Final
Arroyo Seco Channel Hydraulic Analysis
Devils Gate Reservoir Sediment Removal and Management Project

April 25, 2012
Prepared for:
Los Angeles County Flood Control District
900 South Fremont Avenue, 2nd Floor
Alhambra, CA 91803-1331

BUREAU VERITAS NORTH AMERICA, INC.
10620 Treena Street, Suite 200
San Diego, CA 92131
(858) 451-6100
www.us.bureauveritas.com

This page is intentionally left blank to facilitate 2-sided printing.

Engineer's Certification

This report was prepared under the supervision of Charles S. Mohrlock, a Registered Civil Engineer in the State of California. The Registered Civil Engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

Charles S. Mohrlock, P.E.
R.C.E. Number 78322

This page is intentionally left blank to facilitate 2-sided printing.

Table of Contents

List of Appendices

List of Figures

Acronyms

DTM – Digital Terrain Map

GIS – Geographic Information Systems

HEC-RAS – Hydrologic Engineering Center River Analysis System

LACFCD – Los Angeles County Flood Control District

LIDAR – Light Detection and Ranging

NAD83 – North American Datum of 1983

NAVD88 – North American Vertical Datum of 1988

NGVD29 – National Geodetic Vertical Datum of 1929

TIN – Triangulated Irregular Network

Abbreviations

cfs – cubic feet per second

fps – feet per second

ft – feet

This page is intentionally left blank to facilitate 2-sided printing.

1 Introduction

1.1 Purpose

This Hydraulic Analysis of the Arroyo Seco Channel has been prepared per the request of the Los Angeles County Flood Control District (LACFCD) in order to analyze hydraulic characteristics and identify potential areas of flood inundation along the Arroyo Seco Channel extending from the Devils Gate Dam to the Los Angeles River. The analysis utilizes information from several sources including a preliminary HEC-RAS model of the Arroyo Seco Channel which has been provided by the LACFCD and a Hydrologic Analysis of Devils Gate Dam and Arroyo Seco Channel Tributaries report prepared by Bureau Veritas North America, Inc. dated November 11, 2011.

This analysis of the Arroyo Seco Channel has been performed using the existing Capital Storm Event discharge condition of the upstream Devils Gate Dam, which currently has limited available storage for flood control due to the accumulation of sediment within the reservoir. This analysis assumes that the sediment elevation in the Dam is at the spillway ports and that the ports are clogged with debris such that stormwater can only discharge over the top of the spillway. Ultimately, the hydraulic information produced in this report will be utilized in the development of the Flood Hazard Warning and Contingency Plan for the Arroyo Seco Channel report to be completed by Bureau Veritas following completion of this analysis. However, this report will focus on the hydraulic study, analyzing the portion of the Arroyo Seco Channel extending from the Devils Gate Dam to the Los Angeles River in order to determine hydraulic characteristics and potential areas of flood inundation during the anticipated peak Capital Storm Event.

1.2 Project Description

The Devils Gate Dam (Dam) is located in the Los Angeles River Watershed in the City of Pasadena, CA. Situated immediately north of Interstate Highway 210, near the Rose Bowl Stadium, the Dam separates the upper and lower watersheds of the Arroyo Seco Channel and provides significant storage capacity for stormwater runoff originating north of the Dam in the San Gabriel Mountains.

The Dam was the first flood control facility built by the Los Angeles County Flood Control District and was completed in 1920 for flood control and groundwater recharge purposes. In 1971, the Dam was damaged by the Sylmar earthquake and was subsequently renovated and repaired in 1997 in order to perform its primary role of flood control for the downstream communities of Pasadena, South Pasadena, and Los Angeles. The Arroyo Seco Channel flows through the reservoir, now called Hahamongna Watershed Park, and proceeds through the outlet of the Dam.

Figure 1-1: Vicinity Map

In 2009, the Station fires burned through more than 160,000 acres of Los Angeles County. Approximately 68% of the 31.9 square mile Arroyo Seco Channel watershed tributary to the Devils Gate facility was burned during this event. Due to the denuding of this large natural tributary area, large sediment loads (in excess of 1 million cubic yards) were deposited within the Dam and adjacent Hahamongna Watershed Park.

Due to the volume of sediment deposited within the Dam reservoir, the Dam discharge structures are now under threat of becoming covered with sediment. These sediment deposits have allowed for native and non-native vegetation to establish itself within the Dam reservoir.

The Devils Gate Dam directly discharges runoff to the Arroyo Seco Channel. The channel is a natural creek for several hundred feet downstream of the Devils Gate Dam; however, this rapidly converts to an engineered concrete lined flood control channel constructed in 1935. The Arroyo Seco Channel continues to flow in a southerly direction through Pasadena, meandering through Brookside Park and around the Rose Bowl Stadium, ultimately draining to the Los Angeles River located approximately nine (9) miles downstream of Devils Gate Dam. The Arroyo Seco Channel lower watershed is approximately 95% urbanized with a large amount of developed areas located adjacent to the Arroyo Seco Channel.

The LACFCD has requested a hydrologic and hydraulic analysis be performed for the existing sediment impacted reservoir that currently has limited available storage for flood control. The purpose of this analysis is to identify areas of flood inundation along the Arroyo Seco Channel in order to aid in the development of a Flood Hazard Warning and Contingency Plan for the Arroyo Seco Channel.

2 Hydraulic Methodology

2.1 Approach

This analysis utilizes information from several sources including a preliminary HEC-RAS model of the Arroyo Seco Channel which has been provided by the Los Angeles County Flood Control District (LACFCD) and the Hydrologic Analysis of Devils Gate Dam and Arroyo Seco Channel Tributaries report prepared by Bureau Veritas North America, Inc. dated November 11, 2011.

The accuracy of the LACFCD provided preliminary HEC-RAS model was verified by performing a site investigation of the channel, as described in Section 2.3, as well as by cross referencing the model with several available information sources including As-Builts, aerial imagery, and LIDAR data. Where necessary, information within the provided HEC-RAS model was modified in order to reflect revised channel geometries, georeferencing information, Manning's "n" values, channel flow rates, channel obstructions, and boundary conditions identified through the site investigation or through analysis of the available reference information as described in Sections 2.3.1 through 2.3.5.

After producing a revised HEC-RAS model, a mixed steady flow analysis was executed within Version 4.1.0 of the HEC-RAS software in order to identify the hydraulic grade lines generated within the Arroyo Seco Channel during the Capital Storm Event. The analysis revealed that flow rates generated by the Capital Storm are largely contained by the Arroyo Seco Channel but several areas of channel overtopping were also identified. In order to more accurately determine the impacts of this channel overtopping, the channel overbanks for areas experiencing overtopping were extended to contain the hydraulic grade line and determine the extents of overtopping. These overbank sections were extended by using available LIDAR elevation data as described in Section 2.3.6.

Utilizing the updated overbank information, another mixed steady flow analysis was performed in order to generate hydraulic grade lines along the length of the Arroyo Seco Channel. The areas of flood inundation were then mapped in ARC-GIS by overlaying the water surface elevations generated at each channel cross section with available LIDAR elevation data and identifying where the anticipated water surface elevations matched the topography of the overbanks. The revised flood extents were then illustrated in the overbank areas as described in Section 2.4.

In addition to anticipated flooding determined through the mixed steady flow analysis performed in HEC-RAS, anticipated flood limits brought on by the effects of superelevation occurring at curved channel alignments have also been determined per criteria set forth in Section C-3 of the LACFCD Hydraulic Design Manual. A discussion of the effects of freeboard and superelevation characteristics is included in Section 2.5.

2.2 Review of LACFCD Provided Information

The Los Angeles County Flood Control District has provided the following hydraulic information pertaining to the Arroyo Seco Channel: a preliminary HEC-RAS model of the Arroyo Seco Channel completed in 2002 and georeferenced at a later date, 2008 aerial imagery from the Los Angeles Region Imagery Acquisition Consortium (LARIAC), 2006 LIDAR information consisting of Digital Terrain Model (DTM) elevation data with interpolated 2' and 4' contours, references to pertinent City of Los Angeles and County of Los Angeles As-Built documents, and a microstation survey of the natural channel areas. Available As-Built documents and the preliminary HEC-RAS model provided vertical elevations associated with the NGVD29 datum while the LIDAR information provided vertical elevations associated with the NAVD88 datum; therefore, in order to accurately reflect anticipated flood limits, appropriate adjustments to the LIDAR elevations in the overbank areas have been made as described in Section 2.3.6 of this report.

The LACFCD provided HEC-RAS model consisted of 1,179 georeferenced cross sections of the Arroyo Seco Channel, 318 of these sections were determined per As-Built information and 861 of these sections were interpolated by HEC-RAS. These cross sections extend from the most upstream Section 3160 to the most downstream Section 10 and represent the channel geometry as viewed by looking downstream within the channel. It should be noted that the section numbers utilized in the HEC-RAS model are independent from channel stationing indicated in the available As-Built information. This is because HEC-RAS requires sequential stationing that extends from upstream to downstream while the available As-Builts utilize several different station alignments that are not sequential with one another. These cross sections depicted geometric channel information such as depth, width, shape, and slope of the channel at particular station points along the channel. The accuracy of the provided HEC-RAS model was first verified by performing a site investigation of the channel, as described in Section 2.3. Upon confirming that the geometries within the model generally complied with what was observed during the site investigation, more detailed information sources including As-Builts, aerial imagery, and LIDAR data were utilized to verify the channel geometries and georeferencing information as described in Section 2.3.1.

2.3 Independent Determination of Channel Characteristics

The Arroyo Seco Channel site investigation was performed on October 26, 2011. In addition to confirming the LACFCD provided channel geometries, the intent of the site investigation was to navigate the entire length of the channel and observe channel characteristics such as Manning's "n" values, potential break-out and overflow areas, and channel obstructions such as bridges and utility crossings.

The majority of the site investigation was performed by navigating down the center/edge of the Arroyo Seco Channel via foot and bicycle; however, due to the site constraints such as dense vegetation, steep channel walls, and fenced in prohibited areas, it was infeasible to navigate down the center/edge of the channel for its entire length. In order to document channel characteristics for portions of the channel that could not be directly accessed, a series of more readily accessible observation points such as bridge

overpasses and channel overbanks were designated at key channel sections in order to enable observations of channel characteristics for these locations.

Determination of specific channel characteristics are described in Sections 2.3.1 through 2.3.5 below and photos from the site investigation are included in Appendix C.

2.3.1 Geometric/Geographic Cross Section Information

Upon confirmation that the geometries within the LACFCD provided HEC-RAS model generally complied with what was observed during the site investigation as described in Section 2.3, more detailed information sources including As-Builts, aerial imagery, and LIDAR data were utilized to verify the channel geometries and georeferencing information as described below.

The georeferencing information for the provided HEC-RAS model was verified by exporting the cross sections into ARC-GIS and overlaying them with the 2008 aerial imagery and 2006 LIDAR data utilizing the NAD83, California State Plane Coordinate System (Zone V). Upon visual inspection of this ARC-GIS overlay, it was observed that the geographic locations of these cross sections did not adequately align with the available aerial imagery and LIDAR data. This discrepancy with the georeferencing of the provided cross sections was likely a result of the poor aerial image quality previously available during the creation of the preliminary HEC-RAS model.

Significant revisions to the georeferencing information throughout the length of the channel were incorporated into the updated HEC-RAS model. The georeferencing information for the updated HEC-RAS model was corrected by utilizing available As-Built information and higher resolution aerial imagery to relocate the geographic locations of the HEC-RAS cross sections. This process was only completed for channel cross sections that could be identified and located in the available As-Built information, meaning that all interpolated cross sections within the original LACFCD provided HEC-RAS model were removed prior to revisions to the georeferencing.

Once the georeferencing information for the HEC-RAS channel cross sections was updated, further review of available As-Builts was performed in order to confirm the geometric channel information where possible. Upon confirmation that the geographic and geometric channel information was accurate, HEC-RAS was utilized to interpolate additional cross sections at approximately 30’ intervals for areas between the confirmed cross section locations.

While comparison between the provided HEC-RAS section geometries and the available As-Built geometries indicated that the provided HEC-RAS model was overall very accurate within itself, notable revisions to the provided channel geometry are described below.

At Section 3090, the rectangular cross section was revised from a 60’ width to a 50’ width per Los Angeles County As-Built 9-D52.3. At Section 1020, a wall was added along the left channel bank in order to match aerial imagery and City of Los Angeles As-Built D-4314-2. At Section 1010, the slope at the left channel bank was increased to match aerial imagery and City of Los Angeles As-

Built D-4314-2. Finally, minor revisions to cross sectional information of the natural channel areas were made to reflect the revised channel path generated during re-georeferencing.

2.3.2 Manning's "n" Value Determination

During the site investigation, observations of the existing channel material and condition were noted and photographed for purposes of applying appropriate Manning's "n" values to the channel sections. Manning's "n" values for this model have been determined by referencing Chart F-04 of the LACFCD Hydraulic Design Manual and are supplemented with values taken from the Chow Table as well as the HEC-RAS 4.1 User's Manual. As the LACFCD provided preliminary HEC-RAS model was not populated with Manning's "n" value information, the values determined through this independent evaluation were then manually entered into the updated HEC-RAS model.

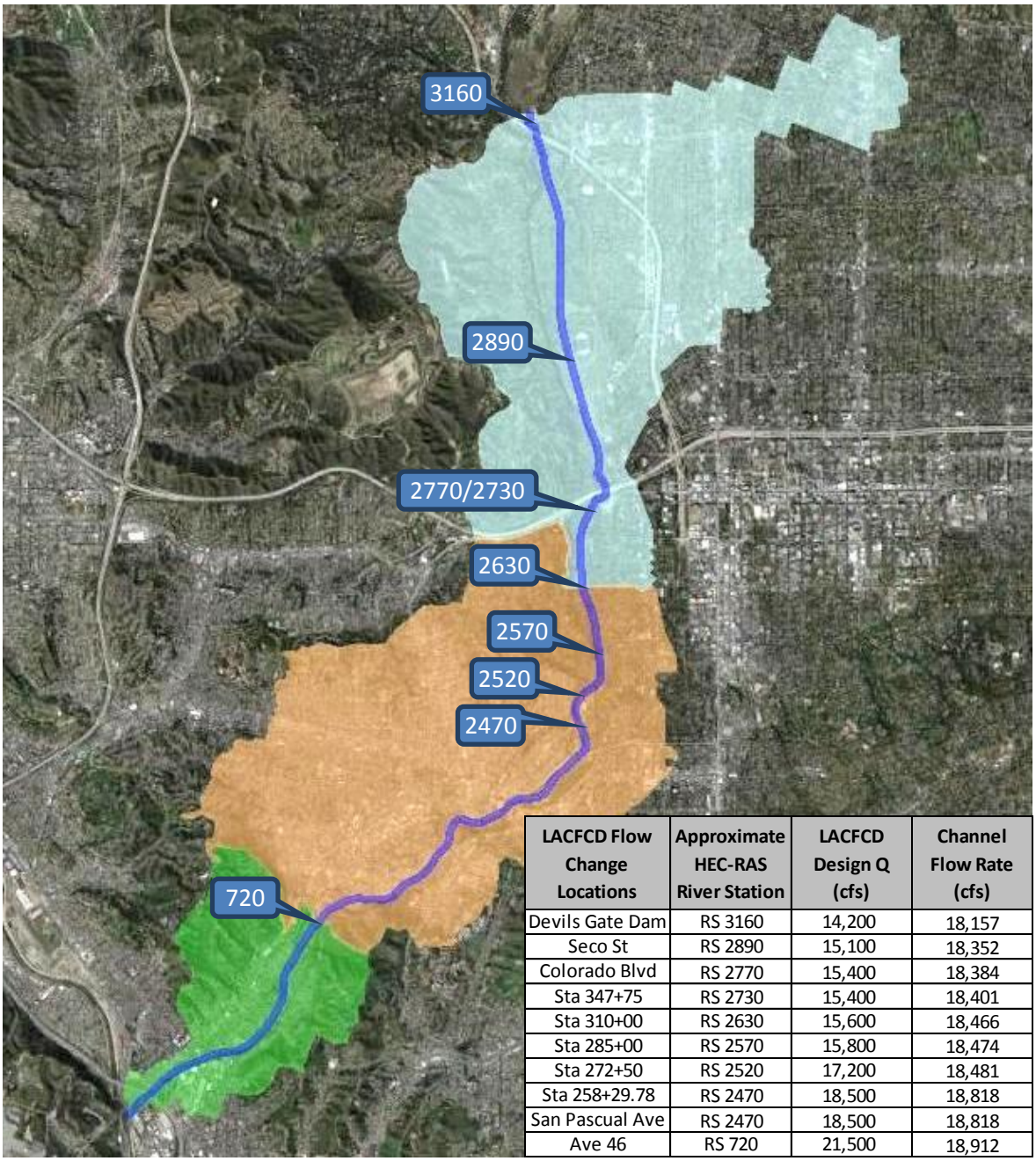
A sensitivity analysis was also performed for the Manning's "n" values in order to analyze the sensitivity of the generated water surface elevations to the Manning's "n" values used for the channel. This analysis was performed by modifying the determined channel "n" values plus or minus 5% from what was observed during the site investigation and performing a mixed steady flow analysis in HEC-RAS. For example, while a section of concrete lined channel was determined to have an "n" value of 0.015 during the site investigation, the sensitivity analysis ran a mixed steady flow analysis in HEC-RAS for "n" values of 0.01425, representing the n value minus 5%, and 0.01575, representing the "n" value plus 5%. The results generated in HEC-RAS indicate that modifying the "n" values plus or minus 5% did not have a significant effect on the water surface elevations generated within the hydraulic model.

An additional sensitivity analysis considering a ±15% deviation in Manning's "n" values had a more significant effect on the areas of concern, resulting in a several additional overtopping areas as well as expanded effects of the previously determined overtopping during the Capital Storm Event. Sections of the channel that appeared to be most sensitive to fluctuations in Manning's "n" values generally include the following: areas where channel overtopping was occurring even with smaller Manning's "n" values, constrictions in the channel such as those located at bridge crossings, and the northern portion of the channel between the Brookside Golf Course and San Pasqual Avenue.

The Manning's "n" values determined during the site investigation are documented in Appendix B. Additionally, photos from the site investigation are illustrated in Appendix C.

2.3.3 Channel Flow Rates

Flow rates within the Arroyo Seco Channel were previously determined and are described in the Hydrologic Analysis of Devils Gate Dam and Arroyo Seco Channel Tributaries report prepared by Bureau Veritas North America, Inc. dated November 11, 2011. Results from the Hydrologic Analysis have been tabulated at specific channel locations as specified by the LACFCD and are provided in the Figure 2-1 below.



LACFCD Flow Change Locations	Approximate HEC-RAS River Station	LACFCD Design Q (cfs)	Channel Flow Rate (cfs)
Devils Gate Dam	RS 3160	14,200	18,157
Seco St	RS 2890	15,100	18,352
Colorado Blvd	RS 2770	15,400	18,384
Sta 347+75	RS 2730	15,400	18,401
Sta 310+00	RS 2630	15,600	18,466
Sta 285+00	RS 2570	15,800	18,474
Sta 272+50	RS 2520	17,200	18,481
Sta 258+29.78	RS 2470	18,500	18,818
San Pascual Ave	RS 2470	18,500	18,818
Ave 46	RS 720	21,500	18,912

Figure 2-1: Arroyo Seco Channel Flow Rates

2.3.4 Channel Obstructions

During the site investigation, several areas of the Arroyo Seco Channel were found to have obstructions that could potentially affect the hydraulic characteristics of the channel. Observed obstructions include bridge decks extending across the top of the channel, bridge abutments encroaching into the top edges of the channel, bridge piers at the State Route 134 overpass, utilities mounted under low bridge structures and trees. Dimensions of these obstructions have been determined per visual and/or field measurement observations during the site investigation. These obstructions were added into the HEC-RAS model of the channel, and are included in Appendix D.

2.3.5 Boundary Conditions

For a mixed steady flow analysis, HEC-RAS requires that boundary conditions for the upstream and downstream portions of the Arroyo Seco Channel be identified. For the downstream boundary conditions, the LACFCD has indicated that the Los Angeles River tailwater elevation of 313.44' (NGVD29) should be used as the downstream control. For the upstream boundary condition, flow is assumed to be at critical depth approximately 500' upstream from the start of the engineered channel and allowed to normalize prior to the start of the engineered channel.

Sensitivity analysis of the downstream boundary condition was performed by examining the hydraulic characteristics produced when assuming a tailwater elevation 5' higher than what has been indicated by LACFCD (313.44' + 5.0' = 318.44'). This higher tailwater elevation resulted in increased water surface elevations for a small number of channel sections located near the outfall at the Los Angeles River between Sections 10-96. These higher water surface elevations do not extend very far upstream because the channel quickly resumes supercritical flow. Due to the adequate freeboard available at these downstream channel sections, no additional areas of concern were generated under this condition and it is not anticipated that the channel is very sensitive to changes in boundary conditions.

Sensitivity analysis for the upstream boundary condition was not performed as flows in this area are subcritical and regulated by downstream conditions instead of upstream boundary conditions.

2.3.6 Break Out and Overflow Areas/Overbank Information

Although flow rates generated by the Capital Storm were largely contained by the Arroyo Seco channel, several areas of channel overtopping were identified. For these overtopping areas, additional channel overbank information such as overbank elevations and additional "n" values were added to the HEC-RAS model per available LIDAR data, aerial imagery and field observations. An example of the overbank information added to the HEC-RAS model is depicted in Figures 2-2 and 2-3 on the next page.

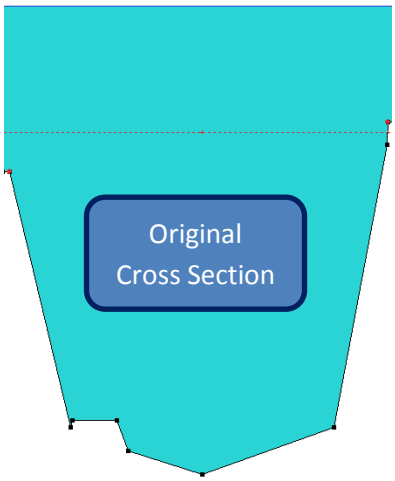


Figure 2-2: Example HEC-RAS Cross Section before Adding Overbank Information

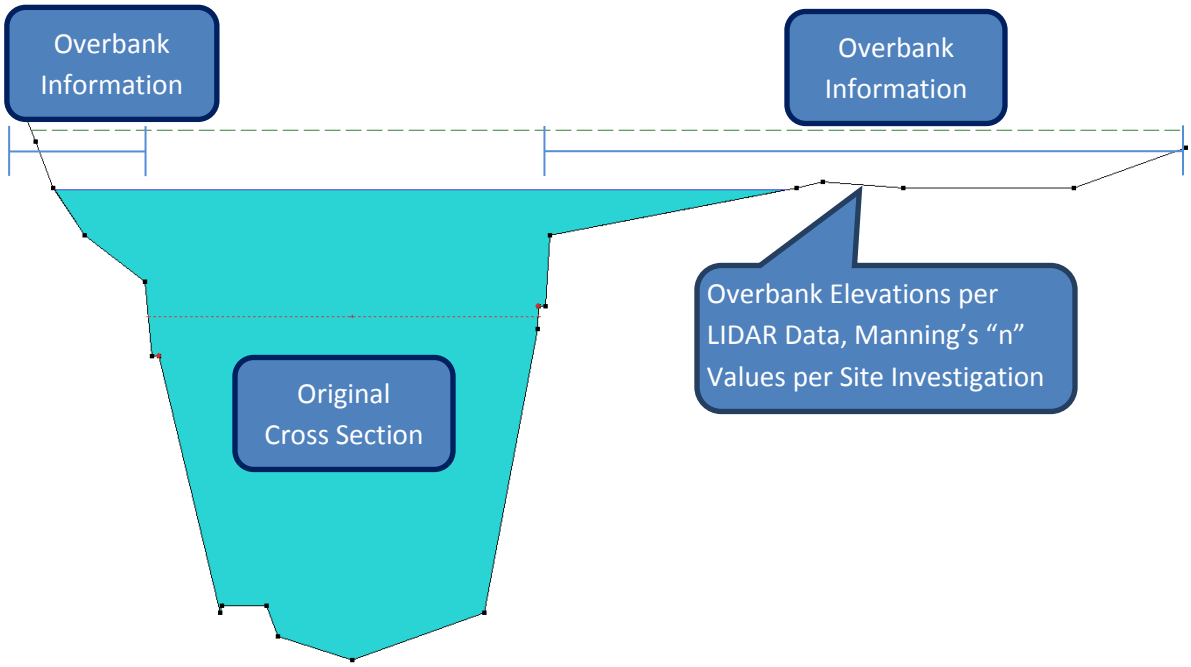


Figure 2-3: Example HEC-RAS Cross Section after Adding Overbank Information

Per VERTCON software and conversion maps provided on the National Geodetic Survey website, the datum related elevation differences between HEC-RAS (NGVD29) and LIDAR (NAVD88) elevations range from 2.572 to 2.625 feet for the Arroyo Seco Channel project area. In other words, a water surface elevation of 100' generated in HEC-RAS using the NGVD29 datum equates to a LIDAR overbank elevation of 102.6' using the NAVD88 datum. All LIDAR overbank elevations entered into the HEC-RAS model have been reduced by 2.6' in order to reflect the conversion from NAVD88 to NGVD29. Additionally, overtopping water surface elevations generated in HEC-RAS have been increased by 2.6' when mapped onto the available LIDAR contours in order to reflect the conversion from NGVD29 to NAVD88.

With updated overbank information now entered into the HEC-RAS model, another steady flow analysis was performed generating more accurate water surface profiles for the areas of the channel that are predicted to overtop during the capital storm.

Upon identification of overtopping areas, the HEC-RAS model was further revised to reflect ineffective flow areas in the overbank areas located outside of the channel. Although recent criteria for determining expansion and contraction ratios for bridges has been established, it was felt that these overtopping areas did not closely follow the flow characteristics of ineffective flow around bridges. Therefore the older Corps of Engineers criterion from the 1998 HEC-RAS User's Manual utilizing a 4:1 ratio of expansion and a 1:1 ratio for contraction was utilized for this model.

2.4 Flood Mapping

A mixed steady flow analysis was executed in the updated HEC-RAS model in order to identify the water surface elevations generated within the Arroyo Seco Channel during the Capital Storm Event. In addition, anticipated water surface elevations produced by the effects of superelevation occurring at curved channel alignments have also been determined per criteria set forth in Section C-3 of the LACFCD Hydraulic Design Manual. The areas of flood inundation were then mapped in ARC-GIS by overlaying the anticipated water surface elevations generated at each channel cross section with available LIDAR elevation data and identifying where the anticipated water surface elevations matched the topography of the overbanks. In cases where the anticipated water surface was calculated at 2.5' or higher above the top of the existing channel walls, additional hydraulic analysis was performed in an effort to accurately depict anticipated flood limits for overtopping associated with the Capital Storm Event. This overtopping height of 2.5' was chosen as additional hydraulic analysis for smaller overtopping heights would become increasingly less accurate and smaller overtopping heights do not generally pose as significant of flooding impacts. These additional hydraulic analyses are included in Appendix H – Additional Hydraulic Analyses for Areas of Significant Overtopping.

Figures of the anticipated flood extents are provided in Sections 3.2 through 3.14. Additional discussion regarding the effects of superelevation and general freeboard characteristics are included in Section 2.5.

2.5 Freeboard and Superelevation

Analysis of the channel's freeboard and superelevation characteristics has been performed in order to identify portions of the channel that do not meet guidelines set forth in the LACFCD Hydraulic Design Manual. It should be noted that this report does not consider violation of minimum freeboard requirements as justification for flood inundation. This report does, however, consider channel overtopping due to the effects of superelevation as justification for flooding.

Minimum freeboard requirements for each channel section have been determined per criteria outlined in Section C-4 of the LACFCD Hydraulic Design Manual. In general, the criteria specifies that depending on channel characteristics such as geometry, flow velocity, and superelevation height, minimum required freeboard heights range from 1.0' to 3.5' for areas not experiencing superelevation and even

higher for areas that are experiencing superelevation. To determine the freeboard requirements for the Arroyo Seco Channel, the channel geometry, the flow velocity, and if necessary, the superelevated water surface for each channel cross section were determined and the appropriate freeboard requirements were applied. These freeboard calculations are included in the Freeboard and Superelevation Calculations included in Appendix E.

Through comparison of the required/provided freeboard values, it was determined that a major portion of the Arroyo Seco Channel, approximately 57% of the channel length, does not meet minimum freeboard requirements. This may be due to the fact that much of the channel was designed and constructed in 1935, prior to the existence of the current LACFCD Hydrology and Hydraulic Design Manuals, and prior to the development of large areas within the channel's contributing areas which have increased flow rates. The majority of available As-Builts indicate flows ranging from 11,100 cfs to 15,400 cfs within the channel, which are considerably lower than the flows anticipated in this report which range from 18,157 cfs to 18,912 cfs.

The effects of superelevation have been tabulated by utilizing the equations and conditions described in Section C-3 of the LACFCD Hydraulic Design Manual. Research of available As-Builts and aerial imagery was used to determine curve locations, curve radii, curve lengths, direction of curves, and channel geometry within the curves, and the revised HEC-RAS model was used to identify stormwater flow velocities and depths. The effects of superelevation at the channel curves raised water surface elevations anywhere from 0.7' to 11.6' which caused channel overtopping in 19 of the 36 curves identified.

Review of the available As-Builts revealed that many areas of channel curvature contained both rectangular and trapezoidal channel geometries even within a single curve. Superelevation values for these types of curves have been calculated by using equations associated with trapezoidal geometries as they provide more conservative results. Additionally, the review of As-Builts did not reveal the presence of any easement curves within the channel. Therefore, a total of three superelevation equations were utilized for the channel with no easement curves including: supercritical-rectangular channels, supercritical-trapezoidal channels, and subcritical-trapezoidal channels.

Superelevation calculations for the Arroyo Seco Channel have been performed per criteria set forth in Section C-3 of the LACFCD Hydraulic Design Manual. The criteria is intended for use in the design of a channel that fully contains stormwater flows and may not accurately depict the superelevation characteristics of a channel that is experiencing overtopping such as the Arroyo Seco Channel. In an effort to apply good engineering judgment to these results which may not accurately reflect actual field conditions, several assumptions were applied to the criteria set forth in Section C-3 of the LACFCD Hydraulic Design Manual to determine the anticipated limits of flooding brought on by superelevation channel overtopping. It is felt, however, that more accurate results for superelevation flooding may be yielded by performing a separate two dimensional analysis of the Arroyo Seco Channel. Performing a two dimensional analysis is not in the scope of this report, so the results presented herein are based on a one dimensional analysis using current LACFCD hydraulic design criteria with several assumptions as described below.

Per guidelines set forth in the LACFCD Hydraulic Design Manual, the effects of superelevation within a curved alignment extend beyond the beginning and end of the channel curves. More specifically, the effects of superelevation extend upstream from the beginning of the curve for a distance equal to two times the curve length, and extend downstream from the end point of the curve for a distance equal to five times the curve length. Given that the channel provides relatively long curves ranging in length from approximately 120' to 1,565', the effects of superelevation can extend quite far from either end of the curve. For many portions the Arroyo Seco Channel, curves are located close enough to one another such that the effects of superelevation between curves overlap. For example, a straight section of channel between curves in two different directions may experience superelevation along the left and right banks simultaneously due to upstream and downstream superelevation effects. Under this condition, the assumption has been made that superelevation will continue along the left and right banks as long as the channel is not curving. As soon as the channel begins to curve, all superelevation effects calculated along the inside edge of the curve are omitted, and only superelevation effects occurring on the outside edge of the curve will be considered.

An assumption has also been made that if superelevation overtopping occurs within the curved section of the channel, the effects of this superelevation will not be extended upstream or downstream of the curved section as all of the overtopping flow will be lost at the curve itself and superelevation effects will not propagate upstream or downstream from the curved channel section. If superelevation overtopping does not occur within the curved section of the channel, superelevation effects will be extended upstream and downstream from the curve in order to identify potential superelevation overtopping locations.

Also, where overtopping occurs such that the anticipated water surface elevation is 2.5' or more above the top of the channel, additional hydraulic analysis will be performed for the overtopping area in order to analyze how the overtopping flow disperses through the overbank areas. It is felt that this additional analysis will produce more realistic flood delineations in overtopping areas that are characterized with low lying overbank areas and significant overtopping. Additional descriptions and calculations associated with these analyses are located in Appendix H – Additional Hydraulic Analyses for Areas of Significant Overtopping.

3 Conclusions

3.1 Findings

Results from this hydraulic analysis illustrate that the vast majority of the Arroyo Seco Channel effectively contains stormwater flows generated by the Capital Storm Event; however, several areas of concern, including channel overtopping areas, areas that violate minimum freeboard requirements, and an unstable overbank slope have been identified as areas of concern by this analysis.

Areas of channel overtopping identified by the mixed steady flow analysis performed in HEC-RAS have been identified along the Arroyo Seco Channel. These channel overtopping areas are primarily due to transitions and/or constrictions in the channel geometry that result in hydraulic jumps that overtop the channel.

Areas of channel overtopping due to the effects of superelevation have also been identified along the length of the Arroyo Seco Channel. Calculations revealed that 19 out of the 36 of the channel curves identified experienced overtopping due to the effects of superelevation.

Approximately 57% of the Arroyo Seco Channel length was found to not meet the minimum freeboard requirements set forth in Section C-4 of the LACFCD Hydraulic Design Manual. It should be noted that this report does not consider violation of minimum freeboard requirements as justification for flood inundation.

Finally, evidence of an unstable slope area that may pose a significant threat to the channel conveyance was observed adjacent to the channel in the vicinity of Section 2510.

The areas of concern briefly identified above are discussed and illustrated in more detail in the Sections that follow. Water surface extents are depicted as the dark blue shading in and around the concrete channel, plan view perspectives of the HEC-RAS cross sections are depicted as black lines, and 2’ LIDAR contours of the overbank areas are depicted as purple lines.

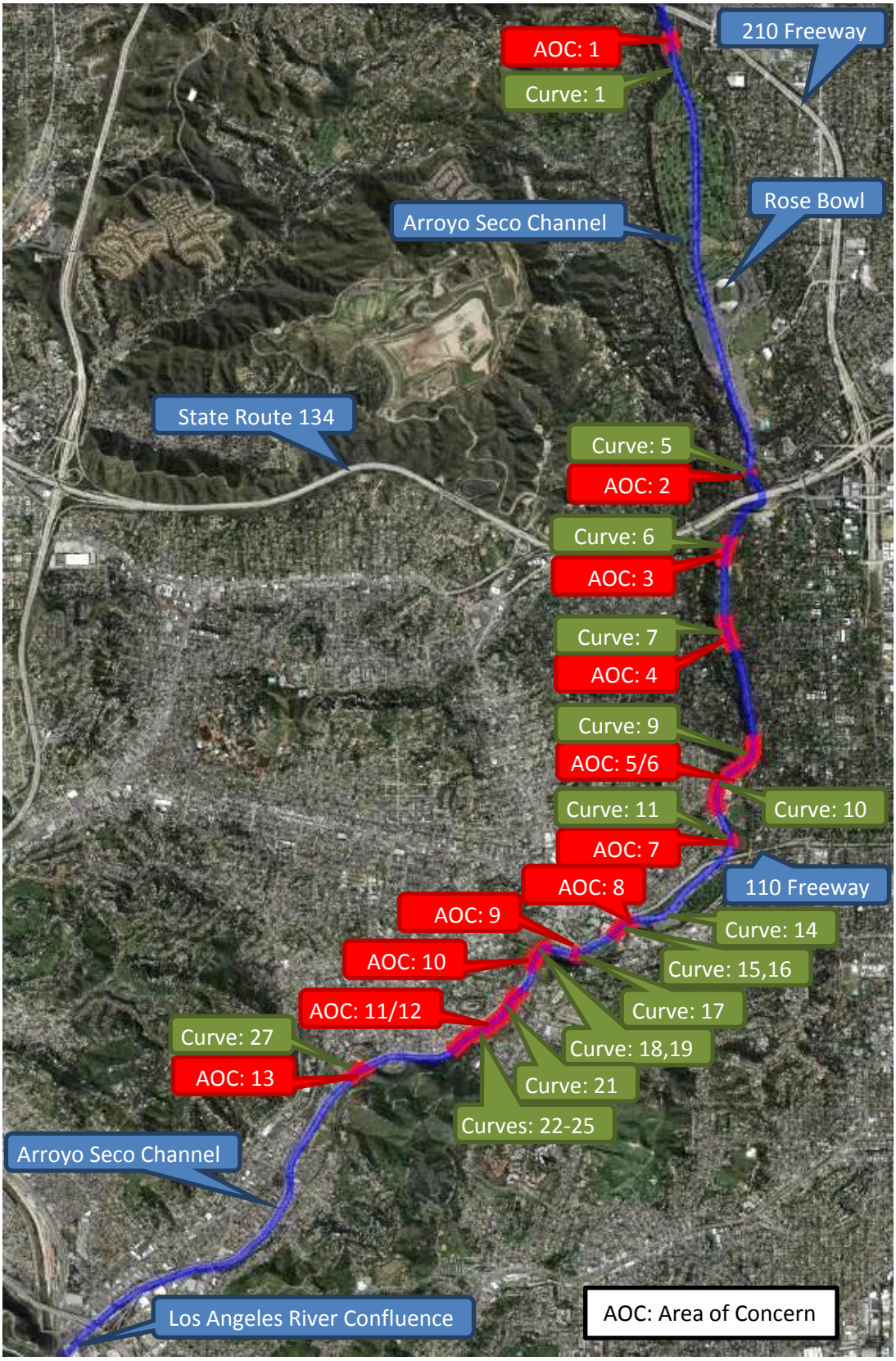


Figure 3-1: Vicinity Map for Identified Areas of Concern

This page is intentionally left blank to facilitate 2-sided printing.

3.2 Area of Concern 1: Sections 3100-3078

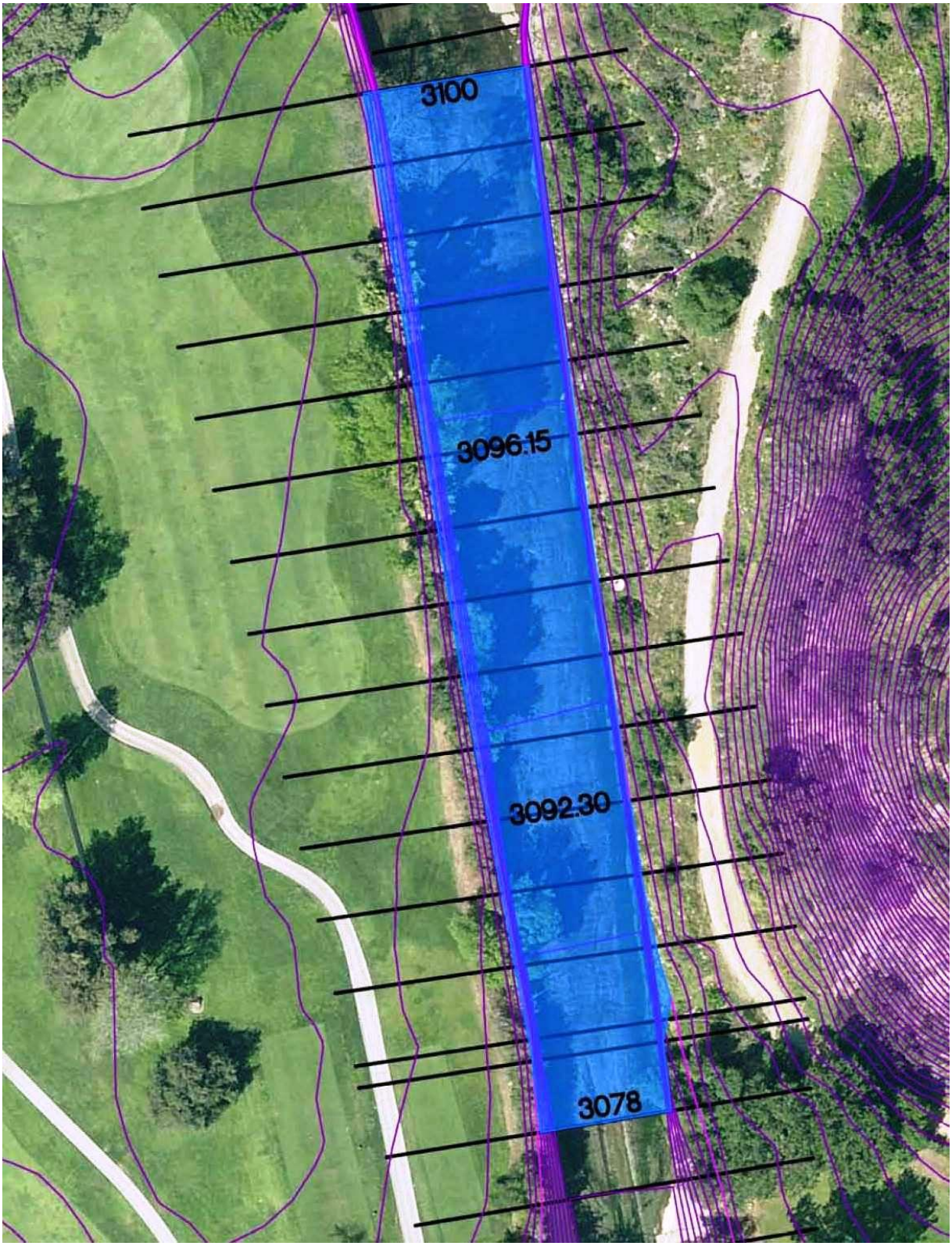


Figure 3-2: Area of Concern 1

Area of Concern 1 is located at the northern end of the Brookside Golf Course, immediately upstream of the northernmost pedestrian bridge that crosses over the Arroyo Seco Channel. Water surface elevations generated by the hydraulic analysis indicate that, prior to the effects of superelevation, stormwater flows from the Capital Storm Event overtop the channel between sections 3091.53–3080 with a maximum water surface elevation approximately 0.3’ above the top of the channel. The channel is overtopped in this location due to a reduction in the rectangular channel geometry from a width of 60’ to a width of 50’ prior to transitioning to a trapezoidal channel. As illustrated in the figure on the previous page, this overtopping is further exacerbated by anticipated superelevation effects from downstream Curve #1. Channel overtopping due to the effects of superelevation from Curve #1 is anticipated along the right bank of the channel between Sections 3100-3078 producing an anticipated maximum water surface elevation approximately 1.4’ above the top of the right channel bank.

The topography of the overbank areas in this location aids in containing the flow to extents that very closely follow the channel alignment with a maximum lateral deviation of approximately 6’ outside of the channel. While negative effects including excessive overbank erosion and subsequent damage to the channel may occur in this area during a Capital Storm Event, no significant flooding impacts are anticipated from this area of overtopping in its current condition.

3.3 Area of Concern 2: Sections 2820.90-2820

Figure 3-3: Area of Concern 2

Area of Concern 2 is located adjacent to North Arroyo Boulevard immediately south of West Holly Street. Minor channel overtopping due to the effects of superelevation from upstream Curve #5 is anticipated along the left bank of the channel between Sections 2820.90-2820 as illustrated in the figure on the previous page. The maximum water surface elevation anticipated in this area is approximately 0.1' above the top of the left channel bank.

The topography of the overbank areas in this location aids in containing the flow to extents that very closely follow the channel alignment and lateral spreading effects are negligible. While negative effects including excessive overbank erosion and subsequent damage to the channel may occur in this area during a Capital Storm Event, no significant flooding impacts are anticipated from this area of overtopping in its current condition.

3.4 Area of Concern 3: Sections 2697.64-2675.88

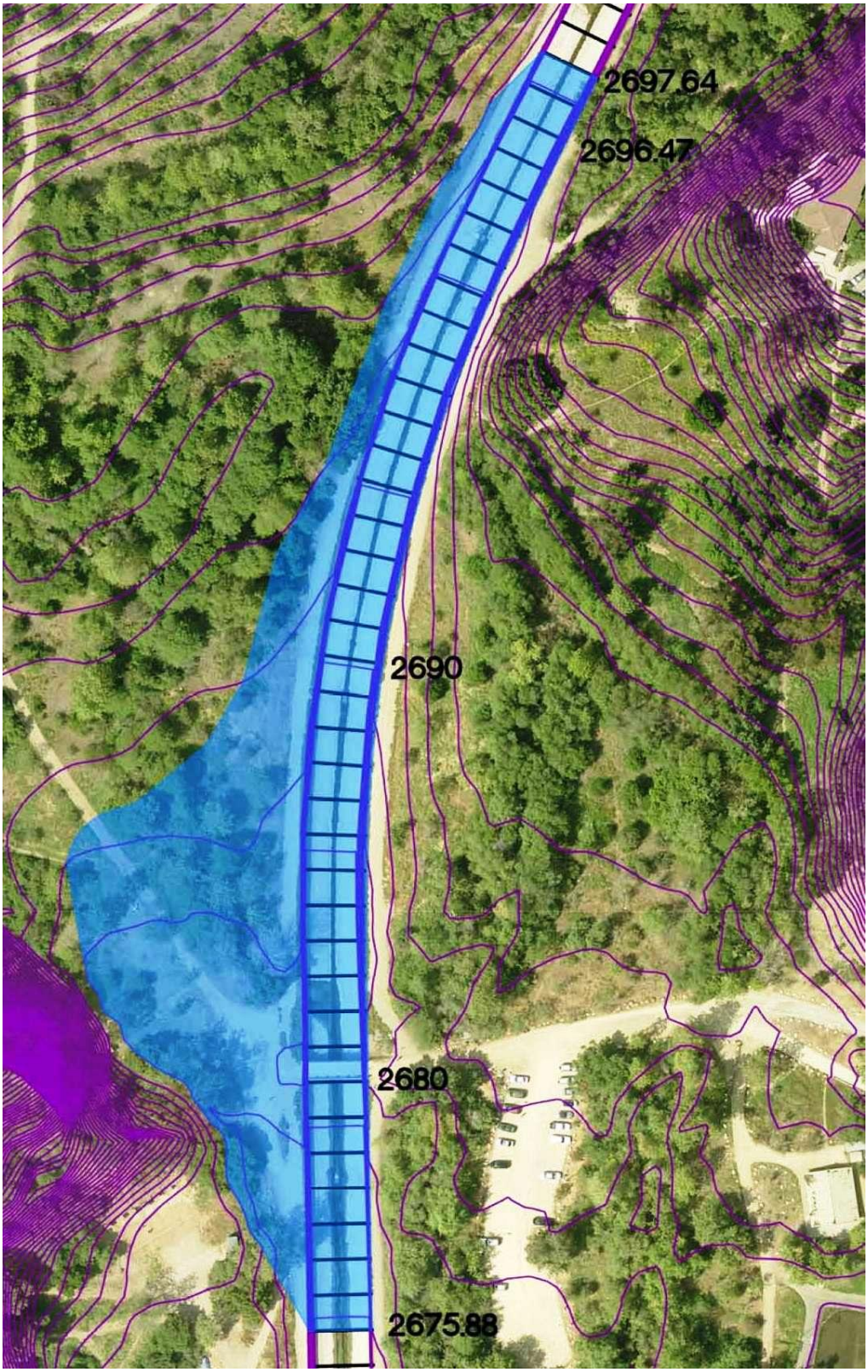


Figure 3-4: Area of Concern 3

Area of Concern 3 is located south of the State Route 134 in the vicinity of Arbor Street. Channel overtopping due to the effects of superelevation from Curve #6 is anticipated along the right bank of the channel between Sections 2697.64-2675.88. As illustrated in the figure on the previous page, the maximum water surface elevation anticipated in this area is approximately 0.9’ above the top of the right channel bank.

The topography of the overbank area in this location is fairly broad and low-lying with steep banks along the far edge of each overbank. Overtopping flow is anticipated to spread approximately 200’ into the right overbank area before being contained by the natural topography. While negative effects including excessive overbank erosion and subsequent damage to the channel may occur in this area during a Capital Storm Event, no significant flooding impacts are anticipated from this area of overtopping in its current condition.

3.5 Area of Concern 4: Sections 2651.76-2628.57

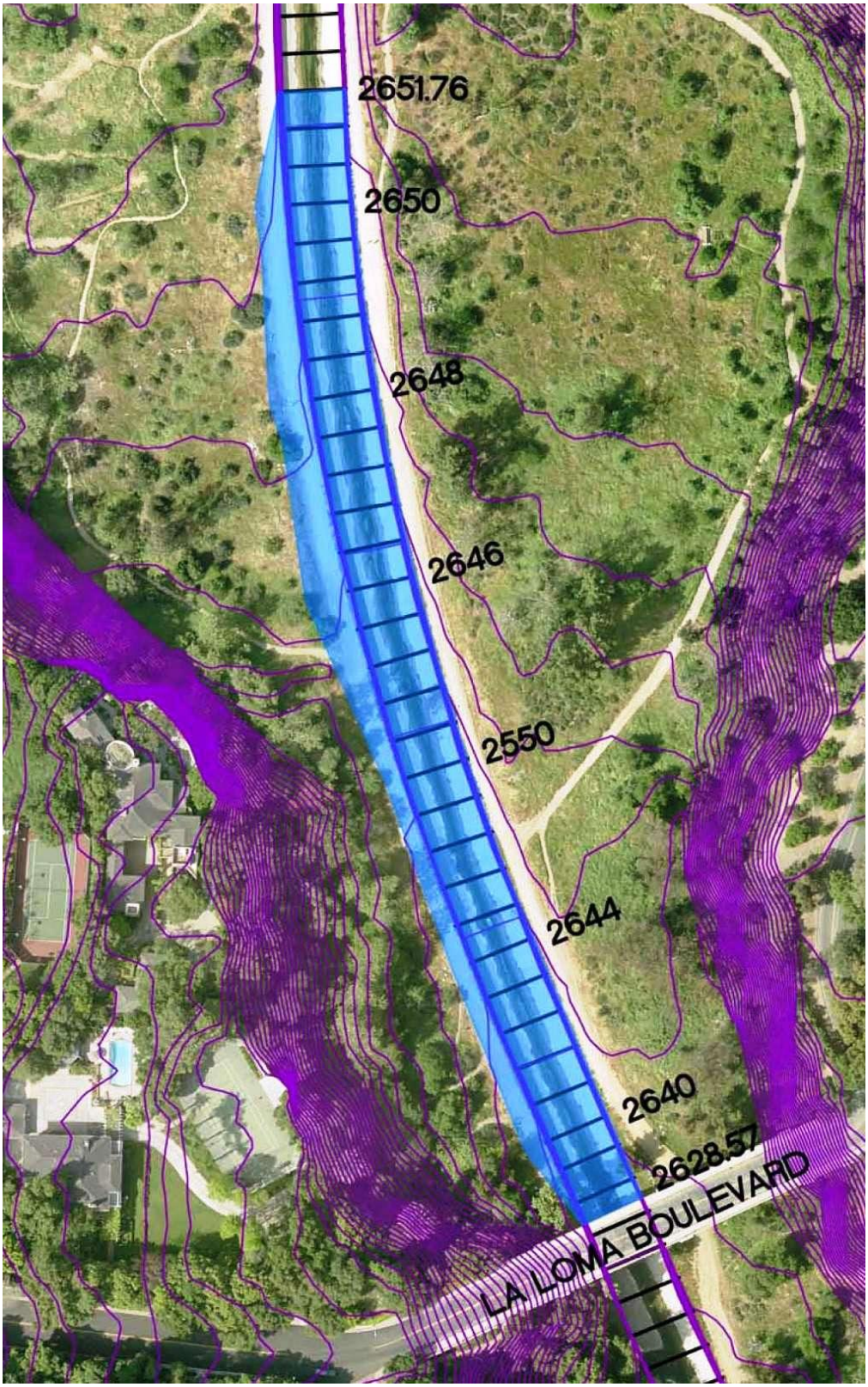


Figure 3-5: Area of Concern 4

Area of Concern 4 is located immediately north of La Loma Boulevard. Channel overtopping due to the effects of superelevation from Curve #7 is anticipated along the right bank of the channel between Sections 2651.76-2628.57. As illustrated in the figure on the previous page, the maximum water surface elevation anticipated in this area is approximately 0.1’ above the top of the right channel bank.

The topography of the overbank area in this location is fairly broad and low-lying with steep banks along the far edge of each overbank. Overtopping flow is anticipated to spread approximately 40’ into the right overbank area before being contained by the natural topography. While negative effects including excessive overbank erosion and subsequent damage to the channel may occur in this area during a Capital Storm Event, no significant flooding impacts are anticipated from this area of overtopping in its current condition.

3.6 Area of Concern 5: Sections 2573.52-2540

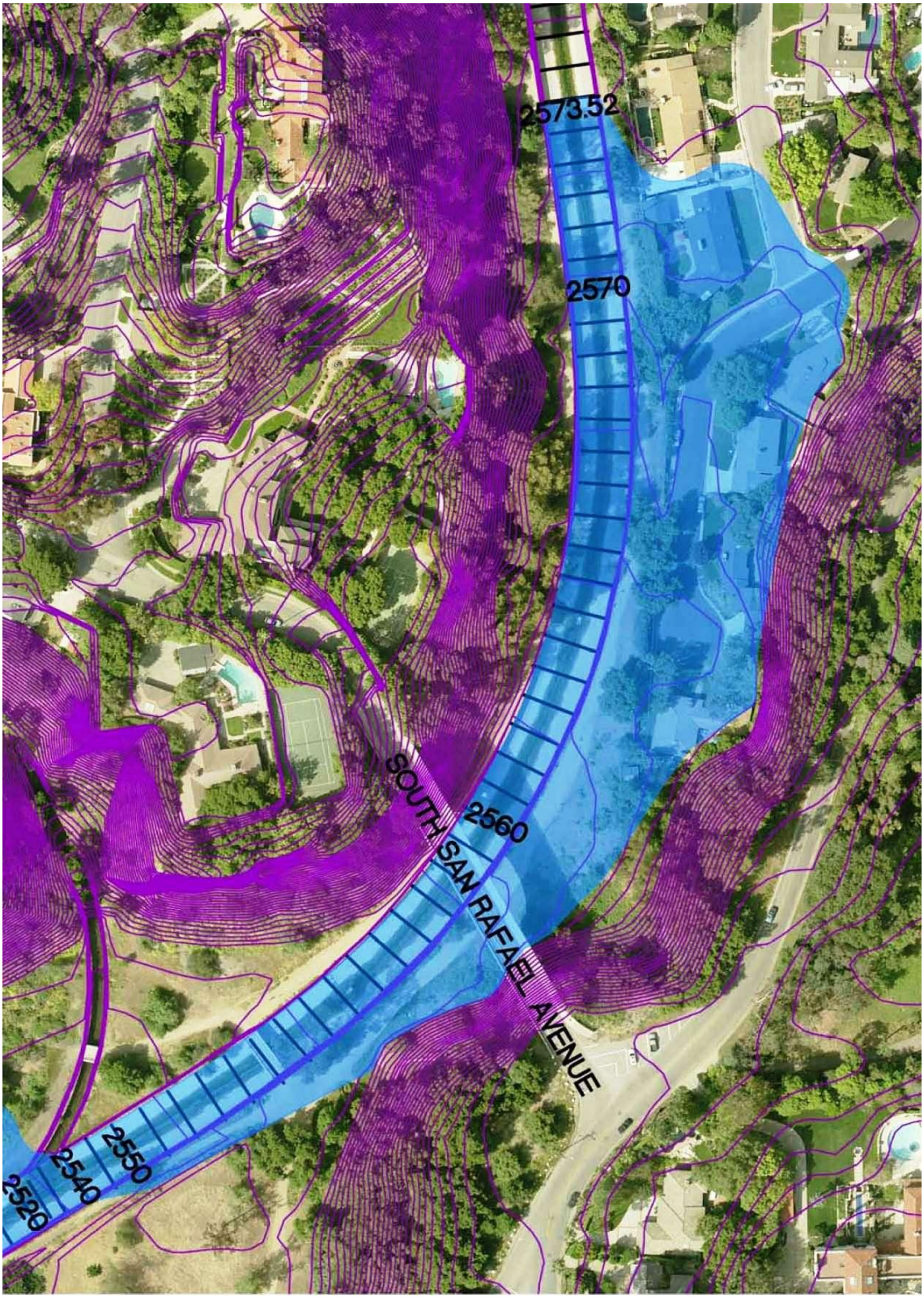


Figure 3-6: Area of Concern 5

Area of Concern 5 is located in the vicinity of South San Rafael Avenue. Channel overtopping due to the effects of superelevation from Curve #9 is anticipated along the left bank of the channel between Sections 2573.52-2540. As illustrated in the figure on the previous page, the maximum water surface elevation anticipated in this area is 2.3' above the top of the left channel bank. This area of channel overtopping has the potential to impact several residential structures and streets adjacent to the channel. Measures to mitigate potential negative flooding effects for these areas is further discussed in a separate Flood Hazard Warning and Contingency Plan report.

The topography of the overbank area in this location begins as fairly broad and low-lying with steep banks along the far edge of each overbank but narrows considerably as the curve progresses downstream. Overtopping flow is anticipated to spread approximately 200' into the left overbank area before being contained by the topography of the adjacent residential area. Negative impacts including flooding of adjacent residential streets and structures, as well as excessive overbank erosion and subsequent damage to the channel may occur in this area during a Capital Storm Event. Measures to mitigate potential negative flooding effects for these areas is further discussed in a separate Flood Hazard Warning and Contingency Plan report.

3.7 Area of Concern 6: Sections 2540-2472.5

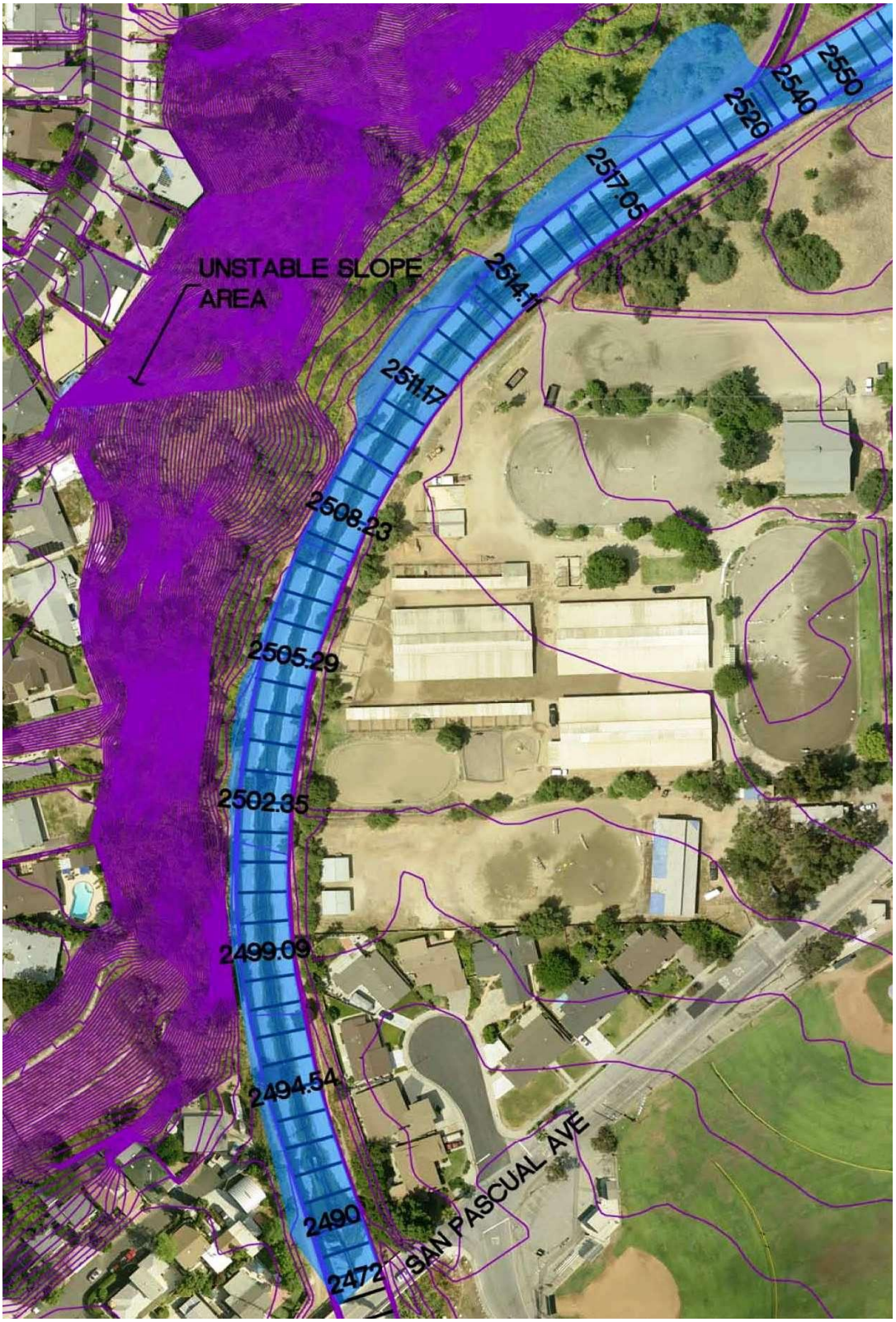


Figure 3-7: Area of Concern 6

Area of Concern 6 is located immediately north of San Pascual Avenue. Channel overtopping due to the effects of superelevation from Curve #10 is anticipated along the right bank of the channel between Sections 2540-2472.5. As illustrated in the figure on the previous page, the maximum water surface elevation anticipated in this area is 1.1' above the top of the right channel bank.

The topography of the overbank area consists of a steep slope along the right overbank and a relatively broad, low-lying area along the left overbank. Overtopping flow is anticipated to spread approximately 100' into the right overbank area before being contained by the natural topography. While negative effects including excessive overbank erosion and subsequent damage to the channel may occur in this area during a Capital Storm Event, no significant flooding impacts are anticipated from this area of overtopping in its current condition.

Additionally, an unstable slope area has been identified adjacent to the channel in the right overbank area. The top of the slope appears to be moderately eroded and is outfitted with a protective tarp that has been laid out over the area in an effort to prevent future erosion. Evidence that a mudslide entered the channel was observed in that debris and sediment is piled up adjacent to the chain link fence running along the edge of the western channel bank. It should be noted that if additional erosion and/or mudslide activity occurs in this location, it may significantly alter hydraulic characteristics of the channel and may potentially pose threat to additional adjacent areas.

3.8 Area of Concern 7: Sections 2392-2378.75

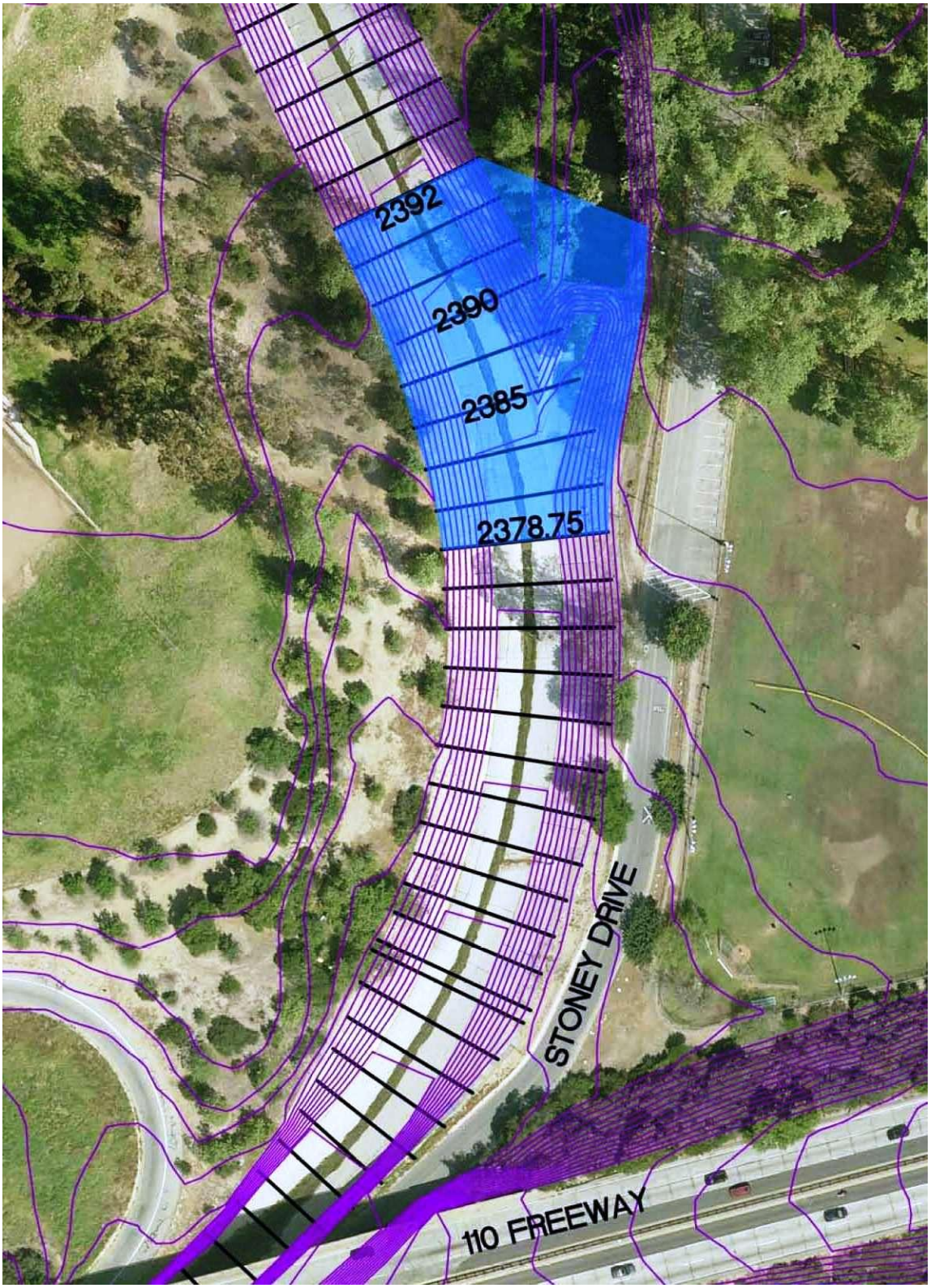


Figure 3-8: Area of Concern 7

Area of Concern 7 is located immediately north of the 110 Freeway adjacent to Stoney Drive. Channel overtopping due to the effects of superelevation from Curve #11 is anticipated along the left bank of the channel between Sections 2392-2378.75. As illustrated in the figure on the previous page, the maximum water surface elevation anticipated in this area is 1.2’ above the top of the left channel bank.

The topography of the overbank area in this location is fairly broad and low-lying primarily consisting of park open-space. Overtopping flow is anticipated to spread approximately 100’ into the left overbank area before being contained by the natural topography. While negative effects including excessive overbank erosion and subsequent damage to the channel may occur in this area during a Capital Storm Event, no significant flooding impacts are anticipated from this area of overtopping in its current condition.

3.9 Area of Concern 8: Sections 2150-1868.66

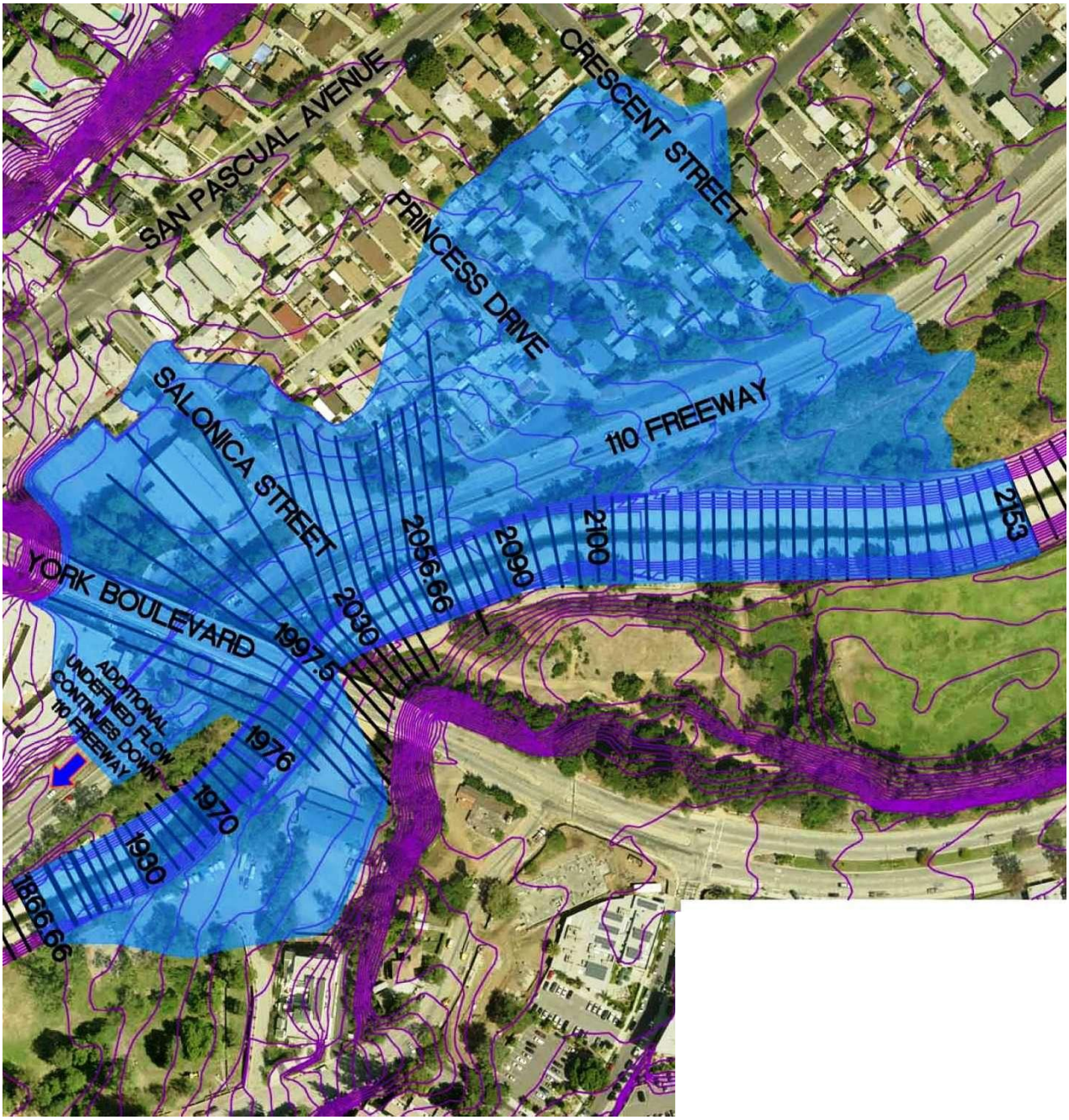


Figure 3-9: Area of Concern 8

Area of Concern 8 is located adjacent to the 110 Freeway in the immediate vicinity of the York Boulevard Bridge. Water surface elevations generated by the hydraulic analysis indicate that, prior to the effects of superelevation, stormwater flows from the Capital Storm Event overtop the channel between sections 2030-1997.5 with a maximum water surface elevation approximately 1.0' above the top of the channel. The channel is overtopped in this location due to a reduction in flow velocity caused by a channel constriction experienced as the flow passes under the York Boulevard Bridge. As illustrated in the figure on the previous page, this overtopping is further exacerbated by anticipated superelevation effects from Curves #14, #15, and #16 producing elevated water surfaces along the left and right channel walls with a maximum height of 10.9' over the top of the right channel bank.

In an effort to more accurately depict flood limits associated with the initial calculated overtopping height of 10.9', additional hydraulic analysis was performed in this area. Further description and calculations of this additional analysis are included in Appendix H – Additional Hydraulic Analyses for Areas of Significant Overtopping. Results from this additional analysis indicate that stormwater flows will overtop the top of the right channel curve by 6.0' resulting in an overbank flow of 7,800 cfs and stormwater flows will overtop the left channel curve by 4.8' resulting in an overbank flow of 1,900 cfs.

The topography along the right overbank area consists of a relatively flat relief including the 110 Freeway and an adjacent residential area and does not contain the flow closely to the existing channel alignment. Available topography indicates that portions of the flow within the right overbank area may not be directed back to the channel at all and may instead continue to flow down the 110 Freeway. Several inhabitable structures as well as portions of the 110 Freeway are located within the anticipated flood limits and may be subject to flood inundation. While large slopes along the left overbank area quickly direct flow back into the channel, at least one inhabitable structure is located within the anticipated flood limits and may be subject to flood inundation. In addition, excessive overbank erosion and subsequent damage to the channel may occur in the left and right overbanks during a Capital Storm Event. Measures to mitigate potential negative flooding effects for these areas is further discussed in a separate Flood Hazard Warning and Contingency Plan report.

Such significant overtopping effects in this area are unexpected as the flow rates anticipated in this analysis are only 318 cfs greater than the LACFCD provided design flow rate of 18,500 cfs. Initially, it was thought that the overtopping in this location may be related to the recent addition of a raised concrete bike trail along this section of channel; however, the hydraulic effects that this bike trail produces were found to be negligible. Results from the Manning's "n" value sensitivity analysis indicate that overtopping due to the hydraulic jump may be eliminated by reducing the Manning's "n" value by 15%, so unexpected overtopping anticipated in this analysis may be related to variations in "n" value determinations made during the design of the channel versus during the time of this analysis. Unexpected overtopping related to the effects of superelevation also occurred. It may be possible that different superelevation criteria and/or assumptions regarding the criteria existed at the time this section of channel was designed versus the time at which this analysis was performed. As noted in Section 2.5 of this report, a number of assumptions were made to the superelevation criteria outlined in Section C-3 of the LACFCD hydraulic design manual in an effort to generate flood limits associated with superelevation channel overtopping.

3.10 Area of Concern 9: Sections 1816.66-1755

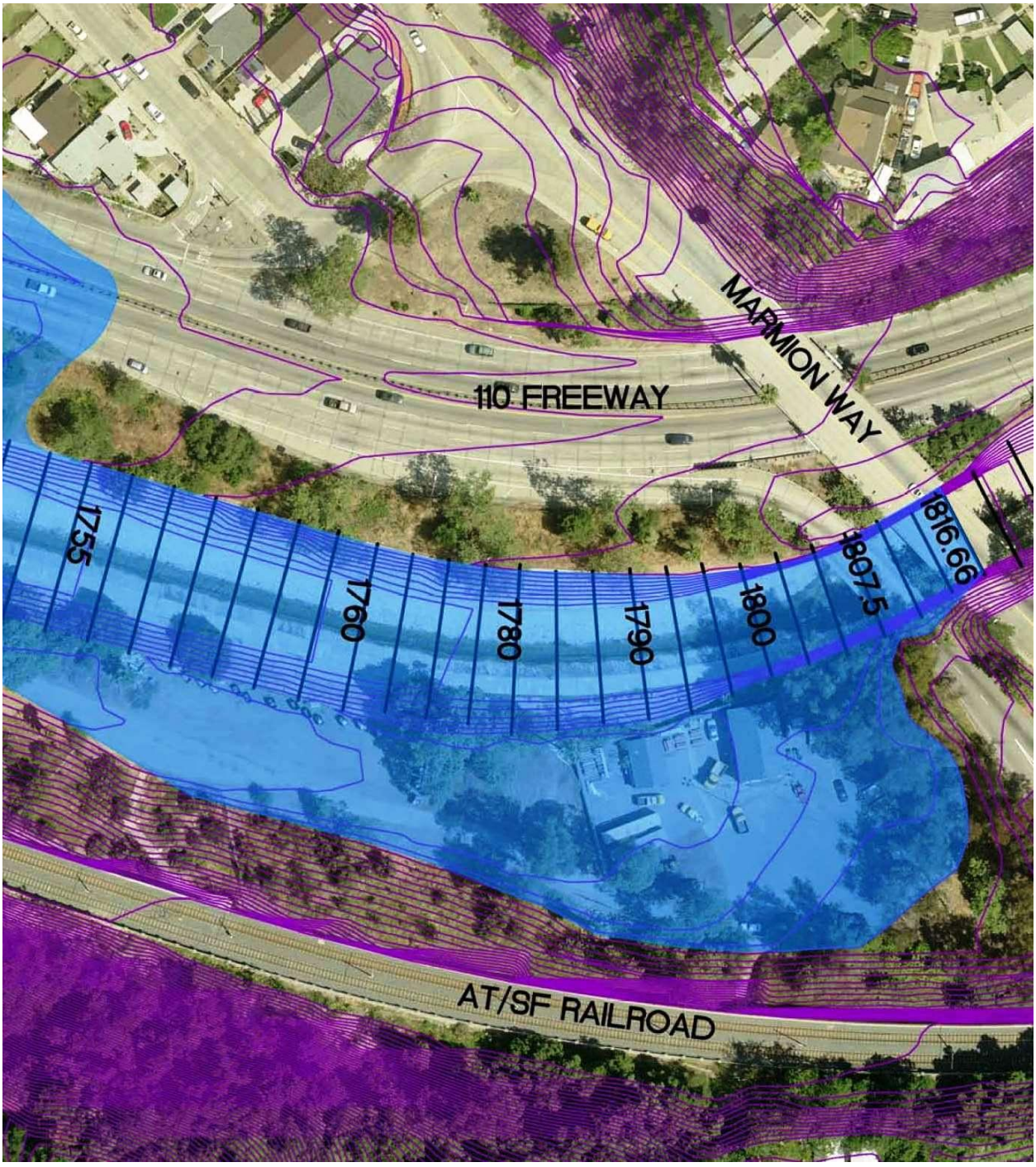


Figure 3-10: Area of Concern 9

Area of Concern 9 is located adjacent to the 110 Freeway in the immediate vicinity of the Marmion Way Bridge. Water surface elevations generated by the hydraulic analysis indicate that, prior to the effects of superelevation, stormwater flows from the Capital Storm Event overtop the channel at Section 1805 with a maximum water surface elevation approximately 0.5' above the top of the channel. The channel is overtopped in this location due to a restriction in the trapezoidal channel geometry as it transitions from a rectangular to a trapezoidal channel. As illustrated in the figure on the previous page, this overtopping is further exacerbated by anticipated superelevation effects from Curve #17. Channel overtopping due to the effects of superelevation from Curve #17 is anticipated along the left bank of the channel between Sections 1816.66-1755 producing an anticipated maximum water surface elevation approximately 6.0' above the top of the left channel bank.

In an effort to more accurately depict flood limits associated with the initial calculated overtopping height of 6.0', additional hydraulic analysis was performed in this area. Further description and calculations of this additional analysis are included in Appendix H – Additional Hydraulic Analyses for Areas of Significant Overtopping. Results from this additional analysis indicate that stormwater flows will overtop the top of the left channel curve by 4.8' resulting in an overbank flow of 1,000 cfs.

While large slopes along the left overbank area quickly direct flow back into the channel, at least one inhabitable structure is located within the anticipated flood limits and may be subject to flood inundation. In addition, excessive overbank erosion and subsequent damage to the channel may occur in this area during a Capital Storm Event. Measures to mitigate potential negative flooding effects for these areas is further discussed in a separate Flood Hazard Warning and Contingency Plan report.

Such significant overtopping effects in this area are unexpected as the flow rates anticipated in this analysis are only 318 cfs greater than the LACFCD provided design flow rate of 18,500 cfs. Initially, it was thought that the overtopping in this location may be related to the recent addition of a raised concrete bike trail along this section of channel; however, the hydraulic effects that this bike trail produces were found to be negligible. Results from the Manning's "n" value sensitivity analysis indicate that overtopping due to the hydraulic jump may be eliminated by reducing the Manning's "n" value by 15%, so unexpected overtopping anticipated in this analysis may be related to variations in "n" value determinations made during the design of the channel versus during the time of this analysis. Unexpected overtopping related to the effects of superelevation also occurred. It may be possible that different superelevation criteria and/or assumptions regarding the criteria existed at the time this section of channel was designed versus the time at which this analysis was performed. As noted in Section 2.5 of this report, a number of assumptions were made to the superelevation criteria outlined in Section C-3 of the LACFCD hydraulic design manual in an effort to generate flood limits associated with superelevation channel overtopping.

3.11 Area of Concern 10: Sections 1755-1600

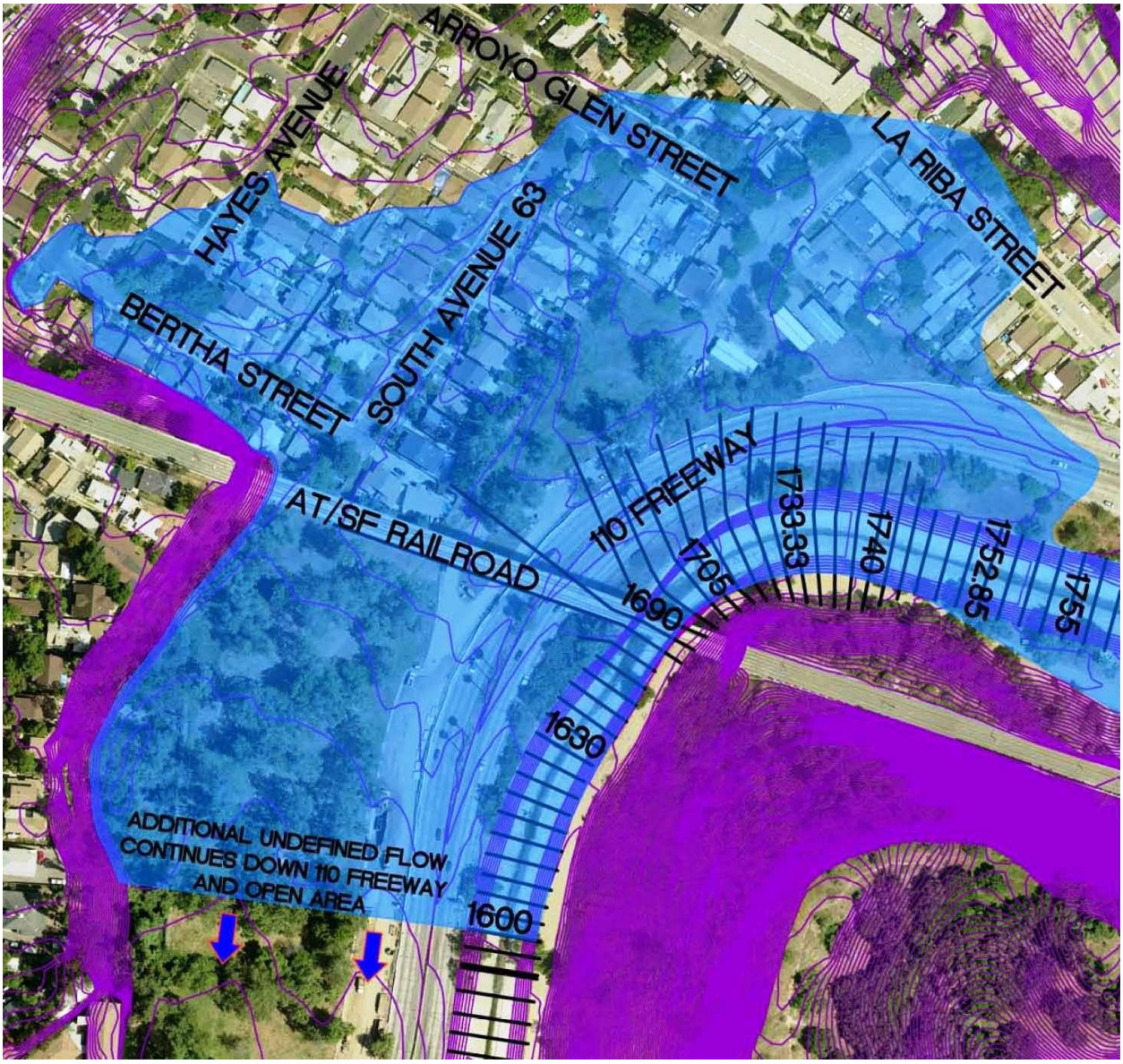


Figure 3-11: Area of Concern 10

Area of Concern 10 is located adjacent to the 110 Freeway in the immediate vicinity of the AT/SF Railroad Crossing. Water surface elevations generated by the hydraulic analysis indicate that, prior to the effects of superelevation, stormwater flows from the Capital Storm Event overtop the channel between sections 1733-1660 with a maximum water surface elevation approximately 7.2' above the top of the channel. The channel is overtopped in this location due to an 8' hydraulic jump caused by a constriction of the existing channel geometry as the flow passes under the AT/SF railroad crossing. As illustrated in the figure on the previous page, this overtopping is further exacerbated by anticipated superelevation effects from Curves #18 and #19. Channel overtopping due to the effects of superelevation from Curves #18 and #19 is anticipated along the right bank of the channel between Sections 1740-1600 producing an anticipated maximum water surface elevation approximately 16.7' above the top of the right channel bank.

In an effort to more accurately depict flood limits associated with the initial calculated overtopping height of 16.7', additional hydraulic analysis was performed in this area. Further description and calculations of this additional analysis are included in Appendix H – Additional Hydraulic Analyses for Areas of Significant Overtopping. Results from this additional analysis indicate that stormwater flows will overtop the top of the right channel curve by 4.1' resulting in an overbank flow of 7,050 cfs.

The topography along the right overbank area consists of a relatively flat relief including the 110 Freeway and an adjacent residential area and does not contain the flow closely to the existing channel alignment. Available topography indicates that portions of the flow within the right overbank area may not be directed back to the channel at all and may instead continue to flow down the 110 Freeway and the adjacent residential area. Several inhabitable structures as well as portions of the 110 Freeway are located within the anticipated flood limits and may be subject to flood inundation. In addition, excessive overbank erosion and subsequent damage to the channel may occur in the right overbank during a Capital Storm Event. Measures to mitigate potential negative flooding effects for these areas is further discussed in a separate Flood Hazard Warning and Contingency Plan report.

Such significant overtopping effects in this area are unexpected as the flow rates anticipated in this analysis are only 318 cfs greater than the LACFCD provided design flow rate of 18,500 cfs. Initially, it was thought that the overtopping in this location may be related to the recent addition of a raised concrete bike trail along this section of channel; however, the hydraulic effects that this bike trail produces were found to be negligible. Results from the Manning's "n" value sensitivity analysis indicate that overtopping due to the hydraulic jump may be eliminated by reducing the Manning's "n" value by 15%, so unexpected overtopping anticipated in this analysis may be related to variations in "n" value determinations made during the design of the channel versus during the time of this analysis. Unexpected overtopping related to the effects of superelevation also occurred. It may be possible that different superelevation criteria and/or assumptions regarding the criteria existed at the time this section of channel was designed versus the time at which this analysis was performed. As noted in Section 2.5 of this report, a number of assumptions were made to the superelevation criteria outlined in Section C-3 of the LACFCD hydraulic design manual in an effort to generate flood limits associated with superelevation channel overtopping.

3.12 Area of Concern 11: Sections 1530-1430

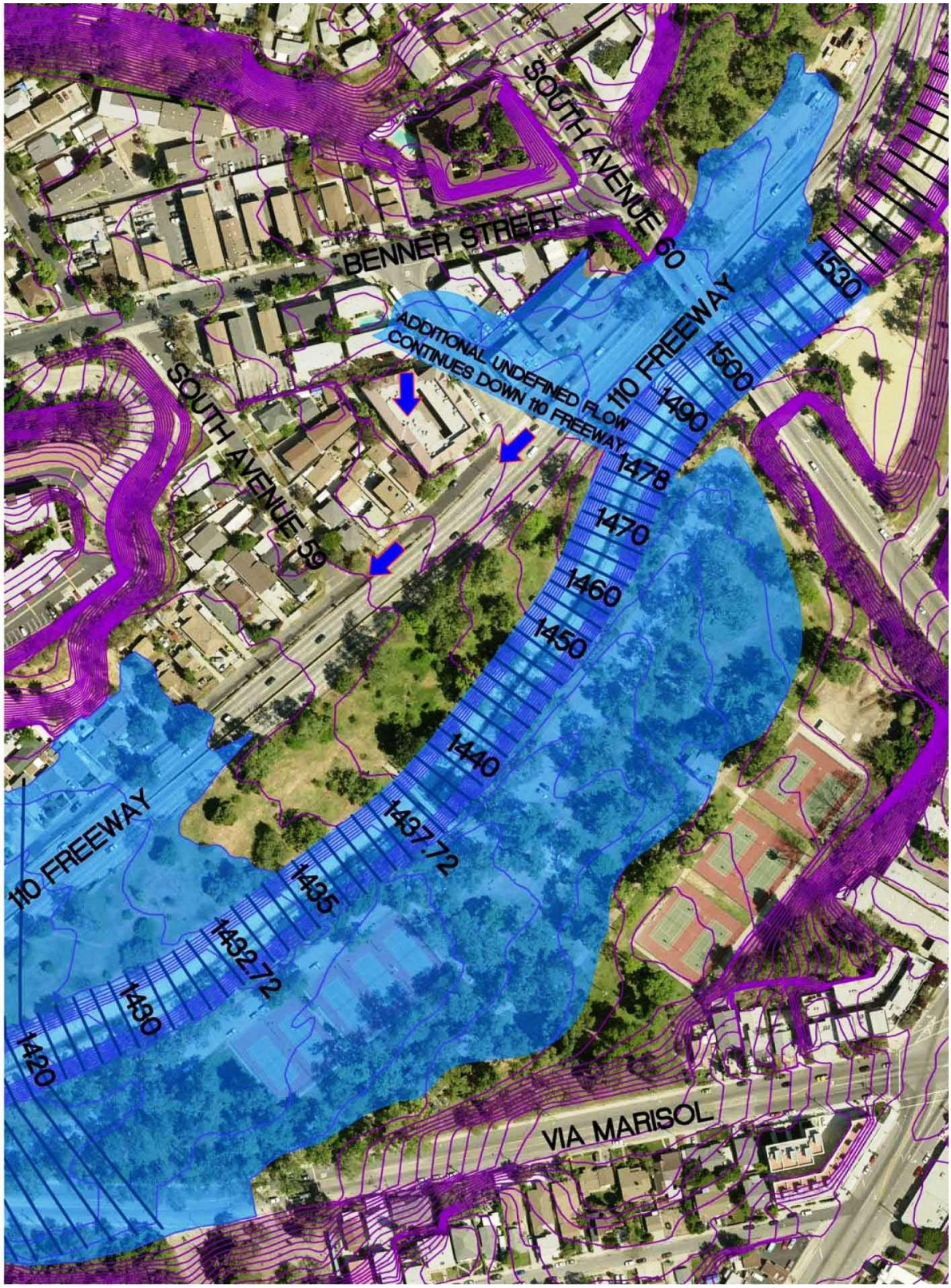


Figure 3-12: Area of Concern 11

Area of Concern 11 is located adjacent to the 110 Freeway and Via Marisol in the vicinity of South Avenue 60. Channel overtopping due to the effects of superelevation from Curve #21 is anticipated along the right bank of the channel between Sections 1500-1478. As illustrated in the figure on the previous page, the maximum water surface elevation anticipated in this area is 0.2' above the top of the right channel bank. Additionally, channel overtopping due to the effects of superelevation from Curves #22 and #23 is anticipated along the left bank of the channel between Sections 1478-1430. As illustrated in the figure on the previous page, the maximum water surface elevation anticipated in this area is 0.9' above the top of the left channel bank. Flood limits in the left overbank area are also affected by the downstream Area of Concern 12 as described in Section 3.13.

The topography along the right overbank consists of moderately sloped relief including the 110 Freeway and an adjacent residential area that contain the overtopping flow within the general vicinity of the engineered channel. Several inhabitable structures and portions of the 110 Freeway are located within the anticipated flood limits and may be subject to flood inundation. Additionally, available topography indicates that portions of the flow within the right overbank may not be direct back to the channel at all and may instead continue to flow through adjacent residential areas and the 110 Freeway. The topography along the left overbank consists of mildly sloped relief including a park area with one inhabitable structure and a parking lot. At least one structure and portions of park area and parking lot are located within the anticipated flood limits and may be subject to flood inundation. In addition, excessive overbank erosion and subsequent damage to the channel may occur in the left and right overbanks area during a Capital Storm Event. Measures to mitigate potential negative flooding effects for these areas is further discussed in a separate Flood Hazard Warning and Contingency Plan report.

Such significant overtopping effects in this area are unexpected as the flow rates anticipated in this analysis are only 318 cfs greater than the LACFCD provided design flow rate of 18,500 cfs. Initially, it was thought that the overtopping in this location may be related to the recent addition of a raised concrete bike trail along this section of channel; however, the hydraulic effects that this bike trail produces were found to be negligible. Results from the Manning's "n" value sensitivity analysis indicate that overtopping due to the hydraulic jump may be eliminated by reducing the Manning's "n" value by 15%, so unexpected overtopping anticipated in this analysis may be related to variations in "n" value determinations made during the design of the channel versus during the time of this analysis. Unexpected overtopping related to the effects of superelevation also occurred. It may be possible that different superelevation criteria and/or assumptions regarding the criteria existed at the time this section of channel was designed versus the time at which this analysis was performed. As noted in Section 2.5 of this report, a number of assumptions were made to the superelevation criteria outlined in Section C-3 of the LACFCD hydraulic design manual in an effort to generate flood limits associated with superelevation channel overtopping.

3.13 Area of Concern 12: Sections 1430-1205

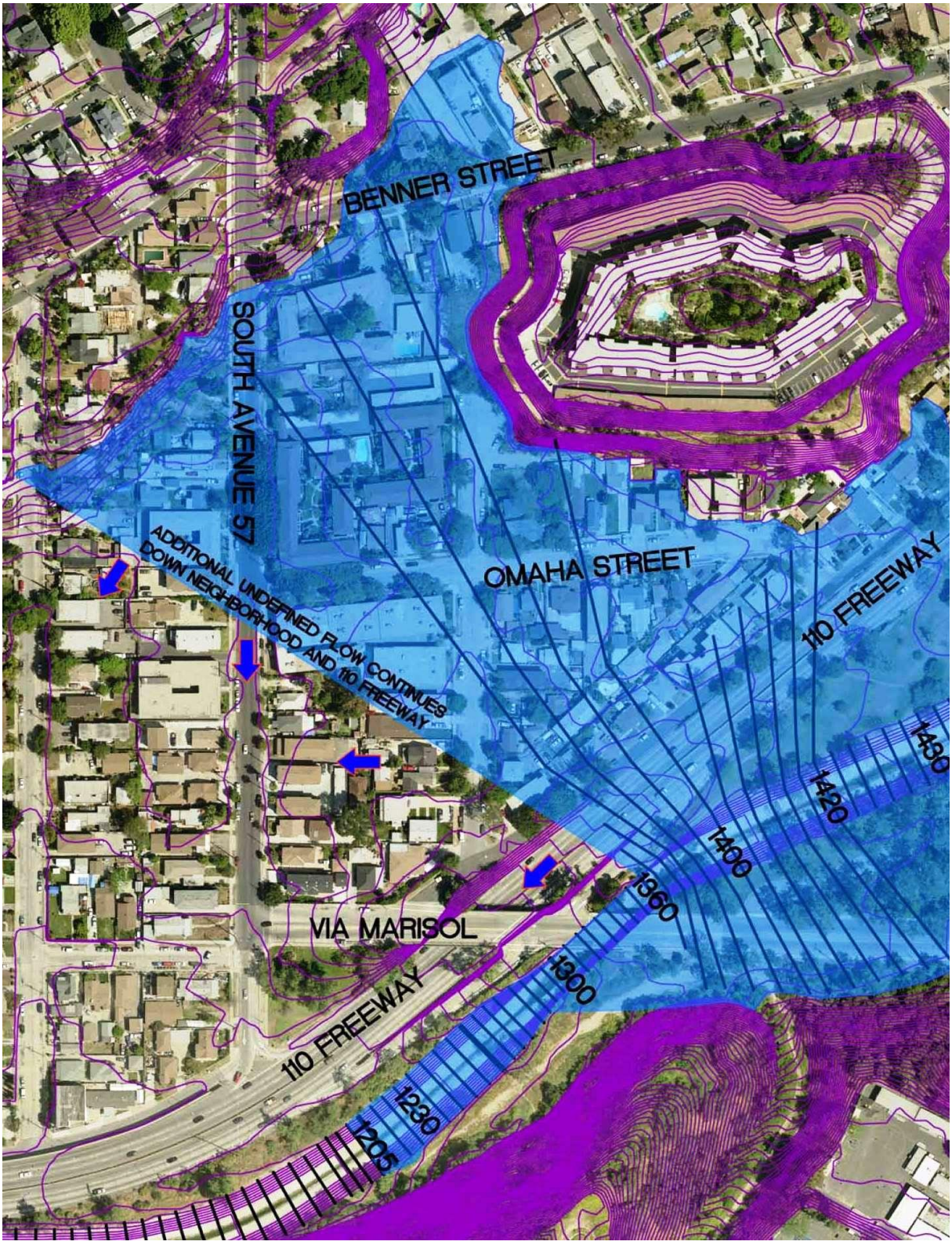


Figure 3-13: Area of Concern 12

Area of Concern 12 is located adjacent to the 110 Freeway in the vicinity of Via Marisol. Water surface elevations generated by the hydraulic analysis indicate that, prior to the effects of superelevation, stormwater flows from the Capital Storm Event overtop the channel between sections 1412-1360 and 1320-1300 with a maximum water surface elevation approximately 7.0' above the top of the channel. The channel is overtopped in this location due to a 9.5' hydraulic jump cause by a constriction of the existing channel geometry as the flow passes under the Via Marisol Bridge. As illustrated in the figure on the previous page, this overtopping is further exacerbated by anticipated superelevation effects from Curves #23, #24 and #25 producing elevated water surfaces along the left and right channel walls with a maximum height of 8.6' over the top of the right channel bank.

In an effort to more accurately depict flood limits associated with the initial calculated overtopping height of 8.6' occurring at Curve #24, additional hydraulic analysis was performed in this area. Further description and calculations of this additional analysis are included in Appendix H – Additional Hydraulic Analyses for Areas of Significant Overtopping. Results from this additional analysis indicate that flows will overtop the top of the right channel curve by 6.2' resulting in an overbank flow of 3,618 cfs.

The topography along the right overbank consists of low lying relief including the 110 Freeway and an adjacent residential area. Due to the low lying relief in this area, overtopping may have the potential to extend a significant distance from the engineered channel and begin to flow through adjacent residential areas and the 110 Freeway instead of immediately re-entering the channel. Consequentially, many inhabitable structures and a large portion of the 110 Freeway are located within the anticipated flood limits and may be subject to flood inundation. Measures to mitigate potential negative flooding effects for these areas is further discussed in a separate Flood Hazard Warning and Contingency Plan report.

The topography along the left overbank consists of a mildly sloped relief including a park area which gives way to a steep slope that ultimately encompasses overtopping flows. While negative effects including excessive overbank erosion and subsequent damage to the channel may occur in this area during a Capital Storm Event, no significant flooding impacts are anticipated from this area of overtopping in its current condition.

Such significant overtopping effects in this area are unexpected as the flow rates anticipated in this analysis are only 318 cfs greater than the LACFCD provided design flow rate of 18,500 cfs. Initially, it was thought that the overtopping in this location may be related to the recent addition of a raised concrete bike trail along this section of channel; however, the hydraulic effects that this bike trail produces were found to be negligible. Results from the Manning's "n" value sensitivity analysis indicate that overtopping due to the hydraulic jump in this location is not sensitive to variations in Manning's "n" values; therefore, overtopping is primarily due to the constricted channel geometry and superelevation effects. It may be possible that different superelevation criteria and/or assumptions regarding the criteria existed at the time this section of channel was designed versus the time at which this analysis was performed. As noted in Section 2.5 of this report, a number of assumptions were made to the superelevation criteria outlined in Section C-3 of the LACFCD hydraulic design manual in an effort to generate flood limits associated with superelevation channel overtopping.

3.14 Area of Concern 13: Sections 990-800

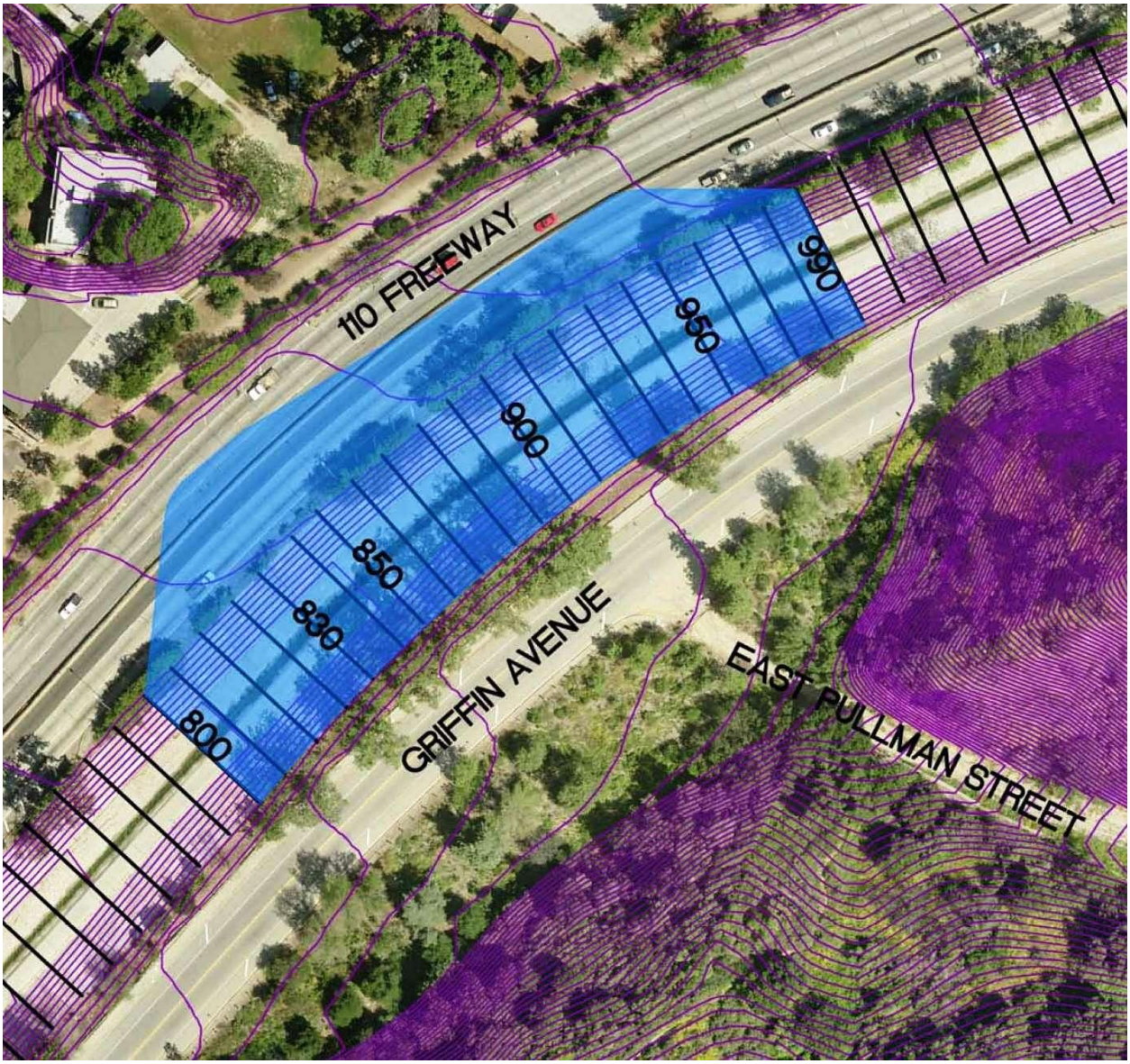


Figure 3-14: Area of Concern 13

Area of Concern 13 is located adjacent to the 110 Freeway and Via Marisol in the vicinity of East Pullman Street. Channel overtopping due to the effects of superelevation from Curve #27 is anticipated along the right bank of the channel between Sections 990-800. As illustrated in the figure on the previous page, the maximum water surface elevation anticipated in this area is 1.1’ above the top of the right channel bank.

The topography along the right overbank consists of low lying relief including the 110 Freeway. Negative impacts associated with this area of concern include potential flooding of the 110 Freeway as well as excessive overbank erosion and subsequent damage to the channel during a Capital Storm Event. Measures to mitigate potential negative flooding effects for these areas is further discussed in a separate Flood Hazard Warning and Contingency Plan report.

3.15 Disclaimer

This report has been prepared largely based upon information provided by the LACFCD and calculations have been completed per requirements set forth in the LACFCD Hydraulic Design Manual. While the provided information has been independently verified through site investigation and examination of available As-Built data, BVNA and its engineers shall not be held liable for any unknown, overlooked, or unforeseen site conditions that may exist or may develop in and around the site area. Additionally, the criteria and guidelines identified in the LACFCD Hydraulic Design Manual are intended for use in the design of a channel that fully contains stormwater flows and may not accurately depict the superelevation characteristics of a channel that is experiencing overtopping such as the Arroyo Seco Channel. Good engineering judgment was applied to these criteria in an effort to generate anticipated flood delineations; however, results and flood delineations depicted in this analysis should be considered approximate and are not intended to reflect exact limits of flood inundation. Instead, flood limits delineated in this analysis are intended to aid in the development of a Flood Hazard Warning and Contingency Plan which will identify and discuss measures that can mitigate potential negative flooding effects for the general areas identified within this report. BVNA and its engineers shall not be held liable for any negative impacts including but not limited to damage and/or loss of life or property occurring during any flooding events of the Arroyo Seco Channel.

This report is solely for the use and benefit of the Client. BVNA is not liable to the Client or any third party for the third party's reliance on or use of this report. Inspections are based solely on visual observation(s) and assessment(s) of the condition of the property or specified items at the time of inspection. Further, BVNA is not liable to the Client or any third party for any damage or claim arising from undisclosed and/or unknown dangerous conditions existing at the site before BVNA entered the project site, or arising out of misrepresentations by Client concerning conditions at the site.

3.16 References

Hydrologic Analysis of Devils Gate Dam & Arroyo Seco Channel Tributaries, prepared by Bureau Veritas, dated November 11, 2011.

Los Angeles County Flood Control District – Devils Gate Dam Background/Reference Information.

Los Angeles County Flood Control District - Devils Gate Dam and Reservoir Post-Fire Sediment Removal - Short Term Solution Report for Sediment Accumulation Along the Face of the Dam, March 2011.

Los Angeles County Flood Control District - Hydraulic Design Manual, March 1982.

Los Angeles County Hydrology Manual, January 2006.

Los Angeles County Sedimentation Manual, January 2006.

Open Channel Hydraulics, Chow 1959.

HEC-RAS River Analysis System Hydraulic Reference Manual Version 4.1, January 2010.

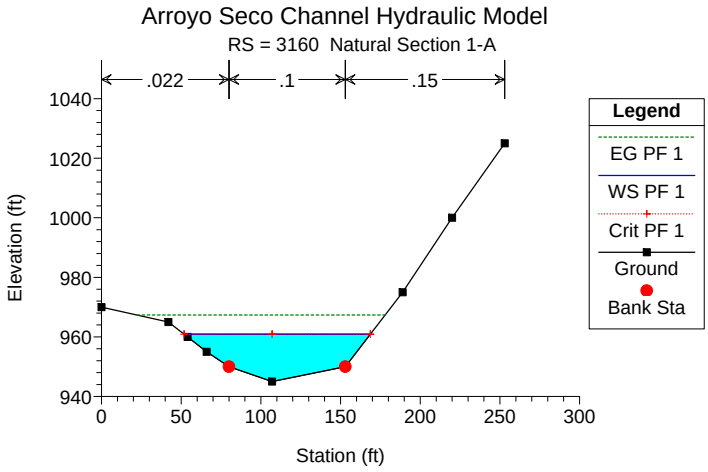
4 Appendices

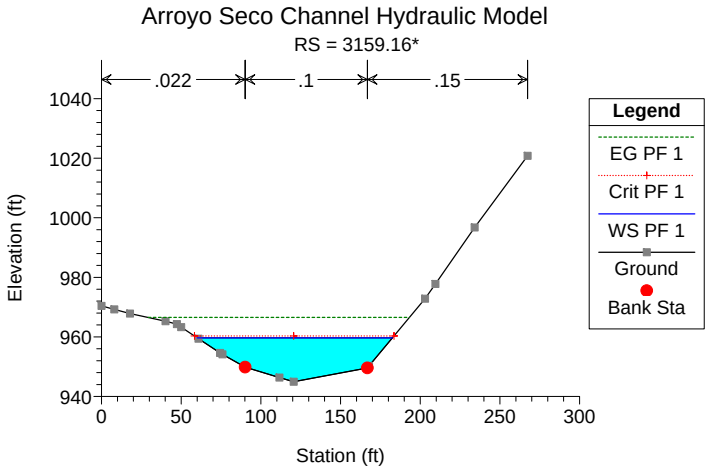
This page is intentionally left blank to facilitate 2-sided printing.

