IDOT HYDRAULIC REPORT

PROJECT SITE:

ST. CHARLES ROAD BRIDGE OVER SALT CREEK

VILLA PARK, DUPAGE COUNTY, ILLINOIS

PREPARED FOR:

VILLAGE OF VILLA PARK
20 S. ARDMORE AVENUE
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PREPARED BY:

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10-04-16

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Project Description

The purpose of this report is to document the hydraulic analysis and waterway information for the St. Charles Road Bridge over Salt Creek located in the Village of Villa Park and the City of Elmhurst, DuPage County, Illinois. This study provides analysis of the existing, natural and proposed hydraulic conditions at the bridge.

The proposed project consists of replacing the St. Charles Road bridge superstructure and the adjacent roadway approach pavement.

Site Specific Information

St. Charles Road over Salt Creek is a five lane roadway located just west of Route 83 in the Village of Villa Park and the City of Elmhurst within DuPage County (sections 3 and 10, T39N, R11E; Elmhurst quadrangle) See Exhibits 1 and 2. The existing Bridge No. 022-6950 is a 3 span concrete deck beam bridge supported by two abutments and two piers. The bridge was widened in 1977. The existing bridge is 68' long and spans 113'. There is an existing concrete pedestrian path that runs under the eastern span.

Salt creek flows from north to south under St. Charles Road through the bridge. There is a bridge located about 285 feet downstream of St. Charles Road that carries the pedestrian path over Salt Creek. This is a 2 span bridge. There is an additional bridge located about 680 feet downstream of St. Charles road that conveys Route 83 over Salt Creek. This is a 3 span bridge. There are no existing bridges or culverts 1000 feet upstream of the St. Charles Road Bridge.

No wetlands are identified in the project area on the National Wetlands Inventory (NWI) Map (see Exhibit 3) however one lake/pond with wetland fringe is identified within the project area on the DuPage County Wetlands Map (see Exhibit 4). A Wetland Delineation and Assessment Report, dated October 8, 2015 and prepared by V3 Companies, was prepared for the project. One Waters of the U.S./Waters of DuPage (Area 1, see Exhibit 5) was delineated within the project area. Area 1 (~0.51 acres on-site, continues off-site to the north and south) is located in the center of the project area and consists of Salt Creek, a Waters of the U.S/Waters of DuPage. In V3's professional opinion, Area 1 is a non-HQAR Waters of the U.S./Waters of DuPage subject to US Army Corps of Engineers (USACE) jurisdiction. No wetland areas were identified within 100-feet of the subject property per the DuPage County Ordinance. The delineated wetland boundary for Area 1 was field verified by Ms. Jenna Fahey of the DuPage County Stormwater Management Commission (SMC) on November 2, 2015. As part of the wetland delineation assessment, Illinois Department of Natural Resources (IDNR) and US Fish and Wildlife Service (USFSW) threatened and endangered species evaluations were conducted. The IDNR confirmed that the Illinois Natural Heritage Database contains no record of State-listed threatened or endangered species, Illinois Natural Area Inventory sites, dedicated Illinois Nature Preserves, or registered Land and Water Reserves in the vicinity of the project location.

The FEMA Flood Insurance Rate Map (FIRM) (Exhibit 6) shows flood zones AE and X throughout the project area associated with Salt Creek. The DuPage County Regulatory Flood Map (RFM), Exhibit 7, shows floodway areas and special flood hazard areas in the center and eastern portion of the project area associated with Salt Creek.

The USGS Hydrologic Atlas (Exhibit 8) shows the presence of Salt Creek throughout the project area. The 12-Digit Hydrologic Unit Code (HUC) Map (Exhibit 9) shows that the

subject property lies within the Lower Salt Creek sub watershed, which is associated with the larger Des Plaines River watershed.

Three soil series were mapped within the subject property by the Natural Resources Conservation Service (Exhibit 10). These soils include Orthents, clayey, undulating (805B), Markham-Ashkum-Beecher complex (854B), and Sawmill silty clay loam (3107A). The 805B soil is classified as hydrologic soil group D, while soils 3107A and 854B are classified as hydrologic soil group C.

Upstream (north) of the St. Charles Road Bridge to the limits of the study area the ground cover is vegetated with dense tree cover adjacent to the creek. West of this vegetation are residential areas and to the east are commercial properties. Downstream of the bridge the existing ground cover is primarily heavy vegetation directly adjacent to the stream. A residential area is located to the west and a park area is south and east with mowed grass. See Aerial Map Exhibit 11.

Historical Observations/Records

The Floodplain Mapping Report for Lower Salt Creek dated November 2011 contains a surveyed high water mark elevation just downstream of the St. Charles Road Bridge for the September 2008 flood event of 666.26 NAVD 88 (666.54 NGVD 29). The high water mark was surveyed at Rotary Park at the end of Wildwood Street (see Exhibit 1). This is somewhat consistent with the USGS Hydrologic Atlas which shows a flood elevation of approximately 665 NGVD 29 at the crossing.

Additionally, USGS gage data is available for the April 2013 flood event. Extrapolating from the downstream Elmhurst gage the high water level at the St. Charles Road bridge is estimated at about 666.74 (NAVD 88). The gage data used can be found within Section 3.

With an existing roadway overtopping elevation of 668.55 (outside the floodplain limits), the road was not overtopped during the April 2013 or the September 2008 flood events.

This structure does not appear to be a source of demonstrable flooding based on the information available at the time of this report. Both the Village of Villa Park and the City of Elmhurst have provided letters stating that the existing structure is not a source of flood damage, see items 4 and 5 in Section 4).

Datum Correlation

Survey information for St. Charles Road, the existing bridge, bounding cross sections, and the streambed profile were obtained for this analysis. The survey was completed on the North American Vertical Datum of 1988 (NAVD 88).

The DuPage County gage data, the Regulatory Floodplain Mapping Report and Documentation For Lower salt Creek Watershed (FEQ modeling), and likely the 1977 engineering plans for the existing St. Charles Road Bridge over Salt Creek use the National Geodetic Vertical Datum of 1929 (NGVD 29). To compute the conversion factor from NGVD 29 to NAVD 88, the National Geodetic Survey VERTCON program was utilized. According to VERTCON, the conversion factor at St. Charles Road over Salt Creek is approximately -0.28 when converting from NGVD 29 to NAVD88. The existing FEMA Flood Insurance Study was also completed on the NGVD 29 datum.

Sensitive Flood Receptors

There are several residential and commercial buildings located both upstream and downstream of the St. Charles Road Bridge. There is a business (Black Alley Burger) located upstream of the St. Charles Road bridge. It's located north of St. Charles Road and east of Salt Creek. The surveyed top of foundation for this building is 671.58 (see Exhibit 13) while the 500-year water surface elevation (WSEL) at this location is 667.22. Therefore this building is not within the floodplain and is elevated more than 4' above the 500-year WSEL.

The residential buildings located north of St. Charles Road and west of Salt Creek (upstream) are all well outside the floodplain limits.

There is a commercial building (Royal Bridal & Tuxedo) at the southwest corner with a surveyed top of foundation elevation of 670.52 while the 500-year WSEL at that location is 667.25. Therefore, this building is not within the floodplain and is elevated about 3' above the 500-year WSEL. The residential buildings just south of this business also appear to be outside the floodplain limits. Per the 2-foot county topographic information the lowest structure elevation appears to be near 668 while the 100-year elevation in this area is below 667.

There is also a building southeast of the bridge and south of the oval pavement. It has a surveyed top of foundation for this building is 671.98 while the 500-year water surface elevation (WSEL) at this location is 666.74.

There are three commercial buildings located west of Route 83 and south of the pedestrian bridge (see Exhibit 13). There is an isolated regulatory floodplain area at this location. A berm elevation of approximately 669.3 must be exceeded for the Creek flow to enter this area. The surveyed top of foundation elevations for these building are 664.87, 666.19 and 667.00. The 100-year WSEL at this location about 666.11 therefore two of these buildings are elevated above the 100-year profile while the lower one is not (but it is behind the berm). As these buildings are downstream of the St. Charles Bridge therefore this project has no ability to impact the WSEL's in this area.

In summary there are no sensitive flood receptors in the vicinity of the bridge. The 500-year WSEL passes under the low chord of the St. Charles Road Bridge as well as the downstream Greenway Trail Bridge.

Bridge Design Criteria:

According to IDOT design standards, the roadway edge of pavement at the low grade point in a floodplain area shall be a minimum of three feet above the design (50-year) headwater elevation. The edge of pavement at the low grade point of the existing roadway within the Salt Creek floodplain is 671.45 and the design headwater in existing conditions is 666.43 for a freeboard of 5.02 feet which exceeds the 3 feet requirement. Additionally there must be a minimum 2 feet of clearance between the 50-year natural water surface elevation and the low beam elevation. The low beam elevation is 669.27 and the 50-year natural WSEL is 666.30 resulting in a clearance of 2.97' in the existing condition which exceeds the criteria.

Hydrologic Analysis

Discharge rates for the hydraulic modeling were obtained from the Floodplain Mapping Report and Documentation for Lower Salt Creek Watershed prepared by Christopher B. Burke Engineering, Ltd. (CBBEL) for DuPage County and dated November 2011. While this FEQ modeling is not currently the regulatory model, it represents the most up to date modeling and survey information and is currently going through the review process to become the regulatory model. It has been reviewed and approved by IDNR-OWR (see Item 3 in Section 4). The modeling in this report is expected to be the approved regulatory DuPage County model sometime in 2017. We expect that by the time this project is in the Phase 2 process and permits are being applied for, this will be the regulatory model. Portions of this report that are relevant to this study are included under Section 3. The Salt Creek discharge rates at the St. Charles Road Bridge are as follows:

Discharge Rates (cfs)					
2-Yr	10-Yr	50-Yr	100-Yr	200-Yr	500-Yr
994	1484	1852	1994	2071	2303

Hydraulic Analysis

Regulatory Modeling

The HEC-RAS hydraulic modeling used for this analysis is based on the FEQ modeling from the Floodplain Mapping Report and Documentation for Lower Salt Creek Watershed prepared by CBBEL for DuPage County and dated November 2011. While this FEQ modeling is not currently the regulatory model, it represents the most up to date modeling and survey information and is currently going through the review process to become the regulatory model. It has been reviewed and approved by IDNR-OWR (see Item 3 in Section 4). The modeling in this report is expected to be the approved regulatory DuPage County model sometime in 2017. We expect that by the time this project is in the Phase 2 process and permits are being applied for, this will be the regulatory model. Portions of this report that are relevant to this study are included under Section 3.

Existing Conditions

The existing conditions HEC-RAS model represents the best available data for the project area. Surveyed cross-sections were taken at the upstream and downstream faces of the existing St. Charles Road Bridge and the downstream Route 83 Bridge. Additional surveyed stream cross sections were taken 130 feet upstream of St. Charles Road, 400 feet downstream of St. Charles Road and 700 feet downstream of Route 83 to supplement the available FEQ cross-sections. Survey information was also collected for the pedestrian bridge so that it could be added to the model. The cross sections were based on field collected survey and in some cases supplemented with 2-foot topography. Manning's n values were calculated using Cowan's Method and site photographs and a 1:1 contraction and 4:1 expansion ratio was used for the ineffective areas throughout the model.

The starting water surface elevations used in the HEC-RAS model were obtained from the FEQ modeling. The modeling calculations were run with the subcritical flow regime as the channel slope is close to 1% and this flow type will provide the worst case elevations at the structure.

Since this model uses the best available data, it was used to determine the impacts of the project on the flood profiles. HEC-RAS input and output files for Existing Conditions can be found in Section 3.

Natural Conditions
A natural conditions model was created by copying the existing geometry and removing the existing bridge at St Charles Road. The ineffective areas used for contraction and expansion from the bridge opening were removed to account for removal of the bridge.

HEC-RAS input and output files for Natural Conditions can be found in Section 3.

Proposed Conditions
The proposed conditions model was created by copying the existing geometry and modifying the existing St. Charles Road Bridge with the proposed design. The existing piers and abutments will remain in place and the bridge deck will be replaced. The bridge low chord and span widths will remain unchanged in the proposed condition. The bridge length will be extended 1' from 68' to 69' and the roadway profile will be raised between 2 and 4.3 inches.

It should be noted that the top of bridge deck in both the existing and proposed models represent the upstream top of parapet wall where appropriate.

HEC-RAS input and output files for Proposed Conditions can be found in Section 3.

Analysis Results
The Waterway Information Table (Section 1) includes water surface elevations taken at the upstream face of St. Charles Road (cross section 96010.9). In order to gain an overall understanding of the impact of the proposed project, a summary table of the existing and proposed conditions results is included below.

Table 2: HEC-RAS Analysis Results

Cross Section	10-year		50-year		100-year		200-year		500-year	
	Exist	Prop	Exist	Prop	Exist	Prop	Exist	Prop	Exist	Prop
96139.5	665.53	665.53	666.42	666.42	666.72	666.72	666.88	666.88	667.31	667.32
96071.51	665.45	665.45	666.33	666.33	666.63	666.63	666.79	666.79	667.22	667.22
96010.9	665.53	665.53	666.43	666.43	666.74	666.74	666.90	666.90	667.35	667.35
St. Charles Road Bridge										
95911	665.45	665.45	666.34	666.34	666.65	666.65	666.81	666.81	667.25	667.25
95657	665.16	665.16	666.03	666.03	666.32	666.32	666.48	666.48	666.90	666.90
Pedestrian Bridge										
95623	665.17	665.17	666.04	666.04	666.34	666.34	666.49	666.49	666.92	666.92
95562.19	665.02	665.02	665.88	665.88	666.17	666.17	666.32	666.32	666.74	666.74
95497.4	664.97	664.97	665.82	665.82	666.11	666.11	666.27	666.27	666.68	666.68
95294.3	664.91	664.91	665.76	665.76	666.05	666.05	666.20	666.20	666.60	666.60
Route 83 Bridge										
95107	664.83	664.83	665.67	665.67	665.96	665.96	666.11	666.11	666.39	666.39
94618.34	664.47	664.47	665.27	665.27	665.54	665.54	665.68	665.68	666.09	666.09
94390.14	664.39	664.39	665.19	665.19	665.46	665.46	665.60	665.60	666.01	666.01

As seen in the summary table, the proposed St. Charles Road bridge deck replacement has little impact on the Salt Creek profiles upstream of the structure. It has no impact downstream of the structure. Due to the small increase in the bridge length the water surface elevations upstream of the bridge are increased by 0.01' at section 96139.5 for the 500-year event. This increase is so small that it can be considered insignificant.

According to IDOT design standards, the roadway edge of pavement at the low grade point in a floodplain area shall be a minimum of three feet above the design (50-year) headwater elevation. The proposed St. Charles Road low edge of pavement within the floodplain is 671.32 and the proposed design headwater 666.43 for a freeboard of 4.89 feet which exceeds the 3 feet requirement. Additionally there must be a minimum 2 feet of clearance between the 50-year natural water surface elevation and the low beam elevation. The low beam elevation is 669.27 and the 50-year natural WSEL is 666.30 resulting in a clearance of 2.97' which exceeds the 2' criteria.

The proposed 500-year WSEL at the bridge is 667.35 while the bridge low chord is 669.27. Therefore the 500-year storm is conveyed through the bridge with no roadway encroachment or overtopping. The 500-year WSEL is almost 2' below the low chord elevation.

As discussed previously the existing bridge meets all of the applicable design criteria as outlined in Section 1-305 of the IDOT Drainage Manual and therefore the substructure will remain in place. The bridge deck and parapet walls will be replaced in the proposed condition. The 3-span bridge waterway opening will remain the same and the bridge low chord elevation will remain unchanged.

Floodplain Fill Analysis

While there is both regulatory floodway and floodplain designated within the project work limits, there is no proposed fill within the floodway or floodplain. Due to the fact that only the bridge deck and approach pavement is being replaced and the fact that the proposed 100-year WSEL is well below the bridge low chord elevation, there is no floodplain or floodway fill associated with this project. The piers and abutments will remain in place and the bridge waterway opening will not be altered in the proposed condition. With the exception of the proposed scour countermeasures, all of the proposed improvements will occur above the 100-year WSEL. The scour countermeasures will be installed below the existing streambed elevation and will not result in any fill within the floodway.

Scour Analysis

A detailed scour analysis was performed for the St. Charles Road Bridge using the HEC-RAS hydraulic model. The following are the scour depths calculated via the HEC-RAS model for the 100-year and 200-year flood events:

Design Scour Depths (ft)				
	West Abutment	West Pier	East Pier	East Abutment
Q100	9.32	4.74	4.76	6.23
Q200	9.54	4.79	4.81	6.46

The above scour depths translate to the following elevations (NAVD 88):

Design Scour Elevations (ft)				
	West Abutment	West Pier	East Pier	East Abutment
Q100	652.65	649.02	648.66	657.66
Q200	652.43	648.97	648.61	657.43

Scour cross-sections for both the 100-year and 200-year storms, which depict the scour depths in relation to the surveyed bridge cross-section, are included in Section 3. According to the soils report and the IDOT Bridge Manual the existing soils do not qualify for any reduction to these calculated depths. Soil boring B-2 was used for the scour analysis as its located just downstream of the bridge (see geotechnical report in Section 3). Using the upper 1.5 foot of bed material within boring B-2, a D_{50} particle size of 1.1 was used and a D_{95} particle size of 17 was used.

It is generally understood that the equations used to calculate scour depths may be overly conservative and engineering judgement should be used to determine the actual scour potential. To that end we know that a 100-year to 500-year flooding event occurred in April of 2013 for Salt Creek. Gage data is available for this flooding event just downstream of our study area. A professional underwater investigation of the bridge occurred in December of 2014 just 1 year and 8 months after this flooding event. This investigation found some evidence of scour at the bridge. The underwater investigation revealed that a portion of the footing of the west pier was partially exposed by as much as 0.5 to 0.8 feet. The approximate top of footing elevation is 652.72 (NAVD 88) therefore this corresponds to a scour elevation of about 651.92 (versus the calculated elevation of between 648.97 and 649.02). The investigation revealed 2.6' of exposure along a portion of the east pier which results in a scour elevation of 650.12 (versus the calculated elevation of between 648.61 and 648.66).

In order to protect the existing bridge piers from future scour the following scour countermeasures are recommended. Permanent sheet piling will be installed around the perimeter of the western pier and around the west side of the eastern pier. This sheet piling will be installed to a depth of approximately 15 feet. The elevated concrete path between the east pier and east abutment prevents the placement scour countermeasures along the east face of the east pier and makes it unnecessary due to the amount of fill already placed along this face of the pier. A preliminary plan view and elevation sketch of the sheet piling layout and dimensions has been provided in Section 3. A detailed design of the proposed scour countermeasures will be provided in Phase II. Consideration will be given to possibly adding grout or pumped concrete within the sheet piling perimeter.

It should be noted that riprap installation around the piers was also considered as a scour countermeasure however portions of theses piers are constructed on spread footings and excavating adjacent to these footings to install the required 4.8 feet depth (scour depth) of riprap could cause structural instability and was therefore eliminated as an option. Additionally there is typically 5 feet of water within Salt Creek under the bridge that would make excavation difficult.

Permit Requirements

A DuPage County Stormwater Management Permit will likely be required as the proposed bridge deck replacement is within the regulatory floodway / floodplain limits. In addition a wetland area is within the project limits. No stormwater detention will be required however as the new impervious area is less than 25,000 sf.

This project falls under the jurisdiction of the IDNR-OWR Part 3708 rules for Floodway Construction in NE Illinois. IDOT District 1 administers Regional Permits 1 and 2 on behalf of IDNR-OWR. This work falls within the Regional Permit No. 2 guidelines however, due to the fact the proposed bridge deck and approach pavement replacement occurs above the 100-year flood profile, it's likely that no floodway permit will be required for this project. The proposed scour countermeasures will also not result in any fill within the floodway.

A Wetland Delineation and Assessment Report, dated October 8, 2015 and prepared by V3 Companies, has been prepared for this project. One Waters of the U.S./Waters of DuPage (Area 1, see Exhibit 5) was delineated within the project area. Area 1 (~0.51 acres on-site, continues off-site to the north and south) is located in the center of the project area and consists of Salt Creek, a Waters of the U.S/Waters of DuPage. In V3's professional opinion, Area 1 is a non-HQAR Waters of the U.S./Waters of DuPage subject to the U.S. Army Corps of Engineers (USACE) jurisdiction. This wetland will not be impacted by the bridge deck replacement however it will be impacted by the proposed scour countermeasures and therefore a USACE Regional Permit No. 3 will be required.

