0.07
Reach	972.2879	100-year	19000.00	17.86	30.60	24.59	30.74	0.001702	2.01	6512.63	755.04	0.11
Reach	972.2879	50-year	13100.00	17.86	29.11	23.93	29.21	0.001529	1.72	5387.21	755.04	0.10
Reach	972.2879	25-year	9000.00	17.86	27.81	23.93	27.88	0.001421	1.51	4405.00	755.04	0.09
Reach	972.2879	10-year	4200.00	17.86	25.93	22.59	25.96	0.001117	1.12	2993.07	745.86	0.08
Reach	972.2879	5-year	2200.00	17.86	24.63	21.07	24.65	0.001066	0.95	2037.41	724.34	0.07
Reach	972.2879	2-year	680.00	17.86	23.94	19.46	23.95	0.000241	0.42	1550.38	691.60	0.03
Reach	615.5682	100-year	19000.00	19.90	29.66	24.93	29.93	0.003074	2.32	4990.64	616.16	0.14
Reach	615.5682	50-year	13100.00	19.90	28.31	24.15	28.50	0.002636	1.89	4157.25	616.16	0.13
Reach	615.5682	25-year	9000.00	19.90	27.10	23.93	27.23	0.002352	1.56	3409.94	616.16	0.12
Reach	615.5682	10-year	4200.00	19.90	25.43	23.38	25.49	0.001573	1.01	2385.07	609.38	0.09
Reach	615.5682	5-year	2200.00	19.90	24.19	23.35	24.22	0.001334	0.73	1639.99	587.50	0.08
Reach	615.5682	2-year	680.00	19.90	23.72	21.97	23.74	0.002606	0.93	620.22	568.71	0.10

HEC-RAS Plan: URSUltimate River: Soledad Canyon Reach: Reach (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	555.0848	100-year	19000.00	21.19	29.26	25.33	29.62	0.004846	2.25	4383.71	603.81	0.15
Reach	555.0848	50-year	13100.00	21.19	27.97	24.53	28.23	0.004265	1.85	3622.05	603.81	0.13
Reach	555.0848	25-year	9000.00	21.19	26.79	23.93	26.98	0.003990	1.54	2926.54	603.81	0.13
Reach	555.0848	10-year	4200.00	21.19	25.23	23.89	25.32	0.002844	1.00	2001.91	597.79	0.10
Reach	555.0848	5-year	2200.00	21.19	24.01	23.35	24.07	0.002736	0.74	1306.40	566.85	0.09
Reach	555.0848	2-year	680.00	21.19	23.54	22.78	23.58	0.006409	1.01	467.82	529.81	0.13
Reach	335.8184	100-year	19000.00	20.47	28.20	24.82	28.60	0.004784	2.24	4154.79	609.87	0.15
Reach	335.8184	50-year	13100.00	20.47	27.06	24.08	27.33	0.004160	1.85	3458.68	609.87	0.14
Reach	335.8184	25-year	9000.00	20.47	25.92	23.41	26.13	0.004078	1.57	2767.64	609.87	0.13
Reach	335.8184	10-year	4200.00	20.47	24.67	22.57	24.76	0.002519	0.99	2001.80	609.66	0.10
Reach	335.8184	5-year	2200.00	20.47	23.45	21.78	23.51	0.002559	0.75	1279.28	567.90	0.09
Reach	335.8184	2-year	680.00	20.47	22.15	20.86	22.19	0.002393	0.46	480.67	434.30	0.08
Reach	30.31517	100-year	19000.00	18.32	24.15	23.30	25.31	0.041187	5.11	2294.00	528.92	0.41
Reach	30.31517	50-year	13100.00	18.32	22.80	22.56	23.51	0.078651	5.53	1486.55	505.75	0.53
Reach	30.31517	25-year	9000.00	18.32	22.33	22.08	23.08	0.051509	4.20	1360.60	502.79	0.42
Reach	30.31517	10-year	4200.00	18.32	21.39	21.39	22.41	0.099357	4.74	555.60	481.57	0.55
Reach	30.31517	5-year	2200.00	18.32	21.03	20.66	21.44	0.050021	3.05	459.38	472.06	0.38
Reach	30.31517	2-year	680.00	18.32	20.08	19.77	20.26	0.050031	2.22	212.37	398.08	0.35


Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 8438.736
.045 .025 .08 .08
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 7999.449
.018 .06 .06 .05
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 7654.838
.018 .06 .17 .08 .035
Elevation (ft)
Station (ft)
Legend
WS 50-year
WS 25-year
WS 100-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 7312.272
.018 .06 .17 .06 .035
Elevation (ft)
Station (ft)
Legend
WS 50-year
WS 25-year
WS 100-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta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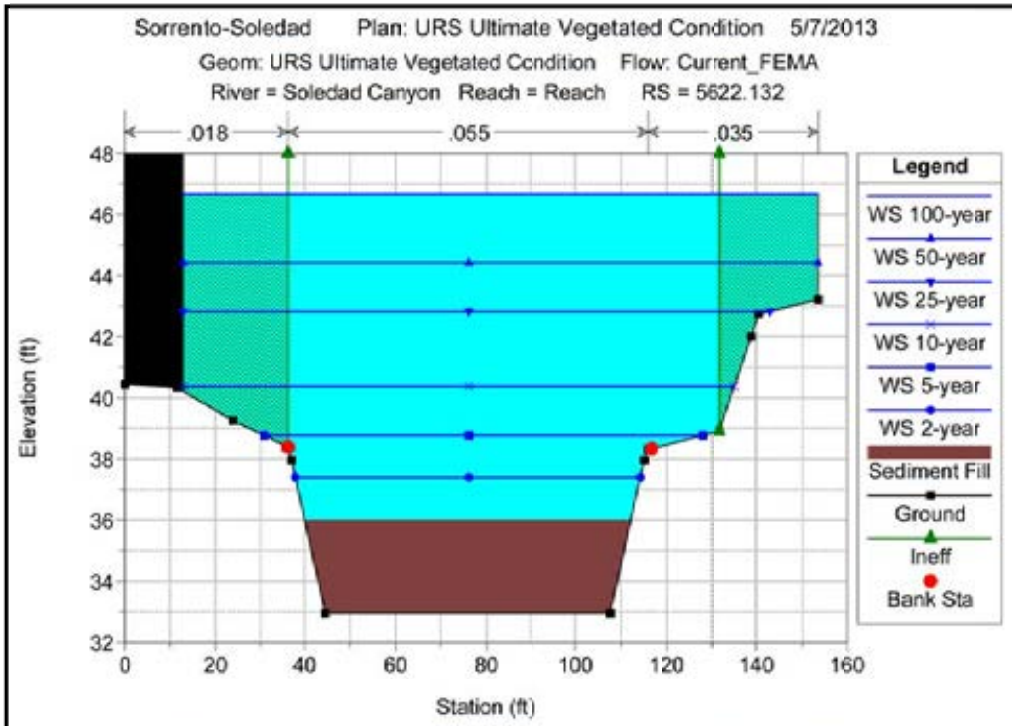