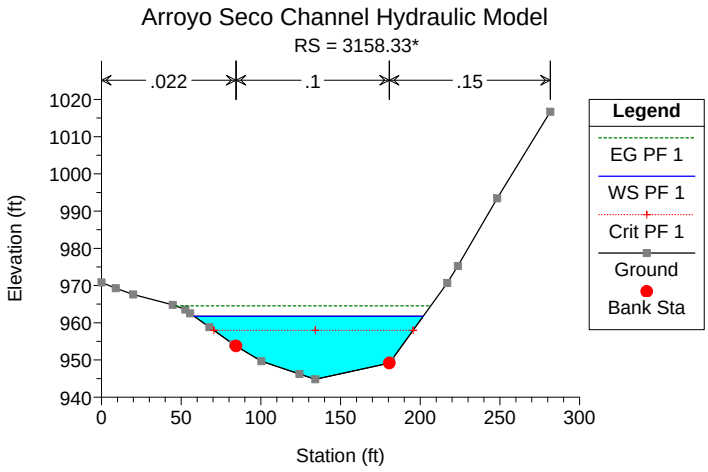
Appendix A

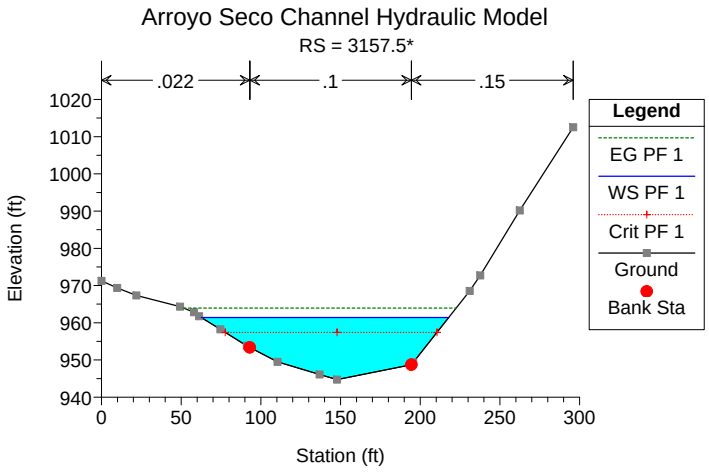
Typical HEC-RAS Channel Cross Sections with Water Surface Elevations

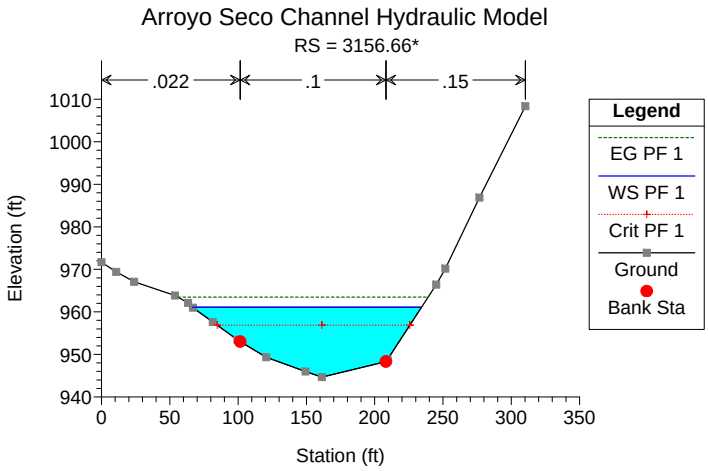
This page is intentionally left blank to facilitate 2-sided printing.

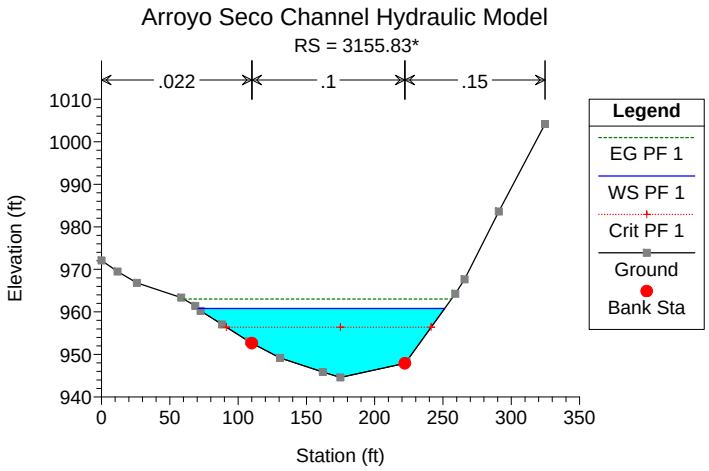

Arroyo Seco Channel Hydraulic Model
RS = 3160 Natural Section 1-A
.022
.1
.15
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

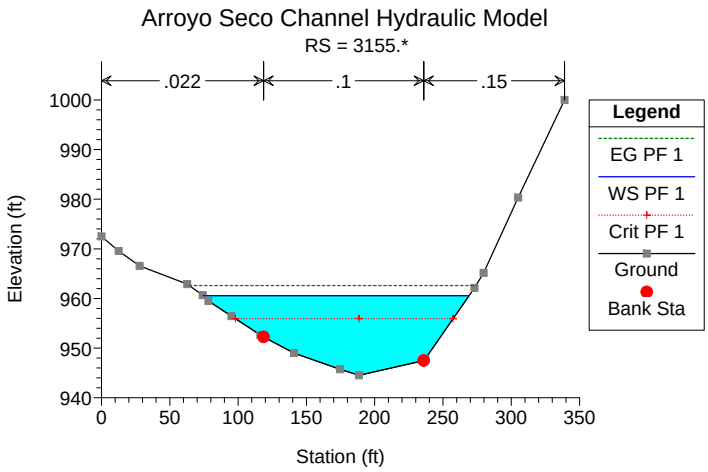

Arroyo Seco Channel Hydraulic Model
RS = 3159.16*
.022
.1
.15
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

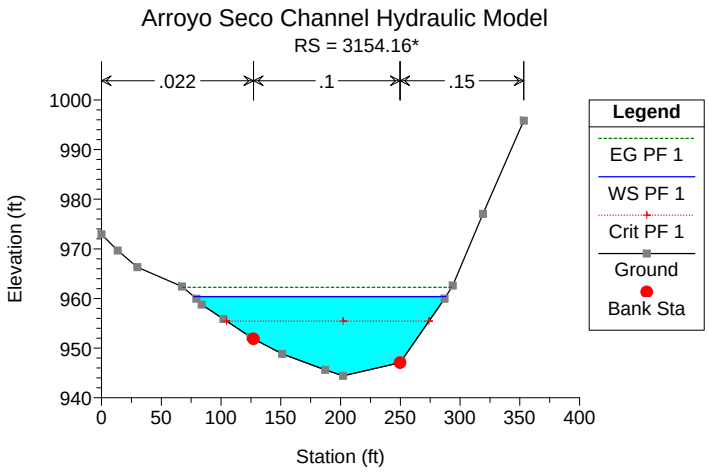

Arroyo Seco Channel Hydraulic Model
RS = 3158.33*
.022
.1
.15
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

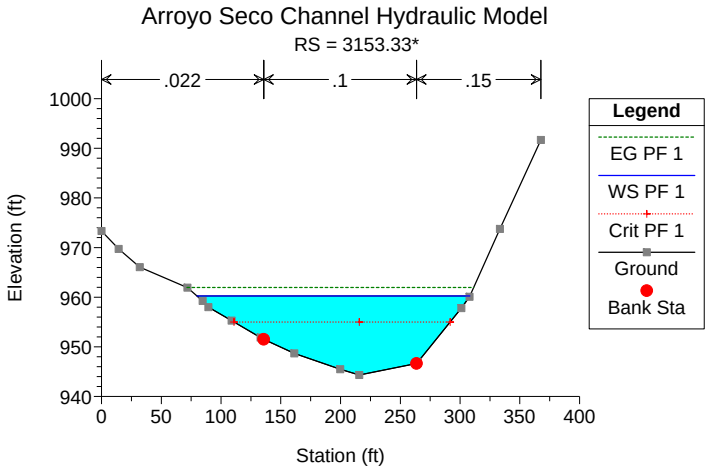

Arroyo Seco Channel Hydraulic Model
RS = 3157.5*
.022
.1
.15
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

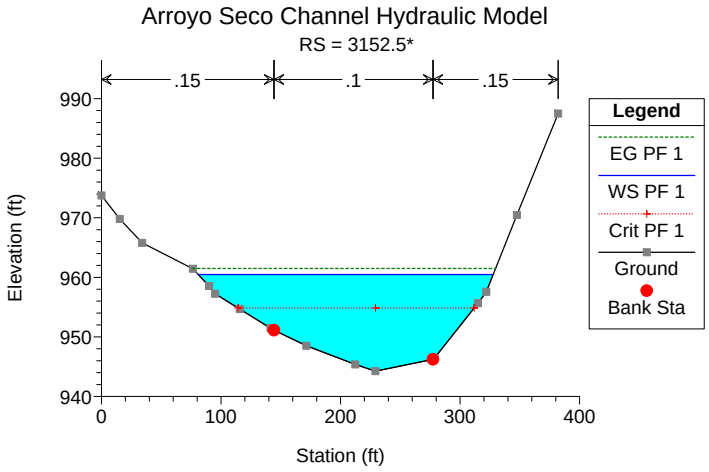

Arroyo Seco Channel Hydraulic Model
RS = 3156.66*
.022
.1
.15
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

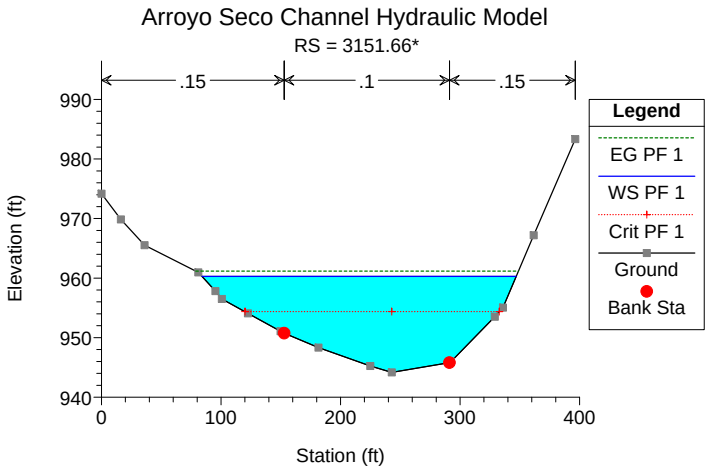

Arroyo Seco Channel Hydraulic Model
RS = 3155.83*
.022
.1
.15
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

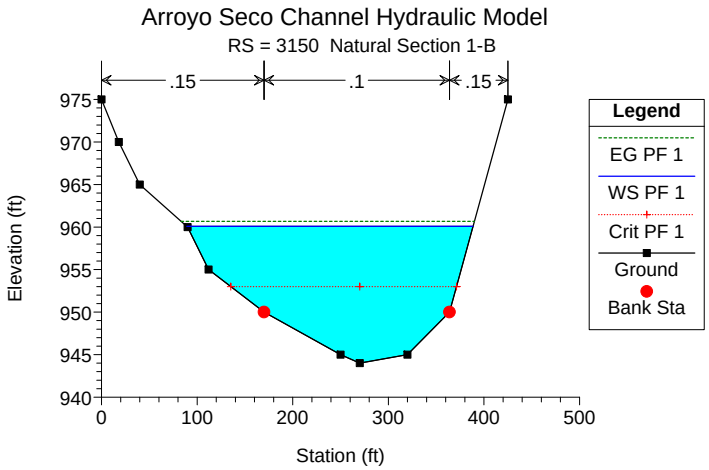

Arroyo Seco Channel Hydraulic Model
RS = 3155.*
.022
.1
.15
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

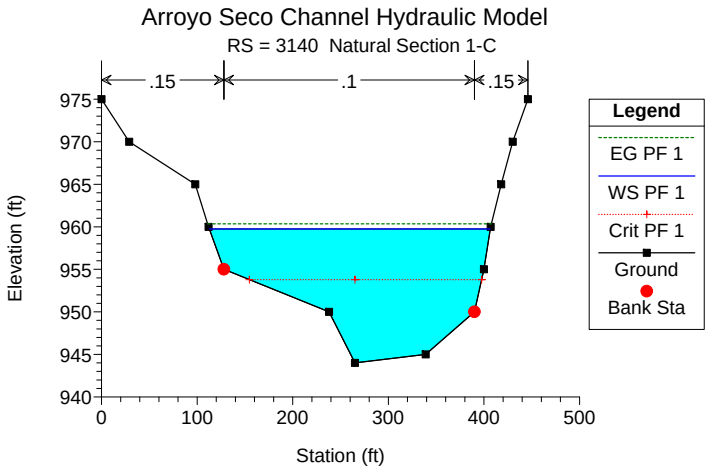

Arroyo Seco Channel Hydraulic Model
RS = 3154.16*
.022
.1
.15
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

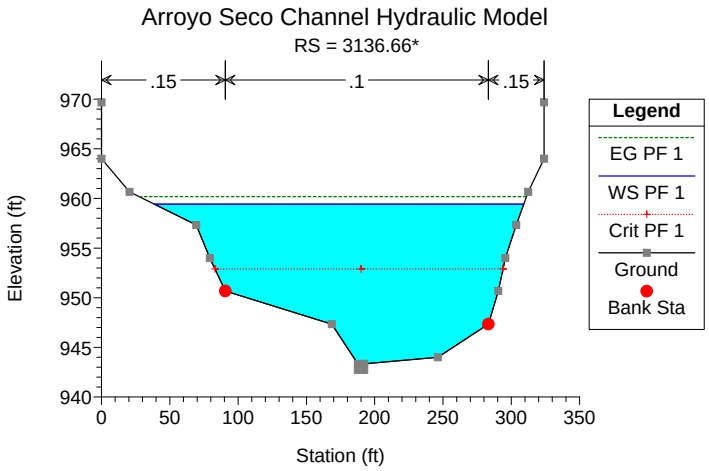

Arroyo Seco Channel Hydraulic Model
RS = 3153.33*
.022
.1
.15
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

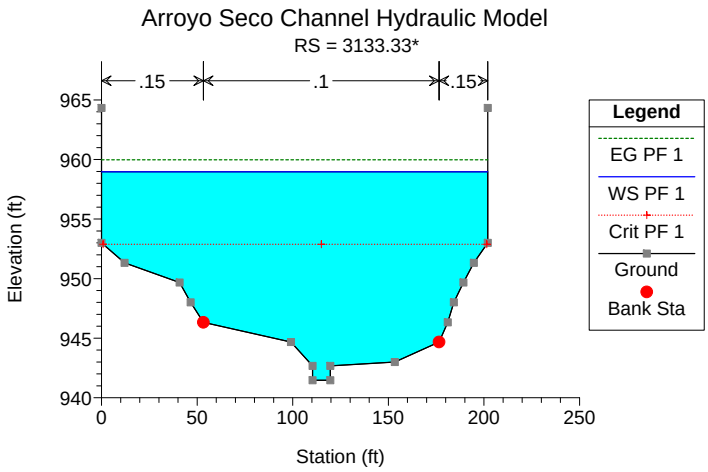

Arroyo Seco Channel Hydraulic Model
RS = 3152.5*
.15
.1
.15
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

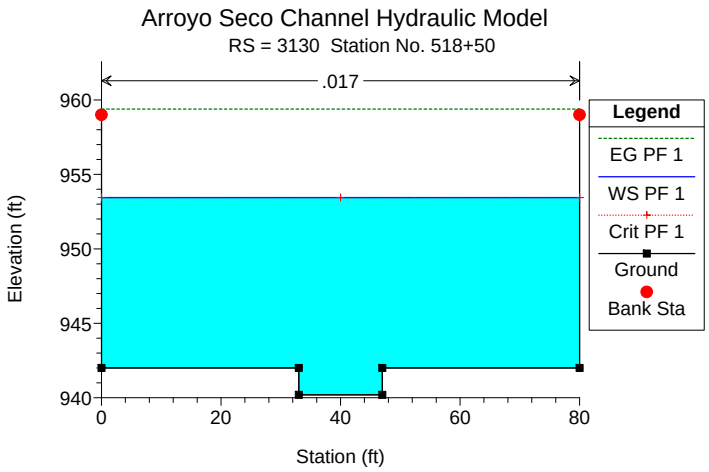

Arroyo Seco Channel Hydraulic Model
RS = 3151.66*
.15
.1
.15
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

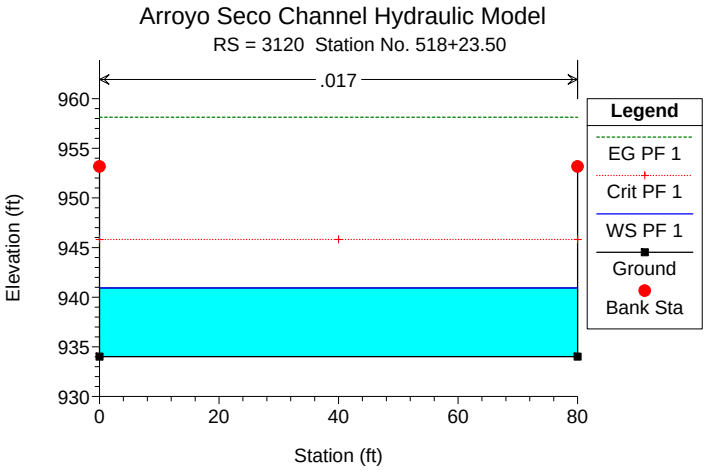

Arroyo Seco Channel Hydraulic Model
RS = 3150 Natural Section 1-B
.15
.1
.15
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

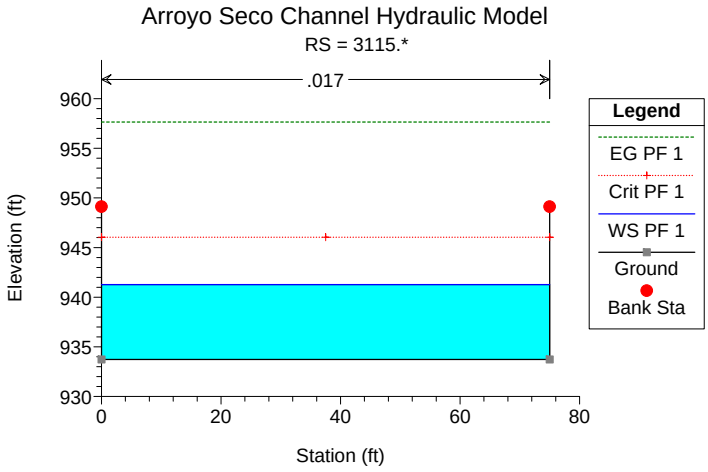

Arroyo Seco Channel Hydraulic Model
RS = 3140 Natural Section 1-C
.15
.1
.15
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

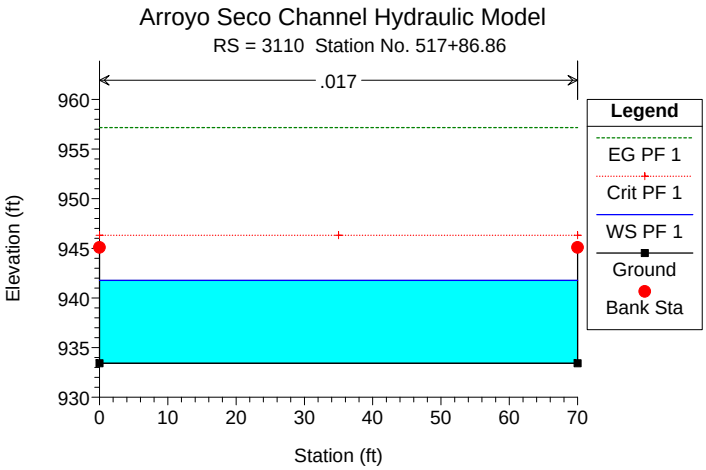

Arroyo Seco Channel Hydraulic Model
RS = 3136.66*
.15
.1
.15
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

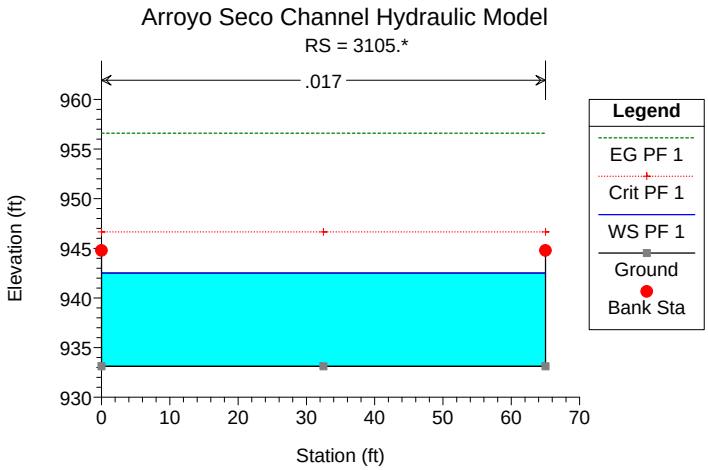

Arroyo Seco Channel Hydraulic Model
RS = 3133.33*
.15
.1
.15
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

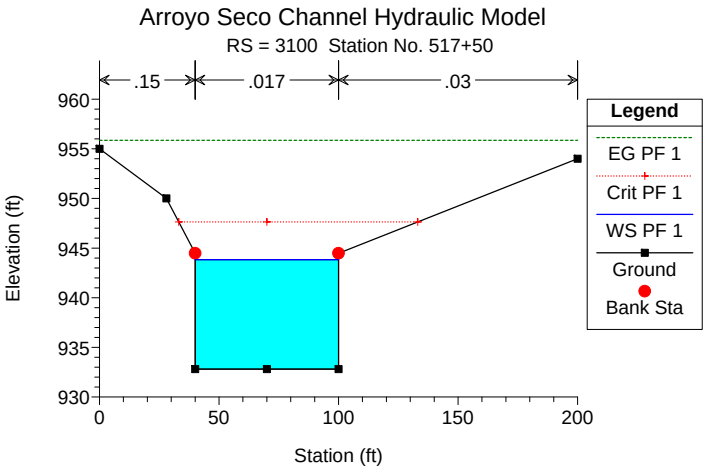

Arroyo Seco Channel Hydraulic Model
RS = 3130 Station No. 518+50
.017
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

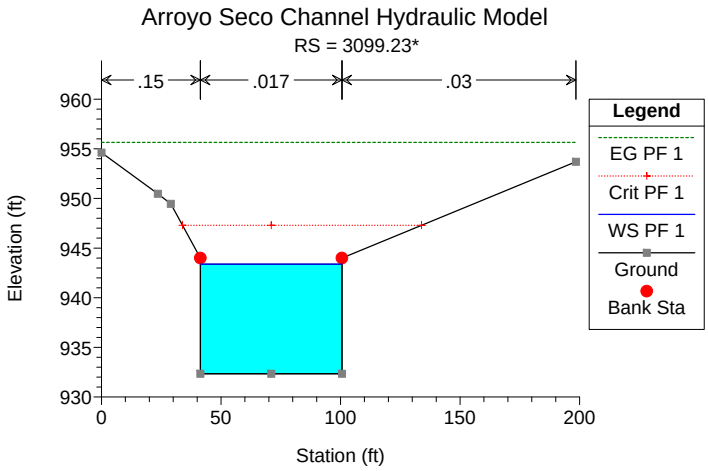

Arroyo Seco Channel Hydraulic Model
RS = 3120 Station No. 518+23.50
.017
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

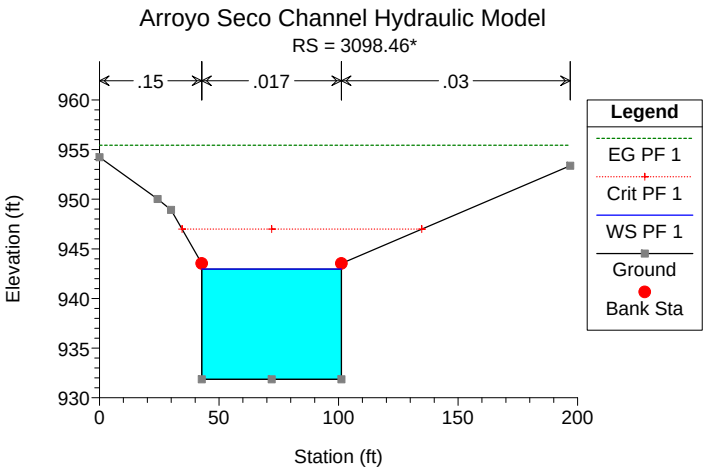

Arroyo Seco Channel Hydraulic Model
RS = 3115.*
.017
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

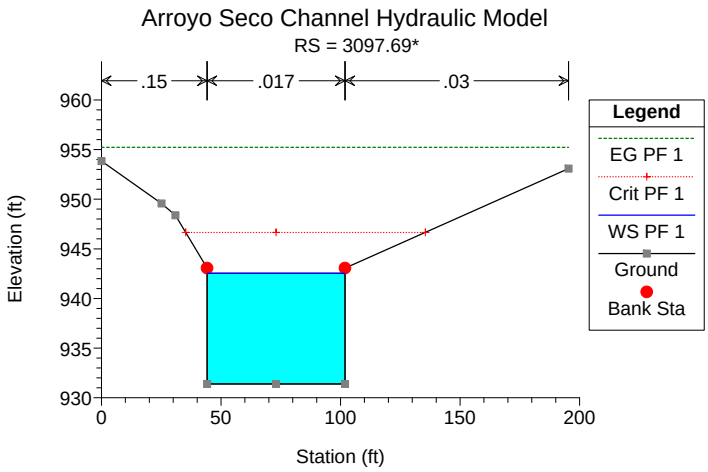

Arroyo Seco Channel Hydraulic Model
RS = 3110 Station No. 517+86.86
.017
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

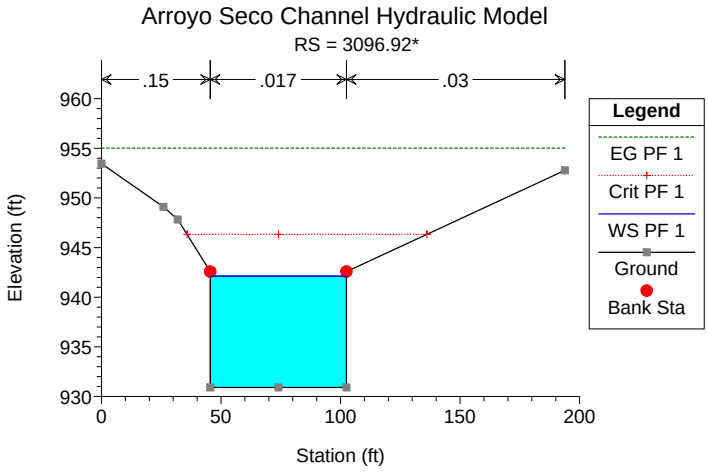

Arroyo Seco Channel Hydraulic Model
RS = 3105.*
.017
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

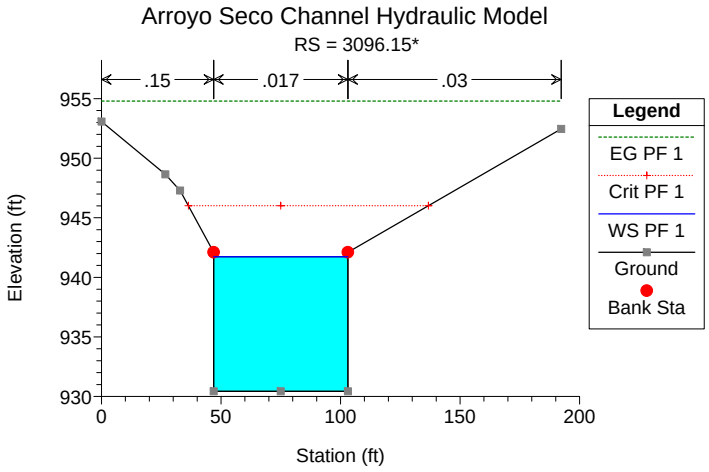

Arroyo Seco Channel Hydraulic Model
RS = 3100 Station No. 517+50
.15
.017
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

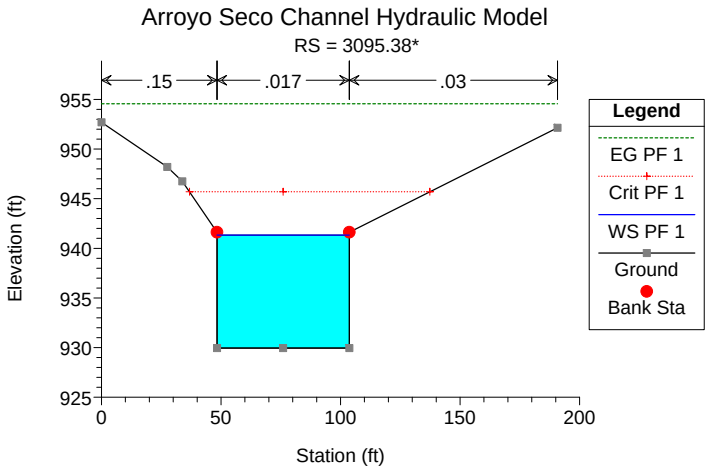

Arroyo Seco Channel Hydraulic Model
RS = 3099.23*
.15
.017
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

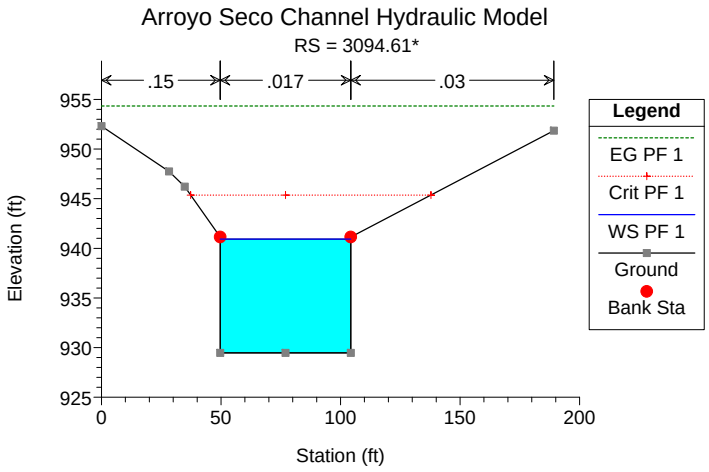

Arroyo Seco Channel Hydraulic Model
RS = 3098.46*
.15
.017
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

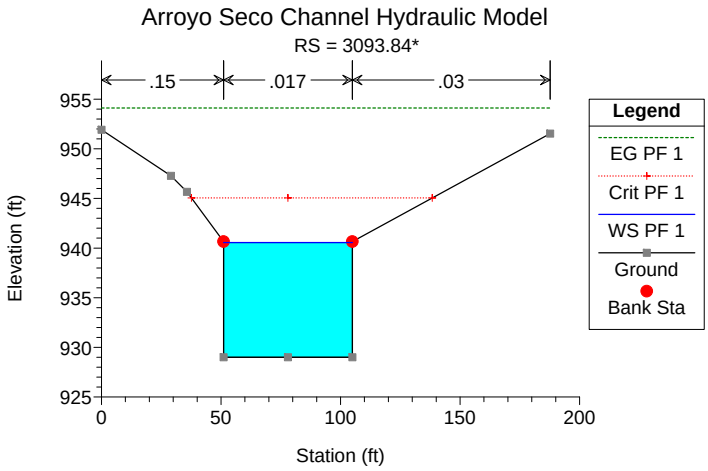

Arroyo Seco Channel Hydraulic Model
RS = 3097.69*
.15
.017
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

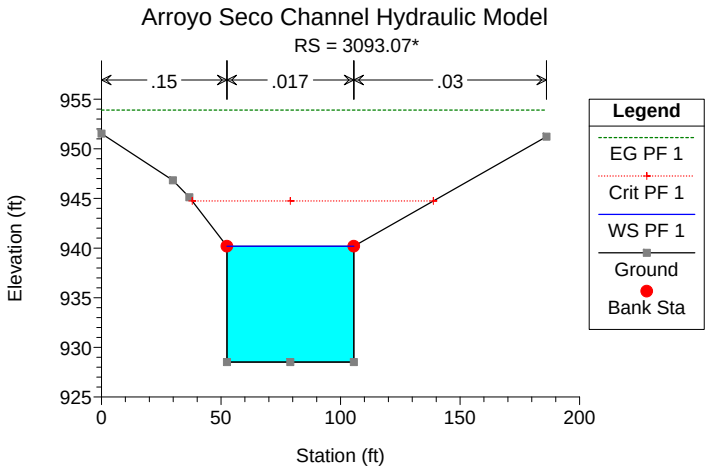

Arroyo Seco Channel Hydraulic Model
RS = 3096.92*
.15
.017
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

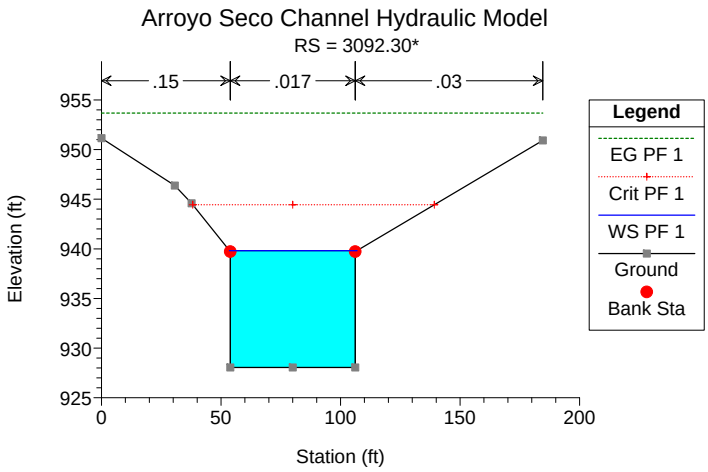

Arroyo Seco Channel Hydraulic Model
RS = 3096.15*
.15
.017
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

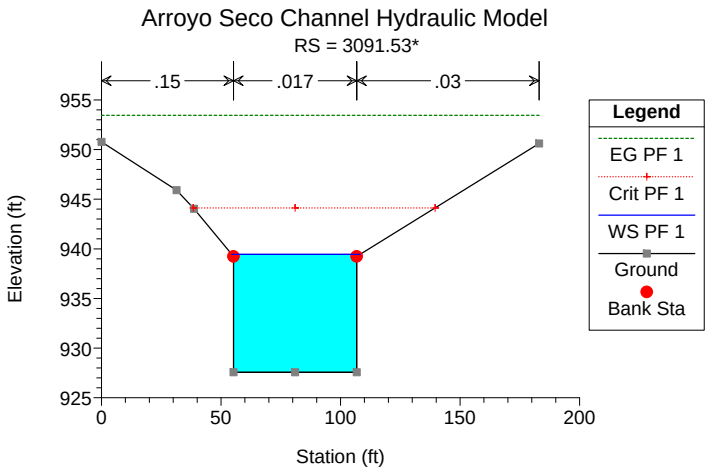

Arroyo Seco Channel Hydraulic Model
RS = 3095.38*
.15
.017
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

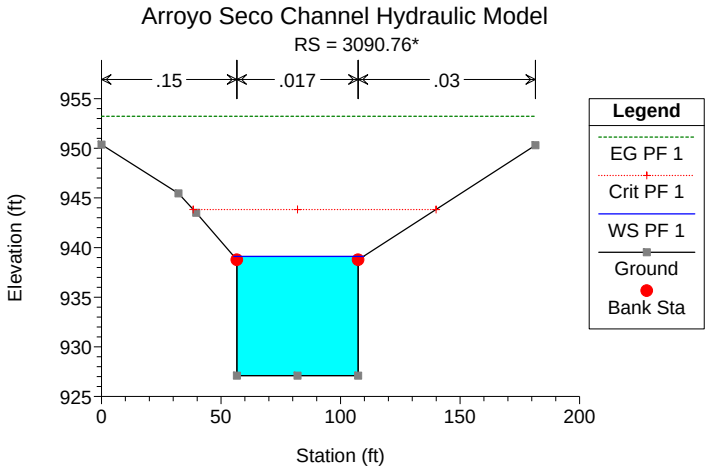

Arroyo Seco Channel Hydraulic Model
RS = 3094.61*
.15
.017
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

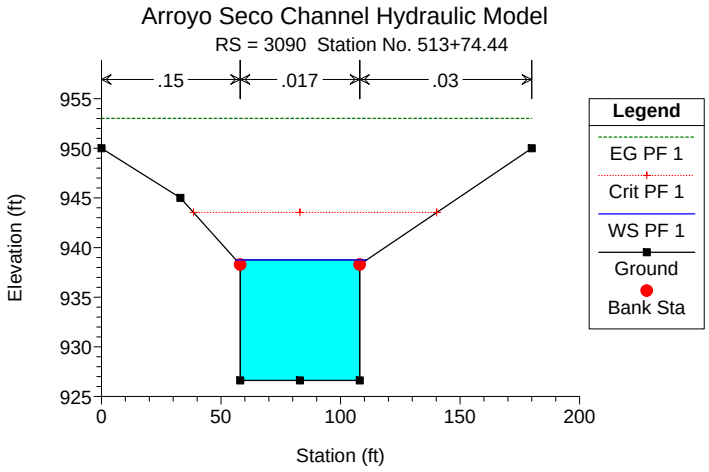

Arroyo Seco Channel Hydraulic Model
RS = 3093.84*
.15
.017
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

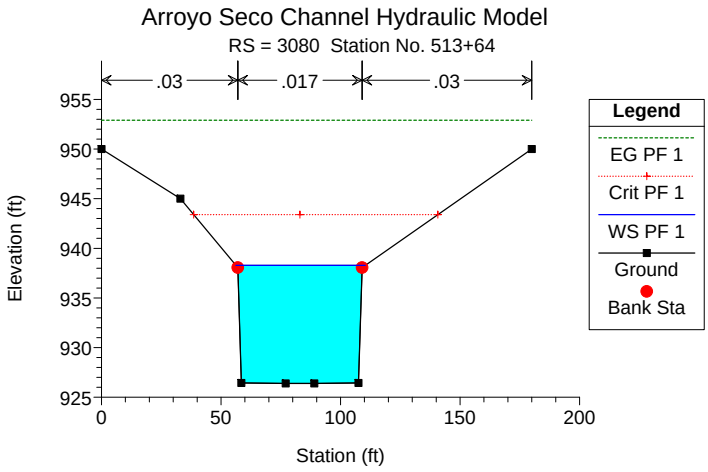

Arroyo Seco Channel Hydraulic Model
RS = 3093.07*
.15
.017
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

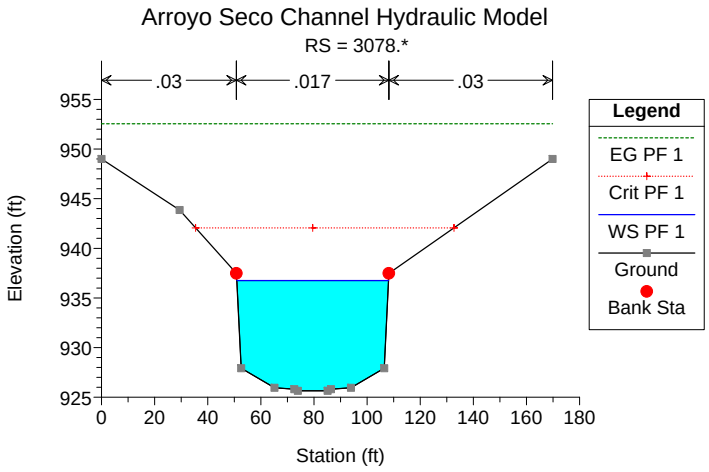

Arroyo Seco Channel Hydraulic Model
RS = 3092.30*
.15
.017
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

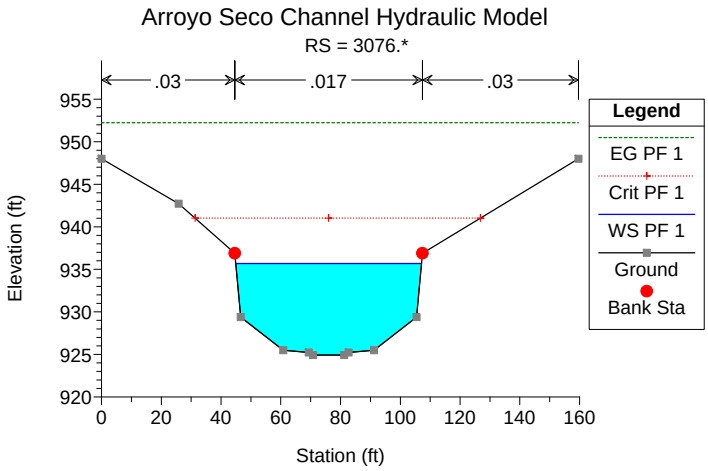

Arroyo Seco Channel Hydraulic Model
RS = 3091.53*
.15
.017
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

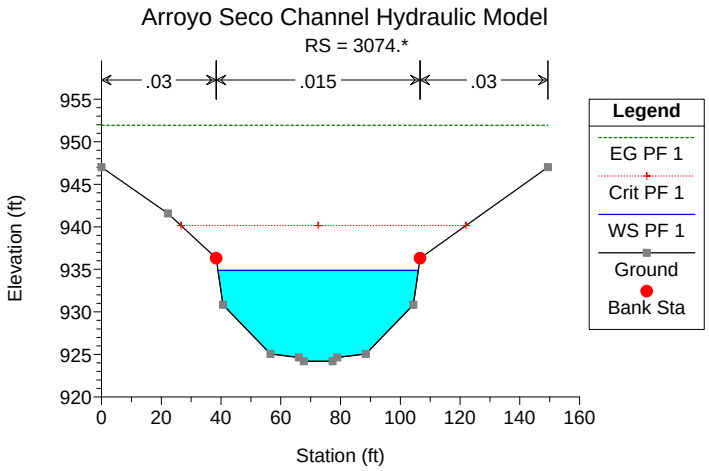

Arroyo Seco Channel Hydraulic Model
RS = 3090.76*
.15
.017
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

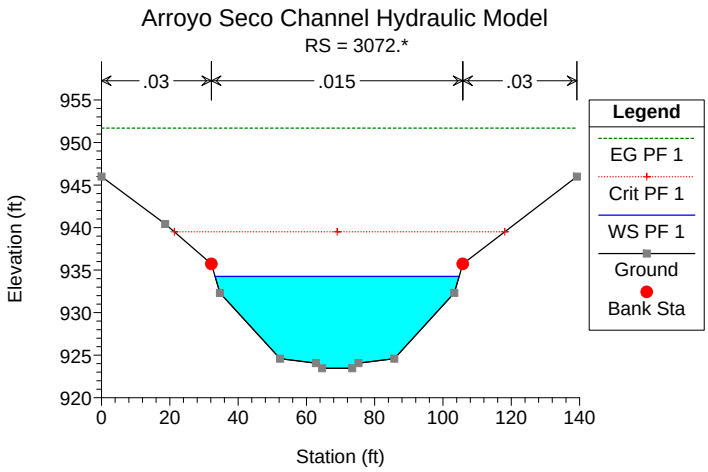

Arroyo Seco Channel Hydraulic Model
RS = 3090 Station No. 513+74.44
.15
.017
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

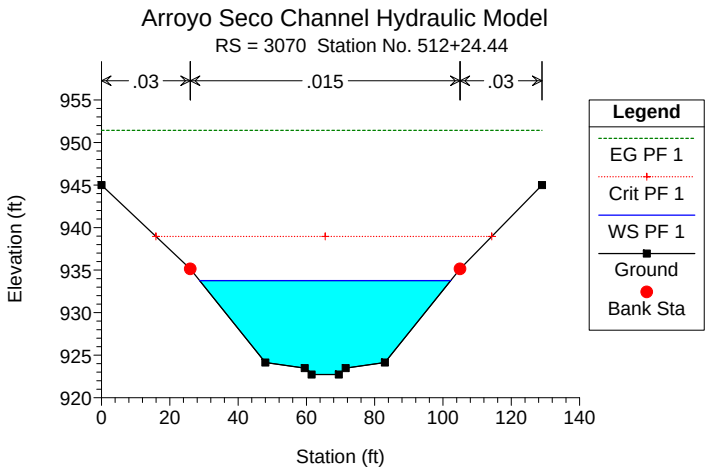

Arroyo Seco Channel Hydraulic Model
RS = 3080 Station No. 513+64
.03
.017
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

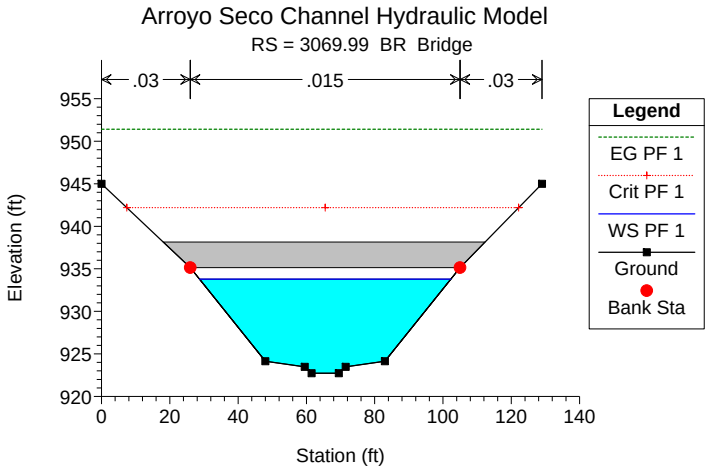

Arroyo Seco Channel Hydraulic Model
RS = 3078.*
.03
.017
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

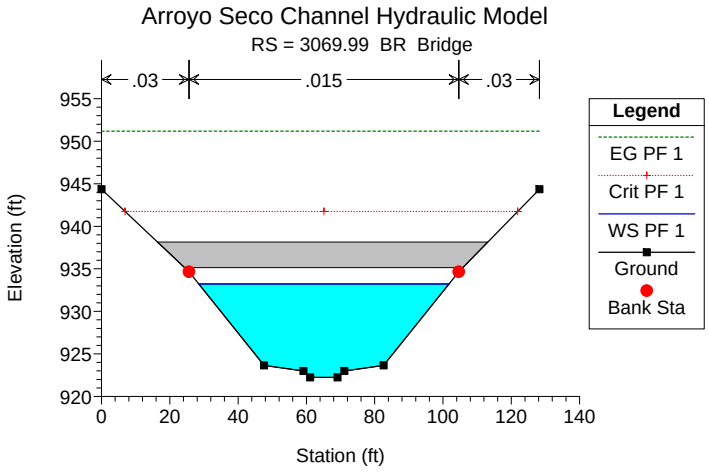

Arroyo Seco Channel Hydraulic Model
RS = 3076.*
.03
.017
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

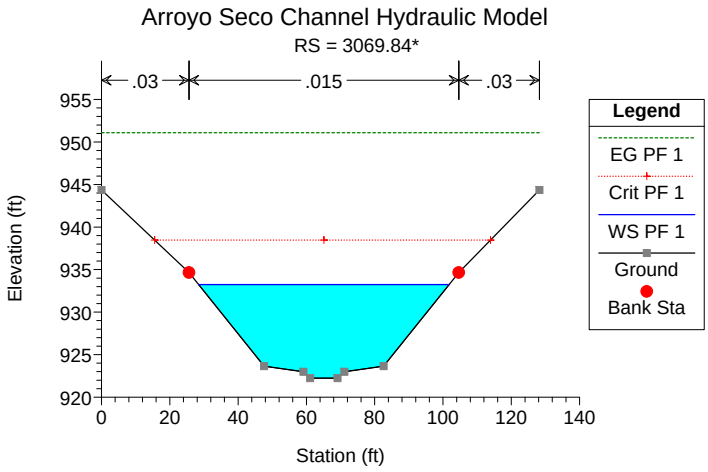

Arroyo Seco Channel Hydraulic Model
RS = 3074.*
.03
.015
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

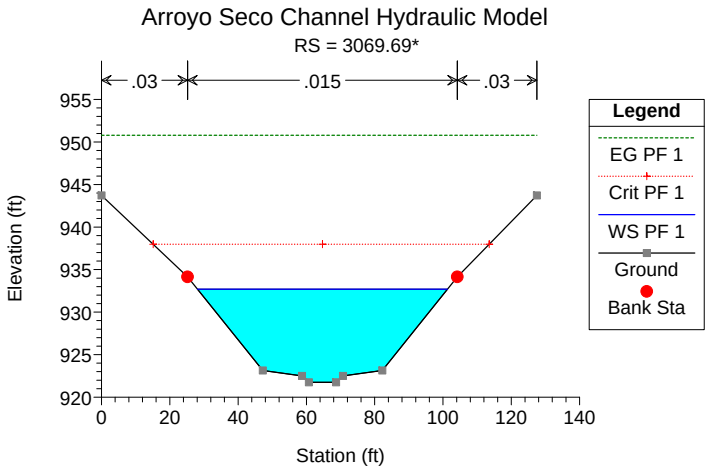

Arroyo Seco Channel Hydraulic Model
RS = 3072.*
.03
.015
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

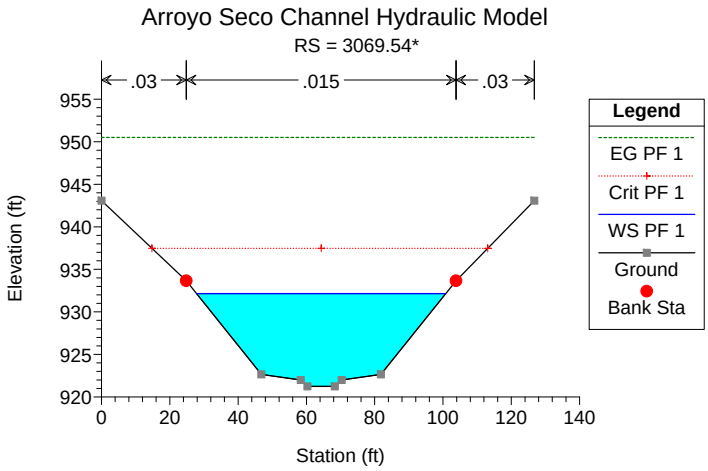

Arroyo Seco Channel Hydraulic Model
RS = 3070 Station No. 512+24.44
.03
.015
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

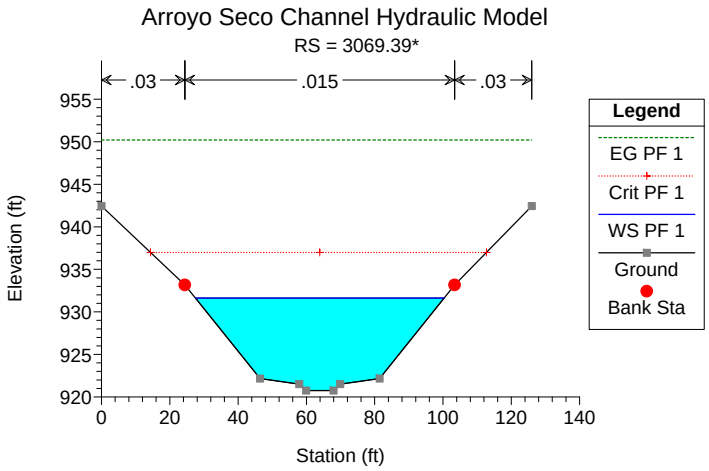

Arroyo Seco Channel Hydraulic Model
RS = 3069.99 BR Bridge
.03
.015
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

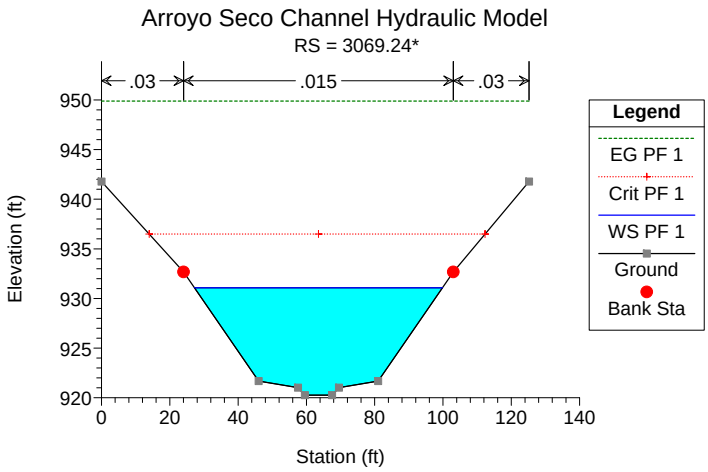

Arroyo Seco Channel Hydraulic Model
RS = 3069.99 BR Bridge
.03
.015
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

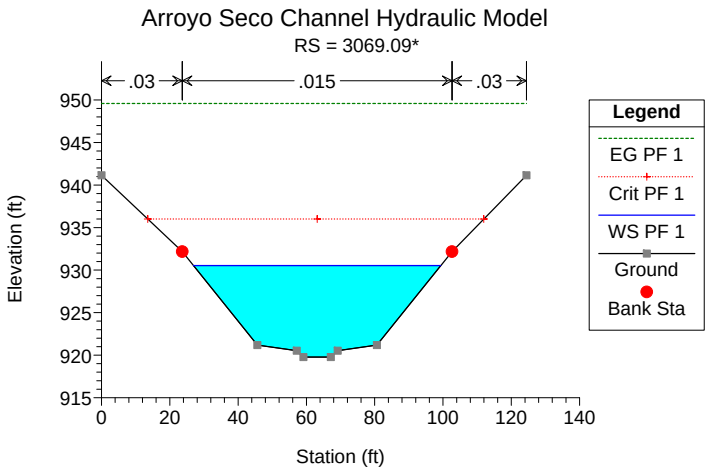

Arroyo Seco Channel Hydraulic Model
RS = 3069.84*
.03
.015
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Arroyo Seco Channel Hydraulic Model
RS = 3069.69*
.03
.015
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Arroyo Seco Channel Hydraulic Model
RS = 3069.54*
.03
.015
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Arroyo Seco Channel Hydraulic Model
RS = 3069.39*
.03
.015
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Arroyo Seco Channel Hydraulic Model
RS = 3069.24*
.03
.015
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Arroyo Seco Channel Hydraulic Model
RS = 3069.09*
.03
.015
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

Appendix B

Manning's "n" Value Determination

This page is intentionally left blank to facilitate 2-sided printing.

Arroyo Seco Channel Manning's "n" Values

From	To	n left overbank	n center channel	n right overbank
Dam Spillway	Hwy 210 Bridge	0.150	0.100	0.150
Hwy 210 Bridge	3160	0.022	0.100	0.150
3160	3153.33	0.022	0.100	0.150
3152.5	3133.33	0.150	0.100	0.150
3130	3076*	0.150	0.017	0.030
3074*	2820	0.030	0.015	0.030
2817.5*	2805.33	0.150	0.100	0.150
2804.66	2800	0.060	0.100	0.150
2799.41	2780	0.060	0.050	0.100
2770	2398.66*		0.015	
2398	2360		0.016	
2350	2240		0.015	
2235*	1943.33		0.017	
1940	303.333*		0.020	
300	10		0.017	

n=0.015 Concrete, float finish
n=0.016 sides are part concrete and part stone in mortor so used n=0.016
n=0.017 Concrete, finished with gravel bottom
n=0.017 Concrete bottom float finished with sides of dressed stone in mortor.
n=0.020 Concrete on good excavated rock
n=0.020 Gravel bottom with sides of formed concrete
n=0.022 Earth, straight and uniform - clean, after weathering
n=0.030 Flood Plains - Short Grass (Golf Course)
n=0.050 Main Channels; more stones
n=0.060 Flood Plains; Brush - light brush and trees, in summer
n=0.100 Flood Plains; Brush - medium to dense brush, in summer
n=0.100 Main Channels; Very weedy, deep pools, floodways w/ heavy timber/brush
n=0.150 Flood Plains; Trees - dense willows, summer, straight
n=0.04 Rock Cuts, jagged and irregular for overbank areas.

Sources
Open Channel Hydraulics, Chow, Table 5-6
HEC-RAS Reference Manual 4.1, Table 3-1
LACFCD Hydraulic Design Manual, Chart F-04

VALUES OF MANNING'S n

PIPE	n	$\frac{2gn^2}{2.21}$
Reinforced Concrete Pipe	.013	.00492
Asbestos Cement Pipe	.013	.00492
Concrete Lined Steel Pipe	.013	.00492
No-joint cast in place Concrete Pipe	.014	.00571
Corrugated Metal Pipe	* varies	
COVERED SECTIONS		
Reinforced Concrete Box	.013	.00492
Reinforced Concrete Arch	.013	.00492
LINED CHANNELS		
Poured Concrete	.014	.00571
Asphalt	.014	.00571
Gunite	.016	.00746
Flush Grouted Cobble	.020	.01166
Medium Weight Levee Riprap	.035	.03570
Jetty Type Riprap	.050	.07285
UNLINED CHANNELS		
Very fine sand, silt or loam	.020	.01166
Usual river sand and gravel	.025	.01821
Coarse gravels	.030	.02623
Coarse gravels mixed with boulders	.035	.03570
REVETTED TRAPEZOIDAL CHANNELS		
Pipe and Wire	.025	.01821
Rail and Wire	.025	.01821

* Refer to Chart F-05

Table 3-1 Manning's 'n' Values

Type of Channel and Description	Minimum	Normal	Maximum
A. *Natural Streams*			
1. **Main Channels**			
a. Clean, straight, full, no rifts or deep pools	0.025	0.030	0.033
b. Same as above, but more stones and weeds	0.030	0.035	0.040
c. Clean, winding, some pools and shoals	0.033	0.040	0.045
d. Same as above, but some weeds and stones	0.035	0.045	0.050
e. Same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055
f. Same as "d" but more stones	0.045	0.050	0.060
g. Sluggish reaches, weedy. deep pools	0.050	0.070	0.080
h. Very weedy reaches, deep pools, or floodways with heavy stands of timber and brush	0.070	0.100	0.150
2. **Flood Plains**			
a. Pasture no brush			
1. Short grass	0.025	0.030	0.035
2. High grass	0.030	0.035	0.050
b. Cultivated areas			
1. No crop	0.020	0.030	0.040
2. Mature row crops	0.025	0.035	0.045
3. Mature field crops	0.030	0.040	0.050
c. Brush			
1. Scattered brush, heavy weeds	0.035	0.050	0.070
2. Light brush and trees, in winter	0.035	0.050	0.060
3. Light brush and trees, in summer	0.040	0.060	0.080
4. Medium to dense brush, in winter	0.045	0.070	0.110
5. Medium to dense brush, in summer	0.070	0.100	0.160
d. Trees			
1. Cleared land with tree stumps, no sprouts	0.030	0.040	0.050
2. Same as above, but heavy sprouts	0.050	0.060	0.080
3. Heavy stand of timber, few down trees, little undergrowth, flow below branches	0.080	0.100	0.120
4. Same as above, but with flow into branches	0.100	0.120	0.160
5. Dense willows, summer, straight	0.110	0.150	0.200
3. **Mountain Streams, no vegetation in channel, banks usually steep, with trees and brush on banks submerged**			
a. Bottom: gravels, cobbles, and few boulders	0.030	0.040	0.050
b. Bottom: cobbles with large boulders	0.040	0.050	0.070

Table 3-1 (Continued) Manning's 'n' Values

Type of Channel and Description	Minimum	Normal	Maximum
B. *Lined or Built-Up Channels*			
1. **Concrete**			
a. Trowel finish	0.011	0.013	0.015
b. Float Finish	0.013	0.015	0.016
c. Finished, with gravel bottom	0.015	0.017	0.020
d. Unfinished	0.014	0.017	0.020
e. Gunite, good section	0.016	0.019	0.023
f. Gunite, wavy section	0.018	0.022	0.025
g. On good excavated rock	0.017	0.020	
h. On irregular excavated rock	0.022	0.027	
2. **Concrete bottom float finished with sides of:**			
a. Dressed stone in mortar	0.015	0.017	0.020
b. Random stone in mortar	0.017	0.020	0.024
c. Cement rubble masonry, plastered	0.016	0.020	0.024
d. Cement rubble masonry	0.020	0.025	0.030
e. Dry rubble on riprap	0.020	0.030	0.035
3. **Gravel bottom with sides of:**			
a. Formed concrete	0.017	0.020	0.025
b. Random stone in mortar	0.020	0.023	0.026
c. Dry rubble or riprap	0.023	0.033	0.036
4. **Brick**			
a. Glazed	0.011	0.013	0.015
b. In cement mortar	0.012	0.015	0.018
5. **Metal**			
a. Smooth steel surfaces	0.011	0.012	0.014
b. Corrugated metal	0.021	0.025	0.030
6. **Asphalt**			
a. Smooth	0.013	0.013	
b. Rough	0.016	0.016	
7. **Vegetal lining**	0.030		0.500

Table 3-1 (Continued) Manning's 'n' Values

Type of Channel and Description	Minimum	Normal	Maximum
C. *Excavated or Dredged Channels*			
1. **Earth, straight and uniform**			
a. Clean, recently completed	0.016	0.018	0.020
b. Clean, after weathering	0.018	0.022	0.025
c. Gravel, uniform section, clean	0.022	0.025	0.030
d. With short grass, few weeds	0.022	0.027	0.033
2. **Earth, winding and sluggish**			
a. No vegetation	0.023	0.025	0.030
b. Grass, some weeds	0.025	0.030	0.033
c. Dense weeds or aquatic plants in deep channels	0.030	0.035	0.040
d. Earth bottom and rubble side	0.028	0.030	0.035
e. Stony bottom and weedy banks	0.025	0.035	0.040
f. Cobble bottom and clean sides	0.030	0.040	0.050
3. **Dragline-excavated or dredged**			
a. No vegetation	0.025	0.028	0.033
b. Light brush on banks	0.035	0.050	0.060
4. **Rock cuts**			
a. Smooth and uniform	0.025	0.035	0.040
b. Jagged and irregular	0.035	0.040	0.050
5. **Channels not maintained, weeds and brush**			
a. Clean bottom, brush on sides	0.040	0.050	0.080
b. Same as above, highest stage of flow	0.045	0.070	0.110
c. Dense weeds, high as flow depth	0.050	0.080	0.120
d. Dense brush, high stage	0.080	0.100	0.140

Other sources that include pictures of selected streams as a guide to n value determination are available (Fasken, 1963; Barnes, 1967; and Hicks and Mason, 1991). In general, these references provide color photos with tables of calibrated n values for a range of flows.

Although there are many factors that affect the selection of the n value for the channel, some of the most important factors are the type and size of materials that compose the bed and banks of a channel, and the shape of the channel. Cowan (1956) developed a procedure for estimating the effects of these factors to determine the value of Manning's n of a channel. In Cowan's procedure, the value of n is computed by the following equation:

TABLE 5-6. VALUES OF THE ROUGHNESS COEFFICIENT n (*continued*)

Type of channel and description	Minimum	Normal	Maximum
B. LINED OR BUILT-UP CHANNELS			
B-1. Metal			
a. Smooth steel surface			
1. Unpainted	0.011	**0.012**	0.014
2. Painted	0.012	0.013	0.017
b. Corrugated	0.021	0.025	0.030
B-2. Nonmetal			
a. Cement			
1. Neat, surface	0.010	0.011	0.013
2. Mortar	0.011	0.013	0.015
b. Wood			
1. Planed, untreated	0.010	0.012	0.014
2. Planed, creosoted	0.011	0.012	0.015
3. Unplaned	0.011	0.013	0.015
4. Plank with battens	0.012	0.015	0.018
5. Lined with roofing paper	0.010	0.014	0.017
c. Concrete			
1. Trowel finish	0.011	**0.013**	0.015
2. Float finish	0.013	0.015	0.016
3. Finished, with gravel on bottom	0.015	0.017	0.020
4. Unfinished	0.014	0.017	0.020
5. Gunite, good section	0.016	0.019	0.023
6. Gunite, wavy section	0.018	0.022	0.025
7. On good excavated rock	0.017	0.020	
8. On irregular excavated rock	0.022	0.027	
d. Concrete bottom float finished with sides of			
1. Dressed stone in mortar	0.015	0.017	0.020
2. Random stone in mortar	0.017	0.020	0.024
3. Cement rubble masonry, plastered	0.016	0.020	0.024
4. Cement rubble masonry	0.020	0.025	0.030
5. Dry rubble or riprap	0.020	0.030	0.035
e. Gravel bottom with sides of			
1. Formed concrete	0.017	0.020	0.025
2. Random stone in mortar	0.020	0.023	0.026
3. Dry rubble or riprap	0.023	0.033	0.036
f. Brick			
1. Glazed	0.011	**0.013**	0.015
2. In cement mortar	0.012	**0.015**	0.018
g. Masonry			
1. Cemented rubble	0.017	0.025	0.030
2. Dry rubble	0.023	0.032	0.035
h. Dressed ashlar	0.013	0.015	0.017
i. Asphalt			
1. Smooth	0.013	0.013	
2. Rough	0.016	0.016	
j. Vegetal lining	0.030	.....	0.500

TABLE 5-6. VALUES OF THE ROUGHNESS COEFFICIENT n (*continued*)

Type of channel and description	Minimum	Normal	Maximum
C. EXCAVATED OR DREDGED			
a. Earth, straight and uniform			
1. Clean, recently completed	0.016	0.018	0.020
2. Clean, after weathering	0.018	**0.022**	0.025
3. Gravel, uniform section, clean	0.022	0.025	0.030
4. With short grass, few weeds	0.022	0.027	0.033
b. Earth, winding and sluggish			
1. No vegetation	0.023	0.025	0.030
2. Grass, some weeds	0.025	0.030	0.033
3. Dense weeds or aquatic plants in deep channels	0.030	0.035	0.040
4. Earth bottom and rubble sides	0.028	0.030	0.035
5. Stony bottom and weedy banks	0.025	0.035	0.040
6. Cobble bottom and clean sides	0.030	0.040	0.050
c. Dragline-excavated or dredged			
1. No vegetation	0.025	0.028	0.033
2. Light brush on banks	0.035	0.050	0.060
d. Rock cuts			
1. Smooth and uniform	0.025	0.035	0.040
2. Jagged and irregular	0.035	0.040	0.050
e. Channels not maintained, weeds and brush uncut			
1. Dense weeds, high as flow depth	0.050	0.080	0.120
2. Clean bottom, brush on sides	0.040	0.050	0.080
3. Same, highest stage of flow	0.045	0.070	0.110
4. Dense brush, high stage	0.080	0.100	0.140
D. NATURAL STREAMS			
D-1. Minor streams (top width at flood stage <100 ft)			
a. Streams on plain			
1. Clean, straight, full stage, no rifts or deep pools	0.025	**0.030**	0.033
2. Same as above, but more stones and weeds	0.030	0.035	0.040
3. Clean, winding, some pools and shoals	0.033	0.040	0.045
4. Same as above, but some weeds and stones	0.035	0.045	0.050
5. Same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055
6. Same as 4, but more stones	0.045	0.050	0.060
7. Sluggish reaches, weedy, deep pools	0.050	0.070	0.080
8. Very weedy reaches, deep pools, or floodways with heavy stand of timber and underbrush	0.075	0.100	0.150

TABLE 5-6. VALUES OF THE ROUGHNESS COEFFICIENT n (*continued*)

Type of channel and description	Minimum	Normal	Maximum
b. Mountain streams, no vegetation in channel, banks usually steep, trees and brush along banks submerged at high stages			
1. Bottom: gravels, cobbles, and few boulders	0.030	0.040	0.050
2. Bottom: cobbles with large boulders	0.040	0.050	0.070
Flood plains			
a. Pasture, no brush			
1. Short grass	0.025	0.030	0.035
2. High grass	0.030	0.035	0.050
b. Cultivated areas			
1. No crop	0.020	0.030	0.040
2. Mature row crops	0.025	0.035	0.045
3. Mature field crops	0.030	0.040	0.050
c. Brush			
1. Scattered brush, heavy weeds	0.035	0.050	0.070
2. Light brush and trees, in winter	0.035	0.050	0.060
3. Light brush and trees, in summer	0.040	0.060	0.080
4. Medium to dense brush, in winter	0.045	0.070	0.110
5. Medium to dense brush, in summer	0.070	0.100	0.160
d. Trees			
1. Dense willows, summer, straight	0.110	0.150	0.200
2. Cleared land with tree stumps, no sprouts	0.030	0.040	0.050
3. Same as above, but with heavy growth of sprouts	0.050	0.060	0.080
4. Heavy stand of timber, a few down trees, little undergrowth, flood stage below branches	0.080	0.100	0.120
5. Same as above, but with flood stage reaching branches	0.100	0.120	0.160
Major streams (top width at flood stage >100 ft). The n value is less than that for minor streams of similar description, because banks offer less effective resistance.			
a. Regular section with no boulders or brush	0.025	.....	0.060
b. Irregular and rough section	0.035	.....	0.100

Appendix C

Site Photos

This page is intentionally left blank to facilitate 2-sided printing.

Section 10: Looking Downstream

Section 10: Looking Upstream

Section 180 Looking Downstream

Section 180 Looking Upstream

Section 376 Looking Downstream

Section 376 Looking Upstream

Section 405 Looking Downstream

Section 405 Looking Downstream, Stairs

Section 405 Looking Upstream

Section 508 Looking Downstream

Section 508 Looking Upstream Left Bank

Section 508 Looking Upstream Right Bank

Section 598 Looking Downstream

Section 598 Looking Upstream

Section 1350 Looking Downstream

Section 1520 Looking Downstream

Section 1520 Looking Downstream Right Bank Bridge Abutment

Section 1535 Looking Downstream Left Bank Bridge Abutment

Section 1535 Downstream Right Bank Bridge Abutment

Section 1580 Looking Upstream Left Bank

Section 1580 Looking Upstream Right Bank Trees

Section 1700 Looking Downstream

Section 1700 Looking Downstream Past Bridge

Section 1700 Looking Upstream Right Bank

Section 1700 Looking Upstream

Section 1930 Looking Downstream

Section 1930 Right Bank

Section 1930 Looking Upstream

Section 1995 Looking Downstream

Section 1995 Left Bank

Section 1995 Looking Upstream

Section 2191.66 Looking Downstream

Section 2191.66 Looking Upstream Right Bank

Section 2191.66 Looking Upstream

Section 2212.30 Looking Downstream

Section 2212.30 Looking Upstream Left Bank

Section 2212.30 Looking Downstream Right Bank

Section 2212.30 Looking Upstream

Section 2380 Looking Downstream

Section 2380 Looking Upstream

Section 2383 Looking Downstream

Section 2383 Looking Upstream

Section 2475 Looking Downstream

Section 2475 Left Bank

Section 2475 Looking Upstream

Section 2509 Left Bank

Section 2509 Right Bank Mudslide

Section 2509 Looking Upstream Right Bank Mudslide

Section 2530 Looking Downstream Lateral Right

Section 2530 Looking Upstream Lateral Right

Section 2560 Looking Downstream

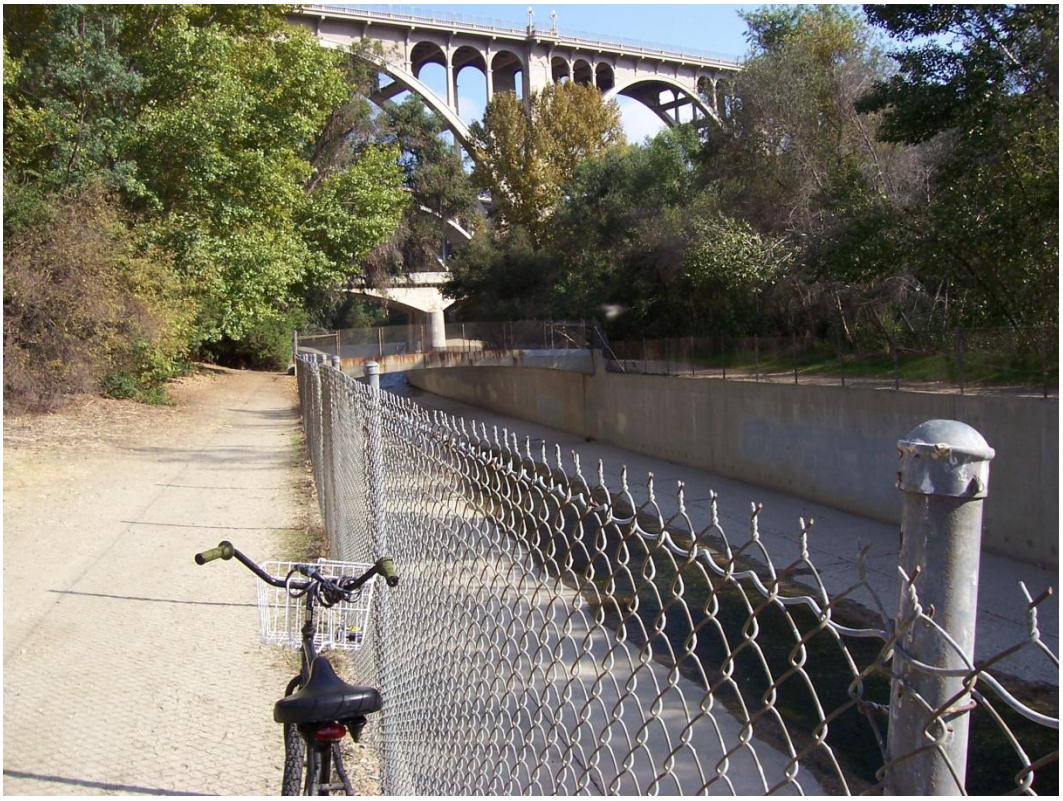
Section 2560 Left Bank

Section 2655 Looking Downstream Left Bank

Section 2655 Right Bank

Section 2655 Looking Downstream Right Bank

Section 2720 Looking Downstream



Section 2720 Looking Upstream

Section 2770 Looking Downstream of Entrance Structure to Channel

Section 2770 Looking Upstream of Entrance Structure to Channel 1

Section 2770 Looking Upstream Entrance Structure to Channel 2

Section 2770 Looking Upstream Entrance Structure to Channel 3

Section 2795 Looking Downstream

Section 2795 Looking Downstream Left Bank

Section 2795 Left Bank

Section 2795 Right Bank

Section 2795 Looking Upstream

Section 2800 Looking Downstream

Section 2800 Left Bank

Section 2800+ Looking Downstream

Section 2800+ Left Bank 1

Section 2800+ Left Bank 2

Section 2820 Looking Downstream

Section 2820 Looking Downstream of Cutoff

Section 2820 Right Bank

Section 2820 Looking Downstream Right Bank

Section 2830 Looking Downstream of Bridge

Section 2830 Looking Upstream

Section 2930 Looking Downstream

Section 3001.36 Looking Downstream

Section 3001.36 Looking Upstream

Section 3023 Looking Downstream

Section 3060 Second Bridge

Section 3060 Looking Downstream Third Bridge

Section 3060 Looking Downstream

Section 3060 Looking Upstream

Section 3090 Looking Downstream

Section 3090 Looking Upstream

Section 3130 Grade Structure

Section 3130 Looking Downstream

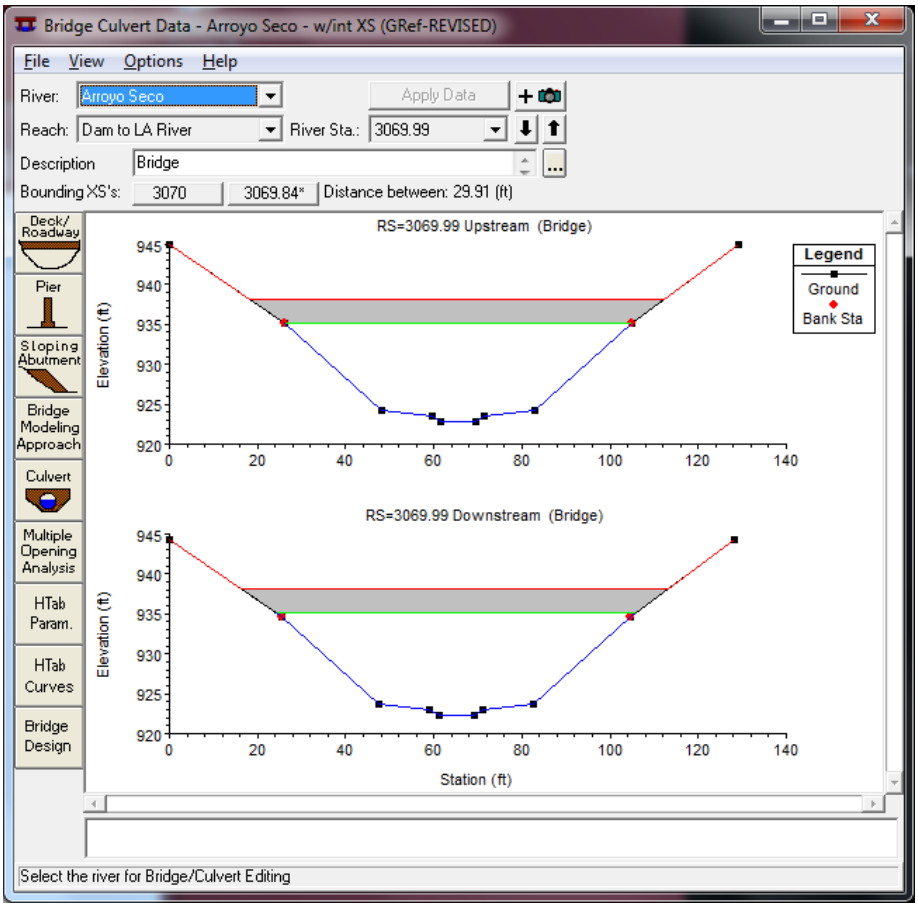
Section 3130 Looking Upstream

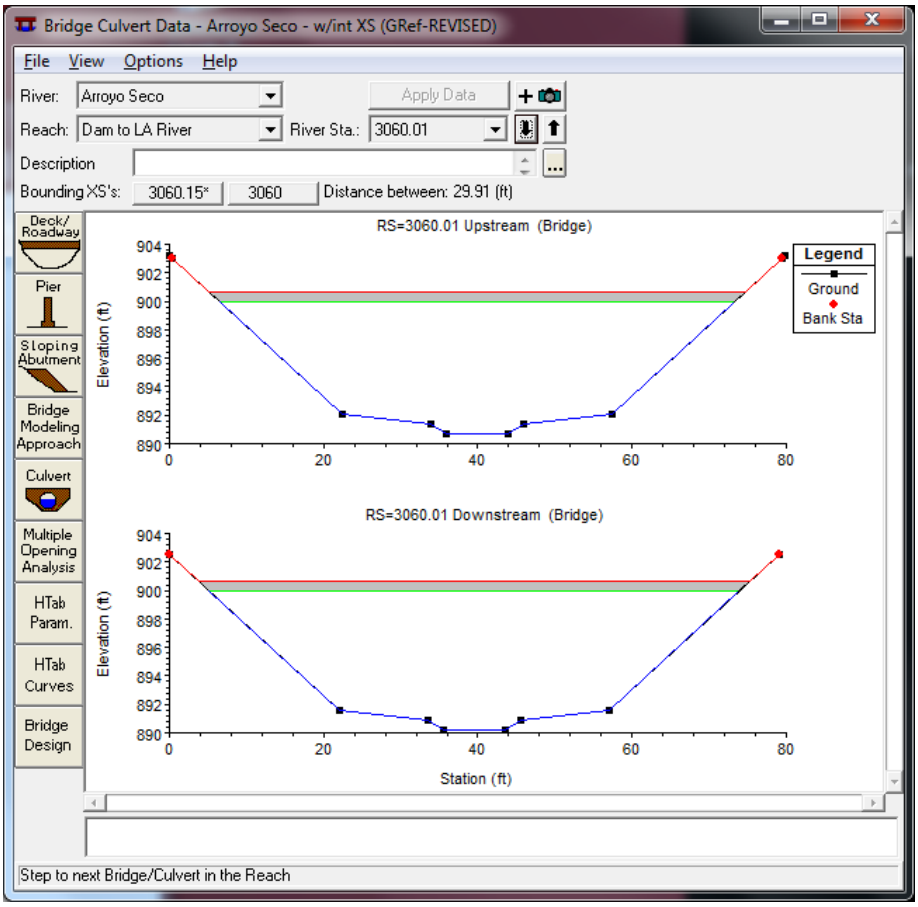
This page is intentionally left blank to facilitate 2-sided printing.

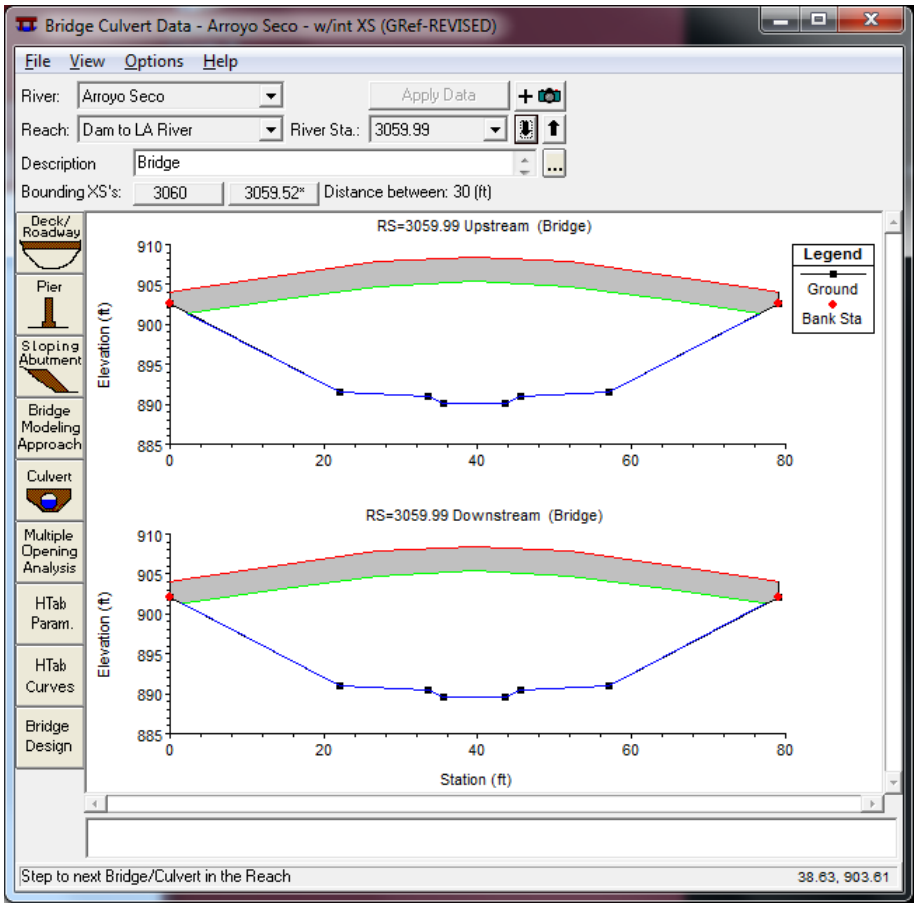
Appendix D

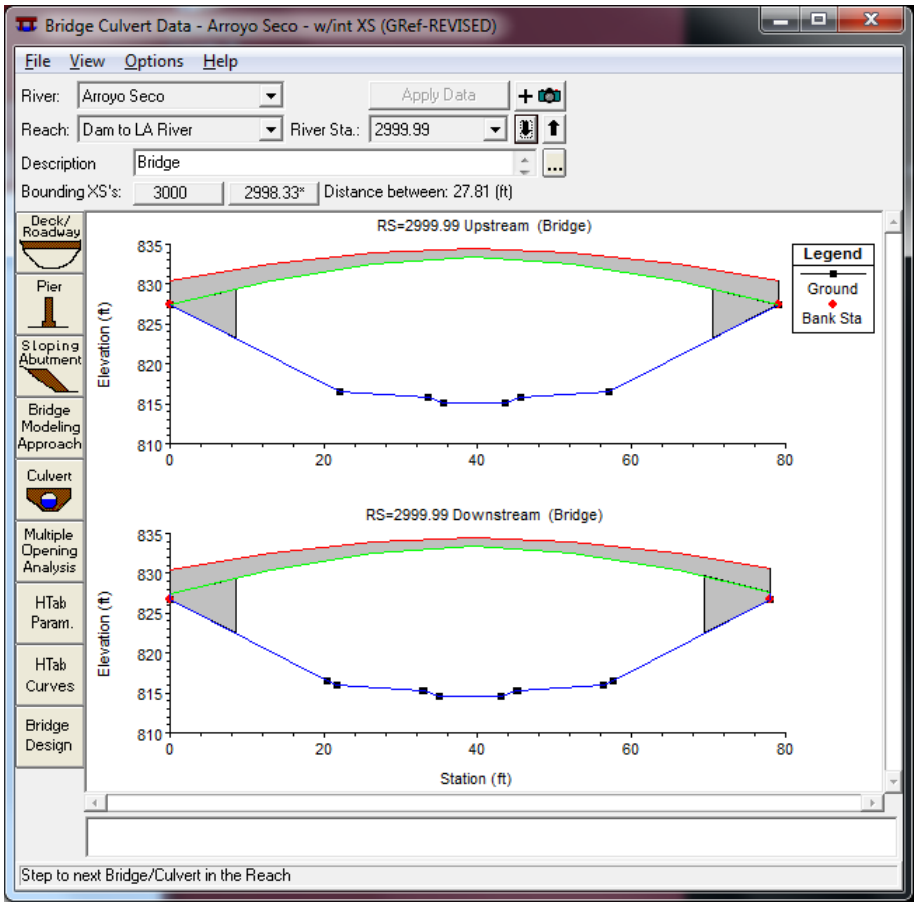
Cross Sections of Obstructions

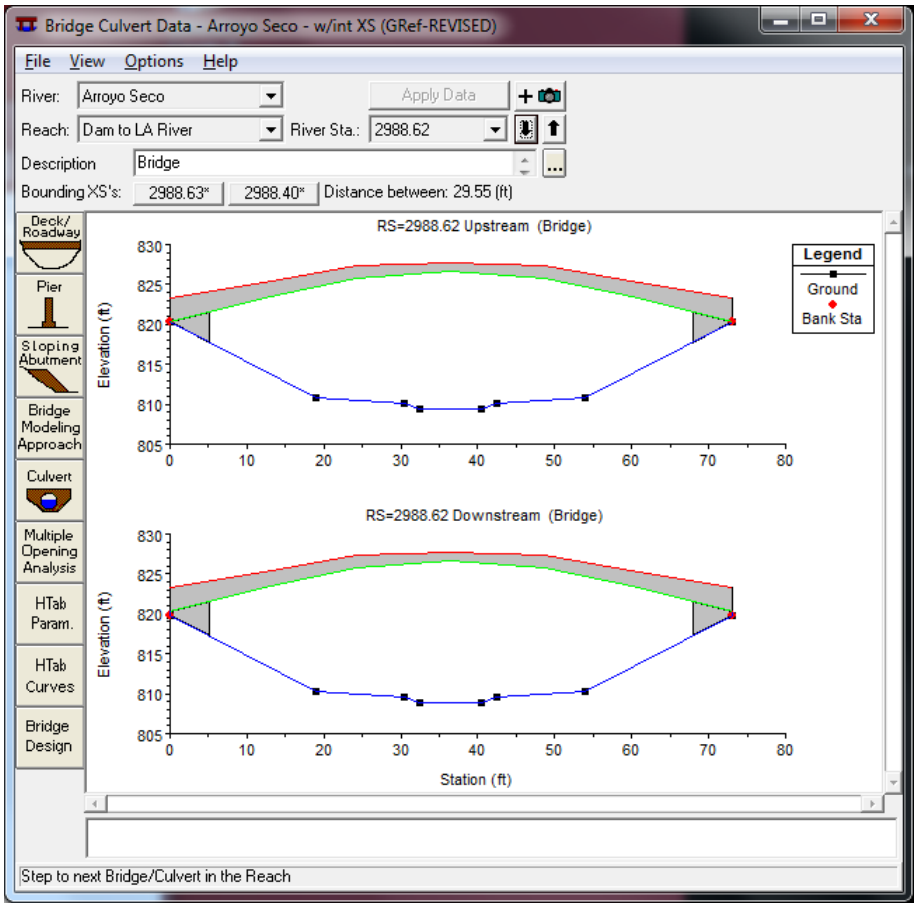
This page is intentionally left blank to facilitate 2-sided printing.

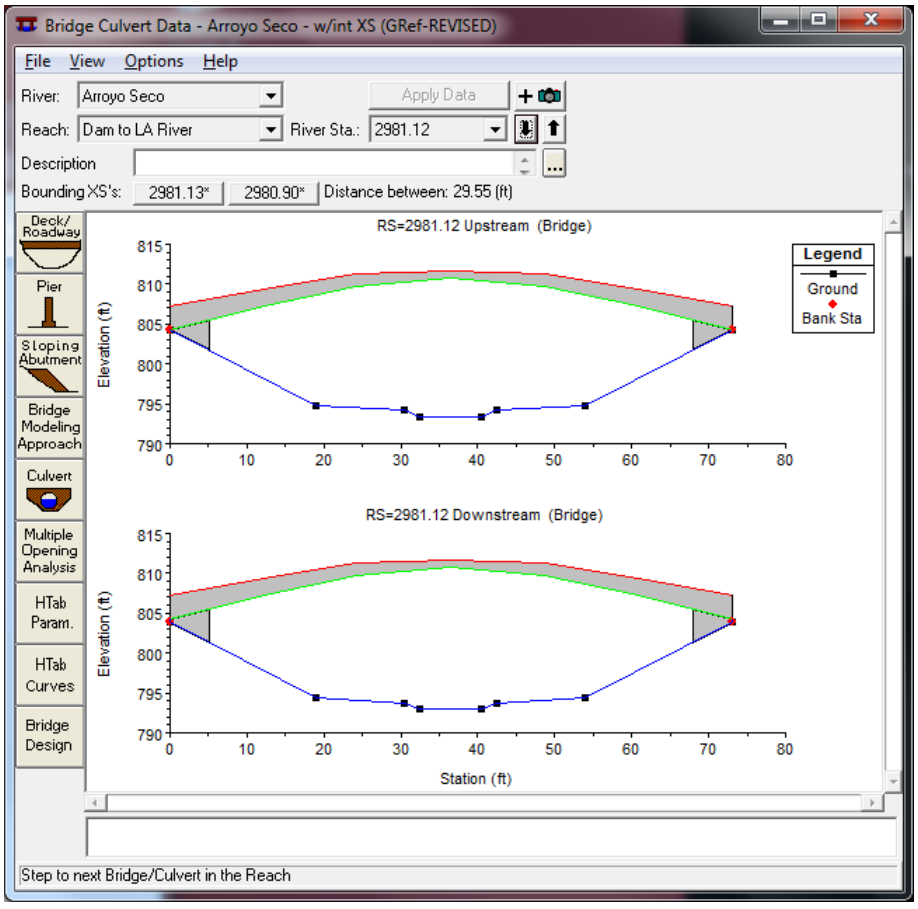

Bridge Culvert Data - Arroyo Seco - w/int XS (GRef-REVISED)
File View Options Help
River: Arroyo Seco
Apply Data
Reach: Dam to LA River
River Sta.: 3069.99
Description: Bridge
Bounding XS's: 3070 3069.84* Distance between: 29.91 (ft)
Deck/ Roadway
Pier
Sloping Abutment
Bridge Modeling Approach
Culvert
Multiple Opening Analysis
HTab Param.
HTab Curves
Bridge Design
RS=3069.99 Upstream (Bridge)
RS=3069.99 Downstream (Bridge)
Elevation (ft)
Station (ft)
Legend
Ground
Bank Sta
Select the river for Bridge/Culvert Editing

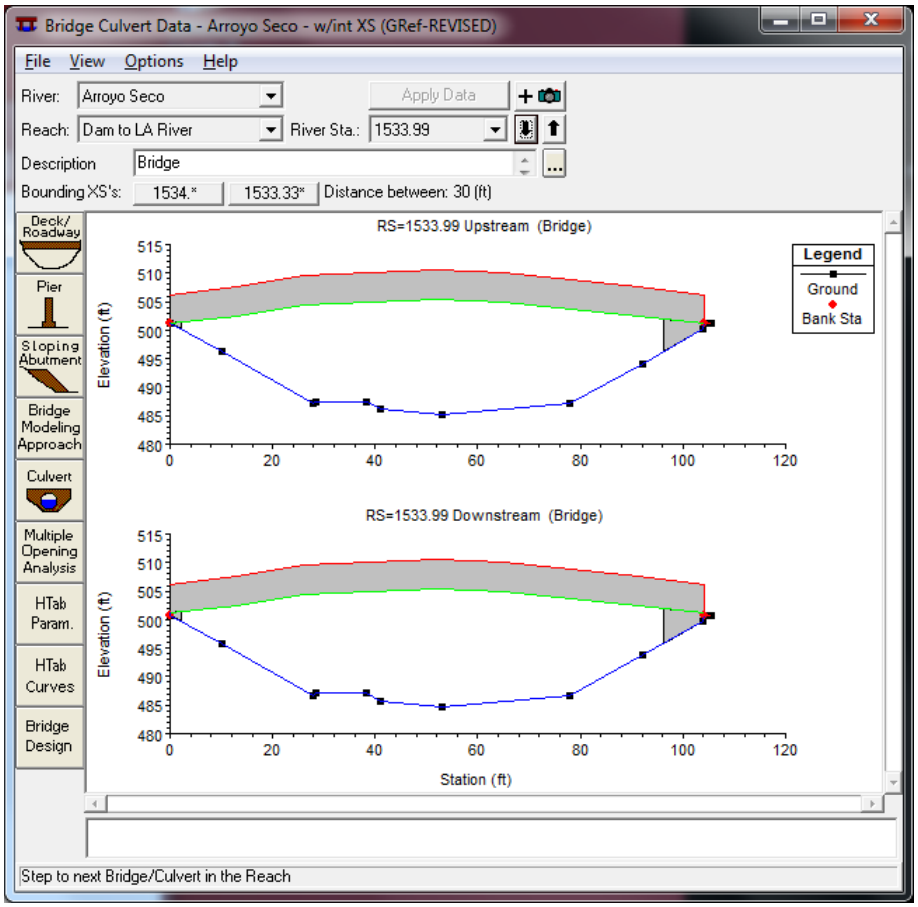

Bridge Culvert Data - Arroyo Seco - w/int XS (GRef-REVISED)
File View Options Help
River: Arroyo Seco
Apply Data
Reach: Dam to LA River
River Sta.: 3060.01
Description:
Bounding XS's: 3060.15* 3060 Distance between: 29.91 (ft)
Deck/ Roadway
Pier
Sloping Abutment
Bridge Modeling Approach
Culvert
Multiple Opening Analysis
HTab Param.
HTab Curves
Bridge Design
RS=3060.01 Upstream (Bridge)
RS=3060.01 Downstream (Bridge)
Elevation (ft)
Station (ft)
Legend
Ground
Bank Sta
Step to next Bridge/Culvert in the Reach

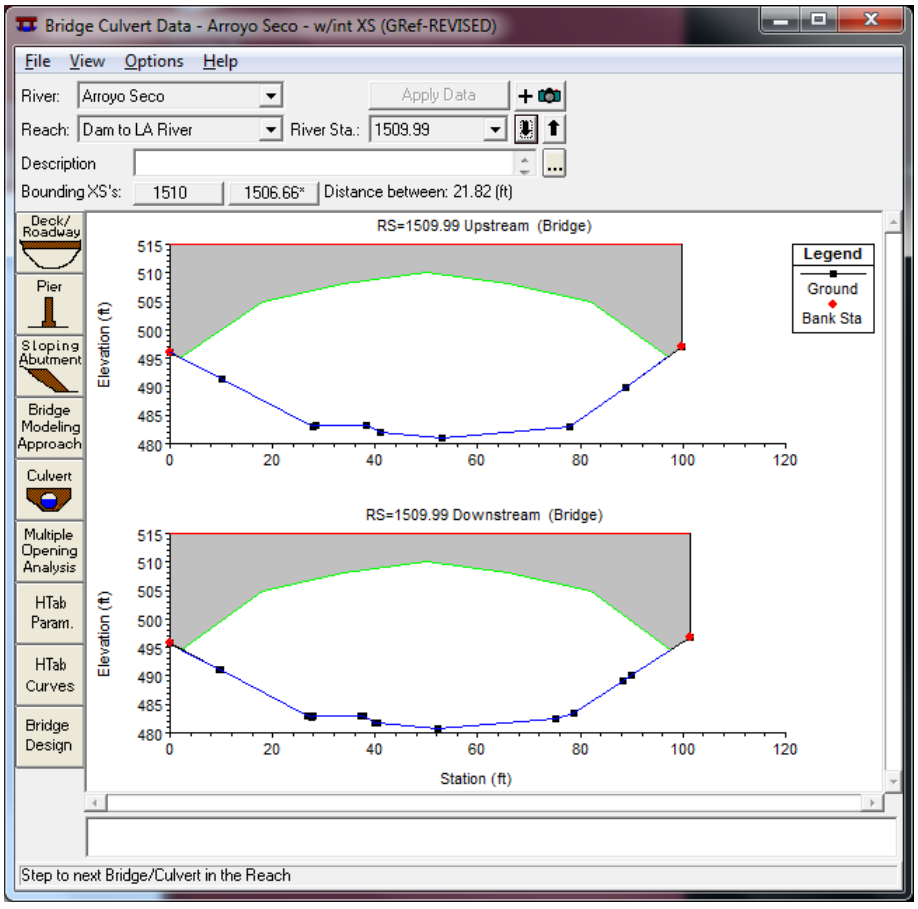

Bridge Culvert Data - Arroyo Seco - w/int XS (GRef-REVISED)
File View Options Help
River: Arroyo Seco
Apply Data
Reach: Dam to LA River
River Sta.: 3059.99
Description: Bridge
Bounding XS's: 3060 3059.52* Distance between: 30 (ft)
Deck/ Roadway
Pier
Sloping Abutment
Bridge Modeling Approach
Culvert
Multiple Opening Analysis
HTab Param.
HTab Curves
Bridge Design
RS=3059.99 Upstream (Bridge)
RS=3059.99 Downstream (Bridge)
Elevation (ft)
Station (ft)
Legend
Ground
Bank Sta
Step to next Bridge/Culvert in the Reach
38.63, 903.61

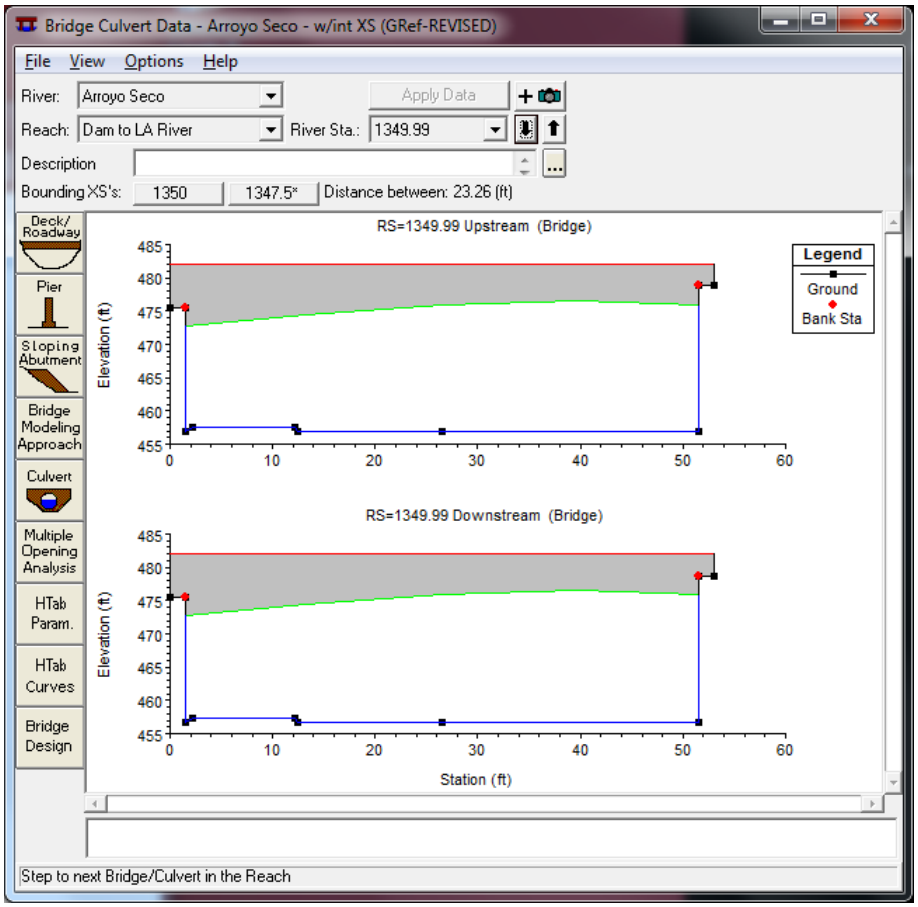

Bridge Culvert Data - Arroyo Seco - w/int XS (GRef-REVISED)
File View Options Help
River: Arroyo Seco
Apply Data
Reach: Dam to LA River
River Sta.: 2999.99
Description: Bridge
Bounding XS's: 3000 2998.33* Distance between: 27.81 (ft)
Deck/ Roadway
Pier
Sloping Abutment
Bridge Modeling Approach
Culvert
Multiple Opening Analysis
HTab Param.
HTab Curves
Bridge Design
RS=2999.99 Upstream (Bridge)
RS=2999.99 Downstream (Bridge)
Elevation (ft)
Station (ft)
Legend
Ground
Bank Sta
Step to next Bridge/Culvert in the Reach

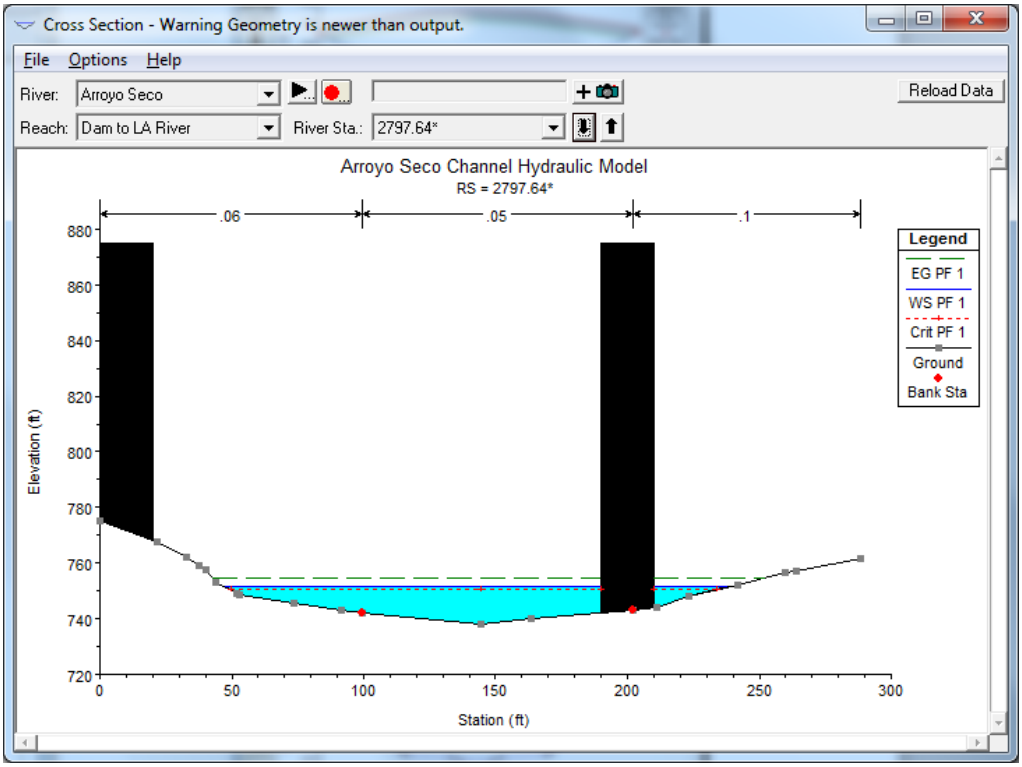

Bridge Culvert Data - Arroyo Seco - w/int XS (GRef-REVISED)
File View Options Help
River: Arroyo Seco
Apply Data
Reach: Dam to LA River
River Sta.: 2988.62
Description: Bridge
Bounding XS's: 2988.63* 2988.40* Distance between: 29.55 (ft)
Deck/ Roadway
Pier
Sloping Abutment
Bridge Modeling Approach
Culvert
Multiple Opening Analysis
HTab Param.
HTab Curves
Bridge Design
RS=2988.62 Upstream (Bridge)
Legend
Ground
Bank Sta
Elevation (ft)
RS=2988.62 Downstream (Bridge)
Station (ft)
Step to next Bridge/Culvert in the Reach

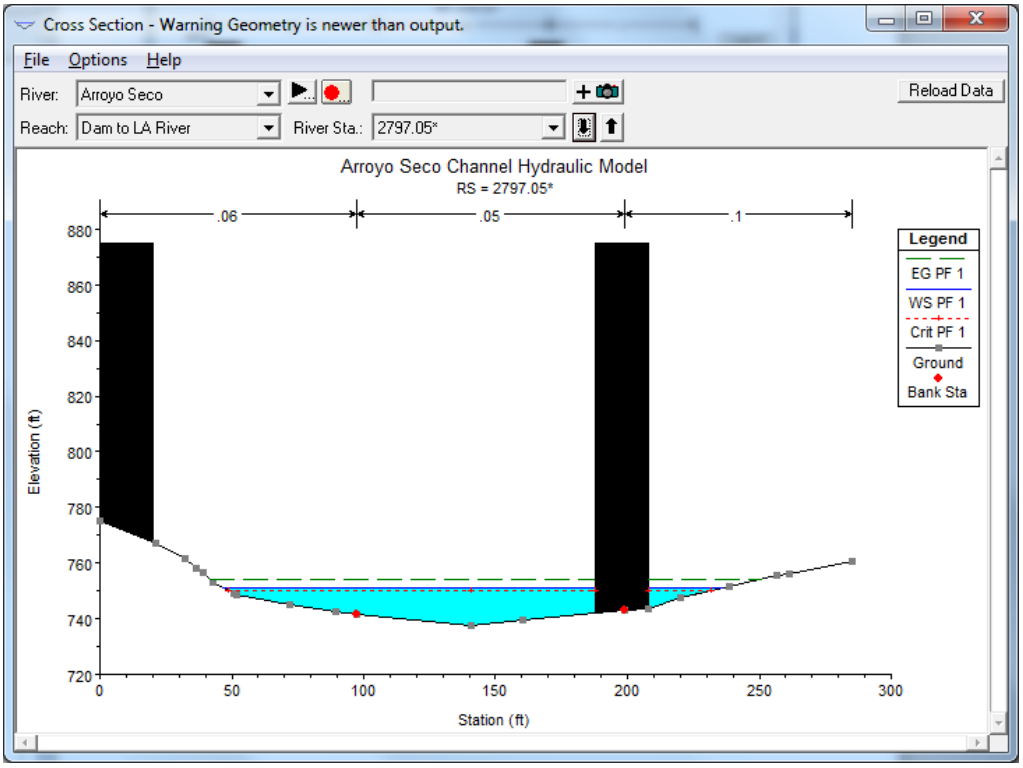

Bridge Culvert Data - Arroyo Seco - w/int XS (GRef-REVISED)
File View Options Help
River: Arroyo Seco
Apply Data
Reach: Dam to LA River
River Sta.: 2981.12
Description:
Bounding XS's: 2981.13* 2980.90* Distance between: 29.55 (ft)
Deck/ Roadway
Pier
Sloping Abutment
Bridge Modeling Approach
Culvert
Multiple Opening Analysis
HTab Param.
HTab Curves
Bridge Design
RS=2981.12 Upstream (Bridge)
Legend
Ground
Bank Sta
Elevation (ft)
RS=2981.12 Downstream (Bridge)
Station (ft)
Step to next Bridge/Culvert in the Reach

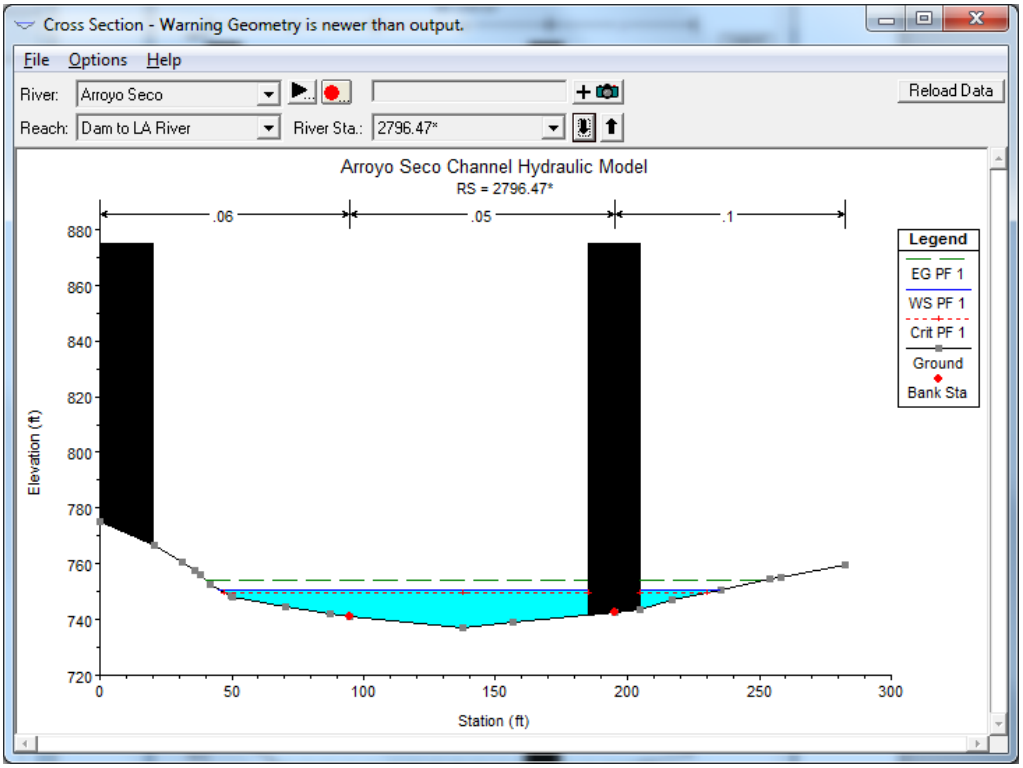

Bridge Culvert Data - Arroyo Seco - w/int XS (GRef-REVISED)
File View Options Help
River: Arroyo Seco
Apply Data
Reach: Dam to LA River
River Sta.: 1533.99
Description: Bridge
Bounding XS's: 1534.* 1533.33* Distance between: 30 (ft)
Deck/ Roadway
Pier
Sloping Abutment
Bridge Modeling Approach
Culvert
Multiple Opening Analysis
HTab Param.
HTab Curves
Bridge Design
RS=1533.99 Upstream (Bridge)
Legend
Ground
Bank Sta
Elevation (ft)
RS=1533.99 Downstream (Bridge)
Station (ft)
Step to next Bridge/Culvert in the Reach

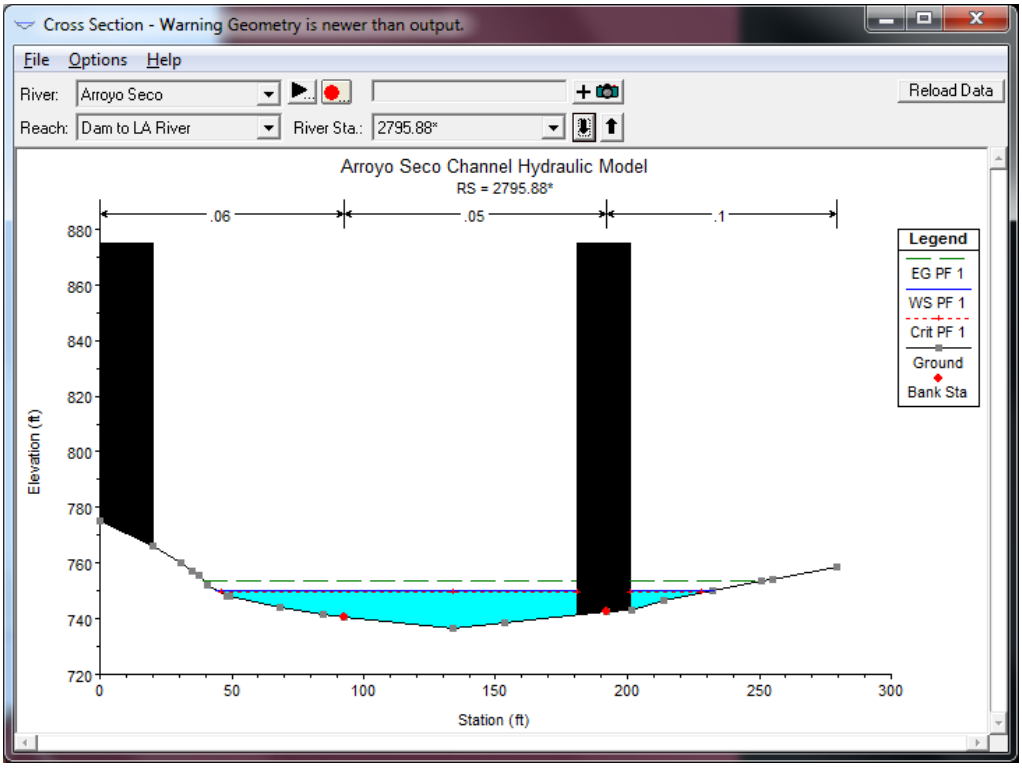

Bridge Culvert Data - Arroyo Seco - w/int XS (GRef-REVISED)
File View Options Help
River: Arroyo Seco
Apply Data
Reach: Dam to LA River
River Sta.: 1509.99
Description:
Bounding XS's: 1510 1506.66* Distance between: 21.82 (ft)
Deck/ Roadway
Pier
Sloping Abutment
Bridge Modeling Approach
Culvert
Multiple Opening Analysis
HTab Param.
HTab Curves
Bridge Design
RS=1509.99 Upstream (Bridge)
Legend
Ground
Bank Sta
Elevation (ft)
RS=1509.99 Downstream (Bridge)
Station (ft)
Step to next Bridge/Culvert in the Reach

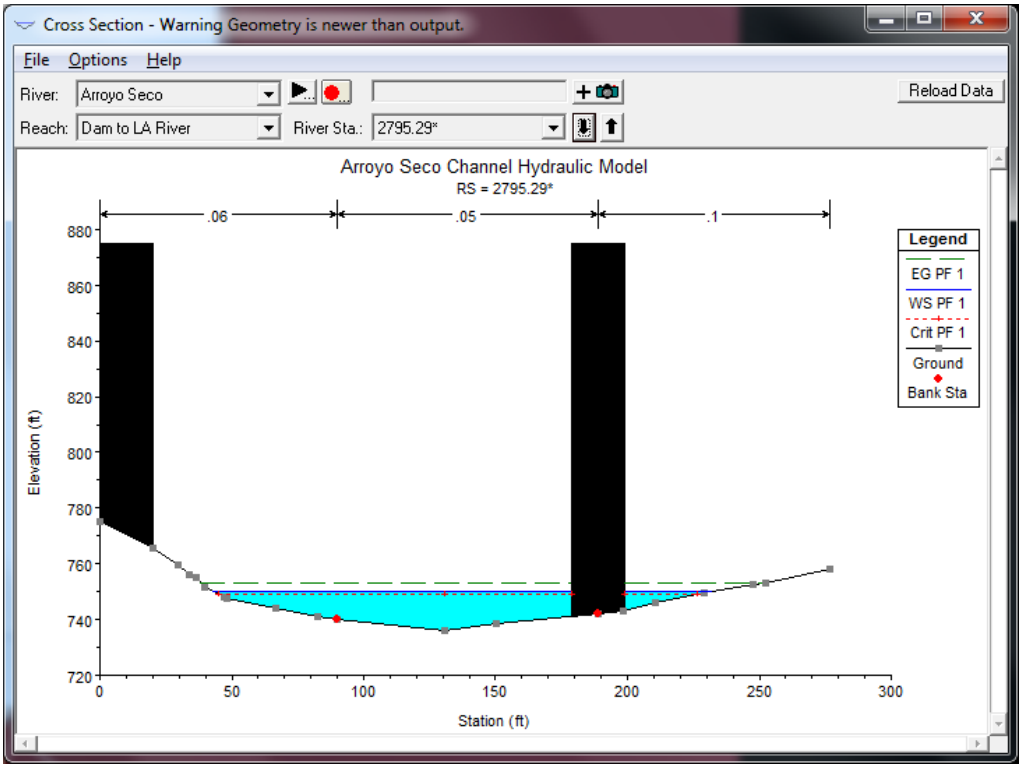

Bridge Culvert Data - Arroyo Seco - w/int XS (GRef-REVISED)
File View Options Help
River: Arroyo Seco
Apply Data
Reach: Dam to LA River
River Sta.: 1349.99
Description
Bounding XS's: 1350 1347.5*
Distance between: 23.26 (ft)
Deck/ Roadway
Pier
Sloping Abutment
Bridge Modeling Approach
Culvert
Multiple Opening Analysis
HTab Param.
HTab Curves
Bridge Design
RS=1349.99 Upstream (Bridge)
RS=1349.99 Downstream (Bridge)
Elevation (ft)
Station (ft)
Legend
Ground
Bank Sta
Step to next Bridge/Culvert in the Reach

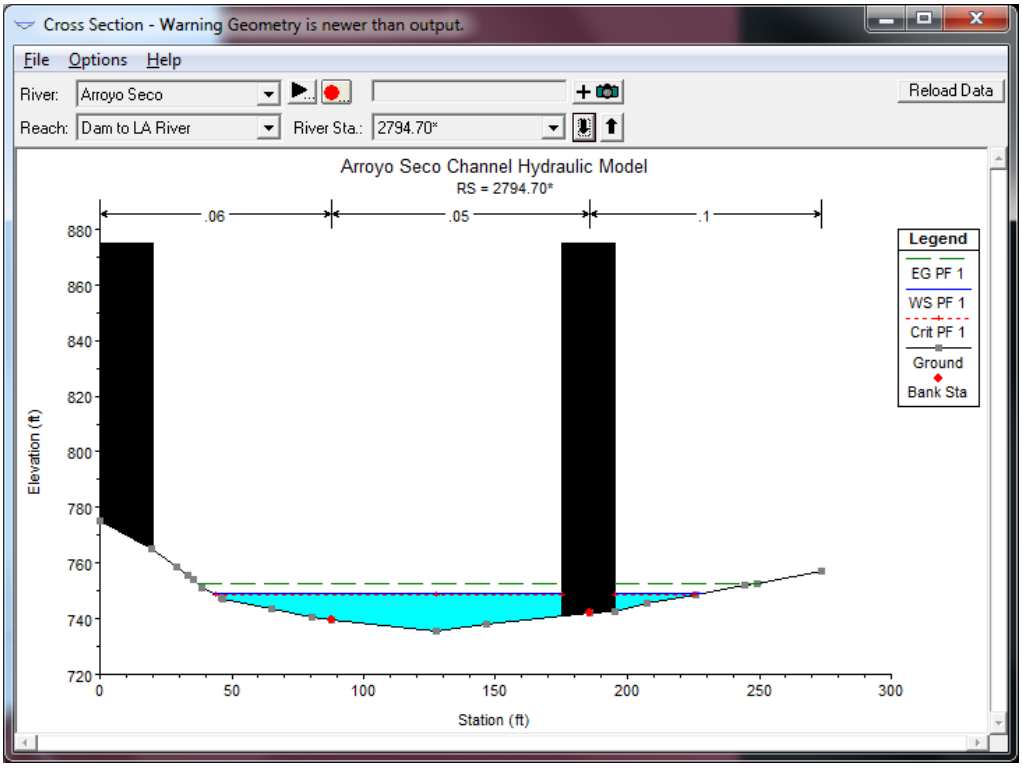

Cross Section - Warning Geometry is newer than output.
File Options Help
River: Arroyo Seco
Reach: Dam to LA River
River Sta.: 2797.64*
Reload Data
Arroyo Seco Channel Hydraulic Model
RS = 2797.64*
.06
.05
.1
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

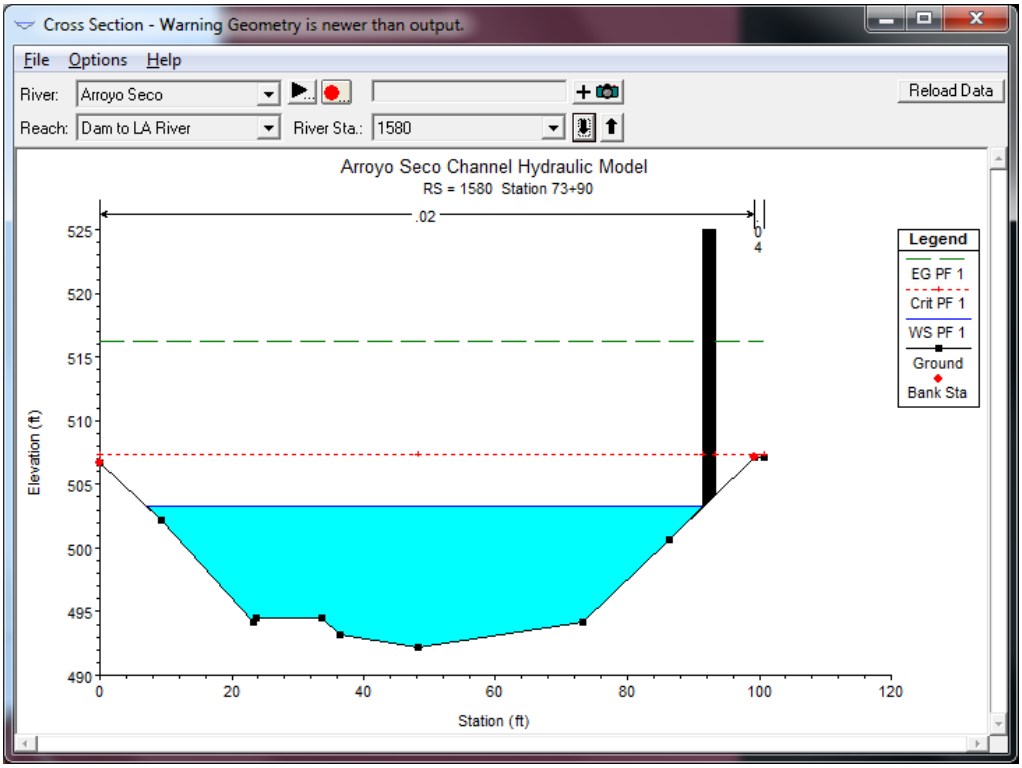

Cross Section - Warning Geometry is newer than output.
File Options Help
River: Arroyo Seco
Reach: Dam to LA River
River Sta.: 2797.05*
Reload Data
Arroyo Seco Channel Hydraulic Model
RS = 2797.05*
.06
.05
.1
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
880
860
840
820
800
780
760
740
720
0
50
100
150
200
250
300


Cross Section - Warning Geometry is newer than output.
File Options Help
River: Arroyo Seco
Reach: Dam to LA River
River Sta.: 2796.47*
Reload Data
Arroyo Seco Channel Hydraulic Model
RS = 2796.47*
.06
.05
.1
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
880
860
840
820
800
780
760
740
720
0
50
100
150
200
250
300


Cross Section - Warning Geometry is newer than output.
File Options Help
River: Arroyo Seco
Reach: Dam to LA River
River Sta.: 2795.88*
Reload Data
Arroyo Seco Channel Hydraulic Model
RS = 2795.88*
.06
.05
.1
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
880
860
840
820
800
780
760
740
720
0
50
100
150
200
250
300


Cross Section - Warning Geometry is newer than output.
File Options Help
River: Arroyo Seco
Reach: Dam to LA River
River Sta.: 2795.29*
Reload Data
Arroyo Seco Channel Hydraulic Model
RS = 2795.29*
.06
.05
.1
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
880
860
840
820
800
780
760
740
720
0
50
100
150
200
250
300


Cross Section - Warning Geometry is newer than output.
File Options Help
River: Arroyo Seco
Reach: Dam to LA River
River Sta.: 2794.70*
Reload Data
Arroyo Seco Channel Hydraulic Model
RS = 2794.70*
.06
.05
.1
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Cross Section - Warning Geometry is newer than output.
File Options Help
River: Arroyo Seco
Reach: Dam to LA River
River Sta.: 1580
Reload Data
Arroyo Seco Channel Hydraulic Model
RS = 1580 Station 73+90
.02
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

Appendix E

Freeboard and Superelevation

This page is intentionally left blank to facilitate 2-sided printing.