Conclusion

The existing 3 span bridge, which conveys Salt Creek under St. Charles Road, currently meets all of the IDOT capacity requirements set forth in section 1-305 of the IDOT Drainage Manual. Therefore the existing waterway opening area and bridge low chord will be maintained in the proposed condition. The bridge deck will be replaced in the proposed condition but the existing piers and abutments will remain in place. As a result of the deck replacement water surface elevations upstream of the bridge are not significantly impacted and all of the required clearance and freeboard requirements are exceeded. Furthermore there is no proposed fill in the floodway and scour countermeasures will be installed.

SECTION I

WIT & DATA SHEETS

Illinois Department of Transportation

Bridge Waterway Information Table

Route:	FAU 1397 (St. Charles Road)	Existing SN:	022-6950
Waterway:	Lower Salt Creek	Proposed SN:	022-6950
Section:	15-00094-00-BR	Prepared by:	VAS Date: 8/19/16
County:	DuPage	Checked by:	SRU Date: 9/1/16

Drainage Area = 92.13 square miles

Existing Overtopping Elev. = 671.45 at Sta. 88+36

Proposed Overtopping Elev. = 671.32 at Sta. 88+36

Flood Event	Freq. Yr.	Discharge ft^3/s	Waterway Opening - ft^2		Natural H.W.E. - ft	Head - ft		Headwater Elevation – ft	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
	10	1484	738.36	738.36	665.41	0.12	0.12	665.53	665.53
Design	50	1852	822.27	822.27	666.30	0.13	0.13	666.43	666.43
Base	100	1994	851.14	851.14	666.60	0.14	0.14	666.74	666.74
Scour Design Check	200	2071	888.12	888.12	666.76	0.14	0.14	666.90	666.90
Overtop Existing	--	--	--	--	--	--	--	--	--
Overtop Proposed	--	--	--	--	--	--	--	--	--
Max. Calc.	500	2303	908.77	908.77	667.19	0.16	0.16	667.35	667.35

Datum:

All-Time H.W.E. & Date: 666.26 NAVD (Sept. 2008) ft

Surveyed Normal Water Level: 658.3 ft

10-Year Velocity through Existing Structure = 1.6 ft/s

10-Year Velocity through Proposed Structure = 1.6 ft/s

2-Yr. Flow Rate = 994 ft^3/s

EXISTING STRUCTURE

Type:	Precast prestress concrete deck beam bridge
Length/Width:	113' -1" span / 68' width
# Spans/Cells:	3
Low Chord:	669.27
Skew:	90 (relative to road)
Clearance:	2.97' (low chord - Nat. 50-yr HWE)
Bridge Flow Line:	652.89 (u/s) 652.89 (d/s)
Low E.O.P:	671.45
Freeboard:	5.02' (low eop - Ex 50-yr headwater)
Culvert Inverts:	N/A (u/s) N/A (d/s)

PROPOSED STRUCTURE

Type:	Precast prestress concrete deck beam bridge
Length Of Span:	113' -1" span / 69' width
# Spans:	3
Low Chord:	669.27
Skew:	90 (relative to road)
Clearance:	2.97' (low chord - Nat. 50-yr HWE)
Bridge Flow Line:	652.89 (u/s) 652.89 (d/s)
Low E.O.P:	671.32
Freeboard:	4.89' (low eop - Pr 50-yr headwater)

NOTE: Proposed Structure Details Are Preliminary; Subject To Refinement In TSL Stage.

Municipality	Village of Villa Park
County	DuPage
Road District	One
Other Agency	City of Elmhurst
Project	P-91-313-15
Section	15-00094-00-BR

Illinois Department of Transportation

Preliminary Bridge Design and Hydraulic Report

Route	FAU 1397 (St. Charles Rd)
Stream	Lower Salt Creek
Ex. St. No.	022-6950
Pr. St. No.	022-6950
Prepared by	Vicki Sykes
Agency/Firm	V3 Companies
Date	09/21/2016

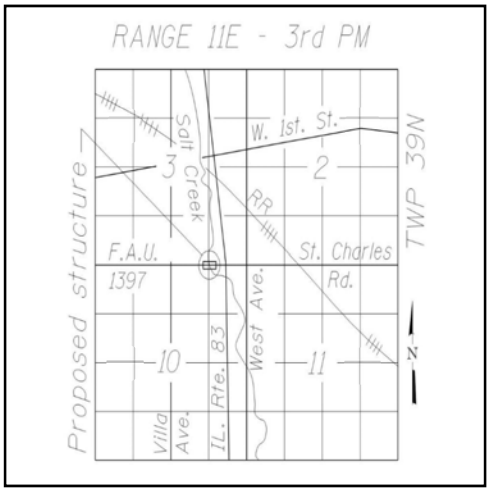
Funding Type: ☐ HBP ☐ STU ☐ STR ☐ Enhancement ☐ TBP ☐ MFT ☐ Non-MFT ☒ Other (STP-BR)

Sufficiency Rating 29.4 Existing clear span length 110.8'

Functionally Obsolete ☐ Yes ☒ No

Structurally Deficient ☒ Yes ☐ No

Range ___ ___, ___PM



Locate bridge accurately above

Construction Information Proposed Letting Date 04/01/2018

Shop Plan Review by ☐ Local Agency ☒ Consultant ☐ State

Fabrication Inspection by ☒ Local Agency ☐ Consultant ☐ State

Approach Roadway Information

Surface Type:	Existing	Asphalt	Proposed	Asphalt
Surface Width:	Existing	53'	Proposed	55'
Shldr to Shldr Width:	Existing	N/A	Proposed	N/A
Elevation of Low Point:	Existing	670.62	Proposed	670.62

Proposed Side Slopes 4:1

Roadway Functional Classification Minor Arterial

DHV 2,300 Current ADT 23,200 Design Year ADT 29,410

% Trucks 3.0 Design Speed 30 m.p.h

3R Design Guidelines Used ☒ Yes ☐ No

Proposed Structure Information

Type of Structure Proposed ☒ Bridge ☐ Culvert ☐ "Standard Plans" Bridge ☐ Pedestrian/Bicycle

Vehicle Design Loading HL-93 Pedestrian/Bicycle Design Loading n/a

Superstructure Type PPC Deck Beams

Structure Length Back to Back Abutments 116'-1" Span Length 36'-11 9/16", 38'-0 1/2", 36'-10 15/16"

Clear Roadway Width 57'-0" Rail Type Concrete w/ railing Crash Tested Rail Required ☐ Yes ☒ No

Wearing Surface Type Concrete Wearing Surface Thickness 5" minimum

Deicing Agents Used ☒ Yes ☐ No

Embankment Slope Under Bridge Yes Proposed Skew Angle 0 Forward on. ☐ Rt. ☐ Lt.

Pier Type Solid concrete wall. Abutment Type Closed Abutment.

Proposed Pile Type n/a

Borings By Everest Engineering Co. Expected Submittal Date for Borings 12/21/2015

Hydraulic Data

Exist. Br. Cr. El. 671.45 @ Sta. 88+36 Prop. Br. Cr. El. 671.32 @ Sta. 88+36

Exist. Low Beam Elev. 669.27 Proposed Low Beam Elev. 669.27

Exist. Freeboard 5.02' Proposed Freeboard 4.89' Streambed Elev. 652.89

Drainage Area 92.13 sq. mi. Crossing Location ☐ Rural ☒ Urban

Crossing Located within a Mapped National Flood Insurance Program Area ☒ Yes ☐ No (Map No. 17043)

Crossing Located within a Northeast Region (District #1) FEMA Mapped Floodway ☒ Yes ☐ No

Crossing Located over designated "Public Bodies of Water" ☒ Yes ☐ No

Design Flood Data

Design Flood Frequency 50 Design Discharge 1852 Design High Water Elev. 666.30

Exist. Br. Opening 822.27 sf Exist. Over-the-Road n/a

Prop. Br. Opening 822.27 sf Prop. Over-the-Road n/a

100 Year Flood Data

100 Year Discharge 1994 100 Year High Water Elev. 666.60

Exist. Br. Opening 851.14 Exist. Over-the-Road n/a Exist. Created Head 0.14

Prop. Br. Opening 851.14 Prop. Over-the-Road n/a Prop. Created Head 0.14

BLR 10210 (Rev. 11/06)

If proposed structure and over-the-road area will not carry entire flow, state kind and area of additional waterway
n/a

Type of Streambed soil Sand & gravel over clay. Will drift or ice permit pier in channel ? ☒ Yes ☐ No
Has scour occurred at or near existing structure ? ☒ Yes ☐ No; If yes, reason for scour No existing scour protection at the piers and flow from 78" pipe outfall within the west abutment.

Comments on hydraulic adequacy of existing structure The 500-year storm is conveyed under the low beam elevation. The existing bridge has adequate capacity to conevry the 50 & 100-year storm events with the required freeboard.

Has the existing structure been the cause of demonstrable flood damage to adjacent property? ☐ Yes ☒ No
If yes, describe damage

Comments on the hydraulic adequacy of upstream and downstream structures and their comparable relationship to the proposed structure There are no existing structures within 1000' upstream of the St. Charles Road Bridge. There are 2 structures downstream, a pedestian bridge loacted 285' downstream and the Rt. 83 bridge 680' down stream. Both downstream bridges convey the 100-yr storm without overtopping.
Will houses, places of business or valuable property be affected by backwater from the proposed bridge? ☐ Yes ☒ No
If yes, describe property and effect of backwater

Is any channel excavation beyond that required to construct the substructure required in the channel? ☐ Yes ☒ No
If yes, describe extent of channel excavation

Will a channel realignment be required? ☐ Yes ☒ No (If yes, attach Channel Change Sketch)
Are stream flow data (gaging station or flood study) available for the stream at or near the proposed site? ☒ Yes ☐ No
(If yes, attach an analysis of the stream flow data)
Provide information regarding high water from other streams, reservoirs, flood control projects, proposed channel changes, strip mine areas or other controls affecting the hydraulic or hydrologic properties of the crossing site n/a

Scour Analysis
Was a HEC-18 scour analysis performed? ☒ Yes ☐ No
Were all substructure units being utilized evaluated to consider the effect of anticipated scour? ☒ Yes ☐ No
Will scour protection or corrective actions be required? ☒ Yes ☐ No
If yes, describe protection or corrective actions. Sheet piling will be installed around each pier to an approximate depth of 15 feet with the exception of the east side of the easern pier. Additionally grout or pumped concrete may be added between the piers and the sheet piling.

Attachments (Check those items below that are included.)
- ☒ Reproduction of applicable portion of USGS quadrangle showing locations of proposed bridge and properties affected by backwater caused by the proposed structure
- ☒ Cross sections as required by WSPRO including floodplain above high water elevation
- ☒ Streambed profile
- ☒ Profile of existing and proposed roadway across floodplain
- ☒ Hydraulic calculations
- ☐ Joint Application Form for construction permit submittals (Joint Form NCR-426)
- ☒ Waterway sketch
- ☐ Channel change sketch
- ☐ Applicable certification(s)
- ☒ Boring data
- ☒ Scour analysis/evaluation
- ☐ Other

Illinois Department of Transportation

Permit Summary for Floodway Construction in Northeast Illinois

Applicant Agency:	Village of Villa Park	County:	DuPage
Route:	FAU 1397 (St. Charles Road)	Stream:	Salt Creek
Section:	15-00094-00-BR	SN:	022-6950

General Description: The existing bridge deck and approach pavement will be replaced. The proposed bridge low chord and waterway opening will remain the same as existing. The 500-yr WSEL is below the bridge low chord therefore the deck replacement and roadway work will occur above the 100-yr flood profile. Scour countermeasures will be installed along the channel bottom.
Existing Facility: 3 span precast prestressed concrete deck beam bridge with cantilevered wall abutments. 113' bridge length (span) and 68' bridge width.

Proposed Improvement: Deck replacement and approach pavement reconstruction, piers and abutments to remain in place. Bridge width will be widened from 68' to 69' and roadway profile will be raised approximately 4".

1. Is the proposed work classified as repairs such as deck replacement, pavement resurfacing, or the armoring or filling of a scour hole? ☒ Yes ☐ No

2. Does the proposed work only consist of modifications to the existing structure which will occur above the regulatory 100-year flood profile? ☒ Yes ☐ No

Note: If the answer to question 1 or 2 is yes, no permit is required and questions 3 through 12 may be omitted.

3. Does the proposed work below the regulatory 100-year flood profile consist of widening of the existing structure by 12 feet or less? ☐ Yes ☐ No

Note: If yes, Regional Permit No. 2 applies and questions 4 through 9 may be omitted.

4. Is the proposed improvement, including the approach roadway, more restrictive to normal and flood flows than the existing structure? ☐ Yes ☐ No

5. Is a Channel Modification proposed? ☐ Yes ☐ No

6. Are there any buildings or structures located upstream in the 100-year floodplain within the influence of the structure backwater? ☐ Yes ☐ No

   6a. If no, does the backwater of the proposed improvement exceed the backwater of the existing structure by more than 0.1 foot? ☐ Yes ☐ No

   6b. If yes, does the proposed backwater exceed the natural high water elevation by more than 0.1 foot? ☐ Yes ☐ No

7. Are transitions required for this project? ☐ Yes ☐ No

8. Is the flood profile at the project site impacted by backwater from a downstream receiving stream? ☐ Yes ☐ No

   If yes, list frequency of starting elevation for analysis:

9. Is backwater from a downstream structure affecting the flood profile at the project site? ☐ Yes ☐ No

9a. Was the existing downstream structure used in the analysis for determining flood profile at the project site? years? (Attach documentation) ☐ Yes ☐ No

9b. Is the downstream structure scheduled for improvement in the next 5 ☐ Yes ☐ No

9c. Was the proposed downstream improvement used in the analysis? ☐ Yes ☐ No

10. Is a floodway map change required due to the proposed project? ☐ Yes ☐ No

11. Will fill or material be placed in the floodway due to the proposed work? ☐ Yes ☐ No

11a. If yes, is compensatory storage provided at the project location? (Attach a copy of completed Attachment A) ☐ Yes ☐ No

11b. If the answer to 11a is no, is compensatory storage provided at another location? If yes, give location and attach a copy of completed Attachment A. ☐ Yes ☐ No

11c. Has compensatory storage relief been granted? (Attach Documentation) ☐ Yes ☐ No

12. Coordination based on Memorandum of Agreement has occurred with Agency(ies) (Attach documentation):. ☐ Yes ☐ No

---

All engineering analysis has been performed by me or under my direct supervision.

Signature: Shawna Ulbrich IL/P.E. #: 062.060451

Date: 9-30-2016 P.E. Expiration Date: November 30, 2017

FOR DEPARTMENTAL USE ONLY

Is a permit required for this project? ☐ Yes ☐ No

If yes, specify type of permit: ☐ Floodway, ☐ Regional 1, ☐ Regional 2

Permit Summary
(Attachment A - Compensatory Storage)

Part of Permit Summary for Floodway Construction in Northeast Illinois:

☒ Phase I (Preliminary) ☐ Phase II (Final)

Applicant Agency:	Village of Villa Park	County:	DuPage
Route:	FAU 1397 (St. Charles Road)	Stream:	Salt Creek
Section:	15-00094-00-BR	SN:	022-6950

Provide the following information for Item 11:

a. Flood Water Elevations (Natural): 100-year 666.00 ft. 10-year 665.41 ft.
Normal 658.3 ft.

b. Determine the amount of fill or material being placed in the floodway:

1. Between the 100-year and 10-year flood elevation 0.0 cu. yds.
2. Between the 10-year and normal water elevation 0.0 cu. yds.

c. Determine the volume being provided to compensate for above item b:
(i.e. from structures removal, excavation, etc.)

1. Between the 100-year and 10-year flood elevation 0.0 cu. yds.
2. Between the 10-year and normal water elevation 0.0 cu. yds.

d. Mark on the exhibits the location and amount of compensatory storage to be excavated. Also show the location of floodway and floodplain boundaries. (Include a set of plans and cross sections)

Attach copy of calculations and Exhibit(s) reflecting the above finding.

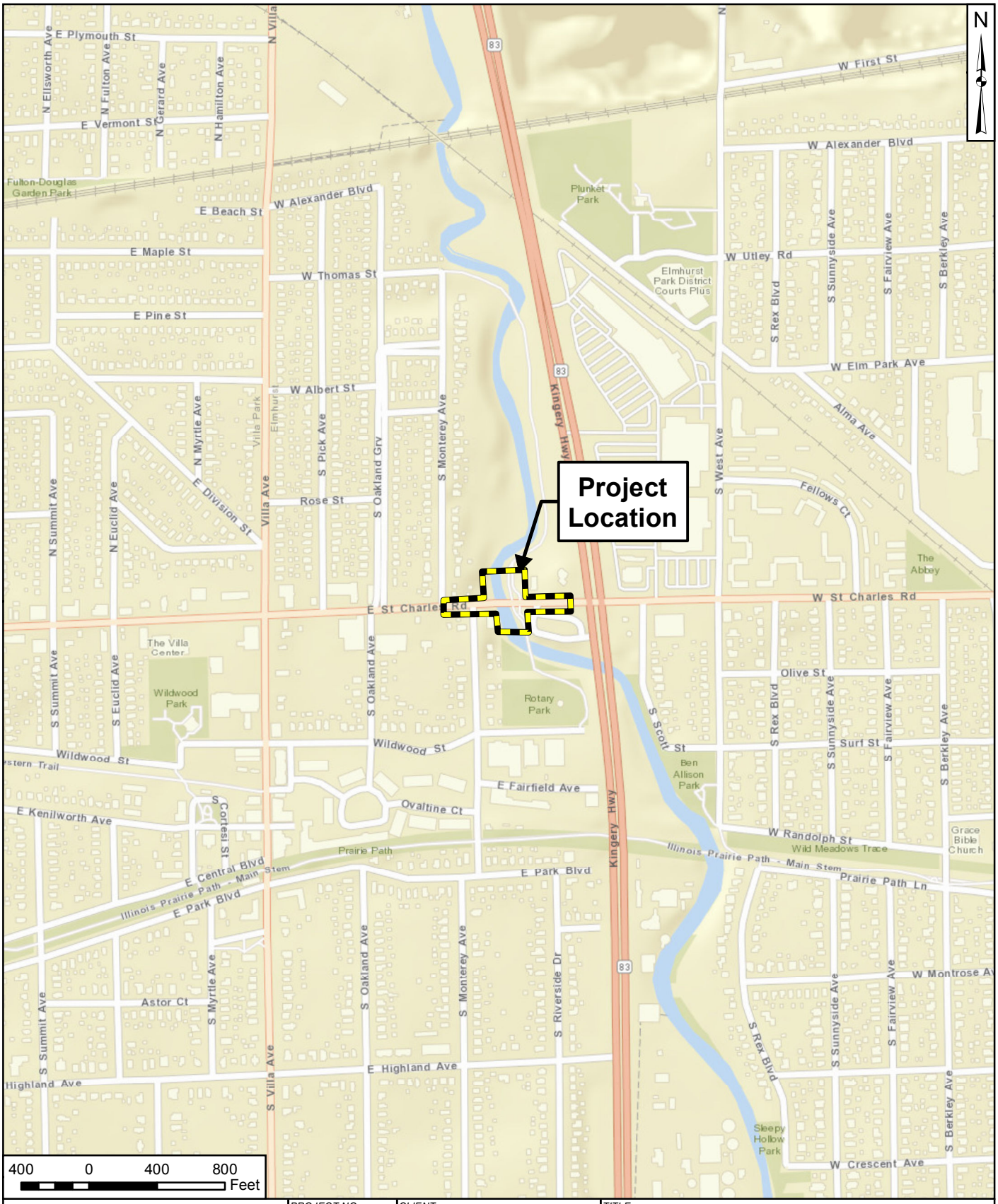
All engineering analysis has been performed by me or under my direct supervision.