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 6915.590
.018 .08 .17 .08 .023 .035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 6558.071
.018 .035 .08 .17 .08 .035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 6219.816 U/S end of concrete channel
.018 .035 .055 .018 .06 .035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 5882.329
.018 .03 .055 .018 .035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta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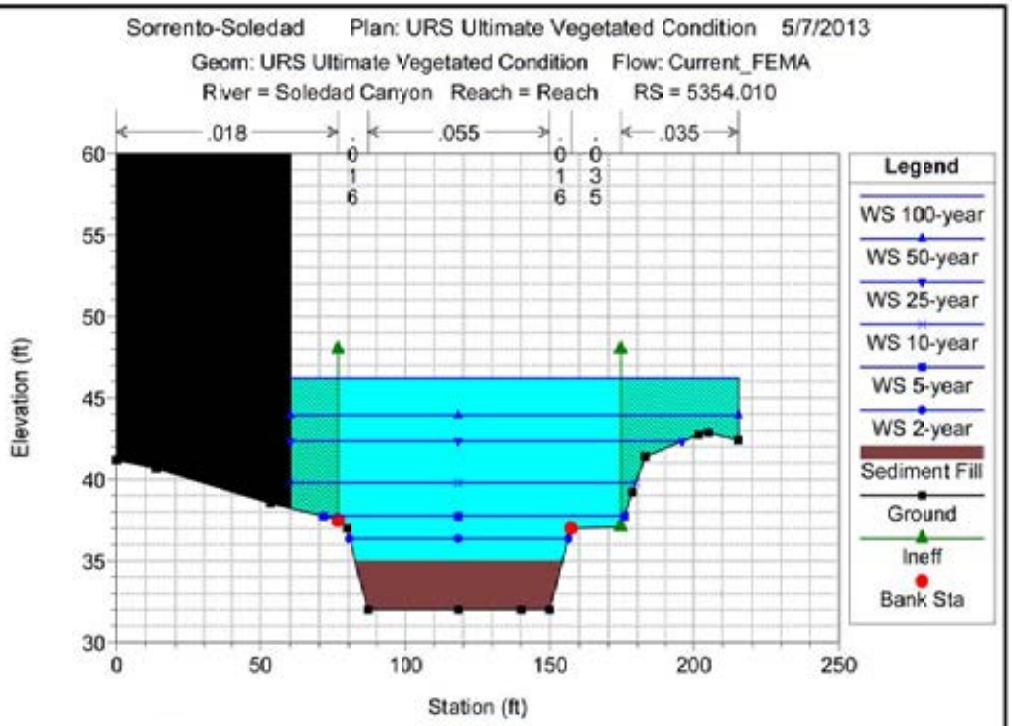
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 5622.132
.018
.055