Table SE1: Superelevation for Supercritical Flow in Rectangular Channels $S_{max}=V^2b/gr$

Curve Information							Extension of Superelevation		Superelevation Characteristics			
Curve #	From Section	To Section	L	r	V	b	2L Maximum (Upstream)	5L Maximum (Downstream)	Superelevation to Right or Left?	S_{max}	Associated Upstream Station	Associated Downstream
4	2875	2860	660	4,000	37.8	60	1,320	3,300	**Right**	**0.7**	**2930**	**2860**
5	2860	2850	965	2,000	36.0	60	1,930	4,825	**Left**	**1.2**	**2982.04**	**2820**
6	2696.47	2680	315	1,200	40.3	50	630	1,575	**Right**	**2.1**	**2730**	**2650**
7	2650	2640	510	2,000	39.9	50	1,020	2,550	**Right**	**1.2**	**2670**	**2612.35**
8	2612.35	2604.7	450	2,700	40.8	50	900	2,250	**Left**	**1.0**	**2640**	**2560**
9	2570	2550	545	700	41.4	50	1,090	2,725	**Left**	**3.8**	**2591.76**	**2520**
10	2520	2490	845	820	41.3	50	1,690	4,225	**Right**	**3.2**	**2550**	**2390**
34	250	240	315	1,570	31.2	60	630	1,575	**Right**	**1.2**	**340**	**196.66**

S_{max}: Rise in water surface at the outerwall above the mean depth of flow (feet).

V: Velocity of the flow in feet per second.

b: Width of the channel in feet.

g: gravitational acceleration

r: Radius of the channel centerline curve in feet.

L: Length of curve in feet

Assumptions

Where hydraulic and geometric characteristics vary through the length of a curve, maximum observed values for V, b, z, D are used to provide conservative superelevation results. Additionally, where curved alignments contain both rectangular and trapezoidal cross sections, the trapezoidal formulas are used as they are more conservative.

Table SE2: Superelevation for Supercritical Flow in Trapezoidal Channels $S_{max}=1.3V^2(b+2zD)/gr$

Curve Information							Extension of Superelevation		Superelevation Characteristics			
Curve #	From STA	To STA	L	r	V	T	2L Maximum (Upstream)	5L Maximum (Downstream)	Superelevation to Right or Left?	S_{max}	Associated Upstream Station	Associated Downstream
1	3070	3065	970	4,000	38.8	73.0	1,940	4,850	**Right**	**1.1**	**3130**	**3065**
2	3065	3050	1,565	4,000	40.9	69.2	3,130	7,825	**Left**	**1.2**	**3065**	**3010**
3	3010	2990	1,050	4,000	42.1	67.1	2,100	5,250	**Right**	**1.2**	**3035.62**	**2860**
11	2390	2340	665	515	42.2	69.8	1,330	3,325	**Left**	**9.7**	**2490**	**2212.7**
12	2212.72	2200	155	600	31.4	98.5	310	775	**Right**	**6.5**	**2217.72**	**2190**
13	2190	2140	315	675	28.0	101.5	630	1,575	**Left**	**4.8**	**2200**	**2110**
14	2100	2090	125	320	27.6	106.3	250	625	**Right**	**10.2**	**2130**	**1970**
15	2090	1976	260	600	27.8	103.0	520	1,300	**Right**	**5.4**	**2130**	**1970**
16	1970	1930	125	320	30.7	91.0	250	625	**Left**	**10.8**	**1976**	**1852.66**
17	1807	1760	270	520	27.7	92.8	540	1,350	**Left**	**5.5**	**1852.66**	**1730**
18	1740	1690	305	250	27.68	93.4	610	1,525	**Right**	**11.6**	**1760**	**1540**
19	1630	1600	120	640	28.6	83.1	240	600	**Right**	**4.3**	**1700**	**1540**
20	1540	1520	585	800	30.4	85.4	1,170	2,925	**Left**	**4.0**	**1600**	**1500**
21	1500	1478	195	520	30.6	84.5	390	975	**Right**	**6.1**	**1520**	**1470**
22	1470	1450	195	630	30.3	86.1	390	975	**Left**	**5.1**	**1478**	**1420**
23	1440	1430	160	600	30.1	86.5	320	800	**Left**	**5.3**	**1460**	**1400**
25	1230	1171.33	120	650	28.4	83.0	240	600	**Left**	**4.2**	**1280**	**1141.81**
26	1040	1020	245	585	32.6	77.7	490	1,225	**Right**	**5.7**	**1140**	**794.444**
27	950	830	425	1,085	32.4	77.7	850	2,125	**Right**	**3.0**	**1040**	**620**
28	720	710	265	1,140	32.8	76.7	530	1,325	**Right**	**2.9**	**790**	**610**
29	610	600	300	645	32.8	77.1	600	1,500	**Left**	**5.2**	**629**	**540**
30	540	520	465	780	32.1	57.0	930	2,325	**Right**	**3.0**	**600**	**460**
31	460	420	295	550	31.2	73.7	590	1,475	**Left**	**5.3**	**520**	**374.583**
32	380	370	170	1,000	27.7	78.1	340	850	**Left**	**2.4**	**403.684**	**310**
33	370	340	740	1,100	30.7	76.5	1,480	3,700	**Left**	**2.6**	**385**	**250**
35	210	200	560	2,000	30.7	74.8	1,120	2,800	**Right**	**1.4**	**242.142**	**160**
36	90	50	200	1,500	34.0	72.1	400	1,000	**Right**	**2.2**	**135**	**10**

Table SE3: Superelevation for Subcritical Flow in Trapezoidal Channels $S_{max}=1.15V^2(b+2zD)/2gr$

Curve Information							Extension of Superelevation		Superelevation Characteristics			
Curve #	From STA	To STA	L	r	V	T	2L Maximum (Upstream)	5L Maximum (Downstream)	Superelevation to Right or Left?	S_{max}	Associated Upstream Station	Associated Downstream
24	1400	1350	135	525	22.2	98	270	675	**Right**	**1.6**	**1430**	**1230**

S_{max}: Rise in water surface at the outerwall above the mean depth of flow (feet).

L: Length of curve in feet

V: Velocity of the flow in feet per second.

b: Bottom width of the channel in feet.

z: Horizontal to vertical ratio of channel bank slope

D: Depth of flow in ft

g: gravitational acceleration

r: Radius of the channel centerline curve in feet.

T=b+2zD (Channel Top Width)

Assumptions

Where hydraulic and geometric characteristics vary through the length of a curve, maximum observed values for V and T are used to provide conservative superelevation results. Additionally, where curved alignments contain both rectangular and trapezoidal cross sections, the trapezoidal formulas are used as they are more conservative.

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
-	-	3160	Natural	13.2	960.8	950.0	n/a	n/a	n/a	n/a	n/a	950.0	n/a	n/a	n/a	n/a	n/a	-
-	-	3159.16*	Natural	13.6	959.6	949.8	n/a	n/a	n/a	n/a	n/a	949.6	n/a	n/a	n/a	n/a	n/a	-
-	-	3158.33*	Natural	11.5	961.7	953.8	n/a	n/a	n/a	n/a	n/a	949.2	n/a	n/a	n/a	n/a	n/a	-
-	-	3157.5*	Natural	10.9	961.3	953.4	n/a	n/a	n/a	n/a	n/a	948.7	n/a	n/a	n/a	n/a	n/a	-
-	-	3156.66*	Natural	10.2	961.0	953.0	n/a	n/a	n/a	n/a	n/a	948.3	n/a	n/a	n/a	n/a	n/a	-
-	-	3155.83*	Natural	9.6	960.7	952.6	n/a	n/a	n/a	n/a	n/a	947.9	n/a	n/a	n/a	n/a	n/a	-
-	-	3155.*	Natural	8.9	960.5	952.3	n/a	n/a	n/a	n/a	n/a	947.5	n/a	n/a	n/a	n/a	n/a	-
-	-	3154.16*	Natural	8.2	960.3	951.9	n/a	n/a	n/a	n/a	n/a	947.1	n/a	n/a	n/a	n/a	n/a	-
-	-	3153.33*	Natural	7.6	960.1	951.5	n/a	n/a	n/a	n/a	n/a	946.7	n/a	n/a	n/a	n/a	n/a	-
-	-	3152.5*	Natural	8.6	960.3	951.1	n/a	n/a	n/a	n/a	n/a	946.2	n/a	n/a	n/a	n/a	n/a	-
-	-	3151.66*	Natural	8.1	960.1	950.8	n/a	n/a	n/a	n/a	n/a	945.8	n/a	n/a	n/a	n/a	n/a	-
-	-	3150	Natural	6.4	959.9	950.0	n/a	n/a	n/a	n/a	n/a	950.0	n/a	n/a	n/a	n/a	n/a	-
-	-	3140	Natural	6.3	959.6	955.0	n/a	n/a	n/a	n/a	n/a	950.0	n/a	n/a	n/a	n/a	n/a	-
-	-	3136.66*	Natural	7.1	959.3	950.7	n/a	n/a	n/a	n/a	n/a	947.3	n/a	n/a	n/a	n/a	n/a	-
-	-	3133.33*	Natural	8.5	958.8	946.3	n/a	n/a	n/a	n/a	n/a	944.7	n/a	n/a	n/a	n/a	n/a	-
-	-	3130	Rectangular	19.5	953.4	959.0	5.6	0.0	5.6	2.0	Yes	959.0	5.6	1.1	4.5	2.1	Yes	-
-	-	3120	Rectangular	33.2	940.9	953.2	12.3	0.0	12.3	2.0	Yes	953.2	12.3	1.1	11.2	2.1	Yes	-
-	-	3115.*	Rectangular	32.4	941.2	949.1	7.9	0.0	7.9	2.0	Yes	949.1	7.9	1.1	6.8	2.1	Yes	-
-	-	3110	Rectangular	31.4	941.7	945.1	3.4	0.0	3.4	2.0	Yes	945.1	3.4	1.1	2.3	2.1	Yes	-
-	-	3105.*	Rectangular	30.1	942.4	944.8	2.4	0.0	2.4	2.0	Yes	944.8	2.4	1.1	1.3	2.1	No	-
-	-	3100	Rectangular	27.9	943.7	944.5	0.8	0.0	0.8	2.0	No	944.5	0.8	1.1	-0.3	2.1	No	1
-	-	3099.23*	Rectangular	28.1	943.2	944.0	0.8	0.0	0.8	2.0	No	944.0	0.8	1.1	-0.3	2.1	No	1
-	-	3098.46*	Rectangular	28.4	942.8	943.5	0.7	0.0	0.7	2.0	No	943.5	0.7	1.1	-0.4	2.1	No	1
-	-	3097.69*	Rectangular	28.6	942.4	943.1	0.7	0.0	0.7	2.0	No	943.1	0.7	1.1	-0.4	2.1	No	1
-	-	3096.92*	Rectangular	28.8	942.0	942.6	0.6	0.0	0.6	2.0	No	942.6	0.6	1.1	-0.5	2.1	No	1
-	-	3096.15*	Rectangular	29.0	941.6	942.1	0.5	0.0	0.5	2.0	No	942.1	0.5	1.1	-0.6	2.1	No	1
-	-	3095.38*	Rectangular	29.2	941.2	941.6	0.5	0.0	0.5	2.0	No	941.6	0.5	1.1	-0.6	2.1	No	1
-	-	3094.61*	Rectangular	29.4	940.8	941.1	0.4	0.0	0.4	2.0	No	941.1	0.4	1.1	-0.7	2.1	No	1
-	-	3093.84*	Rectangular	29.6	940.4	940.7	0.3	0.0	0.3	2.0	No	940.7	0.3	1.1	-0.8	2.1	No	1
-	-	3093.07*	Rectangular	29.7	940.0	940.2	0.2	0.0	0.2	2.0	No	940.2	0.2	1.1	-0.9	2.1	No	1
-	-	3092.30*	Rectangular	29.9	939.7	939.7	0.1	0.0	0.1	2.0	No	939.7	0.1	1.1	-1.0	2.1	No	1
-	-	3091.53*	Rectangular	30.0	939.3	939.2	-0.1	0.0	-0.1	2.0	No	939.2	-0.1	1.1	-1.2	2.1	No	1
-	-	3090.76*	Rectangular	30.2	939.0	938.8	-0.2	0.0	-0.2	2.0	No	938.8	-0.2	1.1	-1.3	2.1	No	1
-	-	3090	Rectangular	30.3	938.6	938.3	-0.3	0.0	-0.3	2.0	No	938.3	-0.3	1.1	-1.4	2.1	No	1
-	-	3080	Trapezoidal	30.7	938.1	938.1	-0.1	0.0	-0.1	2.5	No	938.1	-0.1	1.1	-1.2	2.5	No	1
-	-	3078.*	Trapezoidal	31.9	936.6	937.5	0.9	0.0	0.9	2.5	No	937.5	0.9	1.1	-0.2	2.5	No	1
-	-	3076.*	Trapezoidal	32.6	935.6	936.9	1.3	0.0	1.3	2.5	No	936.9	1.3	1.1	0.2	2.5	No	-
-	-	3074.*	Trapezoidal	33.1	934.8	936.3	1.5	0.0	1.5	2.5	No	936.3	1.5	1.1	0.4	2.5	No	-
-	-	3072.*	Trapezoidal	33.4	934.2	935.7	1.5	0.0	1.5	2.5	No	935.7	1.5	1.1	0.4	2.5	No	-
1	Left	3070	Trapezoidal	33.6	933.7	935.1	1.4	0.0	1.4	2.5	No	935.1	1.4	1.1	0.3	2.5	No	-
1	Left	3069.99	Obstruction	Bridge		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-
1	Left	3069.84*	Trapezoidal	33.8	933.2	934.7	1.5	0.0	1.5	2.5	No	934.7	1.5	1.1	0.4	2.5	No	-
1	Left	3069.69*	Trapezoidal	34.1	932.6	934.2	1.5	0.0	1.5	2.5	No	934.2	1.5	1.1	0.4	2.5	No	-
1	Left	3069.54*	Trapezoidal	34.3	932.1	933.7	1.6	0.0	1.6	2.5	No	933.7	1.6	1.1	0.5	2.5	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
1	Left	3069.39*	Trapezoidal	34.5	931.5	933.2	1.6	0.0	1.6	2.5	No	933.2	1.6	1.1	0.5	2.5	No	-
1	Left	3069.24*	Trapezoidal	34.8	931.0	932.7	1.7	0.0	1.7	2.5	No	932.7	1.7	1.1	0.6	2.5	No	-
1	Left	3069.09*	Trapezoidal	35.0	930.5	932.2	1.7	0.0	1.7	2.5	No	932.2	1.7	1.1	0.6	2.5	No	-
1	Left	3068.93*	Trapezoidal	35.2	929.9	931.7	1.8	0.0	1.8	3.5	No	931.7	1.8	1.1	0.7	3.5	No	-
1	Left	3068.78*	Trapezoidal	35.4	929.4	931.2	1.8	0.0	1.8	3.5	No	931.2	1.8	1.1	0.7	3.5	No	-
1	Left	3068.63*	Trapezoidal	35.5	928.9	930.7	1.9	0.0	1.9	3.5	No	930.7	1.9	1.1	0.8	3.5	No	-
1	Left	3068.48*	Trapezoidal	35.7	928.3	930.2	1.9	0.0	1.9	3.5	No	930.2	1.9	1.1	0.8	3.5	No	-
1	Left	3068.33*	Trapezoidal	35.9	927.8	929.7	1.9	0.0	1.9	3.5	No	929.7	1.9	1.1	0.8	3.5	No	-
1	Left	3068.18*	Trapezoidal	36.1	927.3	929.2	2.0	0.0	2.0	3.5	No	929.2	2.0	1.1	0.9	3.5	No	-
1	Left	3068.03*	Trapezoidal	36.2	926.7	928.7	2.0	0.0	2.0	3.5	No	928.7	2.0	1.1	0.9	3.5	No	-
1	Left	3067.87*	Trapezoidal	36.4	926.2	928.2	2.0	0.0	2.0	3.5	No	928.2	2.0	1.1	0.9	3.5	No	-
1	Left	3067.72*	Trapezoidal	36.6	925.7	927.7	2.0	0.0	2.0	3.5	No	927.7	2.0	1.1	0.9	3.5	No	-
1	Left	3067.57*	Trapezoidal	36.7	925.2	927.2	2.1	0.0	2.1	3.5	No	927.2	2.1	1.1	1.0	3.5	No	-
1	Left	3067.42*	Trapezoidal	36.9	924.6	926.8	2.1	0.0	2.1	3.5	No	926.8	2.1	1.1	1.0	3.5	No	-
1	Left	3067.27*	Trapezoidal	37.0	924.1	926.3	2.1	0.0	2.1	3.5	No	926.3	2.1	1.1	1.0	3.5	No	-
1	Left	3067.12*	Trapezoidal	37.2	923.6	925.8	2.2	0.0	2.2	3.5	No	925.8	2.2	1.1	1.1	3.5	No	-
1	Left	3066.97*	Trapezoidal	37.3	923.1	925.3	2.2	0.0	2.2	3.5	No	925.3	2.2	1.1	1.1	3.5	No	-
1	Left	3066.81*	Trapezoidal	37.5	922.6	924.8	2.2	0.0	2.2	3.5	No	924.8	2.2	1.1	1.1	3.5	No	-
1	Left	3066.66*	Trapezoidal	37.6	922.0	924.3	2.2	0.0	2.2	3.5	No	924.3	2.2	1.1	1.1	3.5	No	-
1	Left	3066.51*	Trapezoidal	37.7	921.5	923.8	2.3	0.0	2.3	3.5	No	923.8	2.3	1.1	1.2	3.5	No	-
1	Left	3066.36*	Trapezoidal	37.8	921.0	923.3	2.3	0.0	2.3	3.5	No	923.3	2.3	1.1	1.2	3.5	No	-
1	Left	3066.21*	Trapezoidal	38.0	920.5	922.8	2.3	0.0	2.3	3.5	No	922.8	2.3	1.1	1.2	3.5	No	-
1	Left	3066.06*	Trapezoidal	38.1	920.0	922.3	2.3	0.0	2.3	3.5	No	922.3	2.3	1.1	1.2	3.5	No	-
1	Left	3065.90*	Trapezoidal	38.2	919.5	921.8	2.3	0.0	2.3	3.5	No	921.8	2.3	1.1	1.2	3.5	No	-
1	Left	3065.75*	Trapezoidal	38.3	919.0	921.3	2.4	0.0	2.4	3.5	No	921.3	2.4	1.1	1.3	3.5	No	-
1	Left	3065.60*	Trapezoidal	38.4	918.4	920.8	2.4	0.0	2.4	3.5	No	920.8	2.4	1.1	1.3	3.5	No	-
1	Left	3065.45*	Trapezoidal	38.5	917.9	920.3	2.4	0.0	2.4	3.5	No	920.3	2.4	1.1	1.3	3.5	No	-
1	Left	3065.30*	Trapezoidal	38.6	917.4	919.8	2.4	0.0	2.4	3.5	No	919.8	2.4	1.1	1.3	3.5	No	-
1	Left	3065.15*	Trapezoidal	38.7	916.9	919.3	2.4	0.0	2.4	3.5	No	919.3	2.4	1.1	1.3	3.5	No	-
1	Left	3065.*	Trapezoidal	38.8	916.4	918.9	2.5	0.0	2.5	3.5	No	918.9	2.5	1.1	1.4	3.5	No	-
2	Right	3064.84*	Trapezoidal	38.9	915.9	918.4	2.5	1.2	1.3	3.5	No	918.4	2.5	0.0	2.5	3.5	No	-
2	Right	3064.69*	Trapezoidal	39.0	915.4	917.9	2.5	1.2	1.3	3.5	No	917.9	2.5	0.0	2.5	3.5	No	-
2	Right	3064.54*	Trapezoidal	39.0	914.9	917.4	2.5	1.2	1.3	3.5	No	917.4	2.5	0.0	2.5	3.5	No	-
2	Right	3064.39*	Trapezoidal	39.1	914.4	916.9	2.5	1.2	1.3	3.5	No	916.9	2.5	0.0	2.5	3.5	No	-
2	Right	3064.24*	Trapezoidal	39.2	913.9	916.4	2.5	1.2	1.3	3.5	No	916.4	2.5	0.0	2.5	3.5	No	-
2	Right	3064.09*	Trapezoidal	39.3	913.4	915.9	2.5	1.2	1.3	3.5	No	915.9	2.5	0.0	2.5	3.5	No	-
2	Right	3063.93*	Trapezoidal	39.3	912.8	915.4	2.5	1.2	1.3	3.5	No	915.4	2.5	0.0	2.5	3.5	No	-
2	Right	3063.78*	Trapezoidal	39.4	912.3	914.9	2.6	1.2	1.4	3.5	No	914.9	2.6	0.0	2.6	3.5	No	-
2	Right	3063.63*	Trapezoidal	39.5	911.8	914.4	2.6	1.2	1.4	3.5	No	914.4	2.6	0.0	2.6	3.5	No	-
2	Right	3063.48*	Trapezoidal	39.6	911.3	913.9	2.6	1.2	1.4	3.5	No	913.9	2.6	0.0	2.6	3.5	No	-
2	Right	3063.33*	Trapezoidal	39.6	910.8	913.4	2.6	1.2	1.4	3.5	No	913.4	2.6	0.0	2.6	3.5	No	-
2	Right	3063.18*	Trapezoidal	39.7	910.3	912.9	2.6	1.2	1.4	3.5	No	912.9	2.6	0.0	2.6	3.5	No	-
2	Right	3063.03*	Trapezoidal	39.7	909.8	912.4	2.6	1.2	1.4	3.5	No	912.4	2.6	0.0	2.6	3.5	No	-
2	Right	3062.87*	Trapezoidal	39.8	909.3	911.9	2.6	1.2	1.4	3.5	No	911.9	2.6	0.0	2.6	3.5	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
2	Right	3062.72*	Trapezoidal	39.9	908.8	911.5	2.6	1.2	1.4	3.5	No	911.5	2.6	0.0	2.6	3.5	No	-
2	Right	3062.57*	Trapezoidal	39.9	908.3	911.0	2.7	1.2	1.5	3.5	No	911.0	2.7	0.0	2.7	3.5	No	-
2	Right	3062.42*	Trapezoidal	40.0	907.8	910.5	2.7	1.2	1.5	3.5	No	910.5	2.7	0.0	2.7	3.5	No	-
2	Right	3062.27*	Trapezoidal	40.0	907.3	910.0	2.7	1.2	1.5	3.5	No	910.0	2.7	0.0	2.7	3.5	No	-
2	Right	3062.12*	Trapezoidal	40.1	906.8	909.5	2.7	1.2	1.5	3.5	No	909.5	2.7	0.0	2.7	3.5	No	-
2	Right	3061.97*	Trapezoidal	40.2	906.3	909.0	2.7	1.2	1.5	3.5	No	909.0	2.7	0.0	2.7	3.5	No	-
2	Right	3061.81*	Trapezoidal	40.2	905.8	908.5	2.7	1.2	1.5	3.5	No	908.5	2.7	0.0	2.7	3.5	No	-
2	Right	3061.66*	Trapezoidal	40.3	905.3	908.0	2.7	1.2	1.5	3.5	No	908.0	2.7	0.0	2.7	3.5	No	-
2	Right	3061.51*	Trapezoidal	40.3	904.8	907.5	2.7	1.2	1.5	3.5	No	907.5	2.7	0.0	2.7	3.5	No	-
2	Right	3061.36*	Trapezoidal	40.4	904.3	907.0	2.7	1.2	1.5	3.5	No	907.0	2.7	0.0	2.7	3.5	No	-
2	Right	3061.21*	Trapezoidal	40.4	903.8	906.5	2.7	1.2	1.5	3.5	No	906.5	2.7	0.0	2.7	3.5	No	-
2	Right	3061.06*	Trapezoidal	40.4	903.3	906.0	2.7	1.2	1.5	3.5	No	906.0	2.7	0.0	2.7	3.5	No	-
2	Right	3060.90*	Trapezoidal	40.5	902.8	905.5	2.7	1.2	1.5	3.5	No	905.5	2.7	0.0	2.7	3.5	No	-
2	Right	3060.75*	Trapezoidal	40.5	902.3	905.0	2.8	1.2	1.6	3.5	No	905.0	2.8	0.0	2.8	3.5	No	-
2	Right	3060.60*	Trapezoidal	40.6	901.8	904.5	2.8	1.2	1.6	3.5	No	904.5	2.8	0.0	2.8	3.5	No	-
2	Right	3060.45*	Trapezoidal	40.6	901.3	904.0	2.8	1.2	1.6	3.5	No	904.0	2.8	0.0	2.8	3.5	No	-
2	Right	3060.30*	Trapezoidal	40.7	900.8	903.6	2.8	1.2	1.6	3.5	No	903.6	2.8	0.0	2.8	3.5	No	-
2	Right	3060.15*	Trapezoidal	40.7	900.3	903.1	2.8	1.2	1.6	3.5	No	903.1	2.8	0.0	2.8	3.5	No	-
2	Right	3060.01	Obstruction	Bridge		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-
2	Right	3060	Trapezoidal	40.1	899.9	902.6	2.7	1.2	1.5	3.5	No	902.6	2.7	0.0	2.7	3.5	No	-
2	Right	3059.99	Obstruction	Bridge		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-
2	Right	3059.52*	Trapezoidal	40.1	899.4	902.1	2.7	1.2	1.5	3.5	No	902.1	2.7	0.0	2.7	3.5	No	-
2	Right	3059.04*	Trapezoidal	40.2	898.9	901.6	2.7	1.2	1.5	3.5	No	901.6	2.7	0.0	2.7	3.5	No	-
2	Right	3058.57*	Trapezoidal	40.2	898.4	901.1	2.7	1.2	1.5	3.5	No	901.1	2.7	0.0	2.7	3.5	No	-
2	Right	3058.09*	Trapezoidal	40.3	897.9	900.6	2.7	1.2	1.5	3.5	No	900.6	2.7	0.0	2.7	3.5	No	-
2	Right	3057.61*	Trapezoidal	40.3	897.4	900.1	2.7	1.2	1.5	3.5	No	900.1	2.7	0.0	2.7	3.5	No	-
2	Right	3057.14*	Trapezoidal	40.4	896.9	899.6	2.7	1.2	1.5	3.5	No	899.6	2.7	0.0	2.7	3.5	No	-
2	Right	3056.66*	Trapezoidal	40.4	896.4	899.1	2.7	1.2	1.5	3.5	No	899.1	2.7	0.0	2.7	3.5	No	-
2	Right	3056.19*	Trapezoidal	40.4	895.9	898.6	2.7	1.2	1.5	3.5	No	898.6	2.7	0.0	2.7	3.5	No	-
2	Right	3055.71*	Trapezoidal	40.5	895.4	898.1	2.7	1.2	1.5	3.5	No	898.1	2.7	0.0	2.7	3.5	No	-
2	Right	3055.23*	Trapezoidal	40.5	894.9	897.7	2.8	1.2	1.6	3.5	No	897.7	2.8	0.0	2.8	3.5	No	-
2	Right	3054.76*	Trapezoidal	40.6	894.4	897.2	2.8	1.2	1.6	3.5	No	897.2	2.8	0.0	2.8	3.5	No	-
2	Right	3054.28*	Trapezoidal	40.6	893.9	896.7	2.8	1.2	1.6	3.5	No	896.7	2.8	0.0	2.8	3.5	No	-
2	Right	3053.81*	Trapezoidal	40.7	893.4	896.2	2.8	1.2	1.6	3.5	No	896.2	2.8	0.0	2.8	3.5	No	-
2	Right	3053.33*	Trapezoidal	40.7	892.9	895.7	2.8	1.2	1.6	3.5	No	895.7	2.8	0.0	2.8	3.5	No	-
2	Right	3052.85*	Trapezoidal	40.7	892.4	895.2	2.8	1.2	1.6	3.5	No	895.2	2.8	0.0	2.8	3.5	No	-
2	Right	3052.38*	Trapezoidal	40.8	891.9	894.7	2.8	1.2	1.6	3.5	No	894.7	2.8	0.0	2.8	3.5	No	-
2	Right	3051.90*	Trapezoidal	40.8	891.4	894.2	2.8	1.2	1.6	3.5	No	894.2	2.8	0.0	2.8	3.5	No	-
2	Right	3051.42*	Trapezoidal	40.8	890.9	893.7	2.8	1.2	1.6	3.5	No	893.7	2.8	0.0	2.8	3.5	No	-
2	Right	3050.95*	Trapezoidal	40.9	890.4	893.2	2.8	1.2	1.6	3.5	No	893.2	2.8	0.0	2.8	3.5	No	-
2	Right	3050.47*	Trapezoidal	40.9	889.9	892.7	2.8	1.2	1.6	3.5	No	892.7	2.8	0.0	2.8	3.5	No	-
2	Right	3050	Trapezoidal	40.9	889.4	892.2	2.8	1.2	1.6	3.5	No	892.2	2.8	0.0	2.8	3.5	No	-
-	-	3048.*	Trapezoidal	41.0	889.0	891.5	2.5	1.2	1.3	3.5	No	891.5	2.5	0.0	2.5	3.5	No	-
-	-	3046.*	Trapezoidal	41.0	888.5	890.7	2.2	1.2	1.0	3.5	No	890.7	2.2	0.0	2.2	3.5	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
-	-	3044.*	Trapezoidal	41.0	888.0	889.9	1.9	1.2	0.7	3.5	No	889.9	1.9	0.0	1.9	3.5	No	-
-	-	3042.*	Trapezoidal	41.0	887.5	889.1	1.6	1.2	0.4	3.5	No	889.1	1.6	0.0	1.6	3.5	No	-
-	-	3040	Trapezoidal	41.1	887.0	888.4	1.3	1.2	0.1	3.5	No	888.4	1.3	0.0	1.3	3.5	No	-
-	-	3039.79*	Trapezoidal	41.1	886.5	887.9	1.3	1.2	0.1	3.5	No	887.9	1.3	0.0	1.3	3.5	No	-
-	-	3039.58*	Trapezoidal	41.1	886.1	887.4	1.3	1.2	0.1	3.5	No	887.4	1.3	0.0	1.3	3.5	No	-
-	-	3039.37*	Trapezoidal	41.2	885.6	886.9	1.4	1.2	0.2	3.5	No	886.9	1.4	0.0	1.4	3.5	No	-
-	-	3039.16*	Trapezoidal	41.2	885.1	886.4	1.4	1.2	0.2	3.5	No	886.4	1.4	0.0	1.4	3.5	No	-
-	-	3038.95*	Trapezoidal	41.2	884.6	885.9	1.4	1.2	0.2	3.5	No	885.9	1.4	0.0	1.4	3.5	No	-
-	-	3038.75*	Trapezoidal	41.2	884.1	885.4	1.4	1.2	0.2	3.5	No	885.4	1.4	0.0	1.4	3.5	No	-
-	-	3038.54*	Trapezoidal	41.3	883.6	885.0	1.4	1.2	0.2	3.5	No	885.0	1.4	0.0	1.4	3.5	No	-
-	-	3038.33*	Trapezoidal	41.3	883.1	884.5	1.4	1.2	0.2	3.5	No	884.5	1.4	0.0	1.4	3.5	No	-
-	-	3038.12*	Trapezoidal	41.3	882.6	884.0	1.4	1.2	0.2	3.5	No	884.0	1.4	0.0	1.4	3.5	No	-
-	-	3037.91*	Trapezoidal	41.3	882.1	883.5	1.4	1.2	0.2	3.5	No	883.5	1.4	0.0	1.4	3.5	No	-
-	-	3037.70*	Trapezoidal	41.3	881.6	883.0	1.4	1.2	0.2	3.5	No	883.0	1.4	0.0	1.4	3.5	No	-
-	-	3037.5*	Trapezoidal	41.4	881.1	882.5	1.4	1.2	0.2	3.5	No	882.5	1.4	0.0	1.4	3.5	No	-
-	-	3037.29*	Trapezoidal	41.4	880.7	882.0	1.4	1.2	0.2	3.5	No	882.0	1.4	0.0	1.4	3.5	No	-
-	-	3037.08*	Trapezoidal	41.4	880.2	881.6	1.4	1.2	0.2	3.5	No	881.6	1.4	0.0	1.4	3.5	No	-
-	-	3036.87*	Trapezoidal	41.4	879.7	881.1	1.4	1.2	0.2	3.5	No	881.1	1.4	0.0	1.4	3.5	No	-
-	-	3036.66*	Trapezoidal	41.4	879.2	880.6	1.4	1.2	0.2	3.5	No	880.6	1.4	0.0	1.4	3.5	No	-
-	-	3036.45*	Trapezoidal	41.5	878.7	880.1	1.4	1.2	0.2	3.5	No	880.1	1.4	0.0	1.4	3.5	No	-
-	-	3036.25*	Trapezoidal	41.5	878.2	879.6	1.4	1.2	0.2	3.5	No	879.6	1.4	0.0	1.4	3.5	No	-
-	-	3036.04*	Trapezoidal	41.5	877.7	879.1	1.4	1.2	0.2	3.5	No	879.1	1.4	0.0	1.4	3.5	No	-
-	-	3035.83*	Trapezoidal	41.5	877.2	878.6	1.4	1.2	0.2	3.5	No	878.6	1.4	0.0	1.4	3.5	No	-
-	-	3035.62*	Trapezoidal	41.5	876.7	878.1	1.4	1.2	0.2	3.5	No	878.1	1.4	1.2	0.2	3.5	No	-
-	-	3035.41*	Trapezoidal	41.6	876.2	877.7	1.4	1.2	0.2	3.5	No	877.7	1.4	1.2	0.2	3.5	No	-
-	-	3035.20*	Trapezoidal	41.6	875.8	877.2	1.4	1.2	0.2	3.5	No	877.2	1.4	1.2	0.2	3.5	No	-
-	-	3035.*	Trapezoidal	41.6	875.3	876.7	1.4	1.2	0.2	3.5	No	876.7	1.4	1.2	0.2	3.5	No	-
-	-	3034.79*	Trapezoidal	41.6	874.8	876.2	1.4	1.2	0.2	3.5	No	876.2	1.4	1.2	0.2	3.5	No	-
-	-	3034.58*	Trapezoidal	41.6	874.3	875.7	1.4	1.2	0.2	3.5	No	875.7	1.4	1.2	0.2	3.5	No	-
-	-	3034.37*	Trapezoidal	41.6	873.8	875.2	1.4	1.2	0.2	3.5	No	875.2	1.4	1.2	0.2	3.5	No	-
-	-	3034.16*	Trapezoidal	41.6	873.3	874.7	1.4	1.2	0.2	3.5	No	874.7	1.4	1.2	0.2	3.5	No	-
-	-	3033.95*	Trapezoidal	41.6	872.8	874.3	1.4	1.2	0.2	3.5	No	874.3	1.4	1.2	0.2	3.5	No	-
-	-	3033.75*	Trapezoidal	41.7	872.3	873.8	1.4	1.2	0.2	3.5	No	873.8	1.4	1.2	0.2	3.5	No	-
-	-	3033.54*	Trapezoidal	41.7	871.8	873.3	1.4	1.2	0.2	3.5	No	873.3	1.4	1.2	0.2	3.5	No	-
-	-	3033.33*	Trapezoidal	41.7	871.4	872.8	1.4	1.2	0.2	3.5	No	872.8	1.4	1.2	0.2	3.5	No	-
-	-	3033.12*	Trapezoidal	41.7	870.9	872.3	1.4	1.2	0.2	3.5	No	872.3	1.4	1.2	0.2	3.5	No	-
-	-	3032.91*	Trapezoidal	41.7	870.4	871.8	1.4	1.2	0.2	3.5	No	871.8	1.4	1.2	0.2	3.5	No	-
-	-	3032.70*	Trapezoidal	41.7	869.9	871.3	1.4	1.2	0.2	3.5	No	871.3	1.4	1.2	0.2	3.5	No	-
-	-	3032.5*	Trapezoidal	41.7	869.4	870.8	1.4	1.2	0.2	3.5	No	870.8	1.4	1.2	0.2	3.5	No	-
-	-	3032.29*	Trapezoidal	41.8	868.9	870.4	1.4	1.2	0.2	3.5	No	870.4	1.4	1.2	0.2	3.5	No	-
-	-	3032.08*	Trapezoidal	41.8	868.4	869.9	1.4	1.2	0.2	3.5	No	869.9	1.4	1.2	0.2	3.5	No	-
-	-	3031.87*	Trapezoidal	41.8	867.9	869.4	1.4	1.2	0.2	3.5	No	869.4	1.4	1.2	0.2	3.5	No	-
-	-	3031.66*	Trapezoidal	41.8	867.4	868.9	1.4	1.2	0.2	3.5	No	868.9	1.4	1.2	0.2	3.5	No	-
-	-	3031.45*	Trapezoidal	41.8	867.0	868.4	1.4	1.2	0.2	3.5	No	868.4	1.4	1.2	0.2	3.5	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
-	-	3031.25*	Trapezoidal	41.8	866.5	867.9	1.4	1.2	0.2	3.5	No	867.9	1.4	1.2	0.2	3.5	No	-
-	-	3031.04*	Trapezoidal	41.8	866.0	867.4	1.4	1.2	0.2	3.5	No	867.4	1.4	1.2	0.2	3.5	No	-
-	-	3030.83*	Trapezoidal	41.8	865.5	867.0	1.5	1.2	0.3	3.5	No	867.0	1.5	1.2	0.3	3.5	No	-
-	-	3030.62*	Trapezoidal	41.8	865.0	866.5	1.5	1.2	0.3	3.5	No	866.5	1.5	1.2	0.3	3.5	No	-
-	-	3030.41*	Trapezoidal	41.8	864.5	866.0	1.5	1.2	0.3	3.5	No	866.0	1.5	1.2	0.3	3.5	No	-
-	-	3030.20*	Trapezoidal	41.8	864.0	865.5	1.5	1.2	0.3	3.5	No	865.5	1.5	1.2	0.3	3.5	No	-
-	-	3030	Trapezoidal	41.9	863.5	865.0	1.5	1.2	0.3	3.5	No	865.0	1.5	1.2	0.3	3.5	No	-
-	-	3029.75*	Trapezoidal	41.9	863.1	864.5	1.5	1.2	0.3	3.5	No	864.5	1.5	1.2	0.3	3.5	No	-
-	-	3029.5*	Trapezoidal	41.9	862.6	864.0	1.5	1.2	0.3	3.5	No	864.0	1.5	1.2	0.3	3.5	No	-
-	-	3029.25*	Trapezoidal	41.9	862.1	863.6	1.5	1.2	0.3	3.5	No	863.6	1.5	1.2	0.3	3.5	No	-
-	-	3029.*	Trapezoidal	41.9	861.6	863.1	1.5	1.2	0.3	3.5	No	863.1	1.5	1.2	0.3	3.5	No	-
-	-	3028.75*	Trapezoidal	41.9	861.1	862.6	1.5	1.2	0.3	3.5	No	862.6	1.5	1.2	0.3	3.5	No	-
-	-	3028.5*	Trapezoidal	41.9	860.7	862.1	1.5	1.2	0.3	3.5	No	862.1	1.5	1.2	0.3	3.5	No	-
-	-	3028.25*	Trapezoidal	41.9	860.2	861.6	1.5	1.2	0.3	3.5	No	861.6	1.5	1.2	0.3	3.5	No	-
-	-	3028.*	Trapezoidal	41.9	859.7	861.2	1.5	1.2	0.3	3.5	No	861.2	1.5	1.2	0.3	3.5	No	-
-	-	3027.75*	Trapezoidal	41.9	859.2	860.7	1.5	1.2	0.3	3.5	No	860.7	1.5	1.2	0.3	3.5	No	-
-	-	3027.5*	Trapezoidal	41.9	858.7	860.2	1.5	1.2	0.3	3.5	No	860.2	1.5	1.2	0.3	3.5	No	-
-	-	3027.25*	Trapezoidal	41.9	858.2	859.7	1.5	1.2	0.3	3.5	No	859.7	1.5	1.2	0.3	3.5	No	-
-	-	3027.*	Trapezoidal	41.9	857.8	859.2	1.5	1.2	0.3	3.5	No	859.2	1.5	1.2	0.3	3.5	No	-
-	-	3026.75*	Trapezoidal	41.9	857.3	858.7	1.5	1.2	0.3	3.5	No	858.7	1.5	1.2	0.3	3.5	No	-
-	-	3026.5*	Trapezoidal	42.0	856.8	858.3	1.5	1.2	0.3	3.5	No	858.3	1.5	1.2	0.3	3.5	No	-
-	-	3026.25*	Trapezoidal	42.0	856.3	857.8	1.5	1.2	0.3	3.5	No	857.8	1.5	1.2	0.3	3.5	No	-
-	-	3026.*	Trapezoidal	42.0	855.8	857.3	1.5	1.2	0.3	3.5	No	857.3	1.5	1.2	0.3	3.5	No	-
-	-	3025.75*	Trapezoidal	42.0	855.3	856.8	1.5	1.2	0.3	3.5	No	856.8	1.5	1.2	0.3	3.5	No	-
-	-	3025.5*	Trapezoidal	42.0	854.9	856.3	1.5	1.2	0.3	3.5	No	856.3	1.5	1.2	0.3	3.5	No	-
-	-	3025.25*	Trapezoidal	42.0	854.4	855.9	1.5	1.2	0.3	3.5	No	855.9	1.5	1.2	0.3	3.5	No	-
-	-	3025.*	Trapezoidal	42.0	853.9	855.4	1.5	1.2	0.3	3.5	No	855.4	1.5	1.2	0.3	3.5	No	-
-	-	3024.75*	Trapezoidal	42.0	853.4	854.9	1.5	1.2	0.3	3.5	No	854.9	1.5	1.2	0.3	3.5	No	-
-	-	3024.5*	Trapezoidal	42.0	852.9	854.4	1.5	1.2	0.3	3.5	No	854.4	1.5	1.2	0.3	3.5	No	-
-	-	3024.25*	Trapezoidal	42.0	852.5	853.9	1.5	1.2	0.3	3.5	No	853.9	1.5	1.2	0.3	3.5	No	-
-	-	3024.*	Trapezoidal	42.0	852.0	853.4	1.5	1.2	0.3	3.5	No	853.4	1.5	1.2	0.3	3.5	No	-
-	-	3023.75*	Trapezoidal	42.0	851.5	853.0	1.5	1.2	0.3	3.5	No	853.0	1.5	1.2	0.3	3.5	No	-
-	-	3023.5*	Trapezoidal	42.0	851.0	852.5	1.5	1.2	0.3	3.5	No	852.5	1.5	1.2	0.3	3.5	No	-
-	-	3023.25*	Trapezoidal	42.0	850.5	852.0	1.5	1.2	0.3	3.5	No	852.0	1.5	1.2	0.3	3.5	No	-
-	-	3023.*	Trapezoidal	42.0	850.0	851.5	1.5	1.2	0.3	3.5	No	851.5	1.5	1.2	0.3	3.5	No	-
-	-	3022.75*	Trapezoidal	42.0	849.6	851.0	1.5	1.2	0.3	3.5	No	851.0	1.5	1.2	0.3	3.5	No	-
-	-	3022.5*	Trapezoidal	42.0	849.1	850.6	1.5	1.2	0.3	3.5	No	850.6	1.5	1.2	0.3	3.5	No	-
-	-	3022.25*	Trapezoidal	42.0	848.6	850.1	1.5	1.2	0.3	3.5	No	850.1	1.5	1.2	0.3	3.5	No	-
-	-	3022.*	Trapezoidal	42.0	848.1	849.6	1.5	1.2	0.3	3.5	No	849.6	1.5	1.2	0.3	3.5	No	-
-	-	3021.75*	Trapezoidal	42.0	847.6	849.1	1.5	1.2	0.3	3.5	No	849.1	1.5	1.2	0.3	3.5	No	-
-	-	3021.5*	Trapezoidal	42.0	847.1	848.6	1.5	1.2	0.3	3.5	No	848.6	1.5	1.2	0.3	3.5	No	-
-	-	3021.25*	Trapezoidal	42.0	846.7	848.2	1.5	1.2	0.3	3.5	No	848.2	1.5	1.2	0.3	3.5	No	-
-	-	3021.*	Trapezoidal	42.0	846.2	847.7	1.5	1.2	0.3	3.5	No	847.7	1.5	1.2	0.3	3.5	No	-
-	-	3020.75*	Trapezoidal	42.1	845.7	847.2	1.5	1.2	0.3	3.5	No	847.2	1.5	1.2	0.3	3.5	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
-	-	3020.5*	Trapezoidal	42.1	845.2	846.7	1.5	1.2	0.3	3.5	No	846.7	1.5	1.2	0.3	3.5	No	-
-	-	3020.25*	Trapezoidal	42.1	844.7	846.2	1.5	1.2	0.3	3.5	No	846.2	1.5	1.2	0.3	3.5	No	-
-	-	3020	Trapezoidal	42.1	844.3	845.7	1.5	1.2	0.3	3.5	No	845.7	1.5	1.2	0.3	3.5	No	-
-	-	3018.*	Trapezoidal	42.1	843.8	845.6	1.8	1.2	0.6	3.5	No	845.6	1.8	1.2	0.6	3.5	No	-
-	-	3016.*	Trapezoidal	42.1	843.3	845.4	2.1	1.2	0.9	3.5	No	845.4	2.1	1.2	0.9	3.5	No	-
-	-	3014.*	Trapezoidal	42.1	842.8	845.2	2.4	1.2	1.2	3.5	No	845.2	2.4	1.2	1.2	3.5	No	-
-	-	3012.*	Trapezoidal	42.1	842.3	845.0	2.7	1.2	1.5	3.5	No	845.0	2.7	1.2	1.5	3.5	No	-
3	Left	3010	Trapezoidal	42.1	841.8	844.8	3.0	0.0	3.0	3.5	No	844.8	3.0	1.2	1.8	3.5	No	-
3	Left	3009.72*	Trapezoidal	42.1	841.3	844.3	3.0	0.0	3.0	3.5	No	844.3	3.0	1.2	1.8	3.5	No	-
3	Left	3009.44*	Trapezoidal	42.1	840.9	843.8	3.0	0.0	3.0	3.5	No	843.8	3.0	1.2	1.8	3.5	No	-
3	Left	3009.16*	Trapezoidal	42.1	840.4	843.4	3.0	0.0	3.0	3.5	No	843.4	3.0	1.2	1.8	3.5	No	-
3	Left	3008.88*	Trapezoidal	42.1	839.9	842.9	3.0	0.0	3.0	3.5	No	842.9	3.0	1.2	1.8	3.5	No	-
3	Left	3008.61*	Trapezoidal	42.1	839.4	842.4	3.0	0.0	3.0	3.5	No	842.4	3.0	1.2	1.8	3.5	No	-
3	Left	3008.33*	Trapezoidal	42.1	838.9	841.9	3.0	0.0	3.0	3.5	No	841.9	3.0	1.2	1.8	3.5	No	-
3	Left	3008.05*	Trapezoidal	42.1	838.4	841.4	3.0	0.0	3.0	3.5	No	841.4	3.0	1.2	1.8	3.5	No	-
3	Left	3007.77*	Trapezoidal	42.1	838.0	840.9	3.0	0.0	3.0	3.5	No	840.9	3.0	1.2	1.8	3.5	No	-
3	Left	3007.5*	Trapezoidal	42.1	837.5	840.5	3.0	0.0	3.0	3.5	No	840.5	3.0	1.2	1.8	3.5	No	-
3	Left	3007.22*	Trapezoidal	42.1	837.0	840.0	3.0	0.0	3.0	3.5	No	840.0	3.0	1.2	1.8	3.5	No	-
3	Left	3006.94*	Trapezoidal	42.1	836.5	839.5	3.0	0.0	3.0	3.5	No	839.5	3.0	1.2	1.8	3.5	No	-
3	Left	3006.66*	Trapezoidal	42.1	836.0	839.0	3.0	0.0	3.0	3.5	No	839.0	3.0	1.2	1.8	3.5	No	-
3	Left	3006.38*	Trapezoidal	42.1	835.5	838.5	3.0	0.0	3.0	3.5	No	838.5	3.0	1.2	1.8	3.5	No	-
3	Left	3006.11*	Trapezoidal	42.1	835.1	838.1	3.0	0.0	3.0	3.5	No	838.1	3.0	1.2	1.8	3.5	No	-
3	Left	3005.83*	Trapezoidal	42.1	834.6	837.6	3.0	0.0	3.0	3.5	No	837.6	3.0	1.2	1.8	3.5	No	-
3	Left	3005.55*	Trapezoidal	42.1	834.1	837.1	3.0	0.0	3.0	3.5	No	837.1	3.0	1.2	1.8	3.5	No	-
3	Left	3005.27*	Trapezoidal	42.1	833.6	836.6	3.0	0.0	3.0	3.5	No	836.6	3.0	1.2	1.8	3.5	No	-
3	Left	3005.*	Trapezoidal	42.1	833.1	836.1	3.0	0.0	3.0	3.5	No	836.1	3.0	1.2	1.8	3.5	No	-
3	Left	3004.72*	Trapezoidal	42.1	832.7	835.6	3.0	0.0	3.0	3.5	No	835.6	3.0	1.2	1.8	3.5	No	-
3	Left	3004.44*	Trapezoidal	42.1	832.2	835.2	3.0	0.0	3.0	3.5	No	835.2	3.0	1.2	1.8	3.5	No	-
3	Left	3004.16*	Trapezoidal	42.1	831.7	834.7	3.0	0.0	3.0	3.5	No	834.7	3.0	1.2	1.8	3.5	No	-
3	Left	3003.88*	Trapezoidal	42.1	831.2	834.2	3.0	0.0	3.0	3.5	No	834.2	3.0	1.2	1.8	3.5	No	-
3	Left	3003.61*	Trapezoidal	42.1	830.7	833.7	3.0	0.0	3.0	3.5	No	833.7	3.0	1.2	1.8	3.5	No	-
3	Left	3003.33*	Trapezoidal	42.1	830.2	833.2	3.0	0.0	3.0	3.5	No	833.2	3.0	1.2	1.8	3.5	No	-
3	Left	3003.05*	Trapezoidal	42.1	829.8	832.7	3.0	0.0	3.0	3.5	No	832.7	3.0	1.2	1.8	3.5	No	-
3	Left	3002.77*	Trapezoidal	42.1	829.3	832.3	3.0	0.0	3.0	3.5	No	832.3	3.0	1.2	1.8	3.5	No	-
3	Left	3002.5*	Trapezoidal	42.1	828.8	831.8	3.0	0.0	3.0	3.5	No	831.8	3.0	1.2	1.8	3.5	No	-
3	Left	3002.22*	Trapezoidal	42.1	828.3	831.3	3.0	0.0	3.0	3.5	No	831.3	3.0	1.2	1.8	3.5	No	-
3	Left	3001.94*	Trapezoidal	42.1	827.8	830.8	3.0	0.0	3.0	3.5	No	830.8	3.0	1.2	1.8	3.5	No	-
3	Left	3001.66*	Trapezoidal	42.1	827.3	830.3	3.0	0.0	3.0	3.5	No	830.3	3.0	1.2	1.8	3.5	No	-
3	Left	3001.38*	Trapezoidal	42.1	826.9	829.9	3.0	0.0	3.0	3.5	No	829.9	3.0	1.2	1.8	3.5	No	-
3	Left	3001.11*	Trapezoidal	42.1	826.4	829.4	3.0	0.0	3.0	3.5	No	829.4	3.0	1.2	1.8	3.5	No	-
3	Left	3000.83*	Trapezoidal	42.1	825.9	828.9	3.0	0.0	3.0	3.5	No	828.9	3.0	1.2	1.8	3.5	No	-
3	Left	3000.55*	Trapezoidal	42.1	825.4	828.4	3.0	0.0	3.0	3.5	No	828.4	3.0	1.2	1.8	3.5	No	-
3	Left	3000.27*	Trapezoidal	42.1	824.9	827.9	3.0	0.0	3.0	3.5	No	827.9	3.0	1.2	1.8	3.5	No	-
3	Left	3000	Trapezoidal	42.1	824.5	827.4	3.0	0.0	3.0	3.5	No	827.4	3.0	1.2	1.8	3.5	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
3	Left	2999.99	Obstruction	Bridge		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-
3	Left	2998.33*	Trapezoidal	42.0	824.0	826.7	2.7	0.0	2.7	3.5	No	826.7	2.7	1.2	1.5	3.5	No	-
3	Left	2996.66*	Trapezoidal	42.0	823.6	826.0	2.5	0.0	2.5	3.5	No	826.0	2.5	1.2	1.3	3.5	No	-
3	Left	2995.*	Trapezoidal	42.0	823.1	825.3	2.2	0.0	2.2	3.5	No	825.3	2.2	1.2	1.0	3.5	No	-
3	Left	2993.33*	Trapezoidal	42.0	822.6	824.6	2.0	0.0	2.0	3.5	No	824.6	2.0	1.2	0.8	3.5	No	-
3	Left	2991.66*	Trapezoidal	42.0	822.2	823.9	1.7	0.0	1.7	3.5	No	823.9	1.7	1.2	0.5	3.5	No	-
3	Left	2990	Trapezoidal	42.1	821.7	823.2	1.5	0.0	1.5	3.5	No	823.2	1.5	1.2	0.3	3.5	No	-
-	-	2989.77*	Trapezoidal	42.0	821.2	822.7	1.5	0.0	1.5	3.5	No	822.7	1.5	1.2	0.3	3.5	No	-
-	-	2989.54*	Trapezoidal	42.1	820.8	822.2	1.5	0.0	1.5	3.5	No	822.2	1.5	1.2	0.3	3.5	No	-
-	-	2989.31*	Trapezoidal	42.1	820.3	821.8	1.5	0.0	1.5	3.5	No	821.8	1.5	1.2	0.3	3.5	No	-
-	-	2989.09*	Trapezoidal	42.1	819.8	821.3	1.5	0.0	1.5	3.5	No	821.3	1.5	1.2	0.3	3.5	No	-
-	-	2988.86*	Trapezoidal	42.1	819.3	820.8	1.5	0.0	1.5	3.5	No	820.8	1.5	1.2	0.3	3.5	No	-
-	-	2988.63*	Trapezoidal	42.1	818.8	820.3	1.5	0.0	1.5	3.5	No	820.3	1.5	1.2	0.3	3.5	No	-
-	-	2988.62	Obstruction	Bridge		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-
-	-	2988.40*	Trapezoidal	42.0	818.3	819.8	1.5	0.0	1.5	3.5	No	819.8	1.5	1.2	0.3	3.5	No	-
-	-	2988.18*	Trapezoidal	42.0	817.9	819.3	1.5	0.0	1.5	3.5	No	819.3	1.5	1.2	0.3	3.5	No	-
-	-	2987.95*	Trapezoidal	42.0	817.4	818.9	1.5	0.0	1.5	3.5	No	818.9	1.5	1.2	0.3	3.5	No	-
-	-	2987.72*	Trapezoidal	42.0	816.9	818.4	1.5	0.0	1.5	3.5	No	818.4	1.5	1.2	0.3	3.5	No	-
-	-	2987.5*	Trapezoidal	42.0	816.4	817.9	1.5	0.0	1.5	3.5	No	817.9	1.5	1.2	0.3	3.5	No	-
-	-	2987.27*	Trapezoidal	42.0	815.9	817.4	1.5	0.0	1.5	3.5	No	817.4	1.5	1.2	0.3	3.5	No	-
-	-	2987.04*	Trapezoidal	42.0	815.4	816.9	1.5	0.0	1.5	3.5	No	816.9	1.5	1.2	0.3	3.5	No	-
-	-	2986.81*	Trapezoidal	42.0	814.9	816.4	1.5	0.0	1.5	3.5	No	816.4	1.5	1.2	0.3	3.5	No	-
-	-	2986.59*	Trapezoidal	42.0	814.5	816.0	1.5	0.0	1.5	3.5	No	816.0	1.5	1.2	0.3	3.5	No	-
-	-	2986.36*	Trapezoidal	42.1	814.0	815.5	1.5	0.0	1.5	3.5	No	815.5	1.5	1.2	0.3	3.5	No	-
-	-	2986.13*	Trapezoidal	42.1	813.5	815.0	1.5	0.0	1.5	3.5	No	815.0	1.5	1.2	0.3	3.5	No	-
-	-	2985.90*	Trapezoidal	42.1	813.0	814.5	1.5	0.0	1.5	3.5	No	814.5	1.5	1.2	0.3	3.5	No	-
-	-	2985.68*	Trapezoidal	42.1	812.5	814.0	1.5	0.0	1.5	3.5	No	814.0	1.5	1.2	0.3	3.5	No	-
-	-	2985.45*	Trapezoidal	42.1	812.0	813.5	1.5	0.0	1.5	3.5	No	813.5	1.5	1.2	0.3	3.5	No	-
-	-	2985.22*	Trapezoidal	42.1	811.6	813.0	1.5	0.0	1.5	3.5	No	813.0	1.5	1.2	0.3	3.5	No	-
-	-	2985.*	Trapezoidal	42.1	811.1	812.6	1.5	0.0	1.5	3.5	No	812.6	1.5	1.2	0.3	3.5	No	-
-	-	2984.77*	Trapezoidal	42.1	810.6	812.1	1.5	0.0	1.5	3.5	No	812.1	1.5	1.2	0.3	3.5	No	-
-	-	2984.54*	Trapezoidal	42.1	810.1	811.6	1.5	0.0	1.5	3.5	No	811.6	1.5	1.2	0.3	3.5	No	-
-	-	2984.31*	Trapezoidal	42.1	809.6	811.1	1.5	0.0	1.5	3.5	No	811.1	1.5	1.2	0.3	3.5	No	-
-	-	2984.09*	Trapezoidal	42.1	809.1	810.6	1.5	0.0	1.5	3.5	No	810.6	1.5	1.2	0.3	3.5	No	-
-	-	2983.86*	Trapezoidal	42.1	808.6	810.1	1.5	0.0	1.5	3.5	No	810.1	1.5	1.2	0.3	3.5	No	-
-	-	2983.63*	Trapezoidal	42.1	808.2	809.7	1.5	0.0	1.5	3.5	No	809.7	1.5	1.2	0.3	3.5	No	-
-	-	2983.40*	Trapezoidal	42.1	807.7	809.2	1.5	0.0	1.5	3.5	No	809.2	1.5	1.2	0.3	3.5	No	-
-	-	2983.18*	Trapezoidal	42.1	807.2	808.7	1.5	0.0	1.5	3.5	No	808.7	1.5	1.2	0.3	3.5	No	-
-	-	2982.95*	Trapezoidal	42.1	806.7	808.2	1.5	0.0	1.5	3.5	No	808.2	1.5	1.2	0.3	3.5	No	-
-	-	2982.72*	Trapezoidal	42.1	806.2	807.7	1.5	0.0	1.5	3.5	No	807.7	1.5	1.2	0.3	3.5	No	-
-	-	2982.5*	Trapezoidal	42.1	805.7	807.2	1.5	0.0	1.5	3.5	No	807.2	1.5	1.2	0.3	3.5	No	-
-	-	2982.27*	Trapezoidal	42.1	805.3	806.7	1.5	0.0	1.5	3.5	No	806.7	1.5	1.2	0.3	3.5	No	-
-	-	2982.04*	Trapezoidal	42.1	804.8	806.3	1.5	0.0	1.5	3.5	No	806.3	1.5	1.2	0.3	3.5	No	-
-	-	2981.81*	Trapezoidal	42.1	804.3	805.8	1.5	0.0	1.5	3.5	No	805.8	1.5	1.2	0.3	3.5	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
-	-	2981.59*	Trapezoidal	42.1	803.8	805.3	1.5	0.0	1.5	3.5	No	805.3	1.5	1.2	0.3	3.5	No	-
-	-	2981.36*	Trapezoidal	42.1	803.3	804.8	1.5	0.0	1.5	3.5	No	804.8	1.5	1.2	0.3	3.5	No	-
-	-	2981.13*	Trapezoidal	42.1	802.8	804.3	1.5	0.0	1.5	3.5	No	804.3	1.5	1.2	0.3	3.5	No	-
-	-	2981.12	Obstruction	Bridge		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-
-	-	2980.90*	Trapezoidal	42.1	802.4	803.8	1.5	0.0	1.5	3.5	No	803.8	1.5	1.2	0.3	3.5	No	-
-	-	2980.68*	Trapezoidal	42.1	801.9	803.4	1.5	0.0	1.5	3.5	No	803.4	1.5	1.2	0.3	3.5	No	-
-	-	2980.45*	Trapezoidal	42.1	801.4	802.9	1.5	0.0	1.5	3.5	No	802.9	1.5	1.2	0.3	3.5	No	-
-	-	2980.22*	Trapezoidal	42.1	800.9	802.4	1.5	0.0	1.5	3.5	No	802.4	1.5	1.2	0.3	3.5	No	-
-	-	2980	Trapezoidal	42.1	800.4	801.9	1.5	0.0	1.5	3.5	No	801.9	1.5	1.2	0.3	3.5	No	-
-	-	2979.41*	Trapezoidal	42.1	799.9	801.4	1.5	0.0	1.5	3.5	No	801.4	1.5	1.2	0.3	3.5	No	-
-	-	2978.82*	Trapezoidal	42.1	799.5	800.9	1.5	0.0	1.5	3.5	No	800.9	1.5	1.2	0.3	3.5	No	-
-	-	2978.23*	Trapezoidal	42.1	799.0	800.5	1.5	0.0	1.5	3.5	No	800.5	1.5	1.2	0.3	3.5	No	-
-	-	2977.64*	Trapezoidal	42.1	798.5	800.0	1.5	0.0	1.5	3.5	No	800.0	1.5	1.2	0.3	3.5	No	-
-	-	2977.05*	Trapezoidal	42.1	798.0	799.5	1.5	0.0	1.5	3.5	No	799.5	1.5	1.2	0.3	3.5	No	-
-	-	2976.47*	Trapezoidal	42.1	797.5	799.0	1.5	0.0	1.5	3.5	No	799.0	1.5	1.2	0.3	3.5	No	-
-	-	2975.88*	Trapezoidal	42.1	797.0	798.5	1.5	0.0	1.5	3.5	No	798.5	1.5	1.2	0.3	3.5	No	-
-	-	2975.29*	Trapezoidal	42.1	796.6	798.1	1.5	0.0	1.5	3.5	No	798.1	1.5	1.2	0.3	3.5	No	-
-	-	2974.70*	Trapezoidal	42.1	796.1	797.6	1.5	0.0	1.5	3.5	No	797.6	1.5	1.2	0.3	3.5	No	-
-	-	2974.11*	Trapezoidal	42.1	795.6	797.1	1.5	0.0	1.5	3.5	No	797.1	1.5	1.2	0.3	3.5	No	-
-	-	2973.52*	Trapezoidal	42.1	795.1	796.6	1.5	0.0	1.5	3.5	No	796.6	1.5	1.2	0.3	3.5	No	-
-	-	2972.94*	Trapezoidal	42.1	794.6	796.1	1.5	0.0	1.5	3.5	No	796.1	1.5	1.2	0.3	3.5	No	-
-	-	2972.35*	Trapezoidal	42.1	794.2	795.7	1.5	0.0	1.5	3.5	No	795.7	1.5	1.2	0.3	3.5	No	-
-	-	2971.76*	Trapezoidal	42.1	793.7	795.2	1.5	0.0	1.5	3.5	No	795.2	1.5	1.2	0.3	3.5	No	-
-	-	2971.17*	Trapezoidal	42.1	793.2	794.7	1.5	0.0	1.5	3.5	No	794.7	1.5	1.2	0.3	3.5	No	-
-	-	2970.58*	Trapezoidal	42.1	792.7	794.2	1.5	0.0	1.5	3.5	No	794.2	1.5	1.2	0.3	3.5	No	-
-	-	2970	Trapezoidal	42.1	792.2	793.7	1.5	0.0	1.5	3.5	No	793.7	1.5	1.2	0.3	3.5	No	-
-	-	2960	Trapezoidal	42.0	791.8	793.3	1.5	0.0	1.5	3.5	No	793.3	1.5	1.2	0.3	3.5	No	-
-	-	2950	Trapezoidal	42.1	791.3	792.9	1.5	0.0	1.5	3.5	No	792.9	1.5	1.2	0.3	3.5	No	-
-	-	2940	Trapezoidal	42.2	791.0	792.7	1.7	0.0	1.7	3.5	No	792.7	1.7	1.2	0.5	3.5	No	-
-	-	2930	Trapezoidal	42.4	790.4	792.4	2.0	0.0	2.0	3.5	No	792.4	2.0	1.2	0.8	3.5	No	-
-	-	2928.*	Trapezoidal	42.5	789.7	791.9	2.2	0.0	2.2	3.5	No	791.9	2.2	1.2	1.0	3.5	No	-
-	-	2926.*	Trapezoidal	42.6	789.0	791.4	2.4	0.0	2.4	3.5	No	791.4	2.4	1.2	1.2	3.5	No	-
-	-	2924.*	Trapezoidal	42.8	788.3	791.0	2.7	0.0	2.7	3.5	No	791.0	2.7	1.2	1.5	3.5	No	-
-	-	2922.*	Trapezoidal	42.9	787.6	790.5	2.9	0.0	2.9	3.5	No	790.5	2.9	1.2	1.7	3.5	No	-
-	-	2920	Rectangular	42.9	786.9	790.0	3.1	0.0	3.1	3.0	Yes	790.0	3.1	1.2	1.9	3.2	No	-
-	-	2916.66*	Rectangular	42.8	786.5	789.6	3.1	0.0	3.1	3.0	Yes	789.6	3.1	1.2	1.9	3.2	No	-
-	-	2913.33*	Rectangular	42.7	786.1	789.2	3.1	0.0	3.1	3.0	Yes	789.2	3.1	1.2	1.9	3.2	No	-
-	-	2910	Rectangular	42.7	785.7	788.8	3.0	0.0	3.0	3.0	Yes	788.8	3.0	1.2	1.8	3.2	No	-
-	-	2908.57*	Rectangular	42.5	785.3	788.4	3.1	0.0	3.1	3.0	Yes	788.4	3.1	1.2	1.9	3.2	No	-
-	-	2907.14*	Rectangular	42.4	784.8	788.1	3.2	0.0	3.2	3.0	Yes	788.1	3.2	1.2	2.0	3.2	No	-
-	-	2905.71*	Rectangular	42.4	784.4	787.7	3.3	0.0	3.3	3.0	Yes	787.7	3.3	1.2	2.1	3.2	No	-
-	-	2904.28*	Rectangular	42.3	783.9	787.3	3.4	0.0	3.4	3.0	Yes	787.3	3.4	1.2	2.2	3.2	No	-
-	-	2902.85*	Rectangular	42.2	783.5	787.0	3.5	0.0	3.5	3.0	Yes	787.0	3.5	1.2	2.3	3.2	No	-
-	-	2901.42*	Rectangular	42.1	783.0	786.6	3.6	0.0	3.6	3.0	Yes	786.6	3.6	1.2	2.4	3.2	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
-	-	2900	Rectangular	42.0	782.6	786.3	3.7	0.0	3.7	3.0	Yes	786.3	3.7	1.2	2.5	3.2	No	-
-	-	2897.5*	Rectangular	42.0	782.2	785.9	3.7	0.0	3.7	3.0	Yes	785.9	3.7	1.2	2.5	3.2	No	-
-	-	2895.*	Rectangular	41.9	781.8	785.4	3.7	0.0	3.7	3.0	Yes	785.4	3.7	1.2	2.5	3.2	No	-
-	-	2892.5*	Rectangular	41.9	781.4	785.0	3.7	0.0	3.7	3.0	Yes	785.0	3.7	1.2	2.5	3.2	No	-
-	-	2890	Rectangular	41.7	781.1	784.6	3.6	0.0	3.6	3.0	Yes	784.6	3.6	1.2	2.4	3.2	No	-
-	-	2889.*	Rectangular	41.5	780.7	784.2	3.5	0.0	3.5	3.0	Yes	784.2	3.5	1.2	2.3	3.2	No	-
-	-	2888.*	Rectangular	41.4	780.3	783.8	3.5	0.0	3.5	3.0	Yes	783.8	3.5	1.2	2.3	3.2	No	-
-	-	2887.*	Rectangular	41.2	779.9	783.4	3.5	0.0	3.5	3.0	Yes	783.4	3.5	1.2	2.3	3.2	No	-
-	-	2886.*	Rectangular	41.1	779.5	783.0	3.5	0.0	3.5	3.0	Yes	783.0	3.5	1.2	2.3	3.2	No	-
-	-	2885.*	Rectangular	41.0	779.1	782.6	3.4	0.0	3.4	3.0	Yes	782.6	3.4	1.2	2.2	3.2	No	-
-	-	2884.*	Rectangular	40.8	778.8	782.2	3.4	0.0	3.4	3.0	Yes	782.2	3.4	1.2	2.2	3.2	No	-
-	-	2883.*	Rectangular	40.7	778.4	781.7	3.4	0.0	3.4	3.0	Yes	781.7	3.4	1.2	2.2	3.2	No	-
-	-	2882.*	Rectangular	40.6	778.0	781.3	3.4	0.0	3.4	3.0	Yes	781.3	3.4	1.2	2.2	3.2	No	-
-	-	2881.*	Rectangular	40.5	777.6	780.9	3.3	0.0	3.3	3.0	Yes	780.9	3.3	1.2	2.1	3.2	No	-
-	-	2880	Rectangular	40.4	777.2	780.5	3.3	0.0	3.3	3.0	Yes	780.5	3.3	1.2	2.1	3.2	No	-
-	-	2879.68*	Rectangular	40.2	776.9	780.2	3.3	0.0	3.3	3.0	Yes	780.2	3.3	1.2	2.1	3.2	No	-
-	-	2879.37*	Rectangular	40.0	776.6	779.9	3.2	0.0	3.2	3.0	Yes	779.9	3.2	1.2	2.0	3.2	No	-
-	-	2879.06*	Rectangular	39.8	776.3	779.5	3.2	0.0	3.2	3.0	Yes	779.5	3.2	1.2	2.0	3.2	No	-
-	-	2878.75*	Rectangular	39.6	776.0	779.2	3.2	0.0	3.2	3.0	Yes	779.2	3.2	1.2	2.0	3.2	No	-
-	-	2878.43*	Rectangular	39.4	775.8	778.9	3.1	0.0	3.1	3.0	Yes	778.9	3.1	1.2	1.9	3.2	No	-
-	-	2878.12*	Rectangular	39.2	775.5	778.6	3.1	0.0	3.1	3.0	Yes	778.6	3.1	1.2	1.9	3.2	No	-
-	-	2877.81*	Rectangular	39.1	775.2	778.2	3.1	0.0	3.1	3.0	Yes	778.2	3.1	1.2	1.9	3.2	No	-
-	-	2877.5*	Rectangular	38.9	774.9	777.9	3.0	0.0	3.0	3.0	Yes	777.9	3.0	1.2	1.8	3.2	No	-
-	-	2877.18*	Rectangular	38.7	774.6	777.6	3.0	0.0	3.0	3.0	Yes	777.6	3.0	1.2	1.8	3.2	No	-
-	-	2876.87*	Rectangular	38.6	774.3	777.2	3.0	0.0	3.0	3.0	No	777.2	3.0	1.2	1.8	3.2	No	-
-	-	2876.56*	Rectangular	38.5	774.0	776.9	2.9	0.0	2.9	3.0	No	776.9	2.9	1.2	1.7	3.2	No	-
-	-	2876.25*	Rectangular	38.3	773.7	776.6	2.9	0.0	2.9	3.0	No	776.6	2.9	1.2	1.7	3.2	No	-
4	Left	2875.93*	Rectangular	38.2	773.4	776.3	2.9	0.0	2.9	3.0	No	776.3	2.9	1.2	1.7	3.2	No	-
4	Left	2875.62*	Rectangular	38.1	773.1	775.9	2.9	0.0	2.9	3.0	No	775.9	2.9	1.2	1.7	3.2	No	-
4	Left	2875.31*	Rectangular	38.0	772.8	775.6	2.9	0.0	2.9	3.0	No	775.6	2.9	1.2	1.7	3.2	No	-
4	Left	2875.*	Rectangular	37.9	772.5	775.3	2.8	0.0	2.8	3.0	No	775.3	2.8	1.2	1.6	3.2	No	-
4	Left	2874.68*	Rectangular	37.8	772.2	775.0	2.8	0.0	2.8	3.0	No	775.0	2.8	1.2	1.6	3.2	No	-
4	Left	2874.37*	Rectangular	37.7	771.9	774.6	2.8	0.0	2.8	3.0	No	774.6	2.8	1.2	1.6	3.2	No	-
4	Left	2874.06*	Rectangular	37.6	771.5	774.3	2.8	0.0	2.8	3.0	No	774.3	2.8	1.2	1.6	3.2	No	-
4	Left	2873.75*	Rectangular	37.5	771.2	774.0	2.8	0.0	2.8	3.0	No	774.0	2.8	1.2	1.6	3.2	No	-
4	Left	2873.43*	Rectangular	37.5	770.9	773.7	2.7	0.0	2.7	3.0	No	773.7	2.7	1.2	1.5	3.2	No	-
4	Left	2873.12*	Rectangular	37.4	770.6	773.3	2.7	0.0	2.7	3.0	No	773.3	2.7	1.2	1.5	3.2	No	-
4	Left	2872.81*	Rectangular	37.3	770.3	773.0	2.7	0.0	2.7	3.0	No	773.0	2.7	1.2	1.5	3.2	No	-
4	Left	2872.5*	Rectangular	37.2	770.0	772.7	2.7	0.0	2.7	3.0	No	772.7	2.7	1.2	1.5	3.2	No	-
4	Left	2872.18*	Rectangular	37.1	769.7	772.4	2.7	0.0	2.7	3.0	No	772.4	2.7	1.2	1.5	3.2	No	-
4	Left	2871.87*	Rectangular	37.1	769.4	772.0	2.6	0.0	2.6	3.0	No	772.0	2.6	1.2	1.4	3.2	No	-
4	Left	2871.56*	Rectangular	37.0	769.1	771.7	2.6	0.0	2.6	3.0	No	771.7	2.6	1.2	1.4	3.2	No	-
4	Left	2871.25*	Rectangular	37.0	768.8	771.4	2.6	0.0	2.6	3.0	No	771.4	2.6	1.2	1.4	3.2	No	-
4	Left	2870.93*	Rectangular	36.9	768.4	771.0	2.6	0.0	2.6	3.0	No	771.0	2.6	1.2	1.4	3.2	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
4	Left	2870.62*	Rectangular	36.8	768.1	770.7	2.6	0.0	2.6	3.0	No	770.7	2.6	1.2	1.4	3.2	No	-
4	Left	2870.31*	Rectangular	36.8	767.8	770.4	2.6	0.0	2.6	3.0	No	770.4	2.6	1.2	1.4	3.2	No	-
4	Left	2870	Rectangular	36.7	767.5	770.1	2.6	0.0	2.6	3.0	No	770.1	2.6	1.2	1.4	3.2	No	-
4	Left	2868.88*	Rectangular	36.6	767.3	769.9	2.6	0.0	2.6	3.0	No	769.9	2.6	1.2	1.4	3.2	No	-
4	Left	2867.77*	Rectangular	36.4	767.1	769.8	2.7	0.0	2.7	3.0	No	769.8	2.7	1.2	1.5	3.2	No	-
4	Left	2866.66*	Rectangular	36.3	766.9	769.6	2.7	0.0	2.7	3.0	No	769.6	2.7	1.2	1.5	3.2	No	-
4	Left	2865.55*	Rectangular	36.1	766.7	769.5	2.8	0.0	2.8	3.0	No	769.5	2.8	1.2	1.6	3.2	No	-
4	Left	2864.44*	Rectangular	35.9	766.6	769.4	2.8	0.0	2.8	3.0	No	769.4	2.8	1.2	1.6	3.2	No	-
4	Left	2863.33*	Rectangular	35.8	766.4	769.2	2.9	0.0	2.9	3.0	No	769.2	2.9	1.2	1.7	3.2	No	-
4	Left	2862.22*	Rectangular	35.7	766.2	769.1	2.9	0.0	2.9	3.0	No	769.1	2.9	1.2	1.7	3.2	No	-
4	Left	2861.11*	Rectangular	35.5	766.0	768.9	3.0	0.0	3.0	3.0	No	768.9	3.0	1.2	1.8	3.2	No	-
4	Left	2860	Rectangular	35.4	765.8	768.8	3.0	0.0	3.0	3.0	Yes	768.8	3.0	1.2	1.8	3.2	No	-
5	Right	2859.67*	Rectangular	35.4	765.4	768.5	3.0	1.2	1.8	3.2	No	768.5	3.0	0.0	3.0	3.0	Yes	-
5	Right	2859.35*	Rectangular	35.5	765.1	768.1	3.0	1.2	1.8	3.2	No	768.1	3.0	0.0	3.0	3.0	Yes	-
5	Right	2859.03*	Rectangular	35.5	764.7	767.8	3.0	1.2	1.8	3.2	No	767.8	3.0	0.0	3.0	3.0	Yes	-
5	Right	2858.71*	Rectangular	35.5	764.4	767.4	3.0	1.2	1.8	3.2	No	767.4	3.0	0.0	3.0	3.0	Yes	-
5	Right	2858.38*	Rectangular	35.6	764.0	767.1	3.1	1.2	1.9	3.2	No	767.1	3.1	0.0	3.1	3.0	Yes	-
5	Right	2858.06*	Rectangular	35.6	763.7	766.7	3.1	1.2	1.9	3.2	No	766.7	3.1	0.0	3.1	3.0	Yes	-
5	Right	2857.74*	Rectangular	35.6	763.3	766.4	3.0	1.2	1.8	3.2	No	766.4	3.0	0.0	3.0	3.0	Yes	-
5	Right	2857.41*	Rectangular	35.6	763.0	766.1	3.1	1.2	1.9	3.2	No	766.1	3.1	0.0	3.1	3.0	Yes	-
5	Right	2857.09*	Rectangular	35.6	762.6	765.7	3.1	1.2	1.9	3.2	No	765.7	3.1	0.0	3.1	3.0	Yes	-
5	Right	2856.77*	Rectangular	35.7	762.3	765.4	3.1	1.2	1.9	3.2	No	765.4	3.1	0.0	3.1	3.0	Yes	-
5	Right	2856.45*	Rectangular	35.7	761.9	765.0	3.1	1.2	1.9	3.2	No	765.0	3.1	0.0	3.1	3.0	Yes	-
5	Right	2856.12*	Rectangular	35.7	761.6	764.7	3.1	1.2	1.9	3.2	No	764.7	3.1	0.0	3.1	3.0	Yes	-
5	Right	2855.80*	Rectangular	35.7	761.3	764.3	3.1	1.2	1.9	3.2	No	764.3	3.1	0.0	3.1	3.0	Yes	-
5	Right	2855.48*	Rectangular	35.7	760.9	764.0	3.1	1.2	1.9	3.2	No	764.0	3.1	0.0	3.1	3.0	Yes	-
5	Right	2855.16*	Rectangular	35.8	760.6	763.7	3.1	1.2	1.9	3.2	No	763.7	3.1	0.0	3.1	3.0	Yes	-
5	Right	2854.83*	Rectangular	35.8	760.2	763.3	3.1	1.2	1.9	3.2	No	763.3	3.1	0.0	3.1	3.0	Yes	-
5	Right	2854.51*	Rectangular	35.8	759.9	763.0	3.1	1.2	1.9	3.2	No	763.0	3.1	0.0	3.1	3.0	Yes	-
5	Right	2854.19*	Rectangular	35.8	759.5	762.6	3.1	1.2	1.9	3.2	No	762.6	3.1	0.0	3.1	3.0	Yes	-
5	Right	2853.87*	Rectangular	35.8	759.2	762.3	3.1	1.2	1.9	3.2	No	762.3	3.1	0.0	3.1	3.0	Yes	-
5	Right	2853.54*	Rectangular	35.8	758.8	761.9	3.1	1.2	1.9	3.2	No	761.9	3.1	0.0	3.1	3.0	Yes	-
5	Right	2853.22*	Rectangular	35.8	758.5	761.6	3.1	1.2	1.9	3.2	No	761.6	3.1	0.0	3.1	3.0	Yes	-
5	Right	2852.90*	Rectangular	35.9	758.1	761.3	3.1	1.2	1.9	3.2	No	761.3	3.1	0.0	3.1	3.0	Yes	-
5	Right	2852.58*	Rectangular	35.9	757.8	760.9	3.1	1.2	1.9	3.2	No	760.9	3.1	0.0	3.1	3.0	Yes	-
5	Right	2852.25*	Rectangular	35.9	757.4	760.6	3.1	1.2	1.9	3.2	No	760.6	3.1	0.0	3.1	3.0	Yes	-
5	Right	2851.93*	Rectangular	35.9	757.1	760.2	3.1	1.2	1.9	3.2	No	760.2	3.1	0.0	3.1	3.0	Yes	-
5	Right	2851.61*	Rectangular	35.9	756.8	759.9	3.1	1.2	1.9	3.2	No	759.9	3.1	0.0	3.1	3.0	Yes	-
5	Right	2851.29*	Rectangular	35.9	756.4	759.5	3.1	1.2	1.9	3.2	No	759.5	3.1	0.0	3.1	3.0	Yes	-
5	Right	2850.96*	Rectangular	35.9	756.1	759.2	3.1	1.2	1.9	3.2	No	759.2	3.1	0.0	3.1	3.0	Yes	-
5	Right	2850.64*	Rectangular	35.9	755.7	758.9	3.1	1.2	1.9	3.2	No	758.9	3.1	0.0	3.1	3.0	Yes	-
5	Right	2850.32*	Rectangular	36.0	755.4	758.5	3.1	1.2	1.9	3.2	No	758.5	3.1	0.0	3.1	3.0	Yes	-
5	Right	2850	Rectangular	36.0	755.0	758.2	3.1	1.2	1.9	3.2	No	758.2	3.1	0.0	3.1	3.0	Yes	-
-	-	2847.5*	Rectangular	36.0	754.7	757.7	3.0	1.2	1.8	3.2	No	757.7	3.0	0.0	3.0	3.0	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
-	-	2845.*	Rectangular	35.9	754.5	757.2	2.8	1.2	1.6	3.2	No	757.2	2.8	0.0	2.8	3.0	No	-
-	-	2842.5*	Rectangular	35.9	754.2	756.8	2.6	1.2	1.4	3.2	No	756.8	2.6	0.0	2.6	3.0	No	-
-	-	2840	Rectangular	35.9	753.9	756.3	2.4	1.2	1.2	3.2	No	756.3	2.4	0.0	2.4	3.0	No	-
-	-	2830	Rectangular	35.1	754.5	756.3	1.8	1.2	0.6	3.2	No	756.3	1.8	0.0	1.8	3.0	No	-
-	-	2829.09*	Rectangular	35.1	754.2	755.9	1.7	1.2	0.5	3.2	No	755.9	1.7	0.0	1.7	3.0	No	-
-	-	2828.18*	Rectangular	35.2	753.9	755.5	1.7	1.2	0.5	3.2	No	755.5	1.7	0.0	1.7	3.0	No	-
-	-	2827.27*	Rectangular	35.2	753.5	755.1	1.6	1.2	0.4	3.2	No	755.1	1.6	0.0	1.6	3.0	No	-
-	-	2826.36*	Rectangular	35.2	753.2	754.7	1.5	1.2	0.3	3.2	No	754.7	1.5	0.0	1.5	3.0	No	-
-	-	2825.45*	Rectangular	35.3	752.9	754.4	1.5	1.2	0.3	3.2	No	754.4	1.5	0.0	1.5	3.0	No	-
-	-	2824.54*	Rectangular	35.3	752.5	754.0	1.4	1.2	0.2	3.2	No	754.0	1.4	0.0	1.4	3.0	No	-
-	-	2823.63*	Rectangular	35.4	752.2	753.6	1.4	1.2	0.2	3.2	No	753.6	1.4	0.0	1.4	3.0	No	-
-	-	2822.72*	Rectangular	35.4	751.9	753.2	1.3	1.2	0.1	3.2	No	753.2	1.3	0.0	1.3	3.0	No	-
-	-	2821.81*	Rectangular	35.4	751.5	752.8	1.3	1.2	0.1	3.2	No	752.8	1.3	0.0	1.3	3.0	No	-
-	-	2820.90*	Rectangular	35.5	751.2	752.4	1.2	1.2	0.0	3.2	No	752.4	1.2	0.0	1.2	3.0	No	2
-	-	2820	Rectangular	35.5	750.9	752.0	1.1	1.2	-0.1	3.2	No	752.0	1.1	0.0	1.1	3.0	No	2
-	-	2817.5*	Natural	39.0	749.4	745.4	n/a	n/a	n/a	n/a	n/a	744.1	n/a	n/a	n/a	n/a	n/a	-
-	-	2810	Natural	7.1	759.8	755.0	n/a	n/a	n/a	n/a	n/a	750.0	n/a	n/a	n/a	n/a	n/a	-
-	-	2808.66*	Natural	7.4	759.3	753.8	n/a	n/a	n/a	n/a	n/a	749.2	n/a	n/a	n/a	n/a	n/a	-
-	-	2808.*	Natural	7.5	759.0	753.2	n/a	n/a	n/a	n/a	n/a	748.8	n/a	n/a	n/a	n/a	n/a	-
-	-	2807.33*	Natural	7.7	758.8	752.6	n/a	n/a	n/a	n/a	n/a	748.4	n/a	n/a	n/a	n/a	n/a	-
-	-	2806.66*	Natural	7.9	758.5	752.0	n/a	n/a	n/a	n/a	n/a	748.0	n/a	n/a	n/a	n/a	n/a	-
-	-	2806.*	Natural	8.1	758.2	751.4	n/a	n/a	n/a	n/a	n/a	747.6	n/a	n/a	n/a	n/a	n/a	-
-	-	2805.33*	Natural	8.4	757.8	750.8	n/a	n/a	n/a	n/a	n/a	747.2	n/a	n/a	n/a	n/a	n/a	-
-	-	2804.66*	Natural	8.3	757.6	750.2	n/a	n/a	n/a	n/a	n/a	746.8	n/a	n/a	n/a	n/a	n/a	-
-	-	2804.*	Natural	8.5	757.2	749.6	n/a	n/a	n/a	n/a	n/a	746.4	n/a	n/a	n/a	n/a	n/a	-
-	-	2803.33*	Natural	8.7	756.9	749.0	n/a	n/a	n/a	n/a	n/a	746.0	n/a	n/a	n/a	n/a	n/a	-
-	-	2802.66*	Natural	9.0	756.4	748.5	n/a	n/a	n/a	n/a	n/a	745.6	n/a	n/a	n/a	n/a	n/a	-
-	-	2802.*	Natural	9.3	756.0	747.9	n/a	n/a	n/a	n/a	n/a	745.2	n/a	n/a	n/a	n/a	n/a	-
-	-	2801.33*	Natural	9.7	755.4	747.3	n/a	n/a	n/a	n/a	n/a	744.8	n/a	n/a	n/a	n/a	n/a	-
-	-	2800	Natural	10.2	754.2	745.0	n/a	n/a	n/a	n/a	n/a	745.0	n/a	n/a	n/a	n/a	n/a	-
-	-	2799.41*	Natural	12.7	753.2	743.7	n/a	n/a	n/a	n/a	n/a	744.1	n/a	n/a	n/a	n/a	n/a	-
-	-	2798.82*	Natural	12.4	753.1	743.1	n/a	n/a	n/a	n/a	n/a	743.8	n/a	n/a	n/a	n/a	n/a	-
-	-	2798.23*	Natural	12.2	753.0	742.6	n/a	n/a	n/a	n/a	n/a	743.5	n/a	n/a	n/a	n/a	n/a	-
-	-	2797.64*	Natural	15.2	751.4	742.1	n/a	n/a	n/a	n/a	n/a	875.0	n/a	n/a	n/a	n/a	n/a	-
-	-	2797.05*	Natural	15.1	751.1	741.5	n/a	n/a	n/a	n/a	n/a	875.0	n/a	n/a	n/a	n/a	n/a	-
-	-	2796.47*	Natural	15.1	750.8	741.0	n/a	n/a	n/a	n/a	n/a	875.0	n/a	n/a	n/a	n/a	n/a	-
-	-	2795.88*	Natural	15.4	750.3	740.4	n/a	n/a	n/a	n/a	n/a	875.0	n/a	n/a	n/a	n/a	n/a	-
-	-	2795.29*	Natural	15.3	750.0	739.9	n/a	n/a	n/a	n/a	n/a	875.0	n/a	n/a	n/a	n/a	n/a	-
-	-	2794.70*	Natural	16.1	749.2	739.3	n/a	n/a	n/a	n/a	n/a	875.0	n/a	n/a	n/a	n/a	n/a	-
-	-	2794.11*	Natural	13.7	749.6	738.8	n/a	n/a	n/a	n/a	n/a	741.8	n/a	n/a	n/a	n/a	n/a	-
-	-	2793.52*	Natural	13.5	749.5	738.3	n/a	n/a	n/a	n/a	n/a	741.5	n/a	n/a	n/a	n/a	n/a	-
-	-	2792.94*	Natural	13.3	749.3	737.7	n/a	n/a	n/a	n/a	n/a	741.3	n/a	n/a	n/a	n/a	n/a	-
-	-	2792.35*	Natural	13.1	749.1	737.2	n/a	n/a	n/a	n/a	n/a	741.0	n/a	n/a	n/a	n/a	n/a	-
-	-	2791.76*	Natural	12.9	749.0	736.6	n/a	n/a	n/a	n/a	n/a	740.8	n/a	n/a	n/a	n/a	n/a	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
-	-	2791.17*	Natural	12.6	748.9	736.1	n/a	n/a	n/a	n/a	n/a	740.5	n/a	n/a	n/a	n/a	n/a	-
-	-	2790.58*	Natural	12.4	748.8	735.5	n/a	n/a	n/a	n/a	n/a	740.3	n/a	n/a	n/a	n/a	n/a	-
-	-	2790	Natural	12.1	748.7	735.0	n/a	n/a	n/a	n/a	n/a	740.0	n/a	n/a	n/a	n/a	n/a	-
-	-	2789.28*	Natural	11.8	748.6	735.2	n/a	n/a	n/a	n/a	n/a	740.3	n/a	n/a	n/a	n/a	n/a	-
-	-	2788.57*	Natural	15.8	747.1	735.3	n/a	n/a	n/a	n/a	n/a	735.8	n/a	n/a	n/a	n/a	n/a	-
-	-	2787.85*	Natural	17.4	746.0	735.5	n/a	n/a	n/a	n/a	n/a	735.1	n/a	n/a	n/a	n/a	n/a	-
-	-	2787.14*	Natural	16.5	745.9	735.6	n/a	n/a	n/a	n/a	n/a	735.5	n/a	n/a	n/a	n/a	n/a	-
-	-	2786.42*	Natural	15.5	745.8	735.8	n/a	n/a	n/a	n/a	n/a	736.0	n/a	n/a	n/a	n/a	n/a	-
-	-	2785.71*	Natural	14.5	745.8	735.9	n/a	n/a	n/a	n/a	n/a	736.4	n/a	n/a	n/a	n/a	n/a	-
-	-	2780	Natural	7.8	745.9	740.0	n/a	n/a	n/a	n/a	n/a	740.0	n/a	n/a	n/a	n/a	n/a	-
-	-	2770	Rectangular	19.0	740.7	741.5	0.8	0.0	0.8	2.0	No	741.5	0.8	0.0	0.8	2.0	No	-
-	-	2766.66*	Rectangular	30.7	730.8	735.0	4.2	0.0	4.2	2.0	Yes	735.0	4.2	0.0	4.2	2.0	Yes	-
-	-	2763.33*	Rectangular	36.5	723.9	728.5	4.6	0.0	4.6	3.0	Yes	728.5	4.6	0.0	4.6	3.0	Yes	-
-	-	2760	Rectangular	41.0	717.6	722.0	4.4	0.0	4.4	3.0	Yes	722.0	4.4	0.0	4.4	3.0	Yes	-
-	-	2755.*	Rectangular	40.6	717.7	721.4	3.7	0.0	3.7	3.0	Yes	721.4	3.7	0.0	3.7	3.0	Yes	-
-	-	2750	Rectangular	40.0	717.9	720.7	2.8	0.0	2.8	3.0	No	720.7	2.8	0.0	2.8	3.0	No	-
-	-	2745.*	Rectangular	39.9	717.7	720.1	2.4	0.0	2.4	3.0	No	720.1	2.4	0.0	2.4	3.0	No	-
-	-	2740	Rectangular	40.9	716.0	719.4	3.4	0.0	3.4	3.0	Yes	719.4	3.4	0.0	3.4	3.0	Yes	-
-	-	2730	Rectangular	41.1	715.6	718.5	3.0	0.0	3.0	3.0	No	718.5	3.0	2.1	0.9	4.1	No	-
-	-	2729.23*	Rectangular	41.0	715.2	718.2	3.0	0.0	3.0	3.0	No	718.2	3.0	2.1	0.9	4.1	No	-
-	-	2728.46*	Rectangular	41.0	714.9	717.9	3.0	0.0	3.0	3.0	Yes	717.9	3.0	2.1	0.9	4.1	No	-
-	-	2727.69*	Rectangular	40.9	714.5	717.5	3.0	0.0	3.0	3.0	Yes	717.5	3.0	2.1	0.9	4.1	No	-
-	-	2726.92*	Rectangular	40.9	714.2	717.2	3.1	0.0	3.1	3.0	Yes	717.2	3.1	2.1	1.0	4.1	No	-
-	-	2726.15*	Rectangular	40.8	713.8	716.9	3.1	0.0	3.1	3.0	Yes	716.9	3.1	2.1	1.0	4.1	No	-
-	-	2725.38*	Rectangular	40.8	713.5	716.6	3.1	0.0	3.1	3.0	Yes	716.6	3.1	2.1	1.0	4.1	No	-
-	-	2724.61*	Rectangular	40.7	713.1	716.3	3.1	0.0	3.1	3.0	Yes	716.3	3.1	2.1	1.0	4.1	No	-
-	-	2723.84*	Rectangular	40.7	712.8	715.9	3.2	0.0	3.2	3.0	Yes	715.9	3.2	2.1	1.1	4.1	No	-
-	-	2723.07*	Rectangular	40.7	712.4	715.6	3.2	0.0	3.2	3.0	Yes	715.6	3.2	2.1	1.1	4.1	No	-
-	-	2722.30*	Rectangular	40.6	712.1	715.3	3.2	0.0	3.2	3.0	Yes	715.3	3.2	2.1	1.1	4.1	No	-
-	-	2721.53*	Rectangular	40.6	711.7	715.0	3.3	0.0	3.3	3.0	Yes	715.0	3.3	2.1	1.2	4.1	No	-
-	-	2720.76*	Rectangular	40.6	711.4	714.7	3.3	0.0	3.3	3.0	Yes	714.7	3.3	2.1	1.2	4.1	No	-
-	-	2720	Rectangular	40.6	711.0	714.3	3.3	0.0	3.3	3.0	Yes	714.3	3.3	2.1	1.2	4.1	No	-
-	-	2715.*	Rectangular	40.5	710.7	713.0	2.3	0.0	2.3	3.0	No	713.0	2.3	2.1	0.2	4.1	No	-
-	-	2710	Rectangular	40.5	710.4	711.7	1.3	0.0	1.3	3.0	No	711.7	1.3	2.1	-0.8	4.1	No	-
-	-	2706.66*	Rectangular	40.5	710.1	711.4	1.3	0.0	1.3	3.0	No	711.4	1.3	2.1	-0.8	4.1	No	-
-	-	2703.33*	Rectangular	40.4	709.8	711.1	1.3	0.0	1.3	3.0	No	711.1	1.3	2.1	-0.8	4.1	No	-
-	-	2700	Rectangular	40.4	709.5	710.8	1.3	0.0	1.3	3.0	No	710.8	1.3	2.1	-0.8	4.1	No	-
-	-	2699.41*	Rectangular	40.4	709.1	710.4	1.3	0.0	1.3	3.0	No	710.4	1.3	2.1	-0.8	4.1	No	-
-	-	2698.82*	Rectangular	40.4	708.8	710.1	1.3	0.0	1.3	3.0	No	710.1	1.3	2.1	-0.8	4.1	No	-
-	-	2698.23*	Rectangular	40.3	708.4	709.7	1.3	0.0	1.3	3.0	No	709.7	1.3	2.1	-0.8	4.1	No	-
-	-	2697.64*	Rectangular	40.3	708.0	709.3	1.3	0.0	1.3	3.0	No	709.3	1.3	2.1	-0.8	4.1	No	-
-	-	2697.05*	Rectangular	40.3	707.7	709.0	1.3	0.0	1.3	3.0	No	709.0	1.3	2.1	-0.8	4.1	No	-
6	Left	2696.47*	Rectangular	40.3	707.3	708.6	1.3	0.0	1.3	3.0	No	708.6	1.3	2.1	-0.8	4.1	No	3
6	Left	2695.88*	Rectangular	40.3	706.9	708.2	1.3	0.0	1.3	3.0	No	708.2	1.3	2.1	-0.8	4.1	No	3