Signature: Shauna Ulbach IL/P.E. #: 062.060451

Date: 9-30-16 P.E. Expiration Date: November 30, 2017

SECTION II

EXHIBITS



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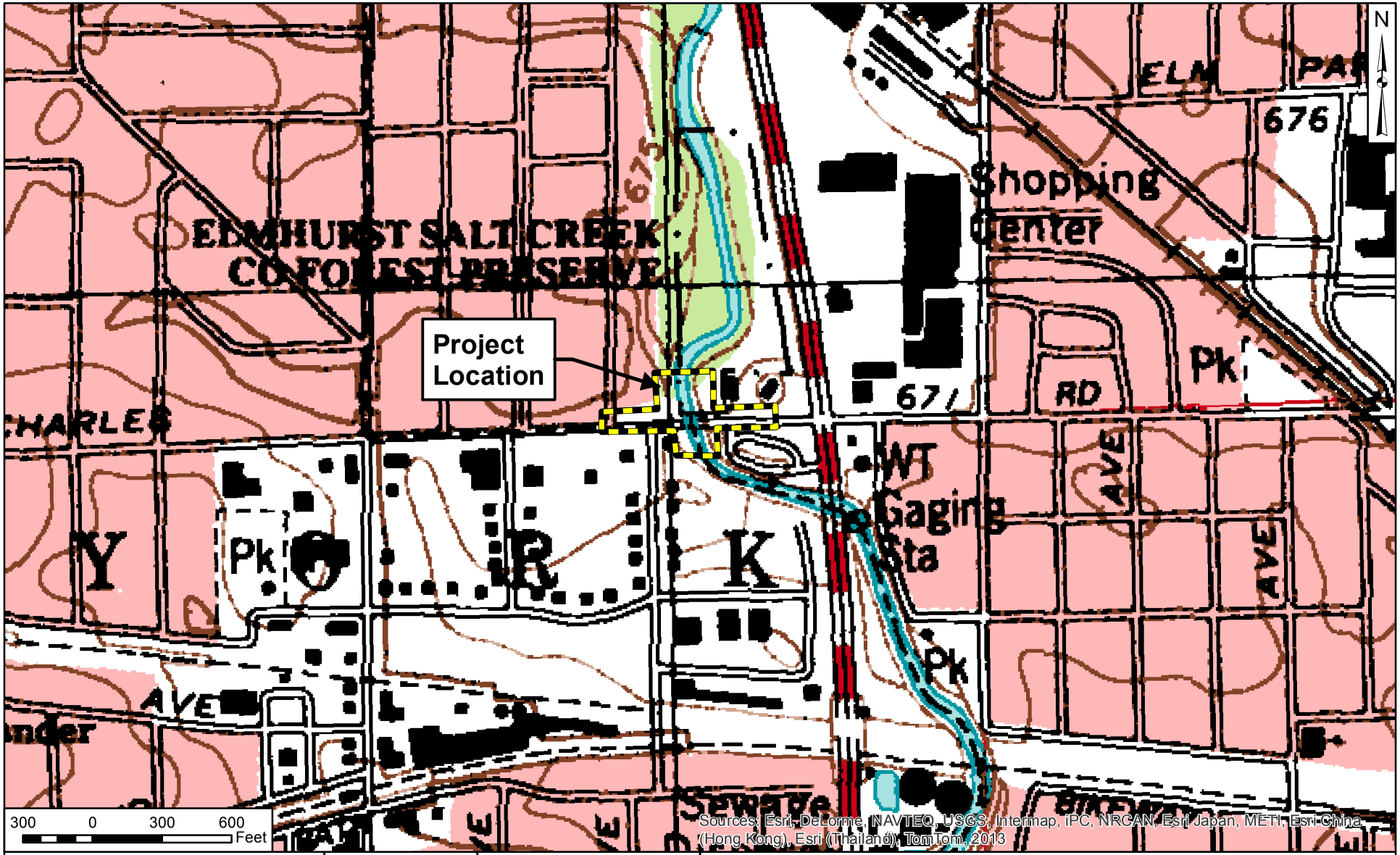
PROJECT NO.:	15228
CREATED BY:	AMM
DATE:	10/08/15
SCALE:	See Scale Bar
CLIENT:	Village of Villa Park 20 S. Ardmore Avenue Villa Park, Illinois 60181
BASE LAYER:	ESRI World Street Map
TITLE:	**PROJECT LOCATION MAP**
SITE:	St. Charles Road Bridge Over Salt Creek Villa Park, Illinois
FIGURE:	1

E:\2015\15228\Drawings\ArcGIS\Storm\Location Drainage Study\FIG1loc15228.mxd



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PROJECT NO.:	15228
CREATED BY:	BAO
DATE:	08/31/16
SCALE:	See Scale Bar

CLIENT:
Village of Villa Park
20 S. Ardmore Avenue
Villa Park, Illinois 60181

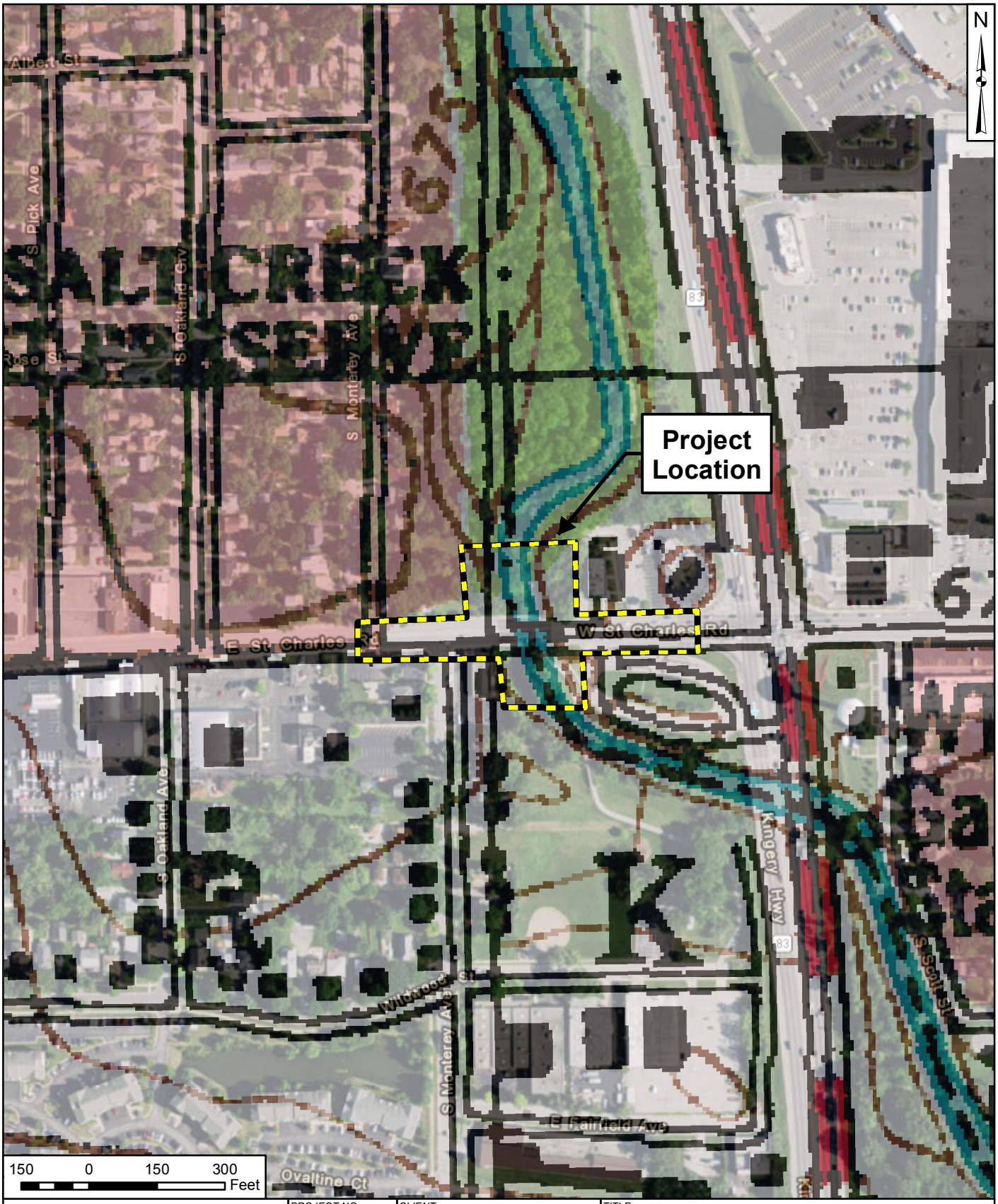
BASE LAYER:
USGS Topographic Map
Elmhurst Quadrangle
(1997)

TITLE:
USGS TOPOGRAPHIC MAP

SITE:
St. Charles Road Bridge Over Salt Creek
Villa Park, Illinois

FIGURE:
2

E:\2015\15228\Drawings\ArcGIS\Storm\Location Drainage Study\FIG2usgs15228.mxd



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PROJECT NO.:	15228
CREATED BY:	AMM
DATE:	08/31/16
SCALE:	See Scale Bar

CLIENT:
Village of Villa Park
20 S. Ardmore Avenue
Villa Park, Illinois 60181

BASE LAYER:
USGS Topographic Map
Elmhurst Quadrangle
(1997)

TITLE:
NATIONAL WETLANDS INVENTORY (NWI) MAP

SITE:
St. Charles Road Bridge
Over Salt Creek
Villa Park, Illinois

FIGURE:
3

E:\2015\15228\Drawings\ArcGIS\Storm\Location Drainage Study\FIG3nwi15228.mxd

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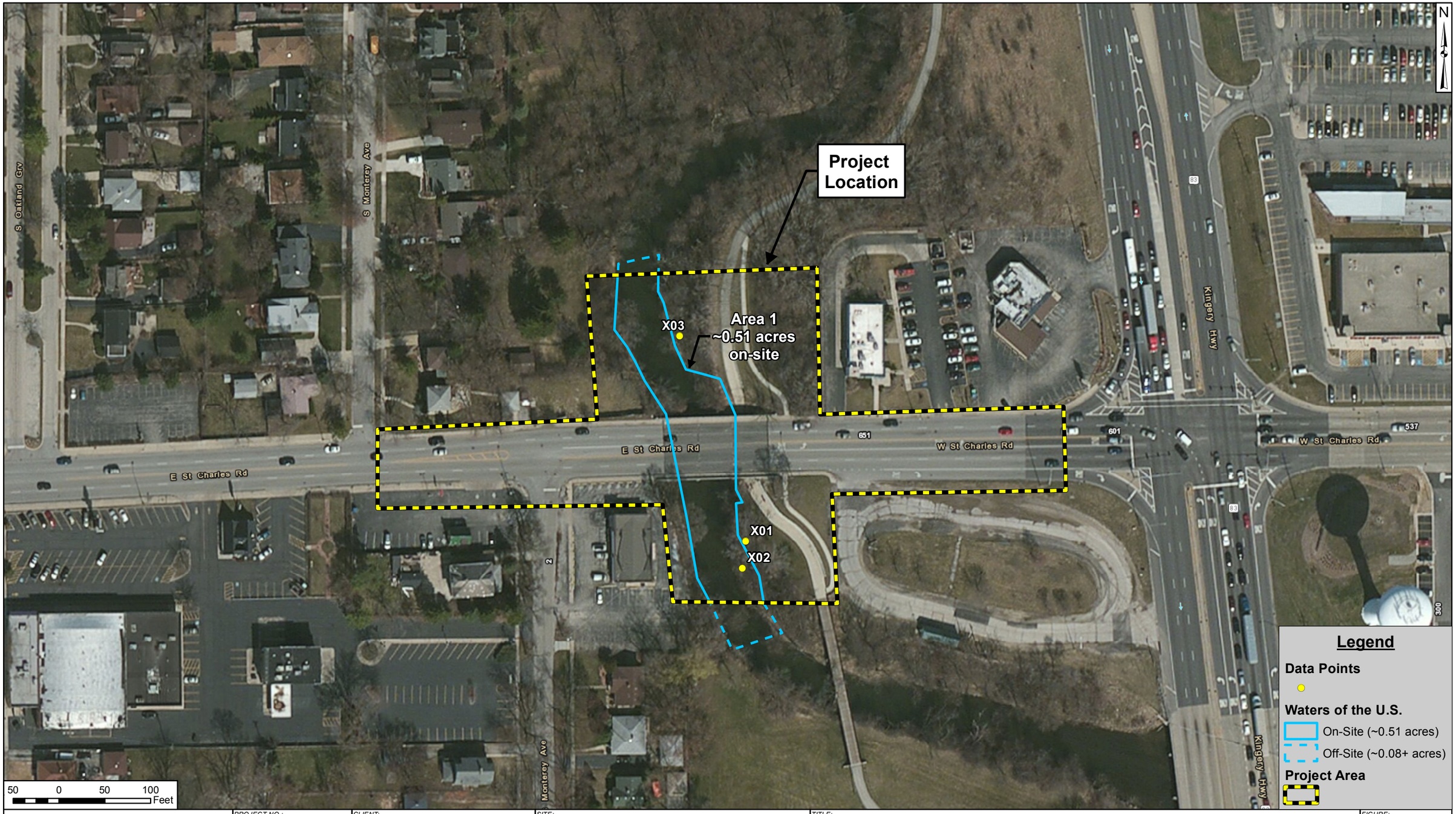
PROJECT NO.:	15228
CREATED BY:	AMM
DATE:	08/31/16
SCALE:	See Scale Bar
CLIENT:	Village of Villa Park 20 S. Ardmore Avenue Villa Park, Illinois 60181
BASE LAYER:	DuPage County Online Wetland Maps (Accessed 10/08/15)

TITLE: **DUPAGE COUNTY WETLANDS MAP**

SITE: St. Charles Road Bridge
Over Salt Creek
Villa Park, Illinois

FIGURE: 4

E:\2015\15228\Drawings\ArcGIS\Storm\Location Drainage Study\FIG4adid15228.mxd



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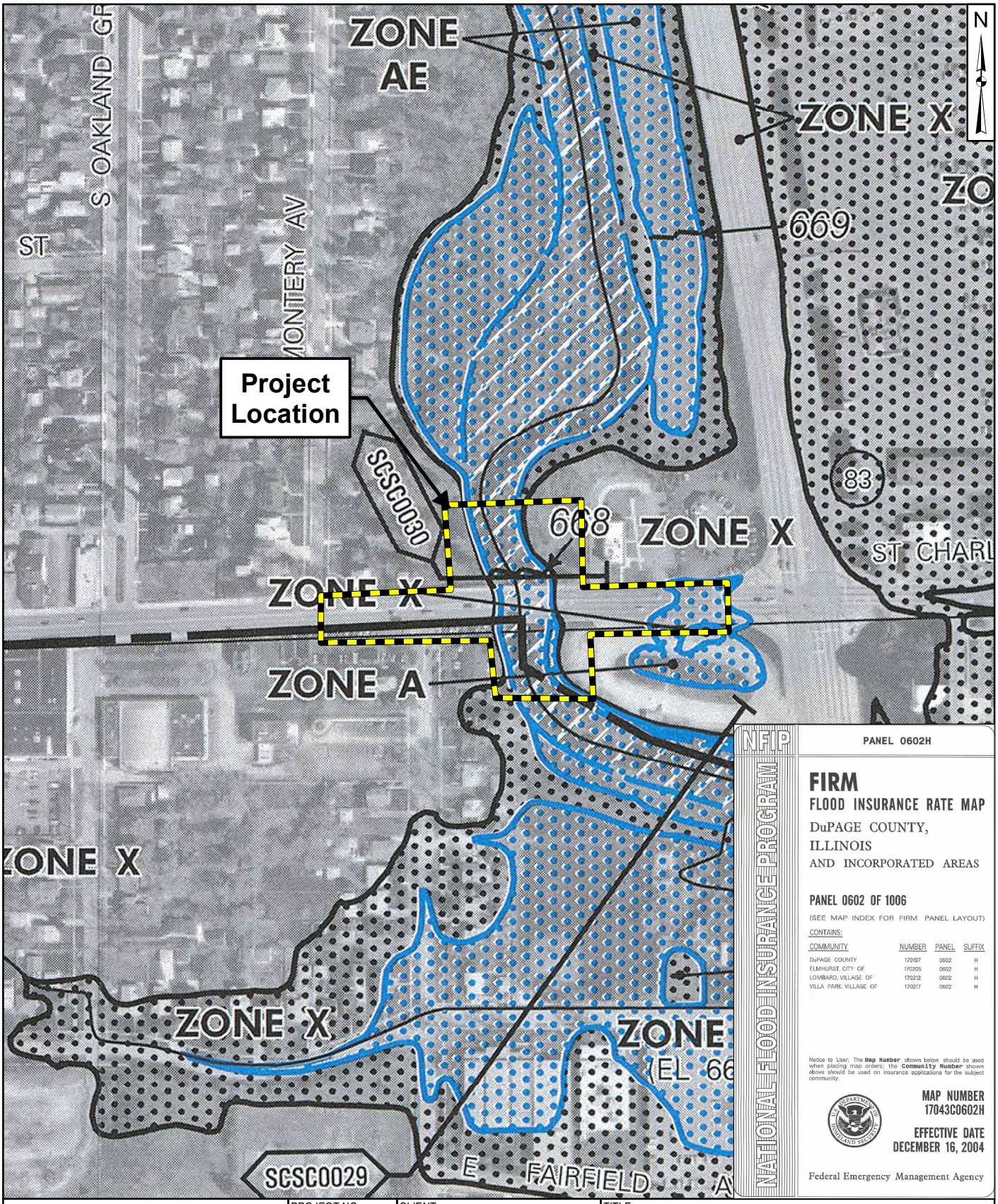
CREATED BY:	AMM
DATE:	08/31/16
SCALE:	See Scale Bar
CLIENT:	Village of Villa Park 20 S. Ardmore Avenue Villa Park, Illinois 60181
BASE LAYER:	NAIP Aerial Imagery (2014)
SITE:	St. Charles Bridge Over Salt Creek Villa Park, Illinois
TITLE:	**WETLAND DELINEATION MAP**
FIGURE:	5

E:\2015\15228\Drawings\ArcGIS\Storm\Location Drainage Study\FIG5delin15228.mxd



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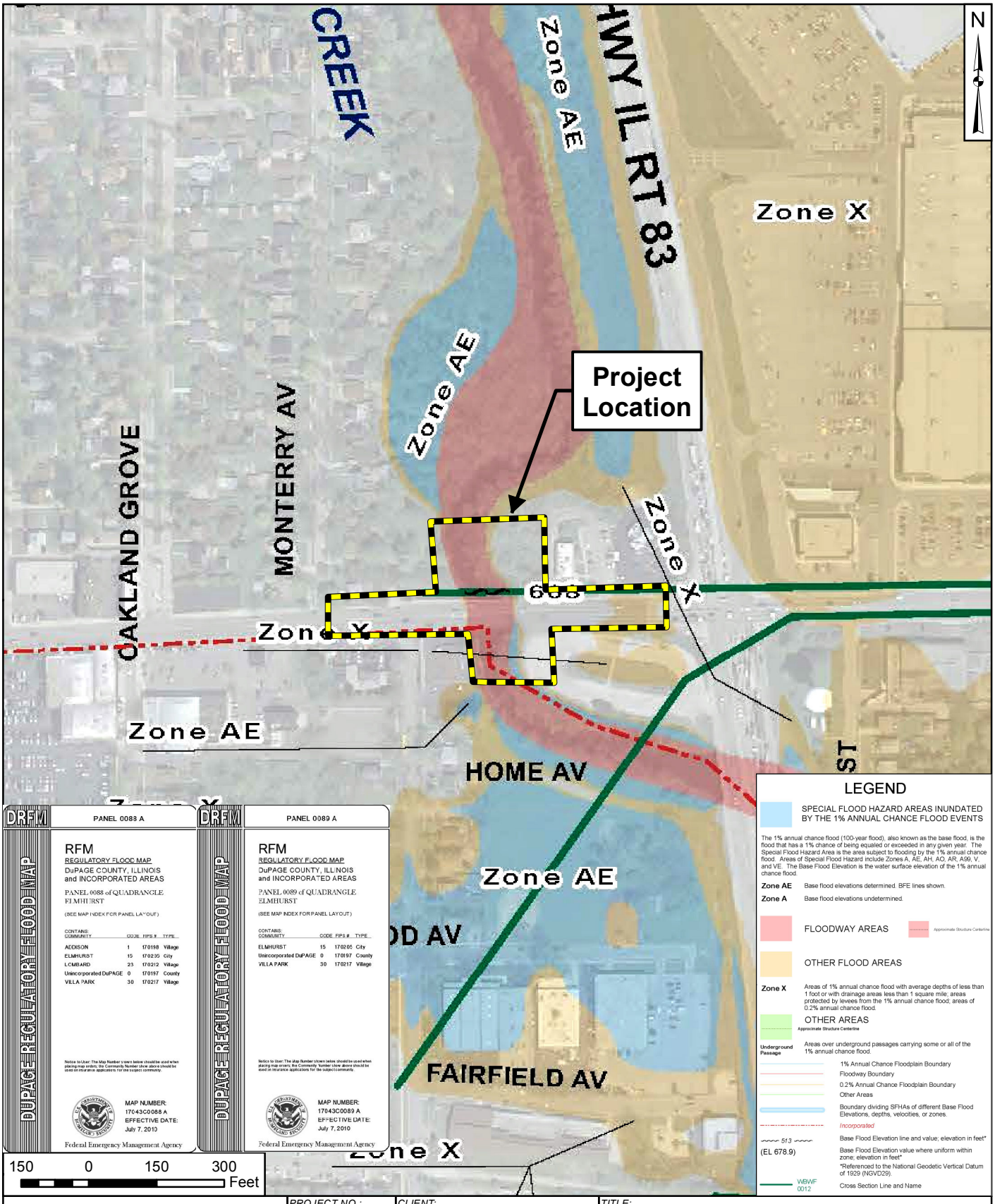
PROJECT NO.:	15228
CREATED BY:	AMM
DATE:	08/31/16
SCALE:	NTS
CLIENT:	Village of Villa Park 20 S. Ardmore Avenue Villa Park, Illinois 60181
BASE LAYER:	FEMA FIRM Panel 17043C0602H
TITLE:	**FEMA FLOOD INSURANCE RATE MAP (FIRM)**
SITE:	St. Charles Road Bridge Over Salt Creek Villa Park, Illinois
FIGURE:	6