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta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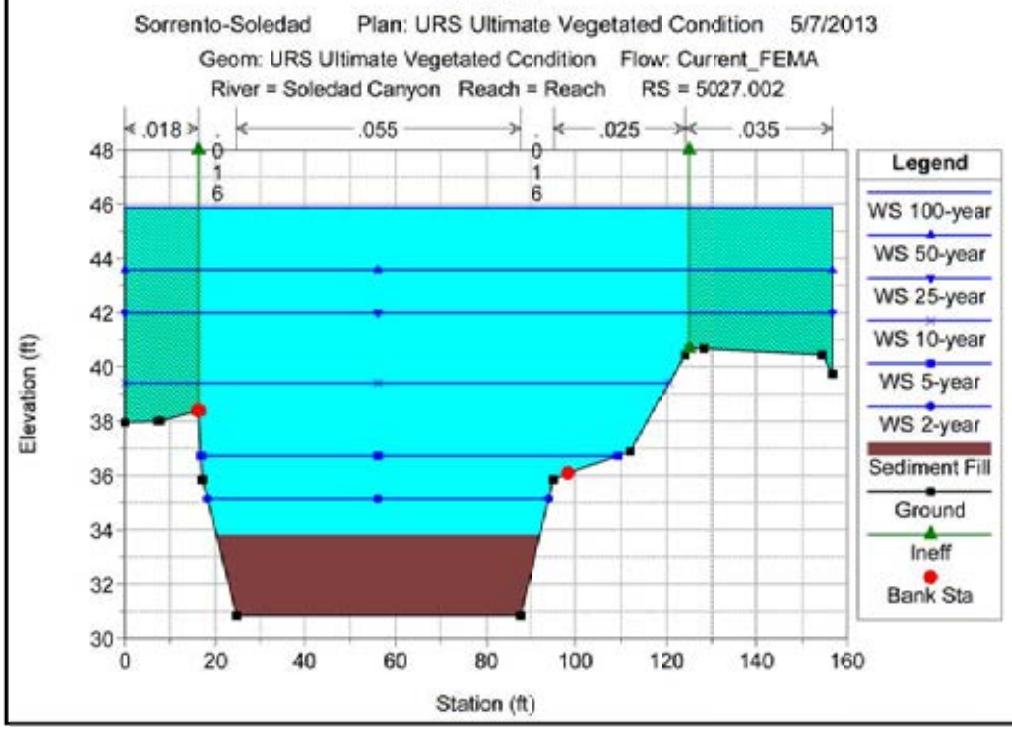
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 5354.010
.018
.055
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta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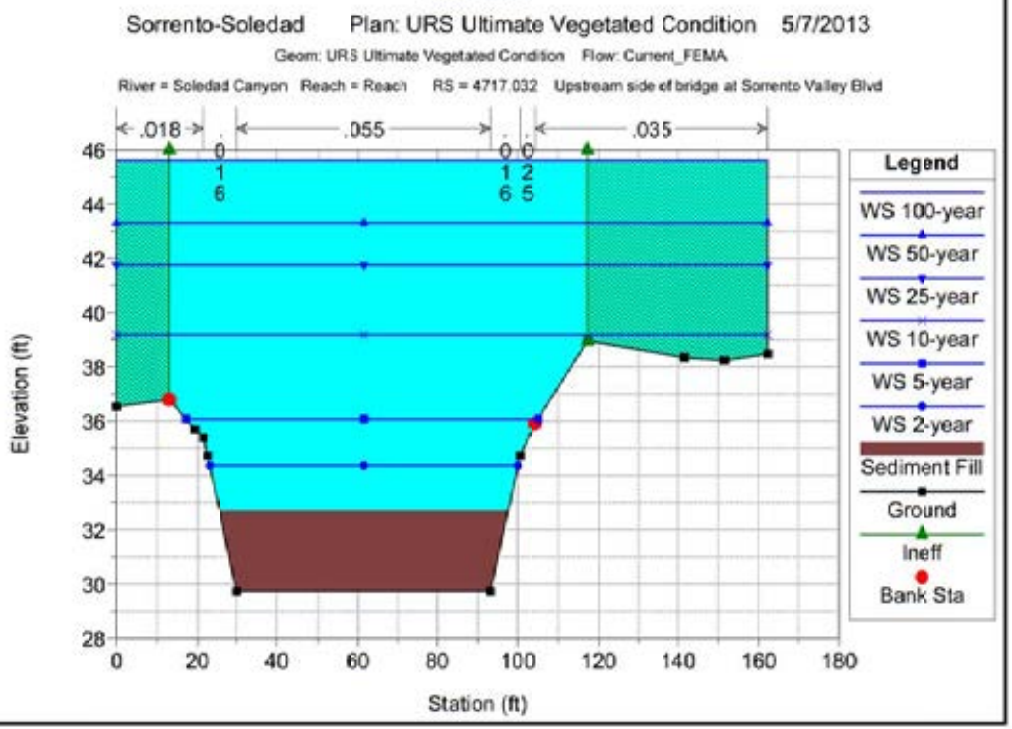
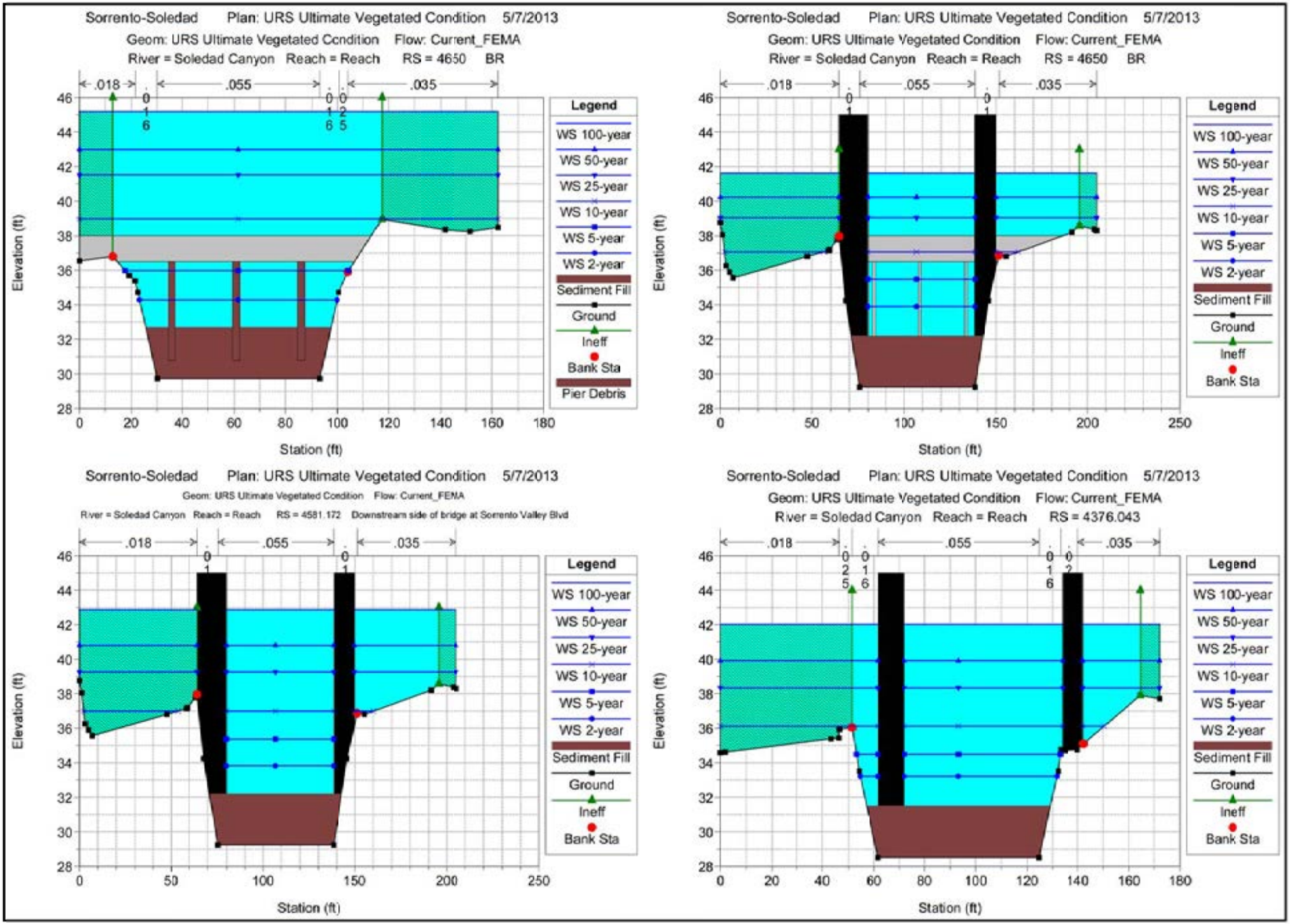
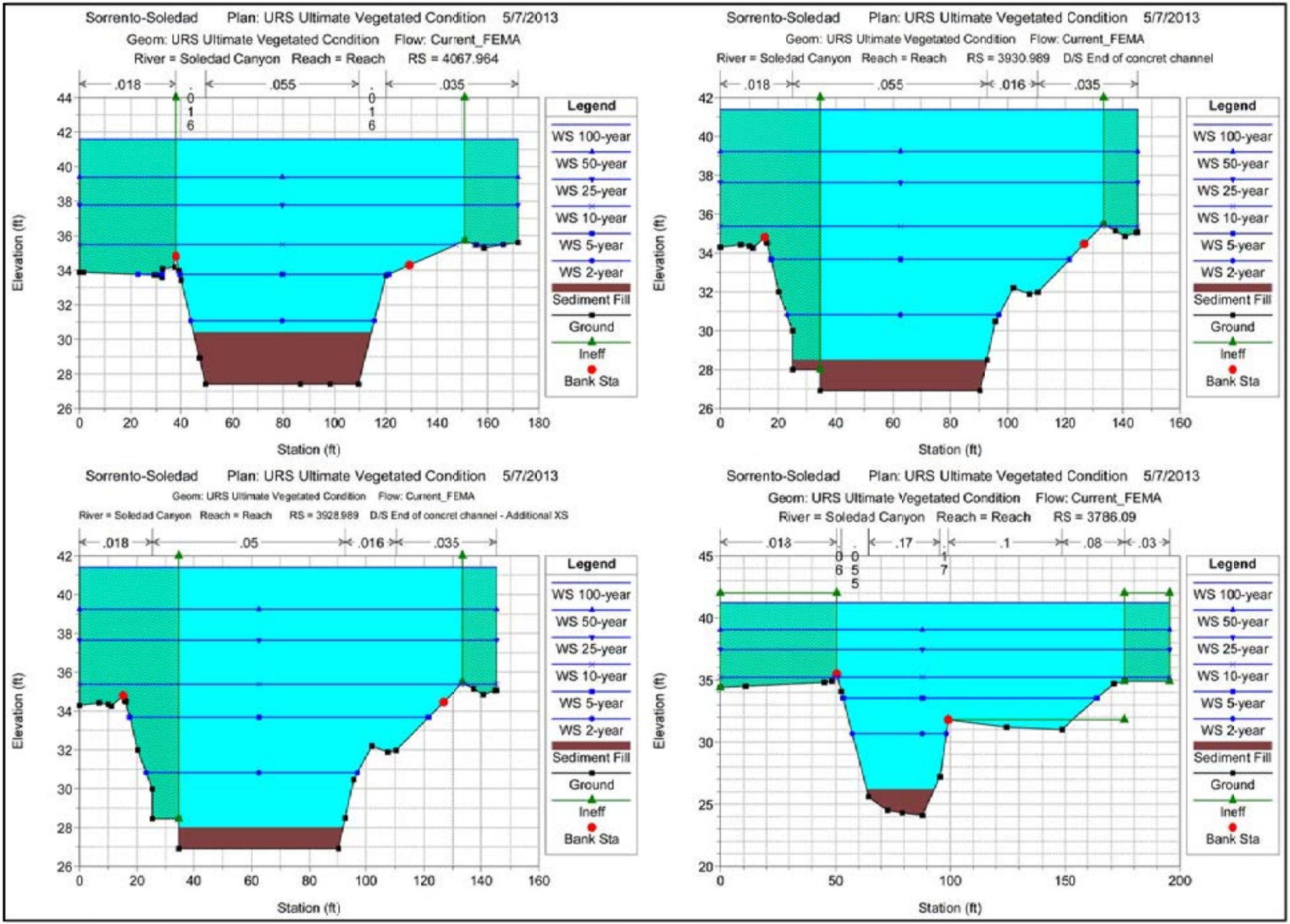
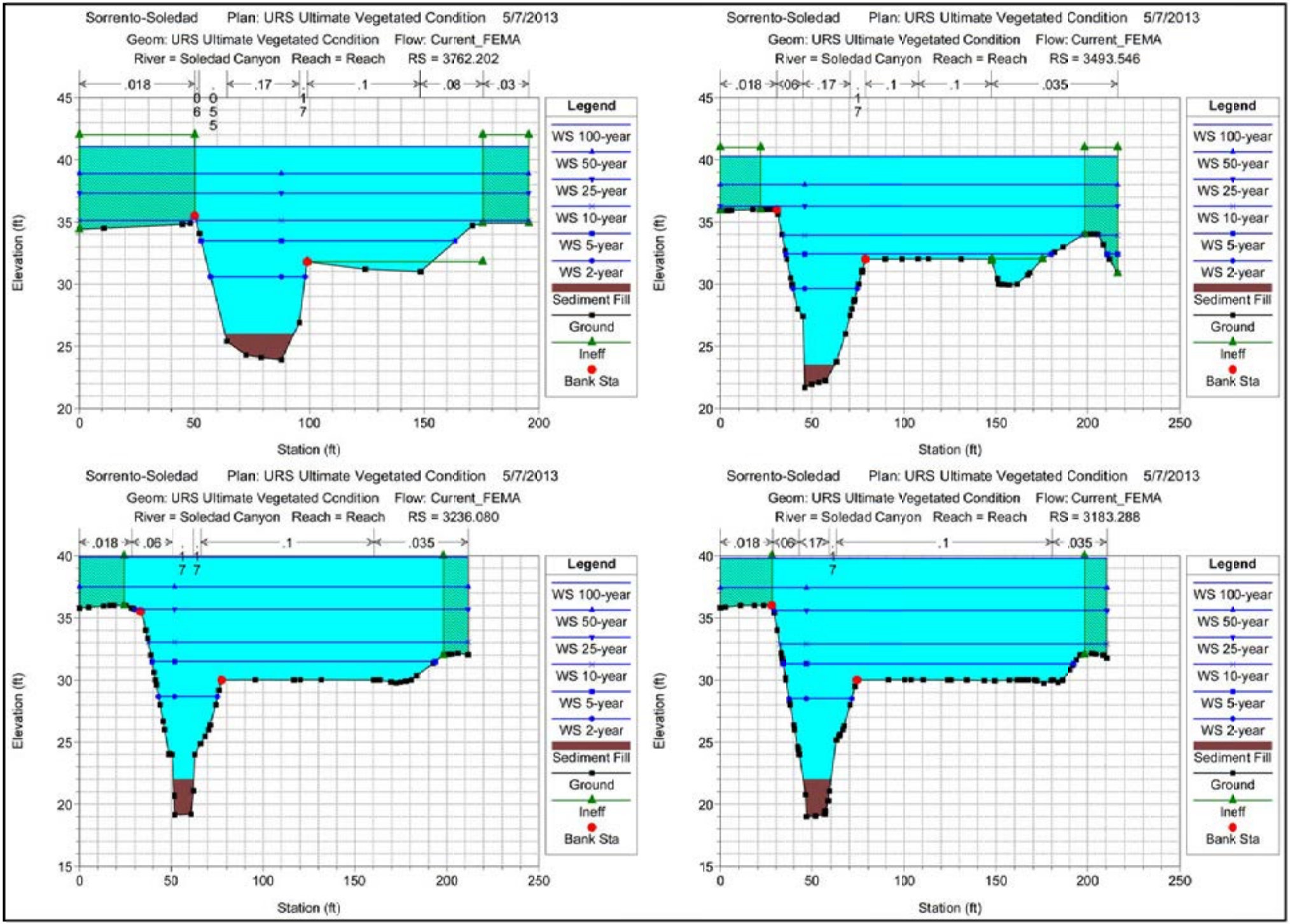
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 5027.002
.018
.055
.025
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta


Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 4717.032 Upstream side of bridge at Sorrento Valley Blvd
.018
.055
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta


Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 4650 BR
.018
.055
.035
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta
Pier Debris
Elevation (ft)
Station (ft)
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 4650 BR
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 4581.172 Downstream side of bridge at Sorrento Valley Blvd
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 4376.043


Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 4067.964
.018
.055
.035
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 3930.989 D/S End of concret channel
.018
.055
.016
.035
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 3928.989 D/S End of concret channel - Additional XS
.018
.05
.016
.035
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 3786.09
.018
.17
.1
.08
.03
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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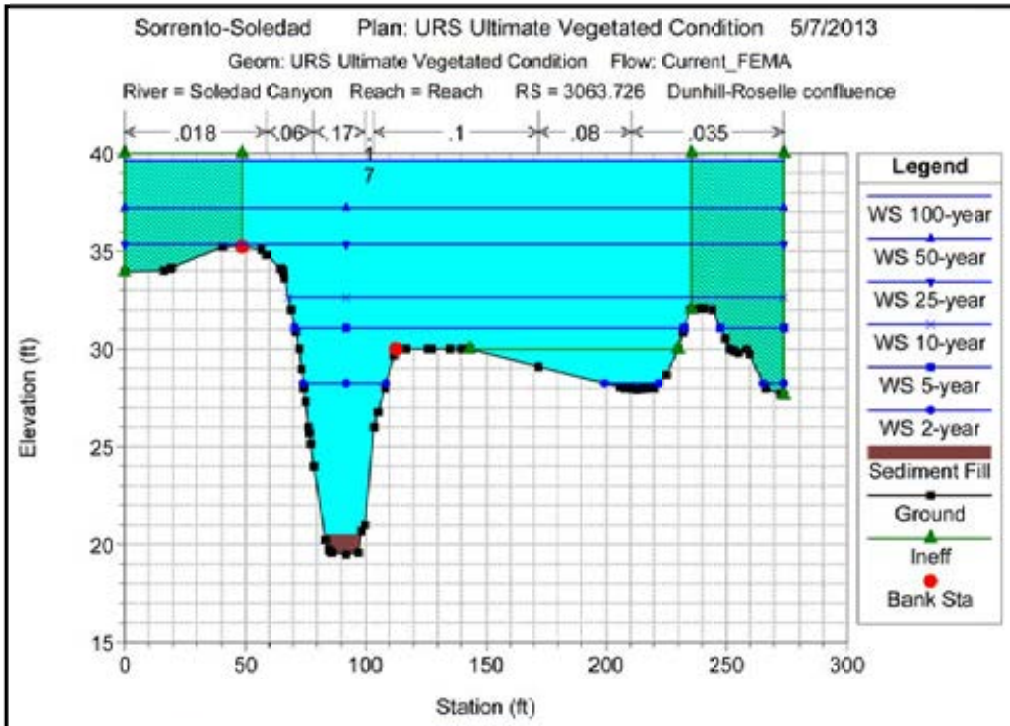
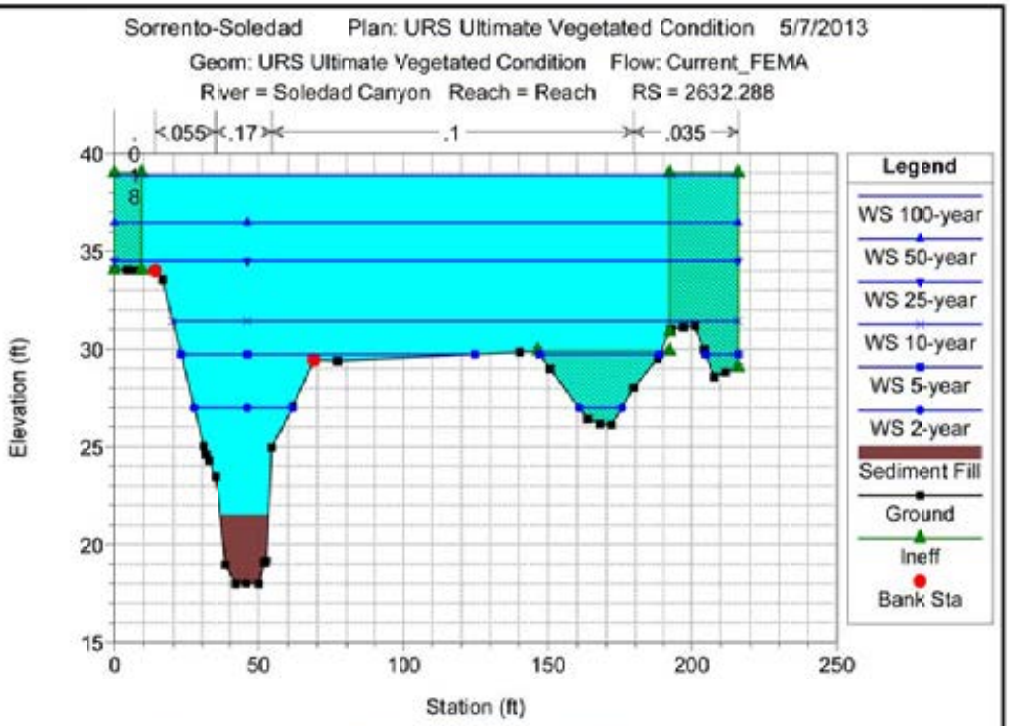
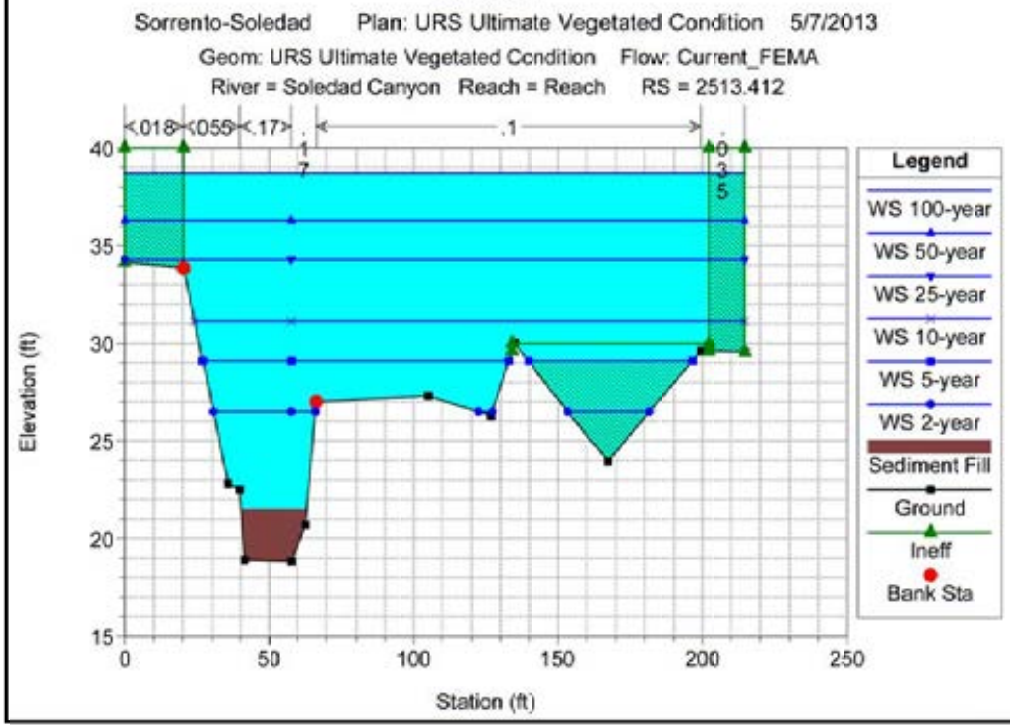
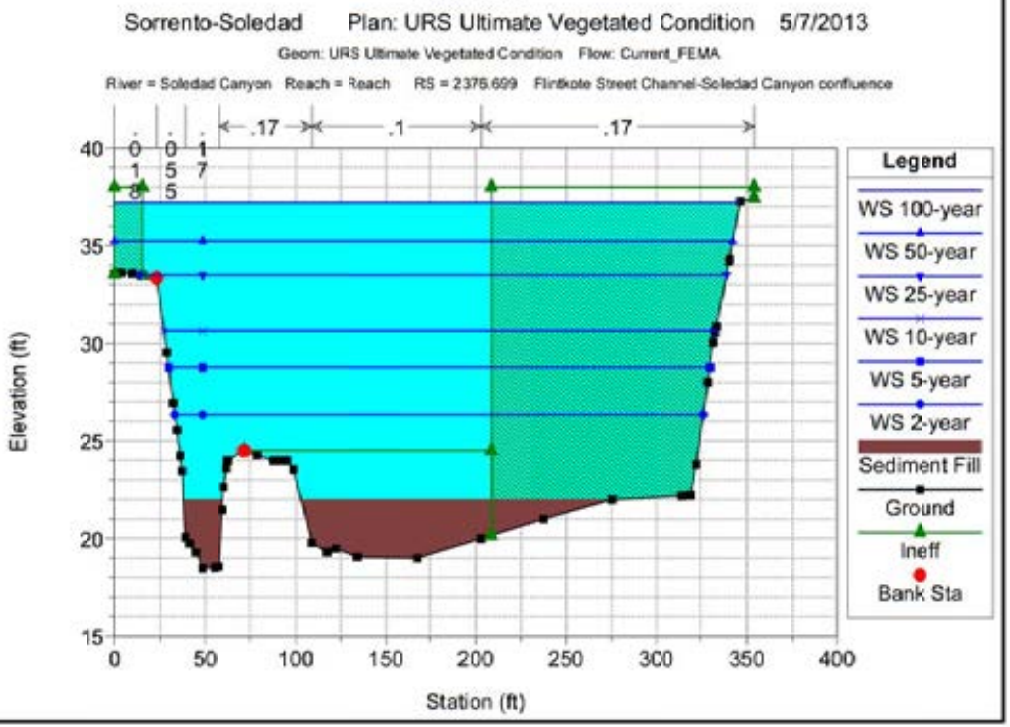
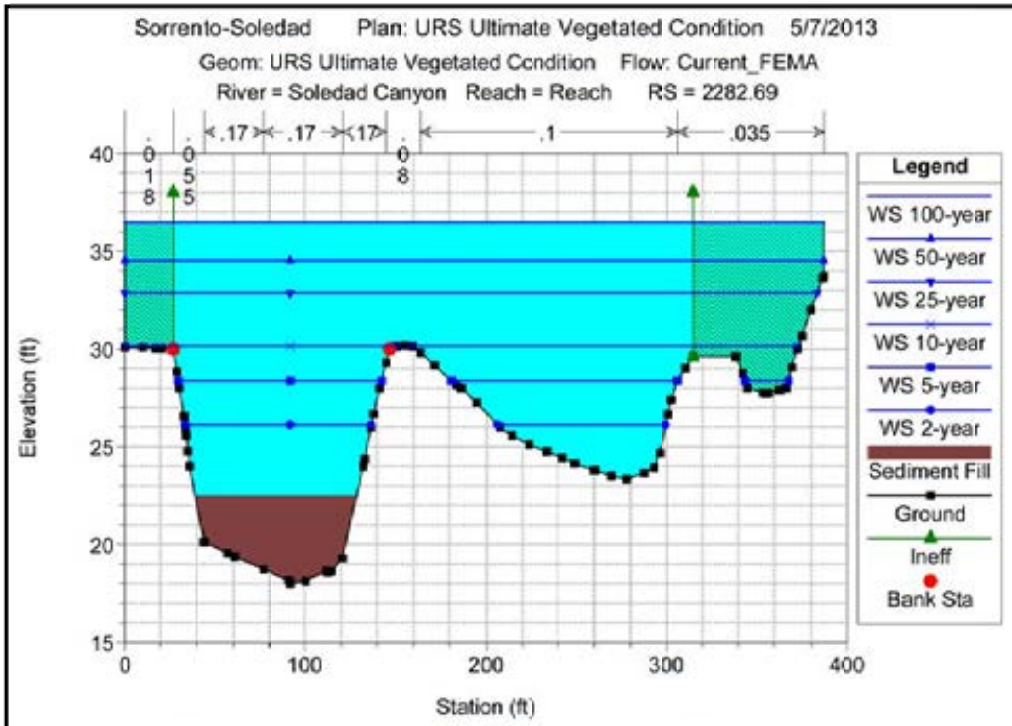
Geom: URS Ultimate Vegetated Ccndition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 3762.202
.018 .06 .055 .17 .1 .08 .03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 3493.546
.018 .06 .17 .1 .1 .035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Ccndition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 3236.080
.018 .06 .1 .035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 3183.288
.018 .06 .17 .1 .035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta