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
6	Left	2695.29*	Rectangular	40.3	706.6	707.9	1.3	0.0	1.3	3.0	No	707.9	1.3	2.1	-0.8	4.1	No	3
6	Left	2694.70*	Rectangular	40.3	706.2	707.5	1.3	0.0	1.3	3.0	No	707.5	1.3	2.1	-0.8	4.1	No	3
6	Left	2694.11*	Rectangular	40.2	705.9	707.1	1.3	0.0	1.3	3.0	No	707.1	1.3	2.1	-0.8	4.1	No	3
6	Left	2693.52*	Rectangular	40.2	705.5	706.8	1.3	0.0	1.3	3.0	No	706.8	1.3	2.1	-0.8	4.1	No	3
6	Left	2692.94*	Rectangular	40.2	705.1	706.4	1.3	0.0	1.3	3.0	No	706.4	1.3	2.1	-0.8	4.1	No	3
6	Left	2692.35*	Rectangular	40.2	704.8	706.0	1.3	0.0	1.3	3.0	No	706.0	1.3	2.1	-0.8	4.1	No	3
6	Left	2691.76*	Rectangular	40.2	704.4	705.7	1.3	0.0	1.3	3.0	No	705.7	1.3	2.1	-0.8	4.1	No	3
6	Left	2691.17*	Rectangular	40.2	704.0	705.3	1.3	0.0	1.3	3.0	No	705.3	1.3	2.1	-0.8	4.1	No	3
6	Left	2690.58*	Rectangular	40.2	703.7	704.9	1.3	0.0	1.3	3.0	No	704.9	1.3	2.1	-0.9	4.1	No	3
6	Left	2690	Rectangular	40.2	703.3	704.6	1.3	0.0	1.3	3.0	No	704.6	1.3	2.1	-0.9	4.1	No	3
6	Left	2689.41*	Rectangular	40.2	702.9	704.2	1.3	0.0	1.3	3.0	No	704.2	1.3	2.1	-0.9	4.1	No	3
6	Left	2688.82*	Rectangular	40.2	702.6	703.8	1.3	0.0	1.3	3.0	No	703.8	1.3	2.1	-0.9	4.1	No	3
6	Left	2688.23*	Rectangular	40.2	702.2	703.5	1.3	0.0	1.3	3.0	No	703.5	1.3	2.1	-0.9	4.1	No	3
6	Left	2687.64*	Rectangular	40.1	701.9	703.1	1.2	0.0	1.2	3.0	No	703.1	1.2	2.1	-0.9	4.1	No	3
6	Left	2687.05*	Rectangular	40.1	701.5	702.7	1.2	0.0	1.2	3.0	No	702.7	1.2	2.1	-0.9	4.1	No	3
6	Left	2686.47*	Rectangular	40.1	701.1	702.4	1.2	0.0	1.2	3.0	No	702.4	1.2	2.1	-0.9	4.1	No	3
6	Left	2685.88*	Rectangular	40.1	700.8	702.0	1.2	0.0	1.2	3.0	No	702.0	1.2	2.1	-0.9	4.1	No	3
6	Left	2685.29*	Rectangular	40.1	700.4	701.6	1.2	0.0	1.2	3.0	No	701.6	1.2	2.1	-0.9	4.1	No	3
6	Left	2684.70*	Rectangular	40.1	700.0	701.3	1.2	0.0	1.2	3.0	No	701.3	1.2	2.1	-0.9	4.1	No	3
6	Left	2684.11*	Rectangular	40.1	699.7	700.9	1.2	0.0	1.2	3.0	No	700.9	1.2	2.1	-0.9	4.1	No	3
6	Left	2683.52*	Rectangular	40.1	699.3	700.5	1.2	0.0	1.2	3.0	No	700.5	1.2	2.1	-0.9	4.1	No	3
6	Left	2682.94*	Rectangular	40.1	698.9	700.2	1.2	0.0	1.2	3.0	No	700.2	1.2	2.1	-0.9	4.1	No	3
6	Left	2682.35*	Rectangular	40.1	698.6	699.8	1.2	0.0	1.2	3.0	No	699.8	1.2	2.1	-0.9	4.1	No	3
6	Left	2681.76*	Rectangular	40.1	698.2	699.4	1.2	0.0	1.2	3.0	No	699.4	1.2	2.1	-0.9	4.1	No	3
6	Left	2681.17*	Rectangular	40.0	697.8	699.1	1.2	0.0	1.2	3.0	No	699.1	1.2	2.1	-0.9	4.1	No	3
6	Left	2680.58*	Rectangular	40.0	697.5	698.7	1.2	0.0	1.2	3.0	No	698.7	1.2	2.1	-0.9	4.1	No	3
6	Left	2680	Rectangular	40.0	697.1	698.3	1.2	0.0	1.2	3.0	No	698.3	1.2	2.1	-0.9	4.1	No	3
-	-	2679.41*	Rectangular	40.0	696.7	698.0	1.2	0.0	1.2	3.0	No	698.0	1.2	2.1	-0.9	4.1	No	-
-	-	2678.82*	Rectangular	40.0	696.4	697.6	1.2	0.0	1.2	3.0	No	697.6	1.2	2.1	-0.9	4.1	No	-
-	-	2678.23*	Rectangular	40.0	696.0	697.2	1.2	0.0	1.2	3.0	No	697.2	1.2	2.1	-0.9	4.1	No	-
-	-	2677.64*	Rectangular	40.0	695.6	696.9	1.2	0.0	1.2	3.0	No	696.9	1.2	2.1	-0.9	4.1	No	-
-	-	2677.05*	Rectangular	40.0	695.3	696.5	1.2	0.0	1.2	3.0	No	696.5	1.2	2.1	-0.9	4.1	No	-
-	-	2676.47*	Rectangular	40.0	694.9	696.1	1.2	0.0	1.2	3.0	No	696.1	1.2	2.1	-0.9	4.1	No	-
-	-	2675.88*	Rectangular	40.0	694.6	695.8	1.2	0.0	1.2	3.0	No	695.8	1.2	2.1	-0.9	4.1	No	-
-	-	2675.29*	Rectangular	40.0	694.2	695.4	1.2	0.0	1.2	3.0	No	695.4	1.2	2.1	-0.9	4.1	No	-
-	-	2674.70*	Rectangular	40.0	693.8	695.0	1.2	0.0	1.2	3.0	No	695.0	1.2	2.1	-0.9	4.1	No	-
-	-	2674.11*	Rectangular	40.0	693.5	694.7	1.2	0.0	1.2	3.0	No	694.7	1.2	2.1	-0.9	4.1	No	-
-	-	2673.52*	Rectangular	40.0	693.1	694.3	1.2	0.0	1.2	3.0	No	694.3	1.2	2.1	-0.9	4.1	No	-
-	-	2672.94*	Rectangular	40.0	692.7	693.9	1.2	0.0	1.2	3.0	No	693.9	1.2	2.1	-0.9	4.1	No	-
-	-	2672.35*	Rectangular	40.0	692.4	693.6	1.2	0.0	1.2	3.0	No	693.6	1.2	2.1	-0.9	4.1	No	-
-	-	2671.76*	Rectangular	40.0	692.0	693.2	1.2	0.0	1.2	3.0	No	693.2	1.2	2.1	-0.9	4.1	No	-
-	-	2671.17*	Rectangular	40.0	691.6	692.8	1.2	0.0	1.2	3.0	No	692.8	1.2	2.1	-0.9	4.1	No	-
-	-	2670.58*	Rectangular	39.9	691.3	692.5	1.2	0.0	1.2	3.0	No	692.5	1.2	2.1	-0.9	4.1	No	-
-	-	2670	Rectangular	39.9	690.9	692.1	1.2	0.0	1.2	3.0	No	692.1	1.2	2.1	-0.9	4.1	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
-	-	2669.41*	Rectangular	39.9	690.5	691.7	1.2	0.0	1.2	3.0	No	691.7	1.1	2.1	-1.0	4.1	No	-
-	-	2668.82*	Rectangular	39.9	690.2	691.4	1.2	0.0	1.2	3.0	No	691.3	1.1	2.1	-1.0	4.1	No	-
-	-	2668.23*	Rectangular	39.9	689.8	691.0	1.2	0.0	1.2	3.0	No	690.9	1.1	2.1	-1.0	4.1	No	-
-	-	2667.64*	Rectangular	39.9	689.4	690.6	1.2	0.0	1.2	3.0	No	690.4	1.0	2.1	-1.1	4.1	No	-
-	-	2667.05*	Rectangular	39.9	689.1	690.3	1.2	0.0	1.2	3.0	No	690.0	0.9	2.1	-1.2	4.1	No	-
-	-	2666.47*	Rectangular	39.9	688.7	689.9	1.2	0.0	1.2	3.0	No	689.6	0.9	2.1	-1.2	4.1	No	-
-	-	2665.88*	Rectangular	39.9	688.4	689.5	1.2	0.0	1.2	3.0	No	689.2	0.9	2.1	-1.2	4.1	No	-
-	-	2665.29*	Rectangular	39.9	688.0	689.2	1.2	0.0	1.2	3.0	No	688.8	0.8	2.1	-1.3	4.1	No	-
-	-	2664.70*	Rectangular	39.9	687.6	688.8	1.2	0.0	1.2	3.0	No	688.4	0.8	2.1	-1.4	4.1	No	-
-	-	2664.11*	Rectangular	39.9	687.3	688.4	1.2	0.0	1.2	3.0	No	688.0	0.7	2.1	-1.4	4.1	No	-
-	-	2663.52*	Rectangular	39.9	686.9	688.1	1.2	0.0	1.2	3.0	No	687.5	0.6	2.1	-1.5	4.1	No	-
-	-	2662.94*	Rectangular	39.9	686.5	687.7	1.2	0.0	1.2	3.0	No	687.1	0.6	2.1	-1.5	4.1	No	-
-	-	2662.35*	Rectangular	39.9	686.2	687.3	1.2	0.0	1.2	3.0	No	686.7	0.6	2.1	-1.5	4.1	No	-
-	-	2661.76*	Rectangular	39.9	685.8	687.0	1.2	0.0	1.2	3.0	No	686.3	0.5	2.1	-1.6	4.1	No	-
-	-	2661.17*	Rectangular	39.9	685.4	686.6	1.2	0.0	1.2	3.0	No	685.9	0.5	2.1	-1.6	4.1	No	-
-	-	2660.58*	Rectangular	39.9	685.1	686.2	1.2	0.0	1.2	3.0	No	685.5	0.4	2.1	-1.7	4.1	No	-
-	-	2660	Rectangular	39.9	684.7	685.9	1.2	0.0	1.2	3.0	No	685.1	0.4	2.1	-1.7	4.1	No	-
-	-	2659.41*	Rectangular	39.9	684.3	685.5	1.2	0.0	1.2	3.0	No	684.7	0.4	2.1	-1.7	4.1	No	-
-	-	2658.82*	Rectangular	39.9	684.0	685.1	1.2	0.0	1.2	3.0	No	684.4	0.5	2.1	-1.6	4.1	No	-
-	-	2658.23*	Rectangular	39.9	683.6	684.8	1.2	0.0	1.2	3.0	No	684.1	0.5	2.1	-1.6	4.1	No	-
-	-	2657.64*	Rectangular	39.9	683.2	684.4	1.2	0.0	1.2	3.0	No	683.8	0.6	2.1	-1.5	4.1	No	-
-	-	2657.05*	Rectangular	39.9	682.9	684.0	1.2	0.0	1.2	3.0	No	683.5	0.6	2.1	-1.5	4.1	No	-
-	-	2656.47*	Rectangular	39.9	682.5	683.7	1.2	0.0	1.2	3.0	No	683.1	0.6	2.1	-1.5	4.1	No	-
-	-	2655.88*	Rectangular	39.9	682.1	683.3	1.2	0.0	1.2	3.0	No	682.8	0.7	2.1	-1.4	4.1	No	-
-	-	2655.29*	Rectangular	39.9	681.8	683.0	1.2	0.0	1.2	3.0	No	682.5	0.7	2.1	-1.4	4.1	No	-
-	-	2654.70*	Rectangular	39.9	681.4	682.6	1.2	0.0	1.2	3.0	No	682.2	0.8	2.1	-1.3	4.1	No	-
-	-	2654.11*	Rectangular	39.9	681.0	682.2	1.2	0.0	1.2	3.0	No	681.9	0.8	2.1	-1.3	4.1	No	-
-	-	2653.52*	Rectangular	39.9	680.7	681.9	1.2	0.0	1.2	3.0	No	681.6	0.9	2.1	-1.2	4.1	No	-
-	-	2652.94*	Rectangular	39.8	680.3	681.5	1.2	0.0	1.2	3.0	No	681.2	0.9	2.1	-1.2	4.1	No	-
-	-	2652.35*	Rectangular	39.8	679.9	681.1	1.2	0.0	1.2	3.0	No	680.9	1.0	2.1	-1.1	4.1	No	-
-	-	2651.76*	Rectangular	39.8	679.6	680.8	1.2	0.0	1.2	3.0	No	680.6	1.0	2.1	-1.1	4.1	No	-
-	-	2651.17*	Rectangular	39.8	679.2	680.4	1.2	0.0	1.2	3.0	No	680.3	1.1	2.1	-1.0	4.1	No	-
-	-	2650.58*	Rectangular	39.8	678.8	680.0	1.2	0.0	1.2	3.0	No	680.0	1.1	2.1	-1.0	4.1	No	-
7	Left	2650	Rectangular	39.8	678.5	679.7	1.2	0.0	1.2	3.0	No	679.7	1.2	1.2	-0.02	3.2	No	4
7	Left	2649.6*	Rectangular	39.8	678.1	679.3	1.2	0.0	1.2	3.0	No	679.3	1.2	1.2	-0.02	3.2	No	4
7	Left	2649.2*	Rectangular	39.9	677.7	678.9	1.2	0.0	1.2	3.0	No	678.9	1.2	1.2	-0.02	3.2	No	4
7	Left	2648.8*	Rectangular	39.9	677.4	678.5	1.2	0.0	1.2	3.0	No	678.5	1.2	1.2	-0.02	3.2	No	4
7	Left	2648.4*	Rectangular	39.9	677.0	678.2	1.2	0.0	1.2	3.0	No	678.2	1.2	1.2	-0.02	3.2	No	4
7	Left	2648.*	Rectangular	39.9	676.6	677.8	1.2	0.0	1.2	3.0	No	677.8	1.2	1.2	-0.02	3.2	No	4
7	Left	2647.6*	Rectangular	39.9	676.2	677.4	1.2	0.0	1.2	3.0	No	677.4	1.2	1.2	-0.02	3.2	No	4
7	Left	2647.2*	Rectangular	39.9	675.9	677.0	1.2	0.0	1.2	3.0	No	677.0	1.2	1.2	-0.02	3.2	No	4
7	Left	2646.8*	Rectangular	39.9	675.5	676.7	1.2	0.0	1.2	3.0	No	676.7	1.2	1.2	-0.02	3.2	No	4
7	Left	2646.4*	Rectangular	39.9	675.1	676.3	1.2	0.0	1.2	3.0	No	676.3	1.2	1.2	-0.02	3.2	No	4
7	Left	2646.*	Rectangular	39.9	674.7	675.9	1.2	0.0	1.2	3.0	No	675.9	1.2	1.2	-0.02	3.2	No	4

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
7	Left	2645.6*	Rectangular	39.9	674.4	675.5	1.2	0.0	1.2	3.0	No	675.5	1.2	1.2	-0.02	3.2	No	4
7	Left	2645.2*	Rectangular	39.9	674.0	675.2	1.2	0.0	1.2	3.0	No	675.2	1.2	1.2	-0.02	3.2	No	4
7	Left	2644.8*	Rectangular	39.9	673.6	674.8	1.2	0.0	1.2	3.0	No	674.8	1.2	1.2	-0.01	3.2	No	4
7	Left	2644.4*	Rectangular	39.9	673.2	674.4	1.2	0.0	1.2	3.0	No	674.4	1.2	1.2	-0.01	3.2	No	4
7	Left	2644.*	Rectangular	39.9	672.9	674.1	1.2	0.0	1.2	3.0	No	674.1	1.2	1.2	-0.01	3.2	No	4
7	Left	2643.6*	Rectangular	39.9	672.5	673.7	1.2	0.0	1.2	3.0	No	673.7	1.2	1.2	-0.01	3.2	No	4
7	Left	2643.2*	Rectangular	39.9	672.1	673.3	1.2	0.0	1.2	3.0	No	673.3	1.2	1.2	-0.01	3.2	No	4
7	Left	2642.8*	Rectangular	39.9	671.7	672.9	1.2	0.0	1.2	3.0	No	672.9	1.2	1.2	-0.01	3.2	No	4
7	Left	2642.4*	Rectangular	39.9	671.4	672.6	1.2	0.0	1.2	3.0	No	672.6	1.2	1.2	-0.01	3.2	No	4
7	Left	2642.*	Rectangular	39.9	671.0	672.2	1.2	0.0	1.2	3.0	No	672.2	1.2	1.2	-0.01	3.2	No	4
7	Left	2641.6*	Rectangular	39.9	670.6	671.8	1.2	0.0	1.2	3.0	No	671.8	1.2	1.2	-0.01	3.2	No	4
7	Left	2641.2*	Rectangular	39.9	670.2	671.4	1.2	0.0	1.2	3.0	No	671.4	1.2	1.2	-0.01	3.2	No	4
7	Left	2640.8*	Rectangular	39.9	669.9	671.1	1.2	0.0	1.2	3.0	No	671.1	1.2	1.2	-0.01	3.2	No	4
7	Left	2640.4*	Rectangular	39.9	669.5	670.7	1.2	0.0	1.2	3.0	No	670.7	1.2	1.2	-0.01	3.2	No	4
7	Left	2640	Rectangular	39.9	669.1	670.3	1.2	0.0	1.2	3.0	No	670.3	1.2	1.2	-0.01	3.2	No	4
-	-	2630	Rectangular	39.8	668.9	670.0	1.1	1.0	0.1	3.0	No	670.0	1.1	1.2	-0.1	3.2	No	-
-	-	2628.57*	Rectangular	39.9	668.5	669.6	1.1	1.0	0.1	3.0	No	669.6	1.1	1.2	-0.1	3.2	No	-
-	-	2627.14*	Rectangular	39.9	668.0	669.2	1.2	1.0	0.2	3.0	No	669.2	1.2	1.2	0.0	3.2	No	-
-	-	2625.71*	Rectangular	40.0	667.6	668.8	1.2	1.0	0.2	3.0	No	668.8	1.2	1.2	0.0	3.2	No	-
-	-	2624.28*	Rectangular	40.0	667.2	668.4	1.2	1.0	0.2	3.0	No	668.4	1.2	1.2	0.0	3.2	No	-
-	-	2622.85*	Rectangular	40.0	666.8	668.0	1.2	1.0	0.2	3.0	No	668.0	1.2	1.2	0.0	3.2	No	-
-	-	2621.42*	Rectangular	40.1	666.4	667.6	1.2	1.0	0.2	3.0	No	667.6	1.2	1.2	0.0	3.2	No	-
-	-	2620	Rectangular	40.1	666.0	667.2	1.2	1.0	0.2	3.0	No	667.2	1.2	1.2	0.0	3.2	No	-
-	-	2619.41*	Rectangular	40.2	665.5	666.8	1.2	1.0	0.2	3.0	No	666.8	1.2	1.2	0.0	3.2	No	-
-	-	2618.82*	Rectangular	40.2	665.1	666.3	1.2	1.0	0.2	3.0	No	666.3	1.2	1.2	0.0	3.2	No	-
-	-	2618.23*	Rectangular	40.2	664.7	665.9	1.2	1.0	0.2	3.0	No	665.9	1.2	1.2	0.0	3.2	No	-
-	-	2617.64*	Rectangular	40.3	664.3	665.5	1.2	1.0	0.2	3.0	No	665.5	1.2	1.2	0.0	3.2	No	-
-	-	2617.05*	Rectangular	40.3	663.8	665.1	1.3	1.0	0.3	3.0	No	665.1	1.3	1.2	0.1	3.2	No	-
-	-	2616.47*	Rectangular	40.3	663.4	664.7	1.3	1.0	0.3	3.0	No	664.7	1.3	1.2	0.1	3.2	No	-
-	-	2615.88*	Rectangular	40.4	663.0	664.3	1.3	1.0	0.3	3.0	No	664.3	1.3	1.2	0.1	3.2	No	-
-	-	2615.29*	Rectangular	40.4	662.6	663.8	1.3	1.0	0.3	3.0	No	663.8	1.3	1.2	0.1	3.2	No	-
-	-	2614.70*	Rectangular	40.4	662.2	663.4	1.3	1.0	0.3	3.0	No	663.4	1.3	1.2	0.1	3.2	No	-
-	-	2614.11*	Rectangular	40.4	661.7	663.0	1.3	1.0	0.3	3.0	No	663.0	1.3	1.2	0.1	3.2	No	-
-	-	2613.52*	Rectangular	40.5	661.3	662.6	1.3	1.0	0.3	3.0	No	662.6	1.3	1.2	0.1	3.2	No	-
-	-	2612.94*	Rectangular	40.5	660.9	662.2	1.3	1.0	0.3	3.0	No	662.2	1.3	1.2	0.1	3.2	No	-
8	Right	2612.35*	Rectangular	40.5	660.5	661.8	1.3	1.0	0.3	3.0	No	661.8	1.3	0.0	1.3	3.0	No	-
8	Right	2611.76*	Rectangular	40.5	660.0	661.4	1.3	1.0	0.3	3.0	No	661.4	1.3	0.0	1.3	3.0	No	-
8	Right	2611.17*	Rectangular	40.6	659.6	660.9	1.3	1.0	0.3	3.0	No	660.9	1.3	0.0	1.3	3.0	No	-
8	Right	2610.58*	Rectangular	40.6	659.2	660.5	1.3	1.0	0.3	3.0	No	660.5	1.3	0.0	1.3	3.0	No	-
8	Right	2610	Rectangular	40.6	658.8	660.1	1.3	1.0	0.3	3.0	No	660.1	1.3	0.0	1.3	3.0	No	-
8	Right	2609.41*	Rectangular	40.7	658.4	659.7	1.3	1.0	0.3	3.0	No	659.7	1.3	0.0	1.3	3.0	No	-
8	Right	2608.82*	Rectangular	40.7	657.9	659.3	1.3	1.0	0.3	3.0	No	659.3	1.3	0.0	1.3	3.0	No	-
8	Right	2608.23*	Rectangular	40.7	657.5	658.9	1.3	1.0	0.3	3.0	No	658.9	1.3	0.0	1.3	3.0	No	-
8	Right	2607.64*	Rectangular	40.7	657.1	658.4	1.3	1.0	0.3	3.0	No	658.4	1.3	0.0	1.3	3.0	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
8	Right	2607.05*	Rectangular	40.7	656.7	658.0	1.4	1.0	0.4	3.0	No	658.0	1.4	0.0	1.4	3.0	No	-
8	Right	2606.47*	Rectangular	40.8	656.3	657.6	1.4	1.0	0.4	3.0	No	657.6	1.4	0.0	1.4	3.0	No	-
8	Right	2605.88*	Rectangular	40.8	655.8	657.2	1.4	1.0	0.4	3.0	No	657.2	1.4	0.0	1.4	3.0	No	-
8	Right	2605.29*	Rectangular	40.8	655.4	656.8	1.4	1.0	0.4	3.0	No	656.8	1.4	0.0	1.4	3.0	No	-
8	Right	2604.70*	Rectangular	40.8	655.0	656.4	1.4	1.0	0.4	3.0	No	656.4	1.4	0.0	1.4	3.0	No	-
-	-	2604.11*	Rectangular	40.8	654.6	655.9	1.4	1.0	0.4	3.0	No	655.9	1.4	0.0	1.4	3.0	No	-
-	-	2603.52*	Rectangular	40.8	654.2	655.5	1.4	1.0	0.4	3.0	No	655.5	1.4	0.0	1.4	3.0	No	-
-	-	2602.94*	Rectangular	40.9	653.7	655.1	1.4	1.0	0.4	3.0	No	655.1	1.4	0.0	1.4	3.0	No	-
-	-	2602.35*	Rectangular	40.9	653.3	654.7	1.4	1.0	0.4	3.0	No	654.7	1.4	0.0	1.4	3.0	No	-
-	-	2601.76*	Rectangular	40.9	652.9	654.3	1.4	1.0	0.4	3.0	No	654.3	1.4	0.0	1.4	3.0	No	-
-	-	2601.17*	Rectangular	40.9	652.5	653.9	1.4	1.0	0.4	3.0	No	653.9	1.4	0.0	1.4	3.0	No	-
-	-	2600.58*	Rectangular	40.9	652.1	653.5	1.4	1.0	0.4	3.0	No	653.5	1.4	0.0	1.4	3.0	No	-
-	-	2600	Rectangular	40.9	651.6	653.0	1.4	1.0	0.4	3.0	No	653.0	1.4	0.0	1.4	3.0	No	-
-	-	2599.41*	Rectangular	41.0	651.2	652.6	1.4	1.0	0.4	3.0	No	652.6	1.4	0.0	1.4	3.0	No	-
-	-	2598.82*	Rectangular	41.0	650.8	652.2	1.4	1.0	0.4	3.0	No	652.2	1.4	0.0	1.4	3.0	No	-
-	-	2598.23*	Rectangular	41.0	650.4	651.8	1.4	1.0	0.4	3.0	No	651.8	1.4	0.0	1.4	3.0	No	-
-	-	2597.64*	Rectangular	41.0	650.0	651.4	1.4	1.0	0.4	3.0	No	651.4	1.4	0.0	1.4	3.0	No	-
-	-	2597.05*	Rectangular	41.0	649.5	651.0	1.4	1.0	0.4	3.0	No	651.0	1.4	0.0	1.4	3.0	No	-
-	-	2596.47*	Rectangular	41.0	649.1	650.5	1.4	1.0	0.4	3.0	No	650.5	1.4	0.0	1.4	3.0	No	-
-	-	2595.88*	Rectangular	41.1	648.7	650.1	1.4	1.0	0.4	3.0	No	650.1	1.4	0.0	1.4	3.0	No	-
-	-	2595.29*	Rectangular	41.1	648.3	649.7	1.4	1.0	0.4	3.0	No	649.7	1.4	0.0	1.4	3.0	No	-
-	-	2594.70*	Rectangular	41.1	647.9	649.3	1.4	1.0	0.4	3.0	No	649.3	1.4	0.0	1.4	3.0	No	-
-	-	2594.11*	Rectangular	41.1	647.5	648.9	1.4	1.0	0.4	3.0	No	648.9	1.4	0.0	1.4	3.0	No	-
-	-	2593.52*	Rectangular	41.1	647.0	648.5	1.4	1.0	0.4	3.0	No	648.5	1.4	0.0	1.4	3.0	No	-
-	-	2592.94*	Rectangular	41.1	646.6	648.1	1.4	1.0	0.4	3.0	No	648.1	1.4	0.0	1.4	3.0	No	-
-	-	2592.35*	Rectangular	41.1	646.2	647.6	1.4	1.0	0.4	3.0	No	647.6	1.4	0.0	1.4	3.0	No	-
-	-	2591.76*	Rectangular	41.1	645.8	647.2	1.4	3.8	-2.4	5.8	No	647.2	1.4	0.0	1.4	3.0	No	-
-	-	2591.17*	Rectangular	41.2	645.4	646.8	1.4	3.8	-2.4	5.8	No	646.8	1.4	0.0	1.4	3.0	No	-
-	-	2590.58*	Rectangular	41.2	645.0	646.4	1.4	3.8	-2.4	5.8	No	646.4	1.4	0.0	1.4	3.0	No	-
-	-	2590	Rectangular	41.2	644.5	646.0	1.4	3.8	-2.4	5.8	No	646.0	1.4	0.0	1.4	3.0	No	-
-	-	2589.41*	Rectangular	41.2	644.1	645.6	1.4	3.8	-2.4	5.8	No	645.6	1.4	0.0	1.4	3.0	No	-
-	-	2588.82*	Rectangular	41.2	643.7	645.1	1.4	3.8	-2.4	5.8	No	645.1	1.4	0.0	1.4	3.0	No	-
-	-	2588.23*	Rectangular	41.2	643.3	644.7	1.5	3.8	-2.3	5.8	No	644.7	1.5	0.0	1.5	3.0	No	-
-	-	2587.64*	Rectangular	41.2	642.9	644.3	1.4	3.8	-2.4	5.8	No	644.3	1.4	0.0	1.4	3.0	No	-
-	-	2587.05*	Rectangular	41.2	642.4	643.9	1.4	3.8	-2.4	5.8	No	643.9	1.4	0.0	1.4	3.0	No	-
-	-	2586.47*	Rectangular	41.2	642.0	643.5	1.5	3.8	-2.3	5.8	No	643.5	1.5	0.0	1.5	3.0	No	-
-	-	2585.88*	Rectangular	41.2	641.6	643.1	1.4	3.8	-2.4	5.8	No	643.1	1.4	0.0	1.4	3.0	No	-
-	-	2585.29*	Rectangular	41.2	641.2	642.6	1.5	3.8	-2.3	5.8	No	642.6	1.5	0.0	1.5	3.0	No	-
-	-	2584.70*	Rectangular	41.2	640.8	642.2	1.5	3.8	-2.3	5.8	No	642.2	1.5	0.0	1.5	3.0	No	-
-	-	2584.11*	Rectangular	41.2	640.4	641.8	1.5	3.8	-2.3	5.8	No	641.8	1.5	0.0	1.5	3.0	No	-
-	-	2583.52*	Rectangular	41.2	639.9	641.4	1.5	3.8	-2.3	5.8	No	641.4	1.5	0.0	1.5	3.0	No	-
-	-	2582.94*	Rectangular	41.2	639.5	641.0	1.5	3.8	-2.3	5.8	No	641.0	1.5	0.0	1.5	3.0	No	-
-	-	2582.35*	Rectangular	41.3	639.1	640.6	1.5	3.8	-2.3	5.8	No	640.6	1.5	0.0	1.5	3.0	No	-
-	-	2581.76*	Rectangular	41.3	638.7	640.2	1.5	3.8	-2.3	5.8	No	640.2	1.5	0.0	1.5	3.0	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
-	-	2581.17*	Rectangular	41.3	638.3	639.7	1.5	3.8	-2.3	5.8	No	639.7	1.5	0.0	1.5	3.0	No	-
-	-	2580.58*	Rectangular	41.3	637.9	639.3	1.5	3.8	-2.3	5.8	No	639.3	1.5	0.0	1.5	3.0	No	-
-	-	2580	Rectangular	41.3	637.4	638.9	1.5	3.8	-2.3	5.8	No	638.9	1.5	0.0	1.5	3.0	No	-
-	-	2579.41*	Rectangular	41.3	637.0	638.5	1.5	3.8	-2.3	5.8	No	638.5	1.5	0.0	1.5	3.0	No	-
-	-	2578.82*	Rectangular	41.3	636.6	638.1	1.5	3.8	-2.3	5.8	No	638.1	1.5	0.0	1.5	3.0	No	-
-	-	2578.23*	Rectangular	41.3	636.2	637.7	1.5	3.8	-2.3	5.8	No	637.7	1.5	0.0	1.5	3.0	No	-
-	-	2577.64*	Rectangular	41.3	635.8	637.2	1.5	3.8	-2.3	5.8	No	637.2	1.5	0.0	1.5	3.0	No	-
-	-	2577.05*	Rectangular	41.3	635.4	636.8	1.5	3.8	-2.3	5.8	No	636.8	1.5	0.0	1.5	3.0	No	-
-	-	2576.47*	Rectangular	41.3	634.9	636.4	1.5	3.8	-2.3	5.8	No	636.4	1.5	0.0	1.5	3.0	No	-
-	-	2575.88*	Rectangular	41.3	634.5	636.0	1.5	3.8	-2.3	5.8	No	636.0	1.5	0.0	1.5	3.0	No	-
-	-	2575.29*	Rectangular	41.3	634.1	635.6	1.5	3.8	-2.3	5.8	No	635.6	1.5	0.0	1.5	3.0	No	-
-	-	2574.70*	Rectangular	41.3	633.7	635.2	1.5	3.8	-2.3	5.8	No	635.2	1.5	0.0	1.5	3.0	No	-
-	-	2574.11*	Rectangular	41.3	633.3	634.7	1.5	3.8	-2.3	5.8	No	634.7	1.5	0.0	1.5	3.0	No	-
-	-	2573.52*	Rectangular	41.3	632.9	634.3	1.5	3.8	-2.3	5.8	No	634.3	1.5	0.0	1.5	3.0	No	-
-	-	2572.94*	Rectangular	41.3	632.4	633.9	1.5	3.8	-2.3	5.8	No	633.9	1.5	0.0	1.5	3.0	No	-
-	-	2572.35*	Rectangular	41.3	632.0	633.5	1.5	3.8	-2.3	5.8	No	633.5	1.5	0.0	1.5	3.0	No	-
-	-	2571.76*	Rectangular	41.3	631.6	633.1	1.5	3.8	-2.3	5.8	No	633.1	1.5	0.0	1.5	3.0	No	-
-	-	2571.17*	Rectangular	41.3	631.2	632.7	1.5	3.8	-2.3	5.8	No	632.7	1.5	0.0	1.5	3.0	No	-
-	-	2570.58*	Rectangular	41.3	630.8	632.3	1.5	3.8	-2.3	5.8	No	632.3	1.5	0.0	1.5	3.0	No	-
9	Right	2570	Rectangular	41.3	630.4	631.8	1.5	3.8	-2.3	5.8	No	631.8	1.5	0.0	1.5	3.0	No	5
9	Right	2569.41*	Rectangular	41.3	629.9	631.4	1.5	3.8	-2.3	5.8	No	631.4	1.5	0.0	1.5	3.0	No	5
9	Right	2568.82*	Rectangular	41.3	629.5	631.0	1.5	3.8	-2.3	5.8	No	631.0	1.5	0.0	1.5	3.0	No	5
9	Right	2568.23*	Rectangular	41.3	629.1	630.6	1.5	3.8	-2.3	5.8	No	630.6	1.5	0.0	1.5	3.0	No	5
9	Right	2567.64*	Rectangular	41.3	628.7	630.2	1.5	3.8	-2.3	5.8	No	630.2	1.5	0.0	1.5	3.0	No	5
9	Right	2567.05*	Rectangular	41.3	628.3	629.8	1.5	3.8	-2.3	5.8	No	629.8	1.5	0.0	1.5	3.0	No	5
9	Right	2566.47*	Rectangular	41.3	627.9	629.3	1.5	3.8	-2.3	5.8	No	629.3	1.5	0.0	1.5	3.0	No	5
9	Right	2565.88*	Rectangular	41.3	627.5	628.9	1.5	3.8	-2.3	5.8	No	628.9	1.5	0.0	1.5	3.0	No	5
9	Right	2565.29*	Rectangular	41.3	627.0	628.5	1.5	3.8	-2.3	5.8	No	628.5	1.5	0.0	1.5	3.0	No	5
9	Right	2564.70*	Rectangular	41.3	626.6	628.1	1.5	3.8	-2.3	5.8	No	628.1	1.5	0.0	1.5	3.0	No	5
9	Right	2564.11*	Rectangular	41.3	626.2	627.7	1.5	3.8	-2.3	5.8	No	627.7	1.5	0.0	1.5	3.0	No	5
9	Right	2563.52*	Rectangular	41.3	625.8	627.3	1.5	3.8	-2.3	5.8	No	627.3	1.5	0.0	1.5	3.0	No	5
9	Right	2562.94*	Rectangular	41.3	625.4	626.9	1.5	3.8	-2.3	5.8	No	626.9	1.5	0.0	1.5	3.0	No	5
9	Right	2562.35*	Rectangular	41.3	625.0	626.4	1.5	3.8	-2.3	5.8	No	626.4	1.5	0.0	1.5	3.0	No	5
9	Right	2561.76*	Rectangular	41.3	624.6	626.0	1.5	3.8	-2.3	5.8	No	626.0	1.5	0.0	1.5	3.0	No	5
9	Right	2561.17*	Rectangular	41.3	624.1	625.6	1.5	3.8	-2.3	5.8	No	625.6	1.5	0.0	1.5	3.0	No	5
9	Right	2560.58*	Rectangular	41.3	623.7	625.2	1.5	3.8	-2.3	5.8	No	625.2	1.5	0.0	1.5	3.0	No	5
9	Right	2560	Rectangular	41.3	623.3	624.8	1.5	3.8	-2.3	5.8	No	624.8	1.5	0.0	1.5	3.0	No	5
9	Right	2559.33*	Rectangular	41.3	622.9	624.4	1.5	3.8	-2.3	5.8	No	624.4	1.5	0.0	1.5	3.0	No	5
9	Right	2558.66*	Rectangular	41.3	622.5	623.9	1.5	3.8	-2.3	5.8	No	623.9	1.5	0.0	1.5	3.0	No	5
9	Right	2558.*	Rectangular	41.3	622.0	623.5	1.5	3.8	-2.3	5.8	No	623.5	1.5	0.0	1.5	3.0	No	5
9	Right	2557.33*	Rectangular	41.3	621.6	623.1	1.5	3.8	-2.3	5.8	No	623.1	1.5	0.0	1.5	3.0	No	5
9	Right	2556.66*	Rectangular	41.3	621.2	622.7	1.5	3.8	-2.3	5.8	No	622.7	1.5	0.0	1.5	3.0	No	5
9	Right	2556.*	Rectangular	41.3	620.8	622.2	1.5	3.8	-2.3	5.8	No	622.2	1.5	0.0	1.5	3.0	No	5
9	Right	2555.33*	Rectangular	41.4	620.3	621.8	1.5	3.8	-2.3	5.8	No	621.8	1.5	0.0	1.5	3.0	No	5

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
9	Right	2554.66*	Rectangular	41.4	619.9	621.4	1.5	3.8	-2.3	5.8	No	621.4	1.5	0.0	1.5	3.0	No	5
9	Right	2554.*	Rectangular	41.4	619.5	621.0	1.5	3.8	-2.3	5.8	No	621.0	1.5	0.0	1.5	3.0	No	5
9	Right	2553.33*	Rectangular	41.4	619.1	620.5	1.5	3.8	-2.3	5.8	No	620.5	1.5	0.0	1.5	3.0	No	5
9	Right	2552.66*	Rectangular	41.4	618.6	620.1	1.5	3.8	-2.3	5.8	No	620.1	1.5	0.0	1.5	3.0	No	5
9	Right	2552.*	Rectangular	41.4	618.2	619.7	1.5	3.8	-2.3	5.8	No	619.7	1.5	0.0	1.5	3.0	No	5
9	Right	2551.33*	Rectangular	41.4	617.8	619.3	1.5	3.8	-2.3	5.8	No	619.3	1.5	0.0	1.5	3.0	No	5
9	Right	2550.66*	Rectangular	41.4	617.3	618.8	1.5	3.8	-2.3	5.8	No	618.8	1.5	0.0	1.5	3.0	No	5
9	Right	2550	Rectangular	41.4	616.9	618.4	1.5	3.8	-2.3	5.8	No	618.4	1.5	0.0	1.5	3.0	No	5
-	-	2545.*	Rectangular	41.4	616.6	618.6	2.0	3.8	-1.8	5.8	No	618.6	2.0	3.2	-1.2	5.2	No	-
-	-	2540	Rectangular	41.4	616.2	618.7	2.5	3.8	-1.3	5.8	No	618.7	2.5	3.2	-0.7	5.2	No	-
-	-	2530	Rectangular	41.4	616.0	618.5	2.5	3.8	-1.3	5.8	No	618.5	2.5	3.2	-0.7	5.2	No	-
-	-	2525.*	Rectangular	41.4	615.8	618.3	2.5	3.8	-1.3	5.8	No	618.3	2.5	3.2	-0.7	5.2	No	-
10	Left	2520	Rectangular	41.4	615.5	618.0	2.5	0.0	2.5	3.0	No	618.0	2.5	3.2	-0.7	5.2	No	6
10	Left	2519.41*	Rectangular	41.3	615.2	617.6	2.5	0.0	2.5	3.0	No	617.6	2.5	3.2	-0.7	5.2	No	6
10	Left	2518.82*	Rectangular	41.2	614.8	617.3	2.4	0.0	2.4	3.0	No	617.3	2.4	3.2	-0.8	5.2	No	6
10	Left	2518.23*	Rectangular	41.2	614.5	616.9	2.4	0.0	2.4	3.0	No	616.9	2.4	3.2	-0.8	5.2	No	6
10	Left	2517.64*	Rectangular	41.1	614.2	616.6	2.4	0.0	2.4	3.0	No	616.6	2.4	3.2	-0.8	5.2	No	6
10	Left	2517.05*	Rectangular	41.0	613.8	616.2	2.4	0.0	2.4	3.0	No	616.2	2.4	3.2	-0.8	5.2	No	6
10	Left	2516.47*	Rectangular	41.0	613.5	615.9	2.4	0.0	2.4	3.0	No	615.9	2.4	3.2	-0.8	5.2	No	6
10	Left	2515.88*	Rectangular	40.9	613.1	615.5	2.4	0.0	2.4	3.0	No	615.5	2.4	3.2	-0.8	5.2	No	6
10	Left	2515.29*	Rectangular	40.9	612.8	615.1	2.4	0.0	2.4	3.0	No	615.1	2.4	3.2	-0.8	5.2	No	6
10	Left	2514.70*	Rectangular	40.8	612.4	614.8	2.4	0.0	2.4	3.0	No	614.8	2.4	3.2	-0.8	5.2	No	6
10	Left	2514.11*	Rectangular	40.8	612.1	614.4	2.3	0.0	2.3	3.0	No	614.4	2.3	3.2	-0.9	5.2	No	6
10	Left	2513.52*	Rectangular	40.7	611.7	614.1	2.3	0.0	2.3	3.0	No	614.1	2.3	3.2	-0.9	5.2	No	6
10	Left	2512.94*	Rectangular	40.7	611.4	613.7	2.3	0.0	2.3	3.0	No	613.7	2.3	3.2	-0.9	5.2	No	6
10	Left	2512.35*	Rectangular	40.6	611.0	613.4	2.3	0.0	2.3	3.0	No	613.4	2.3	3.2	-0.9	5.2	No	6
10	Left	2511.76*	Rectangular	40.6	610.7	613.0	2.3	0.0	2.3	3.0	No	613.0	2.3	3.2	-0.9	5.2	No	6
10	Left	2511.17*	Rectangular	40.5	610.3	612.6	2.3	0.0	2.3	3.0	No	612.6	2.3	3.2	-0.9	5.2	No	6
10	Left	2510.58*	Rectangular	40.5	610.0	612.3	2.3	0.0	2.3	3.0	No	612.3	2.3	3.2	-0.9	5.2	No	6
10	Left	2510	Rectangular	40.5	609.7	611.9	2.3	0.0	2.3	3.0	No	611.9	2.3	3.2	-0.9	5.2	No	6
10	Left	2509.41*	Rectangular	40.4	609.3	611.6	2.3	0.0	2.3	3.0	No	611.6	2.3	3.2	-0.9	5.2	No	6
10	Left	2508.82*	Rectangular	40.4	609.0	611.2	2.3	0.0	2.3	3.0	No	611.2	2.3	3.2	-0.9	5.2	No	6
10	Left	2508.23*	Rectangular	40.4	608.6	610.9	2.3	0.0	2.3	3.0	No	610.9	2.3	3.2	-1.0	5.2	No	6
10	Left	2507.64*	Rectangular	40.3	608.3	610.5	2.3	0.0	2.3	3.0	No	610.5	2.3	3.2	-1.0	5.2	No	6
10	Left	2507.05*	Rectangular	40.3	607.9	610.1	2.2	0.0	2.2	3.0	No	610.1	2.2	3.2	-1.0	5.2	No	6
10	Left	2506.47*	Rectangular	40.3	607.6	609.8	2.2	0.0	2.2	3.0	No	609.8	2.2	3.2	-1.0	5.2	No	6
10	Left	2505.88*	Rectangular	40.2	607.2	609.4	2.2	0.0	2.2	3.0	No	609.4	2.2	3.2	-1.0	5.2	No	6
10	Left	2505.29*	Rectangular	40.2	606.9	609.1	2.2	0.0	2.2	3.0	No	609.1	2.2	3.2	-1.0	5.2	No	6
10	Left	2504.70*	Rectangular	40.2	606.5	608.7	2.2	0.0	2.2	3.0	No	608.7	2.2	3.2	-1.0	5.2	No	6
10	Left	2504.11*	Rectangular	40.2	606.1	608.4	2.2	0.0	2.2	3.0	No	608.4	2.2	3.2	-1.0	5.2	No	6
10	Left	2503.52*	Rectangular	40.1	605.8	608.0	2.2	0.0	2.2	3.0	No	608.0	2.2	3.2	-1.0	5.2	No	6
10	Left	2502.94*	Rectangular	40.1	605.4	607.6	2.2	0.0	2.2	3.0	No	607.6	2.2	3.2	-1.0	5.2	No	6
10	Left	2502.35*	Rectangular	40.1	605.1	607.3	2.2	0.0	2.2	3.0	No	607.3	2.2	3.2	-1.0	5.2	No	6
10	Left	2501.76*	Rectangular	40.1	604.7	606.9	2.2	0.0	2.2	3.0	No	606.9	2.2	3.2	-1.0	5.2	No	6

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
10	Left	2501.17*	Rectangular	40.0	604.4	606.6	2.2	0.0	2.2	3.0	No	606.6	2.2	3.2	-1.0	5.2	No	6
10	Left	2500.58*	Rectangular	40.0	604.0	606.2	2.2	0.0	2.2	3.0	No	606.2	2.2	3.2	-1.0	5.2	No	6
10	Left	2500	Rectangular	40.0	603.7	605.9	2.2	0.0	2.2	3.0	No	605.9	2.2	3.2	-1.0	5.2	No	6
10	Left	2499.09*	Rectangular	40.0	603.3	605.5	2.2	0.0	2.2	3.0	No	605.5	2.2	3.2	-1.0	5.2	No	6
10	Left	2498.18*	Rectangular	39.9	603.0	605.2	2.2	0.0	2.2	3.0	No	605.2	2.2	3.2	-1.0	5.2	No	6
10	Left	2497.27*	Rectangular	39.9	602.6	604.8	2.1	0.0	2.1	3.0	No	604.8	2.1	3.2	-1.1	5.2	No	6
10	Left	2496.36*	Rectangular	39.9	602.3	604.4	2.2	0.0	2.2	3.0	No	604.4	2.2	3.2	-1.0	5.2	No	6
10	Left	2495.45*	Rectangular	39.9	601.9	604.1	2.1	0.0	2.1	3.0	No	604.1	2.1	3.2	-1.1	5.2	No	6
10	Left	2494.54*	Rectangular	39.9	601.6	603.7	2.1	0.0	2.1	3.0	No	603.7	2.1	3.2	-1.1	5.2	No	6
10	Left	2493.63*	Rectangular	39.9	601.3	603.4	2.1	0.0	2.1	3.0	No	603.4	2.1	3.2	-1.1	5.2	No	6
10	Left	2492.72*	Rectangular	39.8	600.9	603.0	2.1	0.0	2.1	3.0	No	603.0	2.1	3.2	-1.1	5.2	No	6
10	Left	2491.81*	Rectangular	39.8	600.6	602.7	2.1	0.0	2.1	3.0	No	602.7	2.1	3.2	-1.1	5.2	No	6
10	Left	2490.90*	Rectangular	39.8	600.2	602.3	2.1	0.0	2.1	3.0	No	602.3	2.1	3.2	-1.1	5.2	No	6
10	Left	2490	Rectangular	39.8	599.9	602.0	2.1	0.0	2.1	3.0	No	602.0	2.1	3.2	-1.1	5.2	No	6
-	-	2480	Rectangular	40.0	599.6	602.0	2.3	9.7	-7.4	11.7	No	602.0	2.3	3.2	-0.9	5.2	No	-
-	-	2477.5*	Rectangular	39.9	599.3	601.7	2.3	9.7	-7.4	11.7	No	601.7	2.3	3.2	-0.9	5.2	No	-
-	-	2475.*	Rectangular	39.9	599.0	601.4	2.3	9.7	-7.4	11.7	No	601.4	2.3	3.2	-0.9	5.2	No	-
-	-	2472.5*	Rectangular	39.8	598.8	601.1	2.3	9.7	-7.4	11.7	No	601.1	2.3	3.2	-0.9	5.2	No	-
-	-	2470	Rectangular	39.5	598.7	600.8	2.1	9.7	-7.6	11.7	No	600.8	2.1	3.2	-1.1	5.2	No	-
-	-	2465.*	Trapezoidal	40.2	597.6	601.0	3.5	9.7	-6.2	11.7	No	601.0	3.5	3.2	0.3	5.2	No	-
-	-	2460	Trapezoidal	40.7	596.6	601.3	4.7	9.7	-5.0	11.7	No	601.3	4.7	3.2	1.5	5.2	No	-
-	-	2455.*	Trapezoidal	41.0	595.9	601.7	5.8	9.7	-3.9	11.7	No	601.7	5.8	3.2	2.6	5.2	No	-
-	-	2450	Trapezoidal	41.2	595.3	602.0	6.8	9.7	-2.9	11.7	No	602.0	6.8	3.2	3.6	5.2	No	-
-	-	2445.*	Trapezoidal	41.5	594.5	602.2	7.7	9.7	-2.0	11.7	No	602.2	7.7	3.2	4.5	5.2	No	-
-	-	2440	Trapezoidal	41.8	593.8	602.4	8.5	9.7	-1.2	11.7	No	602.4	8.5	3.2	5.3	5.2	Yes	-
-	-	2430	Trapezoidal	41.7	593.5	602.0	8.5	9.7	-1.2	11.7	No	602.0	8.5	3.2	5.3	5.2	Yes	-
-	-	2420	Trapezoidal	41.8	593.2	601.8	8.5	9.7	-1.2	11.7	No	601.8	8.5	3.2	5.3	5.2	Yes	-
-	-	2410	Trapezoidal	41.7	593.3	601.8	8.5	9.7	-1.2	11.7	No	601.8	8.5	3.2	5.3	5.2	Yes	-
-	-	2406.66*	Trapezoidal	41.7	592.8	601.3	8.5	9.7	-1.2	11.7	No	601.3	8.5	3.2	5.3	5.2	Yes	-
-	-	2403.33*	Trapezoidal	41.8	592.3	600.9	8.5	9.7	-1.2	11.7	No	600.9	8.5	3.2	5.3	5.2	Yes	-
-	-	2400	Trapezoidal	41.8	591.9	600.4	8.5	9.7	-1.2	11.7	No	600.4	8.5	3.2	5.3	5.2	Yes	-
-	-	2399.33*	Trapezoidal	41.9	591.4	599.9	8.5	9.7	-1.2	11.7	No	599.9	8.5	3.2	5.3	5.2	Yes	-
-	-	2398.66*	Trapezoidal	41.9	590.8	599.4	8.5	9.7	-1.2	11.7	No	599.4	8.5	3.2	5.3	5.2	Yes	-
-	-	2398.*	Trapezoidal	41.9	590.3	598.9	8.6	9.7	-1.1	11.7	No	598.9	8.6	3.2	5.4	5.2	Yes	-
-	-	2397.33*	Trapezoidal	41.9	589.8	598.4	8.6	9.7	-1.1	11.7	No	598.4	8.6	3.2	5.4	5.2	Yes	-
-	-	2396.66*	Trapezoidal	41.9	589.3	597.8	8.6	9.7	-1.1	11.7	No	597.8	8.6	3.2	5.4	5.2	Yes	-
-	-	2396.*	Trapezoidal	41.9	588.8	597.3	8.5	9.7	-1.2	11.7	No	597.3	8.5	3.2	5.3	5.2	Yes	-
-	-	2395.33*	Trapezoidal	41.9	588.3	596.8	8.5	9.7	-1.2	11.7	No	596.8	8.5	3.2	5.3	5.2	Yes	-
-	-	2394.66*	Trapezoidal	41.9	587.7	596.3	8.5	9.7	-1.2	11.7	No	596.3	8.5	3.2	5.3	5.2	Yes	-
-	-	2394.*	Trapezoidal	41.9	587.2	595.8	8.5	9.7	-1.2	11.7	No	595.8	8.5	3.2	5.3	5.2	Yes	-
-	-	2393.33*	Trapezoidal	41.9	586.7	595.3	8.5	9.7	-1.2	11.7	No	595.3	8.5	3.2	5.3	5.2	Yes	-
-	-	2392.66*	Trapezoidal	41.9	586.2	594.7	8.6	9.7	-1.1	11.7	No	594.7	8.6	3.2	5.4	5.2	Yes	-
-	-	2392.*	Trapezoidal	41.9	585.7	594.2	8.6	9.7	-1.1	11.7	No	594.2	8.6	3.2	5.4	5.2	Yes	-
-	-	2391.33*	Trapezoidal	41.9	585.2	593.7	8.6	9.7	-1.1	11.7	No	593.7	8.6	3.2	5.4	5.2	Yes	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
-	-	2390.66*	Trapezoidal	41.9	584.6	593.2	8.6	9.7	-1.1	11.7	No	593.2	8.6	3.2	5.4	5.2	Yes	-
11	Right	2390	Trapezoidal	41.9	584.1	592.7	8.5	9.7	-1.2	11.7	No	592.7	8.5	0.0	8.5	3.5	Yes	7
11	Right	2387.5*	Trapezoidal	41.9	583.6	592.6	9.0	9.7	-0.7	11.7	No	592.1	8.5	0.0	8.5	3.5	Yes	7
11	Right	2385.*	Trapezoidal	41.9	583.1	592.5	9.5	9.7	-0.2	11.7	No	591.5	8.5	0.0	8.5	3.5	Yes	7
11	Right	2382.5*	Trapezoidal	41.9	582.5	592.5	10.0	9.7	0.3	11.7	No	591.0	8.5	0.0	8.5	3.5	Yes	-
11	Right	2380	Trapezoidal	41.9	582.0	592.4	10.4	9.7	0.7	11.7	No	590.4	8.4	0.0	8.4	3.5	Yes	-
11	Right	2378.75*	Trapezoidal	41.9	581.5	591.9	10.4	9.7	0.7	11.7	No	589.9	8.4	0.0	8.4	3.5	Yes	-
11	Right	2377.5*	Trapezoidal	41.9	581.0	591.4	10.5	9.7	0.8	11.7	No	589.4	8.5	0.0	8.5	3.5	Yes	-
11	Right	2376.25*	Trapezoidal	41.9	580.4	590.9	10.5	9.7	0.8	11.7	No	588.9	8.5	0.0	8.5	3.5	Yes	-
11	Right	2375.*	Trapezoidal	41.9	579.9	590.4	10.5	9.7	0.8	11.7	No	588.4	8.5	0.0	8.5	3.5	Yes	-
11	Right	2373.75*	Trapezoidal	41.9	579.4	589.9	10.5	9.7	0.8	11.7	No	587.9	8.5	0.0	8.5	3.5	Yes	-
11	Right	2372.5*	Trapezoidal	41.9	578.9	589.4	10.5	9.7	0.8	11.7	No	587.4	8.5	0.0	8.5	3.5	Yes	-
11	Right	2371.25*	Trapezoidal	41.9	578.4	589.0	10.5	9.7	0.8	11.7	No	587.0	8.5	0.0	8.5	3.5	Yes	-
11	Right	2370	Trapezoidal	41.9	577.9	588.5	10.6	9.7	0.9	11.7	No	586.5	8.6	0.0	8.6	3.5	Yes	-
11	Right	2367.5*	Trapezoidal	41.9	577.4	588.0	10.6	9.7	0.9	11.7	No	586.0	8.6	0.0	8.6	3.5	Yes	-
11	Right	2365.*	Trapezoidal	42.0	576.9	587.5	10.6	9.7	0.9	11.7	No	585.5	8.6	0.0	8.6	3.5	Yes	-
11	Right	2362.5*	Trapezoidal	42.0	576.4	587.0	10.6	9.7	0.9	11.7	No	585.0	8.6	0.0	8.6	3.5	Yes	-
11	Right	2360	Trapezoidal	42.1	575.9	586.5	10.6	9.7	0.9	11.7	No	584.5	8.6	0.0	8.6	3.5	Yes	-
11	Right	2350	Trapezoidal	42.0	575.9	586.5	10.6	9.7	0.9	11.7	No	584.5	8.6	0.0	8.6	3.5	Yes	-
11	Right	2347.5*	Trapezoidal	42.0	575.4	586.0	10.6	9.7	0.9	11.7	No	584.0	8.6	0.0	8.6	3.5	Yes	-
11	Right	2345.*	Trapezoidal	42.1	574.9	585.5	10.6	9.7	0.9	11.7	No	583.5	8.6	0.0	8.6	3.5	Yes	-
11	Right	2342.5*	Trapezoidal	42.2	574.4	585.0	10.6	9.7	0.9	11.7	No	583.0	8.6	0.0	8.6	3.5	Yes	-
11	Right	2340	Trapezoidal	42.2	574.1	584.5	10.4	9.7	0.7	11.7	No	582.5	8.4	0.0	8.4	3.5	Yes	-
-	-	2337.5*	Trapezoidal	42.2	573.7	583.5	9.9	9.7	0.2	11.7	No	582.0	8.4	0.0	8.4	3.5	Yes	-
-	-	2335.*	Trapezoidal	42.4	573.0	582.5	9.5	9.7	-0.2	11.7	No	581.5	8.5	0.0	8.5	3.5	Yes	-
-	-	2332.5*	Trapezoidal	42.8	572.1	581.5	9.4	9.7	-0.3	11.7	No	581.0	8.9	0.0	8.9	3.5	Yes	-
-	-	2330	Trapezoidal	43.2	571.0	580.5	9.5	9.7	-0.2	11.7	No	580.5	9.5	0.0	9.5	3.5	Yes	-
-	-	2326.66*	Trapezoidal	43.1	570.7	580.3	9.6	9.7	-0.1	11.7	No	580.3	9.6	0.0	9.6	3.5	Yes	-
-	-	2323.33*	Trapezoidal	43.0	570.4	580.1	9.8	9.7	0.1	11.7	No	580.1	9.8	0.0	9.8	3.5	Yes	-
-	-	2320	Trapezoidal	42.9	570.0	579.9	9.9	9.7	0.2	11.7	No	579.9	9.9	0.0	9.9	3.5	Yes	-
-	-	2317.5*	Trapezoidal	43.0	569.5	579.4	9.9	9.7	0.2	11.7	No	579.4	9.9	0.0	9.9	3.5	Yes	-
-	-	2315.*	Trapezoidal	43.0	569.0	578.9	9.9	9.7	0.2	11.7	No	578.9	9.9	0.0	9.9	3.5	Yes	-
-	-	2312.5*	Trapezoidal	43.0	568.6	578.4	9.9	9.7	0.2	11.7	No	578.4	9.9	0.0	9.9	3.5	Yes	-
-	-	2310	Trapezoidal	43.0	568.1	577.9	9.8	9.7	0.1	11.7	No	577.9	9.8	0.0	9.8	3.5	Yes	-
-	-	2307.5*	Trapezoidal	41.5	569.1	577.4	8.4	9.7	-1.3	11.7	No	577.6	8.5	0.0	8.5	3.5	Yes	-
-	-	2305.*	Trapezoidal	40.8	569.4	577.0	7.6	9.7	-2.1	11.7	No	577.2	7.8	0.0	7.8	3.5	Yes	-
-	-	2302.5*	Trapezoidal	41.0	568.8	576.5	7.7	9.7	-2.0	11.7	No	576.9	8.1	0.0	8.1	3.5	Yes	-
-	-	2300	Trapezoidal	41.7	567.5	576.1	8.6	9.7	-1.1	11.7	No	576.5	9.0	0.0	9.0	3.5	Yes	-
-	-	2296.66*	Trapezoidal	41.6	567.2	575.6	8.4	9.7	-1.3	11.7	No	576.3	9.2	0.0	9.2	3.5	Yes	-
-	-	2293.33*	Trapezoidal	41.6	566.8	575.1	8.3	9.7	-1.4	11.7	No	576.1	9.3	0.0	9.3	3.5	Yes	-
-	-	2290	Trapezoidal	41.6	566.4	574.7	8.2	9.7	-1.5	11.7	No	575.9	9.5	0.0	9.5	3.5	Yes	-
-	-	2288.75*	Trapezoidal	41.6	565.9	574.1	8.2	9.7	-1.5	11.7	No	575.2	9.3	0.0	9.3	3.5	Yes	-
-	-	2287.5*	Trapezoidal	41.7	565.4	573.6	8.2	9.7	-1.5	11.7	No	574.5	9.1	0.0	9.1	3.5	Yes	-
-	-	2286.25*	Trapezoidal	41.7	565.0	573.1	8.1	9.7	-1.6	11.7	No	573.9	8.9	0.0	8.9	3.5	Yes	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
-	-	2285.*	Trapezoidal	41.6	564.5	572.6	8.0	9.7	-1.7	11.7	No	573.2	8.6	0.0	8.6	3.5	Yes	-
-	-	2283.75*	Trapezoidal	41.5	564.1	572.0	7.9	9.7	-1.8	11.7	No	572.5	8.4	0.0	8.4	3.5	Yes	-
-	-	2282.5*	Trapezoidal	41.4	563.7	571.5	7.8	9.7	-1.9	11.7	No	571.8	8.1	0.0	8.1	3.5	Yes	-
-	-	2281.25*	Trapezoidal	41.4	563.3	571.0	7.7	9.7	-2.0	11.7	No	571.2	7.8	0.0	7.8	3.5	Yes	-
-	-	2280	Trapezoidal	41.3	562.9	570.5	7.6	9.7	-2.1	11.7	No	570.5	7.6	0.0	7.6	3.5	Yes	-
-	-	2277.5*	Trapezoidal	41.5	562.2	570.0	7.8	9.7	-1.9	11.7	No	570.0	7.8	0.0	7.8	3.5	Yes	-
-	-	2275.*	Trapezoidal	41.7	561.5	569.5	8.0	9.7	-1.7	11.7	No	569.5	8.0	0.0	8.0	3.5	Yes	-
-	-	2272.5*	Trapezoidal	41.8	560.9	569.1	8.2	9.7	-1.5	11.7	No	569.1	8.2	0.0	8.2	3.5	Yes	-
-	-	2270	Trapezoidal	41.9	560.2	568.6	8.4	9.7	-1.3	11.7	No	568.6	8.4	0.0	8.4	3.5	Yes	-
-	-	2260	Trapezoidal	42.1	559.3	567.9	8.6	9.7	-1.1	11.7	No	567.9	8.6	0.0	8.6	3.5	Yes	-
-	-	2250	Trapezoidal	41.9	559.3	567.9	8.6	9.7	-1.1	11.7	No	567.9	8.6	0.0	8.6	3.5	Yes	-
-	-	2245.*	Trapezoidal	41.9	558.6	567.3	8.7	9.7	-1.0	11.7	No	567.3	8.7	0.0	8.7	3.5	Yes	-
-	-	2240	Trapezoidal	41.9	557.9	566.8	8.8	9.7	-0.9	11.7	No	566.8	8.8	0.0	8.8	3.5	Yes	-
-	-	2235.*	Trapezoidal	41.3	557.9	566.6	8.8	9.7	-0.9	11.7	No	566.6	8.8	0.0	8.8	3.5	Yes	-
-	-	2230	Trapezoidal	40.6	557.9	566.5	8.7	9.7	-1.0	11.7	No	566.5	8.7	0.0	8.7	3.5	Yes	-
-	-	2220	Trapezoidal	40.4	557.9	566.5	8.6	9.7	-1.1	11.7	No	566.5	8.6	0.0	8.6	3.5	Yes	-
-	-	2219.54*	Trapezoidal	39.6	557.8	566.4	8.6	9.7	-1.1	11.7	No	566.4	8.6	0.0	8.6	3.5	Yes	-
-	-	2219.09*	Trapezoidal	38.9	557.7	566.3	8.6	9.7	-1.1	11.7	No	566.3	8.6	0.0	8.6	3.5	Yes	-
-	-	2218.63*	Trapezoidal	38.2	557.6	566.1	8.6	9.7	-1.1	11.7	No	566.1	8.6	0.0	8.6	3.5	Yes	-
-	-	2218.18*	Trapezoidal	37.5	557.5	566.0	8.5	9.7	-1.2	11.7	No	566.0	8.5	0.0	8.5	3.5	Yes	-
-	-	2217.72*	Trapezoidal	36.9	557.4	565.9	8.5	9.7	-1.2	11.7	No	565.9	8.5	0.0	8.5	3.5	Yes	-
-	-	2217.27*	Trapezoidal	36.3	557.3	565.8	8.5	9.7	-1.2	11.7	No	565.8	8.5	0.0	8.5	3.5	Yes	-
-	-	2216.81*	Trapezoidal	35.7	557.2	565.6	8.5	9.7	-1.2	11.7	No	565.6	8.5	0.0	8.5	3.5	Yes	-
-	-	2216.36*	Trapezoidal	35.2	557.0	565.5	8.5	9.7	-1.2	11.7	No	565.5	8.5	0.0	8.5	3.5	Yes	-
-	-	2215.90*	Trapezoidal	34.6	556.9	565.4	8.4	9.7	-1.3	10.7	No	565.4	8.4	0.0	8.4	2.5	Yes	-
-	-	2215.45*	Trapezoidal	34.2	556.8	565.2	8.4	9.7	-1.3	10.7	No	565.2	8.4	0.0	8.4	2.5	Yes	-
-	-	2215.*	Trapezoidal	33.7	556.7	565.1	8.4	9.7	-1.3	10.7	No	565.1	8.4	0.0	8.4	2.5	Yes	-
-	-	2214.54*	Trapezoidal	33.3	556.6	565.0	8.4	9.7	-1.3	10.7	No	565.0	8.4	0.0	8.4	2.5	Yes	-
-	-	2214.09*	Trapezoidal	32.8	556.5	564.8	8.4	9.7	-1.3	10.7	No	564.8	8.4	0.0	8.4	2.5	Yes	-
-	-	2213.63*	Trapezoidal	32.4	556.3	564.7	8.4	9.7	-1.3	10.7	No	564.7	8.4	0.0	8.4	2.5	Yes	-
-	-	2213.18*	Trapezoidal	32.0	556.2	564.6	8.4	9.7	-1.3	10.7	No	564.6	8.4	0.0	8.4	2.5	Yes	-
12	Left	2212.72*	Trapezoidal	31.7	556.1	564.5	8.4	0.0	8.4	2.5	Yes	564.5	8.4	6.5	1.9	7.5	No	-
12	Left	2212.27*	Trapezoidal	31.4	556.0	564.3	8.4	0.0	8.4	2.5	Yes	564.3	8.4	6.5	1.9	7.5	No	-
12	Left	2211.81*	Trapezoidal	31.0	555.8	564.2	8.4	0.0	8.4	2.5	Yes	564.2	8.4	6.5	1.9	7.5	No	-
12	Left	2211.36*	Trapezoidal	30.7	555.7	564.1	8.4	0.0	8.4	2.5	Yes	564.1	8.4	6.5	1.9	7.5	No	-
12	Left	2210.90*	Trapezoidal	30.5	555.6	563.9	8.4	0.0	8.4	2.5	Yes	563.9	8.4	6.5	1.9	7.5	No	-
12	Left	2210.45*	Trapezoidal	30.2	555.4	563.8	8.4	0.0	8.4	2.5	Yes	563.8	8.4	6.5	1.9	7.5	No	-
12	Left	2210	Trapezoidal	29.9	555.3	563.7	8.4	0.0	8.4	2.5	Yes	563.7	8.4	6.5	1.9	7.5	No	-
12	Left	2208.57*	Trapezoidal	29.7	555.1	563.4	8.3	0.0	8.3	2.5	Yes	563.4	8.3	6.5	1.8	7.5	No	-
12	Left	2207.14*	Trapezoidal	29.5	555.0	563.1	8.1	0.0	8.1	2.5	Yes	563.1	8.1	6.5	1.6	7.5	No	-
12	Left	2205.71*	Trapezoidal	29.3	554.8	562.8	8.0	0.0	8.0	2.5	Yes	562.8	8.0	6.5	1.5	7.5	No	-
12	Left	2204.28*	Trapezoidal	29.1	554.7	562.5	7.8	0.0	7.8	2.5	Yes	562.5	7.8	6.5	1.3	7.5	No	-
12	Left	2202.85*	Trapezoidal	28.9	554.5	562.2	7.7	0.0	7.7	2.5	Yes	562.2	7.7	6.5	1.2	7.5	No	-
12	Left	2201.42*	Trapezoidal	28.7	554.4	561.9	7.5	0.0	7.5	2.5	Yes	561.9	7.5	6.5	1.0	7.5	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
12	Left	2200	Trapezoidal	28.6	554.2	561.6	7.4	0.0	7.4	2.5	Yes	561.6	7.4	6.5	0.9	7.5	No	-
-	-	2198.88*	Trapezoidal	28.5	554.0	561.7	7.7	4.8	2.9	5.8	No	561.4	7.3	6.5	0.8	7.5	No	-
-	-	2197.77*	Trapezoidal	28.4	553.8	561.9	8.0	4.8	3.2	5.8	No	561.1	7.3	6.5	0.8	7.5	No	-
-	-	2196.66*	Trapezoidal	28.3	553.6	562.0	8.4	4.8	3.6	5.8	No	560.9	7.3	6.5	0.8	7.5	No	-
-	-	2195.55*	Trapezoidal	28.3	553.4	562.1	8.7	4.8	3.9	5.8	No	560.7	7.3	6.5	0.8	7.5	No	-
-	-	2194.44*	Trapezoidal	28.2	553.2	562.2	9.0	4.8	4.2	5.8	No	560.4	7.2	6.5	0.7	7.5	No	-
-	-	2193.33*	Trapezoidal	28.1	553.0	562.4	9.4	4.8	4.6	5.8	No	560.2	7.2	6.5	0.7	7.5	No	-
-	-	2192.22*	Trapezoidal	28.1	552.8	562.5	9.7	4.8	4.9	5.8	No	560.0	7.2	6.5	0.7	7.5	No	-
-	-	2191.11*	Trapezoidal	28.1	552.6	562.6	10.0	4.8	5.2	5.8	No	559.7	7.1	6.5	0.6	7.5	No	-
13	Right	2190	Trapezoidal	28.0	552.4	562.7	10.4	4.8	5.6	5.8	No	559.5	7.1	0.0	7.1	2.5	Yes	-
13	Right	2180	Trapezoidal	27.9	552.2	562.5	10.4	4.8	5.6	5.8	No	559.3	7.1	0.0	7.1	2.5	Yes	-
13	Right	2177.5*	Trapezoidal	27.9	552.0	562.6	10.6	4.8	5.8	5.8	No	559.1	7.1	0.0	7.1	2.5	Yes	-
13	Right	2175.*	Trapezoidal	27.8	551.8	562.6	10.8	4.8	6.0	5.8	Yes	558.9	7.1	0.0	7.1	2.5	Yes	-
13	Right	2172.5*	Trapezoidal	27.8	551.6	562.6	11.0	4.8	6.2	5.8	Yes	558.7	7.1	0.0	7.1	2.5	Yes	-
13	Right	2170	Trapezoidal	27.7	551.4	562.7	11.2	4.8	6.4	5.8	Yes	558.5	7.1	0.0	7.1	2.5	Yes	-
13	Right	2167.5*	Trapezoidal	27.7	551.3	562.6	11.4	4.8	6.6	5.8	Yes	558.3	7.1	0.0	7.1	2.5	Yes	-
13	Right	2165.*	Trapezoidal	27.7	551.1	562.6	11.5	4.8	6.7	5.8	Yes	558.1	7.0	0.0	7.0	2.5	Yes	-
13	Right	2162.5*	Trapezoidal	27.7	550.9	562.5	11.6	4.8	6.8	5.8	Yes	558.0	7.0	0.0	7.0	2.5	Yes	-
13	Right	2160	Trapezoidal	27.6	550.8	562.5	11.7	4.8	6.9	5.8	Yes	557.8	7.0	0.0	7.0	2.5	Yes	-
13	Right	2159.*	Trapezoidal	27.6	550.6	562.2	11.7	4.8	6.9	5.8	Yes	557.6	7.0	0.0	7.0	2.5	Yes	-
13	Right	2158.*	Trapezoidal	27.5	550.4	561.9	11.6	4.8	6.8	5.8	Yes	557.4	7.0	0.0	7.0	2.5	Yes	-
13	Right	2157.*	Trapezoidal	27.5	550.1	561.7	11.5	4.8	6.7	5.8	Yes	557.1	7.0	0.0	7.0	2.5	Yes	-
13	Right	2156.*	Trapezoidal	27.5	549.9	561.4	11.5	4.8	6.7	5.8	Yes	556.9	7.0	0.0	7.0	2.5	Yes	-
13	Right	2155.*	Trapezoidal	27.5	549.7	561.1	11.4	4.8	6.6	5.8	Yes	556.7	7.0	0.0	7.0	2.5	Yes	-
13	Right	2154.*	Trapezoidal	27.4	549.5	560.9	11.4	4.8	6.6	5.8	Yes	556.5	7.0	0.0	7.0	2.5	Yes	-
13	Right	2153.*	Trapezoidal	27.4	549.3	560.6	11.3	4.8	6.5	5.8	Yes	556.3	7.0	0.0	7.0	2.5	Yes	-
13	Right	2152.*	Trapezoidal	27.4	549.0	560.3	11.3	4.8	6.5	5.8	Yes	556.0	7.0	0.0	7.0	2.5	Yes	-
13	Right	2151.*	Trapezoidal	27.4	548.8	560.0	11.2	4.8	6.4	5.8	Yes	555.8	7.0	0.0	7.0	2.5	Yes	-
13	Right	2150	Trapezoidal	27.4	548.6	559.8	11.2	4.8	6.3	5.8	Yes	555.6	7.0	0.0	7.0	2.5	Yes	-
13	Right	2148.57*	Trapezoidal	27.4	548.4	559.5	11.1	4.8	6.3	5.8	Yes	555.3	6.9	0.0	6.9	2.5	Yes	-
13	Right	2147.14*	Trapezoidal	27.4	548.1	559.2	11.1	4.8	6.3	5.8	Yes	555.0	6.9	0.0	6.9	2.5	Yes	-
13	Right	2145.71*	Trapezoidal	27.4	547.9	559.0	11.1	4.8	6.3	5.8	Yes	554.7	6.8	0.0	6.8	2.5	Yes	-
13	Right	2144.28*	Trapezoidal	27.4	547.7	558.7	11.0	4.8	6.2	5.8	Yes	554.4	6.8	0.0	6.8	2.5	Yes	-
13	Right	2142.85*	Trapezoidal	27.4	547.4	558.4	11.0	4.8	6.2	5.8	Yes	554.1	6.7	0.0	6.7	2.5	Yes	-
13	Right	2141.42*	Trapezoidal	27.4	547.2	558.1	10.9	4.8	6.1	5.8	Yes	553.8	6.6	0.0	6.6	2.5	Yes	-
13	Right	2140	Trapezoidal	27.4	547.0	557.9	10.9	4.8	6.1	5.8	Yes	553.6	6.6	0.0	6.6	2.5	Yes	-
-	-	2137.5*	Trapezoidal	27.4	546.8	557.4	10.6	4.8	5.8	5.8	Yes	553.4	6.6	0.0	6.6	2.5	Yes	-
-	-	2135.*	Trapezoidal	27.3	546.6	557.0	10.4	4.8	5.6	5.8	No	553.2	6.6	0.0	6.6	2.5	Yes	-
-	-	2132.5*	Trapezoidal	27.3	546.4	556.5	10.1	4.8	5.3	5.8	No	553.0	6.6	0.0	6.6	2.5	Yes	-
-	-	2130	Trapezoidal	27.3	546.2	556.1	9.8	4.8	5.0	5.8	No	552.8	6.6	10.2	-3.6	11.2	No	-
-	-	2127.5*	Trapezoidal	27.2	546.1	555.9	9.8	4.8	5.0	5.8	No	552.6	6.6	10.2	-3.6	11.2	No	-
-	-	2125.*	Trapezoidal	27.2	545.9	555.7	9.8	4.8	5.0	5.8	No	552.4	6.5	10.2	-3.7	11.2	No	-
-	-	2122.5*	Trapezoidal	27.2	545.7	555.5	9.8	4.8	5.0	5.8	No	552.2	6.5	10.2	-3.7	11.2	No	-
-	-	2120	Trapezoidal	27.2	545.5	555.3	9.8	4.8	5.0	5.8	No	552.0	6.5	10.2	-3.7	11.2	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
-	-	2110	Trapezoidal	27.2	545.3	555.1	9.8	4.8	5.0	5.8	No	551.8	6.5	10.2	-3.7	11.2	No	-
-	-	2108.*	Trapezoidal	27.3	545.0	554.8	9.8	0.0	9.8	2.5	Yes	551.8	6.8	10.2	-3.4	11.2	No	-
-	-	2106.*	Trapezoidal	27.3	544.7	554.5	9.8	0.0	9.8	2.5	Yes	551.8	7.1	10.2	-3.1	11.2	No	-
-	-	2104.*	Trapezoidal	27.4	544.4	554.3	9.8	0.0	9.8	2.5	Yes	551.8	7.4	10.2	-2.8	11.2	No	-
-	-	2102.*	Trapezoidal	27.5	544.1	554.0	9.9	0.0	9.9	2.5	Yes	551.8	7.7	10.2	-2.5	11.2	No	-
14	Left	2100	Trapezoidal	27.6	543.8	553.7	9.9	0.0	9.9	2.5	Yes	551.8	8.0	10.2	-2.2	11.2	No	8
14	Left	2097.5*	Trapezoidal	27.3	543.8	552.9	9.1	0.0	9.1	2.5	Yes	550.8	7.0	10.2	-3.2	11.2	No	8
14	Left	2095.*	Trapezoidal	27.1	543.7	552.0	8.3	0.0	8.3	2.5	Yes	549.7	6.0	10.2	-4.2	11.2	No	8
14	Left	2092.5*	Trapezoidal	26.9	543.6	551.2	7.6	0.0	7.6	2.5	Yes	548.7	5.1	10.2	-5.1	11.2	No	8
14	Left	2090	Trapezoidal	26.7	543.6	550.4	6.8	0.0	6.8	2.5	Yes	547.6	4.0	10.2	-6.2	11.2	No	8
15	Left	2077.5*	Trapezoidal	26.8	543.2	549.9	6.7	0.0	6.7	2.5	Yes	547.2	4.0	10.2	-6.2	11.2	No	8
15	Left	2075.*	Trapezoidal	27.0	542.8	549.4	6.6	0.0	6.6	2.5	Yes	546.7	3.9	10.2	-6.3	11.2	No	8
15	Left	2072.5*	Trapezoidal	27.2	542.5	548.9	6.5	0.0	6.5	2.5	Yes	546.3	3.8	10.2	-6.4	11.2	No	8
15	Left	2070	Trapezoidal	27.4	542.2	548.5	6.3	0.0	6.3	2.5	Yes	545.8	3.6	10.2	-6.6	11.2	No	8
15	Left	2060	Trapezoidal	27.1	542.1	547.9	5.8	0.0	5.8	2.5	Yes	544.0	1.9	10.2	-8.3	11.2	No	8
15	Left	2056.66*	Trapezoidal	26.8	542.1	547.4	5.4	0.0	5.4	2.5	Yes	544.0	1.9	10.2	-8.3	11.2	No	8
15	Left	2053.33*	Trapezoidal	26.5	542.1	547.0	4.9	0.0	4.9	2.5	Yes	544.0	1.9	10.2	-8.3	11.2	No	8
15	Left	2050	Trapezoidal	26.2	542.1	546.6	4.5	0.0	4.5	2.5	Yes	544.0	1.9	10.2	-8.3	11.2	No	8
15	Left	2040	Trapezoidal	26.3	541.9	546.3	4.4	0.0	4.4	2.5	Yes	543.8	1.9	10.2	-8.3	11.2	No	8
15	Left	2035.*	Trapezoidal	23.7	543.3	545.9	2.6	0.0	2.6	2.5	Yes	543.7	0.4	10.2	-9.8	11.2	No	8
15	Left	2030.*	Trapezoidal	21.7	544.3	545.5	1.2	0.0	1.2	2.5	No	543.6	-0.6	10.2	-10.9	11.2	No	8
15	Left	2025.*	Trapezoidal	22.7	543.6	545.1	1.5	0.0	1.5	2.5	No	543.6	0.0	10.2	-10.2	11.2	No	8
15	Left	2020	Trapezoidal	24.6	541.9	544.7	2.7	0.0	2.7	2.5	Yes	543.5	1.5	10.2	-8.7	11.2	No	8
15	Left	2010.*	Trapezoidal	24.7	541.9	542.8	1.0	0.0	1.0	2.5	No	542.7	0.9	10.2	-9.3	11.2	No	8
15	Left	2000	Trapezoidal	24.4	542.0	541.0	-1.0	0.0	-1.0	2.5	No	542.0	0.0	10.2	-10.2	11.2	No	8
15	Left	1997.5*	Trapezoidal	25.2	541.2	540.7	-0.4	0.0	-0.4	2.5	No	541.9	0.7	10.2	-9.5	11.2	No	8
15	Left	1995.*	Trapezoidal	25.8	540.4	540.5	0.1	0.0	0.1	2.5	No	541.7	1.3	10.2	-8.9	11.2	No	8
15	Left	1992.5*	Trapezoidal	26.4	539.6	540.2	0.6	0.0	0.6	2.5	No	541.6	2.0	10.2	-8.2	11.2	No	8
15	Left	1990	Trapezoidal	27.2	538.7	539.9	1.2	0.0	1.2	2.5	No	541.4	2.7	10.2	-7.5	11.2	No	8
15	Left	1985.33*	Trapezoidal	27.5	538.4	540.3	1.9	0.0	1.9	2.5	No	541.5	3.1	10.2	-7.1	11.2	No	8
15	Left	1980.66*	Trapezoidal	27.6	538.1	540.6	2.5	0.0	2.5	2.5	Yes	541.5	3.4	10.2	-6.8	11.2	No	8
15	Left	1976	Trapezoidal	27.8	537.8	540.9	3.1	0.0	3.1	2.5	Yes	541.5	3.8	10.2	-6.4	11.2	No	8
-	-	1975.25*	Trapezoidal	27.9	537.5	541.1	3.6	10.8	-7.2	11.8	No	541.2	3.7	10.2	-6.5	11.2	No	-
-	-	1974.5*	Trapezoidal	28.0	537.3	541.3	4.0	10.8	-6.8	11.8	No	540.9	3.6	10.2	-6.6	11.2	No	-
-	-	1973.75*	Trapezoidal	28.1	537.0	541.5	4.5	10.8	-6.3	11.8	No	540.5	3.5	10.2	-6.7	11.2	No	-
-	-	1973	Trapezoidal	28.2	536.8	541.7	4.9	10.8	-5.9	11.8	No	540.2	3.4	10.2	-6.8	11.2	No	-
-	-	1971.5*	Trapezoidal	29.4	535.4	542.9	7.5	10.8	-3.3	11.8	No	540.4	5.0	10.2	-5.2	11.2	No	-
16	Right	1970	Trapezoidal	30.5	534.1	544.1	10.0	10.8	-0.8	11.8	No	540.7	6.6	0.0	6.6	2.5	Yes	8
16	Right	1960	Trapezoidal	30.7	533.8	544.3	10.5	10.8	-0.3	11.8	No	540.1	6.3	0.0	6.3	2.5	Yes	8
16	Right	1950	Trapezoidal	30.7	533.8	542.5	8.7	10.8	-2.1	11.8	No	540.1	6.3	0.0	6.3	2.5	Yes	8
16	Right	1946.66*	Trapezoidal	29.9	534.1	541.1	7.1	10.8	-3.7	11.8	No	539.5	5.5	0.0	5.5	2.5	Yes	8
16	Right	1943.33*	Trapezoidal	30.0	533.8	539.8	6.0	10.8	-4.8	11.8	No	539.0	5.2	0.0	5.2	2.5	Yes	8
16	Right	1940	Trapezoidal	30.5	533.1	538.4	5.4	10.8	-5.4	11.8	No	538.4	5.4	0.0	5.4	2.5	Yes	8
16	Right	1930	Trapezoidal	29.9	533.1	536.5	3.4	10.8	-7.4	11.8	No	537.6	4.5	0.0	4.5	2.5	Yes	8

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
-	-	1926.66*	Trapezoidal	29.7	532.9	536.1	3.2	10.8	-7.6	11.8	No	537.3	4.4	0.0	4.4	2.5	Yes	-
-	-	1923.33*	Trapezoidal	29.5	532.8	535.7	2.9	10.8	-7.9	11.8	No	537.0	4.3	0.0	4.3	2.5	Yes	-
-	-	1920	Trapezoidal	29.3	532.7	535.3	2.6	10.8	-8.2	11.8	No	536.8	4.1	0.0	4.1	2.5	Yes	-
-	-	1915.*	Trapezoidal	29.1	532.6	535.0	2.4	10.8	-8.4	11.8	No	536.4	3.9	0.0	3.9	2.5	Yes	-
-	-	1910	Trapezoidal	29.0	532.4	534.6	2.2	10.8	-8.6	11.8	No	536.0	3.6	0.0	3.6	2.5	Yes	-
-	-	1900	Trapezoidal	28.8	532.5	534.6	2.2	10.8	-8.6	11.8	No	536.0	3.6	0.0	3.6	2.5	Yes	-
-	-	1890	Trapezoidal	28.6	532.4	534.5	2.0	10.8	-8.8	11.8	No	535.9	3.5	0.0	3.5	2.5	Yes	-
-	-	1880	Trapezoidal	28.5	532.3	534.3	2.0	10.8	-8.8	11.8	No	535.5	3.3	0.0	3.3	2.5	Yes	-
-	-	1870	Trapezoidal	28.3	532.3	534.3	2.0	10.8	-8.8	11.8	No	537.8	5.5	0.0	5.5	2.5	Yes	-
-	-	1868.33*	Trapezoidal	28.2	532.1	534.0	1.9	10.8	-8.9	11.8	No	537.5	5.4	0.0	5.4	2.5	Yes	-
-	-	1866.66*	Trapezoidal	28.0	531.9	533.8	1.9	10.8	-8.9	11.8	No	537.2	5.3	0.0	5.3	2.5	Yes	-
-	-	1865.*	Trapezoidal	27.9	531.7	533.6	1.9	10.8	-8.9	11.8	No	537.0	5.2	0.0	5.2	2.5	Yes	-
-	-	1863.33*	Trapezoidal	27.7	531.5	533.4	1.8	10.8	-9.0	11.8	No	536.7	5.1	0.0	5.1	2.5	Yes	-
-	-	1861.66*	Trapezoidal	27.6	531.3	533.1	1.8	10.8	-9.0	11.8	No	536.4	5.1	0.0	5.1	2.5	Yes	-
-	-	1860	Trapezoidal	27.6	531.1	532.9	1.8	10.8	-9.0	11.8	No	536.1	5.0	0.0	5.0	2.5	Yes	-
-	-	1859.33*	Trapezoidal	27.4	530.9	532.6	1.7	10.8	-9.1	11.8	No	535.9	5.0	0.0	5.0	2.5	Yes	-
-	-	1858.66*	Trapezoidal	27.2	530.7	532.4	1.7	10.8	-9.1	11.8	No	535.6	4.9	0.0	4.9	2.5	Yes	-
-	-	1858.*	Trapezoidal	27.1	530.5	532.1	1.7	10.8	-9.1	11.8	No	535.4	4.9	0.0	4.9	2.5	Yes	-
-	-	1857.33*	Trapezoidal	27.1	530.3	531.9	1.6	10.8	-9.2	11.8	No	535.1	4.9	0.0	4.9	2.5	Yes	-
-	-	1856.66*	Trapezoidal	27.0	530.0	531.6	1.6	10.8	-9.2	11.8	No	534.9	4.9	0.0	4.9	2.5	Yes	-
-	-	1856.*	Trapezoidal	26.9	529.8	531.4	1.6	10.8	-9.2	11.8	No	534.6	4.8	0.0	4.8	2.5	Yes	-
-	-	1855.33*	Trapezoidal	26.8	529.6	531.1	1.6	10.8	-9.2	11.8	No	534.4	4.8	0.0	4.8	2.5	Yes	-
-	-	1854.66*	Trapezoidal	26.7	529.3	530.9	1.5	10.8	-9.3	11.8	No	534.1	4.8	0.0	4.8	2.5	Yes	-
-	-	1854.*	Trapezoidal	26.6	529.1	530.6	1.5	10.8	-9.3	11.8	No	533.9	4.8	0.0	4.8	2.5	Yes	-
-	-	1853.33*	Trapezoidal	26.6	528.9	530.4	1.5	10.8	-9.3	11.8	No	533.6	4.8	0.0	4.8	2.5	Yes	-
-	-	1852.66*	Trapezoidal	26.5	528.6	530.1	1.5	10.8	-9.3	11.8	No	533.4	4.8	0.0	4.8	2.5	Yes	-
-	-	1852.*	Trapezoidal	26.5	528.4	529.9	1.5	5.5	-4.0	6.5	No	533.1	4.7	0.0	4.7	2.5	Yes	-
-	-	1851.33*	Trapezoidal	26.5	528.2	529.6	1.5	5.5	-4.0	6.5	No	532.9	4.7	0.0	4.7	2.5	Yes	-
-	-	1850.66*	Trapezoidal	26.4	527.9	529.4	1.5	5.5	-4.0	6.5	No	532.6	4.7	0.0	4.7	2.5	Yes	-
-	-	1850	Trapezoidal	26.4	527.7	529.1	1.5	5.5	-4.0	6.5	No	532.4	4.7	0.0	4.7	2.5	Yes	-
-	-	1845.*	Trapezoidal	25.9	527.8	528.9	1.1	5.5	-4.4	6.5	No	531.0	3.2	0.0	3.2	2.5	Yes	-
-	-	1840	Trapezoidal	25.3	528.0	528.6	0.6	5.5	-4.9	6.5	No	529.6	1.6	0.0	1.6	2.5	No	-
-	-	1830	Trapezoidal	28.5	524.9	528.5	3.7	5.5	-1.8	6.5	No	529.5	4.6	0.0	4.6	2.5	Yes	-
-	-	1820	Rectangular	29.4	523.7	529.5	5.8	5.5	0.3	6.5	No	529.5	5.8	0.0	5.8	2.0	Yes	-
-	-	1816.66*	Rectangular	29.5	523.3	528.9	5.6	5.5	0.1	6.5	No	529.5	6.2	0.0	6.2	2.0	Yes	-
-	-	1813.33*	Rectangular	29.6	522.9	528.3	5.3	5.5	-0.2	6.5	No	529.6	6.6	0.0	6.6	2.0	Yes	-
-	-	1810	Rectangular	29.6	522.5	527.7	5.1	5.5	-0.4	6.5	No	529.6	7.1	0.0	7.1	2.0	Yes	-
17	Right	1807.5*	Trapezoidal	26.3	524.3	527.4	3.0	5.5	-2.5	6.5	No	529.5	5.1	0.0	5.1	2.5	Yes	9
17	Right	1805.*	Trapezoidal	20.5	527.5	527.1	-0.5	5.5	-6.0	6.5	No	529.4	1.8	0.0	1.8	2.5	No	9
17	Right	1802.5*	Trapezoidal	21.7	526.6	526.8	0.2	5.5	-5.3	6.5	No	529.2	2.7	0.0	2.7	2.5	Yes	9
17	Right	1800	Trapezoidal	23.7	524.9	526.5	1.6	5.5	-3.9	6.5	No	529.1	4.2	0.0	4.2	2.5	Yes	9
17	Right	1796.66*	Trapezoidal	25.2	523.5	526.2	2.7	5.5	-2.8	6.5	No	529.0	5.5	0.0	5.5	2.5	Yes	9
17	Right	1793.33*	Trapezoidal	25.9	522.7	525.9	3.2	5.5	-2.3	6.5	No	528.9	6.2	0.0	6.2	2.5	Yes	9
17	Right	1790	Trapezoidal	26.4	522.1	525.6	3.5	5.5	-2.0	6.5	No	528.7	6.7	0.0	6.7	2.5	Yes	9

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
17	Right	1786.66*	Trapezoidal	26.8	521.4	525.3	3.8	5.5	-1.7	6.5	No	528.5	7.1	0.0	7.1	2.5	Yes	9
17	Right	1783.33*	Trapezoidal	27.2	520.9	524.9	4.0	5.5	-1.5	6.5	No	528.3	7.4	0.0	7.4	2.5	Yes	9
17	Right	1780	Trapezoidal	27.4	520.4	524.6	4.2	5.5	-1.3	6.5	No	528.1	7.7	0.0	7.7	2.5	Yes	9
17	Right	1775.*	Trapezoidal	27.5	520.0	524.3	4.2	5.5	-1.3	6.5	No	527.9	7.9	0.0	7.9	2.5	Yes	9
17	Right	1770.*	Trapezoidal	27.6	519.7	523.9	4.3	5.5	-1.2	6.5	No	527.6	8.0	0.0	8.0	2.5	Yes	9
17	Right	1765.*	Trapezoidal	27.6	519.3	523.6	4.3	5.5	-1.2	6.5	No	527.4	8.1	0.0	8.1	2.5	Yes	9
17	Right	1760	Trapezoidal	27.7	519.0	523.3	4.3	5.5	-1.2	6.5	No	527.2	8.3	0.0	8.3	2.5	Yes	9
-	-	1759.28*	Trapezoidal	27.7	518.6	522.8	4.2	5.5	-1.3	6.5	No	526.8	8.2	11.6	-3.4	12.6	No	-
-	-	1758.57*	Trapezoidal	27.8	518.3	522.4	4.1	5.5	-1.4	6.5	No	526.5	8.2	11.6	-3.4	12.6	No	-
-	-	1757.85*	Trapezoidal	27.8	517.9	522.0	4.1	5.5	-1.4	6.5	No	526.1	8.2	11.6	-3.4	12.6	No	-
-	-	1757.14*	Trapezoidal	27.9	517.6	521.6	4.0	5.5	-1.5	6.5	No	525.7	8.1	11.6	-3.5	12.6	No	-
-	-	1756.42*	Trapezoidal	27.9	517.2	521.2	3.9	5.5	-1.6	6.5	No	525.3	8.1	11.6	-3.5	12.6	No	-
-	-	1755.71*	Trapezoidal	28.0	516.9	520.7	3.9	5.5	-1.6	6.5	No	525.0	8.1	11.6	-3.5	12.6	No	-
-	-	1755.*	Trapezoidal	28.0	516.5	520.3	3.8	5.5	-1.7	6.5	No	524.6	8.1	11.6	-3.5	12.6	No	-
-	-	1754.28*	Trapezoidal	28.1	516.2	519.9	3.7	5.5	-1.8	6.5	No	524.2	8.0	11.6	-3.6	12.6	No	-
-	-	1753.57*	Trapezoidal	28.1	515.9	519.5	3.6	5.5	-1.9	6.5	No	523.9	8.0	11.6	-3.6	12.6	No	-
-	-	1752.85*	Trapezoidal	28.1	515.5	519.1	3.5	5.5	-2.0	6.5	No	523.5	8.0	11.6	-3.6	12.6	No	-
-	-	1752.14*	Trapezoidal	28.2	515.2	518.6	3.5	5.5	-2.0	6.5	No	523.1	7.9	11.6	-3.7	12.6	No	-
-	-	1751.42*	Trapezoidal	28.2	514.8	518.2	3.4	5.5	-2.1	6.5	No	522.7	7.9	11.6	-3.7	12.6	No	-
-	-	1750.71*	Trapezoidal	28.3	514.5	517.8	3.3	5.5	-2.2	6.5	No	522.4	7.9	11.6	-3.7	12.6	No	-
-	-	1750	Trapezoidal	28.3	514.2	517.4	3.2	5.5	-2.3	6.5	No	522.0	7.9	11.6	-3.7	12.6	No	-
-	-	1746.66*	Trapezoidal	28.0	513.9	517.0	3.1	5.5	-2.4	6.5	No	521.4	7.5	11.6	-4.1	12.6	No	-
-	-	1743.33*	Trapezoidal	27.2	513.9	516.6	2.8	5.5	-2.7	6.5	No	520.8	7.0	11.6	-4.6	12.6	No	-
18	Left	1740	Trapezoidal	27.1	513.6	516.2	2.6	0.0	2.6	2.5	Yes	520.2	6.6	11.6	-5.0	12.6	No	-
18	Left	1738.33*	Trapezoidal	27.3	513.1	515.8	2.7	0.0	2.7	2.5	Yes	519.5	6.4	11.6	-5.2	12.6	No	-
18	Left	1736.66*	Trapezoidal	27.5	512.7	515.4	2.7	0.0	2.7	2.5	Yes	518.8	6.1	11.6	-5.5	12.6	No	-
18	Left	1735.*	Trapezoidal	27.7	512.3	514.9	2.7	0.0	2.7	2.5	Yes	518.0	5.7	11.6	-5.9	12.6	No	-
18	Left	1733.33*	Trapezoidal	12.5	520.2	514.5	-5.7	0.0	-5.7	2.5	No	517.3	-2.9	11.6	-14.5	12.6	No	10
18	Left	1731.66*	Trapezoidal	12.2	520.3	514.1	-6.2	0.0	-6.2	2.5	No	516.5	-3.7	11.6	-15.3	12.6	No	10
18	Left	1730	Trapezoidal	11.9	520.3	513.7	-6.7	0.0	-6.7	2.5	No	515.8	-4.5	11.6	-16.1	12.6	No	10
18	Left	1720.*	Trapezoidal	12.1	520.2	513.2	-7.0	0.0	-7.0	2.5	No	515.4	-4.9	11.6	-16.5	12.6	No	10
18	Left	1710	Trapezoidal	12.6	520.0	512.8	-7.2	0.0	-7.2	2.5	No	515.0	-5.1	11.6	-16.7	12.6	No	10
18	Left	1705.*	Trapezoidal	13.6	519.6	512.4	-7.2	0.0	-7.2	2.5	No	514.5	-5.1	11.6	-16.7	12.6	No	10
18	Left	1700	Trapezoidal	15.0	518.9	512.0	-6.9	0.0	-6.9	2.5	No	514.1	-4.8	11.6	-16.4	12.6	No	10
18	Left	1695.*	Trapezoidal	16.3	518.2	511.7	-6.6	0.0	-6.6	2.5	No	513.7	-4.5	11.6	-16.1	12.6	No	10
18	Left	1690	Trapezoidal	20.8	515.2	511.3	-4.0	0.0	-4.0	2.5	No	513.3	-2.0	11.6	-13.6	12.6	No	10
-	-	1685.*	Trapezoidal	22.2	514.1	511.0	-3.0	0.0	-3.0	2.5	No	513.0	-1.0	11.6	-12.6	12.6	No	10
-	-	1680	Trapezoidal	20.7	514.7	510.8	-3.9	0.0	-3.9	2.5	No	512.8	-1.9	11.6	-13.5	12.6	No	10
-	-	1670	Trapezoidal	22.7	513.1	510.4	-2.7	0.0	-2.7	2.5	No	512.6	-0.5	11.6	-12.1	12.6	No	10
-	-	1660	Trapezoidal	25.2	510.9	510.2	-0.7	0.0	-0.7	2.5	No	512.4	1.5	11.6	-10.1	12.6	No	10
-	-	1650.*	Trapezoidal	26.9	509.2	509.9	0.7	0.0	0.7	2.5	No	512.2	3.0	11.6	-8.6	12.6	No	-
-	-	1640	Trapezoidal	27.8	508.1	509.6	1.5	0.0	1.5	2.5	No	512.0	3.9	11.6	-7.7	12.6	No	-
-	-	1635.*	Trapezoidal	27.9	507.9	509.8	2.0	0.0	2.0	2.5	No	511.7	3.8	11.6	-7.8	12.6	No	-
19	Left	1630	Trapezoidal	27.9	507.6	510.1	2.5	0.0	2.5	2.5	No	511.3	3.8	11.6	-7.8	12.6	No	10