E:\2015\15228\Drawings\ArcGIS\Storm\Location Drainage Study\FIG6firm15228.mxd



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PROJECT NO.: 15228

CREATED BY: AMM

DATE: 08/31/16

SCALE: See Scale Bar

CLIENT: Village of Villa Park
20 S. Ardmore Avenue
Villa Park, Illinois 60181

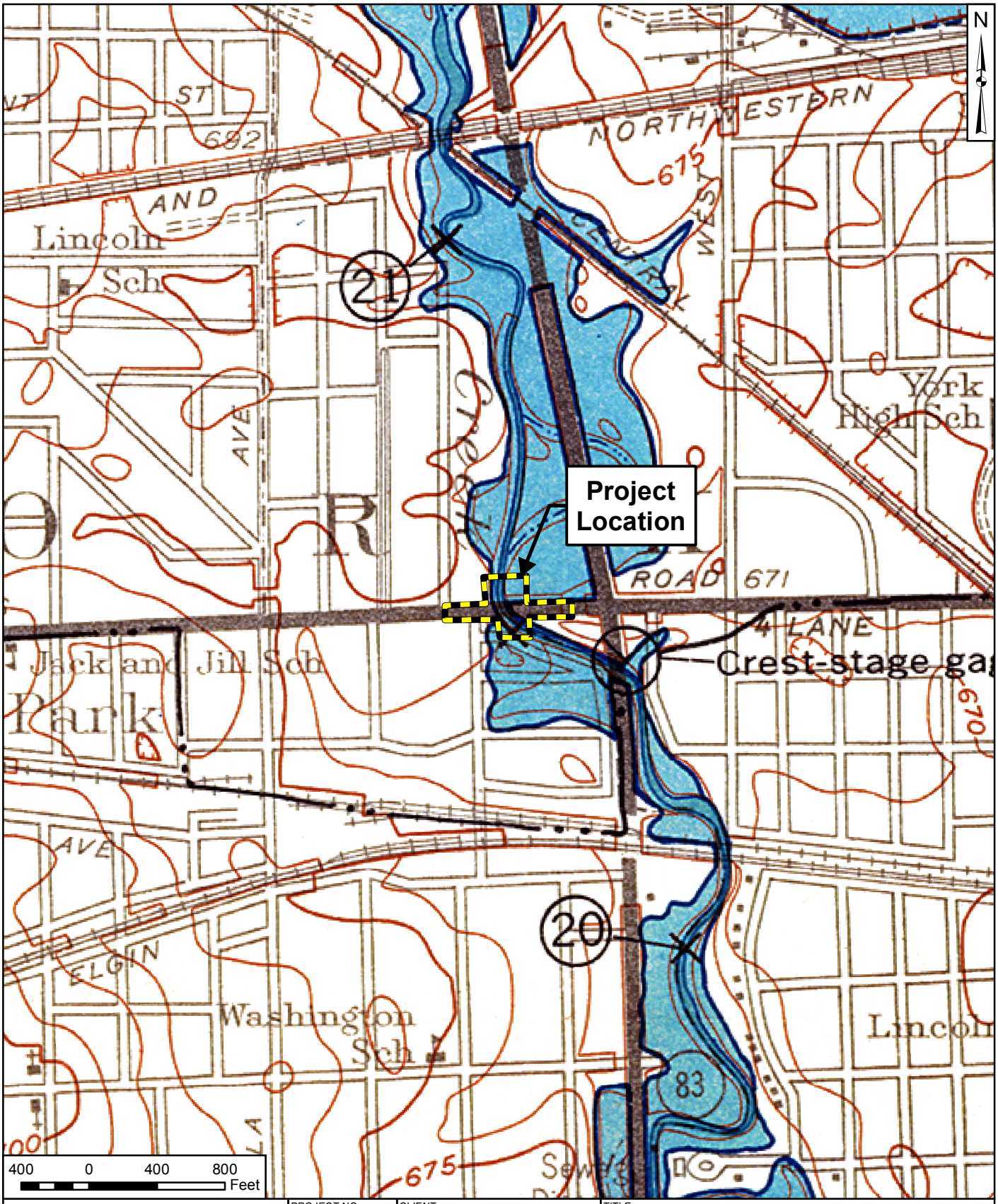
BASE LAYER: DuPage County RFM Panels 17043C0088 A and 17043C0089 A

TITLE: **DUPAGE COUNTY REGULATORY FLOOD MAP (RFM)**

SITE: St. Charles Road Bridge
Over Salt Creek
Villa Park, Illinois

FIGURE: 7

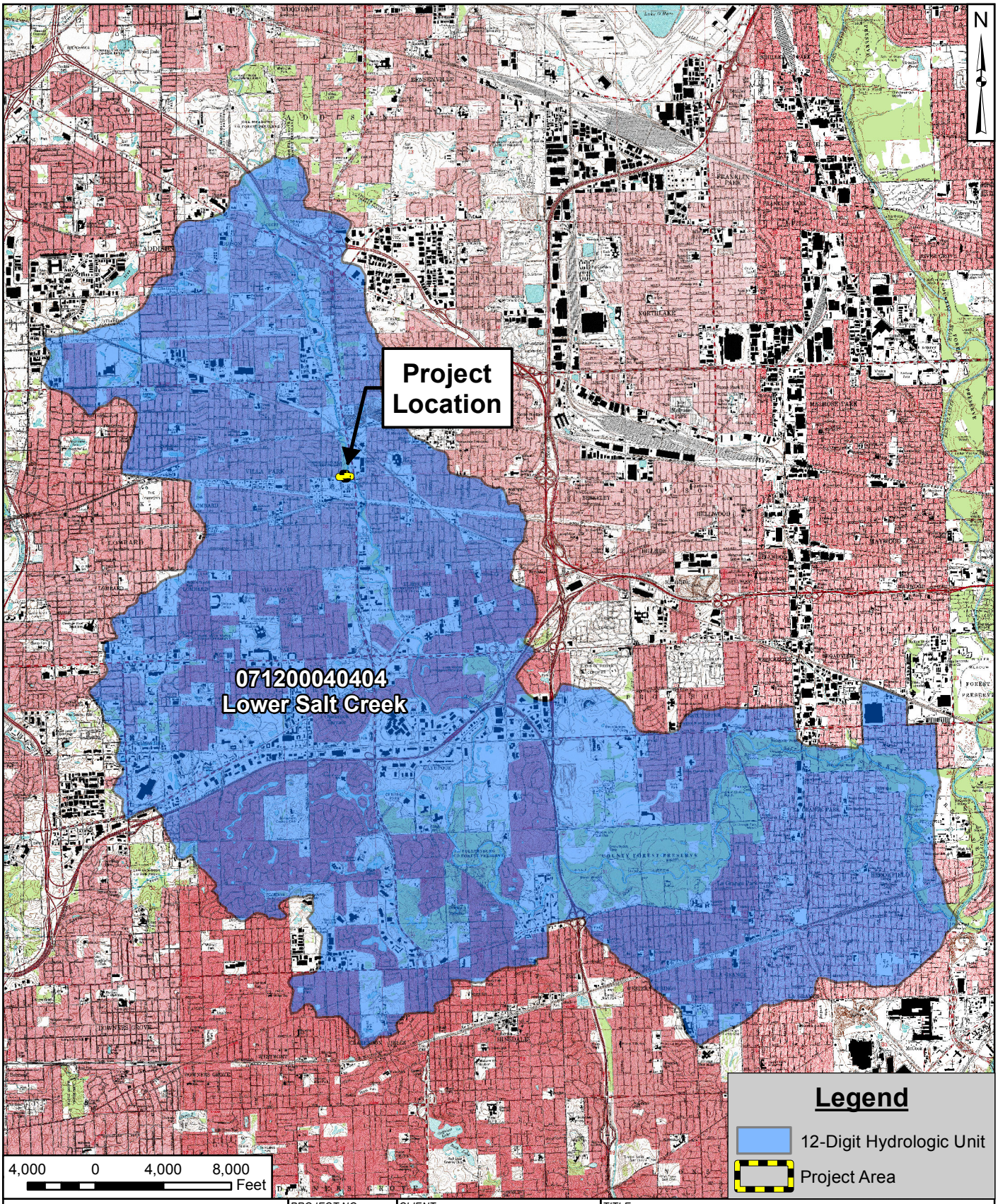
E:\2015\15228\Drawings\ArcGIS\Storm\Location Drainage Study\FIG7rfm15228.mxd



V3 Companies 7325 Janes Avenue Woodridge, Illinois 60517 630.724.9200 phone 630.724.9202 fax www.v3co.com	PROJECT NO.: 15228 CREATED BY: AMM DATE: 08/31/16	CLIENT: Village of Villa Park 20 S. Ardmore Avenue Villa Park, Illinois 60181	TITLE: **USGS HYDROLOGIC ATLAS**
Visio, Vertere, Virtute... *"The Vision To Transform with Excellence"*	SCALE: See Scale Bar	BASE LAYER: USGS Hydrologic Atlas Elmhurst Quadrangle (1965)	SITE: St. Charles Road Bridge Over Salt Creek Villa Park, Illinois

FIGURE: 8

E:\2015\15228\Drawings\ArcGIS\Storm\Location Drainage Study\FIG8hydro15228.mxd



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PROJECT NO.: 15228
CREATED BY: AMM
DATE: 08/31/16
SCALE: See Scale Bar

CLIENT: Village of Villa Park
20 S. Ardmore Avenue
Villa Park, Illinois 60181

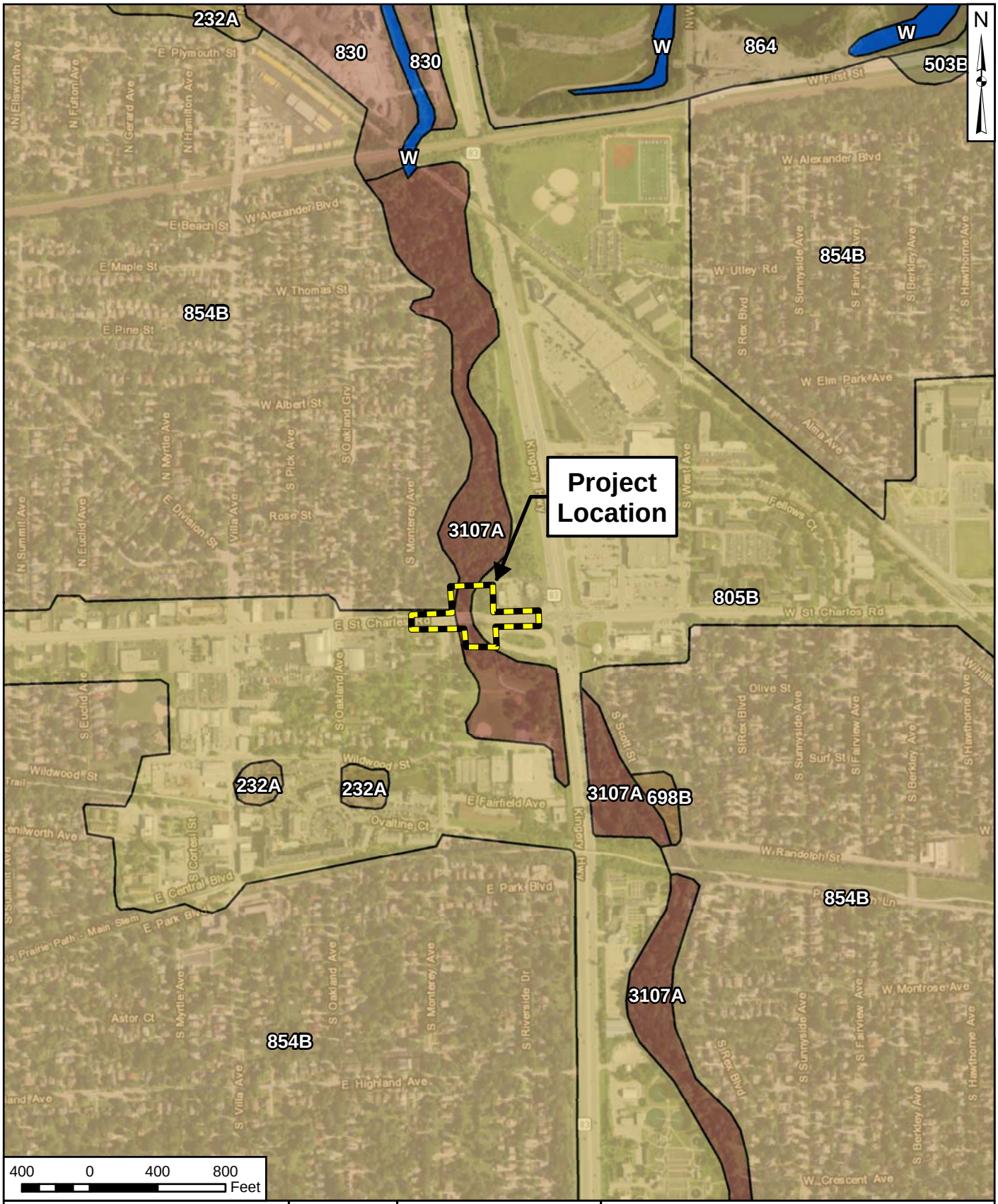
BASE LAYER: USGS Topographic Map
DuPage County, Illinois
(2002)

TITLE: **12-DIGIT HYDROLOGIC UNIT CODE (HUC) MAP**

SITE: St. Charles Road Bridge
Over Salt Creek
Villa Park, Illinois

FIGURE: 9

E:\2015\15228\Drawings\ArcGIS\Storm\Location Drainage Study\FIG9huc15228.mxd



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PROJECT NO.: 15228
CREATED BY: AMM
DATE: 09/22/16
SCALE: See Scale Bar

CLIENT:
Village of Villa Park
20 S. Ardmore Avenue
Villa Park, Illinois 60181

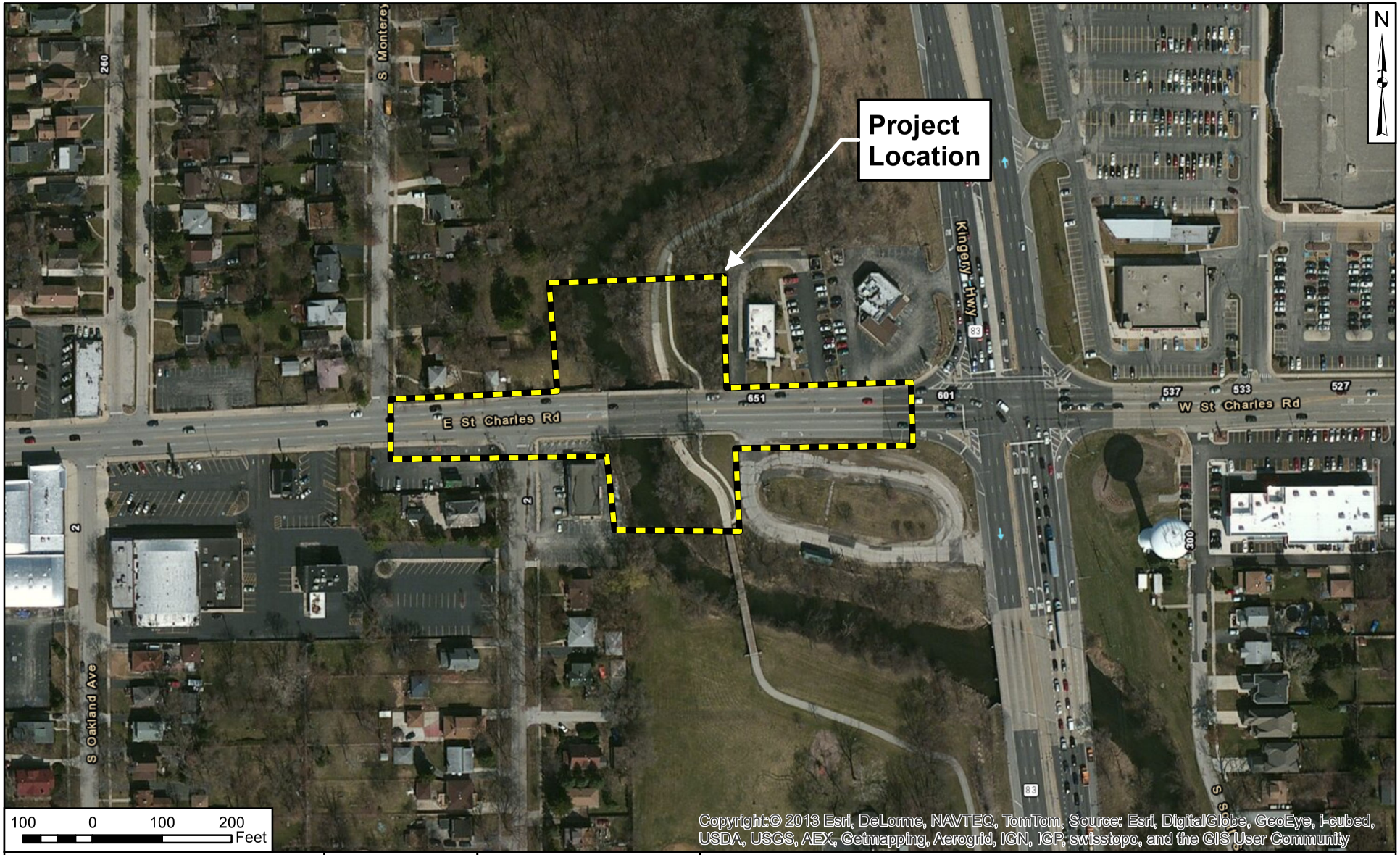
BASE LAYER:
NAIP Aerial Imagery
(2014)

TITLE:
SOIL SURVEY OF DUPAGE COUNTY, ILLINOIS (2014) MAP

SITE:
St. Charles Road Bridge
Over Salt Creek
Villa Park, Illinois

FIGURE: 10

E:\2015\15228\Drawings\ArcGIS\Storm\Location Drainage Study\FIG10soil15228.mxd



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CREATED BY:	BAO
DATE:	08/31/16
SCALE:	See Scale Bar
CLIENT:	Village of Villa Park 20 S. Ardmore Avenue Villa Park, Illinois 60181
BASE LAYER:	DigitalGlabe Aerial Imagery (2014)

TITLE:

AERIAL MAP

SITE:

St. Charles Road Bridge
Over Salt Creek
Villa Park, Illinois

FIGURE:

11

E:\2015\15228\Drawings\ArcGIS\Storm\Location Drainage Study\FIG11aerial15228.mxd

Photograph of downstream side of Charles Road Bridge

Photograph of upstream side of St. Charles Road Bridge, debris at west pier.

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TITLE: SITE PHOTOGRAPHS		**PROJECT:** ST. CHARLES ROAD BRIDGE OVER SALT CREEK	
CLIENT: VILLAGE OF VILLA PARK 20 S. Ardmore Avenue Villa Park, Illinois 60181	**PROJECT NO.** 15228	**EXHIBIT:** 12	**SHEET:** 1 **OF:** 4
	FILE NAME:	**DATE:** 5/10/15	**SCALE:** N/A

Photograph of downstream side of Charles Road Bridge

Photograph of St. Charles Road Bridge deck, looking east.

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TITLE: SITE PHOTOGRAPHS		**PROJECT:** ST. CHARLES ROAD BRIDGE OVER SALT CREEK	
CLIENT: VILLAGE OF VILLA PARK 20 S. Ardmore Avenue Villa Park, Illinois 60181	**PROJECT NO.** 15228	**EXHIBIT:** 12	**SHEET:** 2 **OF:** 4
	FILE NAME:	**DATE:** 5/10/15	**SCALE:** N/A

Photograph of Salt Creek channel and overbank areas upstream of St. Charles Road.

Photograph of Salt Creek channel and overbank areas downstream of St. Charles Road.