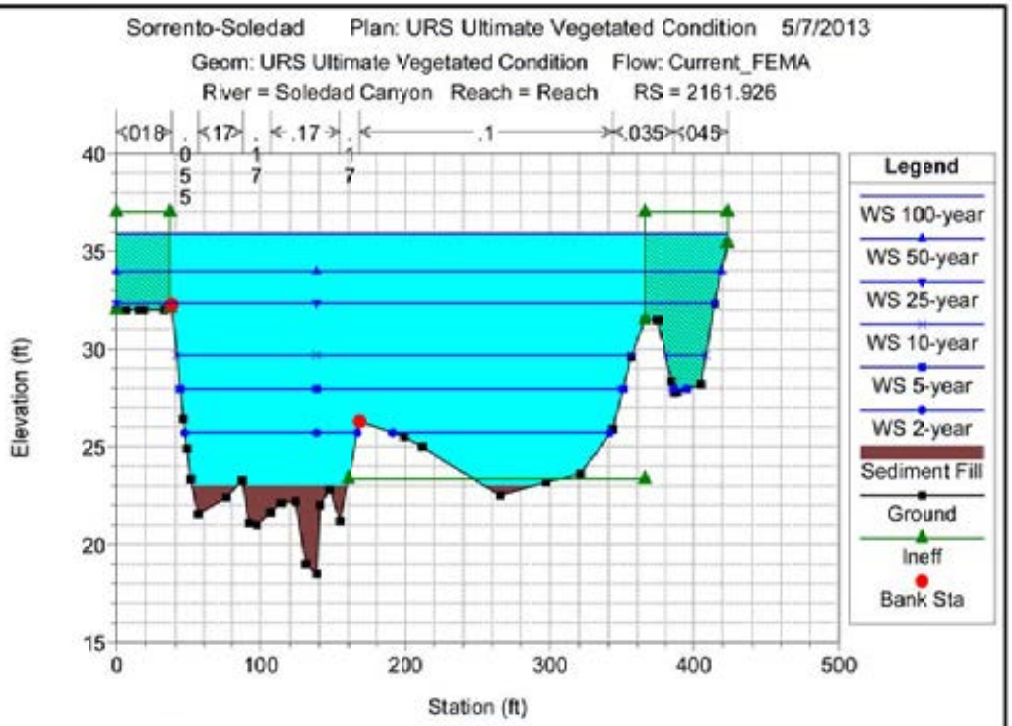

Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 3063.726 Dunhill-Roselle confluence
.018
.06
.17
.1
.08
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta

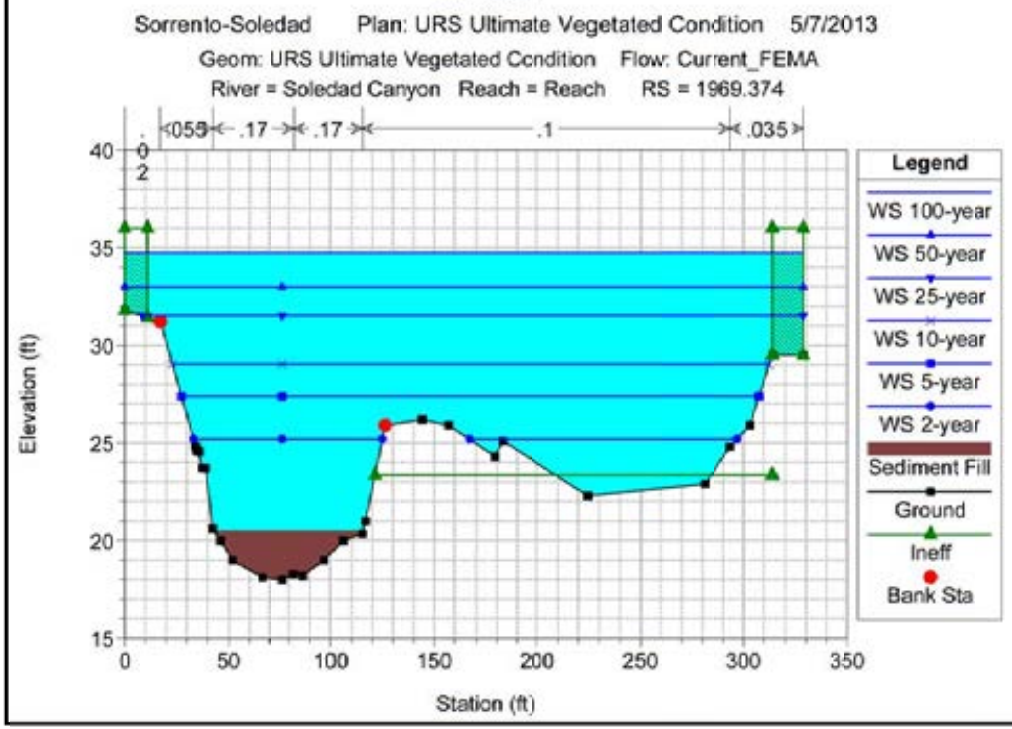

Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 2632.288
.055
.17
.1
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta

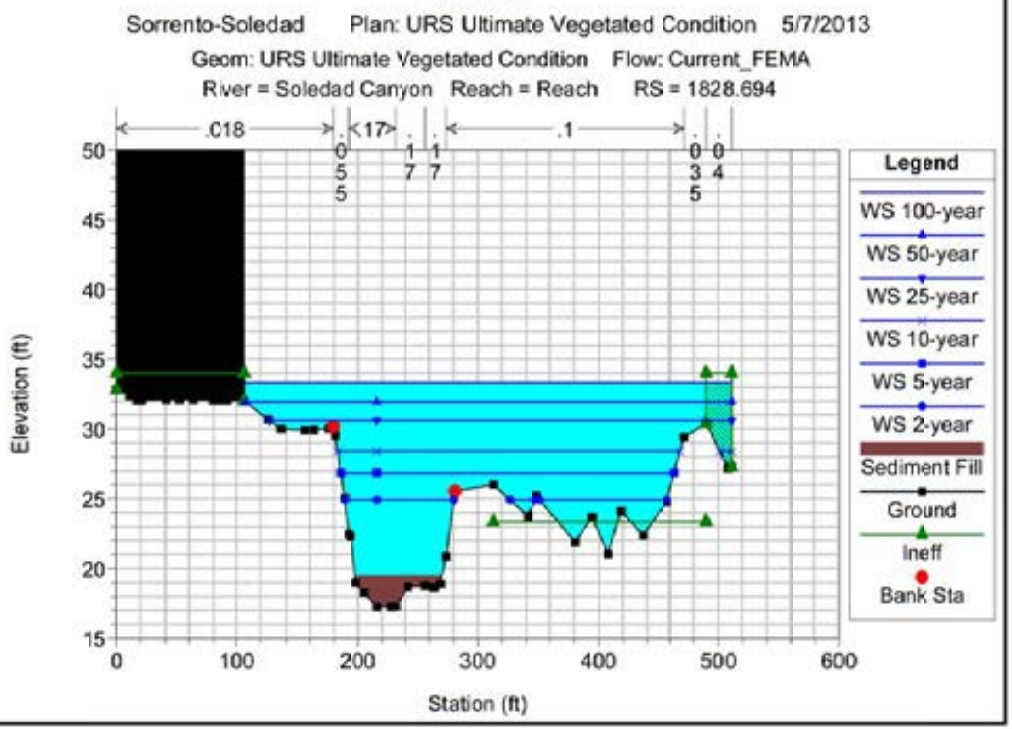

Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Ccndition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 2513.412
.018
.055
.17
.1
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta

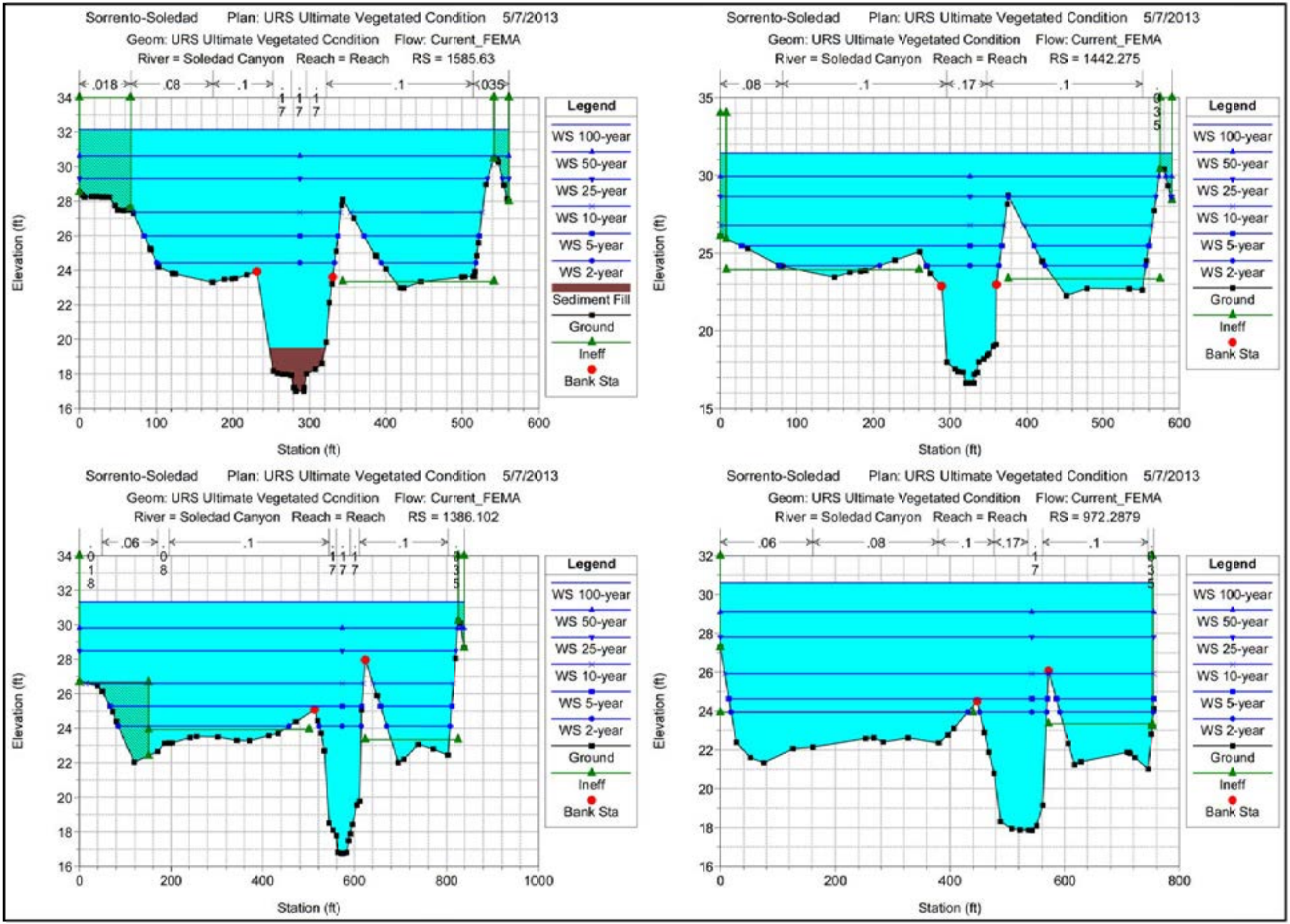

Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 2375.699 Flintkote Street Channel-Soledad Canyon confluence
.17
.1
.17
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta

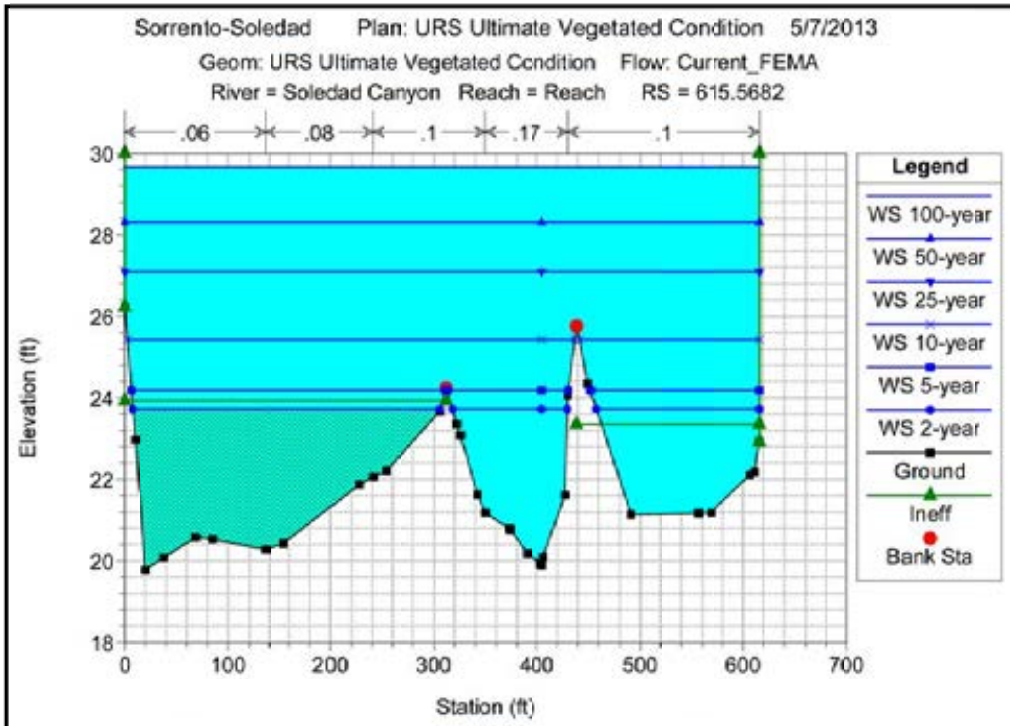

Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 2282.69
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta