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
19	Left	1628.*	Trapezoidal	28.0	507.2	509.7	2.5	0.0	2.5	2.5	Yes	511.0	3.7	11.6	-7.9	12.6	No	10
19	Left	1626.*	Trapezoidal	28.1	506.9	509.4	2.5	0.0	2.5	2.5	Yes	510.6	3.7	11.6	-7.9	12.6	No	10
19	Left	1624.*	Trapezoidal	28.1	506.6	509.1	2.6	0.0	2.6	2.5	Yes	510.2	3.7	11.6	-7.9	12.6	No	10
19	Left	1622.*	Trapezoidal	28.2	506.3	508.8	2.6	0.0	2.6	2.5	Yes	509.9	3.6	11.6	-8.0	12.6	No	10
19	Left	1620	Trapezoidal	28.2	505.9	508.5	2.6	0.0	2.6	2.5	Yes	509.5	3.6	11.6	-8.0	12.6	No	10
19	Left	1616.66*	Trapezoidal	28.3	505.6	508.2	2.6	0.0	2.6	2.5	Yes	509.2	3.6	11.6	-8.0	12.6	No	10
19	Left	1613.33*	Trapezoidal	28.3	505.3	507.9	2.6	0.0	2.6	2.5	Yes	508.9	3.6	11.6	-8.0	12.6	No	10
19	Left	1610	Trapezoidal	28.4	505.0	507.7	2.6	0.0	2.6	2.5	Yes	508.7	3.6	11.6	-8.0	12.6	No	10
19	Left	1606.66*	Trapezoidal	28.4	504.8	507.4	2.6	0.0	2.6	2.5	Yes	508.4	3.6	11.6	-8.0	12.6	No	10
19	Left	1603.33*	Trapezoidal	28.4	504.5	507.1	2.6	0.0	2.6	2.5	Yes	508.1	3.6	11.6	-8.0	12.6	No	10
19	Left	1600	Trapezoidal	28.5	504.2	506.9	2.7	0.0	2.7	2.5	Yes	507.9	3.7	11.6	-7.9	12.6	No	10
-	-	1595.*	Trapezoidal	28.8	503.7	506.8	3.1	4.0	-0.9	5.0	No	507.5	3.8	11.6	-7.8	12.6	No	-
-	-	1590	Trapezoidal	29.0	503.2	506.7	3.5	4.0	-0.5	5.0	No	507.2	3.9	11.6	-7.7	12.6	No	-
-	-	1580	Trapezoidal	28.9	503.3	506.7	3.5	4.0	-0.5	5.0	No	507.2	3.9	11.6	-7.7	12.6	No	-
-	-	1575.*	Trapezoidal	28.7	503.1	506.5	3.4	4.0	-0.6	5.0	No	506.9	3.8	11.6	-7.8	12.6	No	-
-	-	1570	Trapezoidal	28.5	502.9	506.2	3.4	4.0	-0.6	5.0	No	506.7	3.8	11.6	-7.8	12.6	No	-
-	-	1565.*	Trapezoidal	28.7	502.4	506.1	3.7	4.0	-0.3	5.0	No	506.3	3.9	11.6	-7.7	12.6	No	-
-	-	1560	Trapezoidal	28.9	502.0	506.0	4.0	4.0	0.0	5.0	No	506.0	4.0	11.6	-7.6	12.6	No	-
-	-	1555.*	Trapezoidal	29.0	501.6	505.7	4.0	4.0	0.0	5.0	No	505.7	4.0	11.6	-7.6	12.6	No	-
-	-	1550	Trapezoidal	29.0	501.3	505.4	4.1	4.0	0.1	5.0	No	505.4	4.1	11.6	-7.5	12.6	No	-
-	-	1547.5*	Trapezoidal	29.1	500.9	505.3	4.3	4.0	0.3	5.0	No	505.3	4.3	11.6	-7.3	12.6	No	-
-	-	1545.*	Trapezoidal	29.2	500.5	505.1	4.6	4.0	0.6	5.0	No	505.1	4.6	11.6	-7.0	12.6	No	-
-	-	1542.5*	Trapezoidal	29.3	500.1	505.0	4.9	4.0	0.9	5.0	No	505.0	4.9	11.6	-6.7	12.6	No	-
20	Right	1540	Trapezoidal	29.4	499.8	504.9	5.1	4.0	1.1	5.0	No	504.9	5.1	0.0	5.1	2.5	Yes	-
20	Right	1539.33*	Trapezoidal	29.5	499.3	504.5	5.2	4.0	1.2	5.0	No	504.5	5.2	0.0	5.2	2.5	Yes	-
20	Right	1538.66*	Trapezoidal	29.6	498.9	504.1	5.2	4.0	1.2	5.0	No	504.1	5.2	0.0	5.2	2.5	Yes	-
20	Right	1538.*	Trapezoidal	29.7	498.4	503.7	5.2	4.0	1.2	5.0	No	503.7	5.2	0.0	5.2	2.5	Yes	-
20	Right	1537.33*	Trapezoidal	29.7	498.0	503.2	5.2	4.0	1.2	5.0	No	503.2	5.2	0.0	5.2	2.5	Yes	-
20	Right	1536.66*	Trapezoidal	29.8	497.6	502.8	5.3	4.0	1.3	5.0	No	502.8	5.3	0.0	5.3	2.5	Yes	-
20	Right	1536.*	Trapezoidal	29.9	497.1	502.4	5.3	4.0	1.3	5.0	No	502.4	5.3	0.0	5.3	2.5	Yes	-
20	Right	1535.33*	Trapezoidal	30.0	496.7	502.0	5.3	4.0	1.3	5.0	No	502.0	5.3	0.0	5.3	2.5	Yes	-
20	Right	1534.66*	Trapezoidal	30.0	496.3	501.6	5.3	4.0	1.3	5.0	No	501.6	5.3	0.0	5.3	2.5	Yes	-
20	Right	1534.*	Trapezoidal	30.1	495.9	501.2	5.3	4.0	1.3	5.0	No	501.2	5.3	0.0	5.3	2.5	Yes	-
20	Right	1533.99	Obstruction	Bridge		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-
20	Right	1533.33*	Trapezoidal	30.1	495.4	500.7	5.3	4.0	1.3	5.0	No	500.7	5.3	0.0	5.3	2.5	Yes	-
20	Right	1532.66*	Trapezoidal	30.2	495.0	500.3	5.3	4.0	1.3	5.0	No	500.3	5.3	0.0	5.3	2.5	Yes	-
20	Right	1532.*	Trapezoidal	30.3	494.6	499.9	5.4	4.0	1.4	5.0	No	499.9	5.4	0.0	5.4	2.5	Yes	-
20	Right	1531.33*	Trapezoidal	30.3	494.1	499.5	5.4	4.0	1.4	5.0	No	499.5	5.4	0.0	5.4	2.5	Yes	-
20	Right	1530.66*	Trapezoidal	30.4	493.7	499.1	5.4	4.0	1.4	5.0	No	499.1	5.4	0.0	5.4	2.5	Yes	-
20	Right	1530	Trapezoidal	30.4	493.3	498.7	5.4	4.0	1.4	5.0	No	498.7	5.4	0.0	5.4	2.5	Yes	-
20	Right	1520	Trapezoidal	30.2	493.3	498.7	5.4	4.0	1.4	5.0	No	498.7	5.4	0.0	5.4	2.5	Yes	-
-	-	1517.5*	Trapezoidal	30.3	492.9	498.0	5.1	4.0	1.1	5.0	No	498.2	5.3	6.1	-0.8	7.1	No	-
-	-	1515.*	Trapezoidal	30.3	492.5	497.3	4.8	4.0	0.8	5.0	No	497.8	5.3	6.1	-0.8	7.1	No	-
-	-	1512.5*	Trapezoidal	30.4	492.1	496.6	4.5	4.0	0.5	5.0	No	497.4	5.3	6.1	-0.8	7.1	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
-	-	1510	Trapezoidal	30.4	491.7	496.0	4.3	4.0	0.3	5.0	No	497.0	5.3	6.1	-0.9	7.1	No	-
-	-	1509.99	Obstruction	Bridge		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-
-	-	1506.66*	Trapezoidal	30.5	491.4	495.7	4.3	4.0	0.3	5.0	No	496.9	5.5	6.1	-0.6	7.1	No	-
-	-	1503.33*	Trapezoidal	30.5	491.0	495.4	4.4	4.0	0.4	5.0	No	496.7	5.7	6.1	-0.4	7.1	No	-
21	Left	1500	Trapezoidal	30.6	490.7	495.1	4.4	0.0	4.4	2.5	Yes	496.6	5.9	6.1	-0.2	7.1	No	11
21	Left	1497.5*	Trapezoidal	30.5	490.4	494.8	4.4	0.0	4.4	2.5	Yes	496.3	5.9	6.1	-0.2	7.1	No	11
21	Left	1495.*	Trapezoidal	30.5	490.0	494.5	4.4	0.0	4.4	2.5	Yes	496.0	5.9	6.1	-0.2	7.1	No	11
21	Left	1492.5*	Trapezoidal	30.5	489.7	494.1	4.4	0.0	4.4	2.5	Yes	495.6	5.9	6.1	-0.2	7.1	No	11
21	Left	1490	Trapezoidal	30.4	489.4	493.8	4.4	0.0	4.4	2.5	Yes	495.3	5.9	6.1	-0.2	7.1	No	11
21	Left	1486.66*	Trapezoidal	30.4	489.1	493.5	4.4	0.0	4.4	2.5	Yes	495.0	5.9	6.1	-0.2	7.1	No	11
21	Left	1483.33*	Trapezoidal	30.4	488.8	493.2	4.4	0.0	4.4	2.5	Yes	494.7	5.9	6.1	-0.2	7.1	No	11
21	Left	1480	Trapezoidal	30.3	488.5	492.9	4.4	0.0	4.4	2.5	Yes	494.4	5.9	6.1	-0.2	7.1	No	11
21	Left	1478.*	Trapezoidal	30.3	488.2	492.6	4.4	0.0	4.4	2.5	Yes	494.1	5.9	6.1	-0.2	7.1	No	11
-	-	1476.*	Trapezoidal	30.3	488.0	492.3	4.4	5.1	-0.7	6.1	No	493.8	5.9	6.1	-0.2	7.1	No	-
-	-	1474.*	Trapezoidal	30.3	487.7	492.0	4.4	5.1	-0.7	6.1	No	493.5	5.9	6.1	-0.2	7.1	No	-
-	-	1472.*	Trapezoidal	30.3	487.4	491.7	4.4	5.1	-0.7	6.1	No	493.2	5.9	6.1	-0.2	7.1	No	-
22	Right	1470	Trapezoidal	30.3	487.1	491.5	4.4	5.1	-0.7	6.1	No	493.0	5.9	0.0	5.9	2.5	Yes	11
22	Right	1467.5*	Trapezoidal	30.2	486.8	491.4	4.5	5.1	-0.6	6.1	No	492.5	5.7	0.0	5.7	2.5	Yes	11
22	Right	1465.*	Trapezoidal	30.2	486.5	491.3	4.7	5.1	-0.4	6.1	No	492.0	5.5	0.0	5.5	2.5	Yes	11
22	Right	1462.5*	Trapezoidal	30.2	486.2	491.2	4.9	5.1	-0.2	6.1	No	491.5	5.3	0.0	5.3	2.5	Yes	11
22	Right	1460	Trapezoidal	30.2	485.9	491.1	5.1	5.3	-0.2	6.3	No	491.1	5.1	0.0	5.1	2.5	Yes	11
22	Right	1457.5*	Trapezoidal	30.2	485.6	490.6	4.9	5.3	-0.4	6.3	No	490.6	4.9	0.0	4.9	2.5	Yes	11
22	Right	1455.*	Trapezoidal	30.3	485.3	490.1	4.8	5.3	-0.5	6.3	No	490.1	4.8	0.0	4.8	2.5	Yes	11
22	Right	1452.5*	Trapezoidal	30.3	485.0	489.6	4.6	5.3	-0.7	6.3	No	489.6	4.6	0.0	4.6	2.5	Yes	11
22	Right	1450	Trapezoidal	30.3	484.7	489.2	4.5	5.3	-0.8	6.3	No	489.2	4.5	0.0	4.5	2.5	Yes	11
-	-	1448.75*	Trapezoidal	30.3	484.4	488.8	4.5	5.3	-0.8	6.3	No	488.8	4.5	0.0	4.5	2.5	Yes	-
-	-	1447.5*	Trapezoidal	30.2	484.1	488.5	4.4	5.3	-0.9	6.3	No	488.5	4.4	0.0	4.4	2.5	Yes	-
-	-	1446.25*	Trapezoidal	30.2	483.8	488.2	4.4	5.3	-0.9	6.3	No	488.2	4.4	0.0	4.4	2.5	Yes	-
-	-	1445.*	Trapezoidal	30.2	483.5	487.9	4.4	5.3	-0.9	6.3	No	487.9	4.4	0.0	4.4	2.5	Yes	-
-	-	1443.75*	Trapezoidal	30.2	483.2	487.6	4.4	5.3	-0.9	6.3	No	487.6	4.4	0.0	4.4	2.5	Yes	-
-	-	1442.5*	Trapezoidal	30.1	482.8	487.3	4.4	5.3	-0.9	6.3	No	487.3	4.4	0.0	4.4	2.5	Yes	-
-	-	1441.25*	Trapezoidal	30.1	482.5	487.0	4.4	5.3	-0.9	6.3	No	487.0	4.4	0.0	4.4	2.5	Yes	-
23	Right	1440	Trapezoidal	30.1	482.2	486.6	4.4	5.3	-0.9	6.3	No	486.6	4.4	0.0	4.4	2.5	Yes	11
23	Right	1439.54*	Trapezoidal	30.1	481.9	486.3	4.4	5.3	-0.9	6.3	No	486.3	4.4	0.0	4.4	2.5	Yes	11
23	Right	1439.09*	Trapezoidal	30.0	481.5	486.0	4.4	5.3	-0.9	6.3	No	486.0	4.4	0.0	4.4	2.5	Yes	11
23	Right	1438.63*	Trapezoidal	30.0	481.2	485.6	4.4	5.3	-0.9	6.3	No	485.6	4.4	0.0	4.4	2.5	Yes	11
23	Right	1438.18*	Trapezoidal	30.0	480.9	485.3	4.4	5.3	-0.9	6.3	No	485.3	4.4	0.0	4.4	2.5	Yes	11
23	Right	1437.72*	Trapezoidal	30.0	480.5	484.9	4.4	5.3	-0.9	6.3	No	484.9	4.4	0.0	4.4	2.5	Yes	11
23	Right	1437.27*	Trapezoidal	30.0	480.2	484.6	4.4	5.3	-0.9	6.3	No	484.6	4.4	0.0	4.4	2.5	Yes	11
23	Right	1436.81*	Trapezoidal	30.0	479.8	484.2	4.4	5.3	-0.9	6.3	No	484.2	4.4	0.0	4.4	2.5	Yes	11
23	Right	1436.36*	Trapezoidal	30.0	479.5	483.9	4.4	5.3	-0.9	6.3	No	483.9	4.4	0.0	4.4	2.5	Yes	11
23	Right	1435.90*	Trapezoidal	30.0	479.2	483.6	4.4	5.3	-0.9	6.3	No	483.6	4.4	0.0	4.4	2.5	Yes	11
23	Right	1435.45*	Trapezoidal	29.9	478.8	483.2	4.4	5.3	-0.9	6.3	No	483.2	4.4	0.0	4.4	2.5	Yes	11
23	Right	1435.*	Trapezoidal	29.9	478.5	482.9	4.4	5.3	-0.9	6.3	No	482.9	4.4	0.0	4.4	2.5	Yes	11

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
23	Right	1434.54*	Trapezoidal	29.9	478.1	482.5	4.4	5.3	-0.9	6.3	No	482.5	4.4	0.0	4.4	2.5	Yes	11
23	Right	1434.09*	Trapezoidal	29.9	477.8	482.2	4.4	5.3	-0.9	6.3	No	482.2	4.4	0.0	4.4	2.5	Yes	11
23	Right	1433.63*	Trapezoidal	29.9	477.5	481.8	4.4	5.3	-0.9	6.3	No	481.8	4.4	0.0	4.4	2.5	Yes	11
23	Right	1433.18*	Trapezoidal	29.9	477.1	481.5	4.4	5.3	-0.9	6.3	No	481.5	4.4	0.0	4.4	2.5	Yes	11
23	Right	1432.72*	Trapezoidal	29.9	476.8	481.2	4.4	5.3	-0.9	6.3	No	481.2	4.4	0.0	4.4	2.5	Yes	11
23	Right	1432.27*	Trapezoidal	29.9	476.4	480.8	4.4	5.3	-0.9	6.3	No	480.8	4.4	0.0	4.4	2.5	Yes	11
23	Right	1431.81*	Trapezoidal	29.9	476.1	480.5	4.4	5.3	-0.9	6.3	No	480.5	4.4	0.0	4.4	2.5	Yes	11
23	Right	1431.36*	Trapezoidal	29.9	475.8	480.1	4.4	5.3	-0.9	6.3	No	480.1	4.4	0.0	4.4	2.5	Yes	11
23	Right	1430.90*	Trapezoidal	29.9	475.4	479.8	4.4	5.3	-0.9	6.3	No	479.8	4.4	0.0	4.4	2.5	Yes	11
23	Right	1430.45*	Trapezoidal	29.9	475.1	479.4	4.4	5.3	-0.9	6.3	No	479.4	4.4	0.0	4.4	2.5	Yes	11
23	Right	1430	Trapezoidal	29.8	474.7	479.1	4.4	5.3	-0.9	6.3	No	479.1	4.4	0.0	4.4	2.5	Yes	11
-	-	1428.33*	Trapezoidal	29.8	474.4	478.8	4.3	5.3	-1.0	6.3	No	478.8	4.3	1.6	2.7	2.6	Yes	-
-	-	1426.66*	Trapezoidal	29.7	474.1	478.4	4.3	5.3	-1.0	6.3	No	478.4	4.3	1.6	2.7	2.6	Yes	-
-	-	1425.*	Trapezoidal	29.7	473.8	478.1	4.3	5.3	-1.0	6.3	No	478.1	4.3	1.6	2.7	2.6	Yes	-
-	-	1423.33*	Trapezoidal	29.7	473.5	477.8	4.3	5.3	-1.0	6.3	No	477.8	4.3	1.6	2.7	2.6	Yes	-
-	-	1421.66*	Trapezoidal	29.7	473.2	477.4	4.2	5.3	-1.1	6.3	No	477.4	4.2	1.6	2.6	2.6	Yes	-
-	-	1420	Trapezoidal	29.6	472.9	477.1	4.2	5.3	-1.1	6.3	No	477.1	4.2	1.6	2.6	2.6	No	-
-	-	1418.*	Trapezoidal	29.7	472.5	476.7	4.2	5.3	-1.1	6.3	No	476.7	4.2	1.6	2.6	2.6	Yes	-
-	-	1416.*	Trapezoidal	29.7	472.1	476.4	4.3	5.3	-1.0	6.3	No	476.4	4.3	1.6	2.7	2.6	Yes	-
-	-	1414.*	Trapezoidal	29.7	471.7	476.0	4.3	5.3	-1.0	6.3	No	476.0	4.3	1.6	2.7	2.6	Yes	-
-	-	1412.*	Trapezoidal	11.2	480.9	475.7	-5.3	0.0	-5.3	2.5	No	475.7	-5.3	1.6	-6.9	2.6	No	12
-	-	1410	Trapezoidal	10.6	481.1	475.3	-5.8	0.0	-5.8	2.5	No	475.3	-5.8	1.6	-7.4	2.6	No	12
24	Left	1400	Trapezoidal	10.4	481.2	475.1	-6.1	0.0	-6.1	2.5	No	475.1	-6.1	1.6	-7.7	2.6	No	12
24	Left	1393.33*	Trapezoidal	10.6	481.1	474.8	-6.3	0.0	-6.3	2.5	No	474.8	-6.3	1.6	-7.9	2.6	No	12
24	Left	1386.66*	Trapezoidal	10.8	481.1	474.6	-6.6	0.0	-6.6	2.5	No	474.6	-6.6	1.6	-8.2	2.6	No	12
24	Left	1380	Trapezoidal	10.3	481.3	474.3	-7.0	0.0	-7.0	2.5	No	474.3	-7.0	1.6	-8.6	2.6	No	12
24	Left	1370	Trapezoidal	12.8	480.3	474.1	-6.2	0.0	-6.2	2.5	No	477.4	-2.9	1.6	-4.5	2.6	No	12
24	Left	1365.*	Trapezoidal	17.8	477.4	474.8	-2.6	0.0	-2.6	2.5	No	477.9	0.5	1.6	-1.1	2.6	No	12
24	Left	1360	Trapezoidal	18.1	477.0	475.5	-1.4	0.0	-1.4	2.5	No	478.3	1.4	1.6	-0.2	2.6	No	12
24	Left	1350	Rectangular	22.2	474.1	475.5	1.4	0.0	1.4	2.0	No	478.8	4.8	1.6	3.2	2.6	Yes	-
-	-	1349.99	Obstruction	Bridge		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-
-	-	1347.5*	Rectangular	23.4	472.9	475.4	2.5	0.0	2.5	2.0	Yes	478.8	5.8	1.6	4.2	2.6	Yes	-
-	-	1345.*	Rectangular	24.4	472.0	475.4	3.4	0.0	3.4	2.0	Yes	478.7	6.7	1.6	5.1	2.6	Yes	-
-	-	1342.5*	Rectangular	23.3	472.4	475.3	2.8	0.0	2.8	2.0	Yes	478.6	6.2	1.6	4.6	2.6	Yes	-
-	-	1340	Rectangular	24.4	471.4	475.2	3.8	0.0	3.8	2.0	Yes	478.5	7.1	1.6	5.5	2.6	Yes	-
-	-	1330	Rectangular	22.0	472.9	474.0	1.1	0.0	1.1	2.0	No	477.4	4.5	1.6	2.9	2.6	Yes	-
-	-	1320	Rectangular	21.7	473.0	471.9	-1.1	0.0	-1.1	2.0	No	475.4	2.4	1.6	0.8	2.6	No	12
-	-	1310	Trapezoidal	21.6	472.9	471.7	-1.3	0.0	-1.3	2.5	No	475.2	2.2	1.6	0.6	2.6	No	12
-	-	1300	Trapezoidal	22.8	472.0	471.6	-0.4	0.0	-0.4	2.5	No	475.1	3.0	1.6	1.4	2.6	No	12
-	-	1296.66*	Trapezoidal	25.0	470.1	471.4	1.3	0.0	1.3	2.5	No	474.9	4.8	1.6	3.2	2.6	Yes	-
-	-	1293.33*	Trapezoidal	25.3	469.7	471.2	1.4	0.0	1.4	2.5	No	474.7	4.9	1.6	3.3	2.6	Yes	-
-	-	1290	Trapezoidal	24.6	470.1	471.0	0.9	0.0	0.9	2.5	No	474.4	4.3	1.6	2.7	2.6	Yes	-
-	-	1280	Trapezoidal	26.6	468.3	470.9	2.6	4.2	-1.6	5.2	No	470.9	2.6	1.6	1.0	2.6	No	-
-	-	1270	Trapezoidal	27.5	467.3	470.6	3.3	4.2	-0.9	5.2	No	470.6	3.3	1.6	1.7	2.6	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
-	-	1260	Trapezoidal	28.0	466.6	469.9	3.3	4.2	-0.9	5.2	No	469.9	3.3	1.6	1.7	2.6	No	-
-	-	1255.*	Trapezoidal	28.2	466.2	469.1	3.0	4.2	-1.2	5.2	No	469.1	3.0	1.6	1.4	2.6	No	-
-	-	1250	Trapezoidal	28.4	465.8	468.4	2.7	4.2	-1.5	5.2	No	468.4	2.7	1.6	1.1	2.6	No	-
-	-	1240	Trapezoidal	28.3	465.8	468.4	2.6	4.2	-1.6	5.2	No	468.4	2.6	1.6	1.0	2.6	No	-
-	-	1238.*	Trapezoidal	28.3	465.5	468.2	2.6	4.2	-1.6	5.2	No	468.2	2.6	1.6	1.0	2.6	No	-
-	-	1236.*	Trapezoidal	28.3	465.2	467.9	2.6	4.2	-1.6	5.2	No	467.9	2.6	1.6	1.0	2.6	No	-
-	-	1234.*	Trapezoidal	28.3	464.9	467.6	2.6	4.2	-1.6	5.2	No	467.6	2.6	1.6	1.0	2.6	No	-
-	-	1232.*	Trapezoidal	28.3	464.7	467.3	2.7	4.2	-1.5	5.2	No	467.3	2.7	1.6	1.1	2.6	No	-
25	Right	1230	Trapezoidal	28.3	464.4	467.0	2.7	4.2	-1.5	5.2	No	467.0	2.7	0.0	2.7	2.5	Yes	12
25	Right	1226.66*	Trapezoidal	28.2	464.3	467.5	3.2	4.2	-1.0	5.2	No	466.8	2.5	0.0	2.5	2.5	Yes	12
25	Right	1223.33*	Trapezoidal	28.0	464.1	467.9	3.8	4.2	-0.4	5.2	No	466.6	2.4	0.0	2.4	2.5	No	12
25	Right	1220	Trapezoidal	27.9	464.0	468.3	4.3	4.2	0.1	5.2	No	466.3	2.3	0.0	2.3	2.5	No	-
25	Right	1210	Trapezoidal	27.7	464.0	468.3	4.3	4.2	0.1	5.2	No	466.3	2.3	0.0	2.3	2.5	No	-
25	Right	1205.*	Trapezoidal	27.8	463.8	468.1	4.3	4.2	0.1	5.2	No	466.1	2.3	0.0	2.3	2.5	No	-
25	Right	1200	Trapezoidal	27.8	463.5	467.9	4.3	4.2	0.1	5.2	No	465.9	2.3	0.0	2.3	2.5	No	-
25	Right	1195.*	Trapezoidal	27.9	463.4	467.7	4.3	4.2	0.1	5.2	No	465.7	2.3	0.0	2.3	2.5	No	-
25	Right	1190	Trapezoidal	27.9	463.2	467.5	4.3	4.2	0.1	5.2	No	465.5	2.3	0.0	2.3	2.5	No	-
25	Right	1185.*	Trapezoidal	28.1	462.7	467.3	4.6	4.2	0.4	5.2	No	465.3	2.6	0.0	2.6	2.5	Yes	-
25	Right	1180	Trapezoidal	28.4	462.2	467.0	4.8	4.2	0.6	5.2	No	465.0	2.8	0.0	2.8	2.5	Yes	-
25	Right	1179.33*	Trapezoidal	28.4	461.9	466.7	4.8	4.2	0.6	5.2	No	464.7	2.8	0.0	2.8	2.5	Yes	-
25	Right	1178.66*	Trapezoidal	28.4	461.7	466.5	4.8	4.2	0.6	5.2	No	464.5	2.8	0.0	2.8	2.5	Yes	-
25	Right	1178.*	Trapezoidal	28.3	461.4	466.2	4.8	4.2	0.6	5.2	No	464.2	2.8	0.0	2.8	2.5	Yes	-
25	Right	1177.33*	Trapezoidal	28.3	461.1	466.0	4.8	4.2	0.6	5.2	No	464.0	2.8	0.0	2.8	2.5	Yes	-
25	Right	1176.66*	Trapezoidal	28.3	460.9	465.7	4.8	4.2	0.6	5.2	No	463.7	2.8	0.0	2.8	2.5	Yes	-
25	Right	1176.*	Trapezoidal	28.3	460.6	465.4	4.9	4.2	0.7	5.2	No	463.4	2.9	0.0	2.9	2.5	Yes	-
25	Right	1175.33*	Trapezoidal	28.3	460.3	465.2	4.9	4.2	0.7	5.2	No	463.2	2.9	0.0	2.9	2.5	Yes	-
25	Right	1174.66*	Trapezoidal	28.3	460.1	464.9	4.9	4.2	0.7	5.2	No	462.9	2.9	0.0	2.9	2.5	Yes	-
25	Right	1174.*	Trapezoidal	28.3	459.8	464.7	4.9	4.2	0.7	5.2	No	462.7	2.9	0.0	2.9	2.5	Yes	-
25	Right	1173.33*	Trapezoidal	28.3	459.5	464.4	4.9	4.2	0.7	5.2	No	462.4	2.9	0.0	2.9	2.5	Yes	-
25	Right	1172.66*	Trapezoidal	28.3	459.3	464.2	4.9	4.2	0.7	5.2	No	462.2	2.9	0.0	2.9	2.5	Yes	-
25	Right	1172.*	Trapezoidal	28.3	459.0	463.9	4.9	4.2	0.7	5.2	No	461.9	2.9	0.0	2.9	2.5	Yes	-
25	Right	1171.33*	Trapezoidal	28.3	458.7	463.7	4.9	4.2	0.7	5.2	No	461.7	2.9	0.0	2.9	2.5	Yes	-
-	-	1170.66*	Trapezoidal	28.3	458.5	463.4	4.9	4.2	0.7	5.2	No	461.4	2.9	0.0	2.9	2.5	Yes	-
-	-	1170	Trapezoidal	28.3	458.2	463.1	4.9	4.2	0.7	5.2	No	461.1	2.9	0.0	2.9	2.5	Yes	-
-	-	1167.5*	Trapezoidal	28.1	458.1	462.4	4.3	4.2	0.1	5.2	No	460.9	2.8	0.0	2.8	2.5	Yes	-
-	-	1165.*	Trapezoidal	27.8	458.0	461.6	3.6	4.2	-0.6	5.2	No	460.6	2.6	0.0	2.6	2.5	Yes	-
-	-	1162.5*	Trapezoidal	27.6	457.9	460.9	3.0	4.2	-1.2	5.2	No	460.4	2.5	0.0	2.5	2.5	Yes	-
-	-	1160	Trapezoidal	27.4	457.7	460.1	2.4	4.2	-1.8	5.2	No	460.1	2.4	0.0	2.4	2.5	No	-
-	-	1158.33*	Trapezoidal	27.5	457.4	459.9	2.5	4.2	-1.7	5.2	No	459.9	2.5	0.0	2.5	2.5	No	-
-	-	1156.66*	Trapezoidal	27.5	457.0	459.6	2.5	4.2	-1.7	5.2	No	459.6	2.5	0.0	2.5	2.5	Yes	-
-	-	1155.*	Trapezoidal	27.6	456.7	459.3	2.6	4.2	-1.6	5.2	No	459.3	2.6	0.0	2.6	2.5	Yes	-
-	-	1153.33*	Trapezoidal	27.7	456.4	459.1	2.7	4.2	-1.5	5.2	No	459.1	2.7	0.0	2.7	2.5	Yes	-
-	-	1151.66*	Trapezoidal	27.8	456.1	458.8	2.8	4.2	-1.5	5.2	No	458.8	2.8	0.0	2.8	2.5	Yes	-
-	-	1150	Trapezoidal	27.8	455.7	458.5	2.8	4.2	-1.4	5.2	No	458.5	2.8	0.0	2.8	2.5	Yes	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
-	-	1149.09*	Trapezoidal	27.9	455.4	458.2	2.8	4.2	-1.4	5.2	No	458.3	2.9	0.0	2.9	2.5	Yes	-
-	-	1148.18*	Trapezoidal	28.0	455.0	457.9	2.9	4.2	-1.3	5.2	No	458.0	3.0	0.0	3.0	2.5	Yes	-
-	-	1147.27*	Trapezoidal	28.1	454.6	457.5	2.9	4.2	-1.3	5.2	No	457.7	3.1	0.0	3.1	2.5	Yes	-
-	-	1146.36*	Trapezoidal	28.2	454.3	457.2	2.9	4.2	-1.3	5.2	No	457.4	3.1	0.0	3.1	2.5	Yes	-
-	-	1145.45*	Trapezoidal	28.3	453.9	456.9	2.9	4.2	-1.3	5.2	No	457.2	3.2	0.0	3.2	2.5	Yes	-
-	-	1144.54*	Trapezoidal	28.3	453.6	456.6	3.0	4.2	-1.2	5.2	No	456.9	3.3	0.0	3.3	2.5	Yes	-
-	-	1143.63*	Trapezoidal	28.4	453.2	456.2	3.0	4.2	-1.2	5.2	No	456.6	3.4	0.0	3.4	2.5	Yes	-
-	-	1142.72*	Trapezoidal	28.5	452.9	455.9	3.0	4.2	-1.2	5.2	No	456.3	3.4	0.0	3.4	2.5	Yes	-
-	-	1141.81*	Trapezoidal	28.5	452.5	455.6	3.0	4.2	-1.2	5.2	No	456.1	3.5	0.0	3.5	2.5	Yes	-
-	-	1140.90*	Trapezoidal	28.6	452.2	455.2	3.0	0.0	3.0	2.5	Yes	455.8	3.6	5.7	-2.1	6.7	No	-
-	-	1140	Trapezoidal	28.6	451.8	454.9	3.1	0.0	3.1	2.5	Yes	455.5	3.7	5.7	-2.0	6.7	No	-
-	-	1130	Trapezoidal	28.3	452.0	454.9	2.9	0.0	2.9	2.5	Yes	456.5	4.5	5.7	-1.2	6.7	No	-
-	-	1127.5*	Trapezoidal	28.8	451.3	454.8	3.5	0.0	3.5	2.5	Yes	456.2	4.9	5.7	-0.8	6.7	No	-
-	-	1125.*	Trapezoidal	29.3	450.6	454.6	4.0	0.0	4.0	2.5	Yes	455.9	5.3	5.7	-0.4	6.7	No	-
-	-	1122.5*	Trapezoidal	29.6	450.0	454.5	4.5	0.0	4.5	2.5	Yes	455.6	5.6	5.7	-0.1	6.7	No	-
-	-	1120	Trapezoidal	29.9	449.5	454.3	4.8	0.0	4.8	2.5	Yes	455.3	5.8	5.7	0.1	6.7	No	-
-	-	1115.*	Trapezoidal	30.7	448.4	454.2	5.8	0.0	5.8	2.5	Yes	455.0	6.6	5.7	0.9	6.7	No	-
-	-	1110	Trapezoidal	31.8	447.0	454.1	7.1	0.0	7.1	2.5	Yes	454.8	7.7	5.7	2.0	6.7	No	-
-	-	1100	Trapezoidal	32.9	445.6	454.0	8.4	0.0	8.4	2.5	Yes	454.5	8.9	5.7	3.2	6.7	No	-
-	-	1090	Trapezoidal	33.0	445.3	453.9	8.7	0.0	8.7	2.5	Yes	454.3	9.1	5.7	3.4	6.7	No	-
-	-	1085.*	Trapezoidal	33.1	444.9	453.7	8.9	0.0	8.9	2.5	Yes	453.9	9.1	5.7	3.4	6.7	No	-
-	-	1080	Trapezoidal	33.1	444.5	453.6	9.1	0.0	9.1	2.5	Yes	453.6	9.1	5.7	3.4	6.7	No	-
-	-	1070	Trapezoidal	33.2	444.1	453.1	9.0	0.0	9.0	2.5	Yes	453.4	9.3	5.7	3.6	6.7	No	-
-	-	1065.*	Trapezoidal	33.0	443.9	452.5	8.6	0.0	8.6	2.5	Yes	452.8	8.9	5.7	3.2	6.7	No	-
-	-	1060	Trapezoidal	32.3	444.1	452.0	7.8	0.0	7.8	2.5	Yes	452.2	8.1	5.7	2.4	6.7	No	-
-	-	1050	Trapezoidal	31.6	444.3	451.4	7.1	0.0	7.1	2.5	Yes	451.6	7.3	5.7	1.6	6.7	No	-
-	-	1048.*	Trapezoidal	32.0	443.6	450.7	7.1	0.0	7.1	2.5	Yes	450.9	7.3	5.7	1.6	6.7	No	-
-	-	1046.*	Trapezoidal	32.2	442.9	450.1	7.1	0.0	7.1	2.5	Yes	450.2	7.2	5.7	1.5	6.7	No	-
-	-	1044.*	Trapezoidal	32.4	442.3	449.4	7.0	0.0	7.0	2.5	Yes	449.5	7.1	5.7	1.4	6.7	No	-
-	-	1042.*	Trapezoidal	32.6	441.8	448.7	6.9	0.0	6.9	2.5	Yes	448.7	6.9	5.7	1.2	6.7	No	-
26	Left	1040	Trapezoidal	32.6	441.3	448.0	6.7	0.0	6.7	2.5	Yes	448.0	6.7	5.7	1.0	6.7	No	-
26	Left	1037.5*	Trapezoidal	32.6	440.9	447.7	6.8	0.0	6.8	2.5	Yes	447.5	6.5	5.7	0.8	6.7	No	-
26	Left	1035.*	Trapezoidal	32.6	440.6	447.4	6.8	0.0	6.8	2.5	Yes	446.9	6.3	5.7	0.6	6.7	No	-
26	Left	1032.5*	Trapezoidal	32.6	440.2	447.0	6.8	0.0	6.8	2.5	Yes	446.3	6.1	5.7	0.4	6.7	No	-
26	Left	1030	Trapezoidal	32.6	439.9	446.7	6.8	0.0	6.8	2.5	Yes	445.7	5.8	5.7	0.1	6.7	No	-
26	Left	1027.5*	Trapezoidal	32.2	439.8	446.4	6.5	0.0	6.5	2.5	Yes	445.1	5.3	5.7	-0.4	6.7	No	-
26	Left	1025.*	Trapezoidal	31.8	439.8	446.1	6.3	0.0	6.3	2.5	Yes	444.6	4.8	5.7	-0.9	6.7	No	-
26	Left	1022.5*	Trapezoidal	31.4	439.7	445.8	6.0	0.0	6.0	2.5	Yes	444.0	4.3	5.7	-1.4	6.7	No	-
26	Left	1020	Trapezoidal	31.0	439.7	445.4	5.7	0.0	5.7	2.5	Yes	443.4	3.7	5.7	-2.0	6.7	No	-
-	-	1018.*	Trapezoidal	31.3	439.1	445.1	6.1	0.0	6.1	2.5	Yes	443.0	3.9	5.7	-1.8	6.7	No	-
-	-	1016.*	Trapezoidal	31.5	438.5	444.8	6.3	0.0	6.3	2.5	Yes	442.6	4.1	5.7	-1.6	6.7	No	-
-	-	1014.*	Trapezoidal	31.8	437.9	444.5	6.5	0.0	6.5	2.5	Yes	442.2	4.2	5.7	-1.5	6.7	No	-
-	-	1012.*	Trapezoidal	32.0	437.3	444.1	6.8	0.0	6.8	2.5	Yes	441.7	4.4	5.7	-1.3	6.7	No	-
-	-	1010	Trapezoidal	32.3	436.8	443.8	7.1	0.0	7.1	2.5	Yes	441.3	4.6	5.7	-1.1	6.7	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
-	-	1000	Trapezoidal	32.3	436.4	441.0	4.6	0.0	4.6	2.5	Yes	441.0	4.6	5.7	-1.1	6.7	No	-
-	-	999.333*	Trapezoidal	32.3	436.0	440.6	4.6	0.0	4.6	2.5	Yes	440.6	4.6	5.7	-1.1	6.7	No	-
-	-	998.666*	Trapezoidal	32.3	435.6	440.2	4.6	0.0	4.6	2.5	Yes	440.2	4.6	5.7	-1.1	6.7	No	-
-	-	998.*	Trapezoidal	32.3	435.2	439.8	4.6	0.0	4.6	2.5	Yes	439.8	4.6	5.7	-1.1	6.7	No	-
-	-	997.333*	Trapezoidal	32.3	434.8	439.3	4.6	0.0	4.6	2.5	Yes	439.3	4.6	5.7	-1.1	6.7	No	-
-	-	996.666*	Trapezoidal	32.3	434.3	438.9	4.6	0.0	4.6	2.5	Yes	438.9	4.6	5.7	-1.1	6.7	No	-
-	-	996.*	Trapezoidal	32.3	433.9	438.5	4.6	0.0	4.6	2.5	Yes	438.5	4.6	5.7	-1.1	6.7	No	-
-	-	995.333*	Trapezoidal	32.3	433.5	438.1	4.6	0.0	4.6	2.5	Yes	438.1	4.6	5.7	-1.1	6.7	No	-
-	-	994.666*	Trapezoidal	32.3	433.1	437.7	4.6	0.0	4.6	2.5	Yes	437.7	4.6	5.7	-1.1	6.7	No	-
-	-	994.*	Trapezoidal	32.3	432.7	437.3	4.6	0.0	4.6	2.5	Yes	437.3	4.6	5.7	-1.1	6.7	No	-
-	-	993.333*	Trapezoidal	32.3	432.3	436.9	4.6	0.0	4.6	2.5	Yes	436.9	4.6	5.7	-1.1	6.7	No	-
-	-	992.666*	Trapezoidal	32.4	431.9	436.5	4.6	0.0	4.6	2.5	Yes	436.5	4.6	5.7	-1.1	6.7	No	-
-	-	992.*	Trapezoidal	32.3	431.5	436.1	4.6	0.0	4.6	2.5	Yes	436.1	4.6	5.7	-1.1	6.7	No	-
-	-	991.333*	Trapezoidal	32.4	431.1	435.7	4.6	0.0	4.6	2.5	Yes	435.7	4.6	5.7	-1.1	6.7	No	-
-	-	990.666*	Trapezoidal	32.4	430.7	435.3	4.6	0.0	4.6	2.5	Yes	435.3	4.6	5.7	-1.1	6.7	No	-
-	-	990	Trapezoidal	32.4	430.3	434.9	4.6	0.0	4.6	2.5	Yes	434.9	4.6	5.7	-1.1	6.7	No	-
-	-	980	Trapezoidal	32.3	429.9	434.5	4.6	0.0	4.6	2.5	Yes	434.5	4.6	5.7	-1.1	6.7	No	-
-	-	970	Trapezoidal	32.3	429.6	434.2	4.6	0.0	4.6	2.5	Yes	434.2	4.6	5.7	-1.1	6.7	No	-
-	-	960	Trapezoidal	32.3	429.3	433.9	4.6	0.0	4.6	2.5	Yes	433.9	4.6	5.7	-1.1	6.7	No	-
27	Left	950	Trapezoidal	32.3	428.9	433.5	4.6	0.0	4.6	2.5	Yes	433.5	4.6	5.7	-1.1	6.7	No	13
27	Left	940	Trapezoidal	32.3	428.6	433.2	4.6	0.0	4.6	2.5	Yes	433.2	4.6	5.7	-1.1	6.7	No	13
27	Left	930	Trapezoidal	32.4	428.2	432.8	4.6	0.0	4.6	2.5	Yes	432.8	4.6	5.7	-1.1	6.7	No	13
27	Left	920	Trapezoidal	32.4	427.9	432.5	4.6	0.0	4.6	2.5	Yes	432.5	4.6	5.7	-1.1	6.7	No	13
27	Left	910	Trapezoidal	32.4	427.5	432.1	4.6	0.0	4.6	2.5	Yes	432.1	4.6	5.7	-1.1	6.7	No	13
27	Left	900	Trapezoidal	32.4	427.2	431.8	4.6	0.0	4.6	2.5	Yes	431.8	4.6	5.7	-1.1	6.7	No	13
27	Left	890	Trapezoidal	32.4	426.8	431.4	4.6	0.0	4.6	2.5	Yes	431.4	4.6	5.7	-1.1	6.7	No	13
27	Left	880	Trapezoidal	32.4	426.5	431.1	4.6	0.0	4.6	2.5	Yes	431.1	4.6	5.7	-1.1	6.7	No	13
27	Left	870	Trapezoidal	32.4	426.1	430.7	4.6	0.0	4.6	2.5	Yes	430.7	4.6	5.7	-1.1	6.7	No	13
27	Left	860	Trapezoidal	32.4	425.8	430.4	4.6	0.0	4.6	2.5	Yes	430.4	4.6	5.7	-1.1	6.7	No	13
27	Left	850	Trapezoidal	32.4	425.4	430.0	4.6	0.0	4.6	2.5	Yes	430.0	4.6	5.7	-1.1	6.7	No	13
27	Left	840	Trapezoidal	32.4	425.1	429.7	4.6	0.0	4.6	2.5	Yes	429.7	4.6	5.7	-1.1	6.7	No	13
27	Left	830	Trapezoidal	32.4	424.7	429.3	4.6	0.0	4.6	2.5	Yes	429.3	4.6	5.7	-1.1	6.7	No	13
-	-	820	Trapezoidal	32.4	424.3	428.9	4.6	0.0	4.6	2.5	Yes	428.9	4.6	5.7	-1.1	6.7	No	-
-	-	815.*	Trapezoidal	32.3	424.0	428.6	4.6	0.0	4.6	2.5	Yes	428.6	4.6	5.7	-1.1	6.7	No	-
-	-	810	Trapezoidal	32.2	423.7	428.4	4.6	0.0	4.6	2.5	Yes	428.3	4.5	5.7	-1.2	6.7	No	-
-	-	800	Trapezoidal	32.2	423.3	427.9	4.6	0.0	4.6	2.5	Yes	427.9	4.6	5.7	-1.1	6.7	No	-
-	-	798.888*	Trapezoidal	32.4	422.8	427.5	4.8	0.0	4.8	2.5	Yes	427.5	4.8	5.7	-1.0	6.7	No	-
-	-	797.777*	Trapezoidal	32.6	422.2	427.1	5.0	0.0	5.0	2.5	Yes	427.1	5.0	5.7	-0.7	6.7	No	-
-	-	796.666*	Trapezoidal	32.8	421.6	426.7	5.2	0.0	5.2	2.5	Yes	426.7	5.2	5.7	-0.5	6.7	No	-
-	-	795.555*	Trapezoidal	32.9	421.0	426.4	5.4	0.0	5.4	2.5	Yes	426.4	5.4	5.7	-0.3	6.7	No	-
-	-	794.444*	Trapezoidal	33.1	420.4	426.0	5.6	0.0	5.6	2.5	Yes	426.0	5.6	5.7	-0.1	6.7	No	-
-	-	793.333*	Trapezoidal	33.2	419.8	425.6	5.8	0.0	5.8	2.5	Yes	425.6	5.8	3.0	2.8	4.0	No	-
-	-	792.222*	Trapezoidal	33.4	419.2	425.2	5.9	0.0	5.9	2.5	Yes	425.2	5.9	3.0	2.9	4.0	No	-
-	-	791.111*	Trapezoidal	33.5	418.7	424.8	6.1	0.0	6.1	2.5	Yes	424.8	6.1	3.0	3.1	4.0	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
-	-	790	Trapezoidal	33.7	418.1	424.4	6.3	0.0	6.3	2.5	Yes	424.4	6.3	3.0	3.3	4.0	No	-
-	-	787.5*	Trapezoidal	33.8	417.6	424.1	6.5	0.0	6.5	2.5	Yes	424.1	6.5	3.0	3.5	4.0	No	-
-	-	785.*	Trapezoidal	33.9	417.1	423.7	6.6	0.0	6.6	2.5	Yes	423.7	6.6	3.0	3.6	4.0	No	-
-	-	782.5*	Trapezoidal	33.9	416.6	423.4	6.8	0.0	6.8	2.5	Yes	423.4	6.8	3.0	3.8	4.0	No	-
-	-	780	Trapezoidal	34.0	416.0	423.0	7.0	0.0	7.0	2.5	Yes	423.0	7.0	3.0	4.0	4.0	No	-
-	-	770	Trapezoidal	34.1	415.8	422.7	7.0	0.0	7.0	2.5	Yes	422.7	7.0	3.0	4.0	4.0	No	-
-	-	768.*	Trapezoidal	33.5	415.7	422.7	7.0	0.0	7.0	2.5	Yes	422.7	7.0	3.0	4.0	4.0	No	-
-	-	766.*	Trapezoidal	33.0	415.7	422.6	6.9	0.0	6.9	2.5	Yes	422.6	6.9	3.0	3.9	4.0	No	-
-	-	764.*	Trapezoidal	32.5	415.6	422.6	6.9	0.0	6.9	2.5	Yes	422.6	6.9	3.0	3.9	4.0	No	-
-	-	762.*	Trapezoidal	32.0	415.6	422.5	6.9	0.0	6.9	2.5	Yes	422.5	6.9	3.0	3.9	4.0	No	-
-	-	760	Trapezoidal	31.5	415.5	422.4	6.9	0.0	6.9	2.5	Yes	422.4	6.9	3.0	3.9	4.0	No	-
-	-	750	Trapezoidal	31.6	415.4	422.4	7.1	0.0	7.1	2.5	Yes	422.4	7.1	3.0	4.1	4.0	Yes	-
-	-	740	Trapezoidal	31.6	414.9	423.4	8.5	0.0	8.5	2.5	Yes	422.1	7.1	3.0	4.1	4.0	Yes	-
-	-	730	Trapezoidal	31.5	414.9	426.4	11.5	0.0	11.5	2.5	Yes	422.1	7.1	3.0	4.1	4.0	Yes	-
-	-	728.75*	Trapezoidal	31.7	414.4	425.8	11.4	0.0	11.4	2.5	Yes	421.6	7.2	3.0	4.2	4.0	Yes	-
-	-	727.5*	Trapezoidal	31.9	413.8	425.1	11.3	0.0	11.3	2.5	Yes	421.1	7.3	3.0	4.3	4.0	Yes	-
-	-	726.25*	Trapezoidal	32.0	413.2	424.5	11.3	0.0	11.3	2.5	Yes	420.6	7.4	3.0	4.4	4.0	Yes	-
-	-	725.*	Trapezoidal	32.2	412.6	423.8	11.2	0.0	11.2	2.5	Yes	420.1	7.5	3.0	4.5	4.0	Yes	-
-	-	723.75*	Trapezoidal	32.4	412.1	423.2	11.1	0.0	11.1	2.5	Yes	419.7	7.6	3.0	4.6	4.0	Yes	-
-	-	722.5*	Trapezoidal	32.5	411.5	422.5	11.0	0.0	11.0	2.5	Yes	419.2	7.7	3.0	4.7	4.0	Yes	-
-	-	721.25*	Trapezoidal	32.7	410.9	421.9	10.9	0.0	10.9	2.5	Yes	418.7	7.8	3.0	4.8	4.0	Yes	-
28	Left	720	Trapezoidal	32.8	410.4	421.2	10.8	0.0	10.8	2.5	Yes	418.2	7.8	3.0	4.8	4.0	Yes	-
28	Left	719.230*	Trapezoidal	32.8	410.0	420.8	10.8	0.0	10.8	2.5	Yes	417.8	7.8	3.0	4.8	4.0	Yes	-
28	Left	718.461*	Trapezoidal	32.7	409.6	420.4	10.8	0.0	10.8	2.5	Yes	417.4	7.8	3.0	4.8	4.0	Yes	-
28	Left	717.692*	Trapezoidal	32.7	409.3	420.0	10.8	0.0	10.8	2.5	Yes	417.0	7.8	3.0	4.8	4.0	Yes	-
28	Left	716.923*	Trapezoidal	32.7	408.9	419.6	10.8	0.0	10.8	2.5	Yes	416.6	7.8	3.0	4.8	4.0	Yes	-
28	Left	716.153*	Trapezoidal	32.7	408.5	419.2	10.8	0.0	10.8	2.5	Yes	416.2	7.8	3.0	4.8	4.0	Yes	-
28	Left	715.384*	Trapezoidal	32.7	408.1	418.9	10.8	0.0	10.8	2.5	Yes	415.9	7.8	3.0	4.8	4.0	Yes	-
28	Left	714.615*	Trapezoidal	32.7	407.7	418.5	10.7	0.0	10.7	2.5	Yes	415.5	7.7	3.0	4.7	4.0	Yes	-
28	Left	713.846*	Trapezoidal	32.7	407.3	418.1	10.7	0.0	10.7	2.5	Yes	415.1	7.7	3.0	4.7	4.0	Yes	-
28	Left	713.076*	Trapezoidal	32.6	406.9	417.7	10.7	0.0	10.7	2.5	Yes	414.7	7.7	3.0	4.7	4.0	Yes	-
28	Left	712.307*	Trapezoidal	32.6	406.6	417.3	10.7	0.0	10.7	2.5	Yes	414.3	7.7	3.0	4.7	4.0	Yes	-
28	Left	711.538*	Trapezoidal	32.6	406.2	416.9	10.7	0.0	10.7	2.5	Yes	413.9	7.7	3.0	4.7	4.0	Yes	-
28	Left	710.769*	Trapezoidal	32.6	405.8	416.5	10.7	0.0	10.7	2.5	Yes	413.5	7.7	3.0	4.7	4.0	Yes	-
-	-	710	Trapezoidal	32.6	405.4	416.1	10.7	0.0	10.7	2.5	Yes	413.1	7.7	3.0	4.7	4.0	Yes	-
-	-	707.5*	Trapezoidal	32.5	405.1	415.5	10.4	0.0	10.4	2.5	Yes	412.7	7.6	3.0	4.6	4.0	Yes	-
-	-	705.*	Trapezoidal	32.4	404.8	414.8	10.0	0.0	10.0	2.5	Yes	412.3	7.5	3.0	4.5	4.0	Yes	-
-	-	702.5*	Trapezoidal	32.3	404.5	414.2	9.7	0.0	9.7	2.5	Yes	412.0	7.5	3.0	4.5	4.0	Yes	-
-	-	700	Trapezoidal	32.3	404.2	413.6	9.4	0.0	9.4	2.5	Yes	411.6	7.4	3.0	4.4	4.0	Yes	-
-	-	690	Trapezoidal	32.3	404.1	413.5	9.4	0.0	9.4	2.5	Yes	411.5	7.4	3.0	4.4	4.0	Yes	-
-	-	680	Trapezoidal	32.1	404.2	413.5	9.4	0.0	9.4	2.5	Yes	411.5	7.3	3.0	4.3	4.0	Yes	-
-	-	677.5*	Trapezoidal	32.2	403.7	413.2	9.5	0.0	9.5	2.5	Yes	410.9	7.2	3.0	4.2	4.0	Yes	-
-	-	675.*	Trapezoidal	32.3	403.3	412.9	9.6	0.0	9.6	2.5	Yes	410.3	7.0	3.0	4.0	4.0	Yes	-
-	-	672.5*	Trapezoidal	32.5	402.9	412.5	9.6	0.0	9.6	2.5	Yes	409.8	6.9	3.0	3.9	4.0	No	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
-	-	670	Trapezoidal	32.6	402.5	412.2	9.8	0.0	9.8	2.5	Yes	409.2	6.8	3.0	3.8	4.0	No	-
-	-	666.666*	Trapezoidal	32.6	402.2	411.9	9.8	0.0	9.8	2.5	Yes	408.9	6.8	3.0	3.8	4.0	No	-
-	-	663.333*	Trapezoidal	32.6	401.8	411.6	9.8	0.0	9.8	2.5	Yes	408.6	6.8	3.0	3.8	4.0	No	-
-	-	660	Trapezoidal	32.6	401.5	411.3	9.8	0.0	9.8	2.5	Yes	408.3	6.8	3.0	3.8	4.0	No	-
-	-	650	Trapezoidal	32.4	401.6	408.3	6.7	0.0	6.7	2.5	Yes	408.3	6.7	3.0	3.7	4.0	No	-
-	-	640	Trapezoidal	32.5	401.1	407.8	6.7	0.0	6.7	2.5	Yes	407.8	6.7	3.0	3.7	4.0	No	-
-	-	630	Trapezoidal	32.3	401.1	407.8	6.7	0.0	6.7	2.5	Yes	407.8	6.7	3.0	3.7	4.0	No	-
-	-	629.5*	Trapezoidal	32.3	400.7	407.4	6.7	0.0	6.7	2.5	Yes	407.4	6.7	3.0	3.7	4.0	No	-
-	-	629.*	Trapezoidal	32.3	400.3	407.0	6.7	5.2	1.5	6.2	No	407.0	6.7	3.0	3.7	4.0	No	-
-	-	628.5*	Trapezoidal	32.3	399.9	406.6	6.7	5.2	1.5	6.2	No	406.6	6.7	3.0	3.7	4.0	No	-
-	-	628.*	Trapezoidal	32.3	399.5	406.2	6.7	5.2	1.5	6.2	No	406.2	6.7	3.0	3.7	4.0	No	-
-	-	627.5*	Trapezoidal	32.3	399.0	405.7	6.7	5.2	1.5	6.2	No	405.7	6.7	3.0	3.7	4.0	No	-
-	-	627.*	Trapezoidal	32.3	398.6	405.3	6.7	5.2	1.5	6.2	No	405.3	6.7	3.0	3.7	4.0	No	-
-	-	626.5*	Trapezoidal	32.3	398.2	404.9	6.7	5.2	1.5	6.2	No	404.9	6.7	3.0	3.7	4.0	No	-
-	-	626.*	Trapezoidal	32.3	397.8	404.5	6.7	5.2	1.5	6.2	No	404.5	6.7	3.0	3.7	4.0	No	-
-	-	625.5*	Trapezoidal	32.3	397.4	404.1	6.7	5.2	1.5	6.2	No	404.1	6.7	3.0	3.7	4.0	No	-
-	-	625.*	Trapezoidal	32.3	397.0	403.7	6.7	5.2	1.5	6.2	No	403.7	6.7	3.0	3.7	4.0	No	-
-	-	624.5*	Trapezoidal	32.3	396.6	403.3	6.7	5.2	1.5	6.2	No	403.3	6.7	3.0	3.7	4.0	No	-
-	-	624.*	Trapezoidal	32.3	396.2	402.9	6.7	5.2	1.5	6.2	No	402.9	6.7	3.0	3.7	4.0	No	-
-	-	623.5*	Trapezoidal	32.3	395.8	402.4	6.7	5.2	1.5	6.2	No	402.4	6.7	3.0	3.7	4.0	No	-
-	-	623.*	Trapezoidal	32.3	395.3	402.0	6.7	5.2	1.5	6.2	No	402.0	6.7	3.0	3.7	4.0	No	-
-	-	622.5*	Trapezoidal	32.3	394.9	401.6	6.7	5.2	1.5	6.2	No	401.6	6.7	3.0	3.7	4.0	No	-
-	-	622.*	Trapezoidal	32.3	394.5	401.2	6.7	5.2	1.5	6.2	No	401.2	6.7	3.0	3.7	4.0	No	-
-	-	621.5*	Trapezoidal	32.3	394.1	400.8	6.7	5.2	1.5	6.2	No	400.8	6.7	3.0	3.7	4.0	No	-
-	-	621.*	Trapezoidal	32.3	393.7	400.4	6.7	5.2	1.5	6.2	No	400.4	6.7	3.0	3.7	4.0	No	-
-	-	620.5*	Trapezoidal	32.3	393.3	400.0	6.7	5.2	1.5	6.2	No	400.0	6.7	3.0	3.7	4.0	No	-
-	-	620	Trapezoidal	32.3	392.9	399.6	6.7	5.2	1.5	6.2	No	399.6	6.7	3.0	3.7	4.0	No	-
-	-	616.666*	Trapezoidal	32.3	392.6	399.2	6.7	5.2	1.5	6.2	No	399.2	6.7	2.9	3.8	3.9	No	-
-	-	613.333*	Trapezoidal	32.3	392.2	398.9	6.7	5.2	1.5	6.2	No	398.9	6.7	2.9	3.8	3.9	No	-
29	Right	610	Trapezoidal	32.3	391.9	398.6	6.7	5.2	1.5	6.2	No	398.6	6.7	0.0	6.7	2.5	Yes	-
29	Right	606.666*	Trapezoidal	32.4	391.5	398.9	7.4	5.2	2.2	6.2	No	398.9	7.4	0.0	7.4	2.5	Yes	-
29	Right	603.333*	Trapezoidal	32.5	391.1	399.1	8.0	5.2	2.8	6.2	No	399.1	8.0	0.0	8.0	2.5	Yes	-
29	Right	600	Trapezoidal	32.6	390.7	399.4	8.7	5.2	3.5	6.2	No	399.4	8.7	0.0	8.7	2.5	Yes	-
-	-	598.571*	Trapezoidal	32.7	390.2	399.0	8.8	5.2	3.6	6.2	No	399.0	8.8	3.0	5.8	4.0	Yes	-
-	-	597.142*	Trapezoidal	32.8	389.7	398.6	8.9	5.2	3.7	6.2	No	398.6	8.9	3.0	5.9	4.0	Yes	-
-	-	595.714*	Trapezoidal	33.0	389.2	398.2	9.0	5.2	3.8	6.2	No	398.2	9.0	3.0	6.0	4.0	Yes	-
-	-	594.285*	Trapezoidal	33.1	388.7	397.8	9.1	5.2	3.9	6.2	No	397.8	9.1	3.0	6.1	4.0	Yes	-
-	-	592.857*	Trapezoidal	33.1	388.3	397.4	9.1	5.2	3.9	6.2	No	397.4	9.1	3.0	6.1	4.0	Yes	-
-	-	591.428*	Trapezoidal	33.2	387.9	397.0	9.1	5.2	3.9	6.2	No	397.0	9.1	3.0	6.1	4.0	Yes	-
-	-	590	Trapezoidal	33.2	387.5	396.6	9.1	5.2	3.9	6.2	No	396.6	9.1	3.0	6.1	4.0	Yes	-
-	-	587.5*	Trapezoidal	33.3	387.1	396.2	9.1	5.2	3.9	6.2	No	396.9	9.8	3.0	6.8	4.0	Yes	-
-	-	585.*	Trapezoidal	33.5	386.5	395.8	9.3	5.2	4.1	6.2	No	397.1	10.6	3.0	7.6	4.0	Yes	-
-	-	582.5*	Trapezoidal	33.7	385.9	395.4	9.5	5.2	4.3	6.2	No	397.4	11.5	3.0	8.5	4.0	Yes	-
-	-	580	Trapezoidal	33.9	385.4	395.0	9.7	5.2	4.5	6.2	No	397.7	12.3	3.0	9.3	4.0	Yes	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
-	-	575.*	Trapezoidal	33.5	385.4	396.1	10.7	5.2	5.5	6.2	No	397.4	12.0	3.0	9.0	4.0	Yes	-
-	-	570	Trapezoidal	33.3	385.2	397.2	11.9	5.2	6.7	6.2	Yes	397.2	11.9	3.0	8.9	4.0	Yes	-
-	-	565.*	Trapezoidal	32.9	385.2	396.9	11.7	5.2	6.5	6.2	Yes	396.9	11.7	3.0	8.7	4.0	Yes	-
-	-	560	Trapezoidal	32.6	385.1	396.5	11.5	5.2	6.3	6.2	Yes	396.5	11.5	3.0	8.5	4.0	Yes	-
-	-	556.666*	Trapezoidal	32.5	384.8	396.2	11.4	5.2	6.2	6.2	Yes	396.2	11.4	3.0	8.4	4.0	Yes	-
-	-	553.333*	Trapezoidal	32.5	384.5	395.9	11.4	5.2	6.2	6.2	No	395.9	11.4	3.0	8.4	4.0	Yes	-
-	-	550	Trapezoidal	32.4	384.2	395.5	11.3	5.2	6.1	6.2	No	395.5	11.3	3.0	8.3	4.0	Yes	-
-	-	547.5*	Trapezoidal	32.2	384.0	395.2	11.1	5.2	5.9	6.2	No	395.2	11.1	3.0	8.1	4.0	Yes	-
-	-	545.*	Trapezoidal	32.2	383.8	394.8	11.0	5.2	5.8	6.2	No	394.8	11.0	3.0	8.0	4.0	Yes	-
-	-	542.5*	Trapezoidal	32.1	383.6	394.4	10.8	5.2	5.6	6.2	No	394.4	10.8	3.0	7.8	4.0	Yes	-
30	Left	540	Trapezoidal	32.0	383.4	394.0	10.6	0.0	10.6	2.5	Yes	394.0	10.6	3.0	7.6	4.0	Yes	-
30	Left	535.*	Trapezoidal	31.9	383.2	393.7	10.5	0.0	10.5	2.5	Yes	393.7	10.5	3.0	7.5	4.0	Yes	-
30	Left	530	Trapezoidal	31.9	383.0	393.3	10.4	0.0	10.4	2.5	Yes	393.3	10.4	3.0	7.4	4.0	Yes	-
30	Left	529.230*	Trapezoidal	31.7	382.7	393.1	10.4	0.0	10.4	2.5	Yes	393.1	10.4	3.0	7.3	4.0	Yes	-
30	Left	528.461*	Trapezoidal	31.6	382.5	392.8	10.4	0.0	10.4	2.5	Yes	392.8	10.4	3.0	7.4	4.0	Yes	-
30	Left	527.692*	Trapezoidal	31.5	382.2	392.6	10.3	0.0	10.3	2.5	Yes	392.6	10.3	3.0	7.3	4.0	Yes	-
30	Left	526.923*	Trapezoidal	31.5	382.0	392.3	10.3	0.0	10.3	2.5	Yes	392.3	10.3	3.0	7.3	4.0	Yes	-
30	Left	526.153*	Trapezoidal	31.4	381.7	392.0	10.3	0.0	10.3	2.5	Yes	392.0	10.3	3.0	7.3	4.0	Yes	-
30	Left	525.384*	Trapezoidal	31.3	381.4	391.8	10.3	0.0	10.3	2.5	Yes	391.8	10.3	3.0	7.3	4.0	Yes	-
30	Left	524.615*	Trapezoidal	31.3	381.1	391.5	10.4	0.0	10.4	2.5	Yes	391.5	10.4	3.0	7.4	4.0	Yes	-
30	Left	523.846*	Trapezoidal	31.3	380.8	391.2	10.4	0.0	10.4	2.5	Yes	391.2	10.4	3.0	7.4	4.0	Yes	-
30	Left	523.076*	Trapezoidal	31.3	380.5	391.0	10.5	0.0	10.5	2.5	Yes	391.0	10.5	3.0	7.5	4.0	Yes	-
30	Left	522.307*	Trapezoidal	31.3	380.2	390.7	10.5	0.0	10.5	2.5	Yes	390.7	10.5	3.0	7.5	4.0	Yes	-
30	Left	521.538*	Trapezoidal	31.3	379.9	390.5	10.6	0.0	10.6	2.5	Yes	390.5	10.6	3.0	7.6	4.0	Yes	-
30	Left	520.769*	Trapezoidal	31.3	379.6	390.2	10.6	0.0	10.6	2.5	Yes	390.2	10.6	3.0	7.6	4.0	Yes	-
30	Left	520	Trapezoidal	31.3	379.3	389.9	10.7	0.0	10.7	2.5	Yes	389.9	10.7	3.0	7.7	4.0	Yes	-
-	-	517.5*	Trapezoidal	30.8	379.3	389.2	9.8	5.3	4.5	6.3	No	389.9	10.6	3.0	7.6	4.0	Yes	-
-	-	515.*	Trapezoidal	30.9	379.0	388.4	9.4	5.3	4.1	6.3	No	389.9	10.9	3.0	7.9	4.0	Yes	-
-	-	512.5*	Trapezoidal	31.3	378.3	387.7	9.3	5.3	4.0	6.3	No	389.9	11.6	3.0	8.6	4.0	Yes	-
-	-	510	Rectangular	31.6	377.8	386.9	9.1	5.3	3.8	6.3	No	389.9	12.1	3.0	9.1	4.0	Yes	-
-	-	508.888*	Rectangular	31.5	377.5	387.5	9.9	5.3	4.6	6.3	No	390.4	12.9	3.0	9.9	4.0	Yes	-
-	-	507.777*	Rectangular	31.4	377.3	388.0	10.7	5.3	5.4	6.3	No	391.0	13.7	3.0	10.7	4.0	Yes	-
-	-	506.666*	Rectangular	31.3	377.0	388.6	11.5	5.3	6.2	6.3	No	391.5	14.5	3.0	11.5	4.0	Yes	-
-	-	505.555*	Rectangular	31.3	376.8	389.1	12.4	5.3	7.1	6.3	Yes	392.0	15.3	3.0	12.3	4.0	Yes	-
-	-	504.444*	Rectangular	31.2	376.5	389.7	13.2	5.3	7.9	6.3	Yes	392.6	16.0	3.0	13.0	4.0	Yes	-
-	-	503.333*	Rectangular	31.2	376.3	390.2	14.0	5.3	8.7	6.3	Yes	393.1	16.8	3.0	13.8	4.0	Yes	-
-	-	502.222*	Rectangular	31.1	376.0	390.8	14.8	5.3	9.5	6.3	Yes	393.6	17.6	3.0	14.6	4.0	Yes	-
-	-	501.111*	Rectangular	31.0	375.7	391.3	15.6	5.3	10.3	6.3	Yes	394.1	18.4	3.0	15.4	4.0	Yes	-
-	-	500	Rectangular	31.0	375.5	391.9	16.4	5.3	11.1	6.3	Yes	394.7	19.2	3.0	16.2	4.0	Yes	-
-	-	495.*	Rectangular	31.0	375.3	393.3	18.0	5.3	12.7	6.3	Yes	393.4	18.1	3.0	15.1	4.0	Yes	-
-	-	490	Rectangular	31.0	375.1	394.8	19.7	5.3	14.4	6.3	Yes	392.1	17.0	3.0	14.0	4.0	Yes	-
-	-	480	Rectangular	30.8	375.0	389.8	14.7	5.3	9.4	6.3	Yes	390.8	15.8	3.0	12.8	4.0	Yes	-
-	-	470	Rectangular	30.8	374.9	387.0	12.1	5.3	6.8	6.3	Yes	387.8	12.9	3.0	9.9	4.0	Yes	-
31	Right	460	Rectangular	30.8	374.8	384.0	9.2	5.3	3.9	6.3	No	387.8	13.0	0.0	13.0	2.0	Yes	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
31	Right	458.*	Trapezoidal	31.2	374.2	384.0	9.9	5.3	4.6	6.3	No	387.6	13.5	0.0	13.5	2.5	Yes	-
31	Right	456.*	Trapezoidal	31.2	373.9	384.1	10.2	5.3	4.9	6.3	No	387.5	13.6	0.0	13.6	2.5	Yes	-
31	Right	454.*	Trapezoidal	31.0	373.7	384.1	10.4	5.3	5.1	6.3	No	387.3	13.6	0.0	13.6	2.5	Yes	-
31	Right	452.*	Trapezoidal	31.0	373.4	384.1	10.7	5.3	5.4	6.3	No	387.2	13.8	0.0	13.8	2.5	Yes	-
31	Right	450	Trapezoidal	31.2	372.9	384.2	11.3	5.3	6.0	6.3	No	387.0	14.1	0.0	14.1	2.5	Yes	-
31	Right	440	Trapezoidal	31.0	372.7	383.9	11.2	5.3	5.9	6.3	No	386.8	14.1	0.0	14.1	2.5	Yes	-
31	Right	430	Trapezoidal	30.8	372.8	383.9	11.2	5.3	5.9	6.3	No	382.8	10.0	0.0	10.0	2.5	Yes	-
31	Right	426.666*	Trapezoidal	30.8	372.5	384.0	11.5	5.3	6.2	6.3	No	382.7	10.2	0.0	10.2	2.5	Yes	-
31	Right	423.333*	Trapezoidal	30.8	372.3	384.1	11.8	5.3	6.5	6.3	Yes	382.6	10.2	0.0	10.2	2.5	Yes	-
31	Right	420	Trapezoidal	30.6	372.2	384.3	12.1	5.3	6.8	6.3	Yes	382.5	10.3	0.0	10.3	2.5	Yes	-
-	-	410	Trapezoidal	30.1	372.2	384.3	12.1	5.3	6.8	6.3	Yes	384.3	12.1	0.0	12.1	2.5	Yes	-
-	-	409.473*	Trapezoidal	30.0	372.0	383.8	11.8	5.3	6.5	6.3	Yes	383.8	11.8	0.0	11.8	2.5	Yes	-
-	-	408.947*	Trapezoidal	29.8	371.8	383.3	11.5	5.3	6.2	6.3	No	383.3	11.5	0.0	11.5	2.5	Yes	-
-	-	408.421*	Trapezoidal	29.7	371.6	382.8	11.2	5.3	5.9	6.3	No	382.8	11.2	0.0	11.2	2.5	Yes	-
-	-	407.894*	Trapezoidal	29.5	371.4	382.3	10.9	5.3	5.6	6.3	No	382.3	10.9	0.0	10.9	2.5	Yes	-
-	-	407.368*	Trapezoidal	29.4	371.2	381.8	10.6	5.3	5.3	6.3	No	381.8	10.6	0.0	10.6	2.5	Yes	-
-	-	406.842*	Trapezoidal	29.3	371.0	381.3	10.3	5.3	5.0	6.3	No	381.3	10.3	0.0	10.3	2.5	Yes	-
-	-	406.315*	Trapezoidal	29.2	370.8	380.8	10.0	5.3	4.7	6.3	No	380.8	10.0	0.0	10.0	2.5	Yes	-
-	-	405.789*	Trapezoidal	29.1	370.6	380.3	9.7	5.3	4.4	6.3	No	380.3	9.7	0.0	9.7	2.5	Yes	-
-	-	405.263*	Trapezoidal	29.0	370.4	379.8	9.4	5.3	4.1	6.3	No	379.8	9.4	0.0	9.4	2.5	Yes	-
-	-	404.736*	Trapezoidal	28.9	370.2	379.3	9.1	5.3	3.8	6.3	No	379.3	9.1	0.0	9.1	2.5	Yes	-
-	-	404.210*	Trapezoidal	28.8	370.0	378.8	8.9	5.3	3.6	6.3	No	378.8	8.9	0.0	8.9	2.5	Yes	-
-	-	403.684*	Trapezoidal	28.7	369.8	378.3	8.6	5.3	3.3	6.3	No	378.3	8.6	0.0	8.6	2.5	Yes	-
-	-	403.157*	Trapezoidal	28.7	369.5	377.8	8.3	5.3	3.0	6.3	No	377.8	8.3	0.0	8.3	2.5	Yes	-
-	-	402.631*	Trapezoidal	28.6	369.3	377.3	8.0	5.3	2.7	6.3	No	377.3	8.0	0.0	8.0	2.5	Yes	-
-	-	402.105*	Trapezoidal	28.5	369.1	376.8	7.8	5.3	2.5	6.3	No	376.8	7.8	0.0	7.8	2.5	Yes	-
-	-	401.578*	Trapezoidal	28.5	368.8	376.3	7.5	5.3	2.2	6.3	No	376.3	7.5	0.0	7.5	2.5	Yes	-
-	-	401.052*	Trapezoidal	28.4	368.6	375.8	7.2	5.3	1.9	6.3	No	375.8	7.2	0.0	7.2	2.5	Yes	-
-	-	400.526*	Trapezoidal	28.4	368.4	375.4	7.0	5.3	1.7	6.3	No	375.4	7.0	0.0	7.0	2.5	Yes	-
-	-	400	Trapezoidal	28.3	368.2	374.9	6.7	5.3	1.4	6.3	No	374.9	6.7	0.0	6.7	2.5	Yes	-
-	-	395.*	Trapezoidal	28.3	368.1	374.7	6.7	5.3	1.4	6.3	No	374.7	6.7	0.0	6.7	2.5	Yes	-
-	-	390	Trapezoidal	28.2	367.9	374.6	6.6	5.3	1.3	6.3	No	374.6	6.6	0.0	6.6	2.5	Yes	-
-	-	387.5*	Trapezoidal	28.1	367.8	374.6	6.8	5.3	1.5	6.3	No	374.6	6.8	0.0	6.8	2.5	Yes	-
-	-	385.*	Trapezoidal	27.9	367.7	374.6	6.9	5.3	1.6	6.3	No	374.6	6.9	0.0	6.9	2.5	Yes	-
-	-	382.5*	Trapezoidal	27.8	367.5	374.6	7.1	5.3	1.8	6.3	No	374.6	7.1	0.0	7.1	2.5	Yes	-
32	Right	380	Trapezoidal	27.7	367.4	374.6	7.2	5.3	1.9	6.3	No	374.6	7.2	0.0	7.2	2.5	Yes	-
32	Right	379.791*	Trapezoidal	27.7	367.1	374.4	7.2	5.3	1.9	6.3	No	374.4	7.2	0.0	7.2	2.5	Yes	-
32	Right	379.583*	Trapezoidal	27.6	366.9	374.2	7.3	5.3	2.0	6.3	No	374.2	7.3	0.0	7.3	2.5	Yes	-
32	Right	379.375*	Trapezoidal	27.6	366.7	374.0	7.3	5.3	2.0	6.3	No	374.0	7.3	0.0	7.3	2.5	Yes	-
32	Right	379.166*	Trapezoidal	27.5	366.5	373.8	7.3	5.3	2.0	6.3	No	373.8	7.3	0.0	7.3	2.5	Yes	-
32	Right	378.958*	Trapezoidal	27.5	366.3	373.6	7.4	5.3	2.1	6.3	No	373.6	7.4	0.0	7.4	2.5	Yes	-
32	Right	378.75*	Trapezoidal	27.5	366.1	373.4	7.4	5.3	2.1	6.3	No	373.4	7.4	0.0	7.4	2.5	Yes	-
32	Right	378.541*	Trapezoidal	27.4	365.8	373.3	7.4	5.3	2.1	6.3	No	373.3	7.4	0.0	7.4	2.5	Yes	-
32	Right	378.333*	Trapezoidal	27.4	365.6	373.1	7.5	5.3	2.2	6.3	No	373.1	7.5	0.0	7.5	2.5	Yes	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
32	Right	378.125*	Trapezoidal	27.4	365.4	372.9	7.5	5.3	2.2	6.3	No	372.9	7.5	0.0	7.5	2.5	Yes	-
32	Right	377.916*	Trapezoidal	27.4	365.2	372.7	7.5	5.3	2.2	6.3	No	372.7	7.5	0.0	7.5	2.5	Yes	-
32	Right	377.708*	Trapezoidal	27.3	364.9	372.5	7.6	5.3	2.3	6.3	No	372.5	7.6	0.0	7.6	2.5	Yes	-
32	Right	377.5*	Trapezoidal	27.3	364.7	372.3	7.6	5.3	2.3	6.3	No	372.3	7.6	0.0	7.6	2.5	Yes	-
32	Right	377.291*	Trapezoidal	27.3	364.5	372.1	7.7	5.3	2.4	6.3	No	372.1	7.7	0.0	7.7	2.5	Yes	-
32	Right	377.083*	Trapezoidal	27.3	364.3	371.9	7.7	5.3	2.4	6.3	No	371.9	7.7	0.0	7.7	2.5	Yes	-
32	Right	376.875*	Trapezoidal	27.3	364.0	371.8	7.7	5.3	2.4	6.3	No	371.8	7.7	0.0	7.7	2.5	Yes	-
32	Right	376.666*	Trapezoidal	27.3	363.8	371.6	7.8	5.3	2.5	6.3	No	371.6	7.8	0.0	7.8	2.5	Yes	-
32	Right	376.458*	Trapezoidal	27.2	363.6	371.4	7.8	5.3	2.5	6.3	No	371.4	7.8	0.0	7.8	2.5	Yes	-
32	Right	376.25*	Trapezoidal	27.2	363.3	371.2	7.9	5.3	2.6	6.3	No	371.2	7.9	0.0	7.9	2.5	Yes	-
32	Right	376.041*	Trapezoidal	27.2	363.1	371.0	7.9	5.3	2.6	6.3	No	371.0	7.9	0.0	7.9	2.5	Yes	-
32	Right	375.833*	Trapezoidal	27.2	362.9	370.8	7.9	5.3	2.6	6.3	No	370.8	7.9	0.0	7.9	2.5	Yes	-
32	Right	375.625*	Trapezoidal	27.2	362.7	370.6	8.0	5.3	2.7	6.3	No	370.6	8.0	0.0	8.0	2.5	Yes	-
32	Right	375.416*	Trapezoidal	27.2	362.4	370.4	8.0	5.3	2.7	6.3	No	370.4	8.0	0.0	8.0	2.5	Yes	-
32	Right	375.208*	Trapezoidal	27.2	362.2	370.3	8.1	5.3	2.8	6.3	No	370.3	8.1	0.0	8.1	2.5	Yes	-
32	Right	375.*	Trapezoidal	27.2	362.0	370.1	8.1	5.3	2.8	6.3	No	370.1	8.1	0.0	8.1	2.5	Yes	-
32	Right	374.791*	Trapezoidal	27.2	361.7	369.9	8.1	5.3	2.8	6.3	No	369.9	8.1	0.0	8.1	2.5	Yes	-
32	Right	374.583*	Trapezoidal	27.2	361.5	369.7	8.2	5.3	2.9	6.3	No	369.7	8.2	0.0	8.2	2.5	Yes	-
32	Right	374.375*	Trapezoidal	27.2	361.3	369.5	8.2	2.6	5.6	3.6	Yes	369.5	8.2	0.0	8.2	2.5	Yes	-
32	Right	374.166*	Trapezoidal	27.2	361.0	369.3	8.3	2.6	5.7	3.6	Yes	369.3	8.3	0.0	8.3	2.5	Yes	-
32	Right	373.958*	Trapezoidal	27.2	360.8	369.1	8.3	2.6	5.7	3.6	Yes	369.1	8.3	0.0	8.3	2.5	Yes	-
32	Right	373.75*	Trapezoidal	27.2	360.6	368.9	8.4	2.6	5.8	3.6	Yes	368.9	8.4	0.0	8.4	2.5	Yes	-
32	Right	373.541*	Trapezoidal	27.2	360.3	368.7	8.4	2.6	5.8	3.6	Yes	368.7	8.4	0.0	8.4	2.5	Yes	-
32	Right	373.333*	Trapezoidal	27.2	360.1	368.6	8.5	2.6	5.9	3.6	Yes	368.6	8.5	0.0	8.5	2.5	Yes	-
32	Right	373.125*	Trapezoidal	27.2	359.9	368.4	8.5	2.6	5.9	3.6	Yes	368.4	8.5	0.0	8.5	2.5	Yes	-
32	Right	372.916*	Trapezoidal	27.2	359.6	368.2	8.6	2.6	6.0	3.6	Yes	368.2	8.6	0.0	8.6	2.5	Yes	-
32	Right	372.708*	Trapezoidal	27.2	359.4	368.0	8.6	2.6	6.0	3.6	Yes	368.0	8.6	0.0	8.6	2.5	Yes	-
32	Right	372.5*	Trapezoidal	27.2	359.2	367.8	8.6	2.6	6.0	3.6	Yes	367.8	8.6	0.0	8.6	2.5	Yes	-
32	Right	372.291*	Trapezoidal	27.2	358.9	367.6	8.7	2.6	6.1	3.6	Yes	367.6	8.7	0.0	8.7	2.5	Yes	-
32	Right	372.083*	Trapezoidal	27.2	358.7	367.4	8.7	2.6	6.1	3.6	Yes	367.4	8.7	0.0	8.7	2.5	Yes	-
32	Right	371.875*	Trapezoidal	27.2	358.5	367.2	8.8	2.6	6.2	3.6	Yes	367.2	8.8	0.0	8.8	2.5	Yes	-
32	Right	371.666*	Trapezoidal	27.2	358.2	367.1	8.8	2.6	6.2	3.6	Yes	367.1	8.8	0.0	8.8	2.5	Yes	-
32	Right	371.458*	Trapezoidal	27.2	358.0	366.9	8.9	2.6	6.3	3.6	Yes	366.9	8.9	0.0	8.9	2.5	Yes	-
32	Right	371.25*	Trapezoidal	27.2	357.8	366.7	8.9	2.6	6.3	3.6	Yes	366.7	8.9	0.0	8.9	2.5	Yes	-
32	Right	371.041*	Trapezoidal	27.2	357.5	366.5	9.0	2.6	6.4	3.6	Yes	366.5	9.0	0.0	9.0	2.5	Yes	-
32	Right	370.833*	Trapezoidal	27.2	357.3	366.3	9.0	2.6	6.4	3.6	Yes	366.3	9.0	0.0	9.0	2.5	Yes	-
32	Right	370.625*	Trapezoidal	27.2	357.1	366.1	9.0	2.6	6.4	3.6	Yes	366.1	9.0	0.0	9.0	2.5	Yes	-
32	Right	370.416*	Trapezoidal	27.2	356.8	365.9	9.1	2.6	6.5	3.6	Yes	365.9	9.1	0.0	9.1	2.5	Yes	-
32	Right	370.208*	Trapezoidal	27.2	356.6	365.7	9.1	2.6	6.5	3.6	Yes	365.7	9.1	0.0	9.1	2.5	Yes	-
32	Right	370	Trapezoidal	27.2	356.4	365.6	9.2	2.6	6.6	3.6	Yes	365.6	9.2	0.0	9.2	2.5	Yes	-
33	Right	368.333*	Trapezoidal	27.5	355.9	365.2	9.3	2.6	6.7	3.6	Yes	366.4	10.6	0.0	10.6	2.5	Yes	-
33	Right	366.666*	Trapezoidal	27.8	355.4	364.8	9.5	2.6	6.9	3.6	Yes	367.3	11.9	0.0	11.9	2.5	Yes	-
33	Right	365.*	Trapezoidal	28.0	354.8	364.4	9.6	2.6	7.0	3.6	Yes	368.1	13.3	0.0	13.3	2.5	Yes	-
33	Right	363.333*	Trapezoidal	28.3	354.3	364.1	9.7	2.6	7.1	3.6	Yes	369.0	14.7	0.0	14.7	2.5	Yes	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
33	Right	361.666*	Trapezoidal	28.5	353.8	363.7	9.9	2.6	7.3	3.6	Yes	369.9	16.0	0.0	16.0	2.5	Yes	-
33	Right	360	Trapezoidal	28.8	353.3	363.3	10.0	2.6	7.4	3.6	Yes	370.7	17.4	0.0	17.4	2.5	Yes	-
33	Right	358.571*	Trapezoidal	28.9	352.9	363.0	10.1	2.6	7.5	3.6	Yes	370.1	17.2	0.0	17.2	2.5	Yes	-
33	Right	357.142*	Trapezoidal	29.1	352.5	362.6	10.1	2.6	7.5	3.6	Yes	369.4	17.0	0.0	17.0	2.5	Yes	-
33	Right	355.714*	Trapezoidal	29.3	352.0	362.3	10.2	2.6	7.6	3.6	Yes	368.8	16.7	0.0	16.7	2.5	Yes	-
33	Right	354.285*	Trapezoidal	29.4	351.6	361.9	10.3	2.6	7.7	3.6	Yes	368.1	16.5	0.0	16.5	2.5	Yes	-
33	Right	352.857*	Trapezoidal	29.6	351.2	361.5	10.4	2.6	7.8	3.6	Yes	367.5	16.3	0.0	16.3	2.5	Yes	-
33	Right	351.428*	Trapezoidal	29.7	350.8	361.2	10.4	2.6	7.8	3.6	Yes	366.8	16.1	0.0	16.1	2.5	Yes	-
33	Right	350	Trapezoidal	29.8	350.3	360.8	10.5	2.6	7.9	3.6	Yes	366.2	15.9	0.0	15.9	2.5	Yes	-
33	Right	349.090*	Trapezoidal	29.8	350.1	360.6	10.5	2.6	7.9	3.6	Yes	365.5	15.4	0.0	15.4	2.5	Yes	-
33	Right	348.181*	Trapezoidal	29.8	349.8	360.4	10.6	2.6	8.0	3.6	Yes	364.8	15.0	0.0	15.0	2.5	Yes	-
33	Right	347.272*	Trapezoidal	29.8	349.4	360.1	10.7	2.6	8.1	3.6	Yes	364.1	14.7	0.0	14.7	2.5	Yes	-
33	Right	346.363*	Trapezoidal	29.9	349.1	359.9	10.8	2.6	8.2	3.6	Yes	363.4	14.4	0.0	14.4	2.5	Yes	-
33	Right	345.454*	Trapezoidal	30.0	348.6	359.6	11.0	2.6	8.4	3.6	Yes	362.7	14.1	0.0	14.1	2.5	Yes	-
33	Right	344.545*	Trapezoidal	30.2	348.1	359.4	11.3	2.6	8.7	3.6	Yes	362.1	13.9	0.0	13.9	2.5	Yes	-
33	Right	343.636*	Trapezoidal	30.4	347.6	359.2	11.5	2.6	8.9	3.6	Yes	361.4	13.7	0.0	13.7	2.5	Yes	-
33	Right	342.727*	Trapezoidal	30.5	347.2	358.9	11.7	2.6	9.1	3.6	Yes	360.7	13.5	0.0	13.5	2.5	Yes	-
33	Right	341.818*	Trapezoidal	30.6	346.7	358.7	11.9	2.6	9.3	3.6	Yes	360.0	13.2	0.0	13.2	2.5	Yes	-
33	Right	340.909*	Trapezoidal	30.7	346.4	358.4	12.1	2.6	9.5	3.6	Yes	359.3	13.0	0.0	13.0	2.5	Yes	-
33	Right	340	Trapezoidal	30.7	346.0	358.2	12.2	2.6	9.6	3.6	Yes	358.6	12.6	0.0	12.6	2.5	Yes	-
-	-	335.*	Trapezoidal	30.3	346.0	357.2	11.2	2.6	8.6	3.6	Yes	358.0	12.0	1.2	10.8	2.5	Yes	-
-	-	330	Trapezoidal	30.3	345.7	356.2	10.5	2.6	7.9	3.6	Yes	357.4	11.7	1.2	10.5	2.5	Yes	-
-	-	325.*	Trapezoidal	30.3	345.5	360.6	15.1	2.6	12.5	3.6	Yes	356.9	11.4	1.2	10.2	2.5	Yes	-
-	-	320	Rectangular	30.3	345.3	365.0	19.7	2.6	17.1	3.6	Yes	356.5	11.2	1.2	10.0	2.2	Yes	-
-	-	315.*	Rectangular	30.2	345.2	369.4	24.2	2.6	21.6	3.6	Yes	356.0	10.8	1.2	9.6	2.2	Yes	-
-	-	310	Rectangular	30.1	345.1	373.7	28.7	2.6	26.1	3.6	Yes	355.6	10.5	1.2	9.3	2.2	Yes	-
-	-	306.666*	Rectangular	30.1	344.9	373.4	28.5	2.6	25.9	3.6	Yes	355.1	10.2	1.2	9.0	2.2	Yes	-
-	-	303.333*	Rectangular	30.1	344.7	373.0	28.3	2.6	25.7	3.6	Yes	354.5	9.8	1.2	8.6	2.2	Yes	-
-	-	300	Rectangular	30.1	344.5	372.7	28.2	2.6	25.6	3.6	Yes	354.0	9.5	1.2	8.3	2.2	Yes	-
-	-	295.*	Rectangular	30.2	344.3	372.3	28.0	2.6	25.4	3.6	Yes	353.8	9.5	1.2	8.3	2.2	Yes	-
-	-	290	Rectangular	30.2	344.1	372.0	27.9	2.6	25.3	3.6	Yes	353.6	9.6	1.2	8.4	2.2	Yes	-
-	-	280	Rectangular	30.3	343.8	359.4	15.6	2.6	13.0	3.6	Yes	353.4	9.6	1.2	8.4	2.2	Yes	-
-	-	270	Rectangular	30.3	343.6	359.2	15.6	2.6	13.0	3.6	Yes	353.2	9.6	1.2	8.4	2.2	Yes	-
-	-	268.333*	Rectangular	30.4	343.4	359.0	15.6	2.6	13.0	3.6	Yes	353.0	9.6	1.2	8.4	2.2	Yes	-
-	-	266.666*	Rectangular	30.4	343.1	358.8	15.6	2.6	13.0	3.6	Yes	352.7	9.6	1.2	8.4	2.2	Yes	-
-	-	265.*	Rectangular	30.4	342.9	358.5	15.6	2.6	13.0	3.6	Yes	352.5	9.6	1.2	8.4	2.2	Yes	-
-	-	263.333*	Rectangular	30.4	342.7	358.3	15.6	2.6	13.0	3.6	Yes	352.3	9.6	1.2	8.4	2.2	Yes	-
-	-	261.666*	Rectangular	30.5	342.5	358.1	15.6	2.6	13.0	3.6	Yes	352.1	9.6	1.2	8.4	2.2	Yes	-
-	-	260	Rectangular	30.5	342.2	357.9	15.6	2.6	13.0	3.6	Yes	351.8	9.6	1.2	8.4	2.2	Yes	-
-	-	255.*	Rectangular	30.6	342.0	354.1	12.2	2.6	9.6	3.6	Yes	351.6	9.7	1.2	8.5	2.2	Yes	-
34	Left	250	Rectangular	30.7	341.7	350.4	8.7	0.0	8.7	2.0	Yes	351.4	9.7	1.2	8.5	2.2	Yes	-
34	Left	249.285*	Rectangular	30.7	341.4	350.1	8.7	0.0	8.7	2.0	Yes	351.1	9.7	1.2	8.5	2.2	Yes	-
34	Left	248.571*	Rectangular	30.8	341.1	349.9	8.8	0.0	8.8	2.0	Yes	350.9	9.8	1.2	8.6	2.2	Yes	-
34	Left	247.857*	Rectangular	30.8	340.8	349.6	8.8	0.0	8.8	2.0	Yes	350.6	9.8	1.2	8.6	2.2	Yes	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Supreleva-tion at LOB (ft) [5]	LOB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Supereleva-tion (ft) [4]	Calculated Supreleva-tion at ROB (ft) [5]	ROB Freeboard After Supereleva-tion (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Require-ments Being Met?	Area of Concern #
34	Left	247.142*	Rectangular	30.8	340.6	349.3	8.8	0.0	8.8	2.0	Yes	350.3	9.8	1.2	8.6	2.2	Yes	-
34	Left	246.428*	Rectangular	30.9	340.3	349.1	8.8	0.0	8.8	2.0	Yes	350.1	9.8	1.2	8.6	2.2	Yes	-
34	Left	245.714*	Rectangular	30.9	340.0	348.8	8.8	0.0	8.8	2.0	Yes	349.8	9.8	1.2	8.6	2.2	Yes	-
34	Left	245.*	Rectangular	30.9	339.7	348.5	8.8	0.0	8.8	2.0	Yes	349.5	9.8	1.2	8.6	2.2	Yes	-
34	Left	244.285*	Rectangular	31.0	339.4	348.3	8.8	0.0	8.8	2.0	Yes	349.3	9.8	1.2	8.6	2.2	Yes	-
34	Left	243.571*	Rectangular	31.0	339.2	348.0	8.8	0.0	8.8	2.0	Yes	349.0	9.8	1.2	8.6	2.2	Yes	-
34	Left	242.857*	Rectangular	31.1	338.9	347.7	8.9	0.0	8.9	2.0	Yes	348.7	9.9	1.2	8.7	2.2	Yes	-
34	Left	242.142*	Rectangular	31.1	338.6	347.5	8.9	0.0	8.9	2.0	Yes	348.5	9.9	1.4	8.5	2.4	Yes	-
34	Left	241.428*	Rectangular	31.1	338.3	347.2	8.9	0.0	8.9	2.0	Yes	348.2	9.9	1.4	8.5	2.4	Yes	-
34	Left	240.714*	Rectangular	31.1	338.1	346.9	8.9	0.0	8.9	2.0	Yes	347.9	9.9	1.4	8.5	2.4	Yes	-
34	Left	240	Rectangular	31.2	337.8	346.7	8.9	0.0	8.9	2.0	Yes	347.7	9.9	1.4	8.5	2.4	Yes	-
-	-	239.230*	Rectangular	31.2	337.5	346.4	8.9	0.0	8.9	2.0	Yes	347.4	9.9	1.4	8.5	2.4	Yes	-
-	-	238.461*	Rectangular	31.2	337.2	346.1	8.9	0.0	8.9	2.0	Yes	347.1	9.9	1.4	8.5	2.4	Yes	-
-	-	237.692*	Rectangular	31.3	336.9	345.9	8.9	0.0	8.9	2.0	Yes	346.9	9.9	1.4	8.5	2.4	Yes	-
-	-	236.923*	Rectangular	31.3	336.7	345.6	8.9	0.0	8.9	2.0	Yes	346.6	9.9	1.4	8.5	2.4	Yes	-
-	-	236.153*	Rectangular	31.3	336.4	345.3	8.9	0.0	8.9	2.0	Yes	346.3	9.9	1.4	8.5	2.4	Yes	-
-	-	235.384*	Rectangular	31.4	336.1	345.0	9.0	0.0	9.0	2.0	Yes	346.0	10.0	1.4	8.6	2.4	Yes	-
-	-	234.615*	Rectangular	31.4	335.8	344.8	9.0	0.0	9.0	2.0	Yes	345.8	10.0	1.4	8.6	2.4	Yes	-
-	-	233.846*	Rectangular	31.4	335.5	344.5	9.0	0.0	9.0	2.0	Yes	345.5	10.0	1.4	8.6	2.4	Yes	-
-	-	233.076*	Rectangular	31.4	335.3	344.2	9.0	0.0	9.0	2.0	Yes	345.2	10.0	1.4	8.6	2.4	Yes	-
-	-	232.307*	Rectangular	31.5	335.0	344.0	9.0	0.0	9.0	2.0	Yes	345.0	10.0	1.4	8.6	2.4	Yes	-
-	-	231.538*	Rectangular	31.5	334.7	343.7	9.0	0.0	9.0	2.0	Yes	344.7	10.0	1.4	8.6	2.4	Yes	-
-	-	230.769*	Rectangular	31.5	334.4	343.4	9.0	0.0	9.0	2.0	Yes	344.4	10.0	1.4	8.6	2.4	Yes	-
-	-	230	Rectangular	31.5	334.1	343.2	9.0	0.0	9.0	2.0	Yes	344.2	10.0	1.4	8.6	2.4	Yes	-
-	-	229.166*	Rectangular	31.5	333.9	342.9	9.0	0.0	9.0	2.0	Yes	343.9	10.0	1.4	8.6	2.4	Yes	-
-	-	228.333*	Rectangular	31.6	333.6	342.6	9.0	0.0	9.0	2.0	Yes	343.6	10.0	1.4	8.6	2.4	Yes	-
-	-	227.5*	Rectangular	31.6	333.4	342.4	9.0	0.0	9.0	2.0	Yes	343.4	10.0	1.4	8.6	2.4	Yes	-
-	-	226.666*	Rectangular	31.6	333.1	342.1	9.0	0.0	9.0	2.0	Yes	343.1	10.0	1.4	8.6	2.4	Yes	-
-	-	225.833*	Rectangular	31.6	332.8	341.9	9.0	0.0	9.0	2.0	Yes	342.9	10.0	1.4	8.6	2.4	Yes	-
-	-	225.*	Rectangular	31.6	332.6	341.6	9.0	0.0	9.0	2.0	Yes	342.6	10.0	1.4	8.6	2.4	Yes	-
-	-	224.166*	Rectangular	31.6	332.3	341.4	9.0	0.0	9.0	2.0	Yes	342.4	10.0	1.4	8.6	2.4	Yes	-
-	-	223.333*	Rectangular	31.6	332.1	341.1	9.0	0.0	9.0	2.0	Yes	342.1	10.0	1.4	8.6	2.4	Yes	-
-	-	222.5*	Rectangular	31.7	331.8	340.8	9.0	0.0	9.0	2.0	Yes	341.8	10.0	1.4	8.6	2.4	Yes	-
-	-	221.666*	Rectangular	31.7	331.5	340.6	9.1	0.0	9.1	2.0	Yes	341.6	10.1	1.4	8.7	2.4	Yes	-
-	-	220.833*	Rectangular	31.7	331.3	340.3	9.1	0.0	9.1	2.0	Yes	341.3	10.1	1.4	8.7	2.4	Yes	-
-	-	220	Rectangular	31.7	331.0	340.1	9.1	0.0	9.1	2.0	Yes	341.1	10.1	1.4	8.7	2.4	Yes	-
-	-	219.090*	Trapezoidal	31.7	330.8	339.8	9.0	0.0	9.0	2.5	Yes	340.8	10.1	1.4	8.7	2.5	Yes	-
-	-	218.181*	Trapezoidal	31.6	330.6	339.6	9.0	0.0	9.0	2.5	Yes	340.6	10.0	1.4	8.6	2.5	Yes	-
-	-	217.272*	Trapezoidal	31.5	330.4	339.3	8.9	0.0	8.9	2.5	Yes	340.3	9.9	1.4	8.5	2.5	Yes	-
-	-	216.363*	Trapezoidal	31.3	330.3	339.1	8.7	0.0	8.7	2.5	Yes	340.1	9.8	1.4	8.4	2.5	Yes	-
-	-	215.454*	Trapezoidal	31.1	330.2	338.8	8.6	0.0	8.6	2.5	Yes	339.8	9.6	1.4	8.2	2.5	Yes	-
-	-	214.545*	Trapezoidal	30.8	330.2	338.5	8.4	0.0	8.4	2.5	Yes	339.6	9.4	1.4	8.0	2.5	Yes	-
-	-	213.636*	Trapezoidal	30.6	330.1	338.3	8.2	0.0	8.2	2.5	Yes	339.4	9.3	1.4	7.9	2.5	Yes	-
-	-	212.727*	Trapezoidal	30.5	329.9	338.0	8.1	0.0	8.1	2.5	Yes	339.1	9.2	1.4	7.8	2.5	Yes	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
-	-	211.818*	Trapezoidal	30.6	329.7	337.8	8.1	0.0	8.1	2.5	Yes	338.9	9.2	1.4	7.8	2.5	Yes	-
-	-	210.909*	Trapezoidal	30.6	329.4	337.5	8.1	0.0	8.1	2.5	Yes	338.6	9.2	1.4	7.8	2.5	Yes	-
35	Left	210	Trapezoidal	30.6	329.2	337.3	8.1	0.0	8.1	2.5	Yes	338.4	9.2	1.4	7.8	2.5	Yes	-
35	Left	209.*	Trapezoidal	30.7	328.9	337.0	8.1	0.0	8.1	2.5	Yes	338.0	9.1	1.4	7.7	2.5	Yes	-
35	Left	208.*	Trapezoidal	30.7	328.7	336.8	8.1	0.0	8.1	2.5	Yes	337.6	9.0	1.4	7.6	2.5	Yes	-
35	Left	207.*	Trapezoidal	30.6	328.5	336.5	8.0	0.0	8.0	2.5	Yes	337.3	8.8	1.4	7.4	2.5	Yes	-
35	Left	206.*	Trapezoidal	30.5	328.3	336.2	7.9	0.0	7.9	2.5	Yes	336.9	8.6	1.4	7.2	2.5	Yes	-
35	Left	205.*	Trapezoidal	30.3	328.2	336.0	7.7	0.0	7.7	2.5	Yes	336.5	8.3	1.4	6.9	2.5	Yes	-
35	Left	204.*	Trapezoidal	30.1	328.1	335.7	7.6	0.0	7.6	2.5	Yes	336.1	8.0	1.4	6.6	2.5	Yes	-
35	Left	203.*	Trapezoidal	29.9	328.0	335.4	7.4	0.0	7.4	2.5	Yes	335.8	7.8	1.4	6.4	2.5	Yes	-
35	Left	202.*	Trapezoidal	29.9	327.8	335.2	7.4	0.0	7.4	2.5	Yes	335.4	7.6	1.4	6.2	2.5	Yes	-
35	Left	201.*	Trapezoidal	30.0	327.6	334.9	7.4	0.0	7.4	2.5	Yes	335.0	7.5	1.4	6.1	2.5	Yes	-
35	Left	200	Trapezoidal	30.0	327.3	334.7	7.3	0.0	7.3	2.5	Yes	334.7	7.3	1.4	5.9	2.5	Yes	-
-	-	199.583*	Trapezoidal	30.1	327.0	334.4	7.4	0.0	7.4	2.5	Yes	334.4	7.4	1.4	6.0	2.5	Yes	-
-	-	199.166*	Trapezoidal	30.2	326.7	334.1	7.4	0.0	7.4	2.5	Yes	334.1	7.4	1.4	6.0	2.5	Yes	-
-	-	198.75*	Trapezoidal	30.2	326.4	333.9	7.4	0.0	7.4	2.5	Yes	333.9	7.4	1.4	6.0	2.5	Yes	-
-	-	198.333*	Trapezoidal	30.3	326.1	333.6	7.4	0.0	7.4	2.5	Yes	333.6	7.4	1.4	6.0	2.5	Yes	-
-	-	197.916*	Trapezoidal	30.4	325.8	333.3	7.5	0.0	7.5	2.5	Yes	333.3	7.5	1.4	6.1	2.5	Yes	-
-	-	197.5*	Trapezoidal	30.4	325.6	333.0	7.5	0.0	7.5	2.5	Yes	333.0	7.5	1.4	6.1	2.5	Yes	-
-	-	197.083*	Trapezoidal	30.5	325.3	332.8	7.5	0.0	7.5	2.5	Yes	332.8	7.5	1.4	6.1	2.5	Yes	-
-	-	196.666*	Trapezoidal	30.5	325.0	332.5	7.5	0.0	7.5	2.5	Yes	332.5	7.5	1.4	6.1	2.5	Yes	-
-	-	196.25*	Trapezoidal	30.6	324.7	332.2	7.6	0.0	7.6	2.5	Yes	332.2	7.6	1.4	6.2	2.5	Yes	-
-	-	195.833*	Trapezoidal	30.7	324.4	332.0	7.6	0.0	7.6	2.5	Yes	332.0	7.6	1.4	6.2	2.5	Yes	-
-	-	195.416*	Trapezoidal	30.7	324.1	331.7	7.6	0.0	7.6	2.5	Yes	331.7	7.6	1.4	6.2	2.5	Yes	-
-	-	195.*	Trapezoidal	30.8	323.8	331.4	7.6	0.0	7.6	2.5	Yes	331.4	7.6	1.4	6.2	2.5	Yes	-
-	-	194.583*	Trapezoidal	30.8	323.6	331.2	7.6	0.0	7.6	2.5	Yes	331.2	7.6	1.4	6.2	2.5	Yes	-
-	-	194.166*	Trapezoidal	30.9	323.3	330.9	7.6	0.0	7.6	2.5	Yes	330.9	7.6	1.4	6.2	2.5	Yes	-
-	-	193.75*	Trapezoidal	30.9	323.0	330.6	7.7	0.0	7.7	2.5	Yes	330.6	7.7	1.4	6.3	2.5	Yes	-
-	-	193.333*	Trapezoidal	30.9	322.7	330.4	7.7	0.0	7.7	2.5	Yes	330.4	7.7	1.4	6.3	2.5	Yes	-
-	-	192.916*	Trapezoidal	31.0	322.4	330.1	7.7	0.0	7.7	2.5	Yes	330.1	7.7	1.4	6.3	2.5	Yes	-
-	-	192.5*	Trapezoidal	31.0	322.1	329.8	7.7	0.0	7.7	2.5	Yes	329.8	7.7	1.4	6.3	2.5	Yes	-
-	-	192.083*	Trapezoidal	31.1	321.8	329.6	7.7	0.0	7.7	2.5	Yes	329.6	7.7	1.4	6.3	2.5	Yes	-
-	-	191.666*	Trapezoidal	31.1	321.6	329.3	7.7	0.0	7.7	2.5	Yes	329.3	7.7	1.4	6.3	2.5	Yes	-
-	-	191.25*	Trapezoidal	31.2	321.3	329.0	7.7	0.0	7.7	2.5	Yes	329.0	7.7	1.4	6.3	2.5	Yes	-
-	-	190.833*	Trapezoidal	31.2	321.0	328.8	7.8	0.0	7.8	2.5	Yes	328.8	7.8	1.4	6.4	2.5	Yes	-
-	-	190.416*	Trapezoidal	31.2	320.7	328.5	7.8	0.0	7.8	2.5	Yes	328.5	7.8	1.4	6.4	2.5	Yes	-
-	-	190	Trapezoidal	31.3	320.4	328.2	7.8	0.0	7.8	2.5	Yes	328.2	7.8	1.4	6.4	2.5	Yes	-
-	-	187.5*	Trapezoidal	31.2	320.3	328.0	7.7	0.0	7.7	2.5	Yes	328.0	7.7	1.4	6.3	2.5	Yes	-
-	-	185.*	Trapezoidal	31.1	320.1	327.7	7.6	0.0	7.6	2.5	Yes	327.7	7.6	1.4	6.2	2.5	Yes	-
-	-	182.5*	Trapezoidal	31.0	320.0	327.5	7.5	0.0	7.5	2.5	Yes	327.5	7.5	1.4	6.1	2.5	Yes	-
-	-	180	Trapezoidal	30.9	319.8	327.2	7.4	0.0	7.4	2.5	Yes	327.2	7.4	1.4	6.0	2.5	Yes	-
-	-	177.5*	Trapezoidal	30.9	319.6	327.0	7.4	0.0	7.4	2.5	Yes	327.0	7.4	1.4	6.0	2.5	Yes	-
-	-	175.*	Trapezoidal	30.9	319.4	326.8	7.4	0.0	7.4	2.5	Yes	326.8	7.4	1.4	6.0	2.5	Yes	-
-	-	172.5*	Trapezoidal	30.9	319.3	326.6	7.3	0.0	7.3	2.5	Yes	326.6	7.3	1.4	5.9	2.5	Yes	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	Area of Concern #
-	-	170	Trapezoidal	30.8	319.1	326.3	7.3	0.0	7.3	2.5	Yes	326.3	7.3	1.4	5.9	2.5	Yes	-
-	-	169.333*	Trapezoidal	30.9	318.8	326.1	7.3	0.0	7.3	2.5	Yes	326.1	7.3	1.4	5.9	2.5	Yes	-
-	-	168.666*	Trapezoidal	30.9	318.6	325.8	7.3	0.0	7.3	2.5	Yes	325.8	7.3	1.4	5.9	2.5	Yes	-
-	-	168.*	Trapezoidal	30.9	318.3	325.6	7.3	0.0	7.3	2.5	Yes	325.6	7.3	1.4	5.9	2.5	Yes	-
-	-	167.333*	Trapezoidal	31.0	318.0	325.3	7.3	0.0	7.3	2.5	Yes	325.3	7.3	1.4	5.9	2.5	Yes	-
-	-	166.666*	Trapezoidal	31.0	317.8	325.1	7.3	0.0	7.3	2.5	Yes	325.1	7.3	1.4	5.9	2.5	Yes	-
-	-	166.*	Trapezoidal	31.0	317.5	324.8	7.3	0.0	7.3	2.5	Yes	324.8	7.3	1.4	5.9	2.5	Yes	-
-	-	165.333*	Trapezoidal	31.1	317.2	324.6	7.3	0.0	7.3	2.5	Yes	324.6	7.3	1.4	5.9	2.5	Yes	-
-	-	164.666*	Trapezoidal	31.1	317.0	324.3	7.3	0.0	7.3	2.5	Yes	324.3	7.3	1.4	5.9	2.5	Yes	-
-	-	164.*	Trapezoidal	31.1	316.7	324.0	7.3	0.0	7.3	2.5	Yes	324.0	7.3	1.4	5.9	2.5	Yes	-
-	-	163.333*	Trapezoidal	31.1	316.5	323.8	7.3	0.0	7.3	2.5	Yes	323.8	7.3	1.4	5.9	2.5	Yes	-
-	-	162.666*	Trapezoidal	31.2	316.2	323.5	7.3	0.0	7.3	2.5	Yes	323.5	7.3	1.4	5.9	2.5	Yes	-
-	-	162.*	Trapezoidal	31.2	315.9	323.3	7.3	0.0	7.3	2.5	Yes	323.3	7.3	1.4	5.9	2.5	Yes	-
-	-	161.333*	Trapezoidal	31.2	315.7	323.0	7.4	0.0	7.4	2.5	Yes	323.0	7.4	1.4	6.0	2.5	Yes	-
-	-	160.666*	Trapezoidal	31.2	315.4	322.8	7.4	0.0	7.4	2.5	Yes	322.8	7.4	1.4	6.0	2.5	Yes	-
-	-	160	Trapezoidal	31.3	315.1	322.5	7.4	0.0	7.4	2.5	Yes	322.5	7.4	1.4	6.0	2.5	Yes	-
-	-	158.571*	Trapezoidal	31.3	314.9	322.5	7.6	0.0	7.6	2.5	Yes	322.5	7.6	0.0	7.6	2.5	Yes	-
-	-	157.142*	Trapezoidal	31.3	314.6	322.5	7.9	0.0	7.9	2.5	Yes	322.5	7.9	0.0	7.9	2.5	Yes	-
-	-	155.714*	Trapezoidal	31.3	314.3	322.5	8.2	0.0	8.2	2.5	Yes	322.5	8.2	0.0	8.2	2.5	Yes	-
-	-	154.285*	Trapezoidal	31.4	314.1	322.5	8.4	0.0	8.4	2.5	Yes	322.5	8.4	0.0	8.4	2.5	Yes	-
-	-	152.857*	Trapezoidal	31.4	313.8	322.5	8.7	0.0	8.7	2.5	Yes	322.5	8.7	0.0	8.7	2.5	Yes	-
-	-	151.428*	Trapezoidal	31.4	313.6	322.5	8.9	0.0	8.9	2.5	Yes	322.5	8.9	0.0	8.9	2.5	Yes	-
-	-	150	Trapezoidal	31.5	313.3	322.5	9.2	0.0	9.2	2.5	Yes	322.5	9.2	0.0	9.2	2.5	Yes	-
-	-	140	Trapezoidal	31.4	313.3	322.5	9.2	0.0	9.2	2.5	Yes	329.0	15.7	0.0	15.7	2.5	Yes	-
-	-	139.375*	Trapezoidal	31.4	313.1	322.5	9.4	0.0	9.4	2.5	Yes	329.0	16.0	0.0	16.0	2.5	Yes	-
-	-	138.75*	Trapezoidal	31.4	312.8	322.5	9.7	0.0	9.7	2.5	Yes	329.0	16.2	0.0	16.2	2.5	Yes	-
-	-	138.125*	Trapezoidal	31.4	312.5	322.5	10.0	0.0	10.0	2.5	Yes	329.0	16.5	0.0	16.5	2.5	Yes	-
-	-	137.5*	Trapezoidal	31.4	312.3	322.5	10.2	0.0	10.2	2.5	Yes	329.0	16.7	0.0	16.7	2.5	Yes	-
-	-	136.875*	Trapezoidal	31.4	312.0	322.5	10.5	0.0	10.5	2.5	Yes	329.0	17.0	0.0	17.0	2.5	Yes	-
-	-	136.25*	Trapezoidal	31.4	311.8	322.5	10.7	0.0	10.7	2.5	Yes	329.0	17.2	0.0	17.2	2.5	Yes	-
-	-	135.625*	Trapezoidal	31.5	311.5	322.5	11.0	0.0	11.0	2.5	Yes	329.0	17.5	0.0	17.5	2.5	Yes	-
-	-	135.*	Trapezoidal	31.5	311.2	322.5	11.3	0.0	11.3	2.5	Yes	329.0	17.8	2.2	15.6	3.2	Yes	-
-	-	134.375*	Trapezoidal	31.5	311.0	322.5	11.5	0.0	11.5	2.5	Yes	329.0	18.0	2.2	15.8	3.2	Yes	-
-	-	133.75*	Trapezoidal	31.5	310.7	322.5	11.8	0.0	11.8	2.5	Yes	329.0	18.3	2.2	16.1	3.2	Yes	-
-	-	133.125*	Trapezoidal	31.5	310.5	322.5	12.0	0.0	12.0	2.5	Yes	329.0	18.5	2.2	16.3	3.2	Yes	-
-	-	132.5*	Trapezoidal	31.5	310.2	322.5	12.3	0.0	12.3	2.5	Yes	329.0	18.8	2.2	16.6	3.2	Yes	-
-	-	131.875*	Trapezoidal	31.5	310.0	322.5	12.6	0.0	12.6	2.5	Yes	329.0	19.1	2.2	16.9	3.2	Yes	-
-	-	131.25*	Trapezoidal	31.5	309.7	322.5	12.8	0.0	12.8	2.5	Yes	329.0	19.3	2.2	17.1	3.2	Yes	-
-	-	130.625*	Trapezoidal	31.5	309.4	322.5	13.1	0.0	13.1	2.5	Yes	329.0	19.6	2.2	17.4	3.2	Yes	-
-	-	130	Trapezoidal	31.6	309.2	322.5	13.3	0.0	13.3	2.5	Yes	329.0	19.8	2.2	17.6	3.2	Yes	-
-	-	120	Trapezoidal	31.5	309.2	322.5	13.3	0.0	13.3	2.5	Yes	322.5	13.3	2.2	11.1	3.2	Yes	-
-	-	110	Trapezoidal	31.5	309.0	322.4	13.4	0.0	13.4	2.5	Yes	322.4	13.4	2.2	11.2	3.2	Yes	-
-	-	100	Trapezoidal	31.8	308.5	322.3	13.8	0.0	13.8	2.5	Yes	322.3	13.8	2.2	11.6	3.2	Yes	-
-	-	98.*	Trapezoidal	32.2	307.8	322.2	14.4	0.0	14.4	2.5	Yes	322.2	14.4	2.2	12.2	3.2	Yes	-

Table SE4: Arroyo Seco Channel - Freeboard and Superelevation for Individual Channel Sections

Channel Information						Left Overbank (LOB)						Right Overbank (ROB)						Area of Concern #
Curve #	Curve Direction	Channel Section	Channel Geometry	Flow Velocity (fps) [1]	Water Surface Elevation (Prior to Superelevation) [2]	LOB Elevation (ft) [3]	LOB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at LOB (ft) [5]	LOB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	ROB Elevation (ft) [3]	ROB Freeboard Prior to Superelevation (ft) [4]	Calculated Superelevation at ROB (ft) [5]	ROB Freeboard After Superelevation (ft) [6]	Required Freeboard (ft) [7]	Area Freeboard Requirements Being Met?	
-	-	96.*	Trapezoidal	32.7	307.1	322.1	15.0	0.0	15.0	2.5	Yes	322.1	15.0	2.2	12.8	3.2	Yes	-
-	-	94.*	Trapezoidal	33.1	306.5	322.0	15.6	0.0	15.6	2.5	Yes	322.0	15.6	2.2	13.4	3.2	Yes	-
-	-	92.*	Trapezoidal	33.4	305.8	321.9	16.1	0.0	16.1	2.5	Yes	321.9	16.1	2.2	13.9	3.2	Yes	-
36	Left	90	Trapezoidal	33.8	305.1	321.8	16.7	0.0	16.7	2.5	Yes	321.8	16.7	2.2	14.5	3.2	Yes	-
36	Left	86.6666*	Trapezoidal	32.2	306.1	321.7	15.6	0.0	15.6	2.5	Yes	321.7	15.6	2.2	13.4	3.2	Yes	-
36	Left	83.3333*	Trapezoidal	32.7	305.3	321.6	16.3	0.0	16.3	2.5	Yes	321.6	16.3	2.2	14.1	3.2	Yes	-
36	Left	80	Rectangular	33.6	304.1	321.5	17.4	0.0	17.4	2.0	Yes	321.5	17.4	2.2	15.2	3.2	Yes	-
36	Left	70	Rectangular	34.0	303.3	321.4	18.1	0.0	18.1	2.0	Yes	321.4	18.1	2.2	15.9	3.2	Yes	-
36	Left	66.6666*	Rectangular	33.8	303.2	321.1	17.9	0.0	17.9	2.0	Yes	321.1	17.9	2.2	15.7	3.2	Yes	-
36	Left	63.3333*	Rectangular	33.6	303.1	320.7	17.7	0.0	17.7	2.0	Yes	320.7	17.7	2.2	15.5	3.2	Yes	-
36	Left	60	Rectangular	33.4	302.9	320.4	17.4	0.0	17.4	2.0	Yes	320.4	17.4	2.2	15.2	3.2	Yes	-
36	Left	55.*	Rectangular	31.1	304.3	320.3	16.1	0.0	16.1	2.0	Yes	320.3	16.1	2.2	13.9	3.2	Yes	-
36	Left	50	Rectangular	32.1	302.9	320.3	17.4	0.0	17.4	2.0	Yes	320.3	17.4	2.2	15.2	3.2	Yes	-
-	-	48.8888*	Rectangular	32.0	302.7	320.3	17.6	0.0	17.6	2.0	Yes	320.3	17.6	2.2	15.4	3.2	Yes	-
-	-	47.7777*	Rectangular	31.9	302.5	320.2	17.7	0.0	17.7	2.0	Yes	320.2	17.7	2.2	15.5	3.2	Yes	-
-	-	46.6666*	Rectangular	13.9	313.4	320.2	6.8	0.0	6.8	2.0	Yes	320.2	6.8	2.2	4.6	3.2	Yes	-
-	-	45.5555*	Rectangular	13.7	313.5	320.2	6.7	0.0	6.7	2.0	Yes	320.2	6.7	2.2	4.5	3.2	Yes	-
-	-	44.4444*	Rectangular	13.4	313.5	320.2	6.6	0.0	6.6	2.0	Yes	320.2	6.6	2.2	4.4	3.2	Yes	-
-	-	43.3333*	Rectangular	13.2	313.6	320.1	6.5	0.0	6.5	2.0	Yes	320.1	6.5	2.2	4.3	3.2	Yes	-
-	-	42.2222*	Rectangular	13.0	313.6	320.1	6.5	0.0	6.5	2.0	Yes	320.1	6.5	2.2	4.3	3.2	Yes	-
-	-	41.1111*	Rectangular	12.7	313.7	320.1	6.4	0.0	6.4	2.0	Yes	320.1	6.4	2.2	4.2	3.2	Yes	-
-	-	40	Rectangular	12.5	313.7	320.1	6.3	0.0	6.3	2.0	Yes	320.1	6.3	2.2	4.1	3.2	Yes	-
-	-	35.*	Rectangular	13.4	313.3	320.0	6.7	0.0	6.7	2.0	Yes	320.0	6.7	2.2	4.5	3.2	Yes	-
-	-	30	Rectangular	11.7	313.8	320.0	6.3	0.0	6.3	2.0	Yes	320.0	6.3	2.2	4.1	3.2	Yes	-
-	-	20	Rectangular	12.4	313.4	321.0	7.6	0.0	7.6	2.0	Yes	321.0	7.6	2.2	5.4	3.2	Yes	-
-	-	10	Rectangular	12.4	313.4	321.0	7.6	0.0	7.6	2.0	Yes	321.0	7.6	2.2	5.4	3.2	Yes	-

1. Flow velocity per HEC-RAS mixed steady flow analysis.
2. Water surface elevations prior to application of the effects of superelevation are determined per mixed steady flow analysis in HEC-RAS.
3. Left/Right overbank elevations represent the top of channel elevations as determined per available As-Builts and/or interpolated by HEC-RAS values
4. Left/Right overbank freeboard prior to superelevation represents the available freeboard at a channel section prior to application of the effects of superelevation.
5. Superelevation values as determined per attached Tables SE1, SE2, and SE3.
6. Left/Right overbank freeboard after superelevation.
7. Required freeboard has been determined per guidelines in Section C-4 of the LACFCD Hydraulic Design Manual. These requirements vary with channel characteristics such as geometry, flow velocity, and curvature.