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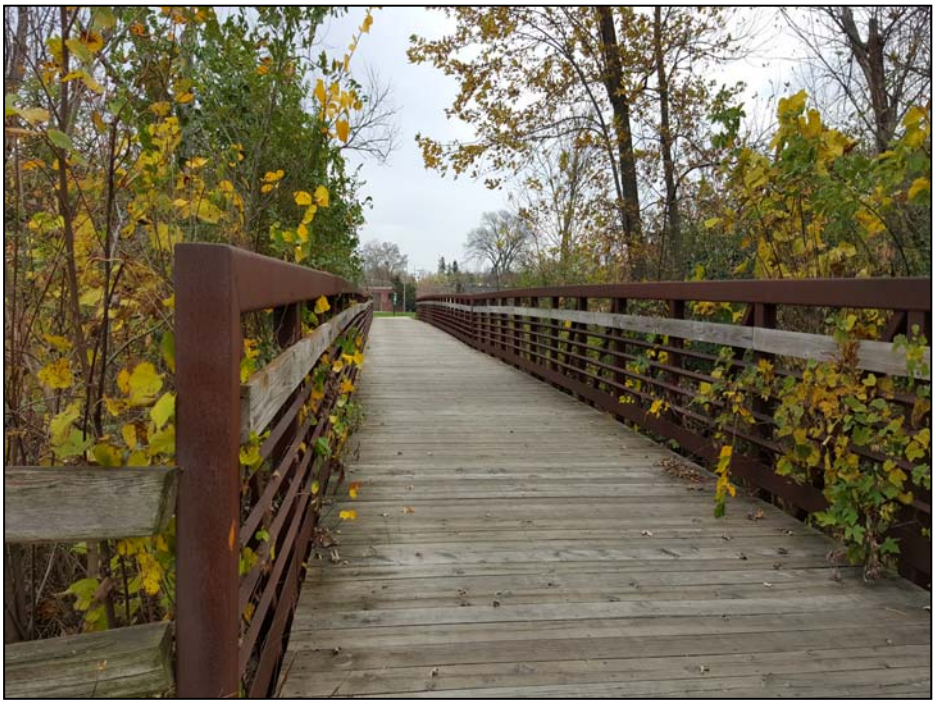
TITLE: SITE PHOTOGRAPHS		**PROJECT:** ST. CHARLES ROAD BRIDGE OVER SALT CREEK	
CLIENT: VILLAGE OF VILLA PARK 20 S. Ardmore Avenue Villa Park, Illinois 60181	**PROJECT NO.** 15228	**EXHIBIT:** 12	**SHEET:** 3 **OF:** 4
	FILE NAME:	**DATE:** 5/10/15	**SCALE:** N/A



Photograph of Pedestrian Bridge downstream of St. Charles Road.

Photograph of the Route 83 Bridge downstream of the Pedestrian Bridge.

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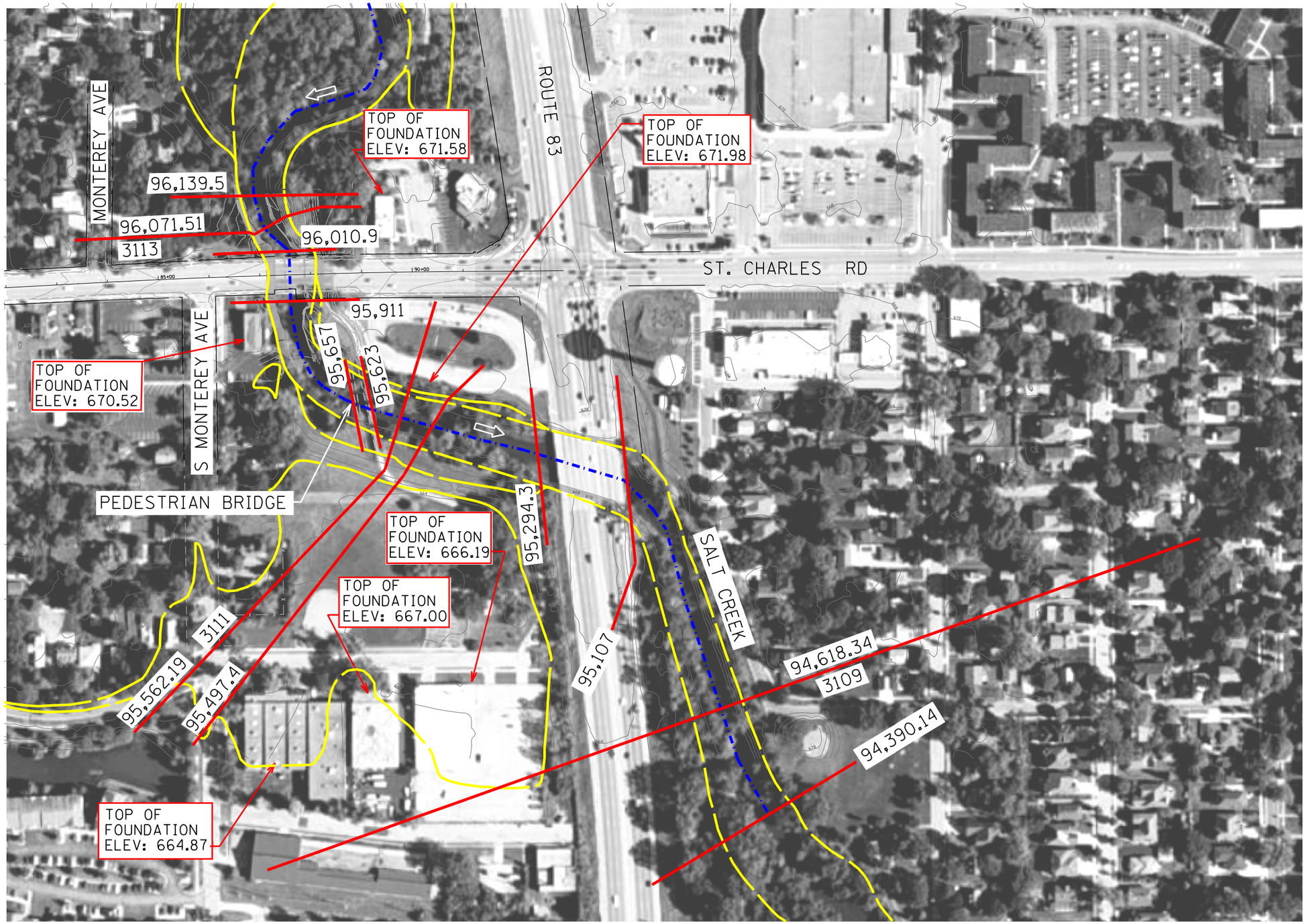
PHONE
630.724.9202 FAX
WWW.V3CO.COM

TITLE: SITE PHOTOGRAPHS		**PROJECT:** ST. CHARLES ROAD BRIDGE OVER SALT CREEK	
CLIENT: VILLAGE OF VILLA PARK 20 S. Ardmore Avenue Villa Park, Illinois 60181	**PROJECT NO.** 15228	**EXHIBIT:** 12	**SHEET:** 4 **OF:** 4
	FILE NAME:	**DATE:** 5/10/15	**SCALE:** N/A



N

1

LEGEND

REGULATORY FLOODWAY LIMITS

REGULATORY FLOODPLAIN LIMITS

CREEK CROSS-SECTION LOCATION

CREEK CENTERLINE

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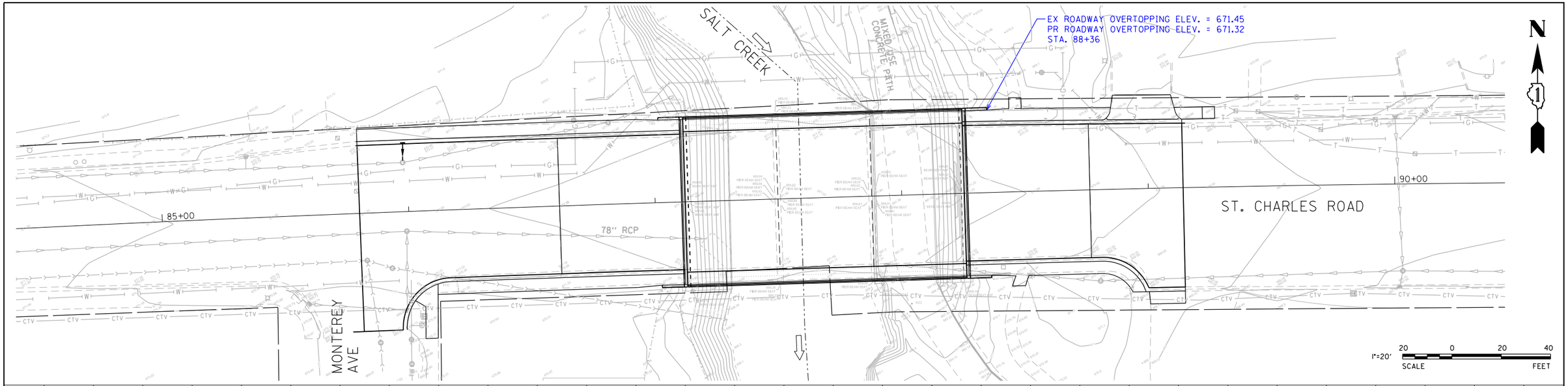
USER NAME = vsykes	DESIGNED - VAS	REVISED -	
	DRAWN - VAS	REVISED -	
PLOT SCALE = 200.0000 ' / in.	CHECKED - GJS	REVISED -	
PLOT DATE = 8/24/2016	DATE - 08-19-16	REVISED -	

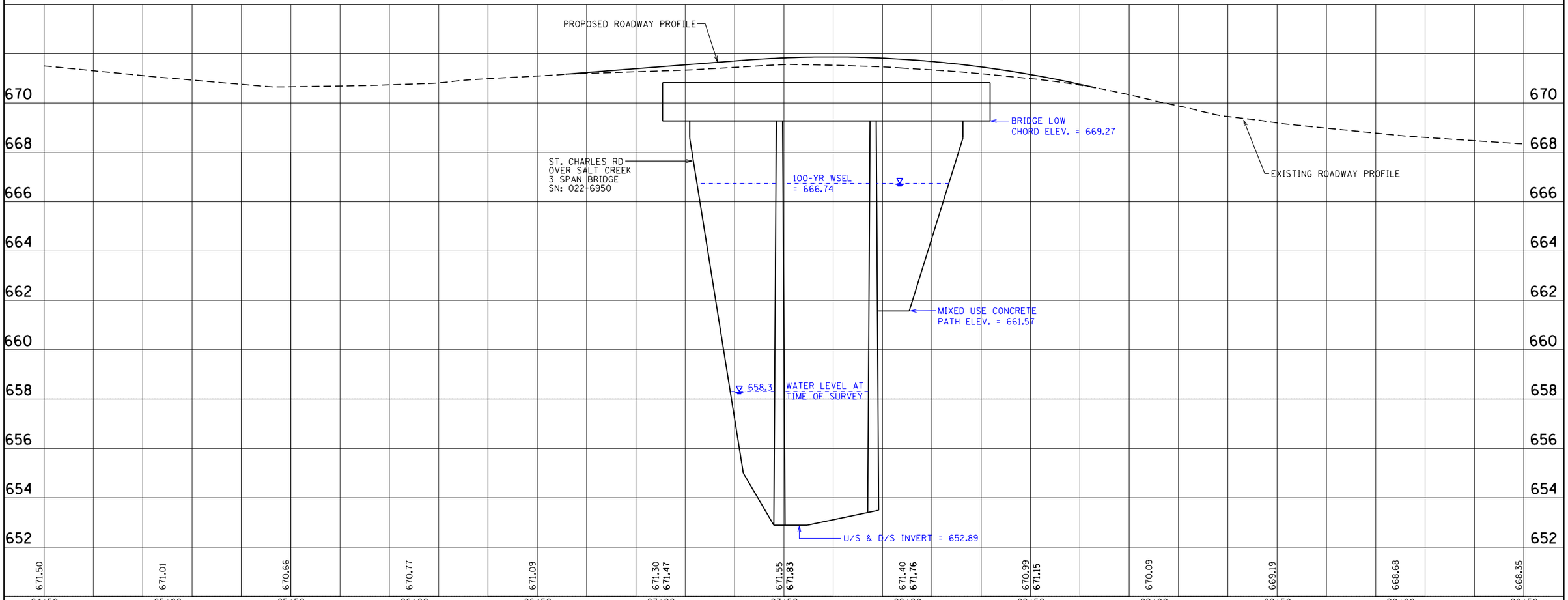
ST. CHARLES ROAD BRIDGE OVER SALT CREEK

EXHIBIT 13
CROSS SECTION LOCATION EXHIBIT

SCALE: 1" = 200' | SHEET 1 OF 1 SHEETS | STA. | TO STA.

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
1397	15-00094-00-BR	DUPAGE	1	1
PROJECT: BRM-4003(508)		JOB: P-91-313-15		
	ILLINOIS	LOCAL ROADS PROJECT		





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630.724.9202 fax
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USER NAME = vsykes	DESIGNED - VAS	REVISED -
	DRAWN - VAS	REVISED -
PLOT SCALE = 40.0000 ' / in.	CHECKED - GJS	REVISED -
PLOT DATE = 8/23/2016	DATE - 08/19/16	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

EXHIBIT 14
ST. CHARLES ROAD BRIDGE OVER SALT CREEK PLAN & PROFILE

SCALE: 1"=20' | SHEET 1 OF 1 SHEETS | STA. 84+50.00 TO STA. 90+50.00

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
1397	15-00094-00-BR	DUPAGE	1	1
PROJECT: BRM-4003(508)		JOB: P-91-313-15		
	ILLINOIS FED. AID PROJECT			

WATERWAY INFORMATION

DRAINAGE AREA = 92.1 SQ. MI.

EXISTING 50-YR OPENING = 822.27 SF

PROPOSED 50-YR OPENING = 822.27 SF

DESIGN 50-YR DISCHARGE = 1852 CFS

DESIGN CREATED HEAD (ABOVE NATURAL) = 0.13 FT

100-YR DISCHARGE = 1994 CFS

100-YR CREATED HEAD (ABOVE NATURAL) = 0.14 FT

LOCATION

DUPAGE COUNTY

VILLAGE OF VILLA PARK

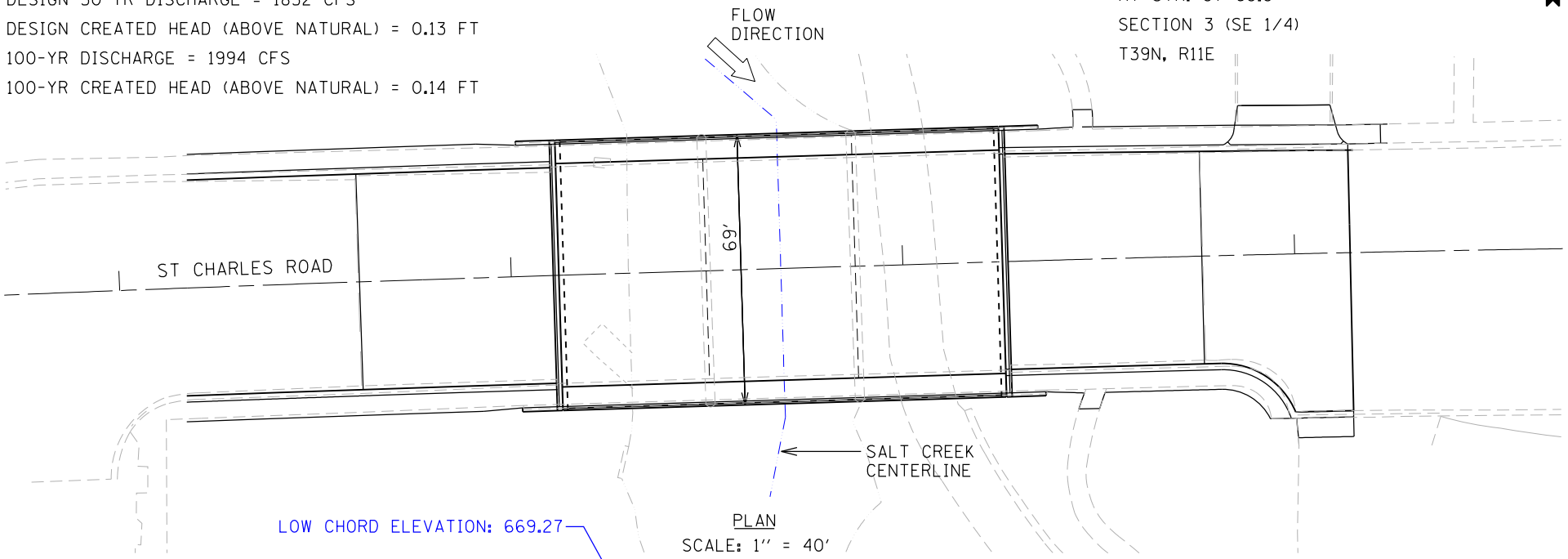
ST. CHARLES RD. WEST OF RT. 83

AT STA. 87+68.8

SECTION 3 (SE 1/4)

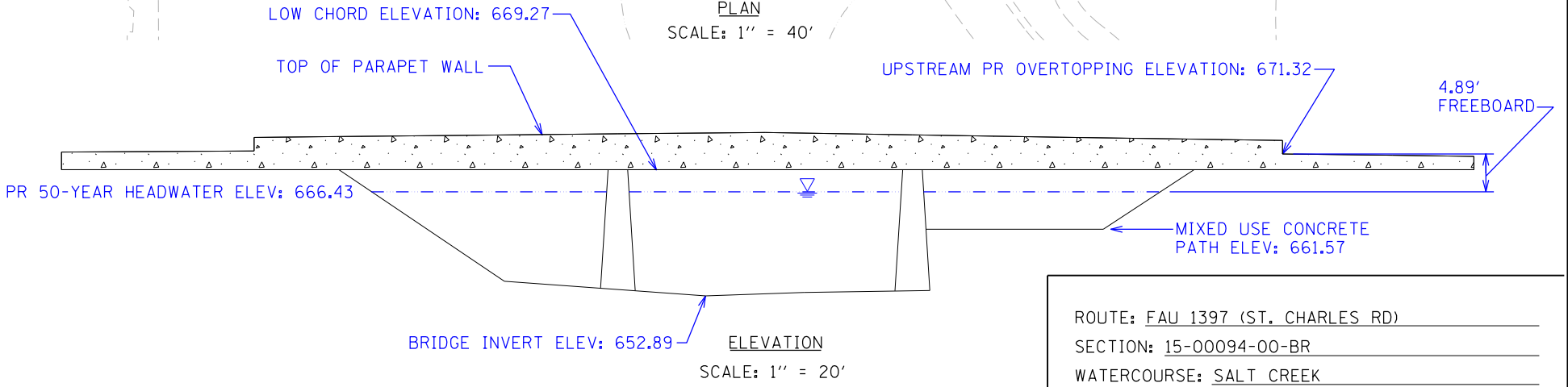
T39N, R11E

N



PLAN

SCALE: 1" = 40'



ELEVATION

SCALE: 1" = 20'

WIT EXHIBIT 15
SALT CREEK / ST. CHARLES RD.
WATERWAY SKETCH

ROUTE: FAU 1397 (ST. CHARLES RD)

SECTION: 15-00094-00-BR

WATERCOURSE: SALT CREEK

EXISTING SN: 022-6950

SCALE: VARIES

PLOTTED BY: VAS DATE: 8-19-16

CHECKED BY: SRU DATE: 9-1-16

SURVEY DATED: 11-20-2015

SECTION III

CALCULATIONS

Information from the:
Floodplain Mapping Report and Documentation for Lower Salt Creek Watershed Prepared by Christopher B. Burke Engineering, Ltd. (CBBEL) for DuPage County and dated November 2011.