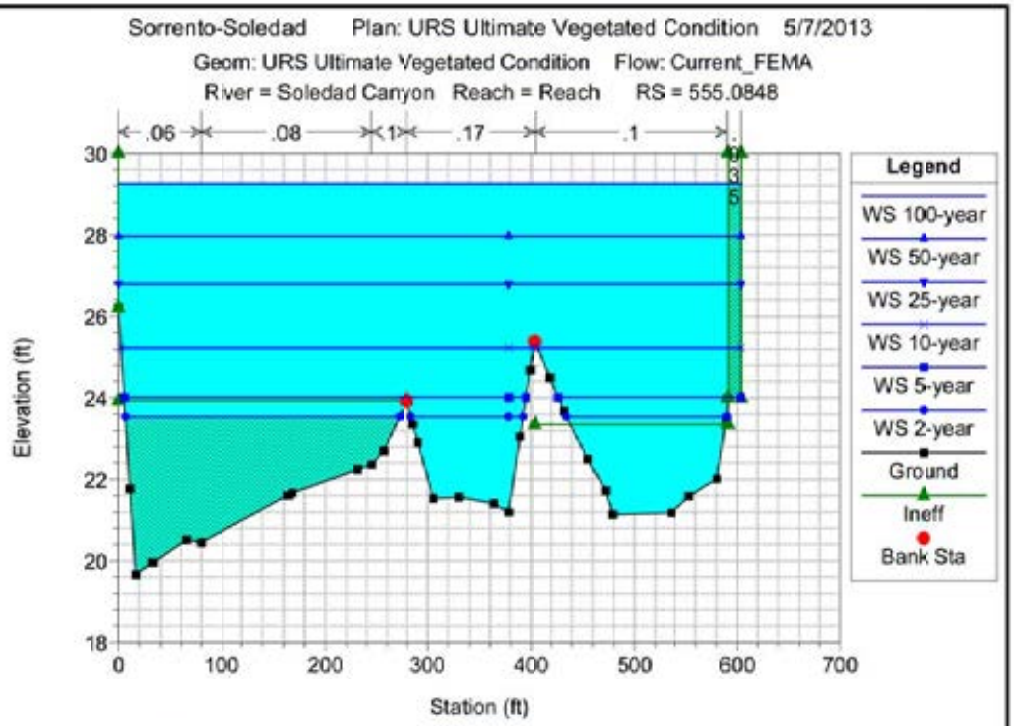

Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 2161.926
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta

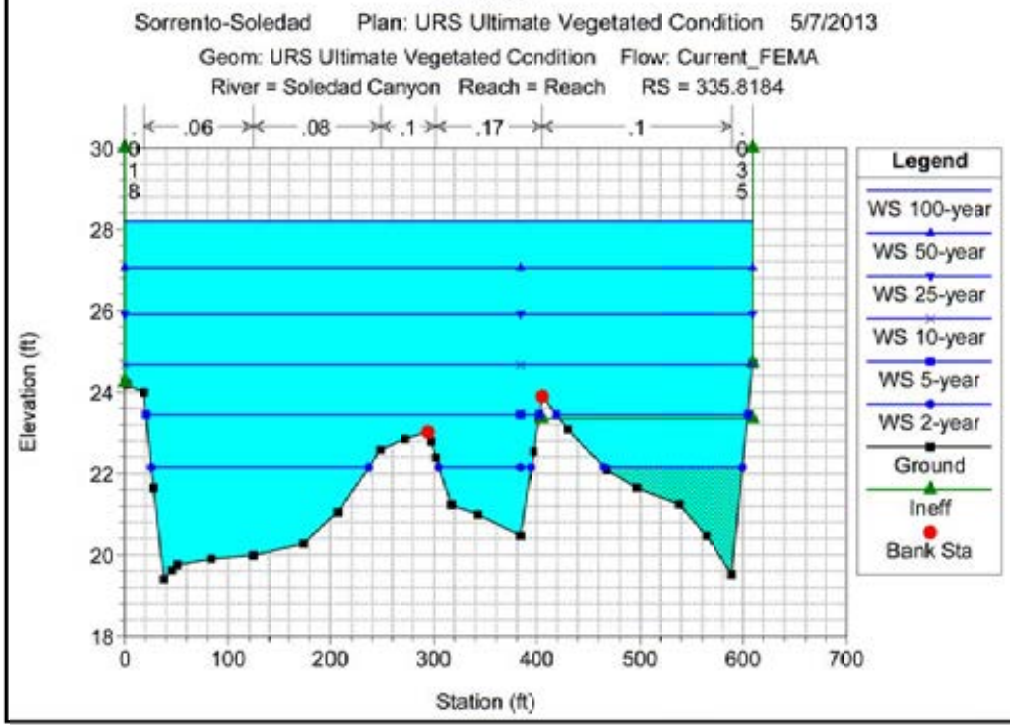

Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 1969.374
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta

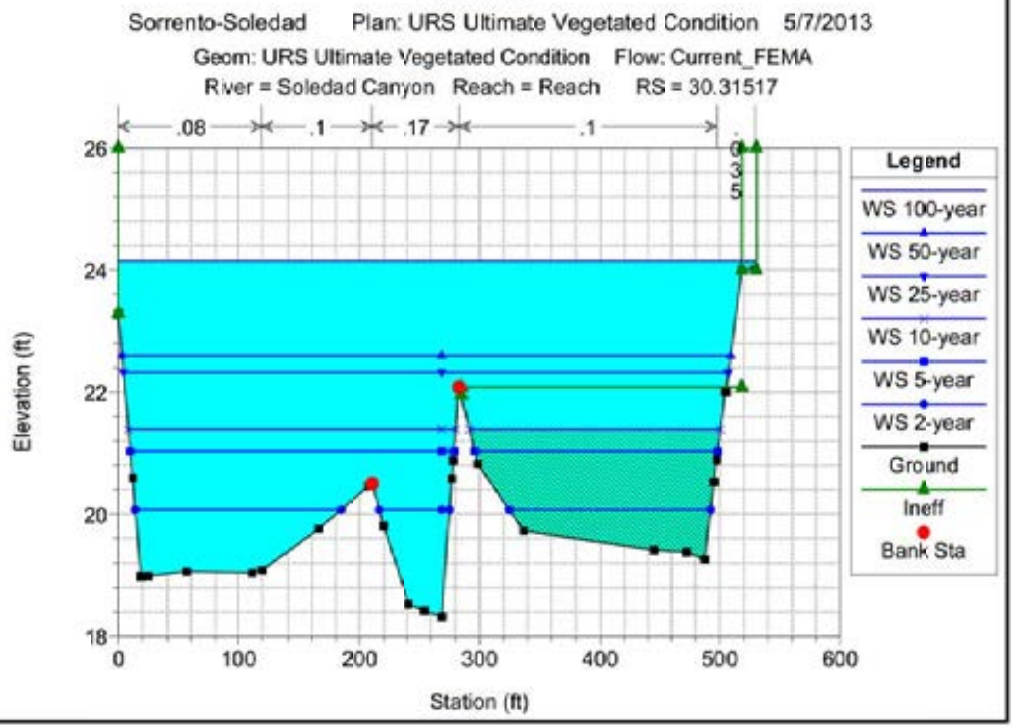

Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 1828.694
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta


Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 1585.63
.018
.08
.1
.1
.035
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Sediment Fill
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 1442.275
.08
.1
.17
.1
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 1386.102
.06
.1
.1
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 972.2879
.06
.08
.1
.17
.1
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 615.5682
.06 .08 .1 .17 .1
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta


Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 555.0848
.06 .08 .1 .17 .1
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta


Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 335.8184
.06 .08 .1 .17 .1
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta


Sorrento-Soledad Plan: URS Ultimate Vegetated Condition 5/7/2013
Geom: URS Ultimate Vegetated Condition Flow: Current_FEMA
River = Soledad Canyon Reach = Reach RS = 30.31517
.08 .1 .17 .1
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 25-year
WS 10-year
WS 5-year
WS 2-year
Ground
Ineff
Bank Sta