Red highlighted cells represent sections of the Arroyo Seco Channel that experience overtopping prior to the effects of superelevation.

Orange highlighted cells represent sections of the Arroyo Seco Channel that experience overtopping with consideration to the effects of superelevation.

Yellow highlighted cells represents sections of the Arroyo Seco Channel that do not meet freeboard requirements outlined in Section C-4 of the LACFCD Hydraulic Design Manual.

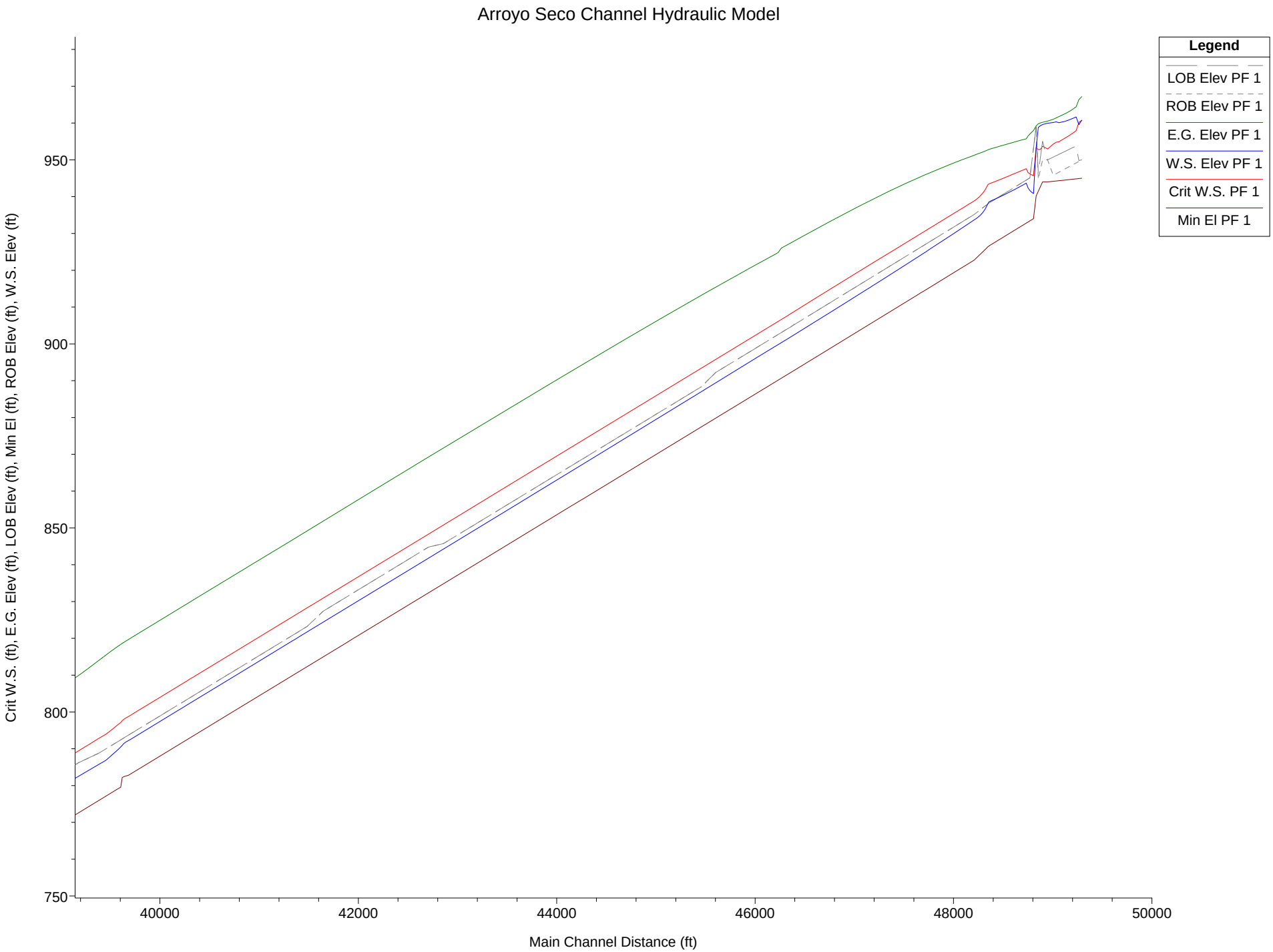
Cells bordered in red represent identified areas of concern.

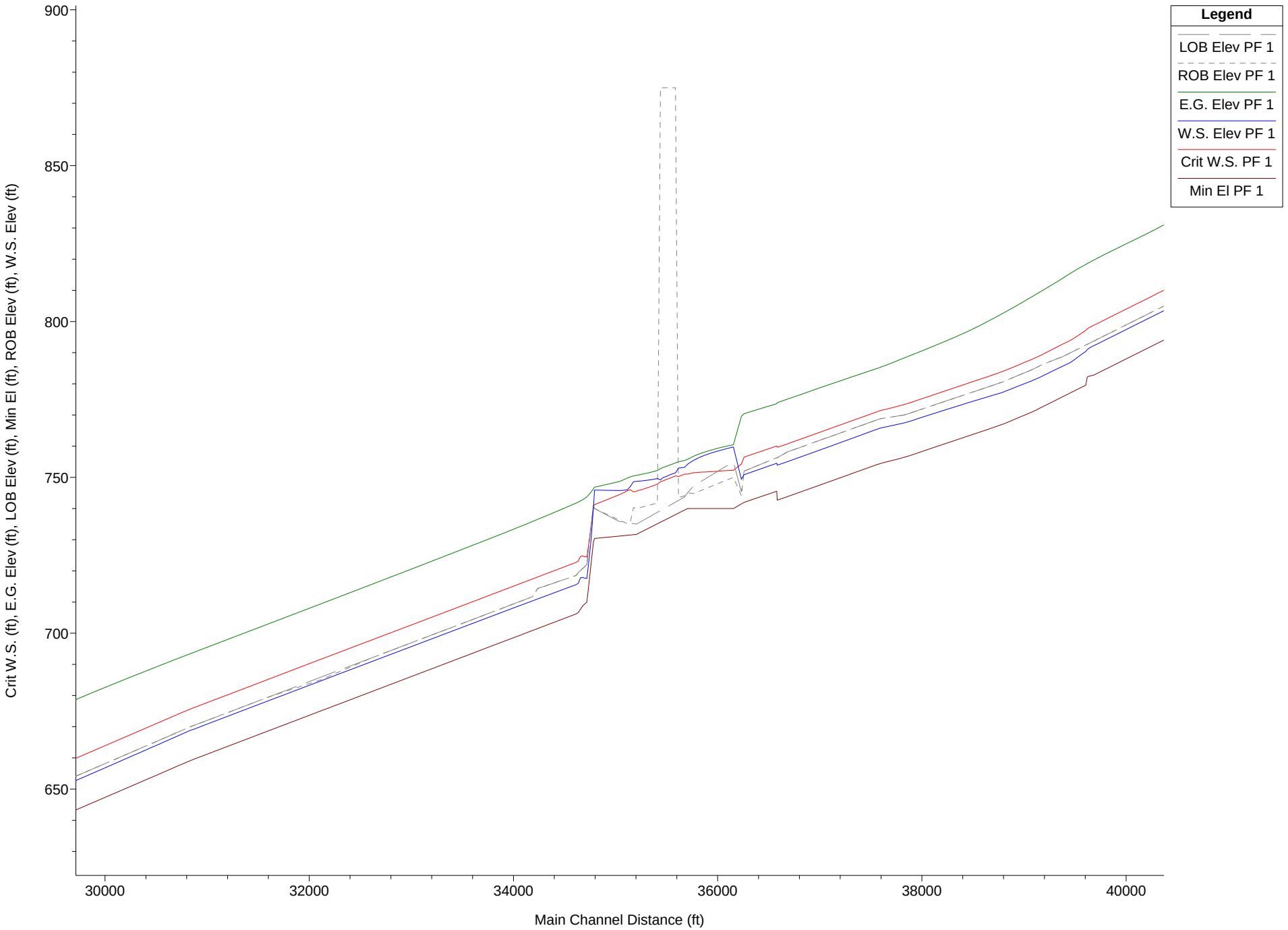
This page is intentionally left blank to facilitate 2-sided printing.

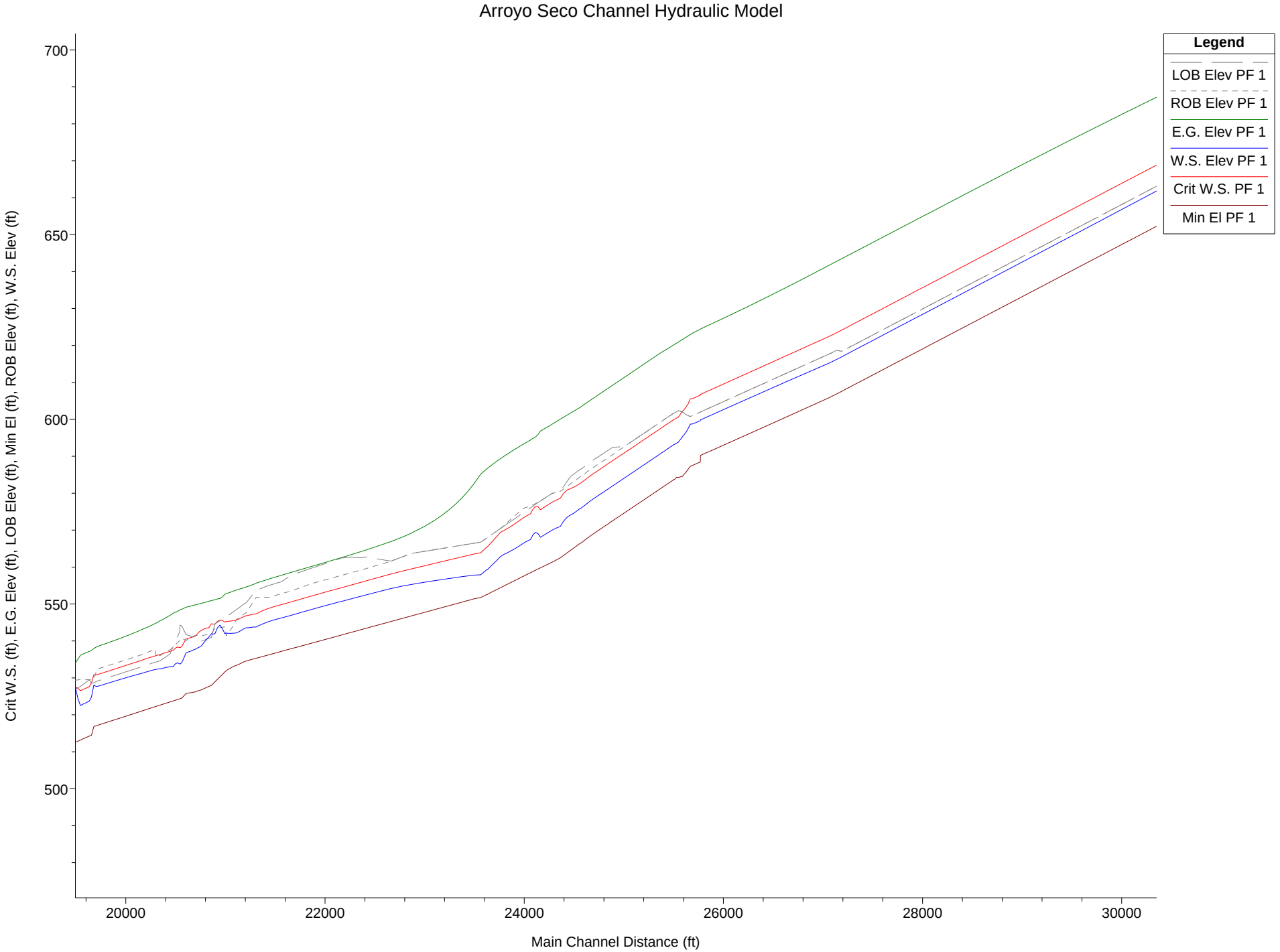
Appendix F

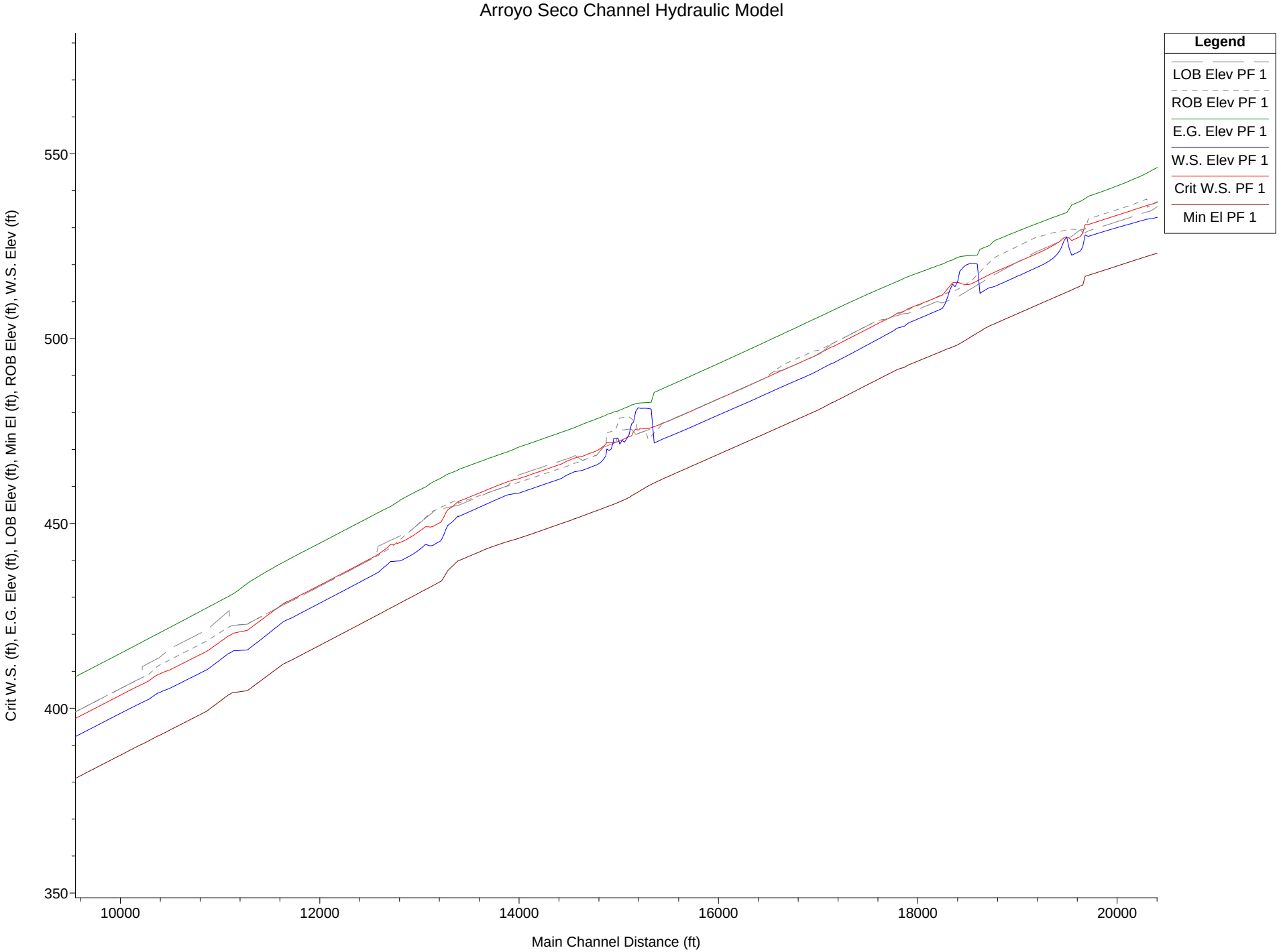
HEC-RAS Profile Plot

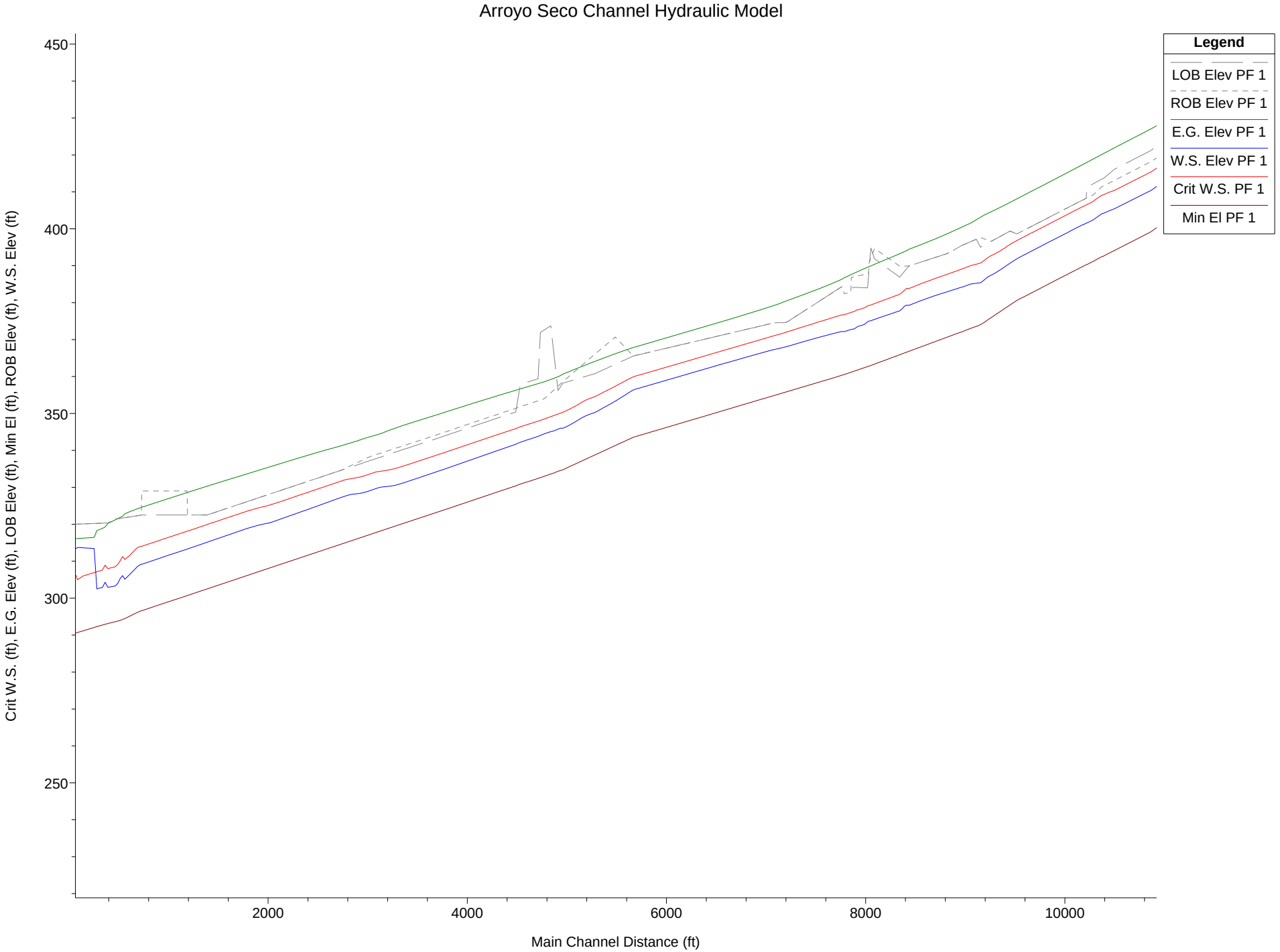
This page is intentionally left blank to facilitate 2-sided printing.


Arroyo Seco Channel Hydraulic Model
Legend
LOB Elev PF 1
ROB Elev PF 1
E.G. Elev PF 1
W.S. Elev PF 1
Crit W.S. PF 1
Min El PF 1
Crit W.S. (ft), E.G. Elev (ft), LOB Elev (ft), Min El (ft), ROB Elev (ft), W.S. Elev (ft)
950
900
850
800
750
40000
42000
44000
46000
48000
50000
Main Channel Distance (ft)


Arroyo Seco Channel Hydraulic Model
Legend
LOB Elev PF 1
ROB Elev PF 1
E.G. Elev PF 1
W.S. Elev PF 1
Crit W.S. PF 1
Min El PF 1
900
850
800
750
700
650
30000
32000
34000
36000
38000
40000
Main Channel Distance (ft)
Crit W.S. (ft), E.G. Elev (ft), LOB Elev (ft), Min El (ft), ROB Elev (ft), W.S. Elev (ft)


Arroyo Seco Channel Hydraulic Model
Legend
LOB Elev PF 1
ROB Elev PF 1
E.G. Elev PF 1
W.S. Elev PF 1
Crit W.S. PF 1
Min El PF 1
700
650
600
550
500
20000
22000
24000
26000
28000
30000
Crit W.S. (ft), E.G. Elev (ft), LOB Elev (ft), Min El (ft), ROB Elev (ft), W.S. Elev (ft)
Main Channel Distance (ft)


Arroyo Seco Channel Hydraulic Model
Legend
LOB Elev PF 1
ROB Elev PF 1
E.G. Elev PF 1
W.S. Elev PF 1
Crit W.S. PF 1
Min El PF 1
Crit W.S. (ft), E.G. Elev (ft), LOB Elev (ft), Min El (ft), ROB Elev (ft), W.S. Elev (ft)
550
500
450
400
350
10000
12000
14000
16000
18000
20000
Main Channel Distance (ft)


Arroyo Seco Channel Hydraulic Model
Legend
LOB Elev PF 1
ROB Elev PF 1
E.G. Elev PF 1
W.S. Elev PF 1
Crit W.S. PF 1
Min El PF 1
Crit W.S. (ft), E.G. Elev (ft), LOB Elev (ft), Min El (ft), ROB Elev (ft), W.S. Elev (ft)
450
400
350
300
250
2000
4000
6000
8000
10000
Main Channel Distance (ft)

This page is intentionally left blank to facilitate 2-sided printing.

Appendix G

HEC-RAS Output Table

This page is intentionally left blank to facilitate 2-sided printing.

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
3160	18157	945	960.76	960.76	967.18	0.025448	13.19	1206.78	116.32	0.64	0.072	950	950	-10.76	-10.76
3159.16*	18157	944.92	959.58	960.16	966.36	0.029802	13.58	1170.36	121.99	0.68	0.073	949.83	949.58	-9.75	-10
3158.33*	18157	944.83	961.66	957.9	964.4	0.018421	11.52	1563.26	143.33	0.55	0.083	953.76	949.16	-7.9	-12.5
3157.5*	18157	944.75	961.3	957.35	963.83	0.01664	10.87	1646.86	154.67	0.52	0.082	953.38	948.74	-7.92	-12.56
3156.66*	18157	944.67	960.98	956.81	963.32	0.0149	10.22	1739.42	167.05	0.49	0.081	953.01	948.33	-7.97	-12.65
3155.83*	18157	944.58	960.7	956.33	962.87	0.013173	9.57	1842.39	179.98	0.46	0.08	952.63	947.91	-8.07	-12.79
3155.*	18157	944.5	960.45	955.85	962.47	0.011475	8.9	1959.53	194.03	0.43	0.079	952.26	947.49	-8.19	-12.96
3154.16*	18157	944.42	960.25	955.38	962.12	0.009828	8.23	2096.95	209.91	0.4	0.078	951.88	947.07	-8.37	-13.18
3153.33*	18157	944.33	960.11	954.92	961.81	0.008238	7.55	2260.38	227.32	0.37	0.077	951.5	946.65	-8.61	-13.46
3152.5*	18157	944.25	960.32	954.78	961.35	0.01035	8.63	2529.32	245.68	0.41	0.099	951.13	946.23	-9.19	-14.09
3151.66*	18157	944.17	960.14	954.3	961.02	0.009109	8.1	2725.37	261.98	0.39	0.101	950.75	945.81	-9.39	-14.33
3150	18157	944	959.94	952.94	960.52	0.005722	6.37	3228.38	297.97	0.31	0.097	950	950	-9.94	-9.94
3140	18157	944	959.59	953.71	960.2	0.007425	6.28	2973.34	293.13	0.34	0.097	955	950	-4.59	-9.59
3136.66*	18157	942.73	959.27	952.83	960.02	0.007522	7.05	2774.52	267.71	0.35	0.092	950.67	947.33	-8.6	-11.94
3133.33*	18157	941.46	958.81	952.79	959.81	0.009325	8.54	2523.28	202	0.39	0.102	946.33	944.67	-12.48	-14.14
3130	18157	940.19	953.35	953.35	959.23	0.002736	19.46	933.22	80	1	0.017	959	959	5.65	5.65
3120	18157	934.02	940.86	945.71	957.97	0.013726	33.2	546.86	80	2.24	0.017	953.16	953.16	12.3	12.3
3115.*	18157	933.72	941.19	945.93	957.5	0.011994	32.41	560.26	75	2.09	0.017	949.12	949.12	7.93	7.93
3110	18157	933.42	941.67	946.2	957.01	0.010281	31.43	577.7	70	1.93	0.017	945.09	945.09	3.42	3.42
3105.*	18157	933.11	942.39	946.53	956.46	0.008501	30.1	603.19	65	1.74	0.017	944.79	944.79	2.4	2.4
3100	18157	932.81	943.68	947.62	955.72	0.00637	27.85	651.93	60	1.49	0.017	944.48	944.48	0.8	0.8
3099.23*	18157	932.33	943.23	947.28	955.51	0.006508	28.13	645.54	59.24	1.5	0.017	944	944	0.77	0.77
3098.46*	18157	931.86	942.81	946.95	955.3	0.00662	28.37	640.12	58.46	1.51	0.017	943.53	943.53	0.72	0.72
3097.69*	18157	931.38	942.38	946.63	955.09	0.00674	28.61	634.56	57.7	1.52	0.017	943.05	943.05	0.67	0.67
3096.92*	18157	930.9	941.96	946.3	954.88	0.006844	28.84	629.58	56.92	1.53	0.017	942.57	942.57	0.61	0.61
3096.15*	18157	930.43	941.57	945.98	954.65	0.006921	29.03	625.53	56.16	1.53	0.017	942.1	942.1	0.53	0.53
3095.38*	18157	929.95	941.17	945.65	954.43	0.006998	29.21	621.53	55.38	1.54	0.017	941.62	941.62	0.45	0.45
3094.61*	18157	929.47	940.78	945.32	954.2	0.007074	29.4	617.64	54.62	1.54	0.017	941.14	941.14	0.36	0.36
3093.84*	18157	928.99	940.4	945.01	953.97	0.007139	29.57	614.06	53.84	1.54	0.017	940.66	940.66	0.26	0.26
3093.07*	18157	928.52	940.03	944.7	953.75	0.007195	29.72	610.84	53.08	1.54	0.017	940.19	940.19	0.16	0.16
3092.30*	18157	928.04	939.66	944.38	953.52	0.00725	29.88	607.66	52.3	1.54	0.017	939.71	939.71	0.05	0.05
3091.53*	18157	927.56	939.29	944.07	953.3	0.007289	30.03	604.58	52.22	1.55	0.017	939.23	939.23	-0.06	-0.06
3090.76*	18157	927.09	938.95	943.78	953.07	0.007287	30.16	602.28	52.87	1.54	0.017	938.76	938.76	-0.19	-0.19
3090	18157	926.61	938.6	943.47	952.85	0.007299	30.3	599.85	53.38	1.54	0.017	938.28	938.28	-0.32	-0.32
3080	18157	926.39	938.13	943.3	952.74	0.007473	30.67	592.08	52.73	1.6	0.017	938.06	938.06	-0.07	-0.07
3078.*	18157	925.65	936.63	941.91	952.4	0.008419	31.87	569.78	57.1	1.78	0.017	937.48	937.48	0.85	0.85
3076.*	18157	924.92	935.57	940.88	952.08	0.009218	32.6	556.93	62.11	1.92	0.017	936.89	936.89	1.32	1.32
3074.*	18157	924.19	934.79	940.02	951.79	0.007775	33.09	548.76	66.96	2.04	0.015	936.31	936.31	1.52	1.52
3072.*	18157	923.46	934.18	939.37	951.52	0.008372	33.42	543.22	71.36	2.13	0.015	935.72	935.72	1.54	1.54
3070	18157	922.73	933.69	938.83	951.26	0.008749	33.64	539.76	73.21	2.18	0.015	935.14	935.14	1.45	1.45

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
3069.99	Bridge														
3069.84*	18157	922.24	933.16	938.34	950.94	0.00889	33.84	536.63	73.03	2.2	0.015	934.65	934.65	1.49	1.49
3069.69*	18157	921.75	932.61	937.86	950.64	0.00907	34.08	532.82	72.84	2.22	0.015	934.15	934.15	1.54	1.54
3069.54*	18157	921.25	932.07	937.35	950.34	0.009238	34.31	529.25	72.63	2.24	0.015	933.66	933.66	1.59	1.59
3069.39*	18157	920.76	931.53	936.86	950.04	0.009402	34.53	525.89	72.44	2.26	0.015	933.17	933.17	1.64	1.64
3069.24*	18157	920.26	930.98	936.36	949.73	0.009571	34.75	522.53	72.26	2.28	0.015	932.67	932.67	1.69	1.69
3069.09*	18157	919.77	930.45	935.87	949.42	0.009728	34.95	519.47	72.09	2.29	0.015	932.18	932.18	1.73	1.73
3068.93*	18157	919.28	929.91	935.37	949.11	0.00989	35.16	516.45	71.93	2.31	0.015	931.68	931.68	1.77	1.77
3068.78*	18157	918.78	929.38	934.88	948.79	0.01004	35.35	513.6	71.76	2.33	0.015	931.19	931.19	1.81	1.81
3068.63*	18157	918.29	928.85	934.39	948.46	0.010187	35.54	510.91	71.61	2.34	0.015	930.7	930.7	1.85	1.85
3068.48*	18157	917.8	928.32	933.89	948.14	0.010339	35.72	508.25	71.48	2.36	0.015	930.2	930.2	1.88	1.88
3068.33*	18157	917.3	927.79	933.4	947.81	0.01048	35.9	505.73	71.32	2.38	0.015	929.71	929.71	1.92	1.92
3068.18*	18157	916.81	927.27	932.91	947.47	0.010617	36.07	503.36	71.19	2.39	0.015	929.22	929.22	1.95	1.95
3068.03*	18157	916.32	926.74	932.41	947.13	0.010759	36.24	501	71.07	2.41	0.015	928.72	928.72	1.98	1.98
3067.87*	18157	915.82	926.21	931.92	946.79	0.010891	36.4	498.77	70.93	2.42	0.015	928.23	928.23	2.02	2.02
3067.72*	18157	915.33	925.69	931.43	946.45	0.011026	36.57	496.56	70.81	2.43	0.015	927.74	927.74	2.05	2.05
3067.57*	18157	914.83	925.16	930.93	946.1	0.01116	36.72	494.41	70.68	2.45	0.015	927.24	927.24	2.08	2.08
3067.42*	18157	914.34	924.64	930.44	945.76	0.011288	36.88	492.38	70.57	2.46	0.015	926.75	926.75	2.11	2.11
3067.27*	18157	913.85	924.12	929.94	945.41	0.011422	37.03	490.33	70.47	2.47	0.015	926.25	926.25	2.13	2.13
3067.12*	18157	913.35	923.6	929.45	945.06	0.011544	37.17	488.42	70.34	2.49	0.015	925.76	925.76	2.16	2.16
3066.97*	18157	912.86	923.08	928.96	944.7	0.011663	37.31	486.63	70.24	2.5	0.015	925.27	925.27	2.19	2.19
3066.81*	18157	912.37	922.56	928.46	944.34	0.011788	37.45	484.82	70.15	2.51	0.015	924.77	924.77	2.21	2.21
3066.66*	18157	911.87	922.04	927.97	943.97	0.0119	37.58	483.12	70.04	2.52	0.015	924.28	924.28	2.24	2.24
3066.51*	18157	911.38	921.53	927.48	943.61	0.01201	37.71	481.53	69.95	2.53	0.015	923.79	923.79	2.26	2.26
3066.36*	18157	910.89	921.01	926.98	943.23	0.012126	37.83	479.91	69.87	2.54	0.015	923.29	923.29	2.28	2.28
3066.21*	18157	910.39	920.49	926.49	942.86	0.012229	37.95	478.4	69.77	2.55	0.015	922.8	922.8	2.31	2.31
3066.06*	18157	909.9	919.98	926	942.48	0.01233	38.07	476.99	69.69	2.56	0.015	922.31	922.31	2.33	2.33
3065.90*	18157	909.4	919.46	925.5	942.1	0.012438	38.19	475.5	69.61	2.57	0.015	921.81	921.81	2.35	2.35
3065.75*	18157	908.91	918.95	925.01	941.72	0.012534	38.29	474.19	69.53	2.58	0.015	921.32	921.32	2.37	2.37
3065.60*	18157	908.42	918.44	924.51	941.33	0.012637	38.4	472.85	69.47	2.59	0.015	920.82	920.82	2.38	2.38
3065.45*	18157	907.92	917.93	924.02	940.94	0.012727	38.5	471.59	69.38	2.6	0.015	920.33	920.33	2.4	2.4
3065.30*	18157	907.43	917.42	923.54	940.55	0.012816	38.6	470.41	69.31	2.61	0.015	919.84	919.84	2.42	2.42
3065.15*	18157	906.94	916.9	923.05	940.16	0.012912	38.7	469.2	69.26	2.62	0.015	919.34	919.34	2.44	2.44
3065.*	18157	906.44	916.39	922.55	939.76	0.012996	38.79	468.07	69.18	2.63	0.015	918.85	918.85	2.46	2.46
3064.84*	18157	905.95	915.89	922.06	939.35	0.013069	38.87	467.12	69.12	2.64	0.015	918.36	918.36	2.47	2.47
3064.69*	18157	905.46	915.38	921.56	938.95	0.013159	38.96	466.02	69.07	2.64	0.015	917.86	917.86	2.48	2.48
3064.54*	18157	904.96	914.87	921.07	938.54	0.013228	39.04	465.09	69	2.65	0.015	917.37	917.37	2.5	2.5
3064.39*	18157	904.47	914.37	920.57	938.12	0.013299	39.11	464.21	68.95	2.66	0.015	916.88	916.88	2.51	2.51
3064.24*	18157	903.97	913.85	920.08	937.72	0.013382	39.2	463.17	68.89	2.66	0.015	916.38	916.38	2.53	2.53
3064.09*	18157	903.48	913.35	919.6	937.3	0.013449	39.27	462.34	68.84	2.67	0.015	915.89	915.89	2.54	2.54

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
3063.93*	18157	902.99	912.84	919.11	936.88	0.013522	39.34	461.48	68.81	2.68	0.015	915.39	915.39	2.55	2.55
3063.78*	18157	902.49	912.34	918.6	936.46	0.013586	39.41	460.66	68.75	2.68	0.015	914.9	914.9	2.56	2.56
3063.63*	18157	902	911.84	918.17	936.04	0.01365	39.48	459.89	68.7	2.69	0.015	914.41	914.41	2.57	2.57
3063.48*	18157	901.51	911.33	917.66	935.62	0.01372	39.55	459.09	68.67	2.7	0.015	913.91	913.91	2.58	2.58
3063.33*	18157	901.01	910.82	917.14	935.19	0.01378	39.62	458.33	68.61	2.7	0.015	913.42	913.42	2.6	2.6
3063.18*	18157	900.52	910.32	916.65	934.77	0.01384	39.68	457.61	68.57	2.71	0.015	912.93	912.93	2.61	2.61
3063.03*	18157	900.03	909.82	916.15	934.34	0.013907	39.74	456.87	68.54	2.71	0.015	912.43	912.43	2.61	2.61
3062.87*	18157	899.53	909.31	915.64	933.91	0.013963	39.8	456.16	68.49	2.72	0.015	911.94	911.94	2.63	2.63
3062.72*	18157	899.04	908.81	915.13	933.49	0.01402	39.86	455.49	68.45	2.72	0.015	911.45	911.45	2.64	2.64
3062.57*	18157	898.54	908.3	914.64	933.05	0.014082	39.93	454.78	68.4	2.73	0.015	910.95	910.95	2.65	2.65
3062.42*	18157	898.05	907.8	914.14	932.62	0.014136	39.98	454.14	68.37	2.73	0.015	910.46	910.46	2.66	2.66
3062.27*	18157	897.56	907.3	913.62	932.19	0.014198	40.04	453.48	68.34	2.74	0.015	909.96	909.96	2.66	2.66
3062.12*	18157	897.06	906.79	913.12	931.75	0.014249	40.09	452.86	68.29	2.74	0.015	909.47	909.47	2.68	2.68
3061.97*	18157	896.57	906.29	912.63	931.32	0.0143	40.15	452.28	68.26	2.75	0.015	908.98	908.98	2.69	2.69
3061.81*	18157	896.08	905.79	912.11	930.88	0.014358	40.2	451.66	68.24	2.75	0.015	908.48	908.48	2.69	2.69
3061.66*	18157	895.58	905.29	911.62	930.45	0.014406	40.25	451.08	68.19	2.76	0.015	907.99	907.99	2.7	2.7
3061.51*	18157	895.09	904.79	911.11	930.01	0.014454	40.3	450.54	68.16	2.76	0.015	907.5	907.5	2.71	2.71
3061.36*	18157	894.6	904.28	910.61	929.57	0.014509	40.35	449.96	68.14	2.77	0.015	907	907	2.72	2.72
3061.21*	18157	894.1	903.78	910.09	929.13	0.014554	40.4	449.43	68.09	2.77	0.015	906.51	906.51	2.73	2.73
3061.06*	18157	893.61	903.29	909.61	928.69	0.014598	40.44	448.94	68.06	2.78	0.015	906.02	906.02	2.73	2.73
3060.90*	18157	893.11	902.78	909.11	928.24	0.014649	40.5	448.38	68.03	2.78	0.015	905.52	905.52	2.74	2.74
3060.75*	18157	892.62	902.28	908.61	927.8	0.014692	40.54	447.91	68	2.78	0.015	905.03	905.03	2.75	2.75
3060.60*	18157	892.13	901.78	908.12	927.35	0.014742	40.58	447.41	67.99	2.79	0.015	904.53	904.53	2.75	2.75
3060.45*	18157	891.63	901.28	907.6	926.9	0.014781	40.63	446.94	67.94	2.79	0.015	904.04	904.04	2.76	2.76
3060.30*	18157	891.14	900.78	907.11	926.46	0.01482	40.66	446.52	67.92	2.79	0.015	903.55	903.55	2.77	2.77
3060.15*	18157	890.65	900.28	906.61	926.01	0.014868	40.71	446.05	67.91	2.8	0.015	903.05	903.05	2.77	2.77
3060.01	Bridge														
3060	18157	890.15	899.88	906.14	924.86	0.014265	40.11	452.68	68.29	2.75	0.015	902.56	902.56	2.68	2.68
3059.99	Bridge														
3059.52*	18157	889.66	899.39	905.65	924.36	0.014257	40.1	452.77	68.29	2.74	0.015	902.07	902.07	2.68	2.68
3059.04*	18157	889.17	898.89	905.12	923.93	0.014307	40.15	452.19	68.25	2.75	0.015	901.58	901.58	2.69	2.69
3058.57*	18157	888.68	898.4	904.63	923.49	0.014356	40.2	451.64	68.22	2.75	0.015	901.09	901.09	2.69	2.69
3058.09*	18157	888.19	897.89	904.13	923.05	0.014413	40.26	451.04	68.2	2.76	0.015	900.59	900.59	2.7	2.7
3057.61*	18157	887.7	897.39	903.64	922.61	0.01446	40.3	450.52	68.17	2.76	0.015	900.1	900.1	2.71	2.71
3057.14*	18157	887.2	896.89	903.15	922.17	0.014504	40.35	449.98	68.12	2.77	0.015	899.61	899.61	2.72	2.72
3056.66*	18157	886.71	896.39	902.66	921.73	0.014549	40.4	449.48	68.09	2.77	0.015	899.12	899.12	2.73	2.73
3056.19*	18157	886.22	895.9	902.17	921.29	0.014592	40.44	449	68.07	2.77	0.015	898.63	898.63	2.73	2.73
3055.71*	18157	885.73	895.4	901.68	920.85	0.014635	40.48	448.53	68.04	2.78	0.015	898.14	898.14	2.74	2.74
3055.23*	18157	885.24	894.9	901.19	920.4	0.014677	40.52	448.08	68.01	2.78	0.015	897.65	897.65	2.75	2.75
3054.76*	18157	884.75	894.4	900.69	919.95	0.014726	40.57	447.58	68	2.79	0.015	897.15	897.15	2.75	2.75

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
3054.28*	18157	884.26	893.9	900.2	919.51	0.014766	40.61	447.15	67.97	2.79	0.015	896.66	896.66	2.76	2.76
3053.81*	18157	883.76	893.4	899.71	919.06	0.014803	40.65	446.7	67.93	2.79	0.015	896.17	896.17	2.77	2.77
3053.33*	18157	883.27	892.91	899.22	918.61	0.014841	40.68	446.29	67.91	2.8	0.015	895.68	895.68	2.77	2.77
3052.85*	18157	882.78	892.41	898.73	918.16	0.014878	40.72	445.89	67.88	2.8	0.015	895.19	895.19	2.78	2.78
3052.38*	18157	882.29	891.92	898.24	917.71	0.014914	40.76	445.51	67.86	2.8	0.015	894.7	894.7	2.79	2.79
3051.90*	18157	881.8	891.42	897.75	917.26	0.014949	40.79	445.13	67.84	2.81	0.015	894.21	894.21	2.79	2.79
3051.42*	18157	881.31	890.92	897.25	916.8	0.014993	40.83	444.71	67.83	2.81	0.015	893.71	893.71	2.79	2.79
3050.95*	18157	880.82	890.42	896.76	916.35	0.015026	40.86	444.35	67.81	2.81	0.015	893.22	893.22	2.8	2.8
3050.47*	18157	880.32	889.92	896.27	915.89	0.015058	40.9	443.98	67.77	2.82	0.015	892.73	892.73	2.81	2.81
3050	18157	879.83	889.43	895.78	915.44	0.015089	40.93	443.66	67.75	2.82	0.015	892.24	892.24	2.81	2.81
3048.*	18157	879.36	888.95	895.3	914.99	0.015115	40.96	443.33	67.75	2.82	0.015	891.46	891.46	2.51	2.51
3046.*	18157	878.88	888.47	894.83	914.55	0.015138	40.98	443.02	67.72	2.82	0.015	890.69	890.69	2.22	2.22
3044.*	18157	878.4	887.99	894.37	914.11	0.015171	41.02	442.69	67.71	2.83	0.015	889.91	889.91	1.92	1.92
3042.*	18157	877.93	887.51	893.89	913.66	0.015199	41.04	442.39	67.67	2.83	0.015	889.14	889.14	1.63	1.63
3040	18157	877.45	887.03	893.42	913.22	0.015241	41.07	442.07	67.66	2.83	0.015	888.36	888.36	1.33	1.33
3039.79*	18157	876.97	886.53	892.93	912.76	0.015273	41.1	441.77	67.65	2.83	0.015	887.87	887.87	1.34	1.34
3039.58*	18157	876.48	886.05	892.45	912.31	0.015294	41.12	441.51	67.62	2.84	0.015	887.39	887.39	1.34	1.34
3039.37*	18157	875.99	885.55	891.96	911.85	0.015324	41.15	441.2	67.61	2.84	0.015	886.9	886.9	1.35	1.35
3039.16*	18157	875.51	885.06	891.47	911.39	0.015354	41.18	440.93	67.6	2.84	0.015	886.41	886.41	1.35	1.35
3038.95*	18157	875.02	884.57	890.99	910.93	0.015373	41.2	440.69	67.58	2.84	0.015	885.93	885.93	1.36	1.36
3038.75*	18157	874.53	884.08	890.5	910.47	0.015401	41.23	440.4	67.56	2.85	0.015	885.44	885.44	1.36	1.36
3038.54*	18157	874.05	883.59	890.01	910.01	0.01543	41.25	440.15	67.56	2.85	0.015	884.95	884.95	1.36	1.36
3038.33*	18157	873.56	883.1	889.53	909.55	0.015447	41.27	439.93	67.53	2.85	0.015	884.47	884.47	1.37	1.37
3038.12*	18157	873.07	882.61	889.04	909.09	0.015474	41.3	439.67	67.51	2.85	0.015	883.98	883.98	1.37	1.37
3037.91*	18157	872.59	882.12	888.55	908.63	0.0155	41.32	439.44	67.52	2.85	0.015	883.49	883.49	1.37	1.37
3037.70*	18157	872.1	881.63	888.07	908.17	0.015516	41.34	439.24	67.49	2.86	0.015	883.01	883.01	1.38	1.38
3037.5*	18157	871.61	881.14	887.58	907.7	0.015541	41.36	438.98	67.47	2.86	0.015	882.52	882.52	1.38	1.38
3037.29*	18157	871.13	880.65	887.09	907.24	0.015566	41.38	438.77	67.48	2.86	0.015	882.03	882.03	1.38	1.38
3037.08*	18157	870.64	880.16	886.61	906.78	0.01558	41.4	438.59	67.45	2.86	0.015	881.55	881.55	1.39	1.39
3036.87*	18157	870.15	879.67	886.12	906.31	0.015603	41.42	438.36	67.44	2.86	0.015	881.06	881.06	1.39	1.39
3036.66*	18157	869.67	879.18	885.63	905.84	0.015627	41.44	438.16	67.44	2.86	0.015	880.57	880.57	1.39	1.39
3036.45*	18157	869.18	878.69	885.15	905.38	0.015639	41.46	437.99	67.42	2.87	0.015	880.09	880.09	1.4	1.4
3036.25*	18157	868.69	878.2	884.66	904.91	0.015661	41.48	437.78	67.4	2.87	0.015	879.6	879.6	1.4	1.4
3036.04*	18157	868.21	877.71	884.17	904.45	0.015683	41.49	437.6	67.41	2.87	0.015	879.11	879.11	1.4	1.4
3035.83*	18157	867.72	877.23	883.69	903.98	0.015694	41.51	437.44	67.38	2.87	0.015	878.63	878.63	1.4	1.4
3035.62*	18157	867.23	876.73	883.2	903.51	0.015715	41.53	437.24	67.37	2.87	0.015	878.14	878.14	1.41	1.41
3035.41*	18157	866.74	876.24	882.71	903.04	0.015734	41.55	437.04	67.36	2.87	0.015	877.65	877.65	1.41	1.41
3035.20*	18157	866.26	875.76	882.23	902.57	0.015746	41.56	436.93	67.35	2.88	0.015	877.17	877.17	1.41	1.41
3035.*	18157	865.77	875.27	881.74	902.1	0.015765	41.57	436.74	67.34	2.88	0.015	876.68	876.68	1.41	1.41
3034.79*	18157	865.28	874.77	881.25	901.63	0.015783	41.59	436.56	67.33	2.88	0.015	876.19	876.19	1.42	1.42

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
3034.58*	18157	864.8	874.29	880.77	901.16	0.015794	41.6	436.45	67.32	2.88	0.015	875.71	875.71	1.42	1.42
3034.37*	18157	864.31	873.8	880.28	900.69	0.015812	41.62	436.28	67.31	2.88	0.015	875.22	875.22	1.42	1.42
3034.16*	18157	863.82	873.31	879.79	900.22	0.015829	41.63	436.1	67.3	2.88	0.015	874.73	874.73	1.42	1.42
3033.95*	18157	863.34	872.82	879.31	899.75	0.015838	41.64	436.02	67.3	2.88	0.015	874.25	874.25	1.43	1.43
3033.75*	18157	862.85	872.33	878.82	899.28	0.015855	41.66	435.85	67.29	2.88	0.015	873.76	873.76	1.43	1.43
3033.54*	18157	862.36	871.84	878.33	898.81	0.015871	41.67	435.69	67.28	2.89	0.015	873.27	873.27	1.43	1.43
3033.33*	18157	861.88	871.36	877.85	898.34	0.015879	41.68	435.61	67.27	2.89	0.015	872.79	872.79	1.43	1.43
3033.12*	18157	861.39	870.87	877.36	897.86	0.015895	41.7	435.46	67.26	2.89	0.015	872.3	872.3	1.43	1.43
3032.91*	18157	860.9	870.37	876.87	897.39	0.015911	41.71	435.3	67.26	2.89	0.015	871.81	871.81	1.44	1.44
3032.70*	18157	860.42	869.89	876.39	896.92	0.015918	41.72	435.23	67.25	2.89	0.015	871.33	871.33	1.44	1.44
3032.5*	18157	859.93	869.4	875.9	896.44	0.015933	41.73	435.09	67.24	2.89	0.015	870.84	870.84	1.44	1.44
3032.29*	18157	859.44	868.91	875.41	895.97	0.015947	41.75	434.95	67.23	2.89	0.015	870.35	870.35	1.44	1.44
3032.08*	18157	858.96	868.43	874.93	895.5	0.015953	41.75	434.88	67.23	2.89	0.015	869.87	869.87	1.44	1.44
3031.87*	18157	858.47	867.94	874.44	895.02	0.015968	41.76	434.75	67.22	2.89	0.015	869.38	869.38	1.44	1.44
3031.66*	18157	857.98	867.44	873.95	894.55	0.015981	41.78	434.61	67.21	2.9	0.015	868.89	868.89	1.45	1.45
3031.45*	18157	857.5	866.96	873.47	894.07	0.015987	41.78	434.56	67.21	2.9	0.015	868.41	868.41	1.45	1.45
3031.25*	18157	857.01	866.47	872.98	893.6	0.016	41.79	434.43	67.2	2.9	0.015	867.92	867.92	1.45	1.45
3031.04*	18157	856.52	865.98	872.49	893.12	0.016013	41.81	434.31	67.2	2.9	0.015	867.43	867.43	1.45	1.45
3030.83*	18157	856.04	865.5	872.01	892.64	0.016017	41.81	434.26	67.19	2.9	0.015	866.95	866.95	1.45	1.45
3030.62*	18157	855.55	865.01	871.52	892.17	0.01603	41.82	434.14	67.19	2.9	0.015	866.46	866.46	1.45	1.45
3030.41*	18157	855.06	864.51	871.03	891.69	0.016042	41.83	434.02	67.18	2.9	0.015	865.97	865.97	1.46	1.46
3030.20*	18157	854.58	864.03	870.55	891.21	0.016046	41.84	433.98	67.18	2.9	0.015	865.49	865.49	1.46	1.46
3030	18157	854.09	863.54	870.06	890.74	0.016058	41.85	433.87	67.17	2.9	0.015	865	865	1.46	1.46
3029.75*	18157	853.61	863.06	869.58	890.27	0.016066	41.86	433.8	67.17	2.9	0.015	864.52	864.52	1.46	1.46
3029.5*	18157	853.13	862.58	869.1	889.79	0.016073	41.86	433.72	67.16	2.9	0.015	864.04	864.04	1.46	1.46
3029.25*	18157	852.65	862.1	868.62	889.32	0.01608	41.87	433.65	67.16	2.9	0.015	863.56	863.56	1.46	1.46
3029.*	18157	852.16	861.61	868.13	888.85	0.016095	41.88	433.51	67.15	2.9	0.015	863.07	863.07	1.46	1.46
3028.75*	18157	851.68	861.13	867.65	888.37	0.016102	41.89	433.44	67.15	2.91	0.015	862.59	862.59	1.46	1.46
3028.5*	18157	851.2	860.65	867.17	887.9	0.016109	41.9	433.38	67.14	2.91	0.015	862.11	862.11	1.46	1.46
3028.25*	18157	850.72	860.16	866.69	887.43	0.016115	41.9	433.32	67.14	2.91	0.015	861.63	861.63	1.47	1.47
3028.*	18157	850.24	859.68	866.21	886.95	0.016121	41.91	433.26	67.13	2.91	0.015	861.15	861.15	1.47	1.47
3027.75*	18157	849.76	859.2	865.73	886.48	0.016127	41.91	433.2	67.13	2.91	0.015	860.67	860.67	1.47	1.47
3027.5*	18157	849.28	858.71	865.24	886.01	0.016143	41.92	433.1	67.14	2.91	0.015	860.18	860.18	1.47	1.47
3027.25*	18157	848.79	858.23	864.76	885.53	0.016146	41.93	433.02	67.12	2.91	0.015	859.7	859.7	1.47	1.47
3027.*	18157	848.31	857.75	864.28	885.06	0.016152	41.94	432.97	67.12	2.91	0.015	859.22	859.22	1.47	1.47
3026.75*	18157	847.83	857.27	863.8	884.58	0.016157	41.94	432.92	67.11	2.91	0.015	858.74	858.74	1.47	1.47
3026.5*	18157	847.35	856.79	863.32	884.11	0.016162	41.95	432.87	67.11	2.91	0.015	858.26	858.26	1.47	1.47
3026.25*	18157	846.87	856.31	862.84	883.63	0.016167	41.95	432.82	67.11	2.91	0.015	857.78	857.78	1.47	1.47
3026.*	18157	846.39	855.83	862.36	883.16	0.016172	41.95	432.77	67.11	2.91	0.015	857.3	857.3	1.47	1.47
3025.75*	18157	845.91	855.34	861.87	882.68	0.016186	41.96	432.68	67.11	2.91	0.015	856.81	856.81	1.47	1.47

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
3025.5*	18157	845.42	854.85	861.39	882.21	0.016189	41.97	432.61	67.1	2.91	0.015	856.33	856.33	1.48	1.48
3025.25*	18157	844.94	854.37	860.91	881.73	0.016194	41.98	432.56	67.09	2.91	0.015	855.85	855.85	1.48	1.48
3025.*	18157	844.46	853.89	860.43	881.26	0.016198	41.98	432.52	67.09	2.91	0.015	855.37	855.37	1.48	1.48
3024.75*	18157	843.98	853.41	859.95	880.78	0.016202	41.98	432.48	67.09	2.91	0.015	854.89	854.89	1.48	1.48
3024.5*	18157	843.5	852.93	859.47	880.31	0.016206	41.99	432.45	67.09	2.91	0.015	854.41	854.41	1.48	1.48
3024.25*	18157	843.02	852.45	858.99	879.83	0.01621	41.99	432.41	67.08	2.91	0.015	853.93	853.93	1.48	1.48
3024.*	18157	842.54	851.96	858.5	879.35	0.016223	42	432.32	67.09	2.92	0.015	853.44	853.44	1.48	1.48
3023.75*	18157	842.05	851.48	858.02	878.88	0.016226	42	432.26	67.07	2.92	0.015	852.96	852.96	1.48	1.48
3023.5*	18157	841.57	851	857.54	878.4	0.016229	42.01	432.22	67.07	2.92	0.015	852.48	852.48	1.48	1.48
3023.25*	18157	841.09	850.52	857.06	877.92	0.016233	42.01	432.19	67.07	2.92	0.015	852	852	1.48	1.48
3023.*	18157	840.61	850.04	856.58	877.45	0.016236	42.01	432.16	67.07	2.92	0.015	851.52	851.52	1.48	1.48
3022.75*	18157	840.13	849.56	856.1	876.97	0.016239	42.02	432.13	67.07	2.92	0.015	851.04	851.04	1.48	1.48
3022.5*	18157	839.65	849.07	855.61	876.49	0.016252	42.03	432.05	67.08	2.92	0.015	850.55	850.55	1.48	1.48
3022.25*	18157	839.17	848.59	855.13	876.02	0.016255	42.03	432.02	67.07	2.92	0.015	850.07	850.07	1.48	1.48
3022.*	18157	838.68	848.1	854.65	875.54	0.016256	42.03	431.97	67.06	2.92	0.015	849.59	849.59	1.49	1.49
3021.75*	18157	838.2	847.62	854.17	875.06	0.016259	42.04	431.94	67.06	2.92	0.015	849.11	849.11	1.49	1.49
3021.5*	18157	837.72	847.14	853.69	874.58	0.016262	42.04	431.91	67.05	2.92	0.015	848.63	848.63	1.49	1.49
3021.25*	18157	837.24	846.66	853.21	874.11	0.016264	42.04	431.89	67.05	2.92	0.015	848.15	848.15	1.49	1.49
3021.*	18157	836.76	846.18	852.73	873.63	0.016267	42.04	431.86	67.05	2.92	0.015	847.67	847.67	1.49	1.49
3020.75*	18157	836.28	845.7	852.24	873.15	0.016279	42.05	431.79	67.06	2.92	0.015	847.18	847.18	1.48	1.48
3020.5*	18157	835.8	845.21	851.76	872.67	0.016281	42.05	431.77	67.06	2.92	0.015	846.7	846.7	1.49	1.49
3020.25*	18157	835.31	844.73	851.28	872.2	0.016282	42.06	431.72	67.04	2.92	0.015	846.22	846.22	1.49	1.49
3020	18157	834.83	844.25	850.8	871.72	0.016284	42.06	431.71	67.05	2.92	0.015	845.74	845.74	1.49	1.49
3018.*	18157	834.34	843.77	850.31	871.23	0.016277	42.06	431.71	67.06	2.92	0.015	845.55	845.55	1.78	1.78
3016.*	18157	833.86	843.27	849.82	870.75	0.016276	42.06	431.67	67.06	2.92	0.015	845.36	845.36	2.09	2.09
3014.*	18157	833.37	842.79	849.32	870.26	0.016272	42.06	431.69	67.05	2.92	0.015	845.18	845.18	2.39	2.39
3012.*	18157	832.88	842.3	848.85	869.78	0.016282	42.06	431.65	67.04	2.92	0.015	844.99	844.99	2.69	2.69
3010	18157	832.39	841.81	848.34	869.29	0.016294	42.07	431.62	67.04	2.92	0.015	844.8	844.8	2.99	2.99
3009.72*	18157	831.91	841.33	847.86	868.81	0.016295	42.07	431.6	67.03	2.92	0.015	844.32	844.32	2.99	2.99
3009.44*	18157	831.43	840.85	847.38	868.33	0.01629	42.06	431.64	67.04	2.92	0.015	843.84	843.84	2.99	2.99
3009.16*	18157	830.95	840.36	846.89	867.85	0.016301	42.07	431.58	67.05	2.92	0.015	843.35	843.35	2.99	2.99
3008.88*	18157	830.46	839.88	846.41	867.37	0.016301	42.07	431.54	67.03	2.92	0.015	842.87	842.87	2.99	2.99
3008.61*	18157	829.98	839.4	845.93	866.88	0.016297	42.07	431.58	67.03	2.92	0.015	842.39	842.39	2.99	2.99
3008.33*	18157	829.5	838.92	845.45	866.4	0.016292	42.07	431.62	67.04	2.92	0.015	841.91	841.91	2.99	2.99
3008.05*	18157	829.02	838.43	844.96	865.92	0.016304	42.07	431.56	67.05	2.92	0.015	841.42	841.42	2.99	2.99
3007.77*	18157	828.54	837.95	844.48	865.43	0.016299	42.07	431.61	67.05	2.92	0.015	840.94	840.94	2.99	2.99
3007.5*	18157	828.05	837.47	844	864.95	0.016298	42.07	431.57	67.03	2.92	0.015	840.46	840.46	2.99	2.99
3007.22*	18157	827.57	836.99	843.52	864.47	0.016293	42.07	431.61	67.04	2.92	0.015	839.98	839.98	2.99	2.99
3006.94*	18157	827.09	836.51	843.04	863.98	0.016288	42.06	431.66	67.04	2.92	0.015	839.5	839.5	2.99	2.99
3006.66*	18157	826.61	836.02	842.55	863.5	0.016299	42.07	431.6	67.05	2.92	0.015	839.01	839.01	2.99	2.99

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
3006.38*	18157	826.12	835.54	842.07	863.02	0.016299	42.07	431.56	67.03	2.92	0.015	838.53	838.53	2.99	2.99
3006.11*	18157	825.64	835.06	841.59	862.54	0.016295	42.07	431.6	67.04	2.92	0.015	838.05	838.05	2.99	2.99
3005.83*	18157	825.16	834.58	841.11	862.05	0.01629	42.06	431.65	67.04	2.92	0.015	837.57	837.57	2.99	2.99
3005.55*	18157	824.68	834.09	840.62	861.58	0.016301	42.07	431.59	67.05	2.92	0.015	837.08	837.08	2.99	2.99
3005.27*	18157	824.2	833.61	840.14	861.09	0.016295	42.07	431.64	67.05	2.92	0.015	836.6	836.6	2.99	2.99
3005.*	18157	823.71	833.13	839.66	860.61	0.016295	42.07	431.59	67.03	2.92	0.015	836.12	836.12	2.99	2.99
3004.72*	18157	823.23	832.65	839.18	860.13	0.01629	42.06	431.64	67.04	2.92	0.015	835.64	835.64	2.99	2.99
3004.44*	18157	822.75	832.17	838.7	859.64	0.016284	42.06	431.7	67.04	2.92	0.015	835.16	835.16	2.99	2.99
3004.16*	18157	822.27	831.68	838.21	859.16	0.016296	42.07	431.63	67.05	2.92	0.015	834.67	834.67	2.99	2.99
3003.88*	18157	821.78	831.2	837.73	858.68	0.016296	42.07	431.59	67.03	2.92	0.015	834.19	834.19	2.99	2.99
3003.61*	18157	821.3	830.72	837.25	858.2	0.016291	42.07	431.64	67.04	2.92	0.015	833.71	833.71	2.99	2.99
3003.33*	18157	820.82	830.24	836.77	857.71	0.016285	42.06	431.7	67.04	2.92	0.015	833.23	833.23	2.99	2.99
3003.05*	18157	820.34	829.75	836.28	857.23	0.016296	42.07	431.63	67.05	2.92	0.015	832.74	832.74	2.99	2.99
3002.77*	18157	819.86	829.27	835.8	856.74	0.016289	42.06	431.7	67.05	2.92	0.015	832.26	832.26	2.99	2.99
3002.5*	18157	819.37	828.79	835.32	856.26	0.016289	42.06	431.65	67.04	2.92	0.015	831.78	831.78	2.99	2.99
3002.22*	18157	818.89	828.31	834.84	855.78	0.016282	42.06	431.72	67.04	2.92	0.015	831.3	831.3	2.99	2.99
3001.94*	18157	818.41	827.83	834.36	855.29	0.016275	42.05	431.79	67.05	2.92	0.015	830.82	830.82	2.99	2.99
3001.66*	18157	817.93	827.34	833.87	854.81	0.016287	42.06	431.72	67.06	2.92	0.015	830.33	830.33	2.99	2.99
3001.38*	18157	817.44	826.86	833.39	854.33	0.016287	42.06	431.68	67.04	2.92	0.015	829.85	829.85	2.99	2.99
3001.11*	18157	816.96	826.38	832.91	853.84	0.01628	42.06	431.74	67.04	2.92	0.015	829.37	829.37	2.99	2.99
3000.83*	18157	816.48	825.9	832.43	853.36	0.016272	42.05	431.82	67.05	2.92	0.015	828.89	828.89	2.99	2.99
3000.55*	18157	816	825.41	831.94	852.88	0.016284	42.05	431.75	67.06	2.92	0.015	828.4	828.4	2.99	2.99
3000.27*	18157	815.52	824.94	831.46	852.39	0.016274	42.05	431.84	67.06	2.92	0.015	827.92	827.92	2.98	2.98
3000	18157	815.03	824.45	830.98	851.91	0.016275	42.05	431.8	67.05	2.92	0.015	827.44	827.44	2.99	2.99
2999.99	Bridge														
2998.33*	18157	814.58	824	830.56	851.43	0.016251	42.03	432	67.08	2.92	0.015	826.73	826.73	2.73	2.73
2996.66*	18157	814.12	823.55	830.07	850.98	0.016243	42.03	432	67.07	2.92	0.015	826.03	826.03	2.48	2.48
2995.*	18157	813.67	823.09	829.62	850.53	0.01624	42.03	431.97	67.06	2.92	0.015	825.33	825.33	2.24	2.24
2993.33*	18157	813.21	822.64	829.19	850.08	0.01625	42.04	431.93	67.07	2.92	0.015	824.62	824.62	1.98	1.98
2991.66*	18157	812.76	822.18	828.72	849.63	0.016254	42.04	431.9	67.05	2.92	0.015	823.92	823.92	1.74	1.74
2990	18157	812.3	821.72	828.27	849.17	0.01627	42.05	431.85	67.05	2.92	0.015	823.21	823.21	1.49	1.49
2989.77*	18157	811.82	821.24	827.79	848.69	0.016265	42.04	431.88	67.05	2.92	0.015	822.73	822.73	1.49	1.49
2989.54*	18157	811.33	820.75	827.3	848.21	0.016274	42.05	431.8	67.05	2.92	0.015	822.24	822.24	1.49	1.49
2989.31*	18157	810.85	820.27	826.82	847.73	0.016274	42.05	431.8	67.05	2.92	0.015	821.76	821.76	1.49	1.49
2989.09*	18157	810.37	819.78	826.33	847.25	0.016284	42.05	431.75	67.06	2.92	0.015	821.27	821.27	1.49	1.49
2988.86*	18157	809.88	819.3	825.85	846.77	0.016282	42.06	431.72	67.04	2.92	0.015	820.79	820.79	1.49	1.49
2988.63*	18157	809.4	818.81	825.36	846.29	0.016292	42.06	431.67	67.05	2.92	0.015	820.3	820.3	1.49	1.49
2988.62	Bridge														
2988.40*	18157	808.91	818.34	824.92	845.75	0.016236	42.01	432.16	67.07	2.92	0.015	819.82	819.82	1.48	1.48
2988.18*	18157	808.43	817.86	824.4	845.27	0.016237	42.02	432.15	67.07	2.92	0.015	819.34	819.34	1.48	1.48

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2987.95*	18157	807.94	817.37	823.91	844.79	0.016246	42.02	432.06	67.06	2.92	0.015	818.85	818.85	1.48	1.48
2987.72*	18157	807.46	816.89	823.43	844.31	0.016246	42.02	432.06	67.06	2.92	0.015	818.37	818.37	1.48	1.48
2987.5*	18157	806.97	816.39	822.94	843.83	0.016255	42.03	431.98	67.06	2.92	0.015	817.88	817.88	1.49	1.49
2987.27*	18157	806.49	815.91	822.46	843.35	0.016255	42.03	431.98	67.06	2.92	0.015	817.4	817.4	1.49	1.49
2987.04*	18157	806.01	815.43	821.97	842.87	0.016265	42.04	431.92	67.07	2.92	0.015	816.91	816.91	1.48	1.48
2986.81*	18157	805.52	814.94	821.49	842.39	0.016264	42.04	431.89	67.05	2.92	0.015	816.43	816.43	1.49	1.49
2986.59*	18157	805.04	814.46	821.01	841.91	0.016264	42.04	431.89	67.05	2.92	0.015	815.95	815.95	1.49	1.49
2986.36*	18157	804.55	813.97	820.52	841.43	0.016273	42.05	431.81	67.05	2.92	0.015	815.46	815.46	1.49	1.49
2986.13*	18157	804.07	813.49	820.04	840.95	0.016273	42.05	431.81	67.05	2.92	0.015	814.98	814.98	1.49	1.49
2985.90*	18157	803.58	813	819.55	840.47	0.016281	42.06	431.73	67.04	2.92	0.015	814.49	814.49	1.49	1.49
2985.68*	18157	803.1	812.52	819.07	839.99	0.016281	42.06	431.73	67.04	2.92	0.015	814.01	814.01	1.49	1.49
2985.45*	18157	802.62	812.03	818.58	839.5	0.01629	42.06	431.68	67.05	2.92	0.015	813.52	813.52	1.49	1.49
2985.22*	18157	802.13	811.55	818.1	839.02	0.016289	42.06	431.66	67.04	2.92	0.015	813.04	813.04	1.49	1.49
2985.*	18157	801.65	811.07	817.62	838.54	0.016289	42.06	431.66	67.04	2.92	0.015	812.56	812.56	1.49	1.49
2984.77*	18157	801.16	810.58	817.13	838.06	0.016297	42.07	431.58	67.03	2.92	0.015	812.07	812.07	1.49	1.49
2984.54*	18157	800.68	810.1	816.65	837.58	0.016297	42.07	431.58	67.03	2.92	0.015	811.59	811.59	1.49	1.49
2984.31*	18157	800.19	809.61	816.16	837.1	0.016304	42.08	431.51	67.03	2.92	0.015	811.1	811.1	1.49	1.49
2984.09*	18157	799.71	809.13	815.68	836.62	0.016304	42.08	431.51	67.03	2.92	0.015	810.62	810.62	1.49	1.49
2983.86*	18157	799.22	808.64	815.19	836.14	0.016312	42.08	431.44	67.03	2.92	0.015	810.13	810.13	1.49	1.49
2983.63*	18157	798.74	808.16	814.71	835.66	0.016312	42.08	431.44	67.03	2.92	0.015	809.65	809.65	1.49	1.49
2983.40*	18157	798.26	807.67	814.22	835.18	0.01632	42.09	431.4	67.04	2.92	0.015	809.16	809.16	1.49	1.49
2983.18*	18157	797.77	807.19	813.74	834.68	0.016306	42.08	431.49	67.03	2.92	0.015	808.68	808.68	1.49	1.49
2982.95*	18157	797.29	806.71	813.26	834.2	0.016306	42.08	431.49	67.03	2.92	0.015	808.2	808.2	1.49	1.49
2982.72*	18157	796.8	806.22	812.77	833.72	0.016314	42.09	431.42	67.02	2.92	0.015	807.71	807.71	1.49	1.49
2982.5*	18157	796.32	805.74	812.29	833.24	0.016314	42.09	431.42	67.02	2.92	0.015	807.23	807.23	1.49	1.49
2982.27*	18157	795.83	805.25	811.8	832.76	0.016321	42.09	431.35	67.02	2.92	0.015	806.74	806.74	1.49	1.49
2982.04*	18157	795.35	804.77	811.32	832.28	0.016321	42.09	431.35	67.02	2.92	0.015	806.26	806.26	1.49	1.49
2981.81*	18157	794.87	804.28	810.83	831.8	0.01633	42.1	431.31	67.03	2.92	0.015	805.77	805.77	1.49	1.49
2981.59*	18157	794.38	803.8	810.35	831.3	0.016317	42.09	431.39	67.02	2.92	0.015	805.29	805.29	1.49	1.49
2981.36*	18157	793.9	803.32	809.87	830.82	0.016317	42.09	431.39	67.02	2.92	0.015	804.81	804.81	1.49	1.49
2981.13*	18157	793.41	802.82	809.38	830.34	0.016325	42.1	431.32	67.02	2.92	0.015	804.32	804.32	1.5	1.5
2981.12	Bridge														
2980.90*	18157	792.93	802.35	808.94	829.8	0.016271	42.05	431.83	67.05	2.92	0.015	803.84	803.84	1.49	1.49
2980.68*	18157	792.44	801.86	808.41	829.32	0.016279	42.05	431.75	67.04	2.92	0.015	803.35	803.35	1.49	1.49
2980.45*	18157	791.96	801.38	807.93	828.84	0.016279	42.05	431.75	67.04	2.92	0.015	802.87	802.87	1.49	1.49
2980.22*	18157	791.47	800.89	807.44	828.36	0.016287	42.06	431.67	67.04	2.92	0.015	802.38	802.38	1.49	1.49
2980	18157	790.99	800.41	806.96	827.88	0.016287	42.06	431.67	67.04	2.92	0.015	801.9	801.9	1.49	1.49
2979.41*	18157	790.51	799.93	806.48	827.4	0.01629	42.06	431.65	67.04	2.92	0.015	801.42	801.42	1.49	1.49
2978.82*	18157	790.03	799.45	806	826.93	0.016292	42.07	431.63	67.04	2.92	0.015	800.94	800.94	1.49	1.49
2978.23*	18157	789.55	798.97	805.52	826.45	0.016294	42.07	431.6	67.04	2.92	0.015	800.46	800.46	1.49	1.49

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2977.64*	18157	789.07	798.49	805.04	825.97	0.016297	42.07	431.58	67.03	2.92	0.015	799.98	799.98	1.49	1.49
2977.05*	18157	788.59	798	804.55	825.49	0.016309	42.08	431.51	67.04	2.92	0.015	799.49	799.49	1.49	1.49
2976.47*	18157	788.1	797.52	804.07	825.02	0.016309	42.08	431.46	67.03	2.92	0.015	799.01	799.01	1.49	1.49
2975.88*	18157	787.62	797.04	803.59	824.53	0.0163	42.07	431.55	67.03	2.92	0.015	798.53	798.53	1.49	1.49
2975.29*	18157	787.14	796.56	803.11	824.03	0.016289	42.06	431.66	67.04	2.92	0.015	798.05	798.05	1.49	1.49
2974.70*	18157	786.66	796.08	802.63	823.56	0.016291	42.07	431.63	67.04	2.92	0.015	797.57	797.57	1.49	1.49
2974.11*	18157	786.18	795.6	802.15	823.08	0.016294	42.07	431.61	67.04	2.92	0.015	797.09	797.09	1.49	1.49
2973.52*	18157	785.7	795.12	801.67	822.6	0.016296	42.07	431.59	67.03	2.92	0.015	796.61	796.61	1.49	1.49
2972.94*	18157	785.22	794.64	801.19	822.12	0.016298	42.07	431.57	67.03	2.92	0.015	796.13	796.13	1.49	1.49
2972.35*	18157	784.74	794.16	800.71	821.65	0.0163	42.07	431.55	67.03	2.92	0.015	795.65	795.65	1.49	1.49
2971.76*	18157	784.26	793.67	800.22	821.17	0.016312	42.08	431.48	67.04	2.92	0.015	795.16	795.16	1.49	1.49
2971.17*	18157	783.78	793.19	799.74	820.68	0.016302	42.07	431.57	67.05	2.92	0.015	794.68	794.68	1.49	1.49
2970.58*	18157	783.3	792.71	799.26	820.19	0.016293	42.06	431.66	67.05	2.92	0.015	794.2	794.2	1.49	1.49
2970	18157	782.81	792.23	798.78	819.71	0.016293	42.07	431.63	67.04	2.92	0.015	793.72	793.72	1.49	1.49
2960	18157	782.57	791.79	798.33	819.22	0.016295	42.03	431.99	67.17	2.92	0.015	793.25	793.25	1.46	1.46
2950	18157	782.39	791.34	797.94	818.86	0.016068	42.1	431.28	66.04	2.9	0.015	792.89	792.89	1.55	1.55
2940	18157	782.17	790.97	797.63	818.64	0.015984	42.21	430.15	65.1	2.89	0.015	792.67	792.67	1.7	1.7
2930	18157	779.57	790.4	797.16	818.36	0.017435	42.43	427.9	63.66	2.88	0.015	792.43	792.43	2.03	2.03
2928.*	18157	779.08	789.74	796.49	817.81	0.018301	42.52	427.02	66.72	2.96	0.015	791.93	791.93	2.19	2.19
2926.*	18157	778.59	789	795.84	817.23	0.018618	42.64	425.8	65.84	2.95	0.015	791.44	791.44	2.44	2.44
2924.*	18157	778.1	788.28	795.19	816.66	0.018828	42.75	424.71	63.89	2.92	0.015	790.95	790.95	2.67	2.67
2922.*	18157	777.61	787.56	794.56	816.07	0.019168	42.85	423.74	61.95	2.89	0.015	790.46	790.46	2.9	2.9
2920	18157	777.12	786.87	793.96	815.48	0.019653	42.93	422.99	60	2.85	0.015	789.97	789.97	3.1	3.1
2916.66*	18157	776.72	786.49	793.56	814.97	0.019511	42.83	423.96	60	2.84	0.015	789.58	789.58	3.09	3.09
2913.33*	18157	776.33	786.11	793.2	814.48	0.019396	42.74	424.8	60	2.83	0.015	789.18	789.18	3.07	3.07
2910	18157	775.94	785.74	792.81	813.98	0.019264	42.65	425.73	60	2.82	0.015	788.79	788.79	3.05	3.05
2908.57*	18157	775.47	785.29	792.34	813.39	0.019116	42.54	426.81	60	2.81	0.015	788.43	788.43	3.14	3.14
2907.14*	18157	775	784.83	791.85	812.81	0.01898	42.44	427.8	60	2.8	0.015	788.07	788.07	3.24	3.24
2905.71*	18157	774.53	784.38	791.37	812.23	0.01885	42.35	428.74	60	2.79	0.015	787.71	787.71	3.33	3.33
2904.28*	18157	774.06	783.93	790.9	811.66	0.01872	42.26	429.67	60	2.78	0.015	787.34	787.34	3.41	3.41
2902.85*	18157	773.6	783.48	790.43	811.09	0.018604	42.17	430.55	60	2.77	0.015	786.98	786.98	3.5	3.5
2901.42*	18157	773.13	783.02	789.96	810.53	0.018489	42.08	431.44	60	2.77	0.015	786.62	786.62	3.6	3.6
2900	18157	772.66	782.56	789.49	809.98	0.018398	42.02	432.12	60	2.76	0.015	786.26	786.26	3.7	3.7
2897.5*	18157	772.25	782.17	789.08	809.5	0.018318	41.96	432.74	60	2.75	0.015	785.85	785.85	3.68	3.68
2895.*	18157	771.84	781.77	788.67	809.03	0.018241	41.9	433.33	60	2.75	0.015	785.44	785.44	3.67	3.67
2892.5*	18157	771.43	781.37	788.26	808.56	0.018167	41.85	433.9	60	2.74	0.015	785.03	785.03	3.66	3.66
2890	18352	771.02	781.06	787.95	808.05	0.017749	41.69	440.22	60	2.71	0.015	784.62	784.62	3.56	3.56
2889.*	18352	770.61	780.68	787.54	807.45	0.017533	41.52	441.98	60	2.7	0.015	784.21	784.21	3.53	3.53
2888.*	18352	770.2	780.3	787.13	806.87	0.01733	41.37	443.65	60	2.68	0.015	783.8	783.8	3.5	3.5
2887.*	18352	769.79	779.92	786.72	806.29	0.017137	41.22	445.27	60	2.67	0.015	783.39	783.39	3.47	3.47

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2886.*	18352	769.38	779.53	786.31	805.73	0.016961	41.08	446.74	60	2.65	0.015	782.98	782.98	3.45	3.45
2885.*	18352	768.96	779.14	785.9	805.17	0.016792	40.95	448.18	60	2.64	0.015	782.57	782.57	3.43	3.43
2884.*	18352	768.55	778.75	785.48	804.62	0.016636	40.82	449.58	60	2.63	0.015	782.15	782.15	3.4	3.4
2883.*	18352	768.14	778.36	785.07	804.08	0.016481	40.7	450.94	60	2.62	0.015	781.74	781.74	3.38	3.38
2882.*	18352	767.73	777.97	784.66	803.54	0.016334	40.58	452.26	60	2.6	0.015	781.33	781.33	3.36	3.36
2881.*	18352	767.32	777.58	784.25	803.01	0.016196	40.47	453.51	60	2.59	0.015	780.92	780.92	3.34	3.34
2880	18352	766.91	777.19	783.84	802.5	0.01608	40.37	454.55	60	2.58	0.015	780.51	780.51	3.32	3.32
2879.68*	18352	766.58	776.9	783.51	801.95	0.015822	40.16	456.96	60	2.56	0.015	780.18	780.18	3.28	3.28
2879.37*	18352	766.26	776.62	783.19	801.4	0.015568	39.95	459.35	60	2.54	0.015	779.86	779.86	3.24	3.24
2879.06*	18352	765.93	776.33	782.86	800.87	0.015333	39.75	461.65	60	2.53	0.015	779.53	779.53	3.2	3.2
2878.75*	18352	765.6	776.03	782.53	800.35	0.015117	39.57	463.79	60	2.51	0.015	779.2	779.2	3.17	3.17
2878.43*	18352	765.28	775.75	782.21	799.83	0.014901	39.39	465.95	60	2.49	0.015	778.88	778.88	3.13	3.13
2878.12*	18352	764.95	775.45	781.88	799.33	0.014701	39.21	468.02	60	2.47	0.015	778.55	778.55	3.1	3.1
2877.81*	18352	764.62	775.16	781.55	798.84	0.014518	39.05	469.93	60	2.46	0.015	778.22	778.22	3.06	3.06
2877.5*	18352	764.3	774.87	781.23	798.35	0.014327	38.88	471.97	60	2.44	0.015	777.9	777.9	3.03	3.03
2877.18*	18352	763.97	774.57	780.9	797.87	0.014163	38.74	473.73	60	2.43	0.015	777.57	777.57	3	3
2876.87*	18352	763.64	774.27	780.57	797.4	0.014008	38.6	475.44	60	2.42	0.015	777.24	777.24	2.97	2.97
2876.56*	18352	763.32	773.98	780.25	796.94	0.013844	38.45	477.27	60	2.4	0.015	776.92	776.92	2.94	2.94
2876.25*	18352	762.99	773.67	779.92	796.5	0.01372	38.34	478.67	60	2.39	0.015	776.59	776.59	2.92	2.92
2875.93*	18352	762.66	773.37	779.6	796.05	0.013581	38.22	480.22	60	2.38	0.015	776.27	776.27	2.9	2.9
2875.62*	18352	762.34	773.07	779.27	795.61	0.013458	38.1	481.69	60	2.37	0.015	775.94	775.94	2.87	2.87
2875.31*	18352	762.01	772.76	778.94	795.18	0.013349	38	482.97	60	2.36	0.015	775.61	775.61	2.85	2.85
2875.*	18352	761.68	772.46	778.62	794.76	0.013243	37.9	484.19	60	2.35	0.015	775.29	775.29	2.83	2.83
2874.68*	18352	761.36	772.16	778.29	794.34	0.013133	37.8	485.55	60	2.34	0.015	774.96	774.96	2.8	2.8
2874.37*	18352	761.03	771.85	777.96	793.92	0.013039	37.71	486.69	60	2.33	0.015	774.63	774.63	2.78	2.78
2874.06*	18352	760.71	771.54	777.64	793.51	0.012935	37.61	487.94	60	2.32	0.015	774.31	774.31	2.77	2.77
2873.75*	18352	760.38	771.23	777.31	793.1	0.012851	37.53	489.01	60	2.32	0.015	773.98	773.98	2.75	2.75
2873.43*	18352	760.05	770.92	776.98	792.7	0.012768	37.45	490.04	60	2.31	0.015	773.65	773.65	2.73	2.73
2873.12*	18352	759.73	770.62	776.66	792.29	0.012676	37.36	491.17	60	2.3	0.015	773.33	773.33	2.71	2.71
2872.81*	18352	759.4	770.31	776.33	791.9	0.012603	37.29	492.13	60	2.29	0.015	773	773	2.69	2.69
2872.5*	18352	759.07	769.99	776	791.5	0.012531	37.22	493.04	60	2.29	0.015	772.67	772.67	2.68	2.68
2872.18*	18352	758.75	769.68	775.68	791.11	0.01245	37.14	494.07	60	2.28	0.015	772.35	772.35	2.67	2.67
2871.87*	18352	758.42	769.37	775.35	790.72	0.012386	37.08	494.93	60	2.28	0.015	772.02	772.02	2.65	2.65
2871.56*	18352	758.09	769.06	775.02	790.34	0.012325	37.02	495.73	60	2.27	0.015	771.69	771.69	2.63	2.63
2871.25*	18352	757.77	768.75	774.7	789.95	0.012254	36.95	496.65	60	2.26	0.015	771.37	771.37	2.62	2.62
2870.93*	18352	757.44	768.43	774.37	789.57	0.012198	36.89	497.41	60	2.26	0.015	771.04	771.04	2.61	2.61
2870.62*	18352	757.11	768.12	774.04	789.19	0.012145	36.84	498.12	60	2.25	0.015	770.71	770.71	2.59	2.59
2870.31*	18352	756.79	767.81	773.72	788.81	0.012079	36.78	499.01	60	2.25	0.015	770.39	770.39	2.58	2.58
2870	18352	756.46	767.49	773.39	788.44	0.012031	36.73	499.64	60	2.24	0.015	770.06	770.06	2.57	2.57
2868.88*	18352	756.24	767.3	773.17	788.07	0.01187	36.57	501.84	60	2.23	0.015	769.92	769.92	2.62	2.62

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2867.77*	18352	756.01	767.12	772.92	787.69	0.011707	36.4	504.15	60	2.21	0.015	769.78	769.78	2.66	2.66
2866.66*	18352	755.79	766.93	772.7	787.33	0.011557	36.25	506.25	60	2.2	0.015	769.64	769.64	2.71	2.71
2865.55*	18352	755.56	766.74	772.48	786.97	0.011408	36.1	508.44	60	2.19	0.015	769.5	769.5	2.76	2.76
2864.44*	18352	755.34	766.55	772.26	786.61	0.01126	35.94	510.58	60	2.17	0.015	769.35	769.35	2.8	2.8
2863.33*	18352	755.11	766.35	772.03	786.27	0.011142	35.82	512.37	60	2.16	0.015	769.21	769.21	2.86	2.86
2862.22*	18352	754.89	766.16	771.8	785.93	0.011007	35.68	514.4	60	2.15	0.015	769.07	769.07	2.91	2.91
2861.11*	18352	754.66	765.97	771.59	785.59	0.010884	35.54	516.32	60	2.14	0.015	768.93	768.93	2.96	2.96
2860	18352	754.44	765.78	771.38	785.25	0.01076	35.41	518.25	60	2.12	0.015	768.79	768.79	3.01	3.01
2859.67*	18352	754.09	765.43	771.03	784.93	0.010787	35.44	517.8	60	2.13	0.015	768.45	768.45	3.02	3.02
2859.35*	18352	753.75	765.08	770.69	784.61	0.010815	35.47	517.41	60	2.13	0.015	768.1	768.1	3.02	3.02
2859.03*	18352	753.41	764.73	770.35	784.29	0.010837	35.49	517.05	60	2.13	0.015	767.76	767.76	3.03	3.03
2858.71*	18352	753.07	764.38	770.01	783.97	0.010862	35.52	516.64	60	2.13	0.015	767.42	767.42	3.04	3.04
2858.38*	18352	752.72	764.03	769.66	783.65	0.010885	35.55	516.26	60	2.14	0.015	767.08	767.08	3.05	3.05
2858.06*	18352	752.38	763.68	769.32	783.33	0.010911	35.57	515.91	60	2.14	0.015	766.73	766.73	3.05	3.05
2857.74*	18352	752.04	763.34	768.98	783.01	0.010931	35.59	515.6	60	2.14	0.015	766.39	766.39	3.05	3.05
2857.41*	18352	751.69	762.98	768.63	782.69	0.010955	35.62	515.18	60	2.14	0.015	766.05	766.05	3.07	3.07
2857.09*	18352	751.35	762.64	768.29	782.36	0.010978	35.64	514.86	60	2.14	0.015	765.7	765.7	3.06	3.06
2856.77*	18352	751.01	762.29	767.95	782.04	0.010997	35.66	514.58	60	2.15	0.015	765.36	765.36	3.07	3.07
2856.45*	18352	750.67	761.94	767.61	781.72	0.011017	35.69	514.25	60	2.15	0.015	765.02	765.02	3.08	3.08
2856.12*	18352	750.32	761.59	767.26	781.39	0.011036	35.71	513.94	60	2.15	0.015	764.68	764.68	3.09	3.09
2855.80*	18352	749.98	761.25	766.92	781.07	0.011057	35.73	513.66	60	2.15	0.015	764.33	764.33	3.08	3.08
2855.48*	18352	749.64	760.9	766.58	780.74	0.011073	35.74	513.42	60	2.15	0.015	763.99	763.99	3.09	3.09
2855.16*	18352	749.29	760.55	766.23	780.41	0.011094	35.77	513.06	60	2.16	0.015	763.65	763.65	3.1	3.1
2854.83*	18352	748.95	760.2	765.89	780.09	0.011113	35.79	512.81	60	2.16	0.015	763.3	763.3	3.1	3.1
2854.51*	18352	748.61	759.86	765.55	779.75	0.011119	35.79	512.72	60	2.16	0.015	762.96	762.96	3.1	3.1
2854.19*	18352	748.27	759.51	765.21	779.43	0.011136	35.81	512.44	60	2.16	0.015	762.62	762.62	3.11	3.11
2853.87*	18352	747.92	759.16	764.86	779.1	0.011152	35.83	512.18	60	2.16	0.015	762.28	762.28	3.12	3.12
2853.54*	18352	747.58	758.82	764.52	778.76	0.011161	35.84	512.09	60	2.16	0.015	761.93	761.93	3.11	3.11
2853.22*	18352	747.24	758.48	764.18	778.43	0.011166	35.84	512.01	60	2.16	0.015	761.59	761.59	3.11	3.11
2852.90*	18352	746.89	758.12	763.83	778.1	0.011184	35.86	511.7	60	2.16	0.015	761.25	761.25	3.13	3.13
2852.58*	18352	746.55	757.78	763.49	777.76	0.011189	35.87	511.62	60	2.16	0.015	760.91	760.91	3.13	3.13
2852.25*	18352	746.21	757.44	763.15	777.43	0.011198	35.88	511.53	60	2.17	0.015	760.56	760.56	3.12	3.12
2851.93*	18352	745.87	757.09	762.81	777.1	0.011213	35.89	511.29	60	2.17	0.015	760.22	760.22	3.13	3.13
2851.61*	18352	745.52	756.75	762.46	776.76	0.011218	35.9	511.2	60	2.17	0.015	759.88	759.88	3.13	3.13
2851.29*	18352	745.18	756.4	762.12	776.42	0.011226	35.91	511.11	60	2.17	0.015	759.53	759.53	3.13	3.13
2850.96*	18352	744.84	756.06	761.78	776.09	0.011231	35.91	511.04	60	2.17	0.015	759.19	759.19	3.13	3.13
2850.64*	18352	744.49	755.71	761.43	775.76	0.011247	35.93	510.76	60	2.17	0.015	758.85	758.85	3.14	3.14
2850.32*	18352	744.15	755.36	761.09	775.43	0.011266	35.95	510.47	60	2.17	0.015	758.51	758.51	3.15	3.15
2850	18352	743.81	755.02	760.75	775.1	0.011273	35.96	510.39	60	2.17	0.015	758.16	758.16	3.14	3.14
2847.5*	18352	743.53	754.74	760.45	774.81	0.011267	35.95	510.45	60	2.17	0.015	757.7	757.7	2.96	2.96

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2845.*	18352	743.26	754.47	760.18	774.54	0.011263	35.94	510.57	60	2.17	0.015	757.24	757.24	2.77	2.77
2842.5*	18352	742.98	754.2	759.9	774.25	0.011256	35.94	510.62	60	2.17	0.015	756.77	756.77	2.57	2.57
2840	18352	742.71	753.93	759.64	773.97	0.011249	35.93	510.77	60	2.17	0.015	756.31	756.31	2.38	2.38
2830	18352	745.56	754.53	760.06	773.63	0.009734	35.08	523.19	60	2.09	0.015	756.31	756.31	1.78	1.78
2829.09*	18352	745.23	754.19	759.74	773.35	0.009774	35.12	522.49	60	2.1	0.015	755.92	755.92	1.73	1.73
2828.18*	18352	744.91	753.86	759.42	773.06	0.009805	35.16	521.94	60	2.1	0.015	755.53	755.53	1.67	1.67
2827.27*	18352	744.58	753.52	759.09	772.77	0.009844	35.21	521.25	60	2.11	0.015	755.13	755.13	1.61	1.61
2826.36*	18352	744.26	753.19	758.77	772.47	0.009873	35.24	520.74	60	2.11	0.015	754.74	754.74	1.55	1.55
2825.45*	18352	743.93	752.85	758.44	772.18	0.009911	35.29	520.09	60	2.11	0.015	754.35	754.35	1.5	1.5
2824.54*	18352	743.61	752.52	758.11	771.89	0.009939	35.32	519.61	60	2.12	0.015	753.96	753.96	1.44	1.44
2823.63*	18352	743.28	752.18	757.78	771.6	0.009975	35.36	518.99	60	2.12	0.015	753.57	753.57	1.39	1.39
2822.72*	18352	742.96	751.85	757.46	771.3	0.010001	35.39	518.54	60	2.12	0.015	753.18	753.18	1.33	1.33
2821.81*	18352	742.63	751.51	757.13	771.01	0.010035	35.43	517.96	60	2.13	0.015	752.78	752.78	1.27	1.27
2820.90*	18352	742.31	751.19	756.81	770.71	0.01006	35.46	517.54	60	2.13	0.015	752.39	752.39	1.2	1.2
2820	18352	741.98	750.85	756.49	770.41	0.010089	35.49	517.04	60	2.13	0.015	752	752	1.15	1.15
2817.5*	18352	741.49	749.39	754.25	769.54	0.55573	39.02	595.11	128.14	2.66	0.099	745.4	744.13	-3.99	-5.26
2810	18352	740	759.75	752.28	760.47	0.006402	7.09	2985.18	275.58	0.32	0.094	755	750	-4.75	-9.75
2808.66*	18352	740	759.28	752.2	760.06	0.007012	7.38	2876.57	268.56	0.34	0.094	753.81	749.21	-5.47	-10.07
2808.*	18352	740	759.03	752.14	759.84	0.007368	7.54	2820.2	264.89	0.35	0.094	753.21	748.81	-5.82	-10.22
2807.33*	18352	740	758.76	752.08	759.61	0.00778	7.72	2761.11	261.27	0.36	0.094	752.62	748.41	-6.14	-10.35
2806.66*	18352	740	758.47	751.97	759.37	0.008263	7.92	2697.96	257.09	0.37	0.094	752.02	748.02	-6.45	-10.45
2806.*	18352	740	758.17	751.9	759.11	0.00882	8.13	2631.76	252.49	0.38	0.095	751.42	747.62	-6.74	-10.54
2805.33*	18352	740	757.83	751.83	758.83	0.009477	8.37	2561.32	247.66	0.39	0.095	750.83	747.22	-7	-10.61
2804.66*	18352	740	757.57	751.81	758.54	0.009332	8.27	2509.36	243.21	0.39	0.092	750.23	746.82	-7.34	-10.75
2804.*	18352	740	757.22	751.74	758.24	0.009968	8.47	2438.72	238.14	0.4	0.092	749.64	746.43	-7.58	-10.79
2803.33*	18352	740	756.85	751.7	757.93	0.010722	8.7	2363.68	232.83	0.42	0.092	749.04	746.03	-7.81	-10.82
2802.66*	18352	740	756.44	751.65	757.59	0.01165	8.96	2282.6	227.27	0.43	0.092	748.45	745.63	-7.99	-10.81
2802.*	18352	740	755.97	751.56	757.21	0.012871	9.28	2191.56	221.36	0.45	0.092	747.85	745.24	-8.12	-10.73
2801.33*	18352	740	755.44	751.48	756.79	0.01452	9.67	2089.04	215.03	0.48	0.092	747.25	744.84	-8.19	-10.6
2800	18352	740	754.18	751.04	755.8	0.017964	10.23	1857.02	201.38	0.53	0.088	745	745	-9.18	-9.18
2799.41*	18352	739.51	753.24	751.02	755.42	0.007024	12.68	1736.93	197.25	0.66	0.05	743.68	744.05	-9.56	-9.19
2798.82*	18352	739.02	753.1	750.66	755.2	0.006546	12.44	1775.6	197.74	0.64	0.05	743.14	743.8	-9.96	-9.3
2798.23*	18352	738.54	752.97	750.29	754.99	0.006092	12.2	1816.92	198.51	0.62	0.05	742.59	743.54	-10.38	-9.43
2797.64*	18352	738.05	751.43	750.47	754.63	0.011823	15.22	1416.2	170.56	0.8	0.048	742.05	875	-9.38	123.57
2797.05*	18352	737.56	751.12	750.07	754.27	0.011437	15.08	1424.37	170.29	0.79	0.047	741.51	875	-9.61	123.88
2796.47*	18352	737.07	750.8	749.69	753.93	0.011259	15.05	1428.47	170.16	0.78	0.047	740.97	875	-9.83	124.2
2795.88*	18352	736.58	750.3	749.34	753.58	0.011817	15.38	1402.6	168.97	0.8	0.047	740.42	875	-9.88	124.7
2795.29*	18352	736.09	749.99	748.94	753.22	0.011507	15.26	1409.77	169.31	0.79	0.047	739.88	875	-10.11	125.01
2794.70*	18352	735.61	749.19	748.61	752.82	0.013359	16.14	1332.22	166.06	0.85	0.047	739.34	875	-9.85	125.81
2794.11*	18352	735.12	749.63	747.81	752.2	0.008086	13.7	1626.71	193.18	0.71	0.049	738.8	741.77	-10.83	-7.86

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2793.52*	18352	734.63	749.45	747.46	751.94	0.007682	13.52	1659.32	195.92	0.69	0.048	738.25	741.52	-11.2	-7.93
2792.94*	18352	734.14	749.28	747.13	751.7	0.007281	13.33	1696.9	199.85	0.67	0.048	737.71	741.27	-11.57	-8.01
2792.35*	18352	733.65	749.13	746.79	751.47	0.006861	13.12	1741.8	203.96	0.66	0.048	737.17	741.01	-11.96	-8.12
2791.76*	18352	733.16	749	746.47	751.24	0.006425	12.88	1793.41	206.64	0.64	0.049	736.63	740.76	-12.37	-8.24
2791.17*	18352	732.68	748.89	746.14	751.03	0.005996	12.62	1849.97	209.27	0.62	0.049	736.08	740.51	-12.81	-8.38
2790.58*	18352	732.19	748.8	745.86	750.83	0.005577	12.35	1912.24	212.03	0.6	0.05	735.54	740.25	-13.26	-8.55
2790	18352	731.7	748.71	745.56	750.64	0.005186	12.09	1978.43	214.97	0.58	0.05	735	740	-13.71	-8.71
2789.28*	18352	731.61	748.61	745.31	750.47	0.005065	11.82	1981.36	215.61	0.57	0.049	735.15	740.34	-13.46	-8.27
2788.57*	18352	731.51	747.14	746.02	750.16	0.008949	15.76	1703.94	207.46	0.75	0.052	735.31	735.82	-11.83	-11.32
2787.85*	18352	731.42	746.01	745.7	749.79	0.01218	17.41	1511.86	201.78	0.86	0.051	735.46	735.1	-10.55	-10.91
2787.14*	18352	731.33	745.89	745.19	749.35	0.011121	16.45	1531.77	201.28	0.82	0.05	735.62	735.54	-10.27	-10.35
2786.42*	18352	731.24	745.81	744.77	748.94	0.010025	15.49	1568.67	202.31	0.77	0.049	735.77	735.99	-10.04	-9.82
2785.71*	18352	731.14	745.77	744.31	748.57	0.008919	14.53	1621.85	204.31	0.73	0.048	735.93	736.44	-9.84	-9.33
2780	18352	730.4	745.92	741.25	746.85	0.003128	7.77	2423.78	248.42	0.42	0.048	740	740	-5.92	-5.92
2770	18384	729.5	740.74	740.74	746.36	0.001997	19.03	966.29	86	1	0.015	741.5	741.5	0.76	0.76
2766.66*	18384	723	730.79	735.06	745.38	0.007935	30.66	599.58	77	1.94	0.015	735	735	4.21	4.21
2763.33*	18384	716.5	723.91	729.64	744.57	0.012199	36.47	504.07	68	2.36	0.015	728.5	728.5	4.59	4.59
2760	18384	710	717.6	724.43	743.72	0.015582	41.02	448.21	59	2.62	0.015	722	722	4.4	4.4
2755.*	18384	709.36	717.67	724.55	743.24	0.014213	40.58	453.02	54.5	2.48	0.015	721.36	721.36	3.69	3.69
2750	18384	708.72	717.92	724.83	742.74	0.012837	39.98	459.82	50	2.32	0.015	720.72	720.72	2.8	2.8
2745.*	18384	707.66	717.73	724.62	742.44	0.011868	39.89	460.91	50	2.32	0.015	720.08	720.08	2.35	2.35
2740	18384	706.61	716.01	723.12	742.03	0.01356	40.94	449.04	50	2.41	0.015	719.44	719.44	3.43	3.43
2730	18401	706.17	715.55	722.71	741.72	0.013662	41.06	448.19	50	2.42	0.015	718.5	718.5	2.95	2.95
2729.23*	18401	705.81	715.2	722.35	741.31	0.013615	41.01	448.71	50	2.41	0.015	718.18	718.18	2.98	2.98
2728.46*	18401	705.45	714.85	721.99	740.9	0.013569	40.96	449.22	50	2.41	0.015	717.86	717.86	3.01	3.01
2727.69*	18401	705.09	714.5	721.62	740.5	0.013526	40.92	449.7	50	2.4	0.015	717.54	717.54	3.04	3.04
2726.92*	18401	704.73	714.15	721.26	740.09	0.013484	40.88	450.17	50	2.4	0.015	717.22	717.22	3.07	3.07
2726.15*	18401	704.37	713.8	720.9	739.69	0.013444	40.83	450.62	50	2.4	0.015	716.9	716.9	3.1	3.1
2725.38*	18401	704.01	713.45	720.54	739.29	0.013405	40.8	451.06	50	2.39	0.015	716.58	716.58	3.13	3.13
2724.61*	18401	703.66	713.11	720.19	738.88	0.013355	40.74	451.63	50	2.39	0.015	716.25	716.25	3.14	3.14
2723.84*	18401	703.3	712.76	719.83	738.49	0.013319	40.71	452.03	50	2.39	0.015	715.93	715.93	3.17	3.17
2723.07*	18401	702.94	712.4	719.47	738.09	0.013285	40.67	452.42	50	2.38	0.015	715.61	715.61	3.21	3.21
2722.30*	18401	702.58	712.05	719.11	737.7	0.013253	40.64	452.8	50	2.38	0.015	715.29	715.29	3.24	3.24
2721.53*	18401	702.22	711.7	718.75	737.3	0.013221	40.61	453.15	50	2.38	0.015	714.97	714.97	3.27	3.27
2720.76*	18401	701.86	711.35	718.39	736.91	0.013191	40.58	453.5	50	2.37	0.015	714.65	714.65	3.3	3.3
2720	18401	701.5	710.99	718.03	736.52	0.013162	40.55	453.84	50	2.37	0.015	714.33	714.33	3.34	3.34
2715.*	18401	701.19	710.69	717.73	736.18	0.013136	40.52	454.15	50	2.37	0.015	713.02	713.02	2.33	2.33
2710	18401	700.88	710.38	717.42	735.84	0.01311	40.49	454.45	50	2.37	0.015	711.71	711.71	1.33	1.33
2706.66*	18401	700.57	710.08	717.11	735.51	0.013085	40.46	454.74	50	2.36	0.015	711.4	711.4	1.32	1.32
2703.33*	18401	700.26	709.78	716.8	735.17	0.01306	40.44	455.02	50	2.36	0.015	711.09	711.09	1.31	1.31