The Following information was extracted from this report:

- Discharge Rates
- Starting Water Surface Elevations
- Drainage Area
- Record Flooding Information

FLOODPLAIN MAPPING REPORT AND DOCUMENTATION FOR LOWER SALT CREEK WATERSHED

Prepared For:

DuPage County
Department Of Engineering
Division of Stormwater Management
421 North County Farm Road
Wheaton, IL 60187

Prepared By:

Christopher B. Burke Engineering, Ltd.
9575 W. Higgins Road, Suite 600
Rosemont, IL 60018

CBBEL Project No. 09-0101.00001

November 2011

Cross Section ID	Description		Station	Invert Elevation	Peak Flows					
			(ft)	(ft-NGVD)	PVSTATS 2-Year (cfs)	PVSTATS 10-Year (cfs)	PVSTATS 50-Year (cfs)	PVSTATS 100-Year (cfs)	PVSTATS 500-Year (cfs)	Sept. 1987 Event (cfs)
001SCSC3146	MACKIE CROSS SECTION 37 - 1800 FEET UPSTREAM OF FULLERTON,,,,,,		111747.99	659.42	889	1505	2276	2654	3785	2704
001SCSC3145	MACKIE CROSS SECTION 38 - 1200 FEET UPSTREAM OF FULLERTON,,,,,,		111004.54	659.37	889	1507	2272	2645	3763	2685
001SCSC3144	MACKIE CROSS SECTION 39 - 800 FEET UPSTREAM OF FULLERTON,,,,,,		110604.08	660.06	889	1509	2270	2641	3751	2675
001SCSC3143	MACKIE CROSS SECTION 40 - 500 FEET UPSTREAM OF FULLERTON,,,,,,		110181.98	660.52	889	1508	2257	2640	3770	2661
001SCSC3142	MACKIE CROSS SECTION 40A - UPSTREAM OF FULLERTON,,,,,,		109807.17	660.57	889	1507	2255	2636	3760	2651
001SCSC3141		FULLERTON AVENUE	109759.40	660.57	889	1507	2255	2636	3758	2650
001SCSC3140			109710.56	661.97	889	1507	2255	2636	3758	2650
001SCSC3139	MACKIE CROSS SECTION 41 - 1 BBL LENGTHS DOWNSTREAM OF STRUCTURE,		109688.32	661.97	889	1507	2255	2635	3758	2649
001SCSC3138	MACKIE CROSS SECTION 43 - 100 FEET DOWNSTREAM OF FULLERTON,,,,,,		109594.54	661.97	889	1507	2254	2634	3755	2648
001SCSC3137	MACKIE CROSS SECTION 44 - 350 FEET DOWNSTREAM OF FULLERTON,,,,,,		109395.08	662.84	889	1507	2253	2633	3751	2646
001SCSC3136	MACKIE CROSS SECTION 45 - 600 FEET DOWNSTREAM OF FULLERTON,,,,,,		109163.15	662.84	888	1507	2251	2629	3742	2641
001SCSC3135	MACKIE CROSS SECTION 46 - 1150 FEET DOWNSTREAM OF FULLERTON,,,,,		108415.51	659.16	887	1506	2248	2624	3726	2630
001SCSC3134	MACKIE CROSS SECTION 47 - 1800 FEET DOWNSTREAM OF FULLERTON,,,,,		107630.92	657.70	885	1502	2257	2618	3679	2623
001SCSC3133	MACKIE CROSS SECTION 48 - 2200 FEET DOWNSTREAM OF FULLERTON,,,,,		107262.18	660.06	885	1503	2255	2615	3669	2620
001SCSC3132	MACKIE CROSS SECTION 49 - 2550 FEET DOWNSTREAM OF FULLERTON,,,,,		106794.70	659.52	898	1504	2260	2622	3676	2618
001SCSC3131	MACKIE CROSS SECTION 49a - DOWNSTREAM OF FULLERTON,,,,,,		106136.74	660.10	899	1504	2261	2623	3672	2614
001SCSC3130	MACKIE CROSS SECTION 50 - 3000 FEET UPSTREAM OF OF IL 64,,,,,,		105673.33	659.67	895	1508	2259	2627	3710	2712
001SCSC3129	MACKIE CROSS SECTION 51 - 2600 FEET UPSTREAM OF IL 64,,,,,,		105224.86	660.79	895	1509	2260	2627	3704	2712
001SCSC3128	MACKIE CROSS SECTION 52 - 2150 FEET UPSTREAM OF IL 64,,,,,,		104840.34	659.88	897	1511	2259	2623	3689	2713
001SCSC3127	MACKIE CROSS SECTION 53 - 1800 FEET UPSTREAM OF IL 64,,,,,,		104478.35	659.96	896	1519	2256	2625	3691	2714
001SCSC3126	MACKIE CROSS SECTION 54 - 1500 FEET UPSTREAM OF IL 64,,,,,,		104203.11	660.09	895	1521	2251	2604	3622	2716
001SCSC3125	MACKIE CROSS SECTION 55 - 600 FEET UPSTREAM OF IL 64,,,,,,		103358.08	659.42	897	1524	2252	2610	3627	2723
001SCSC3124	MACKIE CROSS SECTION 56 - 300 FEET UPSTREAM OF IL 64,,,,,,	NORTH AVENUE	102840.98	658.96	898	1527	2258	2617	3637	2728
001SCSC3123	MACKIE CROSS SECTION 57 - 1 BBL LENGTHS DOWNSTREAM OF STRUCTURE,		102743.61	659.77	898	1528	2258	2618	3637	2729
001SCSC3122	MACKIE CROSS SECTION 59 - 4 BBL LENGTHS DOWNSTREAM OF STRUCTURE,		102100.08	660.58	898	1529	2257	2615	3627	2734
001SCSC3310	MIDWEST SURVEY JOB # 92-018, MAY 1992, XS NO. 6		101752.95	659.84	899	1531	2258	2615	3623	2738
001SCSC3309	MIDWEST SURVEY JOB # 92-018, MAY 1992, XS NO. 7		101334.40	657.10	901	1542	2275	2634	3649	2743
001SCSC3308	MIDWEST SURVEY JOB # 92-018, MAY 1992, XS NO. 1		100959.67	658.11	904	1553	2292	2653	3672	2751
001SCSC3307	MIDWEST SURVEY JOB # 92-018, MAY 1992, XS NO. 2		100646.17	657.62	905	1559	2302	2664	3684	2775
001SCSC3306	MIDWEST SURVEY JOB # 92-018, MAY 1992, XS NO. 3		100538.58	658.06	905	1561	2306	2668	3689	2783
001SCSC3305	MIDWEST SURVEY JOB # 92-018, MAY 1992, XS NO. 4		100434.19	659.45	900	1446	2026	2303	3056	2303
001SCSC3304	MIDWEST SURVEY JOB # 92-018, MAY 1992, XS NO. 5		100333.45	658.57	896	1297	1634	1791	2181	1691
001SCSC3303	MODIFIED XS 3556 TO REPRESENT THE MODIFIED CHANNEL XS	QUARRY ROAD	100141.16	658.20	896	1297	1634	1791	2181	1691
001SCSC3302	MODIFIED XS 3552 TO REPRESENT THE MODIFIED CHANNEL XS	IL CENTRAL RAILROAD	99720.36	658.20	896	1297	1634	1791	2182	1690
001SCSC3121	CROSS SECTION LS 1924 DOWNSTREAM OF UNION PACIFIC RAIL ROAD		99412.44	660.27	944	1399	1717	1845	2127	1805
001SCSC3120	CROSS SECTION LS 1917 DOWNSTREAM OF UNION PACIFIC RAIL ROAD		98993.39	657.34	932	1384	1696	1825	2113	1766
001SCSC3119	CROSS SECTION LS 1908 DOWNSTREAM OF UNION PACIFIC RAIL ROAD		98447.72	658.10	930	1370	1684	1817	2123	1737
001SCSC3118	CROSS SECTION LS 1899 DOWNSTREAM OF UNION PACIFIC RAIL ROAD		98108.06	658.05	936	1395	1725	1863	2176	1823
001SCSC3117	CROSS SECTION LS 1892 DOWNSTREAM OF UNION PACIFIC RAIL ROAD		97871.71	657.31	935	1393	1719	1855	2164	1823
001SCSC3116	CROSS SECTION LS 1885 UPSTREAM OF ST CHARLES RD		97243.64	655.32	934	1393	1720	1855	2163	1834
001SCSC3115	CROSS SECTION LS 1875 UPSTREAM OF ST CHARLES RD		96831.06	656.38	934	1393	1721	1857	2165	1836
001SCSC3114	CROSS SECTION LS 1868 UPSTREAM OF ST CHARLES RD	ST. CHARLES ROAD	96480.64	655.57	936	1396	1723	1858	2160	1849
001SCSC3113	MACKIE CROSS SECTION 60 - 1 BBL LENGTHS DOWNSTREAM OF STRUCTURE,		96071.51	654.89	941	1417	1763	1900	2209	1859

Cross Section ID	Description		Station (ft)	Invert Elevation (ft-NGVD)	Peak Flows					
					PVSTATS 2-Year (cfs)	PVSTATS 10-Year (cfs)	PVSTATS 50-Year (cfs)	PVSTATS 100-Year (cfs)	PVSTATS 500-Year (cfs)	Sept. 1987 Event (cfs)
001SCSC3111	MACKIE CROSS SECTION 62 - 4 BBL LENGTHS DOWNSTREAM OF STRUCTURE,	ROUTE 83	95562.19	655.57	994	1484	1852	1994	2303	2008
001SCSC3109	CROSS SECTION LS 1834 UPSTREAM OF ILLINOIS PRAIRIE PATH		94618.34	655.00	994	1477	1839	1979	2286	1986
001SCSC3108	CROSS SECTION LS 1822 UPSTREAM OF ILLINOIS PRAIRIE PATH		94045.88	655.17	993	1472	1827	1964	2264	1988
001SCSC3107	CROSS SECTION LS 1820 UPSTREAM OF ILLINOIS PRAIRIE PATH	ILLINOIS PRAIRIE PATH	93991.01	655.35	994	1472	1827	1964	2263	1989
001SCSC3106	CROSS SECTION LS 1818 DOWNSTREAM OF ILLINOIS PRAIRIE PATH		93819.80	655.03	1030	1516	1899	2047	2368	2112
001SCSC3105	CROSS SECTION LS 1810 DOWNSTREAM OF ILLINOIS PRAIRIE PATH		93472.14	654.41	1031	1517	1897	2044	2363	2115
001SCSC3104	CROSS SECTION LS 1803 DOWNSTREAM OF ILLINOIS PRAIRIE PATH		93069.56	653.94	1032	1515	1894	2040	2354	2123
001SCSC3103	CROSS SECTION LS 1766 DOWNSTREAM OF ILLINOIS PRAIRIE PATH		91098.53	652.86	1137	1659	2092	2262	2635	2373
001SCSC3102	CROSS SECTION LS 1734 UPSTREAM OF ROOSEVELT RD		89411.91	650.32	1125	1646	2065	2227	2582	2263
001SCSC3101	CROSS SECTION LS 1724 UPSTREAM OF ROOSEVELT RD		88842.75	649.58	1119	1644	2060	2220	2570	2248
001SCSC3100	CROSS SECTION LS 1714 UPSTREAM OF ROOSEVELT RD		88356.29	648.22	1196	1711	2151	2323	2699	2331
001SCSC3099	CROSS SECTION LS 1707 UPSTREAM OF ROOSEVELT RD		87991.15	647.75	1394	2144	2954	3300	4095	2559
001SCSC3098	CROSS SECTION LS 1690 UPSTREAM OF ROOSEVELT RD		87107.05	648.38	1390	2140	2941	3281	4060	2552
001SCSC3097	CROSS SECTION LS 1673 UPSTREAM OF ROOSEVELT RD		86253.73	647.95	1425	2150	2908	3225	3948	2589
001SCSC3096	CROSS SECTION LS 1665 UPSTREAM OF ROOSEVELT RD		85801.02	648.05	1429	2157	2917	3235	3960	2595
001SCSC3095	CROSS SECTION LS 1650 UPSTREAM OF ROOSEVELT RD	BUTTERFIELD ROAD	84991.54	646.57	1430	2168	2933	3253	3983	2604
001SCSC3094	CROSS SECTION LS 1636 UPSTREAM OF ROOSEVELT RD		84216.14	647.41	1452	2218	2982	3301	4036	2616
001SCSC3093	CROSS SECTION LS 1613 UPSTREAM OF ROOSEVELT RD	ROOSEVELT ROAD	83127.04	644.86	1499	2289	3089	3427	4211	2647
001SCSC3092	CROSS SECTION LS 1603 DOWNSTREAM OF ROOSEVELT RD		82522.95	645.75	1508	2314	3136	3483	4287	2657
001SCSC3091	CROSS SECTION LS 1598 DOWNSTREAM OF ROOSEVELT RD		82249.96	646.15	1505	2311	3129	3475	4275	2652
001SCSC3090	CROSS SECTION LS 1588 DOWNSTREAM OF ROOSEVELT RD		81717.60	645.39	1499	2305	3119	3461	4255	2647
001SCSC3089	CROSS SECTION LS 1582 DOWNSTREAM OF ROOSEVELT RD		81417.13	643.38	1496	2300	3119	3467	4282	2645
001SCSC3088	CROSS SECTION LS 1570 DOWNSTREAM OF ROOSEVELT RD		80567.06	644.44	1482	2286	3107	3456	4273	2640
001SCSC3087	CROSS SECTION LS 1557 DOWNSTREAM OF ROOSEVELT RD		80261.24	644.37	1478	2288	3092	3431	4214	2637
001SCSC3086	CROSS SECTION LS 1552 DOWNSTREAM OF ROOSEVELT RD		79837.24	645.83	1558	2433	3348	3739	4649	2787
001SCSC3085	CROSS SECTION LS 1529 UPSTREAM OF HARGER RD		78669.67	644.28	1546	2401	3288	3668	4556	2704
001SCSC3084	CROSS SECTION LS 1505 UPSTREAM OF HARGER RD		77401.65	644.01	1521	2366	3239	3611	4485	2652
001SCSC3083	CROSS SECTION LS 1497 UPSTREAM OF HARGER RD		77021.20	644.37	1498	2324	3205	3582	4461	2642
001SCSC3082	CROSS SECTION LS 1490 UPSTREAM OF HARGER RD		76648.41	643.19	1490	2342	3213	3576	4413	2635
001SCSC3081	CROSS SECTION LS 1480 UPSTREAM OF HARGER RD		76146.39	642.93	1475	2333	3204	3567	4404	2624
001SCSC3080	CROSS SECTION LS 1471 UPSTREAM OF HARGER RD		75654.00	644.13	1453	2314	3187	3550	4387	2608
001SCSC3079	CROSS SECTION LS 1468 UPSTREAM OF HARGER RD		75507.94	644.62	1444	2309	3182	3547	4385	2602
001SCSC3078	CROSS SECTION TSL-HARGER-1 UPSTREAM OF HARGER RD	HARGER ROAD	75469.28	644.90	1443	2307	3183	3550	4396	2601
001SCSC3077	TSL-HARGER-Z	INTERSTATE 88 RAMP	75339.21	645.47	1444	2315	3196	3564	4416	2603
001SCSC3076	TSL-RAMP-Z	INTERSTATE 88	75208.70	645.79	1458	2334	3207	3576	4431	2609
001SCSC3075	TSL-TOLL-Z		74979.40	645.58	1456	2333	3207	3576	4431	2608
001SCSC3074	TSL-CERMAK-5		74580.51	644.72	1454	2332	3207	3576	4435	2605
001SCSC3073	TSL-CERMAK-4		74088.47	644.58	1456	2333	3208	3578	4439	2601
001SCSC3072	TSL-CERMAK-3		73740.26	644.19	1457	2334	3211	3582	4445	2598
001SCSC3071	TSL-CERMAK-2		73302.02	643.74	1453	2333	3213	3585	4452	2594
001SCSC3070	TSL-CERMAK-1	22ND STREET (CERMAK ROAD)	72961.61	643.40	1445	2330	3211	3585	4455	2587
001SCSC3069	TSL-CERMAK-Z		72746.19	643.18	1445	2330	3212	3586	4457	2584

Cross Section ID	Description		Station	Invert Elevation	Peak Elevations						
					PVSTATS 2-Year	PVSTATS 10-Year	PVSTATS 50-Year	PVSTATS 100-Year	PVSTATS 500-Year	Sept. 1987 Event	RFM Data
			(ft)	(ft-NGVD)	(ft-NGVD)	(ft-NGVD)	(ft-NGVD)	(ft-NGVD)	(ft-NGVD)	(ft-NGVD)	(ft-NGVD)
001SCSC3144	MACKIE CROSS SECTION 39 - 800 FEET UPSTREAM OF FULLERTON,,,,,,		110604.08	660.06	670.10	671.85	673.30	673.92	675.49	673.96	674.90
001SCSC3143	MACKIE CROSS SECTION 40 - 500 FEET UPSTREAM OF FULLERTON,,,,,,		110181.98	660.52	669.99	671.75	673.23	673.86	675.44	673.90	674.90
001SCSC3142	MACKIE CROSS SECTION 40A - UPSTREAM OF FULLERTON,,,,,,		109807.17	660.57	669.88	671.67	673.15	673.78	675.38	673.84	674.80
001SCSC3141		FULLERTON AVENUE	109759.40	660.57	669.87	671.65	673.14	673.77	675.38	673.83	674.80
001SCSC3140			109710.56	661.97	669.80	671.53	672.95	673.55	675.05	673.62	674.80
001SCSC3139	MACKIE CROSS SECTION 41 - 1 BBL LENGTHS DOWNSTREAM OF STRUCTURE,		109688.32	661.97	669.80	671.52	672.94	673.54	675.04	673.61	674.80
001SCSC3138	MACKIE CROSS SECTION 43 - 100 FEET DOWNSTREAM OF FULLERTON,,,,,,		109594.54	661.97	669.78	671.51	672.93	673.52	675.02	673.60	674.80
001SCSC3137	MACKIE CROSS SECTION 44 - 350 FEET DOWNSTREAM OF FULLERTON,,,,,,		109395.08	662.84	669.75	671.48	672.90	673.50	675.02	673.58	674.80
001SCSC3136	MACKIE CROSS SECTION 45 - 600 FEET DOWNSTREAM OF FULLERTON,,,,,,		109163.15	662.84	669.69	671.45	672.87	673.46	674.94	673.53	674.70
001SCSC3135	MACKIE CROSS SECTION 46 - 1150 FEET DOWNSTREAM OF FULLERTON,,,,,		108415.51	659.16	669.57	671.34	672.76	673.35	674.82	673.42	674.70
001SCSC3134	MACKIE CROSS SECTION 47 - 1800 FEET DOWNSTREAM OF FULLERTON,,,,,		107630.92	657.70	669.49	671.27	672.68	673.27	674.72	673.34	674.60
001SCSC3133	MACKIE CROSS SECTION 48 - 2200 FEET DOWNSTREAM OF FULLERTON,,,,,		107262.18	660.06	669.41	671.19	672.61	673.19	674.66	673.28	674.50
001SCSC3132	MACKIE CROSS SECTION 49 - 2550 FEET DOWNSTREAM OF FULLERTON,,,,,		106794.70	659.52	669.29	671.08	672.47	673.05	674.50	673.15	674.50
001SCSC3131	MACKIE CROSS SECTION 49a - DOWNSTREAM OF FULLERTON,,,,,,		106136.74	660.10	669.14	670.94	672.33	672.90	674.37	673.00	674.50
001SCSC3130	MACKIE CROSS SECTION 50 - 3000 FEET UPSTREAM OF OF IL 64,,,,,,		105673.33	659.67	669.05	670.87	672.29	672.88	674.36	672.96	674.30
001SCSC3129	MACKIE CROSS SECTION 51 - 2600 FEET UPSTREAM OF IL 64,,,,,,		105224.86	660.79	669.01	670.83	672.26	672.85	674.33	672.94	674.20
001SCSC3128	MACKIE CROSS SECTION 52 - 2150 FEET UPSTREAM OF IL 64,,,,,,		104840.34	659.88	668.93	670.77	672.20	672.79	674.27	672.87	673.80
001SCSC3127	MACKIE CROSS SECTION 53 - 1800 FEET UPSTREAM OF IL 64,,,,,,		104478.35	659.96	668.85	670.69	672.14	672.73	674.22	672.80	673.50
001SCSC3126	MACKIE CROSS SECTION 54 - 1500 FEET UPSTREAM OF IL 64,,,,,,		104203.11	660.09	668.79	670.65	672.07	672.65	674.09	672.75	673.10
001SCSC3125	MACKIE CROSS SECTION 55 - 600 FEET UPSTREAM OF IL 64,,,,,,		103358.08	659.42	668.58	670.46	671.86	672.43	673.87	672.51	672.80
001SCSC3124	MACKIE CROSS SECTION 56 - 300 FEET UPSTREAM OF IL 64,,,,,,	NORTH AVENUE	102840.98	658.96	668.37	670.20	671.55	672.11	673.52	672.14	672.60
001SCSC3123	MACKIE CROSS SECTION 57 - 1 BBL LENGTHS DOWNSTREAM OF STRUCTURE,		102743.61	659.77	668.30	670.11	671.45	672.00	673.40	672.01	672.50
001SCSC3122	MACKIE CROSS SECTION 59 - 4 BBL LENGTHS DOWNSTREAM OF STRUCTURE,		102100.08	660.58	667.54	669.35	670.49	671.00	672.26	670.98	672.50
001SCSC3310	MIDWEST SURVEY JOB # 92-018, MAY 1992, XS NO. 6		101752.95	659.84	667.33	669.07	670.20	670.73	672.06	670.66	672.40
001SCSC3309	MIDWEST SURVEY JOB # 92-018, MAY 1992, XS NO. 7		101334.40	657.10	667.23	668.96	670.05	670.58	671.91	670.47	672.30
001SCSC3308	MIDWEST SURVEY JOB # 92-018, MAY 1992, XS NO. 1		100959.67	658.11	667.10	668.79	669.86	670.41	671.81	670.23	672.30
001SCSC3307	MIDWEST SURVEY JOB # 92-018, MAY 1992, XS NO. 2		100646.17	657.62	666.98	668.61	669.57	670.07	671.36	669.85	672.20
001SCSC3306	MIDWEST SURVEY JOB # 92-018, MAY 1992, XS NO. 3		100538.58	658.06	666.93	668.52	669.44	669.94	671.24	669.65	672.10
001SCSC3305	MIDWEST SURVEY JOB # 92-018, MAY 1992, XS NO. 4		100434.19	659.45	666.85	668.40	669.38	669.78	670.85	669.53	672.10
001SCSC3304	MIDWEST SURVEY JOB # 92-018, MAY 1992, XS NO. 5		100333.45	658.57	666.80	668.39	669.38	669.78	670.66	669.65	672.10
001SCSC3303	MODIFIED XS 3556 TO REPRESENT THE MODIFIED CHANNEL XS	QUARRY ROAD	100141.16	658.20	666.80	668.39	669.38	669.78	670.66	669.66	672.00
001SCSC3302	MODIFIED XS 3552 TO REPRESENT THE MODIFIED CHANNEL XS	IL CENTRAL RAILROAD	99720.36	658.20	666.61	668.11	669.00	669.34	670.06	669.33	672.00
001SCSC3121	CROSS SECTION LS 1924 DOWNSTREAM OF UNION PACIFIC RAIL ROAD		99412.44	660.27	666.41	667.82	668.69	668.99	669.61	668.94	671.30
001SCSC3120	CROSS SECTION LS 1917 DOWNSTREAM OF UNION PACIFIC RAIL ROAD		98993.39	657.34	666.13	667.63	668.50	668.81	669.41	668.78	670.70
001SCSC3119	CROSS SECTION LS 1908 DOWNSTREAM OF UNION PACIFIC RAIL ROAD		98447.72	658.10	666.02	667.53	668.42	668.72	669.34	668.71	669.90
001SCSC3118	CROSS SECTION LS 1899 DOWNSTREAM OF UNION PACIFIC RAIL ROAD		98108.06	658.05	665.97	667.46	668.37	668.69	669.33	668.65	669.50
001SCSC3117	CROSS SECTION LS 1892 DOWNSTREAM OF UNION PACIFIC RAIL ROAD		97871.71	657.31	665.88	667.37	668.27	668.57	669.19	668.57	669.00
001SCSC3116	CROSS SECTION LS 1885 UPSTREAM OF ST CHARLES RD		97243.64	655.32	665.63	667.09	667.95	668.25	668.84	668.26	668.50
001SCSC3115	CROSS SECTION LS 1875 UPSTREAM OF ST CHARLES RD		96831.06	656.38	665.47	666.91	667.79	668.09	668.70	668.11	668.30
001SCSC3114	CROSS SECTION LS 1868 UPSTREAM OF ST CHARLES RD	ST. CHARLES ROAD	96480.64	655.57	665.27	666.73	667.64	667.96	668.58	667.97	668.10
001SCSC3113	MACKIE CROSS SECTION 60 - 1 BBL LENGTHS DOWNSTREAM OF STRUCTURE,		96071.51	654.89	664.95	666.37	667.25	667.55	668.15	667.60	667.80
001SCSC3111	MACKIE CROSS SECTION 62 - 4 BBL LENGTHS DOWNSTREAM OF STRUCTURE,	ROUTE 83	95562.19	655.57	664.11	665.43	666.26	666.54	667.11	666.62	667.50
001SCSC3109	CROSS SECTION LS 1834 UPSTREAM OF ILLINOIS PRAIRIE PATH		94618.34	655.00	663.44	664.72	665.51	665.78	666.32	665.90	667.00

Cross Section ID	Description		Station	Invert Elevation	Peak Elevations						
					PVSTATS 2-Year	PVSTATS 10-Year	PVSTATS 50-Year	PVSTATS 100-Year	PVSTATS 500-Year	Sept. 1987 Event	RFM Data
			(ft)	(ft-NGVD)	(ft-NGVD)	(ft-NGVD)	(ft-NGVD)	(ft-NGVD)	(ft-NGVD)	(ft-NGVD)	(ft-NGVD)
001SCSC3108	CROSS SECTION LS 1822 UPSTREAM OF ILLINOIS PRAIRIE PATH		94045.88	655.17	663.26	664.60	665.42	665.69	666.24	665.80	666.80
001SCSC3107	CROSS SECTION LS 1820 UPSTREAM OF ILLINOIS PRAIRIE PATH	ILLINOIS PRAIRIE PATH	93991.01	655.35	663.21	664.54	665.35	665.62	666.16	665.73	666.80
001SCSC3106	CROSS SECTION LS 1818 DOWNSTREAM OF ILLINOIS PRAIRIE PATH		93819.80	655.03	663.14	664.45	665.27	665.54	666.09	665.64	666.40
001SCSC3105	CROSS SECTION LS 1810 DOWNSTREAM OF ILLINOIS PRAIRIE PATH		93472.14	654.41	662.88	664.13	664.89	665.15	665.66	665.22	665.80
001SCSC3104	CROSS SECTION LS 1803 DOWNSTREAM OF ILLINOIS PRAIRIE PATH		93069.56	653.94	662.48	663.79	664.60	664.88	665.41	664.90	665.60
001SCSC3103	CROSS SECTION LS 1766 DOWNSTREAM OF ILLINOIS PRAIRIE PATH		91098.53	652.86	660.30	661.92	663.09	663.50	664.33	662.95	664.70
001SCSC3102	CROSS SECTION LS 1734 UPSTREAM OF ROOSEVELT RD		89411.91	650.32	658.99	660.95	662.47	663.01	664.21	661.87	664.00
001SCSC3101	CROSS SECTION LS 1724 UPSTREAM OF ROOSEVELT RD		88842.75	649.58	658.55	660.70	662.37	662.98	664.21	661.61	663.60
001SCSC3100	CROSS SECTION LS 1714 UPSTREAM OF ROOSEVELT RD		88356.29	648.22	658.37	660.55	662.23	662.83	664.06	661.38	663.20
001SCSC3099	CROSS SECTION LS 1707 UPSTREAM OF ROOSEVELT RD		87991.15	647.75	658.20	660.44	662.15	662.76	664.02	661.27	663.00
001SCSC3098	CROSS SECTION LS 1690 UPSTREAM OF ROOSEVELT RD		87107.05	648.38	657.95	660.15	661.84	662.45	663.70	660.98	662.70
001SCSC3097	CROSS SECTION LS 1673 UPSTREAM OF ROOSEVELT RD		86253.73	647.95	657.71	659.90	661.58	662.19	663.43	660.70	662.50
001SCSC3096	CROSS SECTION LS 1665 UPSTREAM OF ROOSEVELT RD		85801.02	648.05	657.62	659.80	661.48	662.08	663.31	660.59	662.50
001SCSC3095	CROSS SECTION LS 1650 UPSTREAM OF ROOSEVELT RD	BUTTERFIELD ROAD	84991.54	646.57	657.45	659.64	661.28	661.87	663.06	660.39	662.50
001SCSC3094	CROSS SECTION LS 1636 UPSTREAM OF ROOSEVELT RD		84216.14	647.41	657.24	659.37	660.93	661.49	662.64	659.97	662.50
001SCSC3093	CROSS SECTION LS 1613 UPSTREAM OF ROOSEVELT RD	ROOSEVELT ROAD	83127.04	644.86	656.98	659.10	660.61	661.15	662.25	659.67	662.50
001SCSC3092	CROSS SECTION LS 1603 DOWNSTREAM OF ROOSEVELT RD		82522.95	645.75	656.76	658.75	660.18	660.69	661.74	659.27	661.20
001SCSC3091	CROSS SECTION LS 1598 DOWNSTREAM OF ROOSEVELT RD		82249.96	646.15	656.64	658.62	660.06	660.57	661.63	659.13	661.00
001SCSC3090	CROSS SECTION LS 1588 DOWNSTREAM OF ROOSEVELT RD		81717.60	645.39	656.37	658.32	659.73	660.24	661.30	658.79	660.30
001SCSC3089	CROSS SECTION LS 1582 DOWNSTREAM OF ROOSEVELT RD		81417.13	643.38	656.27	658.20	659.59	660.09	661.13	658.67	660.00
001SCSC3088	CROSS SECTION LS 1570 DOWNSTREAM OF ROOSEVELT RD		80567.06	644.44	656.12	658.02	659.38	659.87	660.89	658.45	659.50
001SCSC3087	CROSS SECTION LS 1557 DOWNSTREAM OF ROOSEVELT RD		80261.24	644.37	656.06	657.94	659.30	659.78	660.80	658.37	659.10
001SCSC3086	CROSS SECTION LS 1552 DOWNSTREAM OF ROOSEVELT RD		79837.24	645.83	655.97	657.83	659.18	659.68	660.70	658.24	658.90
001SCSC3085	CROSS SECTION LS 1529 UPSTREAM OF HARGER RD		78669.67	644.28	655.52	657.37	658.73	659.23	660.28	657.83	658.40
001SCSC3084	CROSS SECTION LS 1505 UPSTREAM OF HARGER RD		77401.65	644.01	655.25	657.11	658.48	658.98	660.03	657.56	657.80
001SCSC3083	CROSS SECTION LS 1497 UPSTREAM OF HARGER RD		77021.20	644.37	655.17	657.01	658.40	658.91	659.99	657.48	657.60
001SCSC3082	CROSS SECTION LS 1490 UPSTREAM OF HARGER RD		76648.41	643.19	655.08	656.94	658.29	658.78	659.79	657.37	657.30
001SCSC3081	CROSS SECTION LS 1480 UPSTREAM OF HARGER RD		76146.39	642.93	655.01	656.89	658.24	658.73	659.74	657.32	657.10
001SCSC3080	CROSS SECTION LS 1471 UPSTREAM OF HARGER RD		75654.00	644.13	654.98	656.86	658.22	658.72	659.74	657.30	657.00
001SCSC3079	CROSS SECTION LS 1468 UPSTREAM OF HARGER RD		75507.94	644.62	654.97	656.86	658.22	658.72	659.74	657.29	657.00
001SCSC3078	CROSS SECTION TSL-HARGER-1 UPSTREAM OF HARGER RD	HARGER ROAD	75469.28	644.90	654.97	656.85	658.22	658.72	659.74	657.29	657.00
001SCSC3077	TSL-HARGER-Z	INTERSTATE 88 RAMP	75339.21	645.47	654.83	656.69	658.03	658.53	659.55	657.10	656.80
001SCSC3076	TSL-RAMP-Z	INTERSTATE 88	75208.70	645.79	654.67	656.50	657.81	658.29	659.29	656.90	656.70
001SCSC3075	TSL-TOLL-Z		74979.40	645.58	654.53	656.33	657.61	658.08	659.05	656.71	656.50
001SCSC3074	TSL-CERMAK-5		74580.51	644.72	654.46	656.25	657.51	657.97	658.92	656.62	656.40
001SCSC3073	TSL-CERMAK-4		74088.47	644.58	654.35	656.12	657.35	657.80	658.74	656.47	656.00
001SCSC3072	TSL-CERMAK-3		73740.26	644.19	654.15	655.86	657.05	657.48	658.37	656.20	655.70
001SCSC3071	TSL-CERMAK-2		73302.02	643.74	653.97	655.65	656.81	657.23	658.10	655.98	655.40
001SCSC3070	TSL-CERMAK-1	22ND STREET (CERMAK ROAD)	72961.61	643.40	653.89	655.56	656.69	657.10	657.95	655.87	655.30
001SCSC3069	TSL-CERMAK-Z		72746.19	643.18	653.78	655.43	656.54	656.94	657.75	655.74	655.10
001SCSC3068	TSL-BNG1-3		72450.23	642.78	653.74	655.37	656.45	656.84	657.64	655.67	655.10
001SCSC3067	TSL-BNG1-2		72094.02	643.43	653.69	655.31	656.40	656.79	657.60	655.60	655.10

Table 3
Summary of USGS Stream flow Gages at Lower Salt Creek

Gage Number	Gage Name	Location	Drainage Area (sq. miles)	Datum (ft-NGVD)
05531175	Wood Dale	Downstream of Irving Park Road	73.99	663.30
05531300	Elmhurst	Downstream of Prairie Path	92.13	651.93
05531410	Oak Brook	Downstream of 22nd Street (Cermak Road)	104.66	600.00
05531500	Western Springs	Downstream of Wolf Road	117.18	624.93

In addition, the high water marks for the September 2008 were surveyed at 22 locations to calibrate the September 2008 event. The observed flood elevations at locations were compared with simulated flood elevations from storm event of September 2008. The location and comparison of the surveyed and simulated high water marls is provided in Table 4.

Table 4
Summary of High Water Marks for September 2008 Event

Location	Flood Elevations (ft-NGVD)		Difference
	Measured	FEQ SEPT 2008 Storm Event	
Parkway of 1388 Wasdale Ave - Elk Grove Village (Upstream of Devon Avenue)	684.76	684.58	-0.18
Parkway between 1372 and 1364 Carlisle – Elk Grove Village	684.86	684.58	-0.28
East of Salt Creek Golf Course at power pole number 68355 or FDR0116 (north of Thorndale Avenue) – Itasca	683.63	682.60	-1.03
South of Industrial Drive on the east side of Prospect Avenue - Itasca	682.21	681.30	-0.91
Parkway at 232 Forest Drive - Wood Dale	678.92	678.50	-0.42
Outside of the entrance to the Salt Creek Park Forest Preserve - Wood Dale (north of Elizabeth Drive)	677.73	677.23	-0.50

Location	Flood Elevations (ft-NGVD)		Difference
	Measured	FEQ SEPT 2008 Storm Event	
North of Elizabeth Drive by 199 S Addison Road (Pixie Dixie Day Care) – Wood Dale	678.04	677.23	-0.81
Parkway by 325 Gilbert Drive - Wood Dale	678.31	677.45	-0.86
Between 215A and 255 Oak Street on the sledding hill at the end of Oak Drive – Addison	676.05	675.40	-0.65
Shell Station north of Lake Street (US 20) and east of Villa Avenue/Wood Dale Road – Addison	675.76	674.61	-1.15
Louis Reservoir at Diversey Avenue (outside of the reservoir) – Addison	675.29	674.58	-0.71
Parkway at 112 Michigan Avenue - Addison	675.92	674.51	-1.41
Parkway of 1190 Armitage Avenue - Villa Park	674.71	674.00	-0.71
Parkway at northwest corner of Routes 83 (Kingery Highway) and 64 (North Avenue) – Elmhurst	670.43	671.96	1.53
Rotary Park at the end of Wildwood - Villa Park (by Bike path embankment)	666.54	665.09	-1.45
Eldridge Park Canoe Launch – Elmhurst	659.61	659.82	0.21
360 W Butterfield Road – Elmhurst Near northeast corner of parking lot	659.76	659.67	-0.09
Northeast abutment of the Timber Edge Drive Bridge – Oakbrook Terrace	658.22	659.12	0.90
417 Forest Trail – Oak Brook	657.32	657.65	0.33
15 Yorkshire Woods – Oak Brook	656.65	657.12	0.47
Bike Path behind the York Tavern west of York Road – Oak Brook	645.43	644.41	-1.02
Parkway across from 15 Salt Creek Lane - Hinsdale	642.74	642.84	0.10

666.54 - 0.28 = 666.26 (NAVD 88)

Peak Flow Rate Summary:

HEC-RAS River Station	FEQ Model Cross-Section ID	Peak Flows					
		2-Yr cfs	10-Yr cfs	50-Yr cfs	100-Yr cfs	200-Yr cfs	500-Yr cfs
96480.64	3114	936	1396	1723	1858	1934	2160
96139.50	n/a	940	1414	1756	1893	1970	2201
96071.51	3113	941	1417	1763	1900	1977	2209
95562.19	3111	994	1484	1852	1994	2071	2303
94618.34	3109	994	1477	1839	1979	2056	2286
94390.14	n/a	994	1475	1834	1973	2049	2277
94045.88	3108	993	1472	1827	1964	2039	2264

Note:

1) Peak flows rates between FEQ sections are interpolated.
2) 200-Yr peak flow rates are interpolated between the 100-yr and 500-year flow rates.

Starting Water Surface Elevation Summary:

Elevations extracted from the FEQ model:

HEC-RAS River Station	FEQ Model Cross-Section ID	Elevations (NGVD 29) from FEQ Model					
		2-Yr feet	10-Yr feet	50-Yr feet	100-Yr feet	200-Yr feet	500-Yr feet
94618.34	3109	663.44	664.72	665.51	665.78	665.92	666.32
94390.14	n/a	663.37	664.67	665.47	665.74	665.88	666.29
94045.88	3108	663.26	664.60	665.42	665.69	665.83	666.24

Elevations converted to the NAVD 88 datum for HEC-RAS model:

HEC-RAS River Station	FEQ Model Cross-Section ID	Elevations corrected to the NAVD 88 datum					
		2-Yr feet	10-Yr feet	50-Yr feet	100-Yr feet	200-Yr feet	500-Yr feet
94618.34	3109	663.16	664.44	665.23	665.50	665.64	666.04
94390.14	n/a	663.09	664.39	665.19	665.46	665.60	666.01
94045.88	3108	662.98	664.32	665.14	665.41	665.55	665.96

Notes:

1) NGVD 29 elevation - 0.28' = NAVD 88 elevation

2) HEC-RAS starting water surface elevation at river station 94390.14 are interpolated between FEQ cross-sections 3108 and 3109.