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2700	18401	699.95	709.47	716.49	734.83	0.013037	40.42	455.3	50	2.36	0.015	710.78	710.78	1.31	1.31
2699.41*	18401	699.58	709.11	716.12	734.44	0.013019	40.4	455.52	50	2.36	0.015	710.41	710.41	1.3	1.3
2698.82*	18401	699.22	708.75	715.76	734.05	0.012987	40.36	455.89	50	2.36	0.015	710.05	710.05	1.3	1.3
2698.23*	18401	698.85	708.39	715.39	733.66	0.01297	40.34	456.09	50	2.35	0.015	709.68	709.68	1.29	1.29
2697.64*	18401	698.48	708.02	715.02	733.27	0.012954	40.33	456.29	50	2.35	0.015	709.31	709.31	1.29	1.29
2697.05*	18401	698.12	707.67	714.66	732.88	0.012924	40.3	456.64	50	2.35	0.015	708.95	708.95	1.28	1.28
2696.47*	18401	697.75	707.3	714.29	732.5	0.01291	40.28	456.81	50	2.35	0.015	708.58	708.58	1.28	1.28
2695.88*	18401	697.38	706.93	713.92	732.13	0.01291	40.28	456.81	50	2.35	0.015	708.21	708.21	1.28	1.28
2695.29*	18401	697.02	706.58	713.56	731.74	0.012882	40.25	457.14	50	2.35	0.015	707.85	707.85	1.27	1.27
2694.70*	18401	696.65	706.21	713.19	731.37	0.012882	40.25	457.14	50	2.35	0.015	707.48	707.48	1.27	1.27
2694.11*	18401	696.29	705.85	712.83	730.98	0.012856	40.23	457.45	50	2.34	0.015	707.12	707.12	1.27	1.27
2693.52*	18401	695.92	705.48	712.46	730.61	0.012856	40.23	457.45	50	2.34	0.015	706.75	706.75	1.27	1.27
2692.94*	18401	695.55	705.11	712.09	730.24	0.012856	40.23	457.45	50	2.34	0.015	706.38	706.38	1.27	1.27
2692.35*	18401	695.19	704.76	711.73	729.85	0.01283	40.2	457.76	50	2.34	0.015	706.02	706.02	1.26	1.26
2691.76*	18401	694.82	704.39	711.36	729.48	0.01283	40.2	457.76	50	2.34	0.015	705.65	705.65	1.26	1.26
2691.17*	18401	694.45	704.02	710.99	729.11	0.01283	40.2	457.76	50	2.34	0.015	705.28	705.28	1.26	1.26
2690.58*	18401	694.09	703.67	710.63	728.73	0.012806	40.17	458.05	50	2.34	0.015	704.92	704.92	1.25	1.25
2690	18401	693.72	703.3	710.26	728.36	0.012806	40.17	458.05	50	2.34	0.015	704.55	704.55	1.25	1.25
2689.41*	18401	693.35	702.93	709.89	727.99	0.012806	40.17	458.05	50	2.34	0.015	704.18	704.18	1.25	1.25
2688.82*	18401	692.99	702.57	709.53	727.6	0.012783	40.15	458.33	50	2.34	0.015	703.82	703.82	1.25	1.25
2688.23*	18401	692.62	702.2	709.16	727.23	0.012783	40.15	458.33	50	2.34	0.015	703.45	703.45	1.25	1.25
2687.64*	18401	692.26	701.85	708.8	726.85	0.01276	40.12	458.6	50	2.33	0.015	703.09	703.09	1.24	1.24
2687.05*	18401	691.89	701.48	708.43	726.48	0.01276	40.12	458.6	50	2.33	0.015	702.72	702.72	1.24	1.24
2686.47*	18401	691.52	701.11	708.06	726.11	0.01276	40.12	458.6	50	2.33	0.015	702.35	702.35	1.24	1.24
2685.88*	18401	691.16	700.75	707.7	725.72	0.012738	40.1	458.86	50	2.33	0.015	701.99	701.99	1.24	1.24
2685.29*	18401	690.79	700.38	707.33	725.35	0.012738	40.1	458.86	50	2.33	0.015	701.62	701.62	1.24	1.24
2684.70*	18401	690.42	700.01	706.96	724.98	0.012738	40.1	458.86	50	2.33	0.015	701.25	701.25	1.24	1.24
2684.11*	18401	690.06	699.66	706.6	724.6	0.012718	40.08	459.11	50	2.33	0.015	700.89	700.89	1.23	1.23
2683.52*	18401	689.69	699.29	706.23	724.23	0.012718	40.08	459.11	50	2.33	0.015	700.52	700.52	1.23	1.23
2682.94*	18401	689.33	698.93	705.87	723.85	0.012698	40.06	459.36	50	2.33	0.015	700.16	700.16	1.23	1.23
2682.35*	18401	688.96	698.56	705.5	723.48	0.012698	40.06	459.36	50	2.33	0.015	699.79	699.79	1.23	1.23
2681.76*	18401	688.59	698.19	705.13	723.11	0.012698	40.06	459.36	50	2.33	0.015	699.42	699.42	1.23	1.23
2681.17*	18401	688.23	697.84	704.77	722.73	0.012679	40.04	459.59	50	2.33	0.015	699.06	699.06	1.22	1.22
2680.58*	18401	687.86	697.47	704.4	722.36	0.012679	40.04	459.59	50	2.33	0.015	698.69	698.69	1.22	1.22
2680	18401	687.5	697.1	704.03	721.99	0.012679	40.04	459.59	50	2.33	0.015	698.33	698.33	1.22	1.22
2679.41*	18401	687.13	696.74	703.67	721.63	0.012679	40.04	459.59	50	2.33	0.015	697.96	697.96	1.22	1.22
2678.82*	18401	686.76	696.37	703.3	721.26	0.012679	40.04	459.59	50	2.33	0.015	697.59	697.59	1.22	1.22
2678.23*	18401	686.4	696.01	702.94	720.88	0.01266	40.02	459.81	50	2.33	0.015	697.23	697.23	1.22	1.22
2677.64*	18401	686.03	695.64	702.57	720.51	0.01266	40.02	459.81	50	2.33	0.015	696.86	696.86	1.22	1.22
2677.05*	18401	685.66	695.27	702.2	720.14	0.01266	40.02	459.81	50	2.33	0.015	696.49	696.49	1.22	1.22

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2676.47*	18401	685.3	694.92	701.84	719.76	0.012643	40	460.03	50	2.32	0.015	696.13	696.13	1.21	1.21
2675.88*	18401	684.93	694.55	701.47	719.39	0.012643	40	460.03	50	2.32	0.015	695.76	695.76	1.21	1.21
2675.29*	18401	684.57	694.19	701.11	719.01	0.012626	39.98	460.23	50	2.32	0.015	695.4	695.4	1.21	1.21
2674.70*	18401	684.2	693.82	700.74	718.64	0.012626	39.98	460.23	50	2.32	0.015	695.03	695.03	1.21	1.21
2674.11*	18401	683.83	693.45	700.37	718.27	0.012626	39.98	460.24	50	2.32	0.015	694.66	694.66	1.21	1.21
2673.52*	18401	683.47	693.09	700.01	717.89	0.01261	39.96	460.43	50	2.32	0.015	694.3	694.3	1.21	1.21
2672.94*	18401	683.1	692.72	699.64	717.52	0.01261	39.96	460.43	50	2.32	0.015	693.93	693.93	1.21	1.21
2672.35*	18401	682.73	692.35	699.27	717.15	0.01261	39.96	460.43	50	2.32	0.015	693.56	693.56	1.21	1.21
2671.76*	18401	682.37	692	698.91	716.78	0.012595	39.95	460.62	50	2.32	0.015	693.2	693.2	1.2	1.2
2671.17*	18401	682	691.63	698.54	716.41	0.012595	39.95	460.62	50	2.32	0.015	692.83	692.83	1.2	1.2
2670.58*	18401	681.64	691.27	698.18	716.03	0.01258	39.93	460.8	50	2.32	0.015	692.47	692.47	1.2	1.2
2670	18401	681.27	690.9	697.81	715.66	0.01258	39.93	460.8	50	2.32	0.015	692.1	692.1	1.2	1.2
2669.41*	18401	680.9	690.53	697.47	715.29	0.01258	39.93	460.8	50	2.32	0.015	691.73	691.68	1.2	1.15
2668.82*	18401	680.54	690.17	697.11	714.92	0.012566	39.92	460.98	50	2.32	0.015	691.37	691.27	1.2	1.1
2668.23*	18401	680.17	689.8	696.74	714.55	0.012565	39.92	460.99	50	2.32	0.015	691	690.85	1.2	1.05
2667.64*	18401	679.81	689.44	696.38	714.19	0.012565	39.92	460.99	50	2.32	0.015	690.64	690.44	1.2	1
2667.05*	18401	679.44	689.08	696.01	713.81	0.012563	39.91	461.02	50	2.32	0.015	690.27	690.02	1.19	0.94
2666.47*	18401	679.07	688.71	695.64	713.44	0.012561	39.91	461.04	50	2.32	0.015	689.9	689.61	1.19	0.9
2665.88*	18401	678.71	688.35	695.28	713.08	0.012561	39.91	461.04	50	2.32	0.015	689.54	689.2	1.19	0.85
2665.29*	18401	678.34	687.98	694.91	712.71	0.012558	39.91	461.07	50	2.32	0.015	689.17	688.78	1.19	0.8
2664.70*	18401	677.97	687.61	694.54	712.34	0.012555	39.91	461.1	50	2.32	0.015	688.8	688.36	1.19	0.75
2664.11*	18401	677.61	687.25	694.18	711.98	0.012555	39.91	461.1	50	2.32	0.015	688.44	687.95	1.19	0.7
2663.52*	18401	677.24	686.88	693.81	711.6	0.012552	39.9	461.14	50	2.32	0.015	688.07	687.53	1.19	0.65
2662.94*	18401	676.88	686.52	693.45	711.24	0.012552	39.9	461.14	50	2.32	0.015	687.71	687.12	1.19	0.6
2662.35*	18401	676.51	686.15	693.08	710.87	0.012549	39.9	461.18	50	2.32	0.015	687.34	686.7	1.19	0.55
2661.76*	18401	676.14	685.78	692.71	710.49	0.012545	39.9	461.23	50	2.31	0.015	686.97	686.29	1.19	0.51
2661.17*	18401	675.78	685.42	692.35	710.13	0.012545	39.9	461.23	50	2.31	0.015	686.61	685.88	1.19	0.46
2660.58*	18401	675.41	685.05	691.98	709.76	0.012541	39.89	461.28	50	2.31	0.015	686.24	685.46	1.19	0.41
2660	18401	675.05	684.69	691.62	709.4	0.012541	39.89	461.28	50	2.31	0.015	685.88	685.05	1.19	0.36
2659.41*	18401	674.68	684.32	691.25	709.03	0.012541	39.89	461.28	50	2.31	0.015	685.51	684.73	1.19	0.41
2658.82*	18401	674.31	683.95	690.88	708.66	0.012536	39.89	461.34	50	2.31	0.015	685.14	684.41	1.19	0.46
2658.23*	18401	673.95	683.59	690.52	708.3	0.012536	39.89	461.34	50	2.31	0.015	684.78	684.09	1.19	0.5
2657.64*	18401	673.58	683.22	690.15	707.92	0.012531	39.88	461.4	50	2.31	0.015	684.41	683.78	1.19	0.56
2657.05*	18401	673.21	682.85	689.78	707.54	0.012526	39.87	461.47	50	2.31	0.015	684.04	683.46	1.19	0.61
2656.47*	18401	672.85	682.49	689.42	707.18	0.012526	39.87	461.47	50	2.31	0.015	683.68	683.14	1.19	0.65
2655.88*	18401	672.48	682.13	689.05	706.81	0.012519	39.87	461.56	50	2.31	0.015	683.31	682.82	1.18	0.69
2655.29*	18401	672.12	681.77	688.69	706.45	0.012519	39.87	461.56	50	2.31	0.015	682.95	682.51	1.18	0.74
2654.70*	18401	671.75	681.4	688.32	706.07	0.012512	39.86	461.65	50	2.31	0.015	682.58	682.19	1.18	0.79
2654.11*	18401	671.38	681.03	687.95	705.69	0.012504	39.85	461.74	50	2.31	0.015	682.21	681.87	1.18	0.84
2653.52*	18401	671.02	680.67	687.59	705.33	0.012504	39.85	461.74	50	2.31	0.015	681.85	681.55	1.18	0.88

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2652.94*	18401	670.65	680.3	687.22	704.95	0.012495	39.84	461.86	50	2.31	0.015	681.48	681.24	1.18	0.94
2652.35*	18401	670.28	679.93	686.85	704.57	0.012485	39.83	461.98	50	2.31	0.015	681.11	680.92	1.18	0.99
2651.76*	18401	669.92	679.57	686.49	704.21	0.012485	39.83	461.97	50	2.31	0.015	680.75	680.6	1.18	1.03
2651.17*	18401	669.55	679.2	686.12	703.84	0.01249	39.84	461.92	50	2.31	0.015	680.38	680.28	1.18	1.08
2650.58*	18401	669.19	678.84	685.76	703.48	0.01249	39.84	461.92	50	2.31	0.015	680.02	679.97	1.18	1.13
2650	18401	668.82	678.47	685.36	703.12	0.012493	39.84	461.87	50	2.31	0.015	679.65	679.65	1.18	1.18
2649.6*	18401	668.45	678.1	684.99	702.75	0.012493	39.84	461.87	50	2.31	0.015	679.28	679.28	1.18	1.18
2649.2*	18401	668.07	677.72	684.61	702.38	0.012501	39.85	461.78	50	2.31	0.015	678.9	678.9	1.18	1.18
2648.8*	18401	667.7	677.35	684.24	702.01	0.012501	39.85	461.78	50	2.31	0.015	678.53	678.53	1.18	1.18
2648.4*	18401	667.33	676.98	683.87	701.64	0.012501	39.85	461.78	50	2.31	0.015	678.16	678.16	1.18	1.18
2648.*	18401	666.95	676.6	683.49	701.26	0.012508	39.86	461.69	50	2.31	0.015	677.78	677.78	1.18	1.18
2647.6*	18401	666.58	676.23	683.12	700.89	0.012508	39.86	461.69	50	2.31	0.015	677.41	677.41	1.18	1.18
2647.2*	18401	666.2	675.85	682.74	700.52	0.012515	39.86	461.6	50	2.31	0.015	677.03	677.03	1.18	1.18
2646.8*	18401	665.83	675.48	682.37	700.15	0.012515	39.86	461.61	50	2.31	0.015	676.66	676.66	1.18	1.18
2646.4*	18401	665.46	675.11	682	699.78	0.012515	39.86	461.61	50	2.31	0.015	676.29	676.29	1.18	1.18
2646.*	18401	665.08	674.73	681.62	699.41	0.012522	39.87	461.52	50	2.31	0.015	675.91	675.91	1.18	1.18
2645.6*	18401	664.71	674.36	681.25	699.04	0.012522	39.87	461.52	50	2.31	0.015	675.54	675.54	1.18	1.18
2645.2*	18401	664.34	673.99	680.88	698.67	0.012522	39.87	461.52	50	2.31	0.015	675.17	675.17	1.18	1.18
2644.8*	18401	663.96	673.6	680.5	698.3	0.012528	39.88	461.44	50	2.31	0.015	674.79	674.79	1.19	1.19
2644.4*	18401	663.59	673.23	680.13	697.93	0.012528	39.88	461.44	50	2.31	0.015	674.42	674.42	1.19	1.19
2644.*	18401	663.22	672.86	679.76	697.56	0.012528	39.88	461.44	50	2.31	0.015	674.05	674.05	1.19	1.19
2643.6*	18401	662.84	672.48	679.38	697.18	0.012534	39.88	461.37	50	2.31	0.015	673.67	673.67	1.19	1.19
2643.2*	18401	662.47	672.11	679.01	696.81	0.012534	39.88	461.37	50	2.31	0.015	673.3	673.3	1.19	1.19
2642.8*	18401	662.1	671.74	678.64	696.44	0.012534	39.88	461.37	50	2.31	0.015	672.93	672.93	1.19	1.19
2642.4*	18401	661.72	671.36	678.26	696.07	0.01254	39.89	461.29	50	2.31	0.015	672.55	672.55	1.19	1.19
2642.*	18401	661.35	670.99	677.89	695.7	0.01254	39.89	461.29	50	2.31	0.015	672.18	672.18	1.19	1.19
2641.6*	18401	660.97	670.61	677.51	695.33	0.012546	39.9	461.23	50	2.31	0.015	671.8	671.8	1.19	1.19
2641.2*	18401	660.6	670.24	677.14	694.96	0.012546	39.9	461.23	50	2.31	0.015	671.43	671.43	1.19	1.19
2640.8*	18401	660.23	669.87	676.77	694.59	0.012546	39.9	461.23	50	2.31	0.015	671.06	671.06	1.19	1.19
2640.4*	18401	659.85	669.49	676.39	694.21	0.012551	39.9	461.16	50	2.32	0.015	670.68	670.68	1.19	1.19
2640	18401	659.48	669.12	676.02	693.84	0.012551	39.9	461.16	50	2.32	0.015	670.31	670.31	1.19	1.19
2630	18466	659.17	668.86	675.74	693.5	0.012445	39.83	463.57	50	2.31	0.015	670	670	1.14	1.14
2628.57*	18466	658.77	668.45	675.34	693.13	0.012482	39.87	463.12	50	2.31	0.015	669.6	669.6	1.15	1.15
2627.14*	18466	658.36	668.03	674.93	692.77	0.012525	39.92	462.58	50	2.31	0.015	669.19	669.19	1.16	1.16
2625.71*	18466	657.96	667.62	674.53	692.41	0.012559	39.96	462.15	50	2.32	0.015	668.79	668.79	1.17	1.17
2624.28*	18466	657.55	667.2	674.12	692.04	0.012601	40	461.64	50	2.32	0.015	668.38	668.38	1.18	1.18
2622.85*	18466	657.15	666.79	673.72	691.68	0.012634	40.04	461.24	50	2.32	0.015	667.98	667.98	1.19	1.19
2621.42*	18466	656.74	666.37	673.31	691.31	0.012673	40.08	460.75	50	2.33	0.015	667.57	667.57	1.2	1.2
2620	18466	656.34	665.96	672.91	690.95	0.012704	40.11	460.37	50	2.33	0.015	667.17	667.17	1.21	1.21
2619.41*	18466	655.92	665.53	672.49	690.57	0.012742	40.15	459.91	50	2.33	0.015	666.75	666.75	1.22	1.22

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2618.82*	18466	655.51	665.12	672.08	690.19	0.012771	40.18	459.56	50	2.34	0.015	666.34	666.34	1.22	1.22
2618.23*	18466	655.09	664.69	671.66	689.81	0.012807	40.22	459.12	50	2.34	0.015	665.92	665.92	1.23	1.23
2617.64*	18466	654.68	664.27	671.25	689.43	0.012834	40.25	458.8	50	2.34	0.015	665.51	665.51	1.24	1.24
2617.05*	18466	654.26	663.84	670.83	689.04	0.012869	40.29	458.38	50	2.34	0.015	665.09	665.09	1.25	1.25
2616.47*	18466	653.84	663.41	670.41	688.66	0.012902	40.32	457.98	50	2.35	0.015	664.67	664.67	1.26	1.26
2615.88*	18466	653.43	663	670	688.28	0.012927	40.35	457.68	50	2.35	0.015	664.26	664.26	1.26	1.26
2615.29*	18466	653.01	662.57	669.58	687.89	0.01296	40.38	457.29	50	2.35	0.015	663.84	663.84	1.27	1.27
2614.70*	18466	652.6	662.16	669.17	687.51	0.012984	40.41	457.01	50	2.36	0.015	663.43	663.43	1.27	1.27
2614.11*	18466	652.18	661.73	668.75	687.12	0.013015	40.44	456.64	50	2.36	0.015	663.01	663.01	1.28	1.28
2613.52*	18466	651.77	661.31	668.34	686.73	0.013037	40.46	456.38	50	2.36	0.015	662.6	662.6	1.29	1.29
2612.94*	18466	651.35	660.89	667.92	686.35	0.013067	40.49	456.03	50	2.36	0.015	662.18	662.18	1.29	1.29
2612.35*	18466	650.93	660.46	667.5	685.96	0.013096	40.52	455.69	50	2.37	0.015	661.76	661.76	1.3	1.3
2611.76*	18466	650.52	660.04	667.09	685.57	0.013116	40.54	455.45	50	2.37	0.015	661.35	661.35	1.31	1.31
2611.17*	18466	650.1	659.62	666.67	685.18	0.013145	40.57	455.12	50	2.37	0.015	660.93	660.93	1.31	1.31
2610.58*	18466	649.69	659.2	666.26	684.79	0.013164	40.59	454.9	50	2.37	0.015	660.52	660.52	1.32	1.32
2610	18466	649.27	658.78	665.84	684.4	0.013191	40.62	454.59	50	2.37	0.015	660.1	660.1	1.32	1.32
2609.41*	18466	648.85	658.35	665.42	684.01	0.013217	40.65	454.28	50	2.38	0.015	659.68	659.68	1.33	1.33
2608.82*	18466	648.44	657.94	665.01	683.62	0.013234	40.67	454.08	50	2.38	0.015	659.27	659.27	1.33	1.33
2608.23*	18466	648.02	657.51	664.59	683.22	0.01326	40.69	453.79	50	2.38	0.015	658.85	658.85	1.34	1.34
2607.64*	18466	647.61	657.1	664.18	682.83	0.013276	40.71	453.6	50	2.38	0.015	658.44	658.44	1.34	1.34
2607.05*	18466	647.19	656.67	663.76	682.44	0.0133	40.73	453.32	50	2.38	0.015	658.02	658.02	1.35	1.35
2606.47*	18466	646.77	656.25	663.34	682.04	0.013324	40.76	453.05	50	2.39	0.015	657.6	657.6	1.35	1.35
2605.88*	18466	646.36	655.83	662.93	681.65	0.013339	40.77	452.88	50	2.39	0.015	657.19	657.19	1.36	1.36
2605.29*	18466	645.94	655.41	662.51	681.25	0.013362	40.8	452.62	50	2.39	0.015	656.77	656.77	1.36	1.36
2604.70*	18466	645.53	654.99	662.1	680.86	0.013376	40.81	452.46	50	2.39	0.015	656.36	656.36	1.37	1.37
2604.11*	18466	645.11	654.57	661.68	680.46	0.013398	40.83	452.21	50	2.39	0.015	655.94	655.94	1.37	1.37
2603.52*	18466	644.7	654.16	661.27	680.06	0.013403	40.84	452.15	50	2.39	0.015	655.53	655.53	1.37	1.37
2602.94*	18466	644.28	653.73	660.85	679.66	0.013424	40.86	451.91	50	2.4	0.015	655.11	655.11	1.38	1.38
2602.35*	18466	643.86	653.31	660.43	679.26	0.013445	40.88	451.68	50	2.4	0.015	654.69	654.69	1.38	1.38
2601.76*	18466	643.45	652.9	660.02	678.86	0.01345	40.89	451.62	50	2.4	0.015	654.28	654.28	1.38	1.38
2601.17*	18466	643.03	652.47	659.6	678.46	0.013471	40.91	451.39	50	2.4	0.015	653.86	653.86	1.39	1.39
2600.58*	18466	642.62	652.06	659.19	678.06	0.013476	40.91	451.33	50	2.4	0.015	653.45	653.45	1.39	1.39
2600	18466	642.2	651.64	658.77	677.66	0.013495	40.93	451.11	50	2.4	0.015	653.03	653.03	1.39	1.39
2599.41*	18466	641.78	651.21	658.35	677.26	0.013514	40.95	450.9	50	2.4	0.015	652.61	652.61	1.4	1.4
2598.82*	18466	641.37	650.8	657.94	676.85	0.013519	40.96	450.85	50	2.4	0.015	652.2	652.2	1.4	1.4
2598.23*	18466	640.95	650.38	657.52	676.45	0.013537	40.98	450.64	50	2.41	0.015	651.78	651.78	1.4	1.4
2597.64*	18466	640.54	649.96	657.11	676.06	0.013555	41	450.44	50	2.41	0.015	651.37	651.37	1.41	1.41
2597.05*	18466	640.12	649.54	656.69	675.66	0.013573	41.01	450.25	50	2.41	0.015	650.95	650.95	1.41	1.41
2596.47*	18466	639.71	649.13	656.28	675.27	0.013589	41.03	450.06	50	2.41	0.015	650.54	650.54	1.41	1.41
2595.88*	18466	639.29	648.7	655.86	674.86	0.013606	41.05	449.88	50	2.41	0.015	650.12	650.12	1.42	1.42

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2595.29*	18466	638.88	648.29	655.45	674.47	0.01362	41.06	449.71	50	2.41	0.015	649.71	649.71	1.42	1.42
2594.70*	18466	638.46	647.87	655.03	674.07	0.013636	41.08	449.54	50	2.41	0.015	649.29	649.29	1.42	1.42
2594.11*	18466	638.05	647.45	654.62	673.67	0.01365	41.09	449.39	50	2.42	0.015	648.88	648.88	1.43	1.43
2593.52*	18466	637.63	647.03	654.2	673.27	0.013665	41.11	449.22	50	2.42	0.015	648.46	648.46	1.43	1.43
2592.94*	18466	637.22	646.62	653.79	672.87	0.013677	41.12	449.09	50	2.42	0.015	648.05	648.05	1.43	1.43
2592.35*	18466	636.8	646.19	653.37	672.47	0.013692	41.13	448.92	50	2.42	0.015	647.63	647.63	1.44	1.44
2591.76*	18466	636.39	645.78	652.96	672.07	0.013703	41.14	448.81	50	2.42	0.015	647.22	647.22	1.44	1.44
2591.17*	18466	635.97	645.36	652.54	671.65	0.013708	41.15	448.74	50	2.42	0.015	646.8	646.8	1.44	1.44
2590.58*	18466	635.56	644.95	652.13	671.26	0.013718	41.16	448.63	50	2.42	0.015	646.39	646.39	1.44	1.44
2590	18466	635.14	644.53	651.71	670.84	0.013724	41.17	448.57	50	2.42	0.015	645.97	645.97	1.44	1.44
2589.41*	18466	634.72	644.11	651.29	670.43	0.01373	41.17	448.5	50	2.42	0.015	645.55	645.55	1.45	1.45
2588.82*	18466	634.31	643.69	650.88	670.03	0.013739	41.18	448.4	50	2.42	0.015	645.14	645.14	1.45	1.45
2588.23*	18466	633.89	643.27	650.46	669.61	0.013745	41.19	448.34	50	2.42	0.015	644.72	644.72	1.45	1.45
2587.64*	18466	633.48	642.86	650.05	669.21	0.013754	41.2	448.25	50	2.42	0.015	644.31	644.31	1.45	1.45
2587.05*	18466	633.06	642.44	649.63	668.8	0.013759	41.2	448.19	50	2.43	0.015	643.89	643.89	1.45	1.45
2586.47*	18466	632.64	642.02	649.21	668.38	0.013765	41.21	448.13	50	2.43	0.015	643.47	643.47	1.45	1.45
2585.88*	18466	632.23	641.61	648.8	667.98	0.013772	41.21	448.04	50	2.43	0.015	643.06	643.06	1.45	1.45
2585.29*	18466	631.81	641.18	648.38	667.57	0.013778	41.22	447.98	50	2.43	0.015	642.64	642.64	1.46	1.46
2584.70*	18466	631.4	640.77	647.97	667.17	0.013785	41.23	447.9	50	2.43	0.015	642.23	642.23	1.46	1.46
2584.11*	18466	630.98	640.35	647.55	666.75	0.01379	41.23	447.85	50	2.43	0.015	641.81	641.81	1.46	1.46
2583.52*	18466	630.57	639.94	647.14	666.35	0.013797	41.24	447.78	50	2.43	0.015	641.4	641.4	1.46	1.46
2582.94*	18466	630.15	639.52	646.72	665.93	0.013802	41.24	447.72	50	2.43	0.015	640.98	640.98	1.46	1.46
2582.35*	18466	629.73	639.1	646.3	665.52	0.013807	41.25	447.66	50	2.43	0.015	640.56	640.56	1.46	1.46
2581.76*	18466	629.32	638.69	645.89	665.12	0.013813	41.26	447.6	50	2.43	0.015	640.15	640.15	1.46	1.46
2581.17*	18466	628.9	638.27	645.47	664.7	0.013818	41.26	447.55	50	2.43	0.015	639.73	639.73	1.46	1.46
2580.58*	18466	628.49	637.85	645.06	664.3	0.013823	41.27	447.49	50	2.43	0.015	639.32	639.32	1.47	1.47
2580	18466	628.07	637.43	644.64	663.88	0.013828	41.27	447.44	50	2.43	0.015	638.9	638.9	1.47	1.47
2579.41*	18466	627.65	637.01	644.22	663.47	0.013833	41.28	447.38	50	2.43	0.015	638.48	638.48	1.47	1.47
2578.82*	18466	627.24	636.6	643.81	663.06	0.013838	41.28	447.33	50	2.43	0.015	638.07	638.07	1.47	1.47
2578.23*	18466	626.82	636.18	643.39	662.65	0.013842	41.29	447.28	50	2.43	0.015	637.65	637.65	1.47	1.47
2577.64*	18466	626.41	635.77	642.98	662.24	0.013847	41.29	447.23	50	2.43	0.015	637.24	637.24	1.47	1.47
2577.05*	18466	625.99	635.35	642.56	661.83	0.013851	41.29	447.18	50	2.43	0.015	636.82	636.82	1.47	1.47
2576.47*	18466	625.57	634.93	642.14	661.41	0.013856	41.3	447.13	50	2.43	0.015	636.4	636.4	1.47	1.47
2575.88*	18466	625.16	634.52	641.73	661.01	0.01386	41.3	447.09	50	2.43	0.015	635.99	635.99	1.47	1.47
2575.29*	18466	624.74	634.1	641.31	660.59	0.013865	41.31	447.04	50	2.43	0.015	635.57	635.57	1.47	1.47
2574.70*	18466	624.33	633.69	640.9	660.17	0.013854	41.3	447.15	50	2.43	0.015	635.16	635.16	1.47	1.47
2574.11*	18466	623.91	633.27	640.48	659.76	0.013859	41.3	447.1	50	2.43	0.015	634.74	634.74	1.47	1.47
2573.52*	18466	623.5	632.86	640.07	659.35	0.013862	41.31	447.06	50	2.43	0.015	634.33	634.33	1.47	1.47
2572.94*	18466	623.08	632.44	639.65	658.93	0.013867	41.31	447.01	50	2.43	0.015	633.91	633.91	1.47	1.47
2572.35*	18466	622.66	632.01	639.23	658.52	0.013872	41.31	446.96	50	2.44	0.015	633.49	633.49	1.48	1.48

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2571.76*	18466	622.25	631.61	638.82	658.1	0.013862	41.3	447.07	50	2.43	0.015	633.08	633.08	1.47	1.47
2571.17*	18466	621.83	631.19	638.4	657.68	0.013867	41.31	447.02	50	2.43	0.015	632.66	632.66	1.47	1.47
2570.58*	18466	621.42	630.78	637.99	657.26	0.013856	41.3	447.13	50	2.43	0.015	632.25	632.25	1.47	1.47
2570	18474	621	630.36	637.58	656.86	0.013863	41.31	447.18	50	2.43	0.015	631.83	631.83	1.47	1.47
2569.41*	18474	620.58	629.94	637.16	656.44	0.013868	41.32	447.13	50	2.43	0.015	631.41	631.41	1.47	1.47
2568.82*	18474	620.17	629.53	636.75	656.02	0.013858	41.31	447.24	50	2.43	0.015	631	631	1.47	1.47
2568.23*	18474	619.75	629.11	636.33	655.61	0.013862	41.31	447.19	50	2.43	0.015	630.58	630.58	1.47	1.47
2567.64*	18474	619.34	628.7	635.92	655.2	0.013865	41.31	447.16	50	2.43	0.015	630.17	630.17	1.47	1.47
2567.05*	18474	618.92	628.28	635.5	654.79	0.01387	41.32	447.11	50	2.43	0.015	629.75	629.75	1.47	1.47
2566.47*	18474	618.51	627.87	635.09	654.37	0.01386	41.31	447.22	50	2.43	0.015	629.34	629.34	1.47	1.47
2565.88*	18474	618.09	627.45	634.67	653.95	0.013865	41.31	447.16	50	2.43	0.015	628.92	628.92	1.47	1.47
2565.29*	18474	617.68	627.04	634.26	653.53	0.013854	41.3	447.28	50	2.43	0.015	628.51	628.51	1.47	1.47
2564.70*	18474	617.26	626.62	633.84	653.12	0.013859	41.31	447.23	50	2.43	0.015	628.09	628.09	1.47	1.47
2564.11*	18474	616.85	626.21	633.43	652.71	0.013863	41.31	447.19	50	2.43	0.015	627.68	627.68	1.47	1.47
2563.52*	18474	616.43	625.79	633.01	652.29	0.013867	41.32	447.14	50	2.43	0.015	627.26	627.26	1.47	1.47
2562.94*	18474	616.02	625.38	632.6	651.87	0.013857	41.31	447.25	50	2.43	0.015	626.85	626.85	1.47	1.47
2562.35*	18474	615.6	624.96	632.18	651.46	0.013862	41.31	447.2	50	2.43	0.015	626.43	626.43	1.47	1.47
2561.76*	18474	615.19	624.55	631.77	651.04	0.013851	41.3	447.32	50	2.43	0.015	626.02	626.02	1.47	1.47
2561.17*	18474	614.77	624.13	631.35	650.62	0.013855	41.3	447.27	50	2.43	0.015	625.6	625.6	1.47	1.47
2560.58*	18474	614.36	623.72	630.94	650.22	0.013859	41.31	447.23	50	2.43	0.015	625.19	625.19	1.47	1.47
2560	18474	613.94	623.3	630.52	649.8	0.013863	41.31	447.18	50	2.43	0.015	624.77	624.77	1.47	1.47
2559.33*	18474	613.52	622.88	630.1	649.39	0.013869	41.32	447.12	50	2.43	0.015	624.35	624.35	1.47	1.47
2558.66*	18474	613.09	622.45	629.67	648.96	0.013874	41.32	447.06	50	2.44	0.015	623.92	623.92	1.47	1.47
2558.*	18474	612.67	622.03	629.25	648.55	0.01388	41.33	447	50	2.44	0.015	623.5	623.5	1.47	1.47
2557.33*	18474	612.24	621.59	628.82	648.12	0.013885	41.33	446.95	50	2.44	0.015	623.07	623.07	1.48	1.48
2556.66*	18474	611.82	621.17	628.4	647.71	0.01389	41.34	446.89	50	2.44	0.015	622.65	622.65	1.48	1.48
2556.*	18474	611.4	620.75	627.98	647.29	0.013895	41.34	446.84	50	2.44	0.015	622.23	622.23	1.48	1.48
2555.33*	18474	610.97	620.32	627.55	646.87	0.0139	41.35	446.79	50	2.44	0.015	621.8	621.8	1.48	1.48
2554.66*	18474	610.55	619.9	627.13	646.45	0.013904	41.35	446.74	50	2.44	0.015	621.38	621.38	1.48	1.48
2554.*	18474	610.12	619.47	626.7	646.03	0.013909	41.36	446.69	50	2.44	0.015	620.95	620.95	1.48	1.48
2553.33*	18474	609.7	619.05	626.28	645.61	0.013913	41.36	446.64	50	2.44	0.015	620.53	620.53	1.48	1.48
2552.66*	18474	609.28	618.63	625.86	645.2	0.013917	41.37	446.6	50	2.44	0.015	620.11	620.11	1.48	1.48
2552.*	18474	608.85	618.2	625.43	644.77	0.013921	41.37	446.55	50	2.44	0.015	619.68	619.68	1.48	1.48
2551.33*	18474	608.43	617.78	625.01	644.36	0.013925	41.37	446.52	50	2.44	0.015	619.26	619.26	1.48	1.48
2550.66*	18474	608	617.34	624.58	643.93	0.013929	41.38	446.47	50	2.44	0.015	618.83	618.83	1.49	1.49
2550	18474	607.58	616.93	624.16	643.5	0.013919	41.37	446.58	50	2.44	0.015	618.41	618.41	1.48	1.48
2545.*	18474	607.22	616.57	623.8	643.14	0.013923	41.37	446.53	50	2.44	0.015	618.55	618.55	1.98	1.98
2540	18474	606.87	616.22	623.45	642.78	0.013914	41.36	446.63	50	2.44	0.015	618.7	618.7	2.48	2.48
2530	18474	606.68	616.03	623.26	642.59	0.013914	41.36	446.63	50	2.44	0.015	618.51	618.51	2.48	2.48
2525.*	18474	606.42	615.77	623	642.35	0.013919	41.37	446.56	50	2.44	0.015	618.26	618.26	2.49	2.49

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2520	18481	606.17	615.52	622.75	642.09	0.013909	41.36	446.81	50	2.44	0.015	618	618	2.48	2.48
2519.41*	18481	605.81	615.18	622.39	641.66	0.013843	41.3	447.52	50	2.43	0.015	617.64	617.64	2.46	2.46
2518.82*	18481	605.46	614.84	622.04	641.23	0.013767	41.22	448.35	50	2.43	0.015	617.29	617.29	2.45	2.45
2518.23*	18481	605.1	614.5	621.68	640.8	0.013706	41.16	449.02	50	2.42	0.015	616.93	616.93	2.43	2.43
2517.64*	18481	604.74	614.15	621.32	640.38	0.013647	41.1	449.66	50	2.42	0.015	616.57	616.57	2.42	2.42
2517.05*	18481	604.38	613.8	620.96	639.96	0.013591	41.04	450.29	50	2.41	0.015	616.21	616.21	2.41	2.41
2516.47*	18481	604.03	613.47	620.61	639.54	0.013524	40.97	451.03	50	2.4	0.015	615.86	615.86	2.39	2.39
2515.88*	18481	603.67	613.12	620.25	639.12	0.013473	40.92	451.61	50	2.4	0.015	615.5	615.5	2.38	2.38
2515.29*	18481	603.31	612.77	619.89	638.71	0.013423	40.87	452.17	50	2.4	0.015	615.14	615.14	2.37	2.37
2514.70*	18481	602.96	612.43	619.54	638.29	0.013362	40.81	452.87	50	2.39	0.015	614.79	614.79	2.36	2.36
2514.11*	18481	602.6	612.08	619.18	637.88	0.013317	40.76	453.38	50	2.39	0.015	614.43	614.43	2.35	2.35
2513.52*	18481	602.24	611.73	618.82	637.48	0.013273	40.72	453.88	50	2.38	0.015	614.07	614.07	2.34	2.34
2512.94*	18481	601.89	611.4	618.47	637.07	0.013218	40.66	454.52	50	2.38	0.015	613.72	613.72	2.32	2.32
2512.35*	18481	601.53	611.04	618.11	636.66	0.013178	40.62	454.98	50	2.37	0.015	613.36	613.36	2.32	2.32
2511.76*	18481	601.17	610.69	617.75	636.26	0.01314	40.58	455.42	50	2.37	0.015	613	613	2.31	2.31
2511.17*	18481	600.81	610.34	617.39	635.86	0.013103	40.54	455.85	50	2.37	0.015	612.64	612.64	2.3	2.3
2510.58*	18481	600.46	610	617.04	635.46	0.013055	40.49	456.42	50	2.36	0.015	612.29	612.29	2.29	2.29
2510	18481	600.1	609.65	616.68	635.07	0.013021	40.46	456.82	50	2.36	0.015	611.93	611.93	2.28	2.28
2509.41*	18481	599.74	609.3	616.32	634.67	0.012989	40.42	457.19	50	2.36	0.015	611.57	611.57	2.27	2.27
2508.82*	18481	599.38	608.95	615.96	634.28	0.012959	40.39	457.56	50	2.35	0.015	611.21	611.21	2.26	2.26
2508.23*	18481	599.03	608.61	615.61	633.88	0.012916	40.35	458.07	50	2.35	0.015	610.86	610.86	2.25	2.25
2507.64*	18481	598.67	608.25	615.25	633.49	0.012888	40.32	458.4	50	2.35	0.015	610.5	610.5	2.25	2.25
2507.05*	18481	598.31	607.9	614.89	633.1	0.012861	40.29	458.72	50	2.34	0.015	610.14	610.14	2.24	2.24
2506.47*	18481	597.95	607.55	614.53	632.72	0.012835	40.26	459.03	50	2.34	0.015	609.78	609.78	2.23	2.23
2505.88*	18481	597.6	607.2	614.18	632.32	0.012797	40.22	459.49	50	2.34	0.015	609.43	609.43	2.23	2.23
2505.29*	18481	597.24	606.85	613.82	631.94	0.012775	40.2	459.77	50	2.34	0.015	609.07	609.07	2.22	2.22
2504.70*	18481	596.88	606.5	613.46	631.56	0.012752	40.17	460.04	50	2.33	0.015	608.71	608.71	2.21	2.21
2504.11*	18481	596.52	606.14	613.1	631.17	0.012731	40.15	460.29	50	2.33	0.015	608.35	608.35	2.21	2.21
2503.52*	18481	596.17	605.8	612.75	630.79	0.012697	40.11	460.71	50	2.33	0.015	608	608	2.2	2.2
2502.94*	18481	595.81	605.44	612.39	630.41	0.012678	40.09	460.94	50	2.33	0.015	607.64	607.64	2.2	2.2
2502.35*	18481	595.45	605.09	612.03	630.03	0.01266	40.07	461.16	50	2.33	0.015	607.28	607.28	2.19	2.19
2501.76*	18481	595.09	604.73	611.67	629.65	0.012643	40.06	461.37	50	2.32	0.015	606.92	606.92	2.19	2.19
2501.17*	18481	594.74	604.39	611.32	629.26	0.012612	40.02	461.75	50	2.32	0.015	606.57	606.57	2.18	2.18
2500.58*	18481	594.38	604.03	610.96	628.89	0.012597	40.01	461.94	50	2.32	0.015	606.21	606.21	2.18	2.18
2500	18481	594.02	603.68	610.6	628.51	0.012582	39.99	462.12	50	2.32	0.015	605.85	605.85	2.17	2.17
2499.09*	18481	593.68	603.34	610.25	628.12	0.012547	39.95	462.56	50	2.31	0.015	605.5	605.5	2.16	2.16
2498.18*	18481	593.33	602.99	609.9	627.76	0.012531	39.94	462.74	50	2.31	0.015	605.15	605.15	2.16	2.16
2497.27*	18481	592.99	602.64	609.55	627.39	0.012522	39.92	462.9	50	2.31	0.015	604.79	604.79	2.15	2.15
2496.36*	18481	592.64	602.29	609.19	627.02	0.012505	39.91	463.08	50	2.31	0.015	604.44	604.44	2.15	2.15
2495.45*	18481	592.3	601.94	608.85	626.65	0.012487	39.89	463.32	50	2.31	0.015	604.09	604.09	2.15	2.15

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2494.54*	18481	591.95	601.59	608.49	626.28	0.012471	39.87	463.49	50	2.31	0.015	603.74	603.74	2.15	2.15
2493.63*	18481	591.61	601.25	608.14	625.91	0.012454	39.85	463.72	50	2.31	0.015	603.39	603.39	2.14	2.14
2492.72*	18481	591.26	600.9	607.79	625.54	0.012438	39.84	463.9	50	2.3	0.015	603.04	603.04	2.14	2.14
2491.81*	18481	590.92	600.55	607.44	625.18	0.012431	39.83	464.02	50	2.3	0.015	602.68	602.68	2.13	2.13
2490.90*	18481	590.57	600.2	607.08	624.81	0.012417	39.81	464.19	50	2.3	0.015	602.33	602.33	2.13	2.13
2490	18481	590.23	599.86	606.74	624.45	0.012401	39.8	464.39	50	2.3	0.015	601.98	601.98	2.12	2.12
2480	18481	588.48	599.64	606.55	624.43	0.013333	39.95	462.55	50	2.31	0.015	601.98	601.98	2.34	2.34
2477.5*	18481	588.17	599.34	606.24	624.08	0.013289	39.91	463.05	50	2.31	0.015	601.67	601.67	2.33	2.33
2475.*	18481	587.86	599.04	605.93	623.73	0.013247	39.87	463.55	50	2.31	0.015	601.36	601.36	2.32	2.32
2472.5*	18481	587.56	598.76	605.63	623.37	0.013193	39.81	464.19	50	2.3	0.015	601.06	601.06	2.3	2.3
2470	18818	587.25	598.69	605.52	622.93	0.012672	39.51	476.24	50	2.26	0.015	600.75	600.75	2.06	2.06
2465.*	18818	586.52	597.55	604.22	622.6	0.013203	40.16	468.54	59	2.51	0.015	601.02	601.02	3.47	3.47
2460	18818	585.78	596.6	603.4	622.26	0.013849	40.65	462.91	60.11	2.58	0.015	601.28	601.28	4.68	4.68
2455.*	18818	585.15	595.88	602.68	621.94	0.014648	40.96	459.37	64.15	2.7	0.015	601.65	601.65	5.77	5.77
2450	18818	584.51	595.25	602.07	621.6	0.015306	41.2	456.77	65.89	2.76	0.015	602.01	602.01	6.76	6.76
2445.*	18818	584.4	594.5	601.36	621.25	0.01575	41.5	453.4	68.42	2.84	0.015	602.18	602.18	7.68	7.68
2440	18818	584.29	593.81	600.6	620.9	0.016034	41.77	450.54	69.83	2.9	0.015	602.35	602.35	8.54	8.54
2430	18818	584.29	593.53	600.31	620.57	0.015844	41.73	450.94	69.95	2.9	0.015	602.04	602.04	8.51	8.51
2420	18818	583.76	593.23	600.05	620.32	0.01588	41.77	450.54	69.89	2.9	0.015	601.76	601.76	8.53	8.53
2410	18818	583.76	593.25	600.02	620.2	0.015768	41.66	451.68	69.95	2.89	0.015	601.76	601.76	8.51	8.51
2406.66*	18818	583.31	592.79	599.57	619.8	0.015818	41.71	451.17	69.92	2.89	0.015	601.31	601.31	8.52	8.52
2403.33*	18818	582.86	592.33	599.12	619.41	0.015867	41.76	450.67	69.9	2.9	0.015	600.86	600.86	8.53	8.53
2400	18818	582.41	591.88	598.67	619.01	0.015915	41.8	450.19	69.87	2.9	0.015	600.41	600.41	8.53	8.53
2399.33*	18818	581.89	591.35	598.15	618.55	0.015972	41.85	449.62	69.84	2.91	0.015	599.89	599.89	8.54	8.54
2398.66*	18818	581.38	590.83	597.64	618.09	0.016019	41.9	449.15	69.81	2.91	0.015	599.38	599.38	8.55	8.55
2398.*	18818	580.86	590.31	597.12	617.6	0.018259	41.92	448.86	69.79	2.91	0.016	598.86	598.86	8.55	8.55
2397.33*	18818	580.35	589.8	596.61	617.08	0.018251	41.92	448.93	69.8	2.91	0.016	598.35	598.35	8.55	8.55
2396.66*	18818	579.83	589.28	596.09	616.55	0.018242	41.91	449.01	69.8	2.91	0.016	597.83	597.83	8.55	8.55
2396.*	18818	579.31	588.76	595.57	616.02	0.01823	41.9	449.11	69.81	2.91	0.016	597.31	597.31	8.55	8.55
2395.33*	18818	578.8	588.25	595.06	615.51	0.01823	41.9	449.11	69.81	2.91	0.016	596.8	596.8	8.55	8.55
2394.66*	18818	578.28	587.73	594.54	615	0.018233	41.9	449.09	69.8	2.91	0.016	596.28	596.28	8.55	8.55
2394.*	18818	577.77	587.22	594.03	614.49	0.018233	41.9	449.09	69.8	2.91	0.016	595.77	595.77	8.55	8.55
2393.33*	18818	577.25	586.7	593.51	613.97	0.018236	41.91	449.06	69.8	2.91	0.016	595.25	595.25	8.55	8.55
2392.66*	18818	576.73	586.18	592.99	613.45	0.018238	41.91	449.04	69.8	2.91	0.016	594.73	594.73	8.55	8.55
2392.*	18818	576.22	585.67	592.48	612.94	0.018238	41.91	449.04	69.8	2.91	0.016	594.22	594.22	8.55	8.55
2391.33*	18818	575.7	585.15	591.96	612.41	0.018225	41.9	449.16	69.81	2.91	0.016	593.7	593.7	8.55	8.55
2390.66*	18818	575.19	584.64	591.45	611.9	0.018225	41.9	449.16	69.81	2.91	0.016	593.19	593.19	8.55	8.55
2390	18818	574.67	584.12	590.93	611.38	0.018228	41.9	449.13	69.81	2.91	0.016	592.67	592.67	8.55	8.55
2387.5*	18818	574.13	583.58	590.41	610.84	0.018216	41.9	449.16	69.8	2.91	0.016	592.6	592.1	9.02	8.52
2385.*	18818	573.59	583.05	589.87	610.3	0.018213	41.89	449.19	69.81	2.91	0.016	592.54	591.54	9.49	8.49

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2382.5*	18818	573.06	582.51	589.34	609.76	0.018215	41.89	449.2	69.81	2.91	0.016	592.47	590.97	9.96	8.46
2380	18818	572.52	581.97	588.8	609.22	0.018216	41.89	449.24	69.81	2.91	0.016	592.41	590.41	10.44	8.44
2378.75*	18818	572.01	581.46	588.29	608.72	0.018223	41.9	449.17	69.81	2.91	0.016	591.91	589.91	10.45	8.45
2377.5*	18818	571.5	580.95	587.78	608.22	0.018232	41.9	449.1	69.81	2.91	0.016	591.42	589.42	10.47	8.47
2376.25*	18818	570.99	580.44	587.27	607.7	0.01823	41.9	449.13	69.82	2.91	0.016	590.92	588.92	10.48	8.48
2375.*	18818	570.48	579.93	586.76	607.2	0.018227	41.9	449.11	69.8	2.91	0.016	590.43	588.43	10.5	8.5
2373.75*	18818	569.98	579.43	586.25	606.69	0.018229	41.9	449.13	69.81	2.91	0.016	589.93	587.93	10.5	8.5
2372.5*	18818	569.47	578.92	585.75	606.18	0.018227	41.9	449.15	69.82	2.91	0.016	589.44	587.44	10.52	8.52
2371.25*	18818	568.96	578.41	585.22	605.66	0.018223	41.89	449.2	69.82	2.91	0.016	588.95	586.95	10.54	8.54
2370	18818	568.45	577.9	584.71	605.16	0.018224	41.9	449.16	69.81	2.91	0.016	588.45	586.45	10.55	8.55
2367.5*	18818	567.96	577.41	584.22	604.72	0.018278	41.94	448.69	69.78	2.91	0.016	587.96	585.96	10.55	8.55
2365.*	18818	567.46	576.9	583.72	604.28	0.018341	41.99	448.15	69.75	2.92	0.016	587.46	585.46	10.56	8.56
2362.5*	18818	566.97	576.4	583.23	603.84	0.018393	42.03	447.69	69.72	2.92	0.016	586.97	584.97	10.57	8.57
2360	18818	566.48	575.9	582.74	603.39	0.018443	42.07	447.26	69.7	2.93	0.016	586.48	584.48	10.58	8.58
2350	18818	566.48	575.92	582.74	603.26	0.016088	41.96	448.46	69.77	2.92	0.015	586.48	584.48	10.56	8.56
2347.5*	18818	565.98	575.41	582.24	602.85	0.016125	42.04	447.66	69.64	2.92	0.015	585.98	583.98	10.57	8.57
2345.*	18818	565.49	574.9	581.83	602.44	0.015752	42.12	446.76	67.61	2.89	0.015	585.49	583.49	10.59	8.59
2342.5*	18818	564.99	574.42	581.5	602.05	0.015215	42.18	446.13	64.57	2.83	0.015	584.99	582.99	10.57	8.57
2340	18818	564.5	574.06	581.28	601.66	0.014635	42.16	446.3	60.95	2.75	0.015	584.5	582.5	10.44	8.44
2337.5*	18818	564.01	573.66	580.99	601.3	0.014194	42.19	446.03	58.32	2.69	0.015	583.51	582.01	9.85	8.35
2335.*	18818	563.51	573.02	580.48	600.92	0.014033	42.39	443.91	55.59	2.64	0.015	582.51	581.51	9.49	8.49
2332.5*	18818	563.02	572.14	579.71	600.52	0.014408	42.75	440.18	53.27	2.62	0.015	581.52	581.02	9.38	8.88
2330	18818	562.52	571.04	578.65	600.07	0.015822	43.24	435.17	52.2	2.64	0.015	580.52	580.52	9.48	9.48
2326.66*	18818	562.11	570.7	578.28	599.59	0.015713	43.14	436.24	51.55	2.61	0.015	580.32	580.32	9.62	9.62
2323.33*	18818	561.7	570.35	577.93	599.11	0.01563	43.03	437.27	50.9	2.59	0.015	580.13	580.13	9.78	9.78
2320	18818	561.29	570.01	577.57	598.63	0.015565	42.93	438.31	50.25	2.56	0.015	579.93	579.93	9.92	9.92
2317.5*	18818	560.92	569.51	577.06	598.18	0.015568	42.97	437.91	51.7	2.6	0.015	579.42	579.42	9.91	9.91
2315.*	18818	560.56	569.03	576.55	597.74	0.015632	43	437.64	53.13	2.64	0.015	578.92	578.92	9.89	9.89
2312.5*	18818	560.2	568.55	576.03	597.28	0.015752	43.01	437.49	54.55	2.68	0.015	578.41	578.41	9.86	9.86
2310	18818	559.83	568.07	575.52	596.82	0.015926	43.03	437.35	55.94	2.71	0.015	577.91	577.91	9.84	9.84
2307.5*	18818	559.49	569.08	576.35	595.86	0.013223	41.52	453.18	55.86	2.57	0.015	577.44	577.56	8.36	8.48
2305.*	18818	559.16	569.4	576.38	595.24	0.012904	40.79	461.31	60.73	2.61	0.015	576.98	577.21	7.58	7.81
2302.5*	18818	558.82	568.79	575.72	594.88	0.013907	40.99	459.07	63.23	2.68	0.015	576.52	576.87	7.73	8.08
2300	18818	558.48	567.48	574.45	594.43	0.015545	41.66	451.75	64.61	2.78	0.015	576.05	576.52	8.57	9.04
2296.66*	18818	558.14	567.15	574.07	594.02	0.015245	41.6	452.33	65.64	2.79	0.015	575.58	576.31	8.43	9.16
2293.33*	18818	557.81	566.81	573.71	593.62	0.015298	41.55	452.85	66.09	2.8	0.015	575.12	576.09	8.31	9.28
2290	18818	557.47	566.41	573.32	593.23	0.015435	41.56	452.76	66.06	2.8	0.015	574.65	575.88	8.24	9.47
2288.75*	18818	557.09	565.89	572.74	592.79	0.015766	41.62	452.14	68.11	2.85	0.015	574.13	575.2	8.24	9.31
2287.5*	18818	556.71	565.4	572.18	592.34	0.016107	41.65	451.8	70.1	2.89	0.015	573.6	574.53	8.2	9.13
2286.25*	18818	556.33	564.95	571.65	591.89	0.01645	41.65	451.85	72.06	2.93	0.015	573.08	573.85	8.13	8.9

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2285.*	18818	555.95	564.53	571.16	591.4	0.016751	41.6	452.37	73.89	2.96	0.015	572.56	573.17	8.03	8.64
2283.75*	18818	555.58	564.13	570.7	590.89	0.016999	41.52	453.28	75.51	2.99	0.015	572.04	572.5	7.91	8.37
2282.5*	18818	555.2	563.73	570.27	590.38	0.016988	41.43	454.26	75.96	2.99	0.015	571.52	571.82	7.79	8.09
2281.25*	18818	554.82	563.32	569.83	589.88	0.016854	41.36	455.02	75.75	2.97	0.015	570.99	571.15	7.67	7.83
2280	18818	554.44	562.89	569.44	589.39	0.016819	41.31	455.51	75.79	2.97	0.015	570.47	570.47	7.58	7.58
2277.5*	18818	554.1	562.19	568.68	588.93	0.017653	41.5	453.48	78.11	3.04	0.015	570.01	570.01	7.82	7.82
2275.*	18818	553.77	561.52	567.94	588.46	0.018522	41.66	451.75	80.5	3.1	0.015	569.54	569.54	8.02	8.02
2272.5*	18818	553.43	560.86	567.2	587.97	0.019417	41.79	450.33	82.94	3.16	0.015	569.07	569.07	8.21	8.21
2270	18818	553.1	560.21	566.49	587.46	0.020338	41.89	449.2	85.43	3.22	0.015	568.61	568.61	8.4	8.4
2260	18818	552.56	559.25	565.42	586.7	0.02188	42.05	447.52	89.73	3.32	0.015	567.87	567.87	8.62	8.62
2250	18818	552.56	559.26	565.42	586.54	0.021666	41.91	448.99	89.8	3.3	0.015	567.87	567.87	8.61	8.61
2245.*	18818	552.16	558.59	564.65	585.86	0.022667	41.91	449.06	93.24	3.37	0.015	567.31	567.31	8.72	8.72
2240	18818	551.75	557.93	563.88	585.15	0.023699	41.87	449.45	96.72	3.42	0.015	566.75	566.75	8.82	8.82
2235.*	18818	551.64	557.89	563.77	584.32	0.029097	41.25	456.15	97	3.35	0.017	566.64	566.64	8.75	8.75
2230	18818	551.53	557.86	563.66	583.42	0.02765	40.57	463.84	97.32	3.27	0.017	566.53	566.53	8.67	8.67
2220	18818	551.53	557.88	563.66	583.21	0.027278	40.39	465.91	97.4	3.25	0.017	566.53	566.53	8.65	8.65
2219.54*	18818	551.31	557.78	563.46	582.15	0.025625	39.62	474.98	97.51	3.16	0.017	566.4	566.4	8.62	8.62
2219.09*	18818	551.1	557.68	563.28	581.14	0.024103	38.87	484.08	97.64	3.08	0.017	566.27	566.27	8.59	8.59
2218.63*	18818	550.88	557.57	563.08	580.21	0.022737	38.18	492.88	97.73	3	0.017	566.14	566.14	8.57	8.57
2218.18*	18818	550.66	557.47	562.89	579.32	0.021486	37.52	501.56	97.82	2.92	0.017	566.01	566.01	8.54	8.54
2217.72*	18818	550.44	557.36	562.71	578.49	0.020339	36.89	510.16	97.93	2.85	0.017	565.88	565.88	8.52	8.52
2217.27*	18818	550.23	557.26	562.52	577.69	0.019271	36.27	518.78	98.03	2.78	0.017	565.75	565.75	8.49	8.49
2216.81*	18818	550.01	557.15	562.33	576.93	0.018295	35.7	527.18	98.11	2.71	0.017	565.62	565.62	8.47	8.47
2216.36*	18818	549.79	557.03	562.14	576.23	0.017414	35.16	535.27	98.18	2.65	0.017	565.49	565.49	8.46	8.46
2215.90*	18818	549.57	556.92	561.95	575.56	0.016607	34.64	543.17	98.24	2.6	0.017	565.36	565.36	8.44	8.44
2215.45*	18818	549.36	556.81	561.76	574.92	0.015859	34.15	550.98	98.31	2.54	0.017	565.23	565.23	8.42	8.42
2215.*	18818	549.14	556.69	561.57	574.32	0.015176	33.69	558.51	98.35	2.49	0.017	565.1	565.1	8.41	8.41
2214.54*	18818	548.92	556.57	561.38	573.74	0.014538	33.25	565.98	98.41	2.44	0.017	564.97	564.97	8.4	8.4
2214.09*	18818	548.71	556.46	561.2	573.17	0.013931	32.81	573.53	98.47	2.4	0.017	564.84	564.84	8.38	8.38
2213.63*	18818	548.49	556.33	561.01	572.65	0.013394	32.42	580.5	98.49	2.35	0.017	564.71	564.71	8.38	8.38
2213.18*	18818	548.27	556.21	560.81	572.15	0.012897	32.04	587.28	98.5	2.31	0.017	564.58	564.58	8.37	8.37
2212.72*	18818	548.05	556.08	560.62	571.67	0.012437	31.69	593.86	98.51	2.27	0.017	564.45	564.45	8.37	8.37
2212.27*	18818	547.84	555.95	560.43	571.22	0.012026	31.36	600.02	98.51	2.24	0.017	564.32	564.32	8.37	8.37
2211.81*	18818	547.62	555.81	560.24	570.78	0.01163	31.04	606.21	98.5	2.21	0.017	564.19	564.19	8.38	8.38
2211.36*	18818	547.4	555.69	560.05	570.35	0.011254	30.73	612.35	98.5	2.17	0.017	564.06	564.06	8.37	8.37
2210.90*	18818	547.18	555.55	559.86	569.95	0.01093	30.46	617.8	98.46	2.14	0.017	563.93	563.93	8.38	8.38
2210.45*	18818	546.97	555.41	559.67	569.56	0.010616	30.19	623.32	98.44	2.11	0.017	563.8	563.8	8.39	8.39
2210	18818	546.75	555.27	559.48	569.18	0.010321	29.93	628.67	98.39	2.09	0.017	563.67	563.67	8.4	8.4
2208.57*	18818	546.54	555.13	559.29	568.83	0.010068	29.7	633.53	98.43	2.06	0.017	563.38	563.38	8.25	8.25
2207.14*	18818	546.33	554.98	559.1	568.48	0.009831	29.49	638.22	98.46	2.04	0.017	563.08	563.08	8.1	8.1

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2205.71*	18818	546.12	554.83	558.9	568.15	0.009614	29.29	642.58	98.46	2.02	0.017	562.79	562.79	7.96	7.96
2204.28*	18818	545.91	554.69	558.72	567.82	0.009406	29.09	646.93	98.48	2	0.017	562.49	562.49	7.8	7.8
2202.85*	18818	545.7	554.54	558.53	567.51	0.009214	28.9	651.09	98.51	1.98	0.017	562.2	562.2	7.66	7.66
2201.42*	18818	545.49	554.39	558.34	567.2	0.009032	28.73	655.1	98.51	1.96	0.017	561.9	561.9	7.51	7.51
2200	18818	545.28	554.23	558.15	566.9	0.008864	28.56	658.84	98.49	1.95	0.017	561.61	561.61	7.38	7.38
2198.88*	18818	545.07	554.03	557.94	566.63	0.008796	28.48	660.69	98.63	1.94	0.017	561.74	561.37	7.71	7.34
2197.77*	18818	544.85	553.83	557.72	566.36	0.008733	28.41	662.4	98.75	1.93	0.017	561.86	561.14	8.03	7.31
2196.66*	18818	544.64	553.63	557.5	566.09	0.008666	28.33	664.32	98.91	1.93	0.017	561.99	560.9	8.36	7.27
2195.55*	18818	544.42	553.42	557.28	565.82	0.00861	28.26	665.87	99.01	1.92	0.017	562.11	560.67	8.69	7.25
2194.44*	18818	544.21	553.22	557.06	565.55	0.008551	28.19	667.66	99.17	1.91	0.017	562.24	560.43	9.02	7.21
2193.33*	18818	543.99	553.01	556.84	565.3	0.008516	28.14	668.69	99.23	1.91	0.017	562.36	560.2	9.35	7.19
2192.22*	18818	543.78	552.8	556.62	565.05	0.008479	28.09	669.87	99.34	1.91	0.017	562.49	559.96	9.69	7.16
2191.11*	18818	543.56	552.58	556.4	564.8	0.00845	28.05	670.83	99.43	1.9	0.017	562.61	559.73	10.03	7.15
2190	18818	543.35	552.37	556.18	564.55	0.008417	28	671.98	99.54	1.9	0.017	562.74	559.49	10.37	7.12
2180	18818	543.13	552.17	555.95	564.29	0.008356	27.94	673.62	99.6	1.89	0.017	562.52	559.27	10.35	7.1
2177.5*	18818	542.93	551.99	555.75	564.05	0.008305	27.88	675.04	99.69	1.89	0.017	562.55	559.07	10.56	7.08
2175.*	18818	542.73	551.79	555.55	563.83	0.00827	27.84	675.97	99.73	1.88	0.017	562.59	558.88	10.8	7.09
2172.5*	18818	542.54	551.61	555.35	563.59	0.008223	27.78	677.43	99.83	1.88	0.017	562.62	558.68	11.01	7.07
2170	18818	542.34	551.42	555.15	563.37	0.008196	27.74	678.33	99.89	1.88	0.017	562.66	558.48	11.24	7.06
2167.5*	18818	542.17	551.25	554.98	563.18	0.008174	27.72	678.97	99.91	1.87	0.017	562.61	558.31	11.36	7.06
2165.*	18818	542	551.09	554.81	563	0.008152	27.69	679.58	99.94	1.87	0.017	562.57	558.14	11.48	7.05
2162.5*	18818	541.83	550.93	554.64	562.81	0.008131	27.67	680.18	99.96	1.87	0.017	562.52	557.97	11.59	7.04
2160	18818	541.66	550.76	554.46	562.63	0.00811	27.64	680.77	99.99	1.87	0.017	562.48	557.8	11.72	7.04
2159.*	18818	541.44	550.55	554.24	562.37	0.008066	27.59	682.04	100.04	1.86	0.017	562.21	557.58	11.66	7.03
2158.*	18818	541.22	550.35	554.02	562.13	0.008024	27.54	683.25	100.09	1.86	0.017	561.94	557.36	11.59	7.01
2157.*	18818	540.99	550.12	553.79	561.89	0.008011	27.53	683.63	100.1	1.86	0.017	561.66	557.13	11.54	7.01
2156.*	18818	540.77	549.91	553.57	561.65	0.007986	27.5	684.34	100.13	1.85	0.017	561.39	556.91	11.48	7
2155.*	18818	540.55	549.69	553.35	561.41	0.007963	27.47	685.03	100.16	1.85	0.017	561.12	556.69	11.43	7
2154.*	18818	540.33	549.48	553.13	561.18	0.00794	27.44	685.7	100.18	1.85	0.017	560.85	556.47	11.37	6.99
2153.*	18818	540.11	549.27	552.91	560.94	0.007918	27.42	686.35	100.21	1.85	0.017	560.58	556.25	11.31	6.98
2152.*	18818	539.88	549.04	552.68	560.71	0.007918	27.42	686.35	100.21	1.85	0.017	560.3	556.02	11.26	6.98
2151.*	18818	539.66	548.82	552.46	560.47	0.007897	27.39	686.98	100.23	1.84	0.017	560.03	555.8	11.21	6.98
2150	18818	539.44	548.61	552.24	560.24	0.007876	27.37	687.58	100.26	1.84	0.017	559.76	555.58	11.15	6.97
2148.57*	18818	539.22	548.37	552.02	560.01	0.007897	27.38	687.4	100.42	1.84	0.017	559.49	555.29	11.12	6.92
2147.14*	18818	539.01	548.14	551.78	559.77	0.007915	27.38	687.34	100.6	1.85	0.017	559.22	555	11.08	6.86
2145.71*	18818	538.79	547.89	551.54	559.54	0.007938	27.39	687.1	100.76	1.85	0.017	558.95	554.71	11.06	6.82
2144.28*	18818	538.58	547.66	551.3	559.31	0.007956	27.39	687.15	100.96	1.85	0.017	558.67	554.42	11.01	6.76
2142.85*	18818	538.36	547.42	551.07	559.07	0.007978	27.39	686.96	101.12	1.85	0.017	558.4	554.13	10.98	6.71
2141.42*	18818	538.15	547.19	550.83	558.83	0.00799	27.38	687.2	101.31	1.85	0.017	558.13	553.84	10.94	6.65
2140	18818	537.93	546.95	550.59	558.6	0.008011	27.39	687.1	101.48	1.85	0.017	557.86	553.55	10.91	6.6

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
2137.5*	18818	537.75	546.77	550.4	558.4	0.007983	27.36	687.89	101.54	1.85	0.017	557.41	553.36	10.64	6.59
2135.*	18818	537.57	546.59	550.22	558.19	0.007959	27.33	688.66	101.6	1.85	0.017	556.96	553.18	10.37	6.59
2132.5*	18818	537.38	546.41	550.03	557.99	0.007947	27.31	689.12	101.64	1.85	0.017	556.51	552.99	10.1	6.58
2130	18818	537.2	546.23	549.84	557.79	0.007926	27.28	689.89	101.69	1.85	0.017	556.06	552.81	9.83	6.58
2127.5*	18818	537.02	546.05	549.66	557.58	0.007899	27.24	690.82	101.77	1.84	0.017	555.86	552.61	9.81	6.56
2125.*	18818	536.83	545.86	549.47	557.38	0.0079	27.24	690.89	101.82	1.84	0.017	555.66	552.41	9.8	6.55
2122.5*	18818	536.65	545.68	549.28	557.17	0.007872	27.2	691.94	101.93	1.84	0.017	555.45	552.2	9.77	6.52
2120	18818	536.46	545.49	549.08	556.97	0.007868	27.19	692.13	101.97	1.84	0.017	555.25	552	9.76	6.51
2110	18818	536.29	545.33	548.91	556.79	0.007854	27.17	692.56	101.99	1.84	0.017	555.08	551.83	9.75	6.5
2108.*	18818	536.09	545.04	548.61	556.57	0.008007	27.26	690.38	102.84	1.85	0.017	554.8	551.83	9.76	6.79
2106.*	18818	535.9	544.74	548.33	556.35	0.008164	27.34	688.22	103.67	1.87	0.017	554.53	551.82	9.79	7.08
2104.*	18818	535.7	544.43	548.06	556.12	0.008334	27.44	685.83	104.46	1.89	0.017	554.25	551.82	9.82	7.39
2102.*	18818	535.51	544.11	547.69	555.88	0.008504	27.53	683.49	105.18	1.9	0.017	553.98	551.81	9.87	7.7
2100	18818	535.31	543.78	547.35	555.64	0.00869	27.64	680.94	105.86	1.92	0.017	553.7	551.81	9.92	8.03
2097.5*	18818	535.13	543.78	547.26	555.34	0.00836	27.28	689.78	106.34	1.89	0.017	552.87	550.76	9.09	6.98
2095.*	18818	534.95	543.7	547.11	555.09	0.008096	27.09	694.74	105.56	1.86	0.017	552.04	549.71	8.34	6.01
2092.5*	18818	534.78	543.61	546.96	554.85	0.007727	26.91	699.4	102.94	1.82	0.017	551.2	548.67	7.59	5.06
2090	18818	534.6	543.57	546.85	554.61	0.007298	26.66	705.91	99.58	1.76	0.017	550.37	547.62	6.8	4.05
2077.5*	18818	534.28	543.21	546.52	554.38	0.007431	26.82	701.75	99.56	1.78	0.017	549.9	547.17	6.69	3.96
2075.*	18818	533.97	542.84	546.23	554.18	0.007611	27.02	696.33	99.51	1.8	0.017	549.42	546.71	6.58	3.87
2072.5*	18818	533.66	542.47	545.92	553.99	0.007792	27.23	691.12	99.45	1.82	0.017	548.94	546.26	6.47	3.79
2070	18818	533.4	542.17	545.63	553.79	0.007917	27.35	688.04	99.58	1.83	0.017	548.47	545.81	6.3	3.64
2060	18818	533.07	542.09	545.5	553.46	0.007513	27.07	695.2	97.92	1.79	0.017	547.85	544	5.76	1.91
2056.66*	18818	532.71	542.06	545.4	553.24	0.007091	26.84	701.13	95.39	1.74	0.017	547.43	543.13	5.37	1.07
2053.33*	18818	532.36	542.08	545.33	553.02	0.006615	26.54	708.92	95.61	1.69	0.017	547	542.27	4.92	0.19
2050	18818	532	542.13	545.26	552.79	0.006071	26.22	720.54	204.51	1.63	0.017	546.58	541.4	4.45	-0.73
2040	18818	531.6	541.94	545.12	552.69	0.006033	26.32	718.98	203.44	1.61	0.016	546.3	543.8	4.36	1.86
2035.*	18818	530.93	543.31	545.59	551.94	0.004043	23.65	822.28	253.03	1.33	0.016	545.89	543.72	2.58	0.41
2030.*	18818	530.27	544.29	545.65	551.5	0.002959	21.74	934.62	303.27	1.14	0.016	545.47	543.64	1.18	-0.65
2025.*	18818	529.6	543.58	545.31	551.37	0.00317	22.69	926.74	298.2	1.16	0.016	545.06	543.55	1.48	-0.03
2020	18818	528.93	541.94	544.56	551.14	0.004088	24.61	854.48	223.89	1.24	0.015	544.65	543.47	2.71	1.53
2010.*	18818	528.46	541.88	544.55	551.07	0.004067	24.66	869.1	222.71	1.22	0.015	542.83	542.73	0.95	0.85
2000	18818	528	541.99	544.66	550.92	0.003898	24.44	909.42	233.57	1.18	0.015	541	542	-0.99	0.01
1997.5*	18818	527.7	541.15	543.62	550.75	0.004175	25.15	854.95	223.17	1.26	0.014	540.73	541.85	-0.42	0.7
1995.*	18818	527.4	540.36	543.46	550.58	0.004519	25.77	794.18	199.39	1.33	0.013	540.46	541.7	0.1	1.34
1992.5*	18818	527.1	539.58	543.26	550.4	0.004931	26.41	729.49	194.71	1.4	0.011	540.2	541.55	0.62	1.97
1990	18818	526.8	538.71	542.88	550.19	0.005539	27.2	691.92	66.21	1.48	0.017	539.93	541.4	1.22	2.69
1985.33*	18818	526.6	538.36	542.51	550.06	0.00575	27.45	685.64	66.6	1.51	0.017	540.25	541.45	1.89	3.09
1980.66*	18818	526.41	538.05	541.89	549.91	0.00593	27.63	680.99	66.99	1.53	0.017	540.56	541.49	2.51	3.44
1976	18818	526.21	537.75	541.31	549.76	0.006107	27.82	676.54	67.3	1.55	0.017	540.88	541.54	3.13	3.79

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
1975.25*	18818	526.1	537.5	541.09	549.6	0.006175	27.92	673.92	68.53	1.57	0.017	541.09	541.19	3.59	3.69
1974.5*	18818	525.99	537.25	540.91	549.45	0.006251	28.02	671.49	69.75	1.59	0.017	541.3	540.85	4.05	3.6
1973.75*	18818	525.89	537.03	540.72	549.29	0.006326	28.1	669.58	71.02	1.61	0.017	541.51	540.51	4.49	3.49
1973	18818	525.78	536.79	540.54	549.13	0.006418	28.19	667.48	72.26	1.63	0.017	541.72	540.16	4.93	3.37
1971.5*	18818	525.14	535.41	539.54	548.86	0.007417	29.44	639.28	74	1.76	0.017	542.91	540.43	7.5	5.02
1970	18818	524.5	534.12	538.48	548.59	0.008473	30.53	616.31	76.18	1.89	0.017	544.1	540.7	9.98	6.58
1960	18818	524.35	533.76	538.17	548.43	0.008806	30.74	612.19	78.14	1.94	0.017	544.3	540.1	10.54	6.34
1950	18818	524.35	533.78	538.24	548.37	0.008735	30.65	613.91	78.2	1.93	0.017	542.5	540.1	8.72	6.32
1946.66*	18818	524.15	534.07	538.34	547.98	0.008386	29.93	628.63	82.29	1.91	0.017	541.13	539.53	7.06	5.46
1943.33*	18818	523.95	533.77	538.04	547.79	0.008812	30.04	626.36	85.43	1.96	0.017	539.77	538.97	6	5.2
1940	18818	523.75	533.05	537.39	547.5	0.013159	30.51	616.84	87.22	2.02	0.02	538.4	538.4	5.35	5.35
1930	18818	523.49	533.06	537.22	546.94	0.01295	29.9	629.34	90.98	2	0.02	536.49	537.6	3.43	4.54
1926.66*	18818	523.3	532.92	537.01	546.61	0.012651	29.68	633.99	91.07	1.98	0.02	536.09	537.32	3.17	4.4
1923.33*	18818	523.12	532.79	536.82	546.27	0.012351	29.47	638.65	91.06	1.96	0.02	535.68	537.04	2.89	4.25
1920	18818	522.93	532.66	536.63	545.96	0.012064	29.26	643.04	90.91	1.94	0.02	535.28	536.76	2.62	4.1
1915.*	18818	522.78	532.55	536.5	545.7	0.011876	29.11	646.51	91.06	1.93	0.02	534.96	536.4	2.41	3.85
1910	18818	522.63	532.42	536.32	545.47	0.011741	28.99	649.11	91.17	1.91	0.02	534.63	536.04	2.21	3.62
1900	18818	522.63	532.46	536.32	545.37	0.011564	28.84	652.54	91.32	1.9	0.02	534.63	536.04	2.17	3.58
1890	18818	522.46	532.42	536.24	545.15	0.011445	28.63	657.26	91.83	1.89	0.02	534.46	535.87	2.04	3.45
1880	18818	522.27	532.27	536.04	544.85	0.011259	28.47	660.99	91.99	1.87	0.02	534.27	535.52	2	3.25
1870	18818	522.27	532.31	536.01	544.76	0.01149	28.32	664.57	94.76	1.88	0.02	534.27	537.77	1.96	5.46
1868.33*	18818	522.04	532.12	535.78	544.42	0.011288	28.15	668.47	94.85	1.87	0.02	534.04	537.5	1.92	5.38
1866.66*	18818	521.81	531.93	535.55	544.1	0.011102	28	672.16	94.93	1.85	0.02	533.81	537.23	1.88	5.3
1865.*	18818	521.58	531.73	535.32	543.78	0.01093	27.85	675.64	95.01	1.84	0.02	533.58	536.96	1.85	5.23
1863.33*	18818	521.35	531.53	535.09	543.48	0.010803	27.74	678.26	95.07	1.83	0.02	533.35	536.68	1.82	5.15
1861.66*	18818	521.12	531.33	534.86	543.19	0.010684	27.64	680.75	95.13	1.82	0.02	533.12	536.41	1.79	5.08
1860	18818	520.89	531.12	534.63	542.91	0.010572	27.55	683.12	95.18	1.81	0.02	532.89	536.14	1.77	5.02
1859.33*	18818	520.64	530.91	534.38	542.56	0.010389	27.39	687.04	95.26	1.8	0.02	532.64	535.89	1.73	4.98
1858.66*	18818	520.39	530.7	534.13	542.23	0.010222	27.24	690.72	95.34	1.78	0.02	532.39	535.64	1.69	4.94
1858.*	18818	520.14	530.48	533.88	541.91	0.0101	27.14	693.44	95.4	1.77	0.02	532.14	535.39	1.66	4.91
1857.33*	18818	519.88	530.25	533.62	541.61	0.010009	27.05	695.57	95.45	1.77	0.02	531.88	535.13	1.63	4.88
1856.66*	18818	519.63	530.02	533.37	541.31	0.009902	26.96	698.01	95.49	1.76	0.02	531.63	534.88	1.61	4.86
1856.*	18818	519.38	529.8	533.13	541.01	0.009805	26.87	700.32	95.55	1.75	0.02	531.38	534.63	1.58	4.83
1855.33*	18818	519.13	529.57	532.87	540.71	0.009713	26.79	702.44	95.58	1.74	0.02	531.13	534.38	1.56	4.81
1854.66*	18818	518.88	529.34	532.62	540.42	0.009629	26.71	704.43	95.62	1.73	0.02	530.88	534.13	1.54	4.79
1854.*	18818	518.63	529.11	532.37	540.13	0.009551	26.64	706.31	95.66	1.73	0.02	530.63	533.88	1.52	4.77
1853.33*	18818	518.38	528.86	532.12	539.85	0.009503	26.6	707.48	95.68	1.72	0.02	530.38	533.63	1.52	4.77
1852.66*	18818	518.13	528.63	531.87	539.57	0.009434	26.54	709.17	95.71	1.72	0.02	530.13	533.38	1.5	4.75
1852.*	18818	517.87	528.39	531.62	539.3	0.009406	26.51	709.93	95.73	1.72	0.02	529.87	533.12	1.48	4.73
1851.33*	18818	517.62	528.15	531.37	539.02	0.009345	26.45	711.43	95.76	1.71	0.02	529.62	532.87	1.47	4.72

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
1850.66*	18818	517.37	527.92	531.11	538.74	0.00929	26.4	712.84	95.79	1.71	0.02	529.37	532.62	1.45	4.7
1850	18818	517.12	527.67	530.86	538.47	0.009256	26.37	713.66	95.79	1.7	0.02	529.12	532.37	1.45	4.7
1845.*	18818	516.98	527.8	530.85	538.22	0.008225	25.91	726.24	91.36	1.62	0.02	528.88	530.99	1.08	3.19
1840	18818	516.85	528.04	530.87	537.95	0.0073	25.27	744.81	87.02	1.52	0.02	528.64	529.61	0.6	1.57
1830	18818	514.46	524.87	528.66	537.48	0.009787	28.5	660.35	76.56	1.71	0.02	528.53	529.49	3.66	4.62
1820	18818	514.26	523.71	527.63	537.17	0.011089	29.44	639.13	68.22	1.7	0.02	529.49	529.49	5.78	5.78
1816.66*	18818	513.89	523.32	527.26	536.83	0.011156	29.5	637.88	68.22	1.7	0.02	528.88	529.53	5.56	6.21
1813.33*	18818	513.52	522.93	526.88	536.49	0.011219	29.56	636.7	68.22	1.7	0.02	528.27	529.56	5.34	6.63
1810	18818	513.15	522.54	526.54	536.16	0.011279	29.61	635.58	68.22	1.71	0.02	527.66	529.6	5.12	7.06
1807.5*	18818	512.86	524.34	527.18	535.07	0.007152	26.28	715.94	66.9	1.42	0.02	527.36	529.47	3.02	5.13
1805.*	18818	512.57	527.53	527.53	534.05	0.003364	20.49	919.07	72.73	1	0.02	527.07	529.35	-0.46	1.82
1802.5*	18818	512.27	526.55	527.37	533.88	0.004076	21.72	866.27	71.75	1.1	0.02	526.77	529.22	0.22	2.67
1800	18818	511.98	524.9	526.77	533.62	0.005356	23.7	793.91	72.14	1.26	0.02	526.48	529.1	1.58	4.2
1796.66*	18818	511.69	523.52	526.18	533.36	0.00656	25.17	747.66	77.98	1.43	0.02	526.19	528.97	2.67	5.45
1793.33*	18818	511.39	522.68	525.73	533.12	0.007511	25.93	725.59	83.11	1.55	0.02	525.89	528.85	3.21	6.17
1790	18818	511.1	522.06	525.36	532.89	0.008254	26.41	712.57	85.86	1.62	0.02	525.6	528.72	3.54	6.66
1786.66*	18818	510.76	521.43	524.91	532.61	0.008879	26.83	701.47	88.44	1.68	0.02	525.26	528.51	3.83	7.08
1783.33*	18818	510.42	520.87	524.47	532.31	0.009489	27.15	693.15	90.88	1.73	0.02	524.92	528.29	4.05	7.42
1780	18818	510.08	520.36	524.05	532.02	0.010086	27.4	686.68	93.1	1.78	0.02	524.58	528.08	4.22	7.72
1775.*	18818	509.75	520.01	523.72	531.73	0.010159	27.47	684.97	93.03	1.78	0.02	524.25	527.86	4.24	7.85
1770.*	18818	509.41	519.65	523.39	531.44	0.010232	27.55	683.17	92.93	1.79	0.02	523.92	527.64	4.27	7.99
1765.*	18818	509.08	519.3	523.05	531.14	0.010311	27.61	681.46	92.88	1.8	0.02	523.58	527.42	4.28	8.12
1760	18818	508.75	518.95	522.72	530.85	0.010374	27.67	680.02	92.82	1.8	0.02	523.25	527.2	4.3	8.25
1759.28*	18818	508.42	518.61	522.39	530.55	0.010423	27.73	678.71	92.75	1.81	0.02	522.83	526.83	4.22	8.22
1758.57*	18818	508.08	518.26	522.04	530.25	0.010477	27.79	677.27	92.66	1.81	0.02	522.41	526.46	4.15	8.2
1757.85*	18818	507.75	517.92	521.69	529.95	0.010522	27.83	676.1	92.59	1.82	0.02	521.99	526.09	4.07	8.17
1757.14*	18818	507.42	517.57	521.36	529.64	0.010565	27.88	674.99	92.52	1.82	0.02	521.57	525.71	4	8.14
1756.42*	18818	507.08	517.22	521.02	529.34	0.010617	27.93	673.68	92.43	1.82	0.02	521.15	525.34	3.93	8.12
1755.71*	18818	506.75	516.88	520.69	529.04	0.010658	27.97	672.7	92.37	1.83	0.02	520.73	524.97	3.85	8.09
1755.*	18818	506.41	516.53	520.34	528.73	0.010707	28.02	671.51	92.28	1.83	0.02	520.32	524.6	3.79	8.07
1754.28*	18818	506.08	516.19	520.01	528.42	0.01075	28.06	670.55	92.22	1.83	0.02	519.9	524.23	3.71	8.04
1753.57*	18818	505.75	515.86	519.69	528.12	0.010787	28.1	669.72	92.16	1.84	0.02	519.48	523.86	3.62	8
1752.85*	18818	505.41	515.51	519.35	527.81	0.010836	28.14	668.65	92.08	1.84	0.02	519.06	523.49	3.55	7.98
1752.14*	18818	505.08	515.17	519.02	527.5	0.010871	28.17	667.91	92.02	1.84	0.02	518.64	523.11	3.47	7.94
1751.42*	18818	504.75	514.83	518.68	527.19	0.010911	28.21	667.13	91.97	1.85	0.02	518.22	522.74	3.39	7.91
1750.71*	18818	504.41	514.48	518.35	526.87	0.010954	28.25	666.23	91.89	1.85	0.02	517.8	522.37	3.32	7.89
1750	18818	504.08	514.15	518.02	526.56	0.010992	28.27	665.55	91.84	1.85	0.02	517.38	522	3.23	7.85
1746.66*	18818	503.79	513.93	517.77	526.08	0.029031	27.97	672.86	92.27	1.83	0.033	516.99	521.41	3.06	7.48
1743.33*	18818	503.51	513.85	517.42	525.33	0.017953	27.2	691.96	93.21	1.76	0.027	516.61	520.81	2.76	6.96
1740	18818	503.22	513.57	517.11	525.01	0.009812	27.14	693.27	93.39	1.76	0.02	516.22	520.22	2.65	6.65

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
1738.33*	18818	502.79	513.13	516.73	524.73	0.009912	27.34	688.38	92.48	1.77	0.02	515.79	519.48	2.66	6.35
1736.66*	18818	502.36	512.69	516.34	524.45	0.009993	27.51	683.98	91.53	1.77	0.02	515.36	518.75	2.67	6.06
1735.*	18818	501.93	512.27	515.99	524.17	0.010064	27.68	679.84	90.49	1.78	0.02	514.93	518.01	2.66	5.74
1733.33*	18818	501.51	520.17	515.61	522.58	0.000861	12.5	1529.54	196.54	0.57	0.02	514.51	517.27	-5.66	-2.9
1731.66*	18818	501.08	520.25	515.24	522.52	0.000773	12.15	1610.84	211.44	0.55	0.019	514.08	516.54	-6.17	-3.71
1730	18818	500.65	520.31	514.88	522.47	0.000706	11.88	1666.85	222.14	0.52	0.019	513.65	515.8	-6.66	-4.51
1720.*	18818	500.24	520.24	514.71	522.45	0.000705	12.08	1719.58	256.41	0.52	0.019	513.24	515.38	-7	-4.86
1710	18818	499.84	520.03	514.59	522.41	0.000762	12.58	1677.53	258.26	0.54	0.018	512.84	514.95	-7.19	-5.08
1705.*	18818	499.43	519.62	514.61	522.35	0.000889	13.55	1610.06	259.01	0.57	0.018	512.44	514.53	-7.18	-5.09
1700	18818	499.03	518.9	514.83	522.26	0.001154	15.03	1469.61	257.51	0.63	0.017	512.03	514.1	-6.87	-4.8
1695.*	18818	498.65	518.23	515.05	522.17	0.001395	16.28	1376.69	288.73	0.68	0.017	511.66	513.69	-6.57	-4.54
1690	18818	498.28	515.24	515.24	521.86	0.002865	20.75	964.16	101.34	0.93	0.016	511.28	513.28	-3.96	-1.96
1685.*	18818	498.02	514.05	515.14	521.68	0.003566	22.21	873.18	90.56	1.03	0.017	511.02	513.02	-3.03	-1.03
1680	18818	497.75	514.69	515.1	521.29	0.002855	20.72	977.59	434.26	0.94	0.016	510.75	512.75	-3.94	-1.94
1670	18818	497.43	513.08	514.15	521.06	0.003899	22.7	842.74	93.6	1.08	0.018	510.43	512.63	-2.65	-0.45
1660	18818	497.18	510.87	513.35	520.75	0.005932	25.22	747.18	71.36	1.36	0.02	510.15	512.35	-0.72	1.48
1650.*	18818	496.89	509.19	512.42	520.44	0.007791	26.92	699.02	76.93	1.57	0.02	509.88	512.17	0.69	2.98
1640	18818	496.6	508.13	511.73	520.15	0.009398	27.82	676.35	83.37	1.72	0.02	509.6	511.99	1.47	3.86
1635.*	18818	496.33	507.85	511.45	519.91	0.009422	27.87	675.09	83.32	1.73	0.02	509.83	511.66	1.98	3.81
1630	18818	496.06	507.56	511.2	519.67	0.009499	27.93	673.83	83.27	1.73	0.02	510.05	511.34	2.49	3.78
1628.*	18818	495.75	507.23	510.89	519.4	0.009562	27.99	672.25	83.21	1.74	0.02	509.74	510.97	2.51	3.74
1626.*	18818	495.44	506.91	510.58	519.13	0.009623	28.06	670.75	83.14	1.74	0.02	509.43	510.61	2.52	3.7
1624.*	18818	495.13	506.58	510.3	518.85	0.00968	28.11	669.34	83.07	1.75	0.02	509.13	510.24	2.55	3.66
1622.*	18818	494.82	506.25	509.99	518.58	0.009736	28.17	667.98	83.02	1.75	0.02	508.82	509.88	2.57	3.63
1620	18818	494.51	505.93	509.7	518.3	0.00979	28.23	666.68	82.96	1.75	0.02	508.51	509.51	2.58	3.58
1616.66*	18818	494.23	505.64	509.42	518.04	0.009828	28.27	665.74	82.93	1.76	0.02	508.23	509.23	2.59	3.59
1613.33*	18818	493.94	505.33	509.14	517.78	0.009874	28.31	664.62	82.87	1.76	0.02	507.94	508.94	2.61	3.61
1610	18818	493.66	505.04	508.87	517.52	0.009915	28.35	663.72	82.84	1.77	0.02	507.66	508.66	2.62	3.62
1606.66*	18818	493.39	504.76	508.62	517.28	0.009952	28.39	662.8	82.8	1.77	0.02	507.39	508.39	2.63	3.63
1603.33*	18818	493.13	504.49	508.38	517.04	0.009982	28.42	662.08	82.77	1.77	0.02	507.13	508.13	2.64	3.64
1600	18818	492.86	504.21	508.15	516.79	0.010027	28.46	661.11	82.73	1.77	0.02	506.86	507.86	2.65	3.65
1595.*	18818	492.5	503.7	507.72	516.54	0.010432	28.76	654.3	83.67	1.81	0.02	506.79	507.5	3.09	3.8
1590	18818	492.15	503.22	507.35	516.28	0.010852	29.01	648.77	84.34	1.84	0.02	506.72	507.15	3.5	3.93
1580	18818	492.15	503.26	507.32	516.19	0.010675	28.86	652.11	84.27	1.83	0.02	506.72	507.15	3.46	3.89
1575.*	18818	491.9	503.07	507.11	515.82	0.010492	28.66	656.6	84.71	1.81	0.02	506.47	506.9	3.4	3.83
1570	18818	491.65	502.86	506.86	515.46	0.010311	28.48	660.68	84.91	1.8	0.02	506.22	506.65	3.36	3.79
1565.*	18818	491.3	502.4	506.44	515.18	0.010593	28.7	655.79	85.41	1.82	0.02	506.09	506.3	3.69	3.9
1560	18818	490.96	501.95	506	514.89	0.010894	28.86	651.96	85.97	1.85	0.02	505.96	505.96	4.01	4.01
1555.*	18818	490.66	501.63	505.7	514.65	0.01099	28.95	649.94	85.88	1.85	0.02	505.66	505.66	4.03	4.03
1550	18818	490.37	501.32	505.42	514.4	0.011069	29.03	648.3	85.8	1.86	0.02	505.37	505.37	4.05	4.05

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
1547.5*	18818	490	500.92	505.06	514.1	0.011159	29.13	646.1	85.7	1.87	0.02	505.25	505.25	4.33	4.33
1545.*	18818	489.63	500.53	504.72	513.79	0.011251	29.22	644.1	85.62	1.88	0.02	505.13	505.13	4.6	4.6
1542.5*	18818	489.26	500.14	504.35	513.48	0.011355	29.31	642.11	85.5	1.88	0.02	505.01	505.01	4.87	4.87
1540	18818	488.89	499.75	503.98	513.16	0.011471	29.39	640.21	85.42	1.89	0.02	504.89	504.89	5.14	5.14
1539.33*	18818	488.48	499.31	503.57	512.81	0.011566	29.48	638.36	85.33	1.9	0.02	504.48	504.48	5.17	5.17
1538.66*	18818	488.06	498.87	503.15	512.45	0.011671	29.57	636.33	85.24	1.91	0.02	504.06	504.06	5.19	5.19
1538.*	18818	487.65	498.44	502.74	512.09	0.011757	29.65	634.68	85.16	1.91	0.02	503.65	503.65	5.21	5.21
1537.33*	18818	487.23	498	502.32	511.73	0.011854	29.74	632.85	85.08	1.92	0.02	503.23	503.23	5.23	5.23
1536.66*	18818	486.82	497.57	501.91	511.37	0.011932	29.8	631.38	85.01	1.93	0.02	502.82	502.82	5.25	5.25
1536.*	18818	486.4	497.13	501.49	511	0.012021	29.88	629.73	84.93	1.93	0.02	502.4	502.4	5.27	5.27
1535.33*	18818	485.99	496.71	501.08	510.63	0.012093	29.95	628.42	84.87	1.94	0.02	501.99	501.99	5.28	5.28
1534.66*	18818	485.57	496.27	500.66	510.26	0.012175	30.02	626.92	84.8	1.95	0.02	501.57	501.57	5.3	5.3
1534.*	18818	485.16	495.85	500.25	509.89	0.01224	30.07	625.75	84.74	1.95	0.02	501.16	501.16	5.31	5.31
1533.99	Bridge														
1533.33*	18818	484.74	495.41	499.83	509.51	0.012315	30.14	624.39	84.68	1.96	0.02	500.74	500.74	5.33	5.33
1532.66*	18818	484.33	494.99	499.42	509.14	0.012374	30.19	623.35	84.63	1.96	0.02	500.33	500.33	5.34	5.34
1532.*	18818	483.91	494.55	499	508.76	0.012444	30.25	622.11	84.57	1.97	0.02	499.91	499.91	5.36	5.36
1531.33*	18818	483.5	494.13	498.59	508.38	0.012497	30.29	621.18	84.53	1.97	0.02	499.5	499.5	5.37	5.37
1530.66*	18818	483.08	493.7	498.17	508	0.012563	30.35	620.04	84.47	1.97	0.02	499.08	499.08	5.38	5.38
1530	18818	482.67	493.28	497.76	507.62	0.01261	30.39	619.21	84.43	1.98	0.02	498.67	498.67	5.39	5.39
1520	18818	482.67	493.31	497.78	507.51	0.012434	30.24	622.28	84.58	1.96	0.02	498.67	498.67	5.36	5.36
1517.5*	18818	482.24	492.9	497.39	507.14	0.012397	30.28	621.43	84.03	1.96	0.02	497.99	498.24	5.09	5.34
1515.*	18818	481.82	492.51	496.96	506.77	0.012358	30.31	620.79	83.52	1.96	0.02	497.32	497.82	4.81	5.31
1512.5*	18818	481.39	492.11	496.56	506.41	0.012319	30.35	620.1	82.94	1.96	0.02	496.64	497.39	4.53	5.28
1510	18818	480.96	491.71	496.17	506.04	0.01229	30.38	619.43	82.35	1.95	0.02	495.96	496.96	4.25	5.25
1509.99	Bridge														
1506.66*	18818	480.68	491.35	495.81	505.76	0.01246	30.46	617.74	83.05	1.97	0.02	495.68	496.85	4.33	5.5
1503.33*	18818	480.4	491.01	495.49	505.48	0.012642	30.53	616.48	83.71	1.98	0.02	495.4	496.73	4.39	5.72
1500	18818	480.12	490.68	495.17	505.2	0.012827	30.57	615.51	84.26	1.99	0.02	495.12	496.62	4.44	5.94
1497.5*	18818	479.79	490.37	494.84	504.83	0.012768	30.52	616.51	84.3	1.99	0.02	494.79	496.29	4.42	5.92
1495.*	18818	479.46	490.04	494.51	504.48	0.012736	30.49	617.16	84.37	1.99	0.02	494.46	495.96	4.42	5.92
1492.5*	18818	479.12	489.71	494.17	504.13	0.012708	30.47	617.53	84.35	1.98	0.02	494.12	495.62	4.41	5.91
1490	18818	478.79	489.39	493.84	503.77	0.012656	30.43	618.42	84.4	1.98	0.02	493.79	495.29	4.4	5.9
1486.66*	18818	478.49	489.09	493.54	503.45	0.012633	30.41	618.83	84.41	1.98	0.02	493.49	494.99	4.4	5.9
1483.33*	18818	478.2	488.82	493.25	503.13	0.012575	30.36	619.83	84.46	1.98	0.02	493.2	494.7	4.38	5.88
1480	18818	477.9	488.52	492.95	502.82	0.012554	30.34	620.19	84.48	1.97	0.02	492.9	494.4	4.38	5.88
1478.*	18818	477.61	488.23	492.66	502.51	0.012532	30.32	620.57	84.5	1.97	0.02	492.61	494.11	4.38	5.88
1476.*	18818	477.32	487.95	492.37	502.21	0.012511	30.31	620.94	84.51	1.97	0.02	492.32	493.82	4.37	5.87
1474.*	18818	477.03	487.66	492.08	501.91	0.012491	30.29	621.29	84.53	1.97	0.02	492.03	493.53	4.37	5.87
1472.*	18818	476.74	487.38	491.79	501.61	0.012471	30.27	621.64	84.55	1.97	0.02	491.74	493.24	4.36	5.86

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
1470	18818	476.45	487.09	491.5	501.31	0.012452	30.26	621.97	84.56	1.97	0.02	491.45	492.95	4.36	5.86
1467.5*	18818	476.16	486.81	491.23	501.01	0.012415	30.24	622.25	84.57	1.96	0.02	491.35	492.48	4.54	5.67
1465.*	18818	475.87	486.52	490.95	500.72	0.012405	30.24	622.28	84.57	1.96	0.02	491.25	492	4.73	5.48
1462.5*	18818	475.58	486.23	490.69	500.42	0.0124	30.23	622.53	84.59	1.96	0.02	491.15	491.52	4.92	5.29
1460	18818	475.29	485.94	490.41	500.13	0.012417	30.23	622.54	84.57	1.96	0.02	491.05	491.05	5.11	5.11
1457.5*	18818	475.01	485.62	490.09	499.83	0.012474	30.24	622.24	84.95	1.97	0.02	490.57	490.57	4.95	4.95
1455.*	18818	474.72	485.31	489.75	499.52	0.012533	30.25	622.17	85.33	1.97	0.02	490.1	490.1	4.79	4.79
1452.5*	18818	474.43	485	489.43	499.22	0.01263	30.27	621.72	85.72	1.98	0.02	489.62	489.62	4.62	4.62
1450	18818	474.15	484.68	489.1	498.93	0.012737	30.29	621.36	86.11	1.99	0.02	489.15	489.15	4.47	4.47
1448.75*	18818	473.83	484.37	488.78	498.59	0.012714	30.26	621.81	86.14	1.98	0.02	488.83	488.83	4.46	4.46
1447.5*	18818	473.52	484.07	488.47	498.26	0.012669	30.23	622.53	86.16	1.98	0.02	488.52	488.52	4.45	4.45
1446.25*	18818	473.2	483.75	488.15	497.92	0.012649	30.21	622.95	86.19	1.98	0.02	488.2	488.2	4.45	4.45
1445.*	18818	472.89	483.45	487.84	497.59	0.012606	30.18	623.62	86.22	1.98	0.02	487.89	487.89	4.44	4.44
1443.75*	18818	472.58	483.15	487.53	497.26	0.012568	30.15	624.24	86.24	1.97	0.02	487.58	487.58	4.43	4.43
1442.5*	18818	472.26	482.83	487.21	496.93	0.012552	30.13	624.57	86.26	1.97	0.02	487.26	487.26	4.43	4.43
1441.25*	18818	471.95	482.53	486.9	496.59	0.012514	30.1	625.19	86.28	1.97	0.02	486.95	486.95	4.42	4.42
1440	18818	471.63	482.21	486.58	496.27	0.012499	30.08	625.5	86.31	1.97	0.02	486.63	486.63	4.42	4.42
1439.54*	18818	471.29	481.88	486.24	495.91	0.012465	30.06	626.05	86.33	1.97	0.02	486.29	486.29	4.41	4.41
1439.09*	18818	470.95	481.54	485.9	495.55	0.01244	30.04	626.5	86.35	1.97	0.02	485.95	485.95	4.41	4.41
1438.63*	18818	470.6	481.19	485.55	495.2	0.01244	30.04	626.5	86.35	1.97	0.02	485.6	485.6	4.41	4.41
1438.18*	18818	470.26	480.86	485.21	494.84	0.012408	30.01	627.01	86.36	1.96	0.02	485.26	485.26	4.4	4.4
1437.72*	18818	469.92	480.52	484.87	494.49	0.012385	29.99	627.42	86.39	1.96	0.02	484.92	484.92	4.4	4.4
1437.27*	18818	469.58	480.18	484.52	494.14	0.012371	29.98	627.61	86.39	1.96	0.02	484.58	484.58	4.4	4.4
1436.81*	18818	469.23	479.83	484.18	493.79	0.012364	29.98	627.79	86.4	1.96	0.02	484.23	484.23	4.4	4.4
1436.36*	18818	468.89	479.49	483.83	493.44	0.01235	29.97	627.98	86.4	1.96	0.02	483.89	483.89	4.4	4.4
1435.90*	18818	468.55	479.15	483.49	493.09	0.012337	29.96	628.16	86.4	1.96	0.02	483.55	483.55	4.4	4.4
1435.45*	18818	468.21	478.82	483.15	492.74	0.012317	29.94	628.52	86.42	1.96	0.02	483.21	483.21	4.39	4.39
1435.*	18818	467.86	478.47	482.8	492.39	0.012305	29.93	628.66	86.4	1.96	0.02	482.86	482.86	4.39	4.39
1434.54*	18818	467.52	478.13	482.46	492.03	0.012285	29.92	629.04	86.44	1.95	0.02	482.52	482.52	4.39	4.39
1434.09*	18818	467.18	477.8	482.12	491.68	0.012267	29.9	629.37	86.45	1.95	0.02	482.18	482.18	4.38	4.38
1433.63*	18818	466.84	477.46	481.78	491.33	0.012253	29.89	629.55	86.45	1.95	0.02	481.84	481.84	4.38	4.38
1433.18*	18818	466.5	477.12	481.44	490.98	0.01224	29.88	629.74	86.45	1.95	0.02	481.5	481.5	4.38	4.38
1432.72*	18818	466.15	476.77	481.09	490.63	0.012239	29.88	629.82	86.47	1.95	0.02	481.15	481.15	4.38	4.38
1432.27*	18818	465.81	476.43	480.75	490.28	0.012225	29.87	630.01	86.47	1.95	0.02	480.81	480.81	4.38	4.38
1431.81*	18818	465.47	476.09	480.41	489.93	0.01221	29.86	630.29	86.48	1.95	0.02	480.47	480.47	4.38	4.38
1431.36*	18818	465.13	475.75	480.07	489.59	0.012196	29.85	630.48	86.48	1.95	0.02	480.13	480.13	4.38	4.38
1430.90*	18818	464.78	475.4	479.72	489.23	0.012196	29.85	630.49	86.48	1.95	0.02	479.78	479.78	4.38	4.38
1430.45*	18818	464.44	475.06	479.38	488.89	0.012196	29.85	630.49	86.48	1.95	0.02	479.44	479.44	4.38	4.38
1430	18818	464.1	474.72	479.03	488.55	0.012182	29.84	630.68	86.48	1.95	0.02	479.1	479.1	4.38	4.38
1428.33*	18818	463.76	474.41	478.71	488.2	0.012082	29.8	631.57	86.27	1.94	0.02	478.76	478.76	4.35	4.35

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
1426.66*	18818	463.43	474.11	478.4	487.85	0.011981	29.74	632.68	86.09	1.93	0.02	478.43	478.43	4.32	4.32
1425.*	18818	463.09	473.8	478.08	487.51	0.011901	29.71	633.45	85.87	1.93	0.02	478.09	478.09	4.29	4.29
1423.33*	18818	462.75	473.49	477.75	487.18	0.011848	29.69	633.85	85.64	1.92	0.02	477.75	477.75	4.26	4.26
1421.66*	18818	462.42	473.19	477.44	486.84	0.011772	29.65	634.76	85.42	1.92	0.02	477.42	477.42	4.23	4.23
1420	18818	462.08	472.88	477.2	486.51	0.011733	29.63	635.13	85.18	1.91	0.02	477.08	477.08	4.2	4.2
1418.*	18818	461.69	472.5	476.82	486.15	0.011729	29.66	634.54	85.01	1.91	0.02	476.73	476.21	4.23	3.71
1416.*	18818	461.31	472.12	476.48	485.8	0.011735	29.68	634.08	84.89	1.91	0.02	476.38	475.34	4.26	3.22
1414.*	18818	460.92	471.74	476.18	485.44	0.011757	29.71	633.44	84.76	1.92	0.02	476.02	474.46	4.28	2.72
1412.*	18818	460.54	480.94	475.89	482.77	0.00063	11.19	1993.94	590.2	0.5	0.019	475.67	473.59	-5.27	-7.35
1410	18818	460.15	481.09	475.64	482.68	0.000535	10.56	2205.02	558	0.46	0.02	475.32	472.72	-5.77	-8.37
1400	18818	459.73	481.15	475.68	482.64	0.000513	10.42	2344.93	1350	0.45	0.021	475.06	475.06	-6.09	-6.09
1393.33*	18818	459.32	481.13	475.65	482.63	0.000507	10.6	2436.71	1087.67	0.44	0.021	474.82	474.82	-6.31	-6.31
1386.66*	18818	458.91	481.13	475.8	482.61	0.000527	10.82	2529.84	825.33	0.44	0.022	474.58	474.58	-6.55	-6.55
1380	18818	458.5	481.29	475.21	482.51	0.000499	10.32	2802.21	563	0.41	0.024	474.34	474.34	-6.95	-6.95
1370	18818	458.1	480.33	475.56	482.41	0.000899	12.83	2062.94	335.39	0.5	0.023	474.1	477.43	-6.23	-2.9
1365.*	18818	457.78	477.39	474.86	482.12	0.002034	17.76	1231.57	187.63	0.74	0.017	474.8	477.88	-2.59	0.49
1360	18818	457.46	476.95	473.65	482.05	0.002217	18.11	1042.34	60.9	0.75	0.019	475.5	478.33	-1.45	1.38
1350	18818	457	474.05	473.49	481.71	0.004137	22.21	847.15	50	0.95	0.02	475.5	478.83	1.45	4.78
1349.99	Bridge														
1347.5*	18818	456.72	472.92	473.19	481.41	0.004779	23.38	804.72	50	1.03	0.02	475.42	478.76	2.5	5.84
1345.*	18818	456.44	471.98	472.91	481.21	0.005374	24.38	771.94	50	1.09	0.02	475.35	478.68	3.37	6.7
1342.5*	18818	456.16	472.43	472.63	480.85	0.004722	23.28	808.19	50	1.02	0.02	475.28	478.61	2.85	6.18
1340	18818	455.88	471.44	472.34	480.65	0.00536	24.35	772.66	50	1.09	0.02	475.2	478.53	3.76	7.09
1330	18818	455.7	472.9	472.14	480.43	0.004037	22.02	854.59	50	0.94	0.02	473.97	477.35	1.07	4.45
1320	18818	455.41	472.97	471.96	480.26	0.003745	21.68	869.71	52	0.92	0.02	471.91	475.39	-1.06	2.42
1310	18818	455.15	472.93	472.03	480.16	0.003602	21.59	873.67	53.39	0.92	0.02	471.65	475.15	-1.28	2.22
1300	18818	455.11	472.04	472.04	480.08	0.004213	22.75	827.75	53.21	1	0.02	471.61	475.09	-0.43	3.05
1296.66*	18818	454.89	470.1	471.79	479.81	0.005305	25	752.59	54.58	1.19	0.02	471.4	474.87	1.3	4.77
1293.33*	18818	454.68	469.74	471.78	479.66	0.005481	25.28	744.42	57.57	1.24	0.02	471.18	474.66	1.44	4.92
1290	18818	454.46	470.11	471.98	479.47	0.005146	24.55	766.49	60.61	1.22	0.02	470.97	474.44	0.86	4.33
1280	18818	454.36	468.25	471.38	479.24	0.006904	26.61	707.16	68.63	1.46	0.02	470.86	470.86	2.61	2.61
1270	18818	454.11	467.27	470.85	478.98	0.007996	27.46	685.22	73.57	1.59	0.02	470.61	470.61	3.34	3.34
1260	18818	453.86	466.58	470.33	478.73	0.008873	27.97	672.79	77.61	1.67	0.02	469.86	469.86	3.28	3.28
1255.*	18818	453.64	466.15	469.98	478.51	0.009373	28.22	666.77	80.15	1.72	0.02	469.14	469.14	2.99	2.99
1250	18818	453.43	465.75	469.59	478.29	0.009951	28.42	662.24	82.88	1.77	0.02	468.43	468.43	2.68	2.68
1240	18818	453.43	465.79	469.59	478.2	0.009808	28.27	665.7	83.05	1.76	0.02	468.43	468.43	2.64	2.64
1238.*	18818	453.15	465.51	469.31	477.93	0.009815	28.28	665.52	83.04	1.76	0.02	468.15	468.15	2.64	2.64
1236.*	18818	452.87	465.23	469.03	477.66	0.009836	28.3	665.02	83.02	1.76	0.02	467.87	467.87	2.64	2.64
1234.*	18818	452.59	464.94	468.75	477.39	0.009862	28.32	664.45	83.01	1.76	0.02	467.59	467.59	2.65	2.65
1232.*	18818	452.31	464.65	468.47	477.11	0.009868	28.33	664.3	83	1.76	0.02	467.31	467.31	2.66	2.66

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
1230	18818	452.03	464.37	468.19	476.84	0.009874	28.33	664.15	82.99	1.77	0.02	467.03	467.03	2.66	2.66
1226.66*	18818	451.79	464.25	468.08	476.56	0.009604	28.15	668.39	82.4	1.74	0.02	467.46	466.79	3.21	2.54
1223.33*	18818	451.56	464.13	467.94	476.29	0.009367	27.99	672.38	81.9	1.72	0.02	467.89	466.56	3.76	2.43
1220	18818	451.32	463.99	467.74	476.04	0.009172	27.86	675.45	81.36	1.7	0.02	468.32	466.32	4.33	2.33
1210	18818	451.32	464.03	467.74	475.96	0.009037	27.71	679.08	81.53	1.69	0.02	468.32	466.32	4.29	2.29
1205.*	18818	451.09	463.78	467.51	475.76	0.009096	27.78	677.48	81.46	1.7	0.02	468.09	466.09	4.31	2.31
1200	18818	450.86	463.53	467.28	475.57	0.009154	27.84	675.94	81.38	1.7	0.02	467.86	465.86	4.33	2.33
1195.*	18818	450.69	463.36	467.11	475.41	0.009176	27.86	675.36	81.36	1.7	0.02	467.69	465.69	4.33	2.33
1190	18818	450.52	463.18	466.94	475.26	0.009197	27.89	674.79	81.33	1.71	0.02	467.52	465.52	4.34	2.34
1185.*	18818	450.25	462.68	466.51	474.96	0.009369	28.12	669.16	80.67	1.72	0.02	467.25	465.25	4.57	2.57
1180	18818	449.98	462.18	466.09	474.66	0.009536	28.35	663.85	80.05	1.73	0.02	466.98	464.98	4.8	2.8
1179.33*	18818	449.71	461.92	465.82	474.4	0.009538	28.35	663.73	80.02	1.73	0.02	466.72	464.72	4.8	2.8
1178.66*	18818	449.44	461.65	465.55	474.13	0.009527	28.35	663.88	79.99	1.73	0.02	466.47	464.47	4.82	2.82
1178.*	18818	449.18	461.4	465.29	473.86	0.009512	28.33	664.27	80.01	1.73	0.02	466.21	464.21	4.81	2.81
1177.33*	18818	448.91	461.13	465.03	473.59	0.009502	28.32	664.4	79.98	1.73	0.02	465.96	463.96	4.83	2.83
1176.66*	18818	448.64	460.86	464.76	473.32	0.009507	28.33	664.23	79.95	1.73	0.02	465.7	463.7	4.84	2.84
1176.*	18818	448.37	460.59	464.49	473.06	0.009511	28.34	664.05	79.91	1.73	0.02	465.44	463.44	4.85	2.85
1175.33*	18818	448.1	460.32	464.22	472.79	0.009501	28.33	664.18	79.88	1.73	0.02	465.19	463.19	4.87	2.87
1174.66*	18818	447.84	460.07	463.96	472.52	0.009484	28.32	664.59	79.89	1.73	0.02	464.93	462.93	4.86	2.86
1174.*	18818	447.57	459.81	463.73	472.25	0.009475	28.31	664.7	79.86	1.73	0.02	464.68	462.68	4.87	2.87
1173.33*	18818	447.3	459.54	463.43	471.99	0.00948	28.32	664.52	79.83	1.73	0.02	464.42	462.42	4.88	2.88
1172.66*	18818	447.03	459.27	463.16	471.72	0.009484	28.33	664.35	79.8	1.73	0.02	464.16	462.16	4.89	2.89
1172.*	18818	446.76	459	462.9	471.45	0.009475	28.32	664.45	79.77	1.73	0.02	463.91	461.91	4.91	2.91
1171.33*	18818	446.5	458.74	462.64	471.19	0.009475	28.32	664.45	79.77	1.73	0.02	463.65	461.65	4.91	2.91
1170.66*	18818	446.23	458.47	462.4	470.93	0.009481	28.33	664.22	79.72	1.73	0.02	463.4	461.4	4.93	2.93
1170	18818	445.96	458.2	462.1	470.67	0.009485	28.34	664.04	79.69	1.73	0.02	463.14	461.14	4.94	2.94
1167.5*	18818	445.74	458.09	461.92	470.32	0.009308	28.06	670.57	80.69	1.72	0.02	462.39	460.89	4.3	2.8
1165.*	18818	445.52	457.98	461.75	469.98	0.009151	27.8	677	81.79	1.7	0.02	461.63	460.63	3.65	2.65
1162.5*	18818	445.29	457.85	461.51	469.65	0.009038	27.57	682.49	82.87	1.69	0.02	460.88	460.38	3.03	2.53
1160	18818	445.07	457.71	461.24	469.33	0.008948	27.36	687.7	84.02	1.69	0.02	460.12	460.12	2.41	2.41
1158.33*	18818	444.82	457.37	460.98	469.07	0.009009	27.45	685.57	83.77	1.69	0.02	459.86	459.86	2.49	2.49
1156.66*	18818	444.56	457.04	460.67	468.81	0.009073	27.53	683.44	83.54	1.7	0.02	459.59	459.59	2.55	2.55
1155.*	18818	444.3	456.7	460.36	468.54	0.009132	27.61	681.48	83.31	1.7	0.02	459.33	459.33	2.63	2.63
1153.33*	18818	444.05	456.38	460.06	468.28	0.009184	27.68	679.73	83.12	1.71	0.02	459.07	459.07	2.69	2.69
1151.66*	18818	443.8	456.05	459.75	468.01	0.00924	27.76	677.89	82.91	1.71	0.02	458.8	458.8	2.75	2.75
1150	18818	443.54	455.71	459.44	467.74	0.009293	27.83	676.11	82.69	1.72	0.02	458.54	458.54	2.83	2.83
1149.09*	18818	443.21	455.36	459.14	467.46	0.009375	27.92	673.92	82.57	1.72	0.02	458.21	458.26	2.85	2.9
1148.18*	18818	442.88	455	458.82	467.18	0.009454	28.01	671.94	82.49	1.73	0.02	457.88	457.99	2.88	2.99
1147.27*	18818	442.54	454.64	458.49	466.9	0.009536	28.09	669.8	82.37	1.74	0.02	457.54	457.71	2.9	3.07
1146.36*	18818	442.21	454.29	458.15	466.61	0.009611	28.17	667.96	82.3	1.74	0.02	457.21	457.43	2.92	3.14

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
1145.45*	18818	441.88	453.93	457.83	466.32	0.00968	28.25	666.2	82.2	1.75	0.02	456.88	457.16	2.95	3.23
1144.54*	18818	441.55	453.58	457.53	466.04	0.009749	28.32	664.51	82.12	1.75	0.02	456.55	456.88	2.97	3.3
1143.63*	18818	441.22	453.23	457.19	465.74	0.009815	28.39	662.91	82.05	1.76	0.02	456.22	456.61	2.99	3.38
1142.72*	18818	440.89	452.89	456.85	465.45	0.009874	28.45	661.53	81.99	1.76	0.02	455.89	456.33	3	3.44
1141.81*	18818	440.55	452.53	456.55	465.16	0.009944	28.52	659.85	81.9	1.77	0.02	455.55	456.05	3.02	3.52
1140.90*	18818	440.22	452.18	456.23	464.86	0.01	28.58	658.51	81.83	1.78	0.02	455.22	455.78	3.04	3.6
1140	18818	439.89	451.83	455.91	464.56	0.010055	28.63	657.22	81.77	1.78	0.02	454.89	455.5	3.06	3.67
1130	18818	439.89	451.97	455.85	464.44	0.009688	28.33	664.14	81.5	1.75	0.02	454.89	456.5	2.92	4.53
1127.5*	18818	439.24	451.26	455.25	464.15	0.00962	28.82	653.01	77.15	1.75	0.02	454.75	456.19	3.49	4.93
1125.*	18818	438.58	450.59	454.66	463.87	0.009558	29.25	643.44	72.69	1.73	0.02	454.61	455.88	4.02	5.29
1122.5*	18818	437.92	450	454.14	463.6	0.009522	29.6	635.78	68.4	1.71	0.02	454.47	455.56	4.47	5.56
1120	18818	437.27	449.49	453.73	463.34	0.009526	29.86	630.11	64.28	1.68	0.02	454.33	455.25	4.84	5.76
1115.*	18818	436.37	448.42	452.89	463.07	0.009925	30.72	612.66	59.79	1.69	0.02	454.2	455	5.78	6.58
1110	18818	435.47	447.03	451.77	462.74	0.011185	31.81	591.52	56.41	1.73	0.02	454.08	454.75	7.05	7.72
1100	18818	434.41	445.57	450.58	462.35	0.012532	32.88	572.3	53.93	1.78	0.02	453.97	454.45	8.4	8.88
1090	18818	434.26	445.26	450.28	462.2	0.012931	33.03	569.68	53.42	1.78	0.02	453.91	454.32	8.65	9.06
1085.*	18818	433.89	444.87	449.91	461.86	0.012979	33.07	568.97	53.41	1.79	0.02	453.73	453.94	8.86	9.07
1080	18818	433.52	444.49	449.54	461.52	0.013025	33.11	568.29	53.4	1.79	0.02	453.56	453.56	9.07	9.07
1070	18818	433.18	444.09	449.19	461.2	0.013052	33.2	566.78	54.95	1.82	0.02	453.05	453.36	8.96	9.27
1065.*	18818	432.83	443.91	449.02	460.83	0.012358	33.01	570.15	57.15	1.84	0.02	452.5	452.77	8.59	8.86
1060	18818	432.47	444.12	449.08	460.32	0.011638	32.3	582.64	58.49	1.8	0.02	451.95	452.18	7.83	8.06
1050	18818	432.11	444.34	449.1	459.83	0.010991	31.58	595.81	61.39	1.79	0.02	451.39	451.59	7.05	7.25
1048.*	18818	431.68	443.59	448.46	459.46	0.011598	31.97	588.65	64.5	1.86	0.02	450.72	450.88	7.13	7.29
1046.*	18818	431.25	442.93	447.85	459.07	0.012229	32.24	583.6	67.65	1.93	0.02	450.05	450.17	7.12	7.24
1044.*	18818	430.83	442.34	447.33	458.68	0.012893	32.44	580.1	70.76	2	0.02	449.37	449.45	7.03	7.11
1042.*	18818	430.4	441.81	446.79	458.26	0.013592	32.55	578.06	73.94	2.05	0.02	448.7	448.74	6.89	6.93
1040	18818	429.97	441.31	446.25	457.84	0.014436	32.63	576.78	77.53	2.11	0.02	448.03	448.03	6.72	6.72
1037.5*	18818	429.61	440.94	445.92	457.48	0.014453	32.63	576.67	77.58	2.11	0.02	447.69	447.45	6.75	6.51
1035.*	18818	429.26	440.59	445.56	457.11	0.01445	32.62	576.8	77.63	2.11	0.02	447.35	446.87	6.76	6.28
1032.5*	18818	428.9	440.23	445.22	456.75	0.014455	32.62	576.87	77.67	2.11	0.02	447.02	446.29	6.79	6.06
1030	18818	428.54	439.87	444.85	456.38	0.014455	32.61	577.01	77.73	2.11	0.02	446.68	445.71	6.81	5.84
1027.5*	18818	428.18	439.83	444.64	455.9	0.013716	32.17	584.88	77.27	2.06	0.02	446.37	445.13	6.54	5.3
1025.*	18818	427.83	439.78	444.4	455.45	0.013078	31.77	592.33	76.8	2.02	0.02	446.06	444.55	6.28	4.77
1022.5*	18818	427.47	439.71	444.3	455.03	0.012513	31.41	599.2	76.1	1.97	0.02	445.75	443.98	6.04	4.27
1020	18818	427.11	439.71	444.31	454.6	0.011511	30.96	607.74	71.9	1.88	0.02	445.44	443.4	5.73	3.69
1018.*	18818	426.75	439.07	443.67	454.27	0.012261	31.29	601.49	75.27	1.95	0.02	445.12	442.99	6.05	3.92
1016.*	18818	426.39	438.5	443.11	453.94	0.012728	31.54	596.73	76.52	1.99	0.02	444.79	442.57	6.29	4.07
1014.*	18818	426.04	437.93	442.6	453.61	0.013113	31.78	592.21	76.93	2.02	0.02	444.47	442.16	6.54	4.23
1012.*	18818	425.68	437.34	442.12	453.26	0.013522	32.02	587.77	77.33	2.05	0.02	444.14	441.74	6.8	4.4
1010	18818	425.32	436.75	441.62	452.9	0.013958	32.25	583.49	77.78	2.08	0.02	443.82	441.33	7.07	4.58

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
1000	18818	424.96	436.39	441.23	452.56	0.013984	32.27	583.09	77.75	2.08	0.02	440.97	440.97	4.58	4.58
999.333*	18818	424.55	435.97	440.82	452.15	0.013993	32.28	582.99	77.76	2.08	0.02	440.56	440.56	4.59	4.59
998.666*	18818	424.15	435.57	440.42	451.75	0.013988	32.27	583.11	77.78	2.08	0.02	440.16	440.16	4.59	4.59
998.*	18818	423.74	435.16	440.01	451.34	0.013997	32.28	583.01	77.79	2.08	0.02	439.75	439.75	4.59	4.59
997.333*	18818	423.34	434.76	439.6	450.94	0.014012	32.28	582.89	77.82	2.08	0.02	439.34	439.34	4.58	4.58
996.666*	18818	422.93	434.34	439.19	450.55	0.014039	32.31	582.51	77.81	2.08	0.02	438.94	438.94	4.6	4.6
996.*	18818	422.52	433.93	438.78	450.15	0.014061	32.32	582.17	77.79	2.08	0.02	438.53	438.53	4.6	4.6
995.333*	18818	422.12	433.53	438.38	449.74	0.014052	32.31	582.41	77.84	2.08	0.02	438.12	438.12	4.59	4.59
994.666*	18818	421.71	433.11	437.97	449.34	0.014076	32.33	582.08	77.83	2.08	0.02	437.72	437.72	4.61	4.61
994.*	18818	421.31	432.71	437.57	448.93	0.014067	32.32	582.32	77.88	2.08	0.02	437.31	437.31	4.6	4.6
993.333*	18818	420.9	432.3	437.16	448.53	0.014087	32.33	582.02	77.87	2.08	0.02	436.9	436.9	4.6	4.6
992.666*	18818	420.49	431.89	436.75	448.13	0.014108	32.35	581.72	77.86	2.09	0.02	436.5	436.5	4.61	4.61
992.*	18818	420.09	431.49	436.34	447.72	0.014099	32.34	581.97	77.91	2.08	0.02	436.09	436.09	4.6	4.6
991.333*	18818	419.68	431.07	435.93	447.32	0.014123	32.35	581.65	77.91	2.09	0.02	435.68	435.68	4.61	4.61
990.666*	18818	419.28	430.67	435.53	446.92	0.014119	32.35	581.75	77.93	2.09	0.02	435.28	435.28	4.61	4.61
990	18818	418.87	430.26	435.12	446.52	0.014142	32.36	581.46	77.93	2.09	0.02	434.87	434.87	4.61	4.61
980	18818	418.52	429.94	434.79	446.15	0.014017	32.31	582.4	77.65	2.08	0.02	434.52	434.52	4.58	4.58
970	18818	418.22	429.64	434.49	445.87	0.014046	32.33	582.08	77.67	2.08	0.02	434.22	434.22	4.58	4.58
960	18818	417.87	429.29	434.14	445.52	0.014046	32.33	582.08	77.67	2.08	0.02	433.87	433.87	4.58	4.58
950	18818	417.52	428.94	433.79	445.17	0.014046	32.33	582.08	77.67	2.08	0.02	433.52	433.52	4.58	4.58
940	18818	417.17	428.59	433.44	444.82	0.014048	32.33	582.04	77.66	2.08	0.02	433.17	433.17	4.58	4.58
930	18818	416.81	428.22	433.09	444.47	0.014073	32.35	581.68	77.65	2.08	0.02	432.81	432.81	4.59	4.59
920	18818	416.46	427.87	432.74	444.12	0.014074	32.35	581.65	77.64	2.08	0.02	432.46	432.46	4.59	4.59
910	18818	416.11	427.52	432.4	443.78	0.014076	32.36	581.61	77.64	2.08	0.02	432.11	432.11	4.59	4.59
900	18818	415.76	427.17	432.05	443.43	0.014076	32.35	581.61	77.64	2.08	0.02	431.76	431.76	4.59	4.59
890	18818	415.41	426.82	431.71	443.07	0.014073	32.35	581.68	77.65	2.08	0.02	431.41	431.41	4.59	4.59
880	18818	415.06	426.47	431.36	442.72	0.014073	32.35	581.68	77.65	2.08	0.02	431.06	431.06	4.59	4.59
870	18818	414.71	426.12	431.02	442.37	0.014074	32.35	581.65	77.64	2.08	0.02	430.71	430.71	4.59	4.59
860	18818	414.36	425.77	430.67	442.02	0.014074	32.35	581.65	77.64	2.08	0.02	430.36	430.36	4.59	4.59
850	18818	414	425.41	430.31	441.68	0.014095	32.37	581.34	77.63	2.08	0.02	430	430	4.59	4.59
840	18818	413.65	425.06	429.96	441.33	0.014095	32.37	581.34	77.63	2.08	0.02	429.65	429.65	4.59	4.59
830	18818	413.3	424.71	429.61	440.97	0.014089	32.36	581.51	77.66	2.08	0.02	429.3	429.3	4.59	4.59
820	18818	412.93	424.34	429.24	440.58	0.01408	32.35	581.74	77.71	2.08	0.02	428.93	428.93	4.59	4.59
815.*	18818	412.59	424.02	428.95	440.19	0.013965	32.27	583.21	77.7	2.08	0.02	428.64	428.59	4.62	4.57
810	18818	412.25	423.71	428.64	439.8	0.013856	32.19	584.61	77.69	2.07	0.02	428.35	428.25	4.64	4.54
800	18818	411.89	423.34	428.2	439.43	0.013883	32.2	584.5	77.79	2.07	0.02	427.89	427.89	4.55	4.55
798.888*	18818	411.35	422.75	427.67	439.04	0.014112	32.39	581.02	77.67	2.09	0.02	427.5	427.5	4.75	4.75
797.777*	18818	410.8	422.15	427.11	438.64	0.014346	32.58	577.55	77.52	2.1	0.02	427.12	427.12	4.97	4.97
796.666*	18818	410.26	421.57	426.59	438.23	0.014564	32.76	574.47	77.42	2.12	0.02	426.73	426.73	5.16	5.16
795.555*	18818	409.72	420.99	426.04	437.82	0.014778	32.93	571.54	77.31	2.13	0.02	426.35	426.35	5.36	5.36

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
794.444*	18818	409.17	420.4	425.52	437.4	0.014991	33.09	568.7	77.19	2.15	0.02	425.96	425.96	5.56	5.56
793.333*	18818	408.63	419.82	424.99	436.98	0.015196	33.24	566.12	77.1	2.16	0.02	425.58	425.58	5.76	5.76
792.222*	18818	408.09	419.24	424.43	436.55	0.015401	33.38	563.67	77.02	2.17	0.02	425.19	425.19	5.95	5.95
791.111*	18818	407.54	418.66	423.88	436.12	0.015599	33.53	561.29	76.91	2.19	0.02	424.81	424.81	6.15	6.15
790	18818	407	418.09	423.33	435.67	0.015783	33.65	559.28	76.85	2.2	0.02	424.42	424.42	6.33	6.33
787.5*	18818	406.5	417.58	422.83	435.26	0.015896	33.75	557.6	76.66	2.21	0.02	424.07	424.07	6.49	6.49
785.*	18818	406	417.06	422.36	434.85	0.016006	33.85	555.97	76.48	2.21	0.02	423.71	423.71	6.65	6.65
782.5*	18818	405.5	416.55	421.84	434.44	0.01611	33.94	554.41	76.3	2.22	0.02	423.36	423.36	6.81	6.81
780	18818	405	416.04	421.33	434.03	0.016219	34.04	552.87	76.14	2.23	0.02	423	423	6.96	6.96
770	18818	404.74	415.77	421.07	433.81	0.016286	34.09	552.05	76.1	2.23	0.02	422.74	422.74	6.97	6.97
768.*	18818	404.64	415.72	420.89	433.18	0.015634	33.54	561.09	76.31	2.18	0.02	422.68	422.68	6.96	6.96
766.*	18818	404.54	415.67	420.76	432.58	0.015031	33	570.22	76.53	2.13	0.02	422.61	422.61	6.94	6.94
764.*	18818	404.43	415.62	420.62	432.01	0.014494	32.49	579.18	76.71	2.08	0.02	422.55	422.55	6.93	6.93
762.*	18818	404.33	415.57	420.43	431.45	0.01398	31.98	588.51	76.94	2.04	0.02	422.48	422.48	6.91	6.91
760	18818	404.23	415.52	420.3	430.92	0.013528	31.49	597.63	77.16	1.99	0.02	422.42	422.42	6.9	6.9
750	18818	404.23	415.36	420.11	430.85	0.01343	31.58	595.9	76.5	1.99	0.02	422.42	422.42	7.06	7.06
740	18818	403.76	414.91	419.69	430.45	0.013626	31.64	594.82	77.57	2.01	0.02	423.41	422.06	8.5	7.15
730	18818	403.76	414.94	419.69	430.34	0.013433	31.48	597.71	77.64	2	0.02	426.41	422.06	11.47	7.12
728.75*	18818	403.19	414.36	419.15	429.94	0.013571	31.67	594.17	77.62	2.02	0.02	425.76	421.58	11.4	7.22
727.5*	18818	402.62	413.79	418.61	429.54	0.0137	31.85	590.79	77.58	2.03	0.02	425.11	421.1	11.32	7.31
726.25*	18818	402.05	413.21	418.07	429.14	0.013837	32.03	587.56	77.56	2.05	0.02	424.46	420.61	11.25	7.4
725.*	18818	401.48	412.64	417.53	428.73	0.013971	32.2	584.49	77.55	2.07	0.02	423.8	420.13	11.16	7.49
723.75*	18818	400.91	412.06	416.99	428.32	0.014104	32.36	581.55	77.53	2.08	0.02	423.15	419.65	11.09	7.59
722.5*	18818	400.34	411.49	416.45	427.91	0.01424	32.52	578.73	77.52	2.1	0.02	422.5	419.17	11.01	7.68
721.25*	18818	399.77	410.92	415.91	427.49	0.014373	32.67	576.03	77.5	2.11	0.02	421.85	418.68	10.93	7.76
720	18912	399.2	410.4	415.4	427.08	0.014274	32.78	577	76.77	2.11	0.02	421.2	418.2	10.8	7.8
719.230*	18912	398.81	410.01	415.02	426.68	0.014238	32.76	577.34	76.73	2.1	0.02	420.81	417.81	10.8	7.8
718.461*	18912	398.42	409.63	414.63	426.27	0.014201	32.74	577.71	76.69	2.1	0.02	420.42	417.42	10.79	7.79
717.692*	18912	398.02	409.25	414.24	425.87	0.014171	32.72	577.94	76.63	2.1	0.02	420.02	417.02	10.77	7.77
716.923*	18912	397.63	408.86	413.86	425.47	0.014135	32.7	578.28	76.58	2.1	0.02	419.63	416.63	10.77	7.77
716.153*	18912	397.24	408.48	413.47	425.07	0.014107	32.69	578.55	76.55	2.1	0.02	419.24	416.24	10.76	7.76
715.384*	18912	396.85	408.1	413.08	424.67	0.014077	32.67	578.83	76.51	2.09	0.02	418.85	415.85	10.75	7.75
714.615*	18912	396.45	407.71	412.7	424.28	0.014048	32.66	579.02	76.43	2.09	0.02	418.45	415.45	10.74	7.74
713.846*	18912	396.06	407.33	412.31	423.88	0.014019	32.65	579.29	76.39	2.09	0.02	418.06	415.06	10.73	7.73
713.076*	18912	395.67	406.94	411.92	423.48	0.013999	32.64	579.46	76.35	2.09	0.02	417.67	414.67	10.73	7.73
712.307*	18912	395.28	406.56	411.54	423.09	0.013968	32.62	579.73	76.29	2.09	0.02	417.28	414.28	10.72	7.72
711.538*	18912	394.88	406.17	411.15	422.69	0.013947	32.62	579.82	76.22	2.08	0.02	416.88	413.88	10.71	7.71
710.769*	18912	394.49	405.79	410.76	422.29	0.013923	32.6	580.06	76.18	2.08	0.02	416.49	413.49	10.7	7.7
710	18912	394.1	405.4	410.37	421.9	0.0139	32.59	580.24	76.12	2.08	0.02	416.1	413.1	10.7	7.7
707.5*	18912	393.72	405.12	410.12	421.48	0.013594	32.46	582.65	75.45	2.06	0.02	415.47	412.72	10.35	7.6

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
705.*	18912	393.34	404.82	409.84	421.08	0.013361	32.36	584.45	74.88	2.04	0.02	414.84	412.34	10.02	7.52
702.5*	18912	392.96	404.5	409.53	420.7	0.013204	32.31	585.42	74.36	2.03	0.02	414.21	411.96	9.71	7.46
700	18912	392.58	404.17	409.19	420.34	0.013088	32.27	586.07	73.92	2.02	0.02	413.58	411.58	9.41	7.41
690	18912	392.52	404.11	409.13	420.28	0.013078	32.27	586.09	73.87	2.02	0.02	413.52	411.48	9.41	7.37
680	18912	392.52	404.15	409.13	420.17	0.012917	32.12	588.7	73.99	2.01	0.02	413.52	411.48	9.37	7.33
677.5*	18912	392.19	403.73	408.77	419.86	0.013155	32.23	586.72	74.6	2.03	0.02	413.19	410.91	9.46	7.18
675.*	18912	391.86	403.31	408.36	419.55	0.013412	32.34	584.78	75.29	2.04	0.02	412.86	410.34	9.55	7.03
672.5*	18912	391.53	402.88	407.91	419.23	0.013696	32.45	582.84	76.08	2.07	0.02	412.53	409.77	9.65	6.89
670	18912	391.2	402.45	407.41	418.91	0.014009	32.56	580.91	76.98	2.09	0.02	412.2	409.2	9.75	6.75
666.666*	18912	390.9	402.15	407.11	418.61	0.014009	32.56	580.91	76.98	2.09	0.02	411.9	408.9	9.75	6.75
663.333*	18912	390.59	401.84	406.8	418.29	0.014005	32.55	580.97	76.99	2.09	0.02	411.59	408.59	9.75	6.75
660	18912	390.29	401.54	406.5	417.99	0.014005	32.55	580.97	76.99	2.09	0.02	411.29	408.29	9.75	6.75
650	18912	390.29	401.57	406.5	417.88	0.01383	32.41	583.61	77.12	2.08	0.02	408.29	408.29	6.72	6.72
640	18912	389.81	401.08	406.02	417.46	0.013916	32.48	582.3	77.06	2.08	0.02	407.81	407.81	6.73	6.73
630	18912	389.81	401.11	406.02	417.34	0.013742	32.33	584.94	77.19	2.07	0.02	407.81	407.81	6.7	6.7
629.5*	18912	389.4	400.7	405.61	416.93	0.013742	32.33	584.94	77.19	2.07	0.02	407.4	407.4	6.7	6.7
629.*	18912	388.98	400.28	405.19	416.52	0.013749	32.34	584.84	77.19	2.07	0.02	406.98	406.98	6.7	6.7
628.5*	18912	388.57	399.87	404.78	416.1	0.013739	32.33	584.98	77.19	2.07	0.02	406.57	406.57	6.7	6.7
628.*	18912	388.16	399.46	404.37	415.68	0.01373	32.32	585.14	77.2	2.07	0.02	406.16	406.16	6.7	6.7
627.5*	18912	387.74	399.04	403.96	415.27	0.013734	32.33	585.04	77.19	2.07	0.02	405.74	405.74	6.7	6.7
627.*	18912	387.33	398.63	403.54	414.85	0.01372	32.31	585.28	77.21	2.07	0.02	405.33	405.33	6.7	6.7
626.5*	18912	386.92	398.23	403.13	414.43	0.013708	32.3	585.47	77.22	2.07	0.02	404.92	404.92	6.69	6.69
626.*	18912	386.51	397.82	402.72	414.01	0.013694	32.29	585.69	77.23	2.07	0.02	404.51	404.51	6.69	6.69
625.5*	18912	386.09	397.4	402.3	413.59	0.013701	32.3	585.58	77.23	2.07	0.02	404.09	404.09	6.69	6.69
625.*	18912	385.68	396.99	401.89	413.19	0.013709	32.3	585.46	77.22	2.07	0.02	403.68	403.68	6.69	6.69
624.5*	18912	385.27	396.58	401.48	412.77	0.013693	32.29	585.7	77.23	2.07	0.02	403.27	403.27	6.69	6.69
624.*	18912	384.85	396.16	401.06	412.35	0.013701	32.3	585.58	77.23	2.07	0.02	402.85	402.85	6.69	6.69
623.5*	18912	384.44	395.75	400.65	411.95	0.013709	32.3	585.46	77.22	2.07	0.02	402.44	402.44	6.69	6.69
623.*	18912	384.03	395.34	400.24	411.53	0.013693	32.29	585.7	77.23	2.07	0.02	402.03	402.03	6.69	6.69
622.5*	18912	383.61	394.92	399.82	411.11	0.0137	32.3	585.59	77.23	2.07	0.02	401.61	401.61	6.69	6.69
622.*	18912	383.2	394.51	399.41	410.71	0.013708	32.3	585.47	77.22	2.07	0.02	401.2	401.2	6.69	6.69
621.5*	18912	382.79	394.1	399	410.29	0.013692	32.29	585.71	77.23	2.07	0.02	400.79	400.79	6.69	6.69
621.*	18912	382.38	393.69	398.59	409.88	0.013701	32.3	585.58	77.23	2.07	0.02	400.38	400.38	6.69	6.69
620.5*	18912	381.96	393.27	398.17	409.47	0.013708	32.3	585.46	77.22	2.07	0.02	399.96	399.96	6.69	6.69
620	18912	381.55	392.86	397.76	409.05	0.013693	32.29	585.7	77.23	2.07	0.02	399.55	399.55	6.69	6.69
616.666*	18912	381.24	392.55	397.45	408.74	0.013688	32.29	585.77	77.24	2.07	0.02	399.24	399.24	6.69	6.69
613.333*	18912	380.92	392.23	397.13	408.42	0.013694	32.29	585.68	77.23	2.07	0.02	398.92	398.92	6.69	6.69
610	18912	380.61	391.92	396.82	408.11	0.013688	32.29	585.77	77.24	2.07	0.02	398.61	398.61	6.69	6.69
606.666*	18912	380.2	391.51	396.47	407.79	0.01351	32.38	584.13	75.64	2.05	0.02	398.87	398.87	7.36	7.36
603.333*	18912	379.8	391.11	396.13	407.48	0.013381	32.47	582.46	74.21	2.04	0.02	399.13	399.13	8.02	8.02

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
600	18912	379.39	390.69	395.78	407.17	0.013305	32.57	580.59	72.88	2.03	0.02	399.39	399.39	8.7	8.7
598.571*	18912	378.9	390.18	395.29	406.79	0.013316	32.71	578.17	72.11	2.04	0.02	398.99	398.99	8.81	8.81
597.142*	18912	378.41	389.66	394.8	406.41	0.013245	32.84	575.83	70.79	2.03	0.02	398.59	398.59	8.93	8.93
595.714*	18912	377.92	389.17	394.31	406.04	0.013131	32.96	573.74	69.13	2.02	0.02	398.19	398.19	9.02	9.02
594.285*	18912	377.44	388.71	393.87	405.68	0.012986	33.06	572.06	67.21	2	0.02	397.8	397.8	9.09	9.09
592.857*	18912	376.95	388.27	393.46	405.32	0.012839	33.14	570.68	65.13	1.97	0.02	397.4	397.4	9.13	9.13
591.428*	18912	376.46	387.86	393.09	404.97	0.012696	33.2	569.72	62.9	1.94	0.02	397	397	9.14	9.14
590	18912	375.97	387.5	392.75	404.62	0.012545	33.2	569.62	60.57	1.91	0.02	396.6	396.6	9.1	9.1
587.5*	18912	375.48	387.08	392.3	404.27	0.012483	33.28	568.33	60.43	1.91	0.02	396.21	396.86	9.13	9.78
585.*	18912	374.99	386.54	391.77	403.92	0.012663	33.46	565.25	60.91	1.94	0.02	395.81	397.12	9.27	10.58
582.5*	18912	374.51	385.92	391.22	403.56	0.01289	33.7	561.22	58.69	1.92	0.02	395.42	397.39	9.5	11.47
580	18912	374.02	385.36	390.72	403.18	0.01351	33.88	558.17	56.42	1.9	0.02	395.02	397.65	9.66	12.29
575.*	18912	373.8	385.36	390.6	402.78	0.012902	33.5	564.54	56.47	1.87	0.02	396.09	397.4	10.73	12.04
570	18912	373.59	385.23	390.4	402.45	0.012736	33.3	567.99	56.24	1.85	0.02	397.16	397.16	11.93	11.93
565.*	18912	373.33	385.16	390.25	402	0.012221	32.93	574.34	56.31	1.82	0.02	396.85	396.85	11.69	11.69
560	18912	373.06	385.06	390.04	401.59	0.011912	32.62	579.71	56.25	1.79	0.02	396.54	396.54	11.48	11.48
556.666*	18912	372.76	384.79	389.74	401.22	0.011809	32.53	581.41	56.26	1.78	0.02	396.2	396.2	11.41	11.41
553.333*	18912	372.45	384.51	389.44	400.86	0.011726	32.45	582.79	56.27	1.78	0.02	395.87	395.87	11.36	11.36
550	18912	372.15	384.23	389.13	400.5	0.011637	32.36	584.34	56.28	1.77	0.02	395.53	395.53	11.3	11.3
547.5*	18912	371.91	384.03	388.9	400.17	0.011498	32.24	586.67	56.31	1.76	0.02	395.15	395.15	11.12	11.12
545.*	18912	371.66	383.81	388.65	399.87	0.011411	32.16	588.13	56.32	1.75	0.02	394.78	394.78	10.97	10.97
542.5*	18912	371.42	383.6	388.4	399.56	0.011318	32.06	589.82	56.35	1.75	0.02	394.4	394.4	10.8	10.8
540	18912	371.18	383.39	388.16	399.26	0.011235	31.97	591.47	56.37	1.74	0.02	394.03	394.03	10.64	10.64
535.*	18912	370.95	383.19	387.97	398.98	0.011109	31.89	593.07	56.4	1.73	0.02	393.68	393.68	10.49	10.49
530	18912	370.71	382.96	387.73	398.71	0.011104	31.85	593.85	56.4	1.73	0.02	393.33	393.33	10.37	10.37
529.230*	18912	370.41	382.72	387.43	398.34	0.010991	31.72	596.15	56.5	1.72	0.02	393.07	393.07	10.35	10.35
528.461*	18912	370.11	382.46	387.15	398	0.01092	31.64	597.66	56.58	1.72	0.02	392.81	392.81	10.35	10.35
527.692*	18912	369.81	382.21	386.87	397.65	0.010823	31.53	599.76	56.69	1.71	0.02	392.55	392.55	10.34	10.34
526.923*	18912	369.52	381.96	386.59	397.31	0.01075	31.45	601.4	56.78	1.7	0.02	392.28	392.28	10.32	10.32
526.153*	18912	369.22	381.69	386.3	396.98	0.010698	31.38	602.66	56.86	1.7	0.02	392.02	392.02	10.33	10.33
525.384*	18912	368.92	381.43	386.01	396.65	0.010644	31.31	603.96	56.95	1.69	0.02	391.76	391.76	10.33	10.33
524.615*	18912	368.62	381.13	385.72	396.34	0.010481	31.29	604.38	56.2	1.68	0.02	391.5	391.5	10.37	10.37
523.846*	18912	368.32	380.83	385.43	396.01	0.010461	31.27	604.88	56.26	1.68	0.02	391.24	391.24	10.41	10.41
523.076*	18912	368.02	380.52	385.14	395.7	0.010468	31.26	604.9	56.32	1.68	0.02	390.98	390.98	10.46	10.46
522.307*	18912	367.73	380.21	384.8	395.39	0.010474	31.26	605.01	56.38	1.68	0.02	390.71	390.71	10.5	10.5
521.538*	18912	367.43	379.9	384.47	395.07	0.010483	31.26	605.06	56.44	1.68	0.02	390.45	390.45	10.55	10.55
520.769*	18912	367.13	379.59	384.16	394.76	0.0105	31.26	605.05	56.49	1.68	0.02	390.19	390.19	10.6	10.6
520	18912	366.83	379.28	383.84	394.45	0.010516	31.25	605.09	56.54	1.68	0.02	389.93	389.93	10.65	10.65
517.5*	18912	366.6	379.34	383.86	394.08	0.010041	30.81	613.85	56.74	1.65	0.02	389.17	389.92	9.83	10.58
515.*	18912	366.36	379	383.32	393.83	0.010631	30.9	611.95	60.72	1.72	0.02	388.41	389.91	9.41	10.91

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
512.5*	18912	366.12	378.32	382.76	393.54	0.010888	31.3	604.15	57.86	1.71	0.02	387.65	389.9	9.33	11.58
510	18912	365.89	377.78	382.27	393.26	0.011297	31.57	599.01	55	1.69	0.02	386.89	389.89	9.11	12.11
508.888*	18912	365.61	377.53	381.99	392.93	0.011212	31.49	600.54	55	1.68	0.02	387.45	390.42	9.92	12.89
507.777*	18912	365.33	377.28	381.71	392.6	0.011133	31.42	601.99	55	1.67	0.02	388	390.95	10.72	13.67
506.666*	18912	365.05	377.02	381.43	392.28	0.011058	31.34	603.37	55	1.67	0.02	388.56	391.48	11.54	14.46
505.555*	18912	364.77	376.76	381.15	391.95	0.010988	31.28	604.67	55	1.66	0.02	389.12	392.01	12.36	15.25
504.444*	18912	364.49	376.51	380.87	391.63	0.010923	31.21	605.9	55	1.66	0.02	389.67	392.55	13.16	16.04
503.333*	18912	364.21	376.25	380.59	391.32	0.010861	31.15	607.06	55	1.65	0.02	390.23	393.08	13.98	16.83
502.222*	18912	363.93	375.99	380.31	391	0.010804	31.1	608.16	55	1.65	0.02	390.79	393.61	14.8	17.62
501.111*	18912	363.65	375.73	380.03	390.69	0.01075	31.04	609.19	55	1.64	0.02	391.34	394.14	15.61	18.41
500	18912	363.38	375.47	379.75	390.38	0.010687	30.98	610.4	55	1.64	0.02	391.9	394.67	16.43	19.2
495.*	18912	363.19	375.29	379.57	390.18	0.01067	30.97	610.74	55	1.64	0.02	393.33	393.41	18.04	18.12
490	18912	363	375.1	379.38	389.99	0.01067	30.97	610.74	55	1.64	0.02	394.76	392.14	19.66	17.04
480	18912	362.84	375.04	379.28	389.77	0.010414	30.8	613.97	55.3	1.63	0.02	389.77	390.82	14.73	15.78
470	18912	362.75	374.92	379.2	389.69	0.0104	30.84	613.22	55.87	1.64	0.02	386.98	387.84	12.06	12.92
460	18912	362.68	374.83	379.14	389.6	0.010355	30.84	613.19	56.45	1.65	0.02	384.01	387.79	9.18	12.96
458.*	18912	362.43	374.19	378.66	389.29	0.010763	31.18	606.61	62.24	1.76	0.02	384.04	387.64	9.85	13.45
456.*	18912	362.18	373.87	378.41	388.99	0.011141	31.21	606.01	67.7	1.84	0.02	384.07	387.49	10.2	13.62
454.*	18912	361.94	373.74	378.18	388.62	0.011118	30.96	610.88	70.68	1.86	0.02	384.1	387.33	10.36	13.59
452.*	18912	361.69	373.41	378.05	388.32	0.011023	30.99	610.29	69.58	1.84	0.02	384.13	387.18	10.72	13.77
450	18912	361.44	372.9	377.6	388.01	0.01125	31.19	606.29	69.04	1.86	0.02	384.16	387.03	11.26	14.13
440	18912	361.2	372.73	377.36	387.61	0.011003	30.95	610.97	69.19	1.84	0.02	383.92	386.79	11.19	14.06
430	18912	361.2	372.77	377.36	387.51	0.010859	30.81	613.78	69.27	1.82	0.02	383.92	382.79	11.15	10.02
426.666*	18912	360.98	372.53	377.13	387.28	0.011004	30.81	613.81	71.11	1.85	0.02	384.03	382.68	11.5	10.15
423.333*	18912	360.76	372.34	376.94	387.03	0.011132	30.75	614.96	72.61	1.86	0.02	384.14	382.56	11.8	10.22
420	18912	360.54	372.18	376.75	386.75	0.011188	30.63	617.4	73.7	1.87	0.02	384.25	382.45	12.07	10.27
410	18912	360.28	372.19	376.66	386.29	0.010619	30.13	627.58	73.74	1.82	0.02	384.28	384.28	12.09	12.09
409.473*	18912	360.05	372	376.42	385.96	0.010486	29.99	630.66	74	1.81	0.02	383.78	383.78	11.78	11.78
408.947*	18912	359.82	371.81	376.19	385.62	0.010331	29.82	634.24	74.25	1.8	0.02	383.29	383.29	11.48	11.48
408.421*	18912	359.6	371.62	375.96	385.29	0.0102	29.67	637.48	74.53	1.79	0.02	382.79	382.79	11.17	11.17
407.894*	18912	359.37	371.42	375.73	384.97	0.01009	29.54	640.24	74.77	1.78	0.02	382.29	382.29	10.87	10.87
407.368*	18912	359.14	371.22	375.49	384.66	0.009988	29.42	642.87	75.01	1.77	0.02	381.8	381.8	10.58	10.58
406.842*	18912	358.91	371.02	375.25	384.35	0.009893	29.3	645.42	75.25	1.76	0.02	381.3	381.3	10.28	10.28
406.315*	18912	358.68	370.81	375.01	384.04	0.009804	29.19	647.85	75.49	1.76	0.02	380.81	380.81	10	10
405.789*	18912	358.46	370.61	374.8	383.73	0.009711	29.07	650.52	75.76	1.75	0.02	380.31	380.31	9.7	9.7
405.263*	18912	358.23	370.39	374.54	383.44	0.009645	28.98	652.52	75.99	1.74	0.02	379.81	379.81	9.42	9.42
404.736*	18912	358	370.18	374.3	383.15	0.009589	28.9	654.32	76.22	1.74	0.02	379.32	379.32	9.14	9.14
404.210*	18912	357.77	369.96	374.06	382.85	0.009528	28.82	656.27	76.45	1.73	0.02	378.82	378.82	8.86	8.86
403.684*	18912	357.55	369.75	373.84	382.56	0.009467	28.73	658.35	76.71	1.73	0.02	378.32	378.32	8.57	8.57
403.157*	18912	357.32	369.52	373.57	382.29	0.009441	28.68	659.5	76.91	1.73	0.02	377.83	377.83	8.31	8.31

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
402.631*	18912	357.09	369.3	373.34	382	0.009391	28.6	661.34	77.16	1.72	0.02	377.33	377.33	8.03	8.03
402.105*	18912	356.86	369.07	373.11	381.72	0.009366	28.54	662.58	77.38	1.72	0.02	376.84	376.84	7.77	7.77
401.578*	18912	356.63	368.84	372.84	381.44	0.009344	28.49	663.79	77.6	1.72	0.02	376.34	376.34	7.5	7.5
401.052*	18912	356.41	368.62	372.6	381.15	0.009299	28.41	665.68	77.87	1.71	0.02	375.84	375.84	7.22	7.22
400.526*	18912	356.18	368.39	372.36	380.87	0.009276	28.36	666.96	78.1	1.71	0.02	375.35	375.35	6.96	6.96
400	18912	355.95	368.16	372.13	380.58	0.009245	28.29	668.56	78.37	1.71	0.02	374.85	374.85	6.69	6.69
395.*	18912	355.83	368.05	371.98	380.44	0.009218	28.25	669.33	78.42	1.7	0.02	374.71	374.71	6.66	6.66
390	18912	355.71	367.93	371.86	380.3	0.009191	28.22	670.11	78.48	1.7	0.02	374.57	374.57	6.64	6.64
387.5*	18912	355.51	367.8	371.65	380.03	0.009024	28.07	673.71	78.41	1.69	0.02	374.57	374.57	6.77	6.77
385.*	18912	355.31	367.66	371.47	379.77	0.008872	27.93	677.09	78.34	1.67	0.02	374.57	374.57	6.91	6.91
382.5*	18912	355.11	367.52	371.28	379.52	0.008734	27.8	680.24	78.25	1.66	0.02	374.57	374.57	7.05	7.05
380	18912	354.91	367.36	371.1	379.29	0.008636	27.71	682.38	78.13	1.65	0.02	374.57	374.57	7.21	7.21
379.791*	18912	354.67	367.14	370.86	379.03	0.008585	27.66	683.62	78.13	1.65	0.02	374.38	374.38	7.24	7.24
379.583*	18912	354.44	366.94	370.63	378.76	0.008519	27.59	685.35	78.16	1.64	0.02	374.19	374.19	7.25	7.25
379.375*	18912	354.2	366.72	370.4	378.51	0.008471	27.55	686.52	78.15	1.64	0.02	374.01	374.01	7.29	7.29
379.166*	18912	353.96	366.49	370.16	378.26	0.008444	27.52	687.09	78.12	1.64	0.02	373.82	373.82	7.33	7.33
378.958*	18912	353.73	366.28	369.94	378	0.008391	27.47	688.53	78.15	1.63	0.02	373.63	373.63	7.35	7.35
378.75*	18912	353.49	366.06	369.7	377.75	0.008365	27.45	689.07	78.11	1.63	0.02	373.44	373.44	7.38	7.38
378.541*	18912	353.25	365.83	369.47	377.51	0.00834	27.42	689.61	78.08	1.63	0.02	373.25	373.25	7.42	7.42
378.333*	18912	353.02	365.61	369.24	377.26	0.008311	27.4	690.31	78.07	1.62	0.02	373.07	373.07	7.46	7.46
378.125*	18912	352.78	365.38	369	377.02	0.008287	27.38	690.83	78.03	1.62	0.02	372.88	372.88	7.5	7.5
377.916*	18912	352.54	365.15	368.77	376.78	0.008267	27.36	691.25	78	1.62	0.02	372.69	372.69	7.54	7.54
377.708*	18912	352.31	364.93	368.54	376.53	0.008241	27.33	691.88	77.98	1.62	0.02	372.5	372.5	7.57	7.57
377.5*	18912	352.07	364.71	368.31	376.29	0.00822	27.32	692.32	77.95	1.62	0.02	372.32	372.32	7.61	7.61
377.291*	18912	351.83	364.47	368.07	376.05	0.008204	27.31	692.62	77.91	1.61	0.02	372.13	372.13	7.66	7.66
377.083*	18912	351.6	364.26	367.84	375.81	0.008178	27.28	693.27	77.89	1.61	0.02	371.94	371.94	7.68	7.68
376.875*	18912	351.36	364.02	367.61	375.57	0.008164	27.27	693.51	77.85	1.61	0.02	371.75	371.75	7.73	7.73
376.666*	18912	351.12	363.79	367.37	375.33	0.008147	27.26	693.85	77.82	1.61	0.02	371.56	371.56	7.77	7.77
376.458*	18912	350.89	363.57	367.14	375.09	0.008127	27.24	694.33	77.79	1.61	0.02	371.38	371.38	7.81	7.81
376.25*	18912	350.65	363.34	366.91	374.85	0.008113	27.23	694.59	77.75	1.61	0.02	371.19	371.19	7.85	7.85
376.041*	18912	350.41	363.11	366.67	374.61	0.008099	27.22	694.84	77.72	1.6	0.02	371	371	7.89	7.89
375.833*	18912	350.18	362.89	366.44	374.37	0.008081	27.2	695.28	77.69	1.6	0.02	370.81	370.81	7.92	7.92
375.625*	18912	349.94	362.65	366.21	374.14	0.00807	27.19	695.46	77.65	1.6	0.02	370.62	370.62	7.97	7.97
375.416*	18912	349.7	362.42	365.97	373.9	0.008058	27.19	695.64	77.6	1.6	0.02	370.44	370.44	8.02	8.02
375.208*	18912	349.47	362.2	365.74	373.66	0.00804	27.17	696.08	77.58	1.6	0.02	370.25	370.25	8.05	8.05
375.*	18912	349.23	361.96	365.51	373.43	0.00804	27.18	695.93	77.53	1.6	0.02	370.06	370.06	8.1	8.1
374.791*	18912	348.99	361.72	365.27	373.2	0.008043	27.19	695.67	77.47	1.6	0.02	369.87	369.87	8.15	8.15
374.583*	18912	348.76	361.5	365.04	372.96	0.008026	27.17	696.11	77.46	1.6	0.02	369.68	369.68	8.18	8.18
374.375*	18912	348.52	361.26	364.81	372.73	0.008027	27.18	695.88	77.39	1.6	0.02	369.5	369.5	8.24	8.24
374.166*	18912	348.28	361.03	364.57	372.5	0.00803	27.19	695.63	77.33	1.6	0.02	369.31	369.31	8.28	8.28

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
373.958*	18912	348.05	360.8	364.34	372.27	0.008029	27.19	695.59	77.29	1.6	0.02	369.12	369.12	8.32	8.32
373.75*	18912	347.81	360.56	364.11	372.04	0.008032	27.2	695.34	77.23	1.6	0.02	368.93	368.93	8.37	8.37
373.541*	18912	347.57	360.32	363.87	371.81	0.00803	27.2	695.25	77.18	1.6	0.02	368.74	368.74	8.42	8.42
373.333*	18912	347.34	360.1	363.64	371.57	0.008012	27.18	695.69	77.15	1.6	0.02	368.56	368.56	8.46	8.46
373.125*	18912	347.1	359.86	363.41	371.35	0.008015	27.19	695.44	77.1	1.6	0.02	368.37	368.37	8.51	8.51
372.916*	18912	346.86	359.62	363.17	371.11	0.008013	27.2	695.37	77.05	1.6	0.02	368.18	368.18	8.56	8.56
372.708*	18912	346.63	359.4	362.94	370.87	0.007998	27.18	695.74	77.03	1.59	0.02	367.99	367.99	8.59	8.59
372.5*	18912	346.39	359.16	362.71	370.64	0.007997	27.19	695.63	76.98	1.59	0.02	367.8	367.8	8.64	8.64
372.291*	18912	346.15	358.93	362.47	370.41	0.007999	27.2	695.41	76.91	1.59	0.02	367.62	367.62	8.69	8.69
372.083*	18912	345.92	358.7	362.24	370.18	0.007995	27.19	695.45	76.89	1.59	0.02	367.43	367.43	8.73	8.73
371.875*	18912	345.68	358.46	362.01	369.95	0.007998	27.2	695.23	76.83	1.59	0.02	367.24	367.24	8.78	8.78
371.666*	18912	345.44	358.22	361.77	369.72	0.007996	27.21	695.16	76.78	1.59	0.02	367.05	367.05	8.83	8.83
371.458*	18912	345.21	358	361.54	369.48	0.007979	27.19	695.55	76.75	1.59	0.02	366.87	366.87	8.87	8.87
371.25*	18912	344.97	357.77	361.31	369.25	0.007978	27.19	695.46	76.71	1.59	0.02	366.68	366.68	8.91	8.91
371.041*	18912	344.73	357.53	361.07	369.01	0.007976	27.2	695.42	76.66	1.59	0.02	366.49	366.49	8.96	8.96
370.833*	18912	344.5	357.31	360.84	368.78	0.007963	27.18	695.74	76.64	1.59	0.02	366.3	366.3	8.99	8.99
370.625*	18912	344.26	357.07	360.61	368.54	0.007957	27.18	695.79	76.59	1.59	0.02	366.11	366.11	9.04	9.04
370.416*	18912	344.02	356.83	360.37	368.31	0.007957	27.19	695.64	76.54	1.59	0.02	365.93	365.93	9.1	9.1
370.208*	18912	343.79	356.6	360.14	368.08	0.007954	27.19	695.66	76.5	1.59	0.02	365.74	365.74	9.14	9.14
370	18912	343.55	356.37	359.91	367.85	0.007951	27.19	695.61	76.46	1.59	0.02	365.55	365.55	9.18	9.18
368.333*	18912	343.18	355.86	359.51	367.59	0.008169	27.48	688.24	75.88	1.61	0.02	365.18	366.41	9.32	10.55
366.666*	18912	342.81	355.35	359.11	367.32	0.00839	27.76	681.26	75.37	1.63	0.02	364.81	367.27	9.46	11.92
365.*	18912	342.43	354.84	358.66	367.04	0.008616	28.04	674.52	74.92	1.65	0.02	364.43	368.14	9.59	13.3
363.333*	18912	342.06	354.33	358.23	366.76	0.008829	28.29	668.49	74.52	1.66	0.02	364.06	369	9.73	14.67
361.666*	18912	341.69	353.83	357.83	366.48	0.009044	28.53	662.77	74.17	1.68	0.02	363.69	369.86	9.86	16.03
360	18912	341.32	353.33	357.37	366.18	0.009256	28.77	657.44	73.86	1.7	0.02	363.32	370.72	9.99	17.39
358.571*	18912	340.96	352.9	356.98	365.9	0.009358	28.93	653.74	73.56	1.71	0.02	362.96	370.07	10.06	17.17
357.142*	18912	340.61	352.47	356.59	365.61	0.009461	29.09	650.08	73.17	1.72	0.02	362.61	369.42	10.14	16.95
355.714*	18912	340.25	352.04	356.19	365.32	0.009565	29.25	646.52	72.73	1.73	0.02	362.25	368.77	10.21	16.73
354.285*	18912	339.9	351.61	355.81	365.03	0.009666	29.4	643.22	72.22	1.74	0.02	361.9	368.12	10.29	16.51
352.857*	18912	339.54	351.17	355.41	364.74	0.009782	29.56	639.85	71.64	1.74	0.02	361.54	367.47	10.37	16.3
351.428*	18912	339.19	350.75	355.02	364.44	0.009903	29.7	636.85	71.02	1.75	0.02	361.19	366.82	10.44	16.07
350	18912	338.83	350.32	354.62	364.14	0.010051	29.84	633.82	70.36	1.75	0.02	360.83	366.17	10.51	15.85
349.090*	18912	338.46	350.05	354.33	363.84	0.009979	29.8	634.68	70.4	1.75	0.02	360.59	365.48	10.54	15.43
348.181*	18912	338.09	349.76	354.03	363.54	0.009971	29.79	634.74	70.65	1.75	0.02	360.35	364.8	10.59	15.04
347.272*	18912	337.72	349.43	353.72	363.25	0.010032	29.82	634.14	71.21	1.76	0.02	360.11	364.11	10.68	14.68
346.363*	18912	337.35	349.06	353.28	362.94	0.010193	29.9	632.56	72.14	1.78	0.02	359.87	363.42	10.81	14.36
345.454*	18912	336.98	348.62	352.83	362.62	0.010419	30.02	629.9	72.89	1.8	0.02	359.63	362.73	11.01	14.11
344.545*	18912	336.62	348.14	352.31	362.28	0.010655	30.18	626.56	73.03	1.82	0.02	359.39	362.05	11.25	13.91
343.636*	18912	336.25	347.64	351.91	361.94	0.010672	30.35	623.14	70.77	1.8	0.02	359.15	361.36	11.51	13.72

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
342.727*	18912	335.88	347.18	351.47	361.61	0.010694	30.49	620.28	68.46	1.79	0.02	358.91	360.67	11.73	13.49
341.818*	18912	335.51	346.74	351.06	361.28	0.010733	30.6	618.01	66.12	1.76	0.02	358.67	359.98	11.93	13.24
340.909*	18912	335.14	346.35	350.68	360.96	0.010787	30.67	616.59	63.75	1.74	0.02	358.43	359.3	12.08	12.95
340	18912	334.77	346	350.31	360.63	0.010869	30.69	616.14	61.36	1.71	0.02	358.19	358.61	12.19	12.61
335.*	18912	334.57	346.01	350.15	360.26	0.01033	30.29	624.34	61.76	1.68	0.02	357.21	358	11.2	11.99
330	18912	334.36	345.74	349.88	360.01	0.010567	30.31	623.85	60.28	1.66	0.02	356.22	357.39	10.48	11.65
325.*	18912	334.14	345.54	349.66	359.81	0.01052	30.31	624.02	60.25	1.66	0.02	360.62	356.93	15.08	11.39
320	18912	333.93	345.32	349.44	359.61	0.010597	30.34	623.4	60	1.66	0.02	365.02	356.47	19.7	11.15
315.*	18912	333.78	345.2	349.29	359.4	0.010492	30.24	625.48	60	1.65	0.02	369.38	356.02	24.18	10.82
310	18912	333.63	345.09	349.14	359.19	0.010392	30.14	627.5	60	1.64	0.02	373.74	355.56	28.65	10.47
306.666*	18912	333.43	344.9	348.94	358.98	0.010366	30.11	628.03	60	1.64	0.02	373.38	355.05	28.48	10.15
303.333*	18912	333.23	344.71	348.74	358.76	0.010341	30.09	628.54	60	1.64	0.02	373.03	354.54	28.32	9.83
300	18912	333.03	344.5	348.54	358.57	0.007484	30.11	628.18	60	1.64	0.017	372.67	354.03	28.17	9.53
295.*	18912	332.84	344.29	348.35	358.42	0.007525	30.16	627.04	60	1.64	0.017	372.32	353.84	28.03	9.55
290	18912	332.64	344.07	348.15	358.26	0.007575	30.23	625.64	60	1.65	0.017	371.97	353.64	27.9	9.57
280	18912	332.41	343.81	347.92	358.07	0.007626	30.3	624.22	60	1.66	0.017	359.41	353.41	15.6	9.6
270	18912	332.2	343.59	347.71	357.88	0.00765	30.33	623.58	60	1.66	0.017	359.2	353.2	15.61	9.61
268.333*	18912	331.98	343.36	347.49	357.68	0.007676	30.36	622.87	60	1.66	0.017	358.98	352.97	15.62	9.61
266.666*	18912	331.76	343.13	347.27	357.48	0.007701	30.4	622.18	60	1.66	0.017	358.75	352.74	15.62	9.61
265.*	18912	331.55	342.92	347.06	357.27	0.007705	30.4	622.07	60	1.66	0.017	358.53	352.51	15.61	9.59
263.333*	18912	331.33	342.69	346.84	357.07	0.00773	30.43	621.41	60	1.67	0.017	358.3	352.28	15.61	9.59
261.666*	18912	331.11	342.46	346.62	356.87	0.007754	30.47	620.76	60	1.67	0.017	358.08	352.05	15.62	9.59
260	18912	330.89	342.23	346.4	356.67	0.007777	30.5	620.14	60	1.67	0.017	357.85	351.82	15.62	9.59
255.*	18912	330.65	341.96	346.16	356.48	0.007839	30.58	618.49	60	1.68	0.017	354.12	351.61	12.16	9.65
250	18912	330.4	341.68	345.91	356.28	0.00791	30.67	616.62	60	1.69	0.017	350.4	351.4	8.72	9.72
249.285*	18912	330.13	341.39	345.64	356.04	0.007948	30.72	615.63	60	1.69	0.017	350.13	351.13	8.74	9.74
248.571*	18912	329.87	341.12	345.38	355.81	0.007975	30.75	614.95	60	1.69	0.017	349.87	350.87	8.75	9.75
247.857*	18912	329.6	340.83	345.11	355.56	0.008011	30.8	614.02	60	1.7	0.017	349.6	350.6	8.77	9.77
247.142*	18912	329.33	340.55	344.84	355.32	0.008046	30.84	613.13	60	1.7	0.017	349.33	350.33	8.78	9.78
246.428*	18912	329.07	340.28	344.58	355.08	0.008069	30.87	612.54	60	1.7	0.017	349.07	350.07	8.79	9.79
245.714*	18912	328.8	340	344.31	354.84	0.008102	30.92	611.7	60	1.71	0.017	348.8	349.8	8.8	9.8
245.*	18912	328.54	339.73	344.05	354.59	0.008123	30.94	611.16	60	1.71	0.017	348.54	349.54	8.81	9.81
244.285*	18912	328.27	339.44	343.78	354.35	0.008155	30.98	610.37	60	1.71	0.017	348.27	349.27	8.83	9.83
243.571*	18912	328	339.16	343.51	354.1	0.008185	31.02	609.61	60	1.72	0.017	348	349	8.84	9.84
242.857*	18912	327.74	338.89	343.25	353.86	0.008204	31.05	609.15	60	1.72	0.017	347.74	348.74	8.85	9.85
242.142*	18912	327.47	338.61	342.98	353.61	0.008233	31.08	608.43	60	1.72	0.017	347.47	348.47	8.86	9.86
241.428*	18912	327.2	338.33	342.71	353.37	0.00826	31.12	607.74	60	1.72	0.017	347.2	348.2	8.87	9.87
240.714*	18912	326.94	338.06	342.45	353.12	0.008277	31.14	607.34	60	1.72	0.017	346.94	347.94	8.88	9.88
240	18912	326.67	337.78	342.18	352.87	0.008303	31.17	606.69	60	1.73	0.017	346.67	347.67	8.89	9.89
239.230*	18912	326.4	337.5	341.91	352.62	0.008328	31.2	606.08	60	1.73	0.017	346.4	347.4	8.9	9.9

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
238.461*	18912	326.13	337.22	341.64	352.37	0.008353	31.23	605.49	60	1.73	0.017	346.13	347.13	8.91	9.91
237.692*	18912	325.86	336.94	341.37	352.12	0.008376	31.26	604.92	60	1.74	0.017	345.86	346.86	8.92	9.92
236.923*	18912	325.59	336.66	341.1	351.87	0.008399	31.29	604.38	60	1.74	0.017	345.59	346.59	8.93	9.93
236.153*	18912	325.31	336.37	340.82	351.61	0.008431	31.33	603.6	60	1.74	0.017	345.31	346.31	8.94	9.94
235.384*	18912	325.04	336.09	340.55	351.36	0.008452	31.36	603.1	60	1.74	0.017	345.04	346.04	8.95	9.95
234.615*	18912	324.77	335.81	340.28	351.11	0.008472	31.38	602.61	60	1.75	0.017	344.77	345.77	8.96	9.96
233.846*	18912	324.5	335.54	340.01	350.85	0.008492	31.41	602.15	60	1.75	0.017	344.5	345.5	8.96	9.96
233.076*	18912	324.23	335.26	339.74	350.6	0.008511	31.43	601.7	60	1.75	0.017	344.23	345.23	8.97	9.97
232.307*	18912	323.96	334.98	339.47	350.34	0.00853	31.45	601.26	60	1.75	0.017	343.96	344.96	8.98	9.98
231.538*	18912	323.69	334.7	339.2	350.09	0.008548	31.48	600.84	60	1.75	0.017	343.69	344.69	8.99	9.99
230.769*	18912	323.42	334.43	338.93	349.83	0.008565	31.5	600.44	60	1.75	0.017	343.42	344.42	8.99	9.99
230	18912	323.15	334.14	338.66	349.58	0.008587	31.52	599.92	60	1.76	0.017	343.15	344.15	9	10
229.166*	18912	322.89	333.88	338.4	349.33	0.008597	31.54	599.69	60	1.76	0.017	342.89	343.89	9.01	10.01
228.333*	18912	322.63	333.62	338.14	349.08	0.008617	31.56	599.22	60	1.76	0.017	342.63	343.63	9.01	10.01
227.5*	18912	322.37	333.35	337.88	348.84	0.008636	31.58	598.78	60	1.76	0.017	342.37	343.37	9.02	10.02
226.666*	18912	322.12	333.1	337.63	348.59	0.008636	31.58	598.78	60	1.76	0.017	342.12	343.12	9.02	10.02
225.833*	18912	321.86	332.83	337.37	348.34	0.008654	31.61	598.37	60	1.76	0.017	341.86	342.86	9.03	10.03
225.*	18912	321.6	332.57	337.11	348.1	0.00867	31.63	597.99	60	1.77	0.017	341.6	342.6	9.03	10.03
224.166*	18912	321.35	332.32	336.86	347.85	0.00867	31.63	597.99	60	1.77	0.017	341.35	342.35	9.03	10.03
223.333*	18912	321.09	332.05	336.6	347.6	0.008685	31.64	597.64	60	1.77	0.017	341.09	342.09	9.04	10.04
222.5*	18912	320.83	331.79	336.34	347.35	0.0087	31.66	597.31	60	1.77	0.017	340.83	341.83	9.04	10.04
221.666*	18912	320.57	331.52	336.08	347.1	0.008713	31.68	597	60	1.77	0.017	340.57	341.57	9.05	10.05
220.833*	18912	320.32	331.27	335.83	346.85	0.008713	31.68	597	60	1.77	0.017	340.32	341.32	9.05	10.05
220	18912	320.06	331.01	335.57	346.6	0.008726	31.69	596.72	60	1.77	0.017	340.06	341.06	9.05	10.05
219.090*	18912	319.81	330.77	335.34	346.36	0.008732	31.68	596.95	61.55	1.79	0.017	339.81	340.82	9.04	10.05
218.181*	18912	319.55	330.58	335.13	346.1	0.00872	31.62	598.09	63.09	1.81	0.017	339.55	340.57	8.97	9.99
217.272*	18912	319.3	330.43	334.94	345.82	0.00866	31.48	600.81	64.64	1.82	0.017	339.3	340.33	8.87	9.9
216.363*	18912	319.05	330.32	334.79	345.52	0.008573	31.28	604.54	66.18	1.82	0.017	339.05	340.08	8.73	9.76
215.454*	18912	318.79	330.24	334.64	345.22	0.008475	31.06	608.87	67.73	1.83	0.017	338.79	339.84	8.55	9.6
214.545*	18912	318.54	330.19	334.51	344.9	0.00831	30.79	614.31	68.89	1.82	0.017	338.54	339.59	8.35	9.4
213.636*	18912	318.28	330.08	334.39	344.62	0.008016	30.6	617.96	67.54	1.78	0.017	338.28	339.35	8.2	9.27
212.727*	18912	318.03	329.9	334.29	344.39	0.007863	30.54	619.22	66.52	1.76	0.017	338.03	339.1	8.13	9.2
211.818*	18912	317.78	329.68	334.19	344.17	0.007791	30.55	619.14	65.77	1.75	0.017	337.78	338.86	8.1	9.18
210.909*	18912	317.52	329.43	333.92	343.95	0.007764	30.58	618.41	65.2	1.75	0.017	337.52	338.61	8.09	9.18
210	18912	317.27	329.15	333.67	343.72	0.00777	30.63	617.34	64.82	1.75	0.017	337.27	338.37	8.12	9.22
209.*	18912	317.01	328.88	333.4	343.49	0.007806	30.68	616.49	66.46	1.77	0.017	337.01	338	8.13	9.12
208.*	18912	316.75	328.65	333.13	343.26	0.007837	30.67	616.58	68.16	1.8	0.017	336.75	337.63	8.1	8.98
207.*	18912	316.48	328.46	332.91	343.03	0.007864	30.63	617.42	69.92	1.82	0.017	336.48	337.25	8.02	8.79
206.*	18912	316.22	328.32	332.72	342.76	0.00784	30.5	620.12	71.74	1.83	0.017	336.22	336.88	7.9	8.56
205.*	18912	315.96	328.22	332.57	342.48	0.007786	30.3	624.11	73.64	1.83	0.017	335.96	336.51	7.74	8.29

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
204.*	18912	315.7	328.14	332.42	342.19	0.007666	30.08	628.67	74.83	1.83	0.017	335.7	336.14	7.56	8
203.*	18912	315.44	328.01	332.3	341.93	0.007435	29.94	631.61	73.64	1.8	0.017	335.44	335.77	7.43	7.76
202.*	18912	315.17	327.81	332.18	341.72	0.00734	29.94	631.76	72.7	1.79	0.017	335.17	335.39	7.37	7.59
201.*	18912	314.91	327.56	331.99	341.5	0.007294	29.96	631.2	71.99	1.78	0.017	334.91	335.02	7.35	7.46
200	18912	314.65	327.3	331.72	341.29	0.007288	30.02	630.04	71.44	1.78	0.017	334.65	334.65	7.35	7.35
199.583*	18912	314.38	327	331.45	341.06	0.007339	30.09	628.49	71.38	1.79	0.017	334.38	334.38	7.38	7.38
199.166*	18912	314.11	326.71	331.18	340.84	0.007389	30.16	626.99	71.33	1.79	0.017	334.11	334.11	7.4	7.4
198.75*	18912	313.85	326.42	330.91	340.61	0.007432	30.22	625.72	71.29	1.8	0.017	333.85	333.85	7.43	7.43
198.333*	18912	313.58	326.13	330.64	340.38	0.007479	30.29	624.33	71.24	1.8	0.017	333.58	333.58	7.45	7.45
197.916*	18912	313.31	325.84	330.37	340.15	0.007526	30.36	622.96	71.19	1.81	0.017	333.31	333.31	7.47	7.47
197.5*	18912	313.04	325.55	330.1	339.92	0.007569	30.42	621.71	71.15	1.81	0.017	333.04	333.04	7.49	7.49
197.083*	18912	312.77	325.26	329.82	339.69	0.007615	30.48	620.42	71.11	1.82	0.017	332.77	332.77	7.51	7.51
196.666*	18912	312.51	324.98	329.55	339.46	0.007652	30.53	619.37	71.08	1.82	0.017	332.51	332.51	7.53	7.53
196.25*	18912	312.24	324.69	329.28	339.22	0.007693	30.59	618.22	71.04	1.83	0.017	332.24	332.24	7.55	7.55
195.833*	18912	311.97	324.4	329.01	338.99	0.007734	30.65	617.06	71	1.83	0.017	331.97	331.97	7.57	7.57
195.416*	18912	311.7	324.11	328.74	338.75	0.007773	30.7	615.98	70.97	1.84	0.017	331.7	331.7	7.59	7.59
195.*	18912	311.43	323.83	328.46	338.51	0.007811	30.75	614.93	70.93	1.84	0.017	331.43	331.43	7.6	7.6
194.583*	18912	311.17	323.55	328.2	338.28	0.007843	30.8	614.07	70.9	1.84	0.017	331.17	331.17	7.62	7.62
194.166*	18912	310.9	323.26	327.92	338.04	0.007879	30.85	613.1	70.87	1.85	0.017	330.9	330.9	7.64	7.64
193.75*	18912	310.63	322.97	327.65	337.8	0.007916	30.9	612.12	70.84	1.85	0.017	330.63	330.63	7.66	7.66
193.333*	18912	310.36	322.69	327.38	337.56	0.00795	30.94	611.21	70.81	1.86	0.017	330.36	330.36	7.67	7.67
192.916*	18912	310.1	322.41	327.11	337.31	0.007977	30.98	610.5	70.79	1.86	0.017	330.1	330.1	7.69	7.69
192.5*	18912	309.83	322.13	326.84	337.07	0.00801	31.02	609.64	70.77	1.86	0.017	329.83	329.83	7.7	7.7
192.083*	18912	309.56	321.84	326.57	336.83	0.008044	31.07	608.78	70.75	1.87	0.017	329.56	329.56	7.72	7.72
191.666*	18912	309.29	321.56	326.29	336.58	0.008076	31.11	607.95	70.73	1.87	0.017	329.29	329.29	7.73	7.73
191.25*	18912	309.02	321.28	326.02	336.34	0.008105	31.15	607.18	70.7	1.87	0.017	329.02	329.02	7.75	7.75
190.833*	18912	308.76	321	325.76	336.09	0.008129	31.18	606.6	70.69	1.88	0.017	328.76	328.76	7.76	7.76
190.416*	18912	308.49	320.72	325.48	335.85	0.008157	31.21	605.88	70.67	1.88	0.017	328.49	328.49	7.77	7.77
190	18912	308.22	320.44	325.21	335.6	0.008186	31.25	605.14	70.65	1.88	0.017	328.22	328.22	7.78	7.78
187.5*	18912	307.97	320.27	325.03	335.35	0.00812	31.16	606.95	70.86	1.88	0.017	327.97	327.97	7.7	7.7
185.*	18912	307.73	320.12	324.85	335.1	0.008052	31.05	609	71.07	1.87	0.017	327.73	327.73	7.61	7.61
182.5*	18912	307.48	319.95	324.66	334.87	0.008018	30.99	610.29	71.25	1.87	0.017	327.48	327.48	7.53	7.53
180	18912	307.23	319.79	324.48	334.64	0.00799	30.92	611.59	71.42	1.86	0.017	327.23	327.23	7.44	7.44
177.5*	18912	307.01	319.61	324.3	334.44	0.007998	30.9	611.97	71.73	1.86	0.017	327.01	327.01	7.4	7.4
175.*	18912	306.79	319.44	324.13	334.25	0.008011	30.88	612.4	72.03	1.87	0.017	326.79	326.79	7.35	7.35
172.5*	18912	306.56	319.26	323.95	334.05	0.008029	30.86	612.8	72.33	1.87	0.017	326.56	326.56	7.3	7.3
170	18912	306.34	319.09	323.77	333.85	0.008036	30.82	613.61	72.63	1.87	0.017	326.34	326.34	7.25	7.25
169.333*	18912	306.08	318.82	323.51	333.61	0.008065	30.86	612.81	72.6	1.87	0.017	326.08	326.08	7.26	7.26
168.666*	18912	305.83	318.57	323.26	333.38	0.008084	30.89	612.28	72.57	1.87	0.017	325.83	325.83	7.26	7.26
168.*	18912	305.57	318.3	323	333.15	0.008112	30.93	611.53	72.53	1.88	0.017	325.57	325.57	7.27	7.27

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
167.333*	18912	305.32	318.04	322.75	332.91	0.008132	30.95	610.97	72.5	1.88	0.017	325.32	325.32	7.28	7.28
166.666*	18912	305.06	317.77	322.49	332.68	0.008156	30.99	610.32	72.48	1.88	0.017	325.06	325.06	7.29	7.29
166.*	18912	304.8	317.5	322.23	332.44	0.008182	31.02	609.62	72.44	1.88	0.017	324.8	324.8	7.3	7.3
165.333*	18912	304.55	317.24	321.98	332.21	0.0082	31.05	609.12	72.41	1.89	0.017	324.55	324.55	7.31	7.31
164.666*	18912	304.29	316.97	321.72	331.97	0.008222	31.08	608.52	72.39	1.89	0.017	324.29	324.29	7.32	7.32
164.*	18912	304.04	316.72	321.47	331.74	0.00824	31.1	608.05	72.36	1.89	0.017	324.04	324.04	7.32	7.32
163.333*	18912	303.78	316.45	321.21	331.5	0.008263	31.13	607.42	72.33	1.89	0.017	323.78	323.78	7.33	7.33
162.666*	18912	303.52	316.18	320.95	331.26	0.008284	31.16	606.88	72.31	1.9	0.017	323.52	323.52	7.34	7.34
162.*	18912	303.27	315.92	320.7	331.02	0.0083	31.18	606.46	72.29	1.9	0.017	323.27	323.27	7.35	7.35
161.333*	18912	303.01	315.65	320.44	330.78	0.008322	31.21	605.87	72.26	1.9	0.017	323.01	323.01	7.36	7.36
160.666*	18912	302.76	315.4	320.19	330.54	0.008326	31.22	605.75	72.25	1.9	0.017	322.76	322.76	7.36	7.36
160	18912	302.5	315.14	319.93	330.3	0.008348	31.25	605.19	72.22	1.9	0.017	322.5	322.5	7.36	7.36
158.571*	18912	302.24	314.87	319.67	330.06	0.008367	31.28	604.58	72.19	1.9	0.017	322.5	322.5	7.63	7.63
157.142*	18912	301.99	314.61	319.42	329.83	0.008385	31.31	604.08	72.18	1.91	0.017	322.5	322.5	7.89	7.89
155.714*	18912	301.73	314.34	319.16	329.59	0.008406	31.34	603.51	72.15	1.91	0.017	322.5	322.5	8.16	8.16
154.285*	18912	301.47	314.08	318.9	329.35	0.008426	31.36	602.99	72.12	1.91	0.017	322.5	322.5	8.42	8.42
152.857*	18912	301.21	313.81	318.64	329.12	0.00845	31.39	602.39	72.09	1.91	0.017	322.5	322.5	8.69	8.69
151.428*	18912	300.96	313.55	318.38	328.88	0.008471	31.42	601.91	72.07	1.92	0.017	322.5	322.5	8.95	8.95
150	18912	300.7	313.28	318.13	328.64	0.008493	31.45	601.41	72.04	1.92	0.017	322.5	322.5	9.22	9.22
140	18912	300.7	313.3	318.13	328.58	0.008432	31.36	602.98	72.12	1.91	0.017	322.5	329	9.2	15.7
139.375*	18912	300.44	313.05	317.88	328.33	0.008434	31.37	602.84	72.11	1.91	0.017	322.5	329	9.45	15.95
138.75*	18912	300.19	312.8	317.62	328.08	0.008436	31.38	602.74	72.12	1.91	0.017	322.5	329	9.7	16.2
138.125*	18912	299.93	312.53	317.37	327.84	0.008449	31.4	602.36	72.11	1.91	0.017	322.5	329	9.97	16.47
137.5*	18912	299.68	312.28	317.11	327.59	0.008452	31.4	602.24	72.1	1.91	0.017	322.5	329	10.22	16.72
136.875*	18912	299.42	312.02	316.86	327.35	0.008466	31.42	601.85	72.09	1.92	0.017	322.5	329	10.48	16.98
136.25*	18912	299.17	311.76	316.6	327.1	0.00847	31.43	601.75	72.08	1.92	0.017	322.5	329	10.74	17.24
135.625*	18912	298.91	311.5	316.35	326.86	0.008486	31.45	601.33	72.07	1.92	0.017	322.5	329	11	17.5
135.*	18912	298.65	311.24	316.09	326.62	0.0085	31.47	600.96	72.05	1.92	0.017	322.5	329	11.26	17.76
134.375*	18912	298.4	310.98	315.83	326.37	0.008506	31.48	600.84	72.05	1.92	0.017	322.5	329	11.52	18.02
133.75*	18912	298.14	310.72	315.58	326.11	0.00851	31.48	600.72	72.03	1.92	0.017	322.5	329	11.78	18.28
133.125*	18912	297.89	310.47	315.32	325.86	0.008516	31.49	600.61	72.03	1.92	0.017	322.5	329	12.03	18.53
132.5*	18912	297.63	310.2	315.06	325.62	0.008534	31.51	600.19	72	1.92	0.017	322.5	329	12.3	18.8
131.875*	18912	297.38	309.95	314.81	325.37	0.00854	31.52	600.09	72	1.92	0.017	322.5	329	12.55	19.05
131.25*	18912	297.12	309.68	314.55	325.13	0.008555	31.53	599.72	71.97	1.93	0.017	322.5	329	12.82	19.32
130.625*	18912	296.87	309.43	314.29	324.87	0.008563	31.54	599.6	71.97	1.93	0.017	322.5	329	13.07	19.57
130	18912	296.61	309.17	314.04	324.62	0.008569	31.55	599.48	71.95	1.93	0.017	322.5	329	13.33	19.83
120	18912	296.61	309.19	314.04	324.56	0.008508	31.47	601.04	72.02	1.92	0.017	322.5	322.5	13.31	13.31
110	18912	296.42	309	313.95	324.42	0.008386	31.52	600	70.52	1.9	0.017	322.42	322.42	13.42	13.42
100	18912	296.14	308.51	313.63	324.19	0.008392	31.78	595.14	68.52	1.9	0.017	322.32	322.32	13.81	13.81
98.*	18912	295.8	307.81	313.01	323.93	0.008623	32.22	586.89	67.45	1.93	0.017	322.21	322.21	14.4	14.4

HEC-RAS Output Table

River Section	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (fps)	Flow Area (sq ft)	Top Width (ft)	Froude #	Mann Wtd Total	LOB Elev (ft)	ROB Elev (ft)	L. Freeboard (ft)	R. Freeboard (ft)
96.*	18912	295.46	307.12	312.33	323.67	0.008884	32.65	579.26	66.19	1.94	0.017	322.11	322.11	14.99	14.99
94.*	18912	295.13	306.45	311.56	323.4	0.009187	33.05	572.26	64.84	1.96	0.017	322	322	15.55	15.55
92.*	18912	294.79	305.78	311.06	323.13	0.009544	33.43	565.8	63.43	1.97	0.017	321.9	321.9	16.12	16.12
90	18912	294.45	305.13	310.46	322.85	0.009971	33.78	559.86	62	1.98	0.017	321.79	321.79	16.66	16.66
86.6666*	18912	294.24	306.07	311.25	322.15	0.008195	32.18	587.76	59.83	1.81	0.017	321.7	321.7	15.63	15.63
83.3333*	18912	294.03	305.34	310.15	321.89	0.010198	32.65	579.28	72.08	2.03	0.017	321.61	321.61	16.27	16.27
80	18912	293.82	304.08	309.22	321.56	0.010454	33.55	563.76	60.86	1.94	0.017	321.52	321.52	17.44	17.44
70	18912	293.65	303.3	308.52	321.21	0.011329	33.97	556.75	64.38	2.04	0.017	321.44	321.44	18.14	18.14
66.6666*	18912	293.47	303.17	308.34	320.87	0.011125	33.77	560.09	64.38	2.02	0.017	321.08	321.08	17.91	17.91
63.3333*	18912	293.3	303.06	308.16	320.53	0.01091	33.55	563.69	64.38	2	0.017	320.71	320.71	17.65	17.65
60	18912	293.12	302.92	307.98	320.21	0.010726	33.36	566.85	64.38	1.98	0.017	320.35	320.35	17.43	17.43
55.*	18912	292.93	304.28	308.94	319.25	0.008984	31.05	609.02	66.95	1.81	0.017	320.33	320.33	16.05	16.05
50	18912	292.74	302.89	307.61	318.89	0.00954	32.1	589.15	64.38	1.87	0.017	320.3	320.3	17.41	17.41
48.8888*	18912	292.51	302.71	307.38	318.59	0.009517	31.98	591.4	64.95	1.87	0.017	320.27	320.27	17.56	17.56
47.7777*	18912	292.29	302.53	307.17	318.29	0.009495	31.86	593.63	65.52	1.87	0.017	320.24	320.24	17.71	17.71
46.6666*	18912	292.06	313.44	306.94	316.46	0.000917	13.93	1357.9	77.38	0.59	0.017	320.22	320.22	6.78	6.78
45.5555*	18912	291.83	313.49	306.7	316.4	0.000873	13.68	1382.89	77.83	0.57	0.017	320.19	320.19	6.7	6.7
44.4444*	18912	291.61	313.54	306.46	316.34	0.000831	13.44	1407.67	78.26	0.56	0.017	320.16	320.16	6.62	6.62
43.3333*	18912	291.38	313.59	306.24	316.29	0.00079	13.19	1433.67	78.69	0.54	0.017	320.13	320.13	6.54	6.54
42.2222*	18912	291.15	313.64	306.01	316.24	0.000751	12.95	1460.17	79.1	0.53	0.017	320.11	320.11	6.47	6.47
41.1111*	18912	290.93	313.68	305.5	316.19	0.000715	12.72	1486.59	79.51	0.52	0.017	320.08	320.08	6.4	6.4
40	18912	290.7	313.72	304.98	316.15	0.00068	12.49	1514.12	79.93	0.51	0.017	320.05	320.05	6.33	6.33
35.*	18912	290.48	313.29	306.8	316.09	0.000814	13.44	1407.47	80.38	0.57	0.017	320.02	320.02	6.73	6.73
30	18912	290.27	313.75	303.86	315.86	0.000577	11.66	1621.42	82.62	0.46	0.017	320	320	6.25	6.25
20	18912	290.07	313.43	303.82	315.82	0.00062	12.41	1524.07	65.24	0.45	0.017	321	321	7.57	7.57
10	18912	289.96	313.44	303.71	315.81	0.000611	12.35	1531.84	65.24	0.45	0.017	321	321	7.56	7.56

This page is intentionally left blank to facilitate 2-sided printing.

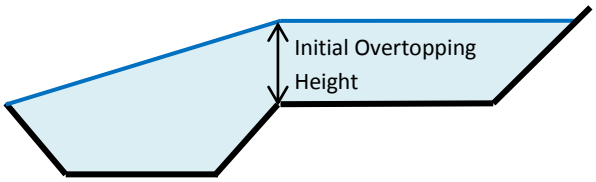
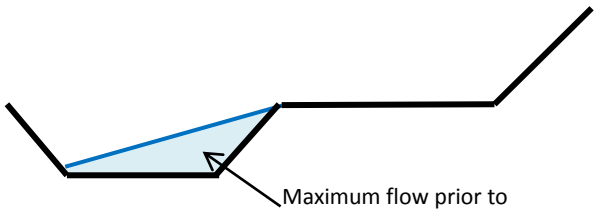
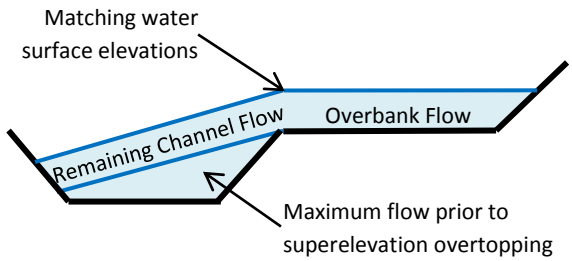
Appendix H

Additional Hydraulic Analyses for Areas of Significant Overtopping

This page is intentionally left blank to facilitate 2-sided printing.

In cases where the anticipated water surface was calculated at 2.5' or higher above the top of the existing channel walls, a separate hydraulic analysis has been performed for the overtopping area in order to analyze how the overtopping flow disperses through the overbank areas. This separate analysis was performed by utilizing LIDAR data to identify a typical overbank cross section, then running a mixed steady flow analysis for the anticipated overtopping flow in this area. It is felt that this additional analysis will produce more realistic flood delineations in overtopping areas that are characterized by low lying overbank areas and significant overtopping heights. A summary of this analysis is included in Table 1 below.

Table 1: Steps for Additional Hydraulic Analysis

a) Initial Overtopping Results 	Initially, superelevation results were determined per Section C-3 of the LACFCD Hydraulic Design Manual. Criteria set forth in this manual are intended for use in the design of a channel that fully contains stormwater flows and may not accurately depict the superelevation characteristics of a channel that is experiencing overtopping such as the Arroyo Seco Channel. In an effort to model the effects of overtopping superelevation, the steps below are followed.
b) Maximum Fully Contained Flow 	The maximum flow rate that can be fully contained within the channel was determined by assuming progressively smaller flow rates within the curve, applying appropriate superelevation calculations to these smaller flow rates, and then identifying the maximum flow that can be completely accommodated within the channel. When the curve experiences a flow rate greater than this maximum determined flow rate, some portion of the additional flow will begin to flow in the overbank area.
c) Actual Flow within Curve and Overbank 	In order to determine what portion of the overtopping flow will flow in the overbank area, a typical cross section of the overbank area was defined within HEC-RAS and a mixed steady flow analysis for an assumed overbank flow rate was executed. The water surface elevation generated by this mixed steady flow analysis was then compared to the water surface elevation generated by the superelevation calculations of the remaining flow within the channel curve. Several iterations of Channel vs Overbank flow rates were performed until the overbank water surface elevations matched the superelevated water surface of the channel curve.

While this report has identified and discussed 13 different areas of concern, only 4 of these areas have an anticipated overtopping height of 2.5’ or more above the top of the existing channel walls. These areas are identified as Areas of Concern 8, 9, 10, and 12. A brief discussion of these areas of concern is included below and more detailed calculations are included in the pages that follow.

Area of Concern 8 experiences significant channel overtopping of more than 2.5’ due to superelevation effects from Curves #14, 15, and 16.

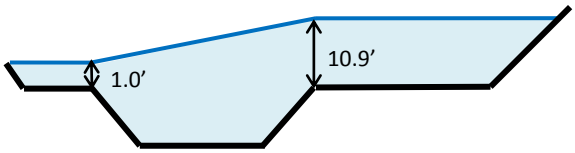
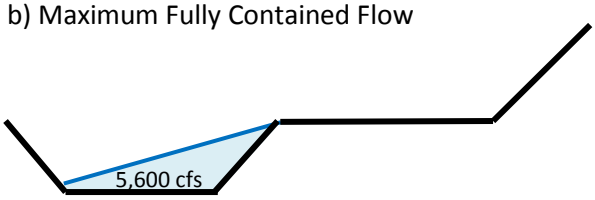
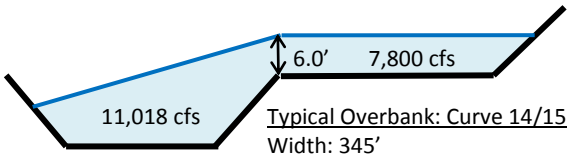
Area of Concern 9 experiences significant channel overtopping of more than 2.5’ due to superelevation effects from Curve #17.

Area of Concern 10 experiences significant channel overtopping of more than 2.5’ due to superelevation effects from Curve #18.

Area of Concern 12 experiences significant channel overtopping of more than 2.5’ due to superelevation effects from Curve #24 as well as a hydraulic jump experienced within Curve #24.

Area of Concern 8 - Curves 14 & 15: Additional Hydraulic Analysis

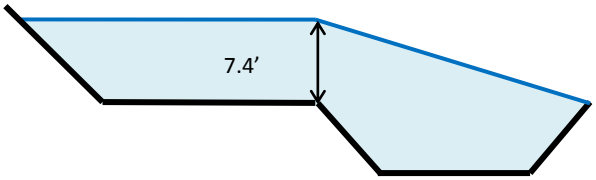
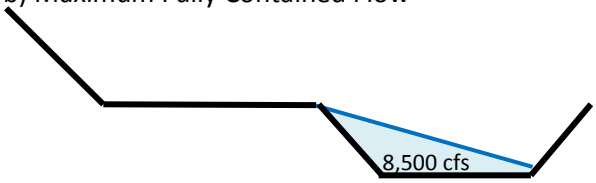
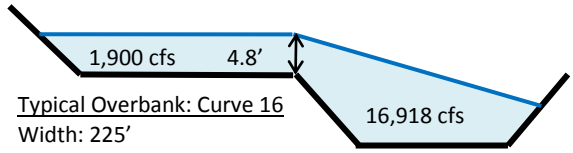
Curves 14 and 15 are in the same direction and immediately adjacent to one another. Given that superelevation effects extend upstream and downstream from the actual curve locations, superelevation effects from these curves is combined utilizing the curve data from Curve 14 as it produces higher superelevation values.

a)Initial Overtopping Results  	Calculations per Section C-3 of the LACFCD Hydraulic Design Manual indicate an initial superelevation height of 10.2' resulting in a water surface elevation that is 10.9' above the top of the right channel bank. Additional channel overtopping of 1.0' along the left channel bank is anticipated due to a reduction in flow velocity in this location.
b) Maximum Fully Contained Flow  	The maximum flow rate that can be fully contained within this section of channel with no overtopping is 5,600 cfs.
c) Actual Flow within Curve & Overbank  <u>Typical Overbank: Curve 14/15</u> Width: 345' Cross Slope: 2.3% Longitudinal Slope: 1.9% Manning's "n": 0.04	During the Capital Storm Event, it is anticipated that stormwater flows will overtop the channel at this curve and water surface elevations between the channel and the overbank will equalize at 6.0' above the top of the channel, resulting in a channel flow rate of 11,018 cfs and a right overbank flow rate of 7,800 cfs. Additionally, because there is now less flow within the channel curve at this location (11,018 cfs), the left bank of the channel is no longer overtopped.

Calculations for Overtopping Flow at Curves 14 & 15: $S_{max}=1.3V^2(b+2zD)/gr$

Variable	Initial Overtopping Results	Maximum Fully Contained Flow	Actual Flow within Curve	Actual Flow in Overbank
Length of Curve (L) in feet	125	125	125	-
Radius of Curve (R) in feet	320	320	320	-
Velocity in Curve (V) in fps	27.6	23.1	26.3	-
Top Width (T) in feet	106.3	91.3	91.3	-
From STA	2100	2100	2100	-
To STA	1976	1976	1976	-
Flow Rate (Q) in cfs	18,818	5,600	11,018	7,800
Superelevation Direction	Right	Right	Right	-
Superelevation Height (ft)	10.2	6.1	7.9	-
Minimum Available Freeboard Within Curve (ft)	-0.7	6.1	1.9	-
Minimum Available Freeboard Within Curve after Effects of Superelevation (ft)	-10.9	0.0	-6.0	-6.0

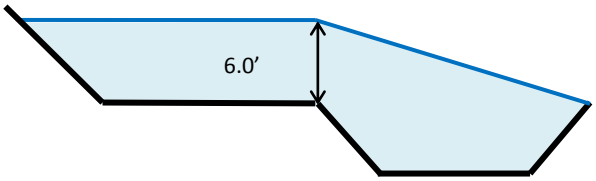
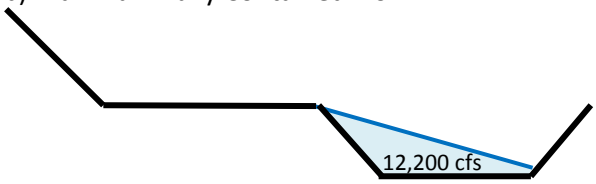
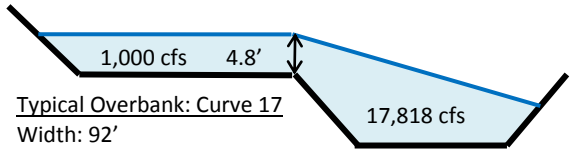
Area of Concern 8 - Curve 16: Additional Hydraulic Analysis

a) Initial Overtopping Results 	Calculations per Section C-3 of the LACFCD Hydraulic Design Manual indicate an initial superelevation height of 10.8', resulting in a water surface elevation that is 7.4' above the top of the left channel bank.
b) Maximum Fully Contained Flow 	The maximum flow rate that can be fully contained within this section of channel with no overtopping is 8,500 cfs.
c) Actual Flow within Curve & Overbank  Typical Overbank: Curve 16 Width: 225' Cross Slope: 4.4% Longitudinal Slope: 1.3% Manning's "n": 0.04	During the Capital Storm Event, it is anticipated that stormwater flows will overtop the channel at this curve and water surface elevations between the channel and the overbank will equalize at 4.8' above the top of the channel, resulting in a channel flow rate of 16,918 cfs and a left overbank flow rate of 1,900 cfs.

Calculations for Overtopping Flow at Curve 16: $S_{max}=1.3V^2(b+2zD)/gr$

Variable	Initial Overtopping Results	Maximum Fully Contained Flow	Actual Flow within Curve	Actual Flow in Overbank
Length of Curve (L)	125	125	125	-
Radius of Curve (R)	320	320	320	-
Velocity in Curve (V)	30.7	26.1	30	-
Top Width (T)	91	77.5	77.5	-
From STA	1970	1970	1970	-
To STA	1930	1930	1930	-
Flow Rate (Q)	18,818	8,500	16,918	1,900
Superelevation Direction	Left	Left	Left	-
Superelevation Height	10.8	6.6	8.8	-
Minimum Available Freeboard Within Curve	3.4	6.6	4.0	-
Minimum Available Freeboard Within Curve after Effects of Superelevation	-7.4	0.0	-4.8	-4.8

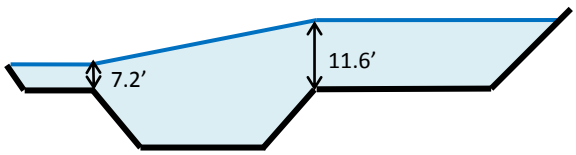
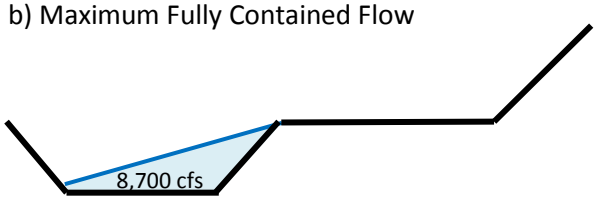
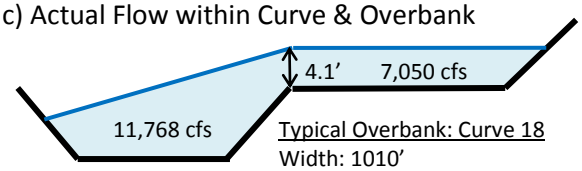
Area of Concern 9 - Curve 17: Additional Hydraulic Analysis

a) Initial Overtopping Results 	Calculations per Section C-3 of the LACFCD Hydraulic Design Manual indicate an initial superelevation height of 5.5', resulting in a water surface elevation that is 6.0' above the top of the left channel bank.
b) Maximum Fully Contained Flow 	The maximum flow rate that can be fully contained within this section of channel with no overtopping is 12,200 cfs.
c) Actual Flow within Curve & Overbank  Typical Overbank: Curve 17 Width: 92' Cross Slope: 6.7% Longitudinal Slope: 0.8% Manning's "n": 0.04	During the Capital Storm Event, it is anticipated that stormwater flows will overtop the channel at this curve and water surface elevations between the channel and the overbank will equalize at 4.8' above the top of the channel, resulting in a channel flow rate of 17,818 cfs and a left overbank flow rate of 1,000 cfs.

Calculations for Overtopping Flow at Curve 17: $S_{max}=1.3V^2(b+2zD)/gr$

Variable	Initial Overtopping Results	Maximum Fully Contained Flow	Actual Flow within Curve	Actual Flow in Overbank
Length of Curve (L)	270	270	270	-
Radius of Curve (R)	520	520	520	-
Velocity in Curve (V)	27.7	24.6	27.2	-
Top Width (T)	92.8	85.0	85.0	-
From STA	1807	1807	1807	-
To STA	1760	1760	1760	-
Flow Rate (Q)	18,818	12,200	17,818	1,000
Superelevation Direction	Left	Left	Left	-
Superelevation Height	5.5	4.0	4.9	-
Minimum Available Freeboard Within Curve	-0.5	4.0	0.1	-
Minimum Available Freeboard Within Curve after Effects of Superelevation	-6.0	0.0	-4.8	-4.8

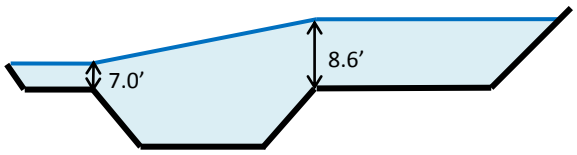
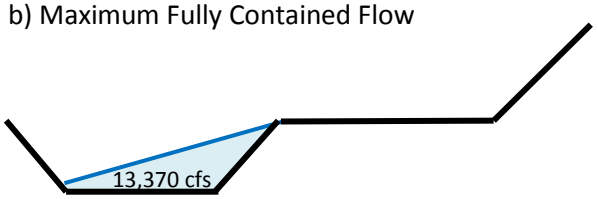
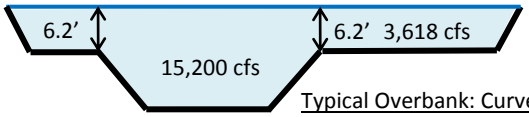
Area of Concern 10 - Curve 18: Additional Hydraulic Analysis

a) Initial Overtopping Results  	Calculations per Section C-3 of the LACFCD Hydraulic Design Manual indicate an initial superelevation height of 11.6', resulting in a water surface elevation that is 16.7' above the top of the channel. Additional channel overtopping of 7.2' along the left channel bank is anticipated due to a hydraulic jump experienced within Curve 18.
b) Maximum Fully Contained Flow  	The maximum flow rate that can be fully contained within this section of channel with no overtopping is 8,700 cfs.
c) Actual Flow within Curve & Overbank  Typical Overbank: Curve 18 Width: 1010' Cross Slope: Varies Longitudinal Slope: 1.5% Manning's "n": 0.04	During the Capital Storm Event, it is anticipated that stormwater flows will overtop the channel at this curve and water surface elevations between the channel and the overbank will equalize at 4.1' above the top of the channel, resulting in a channel flow rate of 11,768 cfs and a right overbank flow rate of 7,050 cfs. Additionally, because there is now less flow within the channel curve at this location (11,768 cfs), there is now no hydraulic jump in this location and the left bank of the channel is no longer overtopped.

Calculations for Overtopping Flow at Curve 18: $Smax=1.3V^2(b+2zD)/gr$

Variable	Initial Overtopping Results	Maximum Fully Contained Flow	Actual Flow within Curve	Actual Flow in Overbank
Length of Curve (L)	305	305	305	-
Radius of Curve (R)	250	250	250	-
Velocity in Curve (V)	27.7	22.6	24.6	-
Top Width (T)	93.4	80.7	80.7	-
From STA	1740	1740	1740	-
To STA	1690	1690	1690	-
Flow Rate (Q)	18,818	8,700	11,768	7,050
Superelevation Direction	Right	Right	Right	-
Superelevation Height	11.6	6.6	7.9	-
Minimum Available Freeboard Within Curve	-5.1	6.6	3.8	-
Minimum Available Freeboard Within Curve after Effects of Superelevation	-16.7	0.0	-4.1	-4.1

Area of Concern 12 - Curve 24: Additional Hydraulic Analysis

a) Initial Overtopping Results  	Calculations per Section C-3 of the LACFCD Hydraulic Design Manual indicate an initial superelevation height of 1.6', resulting in a water surface elevation that is 8.6' above the top of the right channel bank. Prior to the effects of superelevation, channel overtopping along the left and right channel banks is anticipated due to a hydraulic jump occurring in this location. This hydraulic jump is anticipated to produce channel overtopping 7.0' above the top of the left channel bank.
b) Maximum Fully Contained Flow  	The maximum flow rate that can be fully contained within this section of channel with no overtopping is 13,370 cfs.
c) Actual Flow within Curve & Overbank  Typical Overbank: Curve 24 Width: 280' Cross Slope: 2.1% Longitudinal Slope: 2.8% Manning's "n": 0.04	During the Capital Storm Event, it is anticipated that stormwater flows will overtop the channel at this curve and water surface elevations between the channel and the overbank will equalize at 6.2' above the top of the channel, resulting in a channel flow rate of 15,200 cfs and a right overbank flow rate of 3,618 cfs.

Calculations for Overtopping Flow at Curve 24: $S_{max}=1.15V^2(b+2zD)/2gr$ for reduced flows $S_{max}=1.3V^2(b+2zD)/gr$

Variable	Initial Overtopping Results	Maximum Fully Contained Flow	Actual Flow within Curve	Actual Flow in Overbank
Length of Curve (L)	135	135	135	-
Radius of Curve (R)	525	525	525	-
Velocity in Curve (V)	22.2	26.8	20.7	-
Top Width (T)	98	74.7	74.7	-
From STA	1400	1400	1400	-
To STA	1350	1350	1350	-
Flow Rate (Q)	18,818	13,370	15,200	3,618
Superelevation Direction	Right	Right	Right	-
Superelevation Height	1.6	4.1	2.5	-
Minimum Available Freeboard Within Curve	-7.0	4.1	-3.7	-
Minimum Available Freeboard Within Curve after Effects of Superelevation	-8.6	0.0	-6.2	-4.3

**Initial overtopping results in this area use subcritical superelevation calculations because flow through the entire curve is subcritical. However, as flow within the channel curve is reduced to account for flow within the overbank area, a portion of the channel curve becomes supercritical so supercritical superelevation calculations are utilized for reduced flow rate calculations above. These calculations are performed with the intention of balancing the channels superelevated water surface with the overbanks water surface; however, due to a large hydraulic jump occurring in the channel at approximately 15,200 cfs, the water surfaces were unable to be equalized. As the water surface elevation generated by the hydraulic jump within the channel is greater than the calculated overbank water surface elevation, the hydraulic jump water surface elevation (6.2' above the top of the channel) will be applied to the overbank area to be conservative.

This page is intentionally left blank to facilitate 2-sided printing.

Appendix I

Electronic Information (CD)

This page is intentionally left blank to facilitate 2-sided printing.