HEC-RAS
HYDRAULIC CALULATIONS

EXISTING CONDITIONS

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
```

****

PROJECT DATA
Project Title: Salt Creek Ex Scour
Project File : SaltCreek Ex Scour.prj
Run Date and Time: 8/23/2016 8:24:35 AM

Project in English units

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PLAN DATA

Plan Title: Ex Scour
Plan File : e:\2015\15228\Calcs&Data\NR\Storm\Hydraulic Report\HEC-RAS\Scour Run\SaltCreek_Ex_Scour.p04

Geometry Title: SaltCreek Geom Ex
Geometry File : e:\2015\15228\Calcs&Data\NR\Storm\Hydraulic Report\HEC-RAS\Scour Run\SaltCreek_Ex_Scour.g01

Flow Title   : SaltCreek Reg Q
Flow File   : e:\2015\15228\Calcs&Data\NR\Storm\Hydraulic Report\HEC-RAS\Scour Run\SaltCreek_Ex_Scour.f01

Plan Summary Information:
Number of: Cross Sections =   12   Multiple Openings =   0
            Culverts   =   0   Inline Structures =   0
            Bridges   =   3   Lateral Structures =   0

Computational Information
    Water surface calculation tolerance = 0.01
    Critical depth calculation tolerance = 0.01
    Maximum number of iterations   = 20
    Maximum difference tolerance   = 0.3
    Flow tolerance factor   = 0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method: Average Conveyance
    Computational Flow Regime: Subcritical Flow

****

FLOW DATA

Flow Title: SaltCreek Reg Q
Flow File : e:\2015\15228\Calcs&Data\NR\Storm\Hydraulic Report\HEC-RAS\Scour Run\SaltCreek_Ex_Scour.f01

Flow Data (cfs)

River	Reach	RS	2yr	10yr	50yr	100yr	200yr	500yr
Salt Creek	A	96139.5	940	1414	1756	1893	1970	2201
Salt Creek	A	96071.51	941	1417	1763	1900	1977	2209
Salt Creek	A	96010.9	994	1484	1852	1994	2071	2303
Salt Creek	A	95497.4	994	1477	1839	1979	2056	2286
Salt Creek	A	94390.14	994	1475	1834	1973	2049	2277

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Salt Creek	A	2yr		Known WS = 663.09
Salt Creek	A	10yr		Known WS = 664.39
Salt Creek	A	50yr		Known WS = 665.19
Salt Creek	A	100yr		Known WS = 665.46
Salt Creek	A	200yr		Known WS = 665.6
Salt Creek	A	500yr		Known WS = 666.01

****

GEOMETRY DATA

Geometry Title: SaltCreek Geom Ex
Geometry File : e:\2015\15228\Calcs&Data\NR\Storm\Hydraulic Report\HEC-RAS\Scour Run\SaltCreek_Ex_Scour.g01

CROSS SECTION

RIVER: Salt Creek
REACH: A   RS: 96139.5

INPUT
Description: Most u/s section (surveyed section)
Station Elevation Data   num=   21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-191.7	670.29	-185.8	670.4	-171.6	670.75	-159.6	671.06	-124.9	672.03
-113.1	669.8	-108.2	669.71	-96.2	666.15	-85.7	665.98	-58.5	669.26
-24.9	661.93	-23.6	661.77	-20.6	658.34	-15.3	656.61	-9.2	655.84

```
    -1.3  655.82    12.5  656.07    23.2  658.48   26.57  661.63    38.2  672.52
    85.8  673.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
  -191.7     .12   -24.9    .065   26.57     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -24.9   26.57              32   67.99      75             .1       .3
Left Levee      Station=   -58.5      Elevation=  669.26
```

CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	664.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.120	0.065	0.120
W.S. Elev (ft)	664.09	Reach Len. (ft)	32.00	67.99	75.00
Crit W.S. (ft)	658.92	Flow Area (sq ft)	10.66	362.06	3.22
E.G. Slope (ft/ft)	0.001030	Area (sq ft)	10.66	362.06	3.22
Q Total (cfs)	940.00	Flow (cfs)	4.39	934.42	1.19
Top Width (ft)	63.98	Top Width (ft)	9.89	51.47	2.62
Vel Total (ft/s)	2.50	Avg. Vel. (ft/s)	0.41	2.58	0.37
Max Chl Dpth (ft)	8.27	Hydr. Depth (ft)	1.08	7.03	1.23
Conv. Total (cfs)	29290.1	Conv. (cfs)	136.7	29116.3	37.1
Length Wtd. (ft)	67.44	Wetted Per. (ft)	10.12	54.87	3.59
Min Ch El (ft)	655.82	Shear (lb/sq ft)	0.07	0.42	0.06
Alpha	1.06	Stream Power (lb/ft s)	85.80	-58.50	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	1.41	21.89	1.09
C & E Loss (ft)	0.00	Cum SA (acres)	0.72	3.19	0.92

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	665.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.	0.120	0.065	0.120
W.S. Elev (ft)	665.53	Reach Len. (ft)	32.00	67.99	75.00
Crit W.S. (ft)	659.68	Flow Area (sq ft)	29.69	436.31	8.12
E.G. Slope (ft/ft)	0.001225	Area (sq ft)	29.69	436.31	8.12
Q Total (cfs)	1414.00	Flow (cfs)	18.75	1390.80	4.45
Top Width (ft)	72.13	Top Width (ft)	16.50	51.47	4.16
Vel Total (ft/s)	2.98	Avg. Vel. (ft/s)	0.63	3.19	0.55
Max Chl Dpth (ft)	9.71	Hydr. Depth (ft)	1.80	8.48	1.95
Conv. Total (cfs)	40396.6	Conv. (cfs)	535.6	39733.7	127.2
Length Wtd. (ft)	66.99	Wetted Per. (ft)	16.89	54.87	5.70
Min Ch El (ft)	655.82	Shear (lb/sq ft)	0.13	0.61	0.11
Alpha	1.12	Stream Power (lb/ft s)	85.80	-58.50	0.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	2.53	26.30	2.89
C & E Loss (ft)	0.00	Cum SA (acres)	0.93	3.20	1.74

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50yr

E.G. Elev (ft)	666.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.	0.120	0.065	0.120
W.S. Elev (ft)	666.42	Reach Len. (ft)	32.00	67.99	75.00
Crit W.S. (ft)	660.19	Flow Area (sq ft)	46.10	481.90	12.23
E.G. Slope (ft/ft)	0.001334	Area (sq ft)	46.10	481.90	12.23
Q Total (cfs)	1756.00	Flow (cfs)	35.18	1712.80	8.02
Top Width (ft)	77.14	Top Width (ft)	20.56	51.47	5.11
Vel Total (ft/s)	3.25	Avg. Vel. (ft/s)	0.76	3.55	0.66
Max Chl Dpth (ft)	10.60	Hydr. Depth (ft)	2.24	9.36	2.39
Conv. Total (cfs)	48074.2	Conv. (cfs)	963.0	46891.6	219.6
Length Wtd. (ft)	66.69	Wetted Per. (ft)	21.04	54.87	7.00
Min Ch El (ft)	655.82	Shear (lb/sq ft)	0.18	0.73	0.15
Alpha	1.17	Stream Power (lb/ft s)	85.80	-58.50	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	3.41	29.01	4.96
C & E Loss (ft)	0.00	Cum SA (acres)	1.16	3.20	2.40

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	666.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.	0.120	0.065	0.120
W.S. Elev (ft)	666.72	Reach Len. (ft)	32.00	67.99	75.00
Crit W.S. (ft)	660.37	Flow Area (sq ft)	52.57	497.56	13.83
E.G. Slope (ft/ft)	0.001385	Area (sq ft)	52.57	497.56	13.83
Q Total (cfs)	1893.00	Flow (cfs)	42.70	1840.67	9.63
Top Width (ft)	78.86	Top Width (ft)	21.95	51.47	5.44
Vel Total (ft/s)	3.36	Avg. Vel. (ft/s)	0.81	3.70	0.70
Max Chl Dpth (ft)	10.90	Hydr. Depth (ft)	2.39	9.67	2.54
Conv. Total (cfs)	50864.8	Conv. (cfs)	1147.3	49458.8	258.8
Length Wtd. (ft)	66.59	Wetted Per. (ft)	22.47	54.87	7.45
Min Ch El (ft)	655.82	Shear (lb/sq ft)	0.20	0.78	0.16
Alpha	1.18	Stream Power (lb/ft s)	85.80	-58.50	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	3.75	29.93	5.65
C & E Loss (ft)	0.00	Cum SA (acres)	1.25	3.20	2.52

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	667.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.	0.120	0.065	0.120
W.S. Elev (ft)	666.88	Reach Len. (ft)	32.00	67.99	75.00
Crit W.S. (ft)	660.48	Flow Area (sq ft)	56.11	505.71	14.71
E.G. Slope (ft/ft)	0.001416	Area (sq ft)	56.11	505.71	14.71
Q Total (cfs)	1970.00	Flow (cfs)	47.09	1912.34	10.57
Top Width (ft)	79.75	Top Width (ft)	22.68	51.47	5.60
Vel Total (ft/s)	3.42	Avg. Vel. (ft/s)	0.84	3.78	0.72
Max Chl Dpth (ft)	11.06	Hydr. Depth (ft)	2.47	9.83	2.62
Conv. Total (cfs)	52349.3	Conv. (cfs)	1251.3	50817.2	280.8

* Length Wtd. (ft)	*	66.54	* Wetted Per. (ft)	*	23.21	*	54.87	*	7.68	*
* Min Ch El (ft)	*	655.82	* Shear (lb/sq ft)	*	0.21	*	0.81	*	0.17	*
* Alpha	*	1.19	* Stream Power (lb/ft s)	*	85.80	*	-58.50	*	0.00	*
* Frctn Loss (ft)	*	0.09	* Cum Volume (acre-ft)	*	3.95	*	30.42	*	6.03	*
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	1.30	*	3.20	*	2.56	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	*	667.56	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.24	* Wt. n-Val.	*	0.120	*	0.065	*	0.120	*	
* W.S. Elev (ft)	*	667.31	* Reach Len. (ft)	*	32.00	*	67.99	*	75.00	*	
* Crit W.S. (ft)	*	660.77	* Flow Area (sq ft)	*	66.45	*	528.19	*	17.25	*	
* E.G. Slope (ft/ft)	*	0.001515	* Area (sq ft)	*	66.45	*	528.19	*	17.25	*	
* Q Total (cfs)	*	2201.00	* Flow (cfs)	*	61.02	*	2126.45	*	13.53	*	
* Top Width (ft)	*	82.22	* Top Width (ft)	*	24.68	*	51.47	*	6.07	*	
* Vel Total (ft/s)	*	3.60	* Avg. Vel. (ft/s)	*	0.92	*	4.03	*	0.78	*	
* Max Chl Dpth (ft)	*	11.49	* Hydr. Depth (ft)	*	2.69	*	10.26	*	2.84	*	
* Conv. Total (cfs)	*	56553.2	* Conv. (cfs)	*	1567.9	*	54637.7	*	347.6	*	
* Length Wtd. (ft)	*	66.39	* Wetted Per. (ft)	*	25.26	*	54.87	*	8.32	*	
* Min Ch El (ft)	*	655.82	* Shear (lb/sq ft)	*	0.25	*	0.91	*	0.20	*	
* Alpha	*	1.21	* Stream Power (lb/ft s)	*	85.80	*	-58.50	*	0.00	*	
* Frctn Loss (ft)	*	0.10	* Cum Volume (acre-ft)	*	4.44	*	31.58	*	7.05	*	
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	1.39	*	2.85	*	2.68	*	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 96071.51

INPUT
Description: 3113 (Regulatory Section)
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-2751.5	674.38	-2483.48	673.53	-2215.48	675.88	-1947.49	673.05	-1679.45	673.44
-1411.47	671.34	-1143.5	669.6	-875.5	668.18	-607.51	669.97	-339.48	670.05
-71.5	670.3	-53.02	668.4	-31.16	661.76	-19.15	661	-14.75	657.82
-10.95	656.57	3.76	654.71	14.14	654.61	20.62	657.48	25.53	660.45
39.94	669.18	60.44	670.89	238.42	677.13	416.46	678.64	594.44	677.97
772.42	675.86	950.46	673.65	1128.44	673.58	1306.41	674.11	1484.46	674.84
1662.44	675.62	1840.47	681.22						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-2751.5	.085	-1947.49	.2	-607.51	.12	-19.15	.065	39.94	.12
416.46	.2								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-19.15	25.53	87	60.61	39	.1	.3

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	*	664.12	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.10	* Wt. n-Val.	*	0.120	*	0.065	*	0.065	*	
* W.S. Elev (ft)	*	664.02	* Reach Len. (ft)	*	87.00	*	60.61	*	39.00	*	
* Crit W.S. (ft)	*	658.43	* Flow Area (sq ft)	*	40.08	*	343.08	*	10.51	*	
* E.G. Slope (ft/ft)	*	0.000952	* Area (sq ft)	*	40.08	*	343.08	*	10.51	*	
* Q Total (cfs)	*	941.00	* Flow (cfs)	*	26.47	*	904.71	*	9.83	*	
* Top Width (ft)	*	70.02	* Top Width (ft)	*	19.45	*	44.68	*	5.89	*	
* Vel Total (ft/s)	*	2.39	* Avg. Vel. (ft/s)	*	0.66	*	2.64	*	0.93	*	
* Max Chl Dpth (ft)	*	9.41	* Hydr. Depth (ft)	*	2.06	*	7.68	*	1.78	*	
* Conv. Total (cfs)	*	30496.4	* Conv. (cfs)	*	857.7	*	29320.2	*	318.5	*	
* Length Wtd. (ft)	*	64.94	* Wetted Per. (ft)	*	19.80	*	47.46	*	6.89	*	
* Min Ch El (ft)	*	654.61	* Shear (lb/sq ft)	*	0.12	*	0.43	*	0.09	*	
* Alpha	*	1.17	* Stream Power (lb/ft s)	*	1840.47	*	0.00	*	0.00	*	
* Frctn Loss (ft)	*	0.03	* Cum Volume (acre-ft)	*	1.39	*	21.34	*	1.08	*	
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.71	*	3.12	*	0.91	*	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	*	665.60	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.15	* Wt. n-Val.	*	0.120	*	0.065	*	0.065	*	
* W.S. Elev (ft)	*	665.45	* Reach Len. (ft)	*	87.00	*	60.61	*	39.00	*	
* Crit W.S. (ft)	*	659.30	* Flow Area (sq ft)	*	71.29	*	407.04	*	20.63	*	
* E.G. Slope (ft/ft)	*	0.001154	* Area (sq ft)	*	71.29	*	407.04	*	20.63	*	
* Q Total (cfs)	*	1417.00	* Flow (cfs)	*	66.11	*	1324.30	*	26.59	*	
* Top Width (ft)	*	77.09	* Top Width (ft)	*	24.16	*	44.68	*	8.25	*	
* Vel Total (ft/s)	*	2.84	* Avg. Vel. (ft/s)	*	0.93	*	3.25	*	1.29	*	
* Max Chl Dpth (ft)	*	10.84	* Hydr. Depth (ft)	*	2.95	*	9.11	*	2.50	*	
* Conv. Total (cfs)	*	41714.8	* Conv. (cfs)	*	1946.3	*	38985.7	*	782.8	*	
* Length Wtd. (ft)	*	65.10	* Wetted Per. (ft)	*	24.73	*	47.46	*	9.65	*	
* Min Ch El (ft)	*	654.61	* Shear (lb/sq ft)	*	0.21	*	0.62	*	0.15	*	
* Alpha	*	1.24	* Stream Power (lb/ft s)	*	1840.47	*	0.00	*	0.00	*	
* Frctn Loss (ft)	*	0.04	* Cum Volume (acre-ft)	*	2.49	*	25.64	*	2.87	*	
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.91	*	3.12	*	1.73	*	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	*	666.52	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.19	* Wt. n-Val.	*	0.120	*	0.065	*	0.065	*	
* W.S. Elev (ft)	*	666.33	* Reach Len. (ft)	*	87.00	*	60.61	*	39.00	*	
* Crit W.S. (ft)	*	659.87	* Flow Area (sq ft)	*	93.82	*	446.35	*	28.53	*	

* E.G. Slope (ft/ft)	*0.001268	* Area (sq ft)	* 93.82	* 446.35	* 28.53	*
* Q Total (cfs)	* 1763.00	* Flow (cfs)	* 101.54	* 1618.51	* 42.94	*
* Top Width (ft)	* 81.44	* Top Width (ft)	* 27.05	* 44.68	* 9.71	*
* Vel Total (ft/s)	* 3.10	* Avg. Vel. (ft/s)	* 1.08	* 3.63	* 1.50	*
* Max Chl Dpth (ft)	* 11.72	* Hydr. Depth (ft)	* 3.47	* 9.99	* 2.94	*
* Conv. Total (cfs)	* 49519.1	* Conv. (cfs)	* 2852.2	* 45460.8	* 1206.1	*
* Length Wtd. (ft)	* 65.10	* Wetted Per. (ft)	* 27.76	* 47.46	* 11.35	*
* Min Ch El (ft)	* 654.61	* Shear (lb/sq ft)	* 0.27	* 0.74	* 0.20	*
* Alpha	* 1.27	* Stream Power (lb/ft s)	* 1840.47	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.04	* Cum Volume (acre-ft)	* 3.36	* 28.28	* 4.93	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.14	* 3.13	* 2.39	*

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	* 666.84	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.20	* Wt. n-Val.	* 0.120	* 0.065	* 0.065 *
* W.S. Elev (ft)	* 666.63	* Reach Len. (ft)	* 87.00	* 60.61	* 39.00 *
* Crit W.S. (ft)	* 660.10	* Flow Area (sq ft)	* 102.14	* 459.83	* 31.54 *
* E.G. Slope (ft/ft)	*0.001317	* Area (sq ft)	* 102.14	* 459.83	* 31.54 *
* Q Total (cfs)	* 1900.00	* Flow (cfs)	* 116.37	* 1733.61	* 50.02 *
* Top Width (ft)	* 82.93	* Top Width (ft)	* 28.05	* 44.68	* 10.20 *
* Vel Total (ft/s)	* 3.20	* Avg. Vel. (ft/s)	* 1.14	* 3.77	* 1.59 *
* Max Chl Dpth (ft)	* 12.02	* Hydr. Depth (ft)	* 3.64	* 10.29	* 3.09 *
* Conv. Total (cfs)	* 52357.6	* Conv. (cfs)	* 3206.8	* 47772.4	* 1378.3 *
* Length Wtd. (ft)	* 65.09	* Wetted Per. (ft)	* 28.80	* 47.46	* 11.93 *
* Min Ch El (ft)	* 654.61	* Shear (lb/sq ft)	* 0.29	* 0.80	* 0.22 *
* Alpha	* 1.28	* Stream Power (lb/ft s)	* 1840.47	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.04	* Cum Volume (acre-ft)	* 3.70	* 29.19	* 5.61 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.23	* 3.13	* 2.50 *

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	* 667.00	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.21	* Wt. n-Val.	* 0.120	* 0.065	* 0.065 *
* W.S. Elev (ft)	* 666.79	* Reach Len. (ft)	* 87.00	* 60.61	* 39.00 *
* Crit W.S. (ft)	* 660.22	* Flow Area (sq ft)	* 106.58	* 466.84	* 33.16 *
* E.G. Slope (ft/ft)	*0.001347	* Area (sq ft)	* 106.58	* 466.84	* 33.16 *
* Q Total (cfs)	* 1977.00	* Flow (cfs)	* 124.80	* 1798.11	* 54.09 *
* Top Width (ft)	* 83.71	* Top Width (ft)	* 28.56	* 44.68	* 10.46 *
* Vel Total (ft/s)	* 3.26	* Avg. Vel. (ft/s)	* 1.17	* 3.85	* 1.63 *
* Max Chl Dpth (ft)	* 12.18	* Hydr. Depth (ft)	* 3.73	* 10.45	* 3.17 *
* Conv. Total (cfs)	* 53867.2	* Conv. (cfs)	* 3400.4	* 48993.1	* 1473.7 *
* Length Wtd. (ft)	* 65.09	* Wetted Per. (ft)	* 29.34	* 47.46	* 12.23 *
* Min Ch El (ft)	* 654.61	* Shear (lb/sq ft)	* 0.31	* 0.83	* 0.23 *
* Alpha	* 1.29	* Stream Power (lb/ft s)	* 1840.47	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.05	* Cum Volume (acre-ft)	* 3.89	* 29.66	* 5.99 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.28	* 3.13	* 2.55 *

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 667.46	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.24	* Wt. n-Val.	* 0.120	* 0.065	* 0.065 *
* W.S. Elev (ft)	* 667.22	* Reach Len. (ft)	* 87.00	* 60.61	* 39.00 *
* Crit W.S. (ft)	* 660.53	* Flow Area (sq ft)	* 119.22	* 486.13	* 37.83 *
* E.G. Slope (ft/ft)	*0.001444	* Area (sq ft)	* 119.22	* 486.13	* 37.83 *
* Q Total (cfs)	* 2209.00	* Flow (cfs)	* 150.68	* 1991.57	* 66.75 *
* Top Width (ft)	* 85.84	* Top Width (ft)	* 29.99	* 44.68	* 11.18 *
* Vel Total (ft/s)	* 3.43	* Avg. Vel. (ft/s)	* 1.26	* 4.10	* 1.76 *
* Max Chl Dpth (ft)	* 12.61	* Hydr. Depth (ft)	* 3.98	* 10.88	* 3.39 *
* Conv. Total (cfs)	* 58134.2	* Conv. (cfs)	* 3965.5	* 52412.1	* 1756.6 *
* Length Wtd. (ft)	* 65.10	* Wetted Per. (ft)	* 30.82	* 47.46	* 13.07 *
* Min Ch El (ft)	* 654.61	* Shear (lb/sq ft)	* 0.35	* 0.92	* 0.26 *
* Alpha	* 1.30	* Stream Power (lb/ft s)	* 1840.47	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.05	* Cum Volume (acre-ft)	* 4.37	* 30.79	* 7.00 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.37	* 2.77	* 2.66 *

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 96010.9

INPUT
Description: U/S St. Charles (surveyed x-section)
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-88.4	670.76	-83.4	670.64	-45.8	661.57	-20.75	661.57	-20.25	653.42
-5	653.42	7.7	652.89	35.7	655	60.26	663.66	78.1	669.95
85.2	670.79	104.5	670.78	147.2	671.56				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-88.4	.085	-45.8	.065	60.26	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-45.8	60.26	99.9	99.9	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-88.4	-68.3	671.45	F
68.3	147.2	671.45	F

CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	664.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.085	0.065	0.085
W.S. Elev (ft)	664.06	Reach Len. (ft)	12.90	12.90	12.90
Crit W.S. (ft)	655.77	Flow Area (sq ft)	12.90	766.30	0.23
E.G. Slope (ft/ft)	*0.000256	Area (sq ft)	12.90	766.30	0.23
Q Total (cfs)	994.00	Flow (cfs)	4.10	989.88	0.02
Top Width (ft)	117.55	Top Width (ft)	10.34	106.06	1.15
Vel Total (ft/s)	1.28	Avg. Vel. (ft/s)	0.32	1.29	0.09
Max Chl Dpth (ft)	11.17	Hydr. Depth (ft)	1.25	7.23	0.20
Conv. Total (cfs)	62182.4	Conv. (cfs)	256.4	61924.7	1.3
Length Wtd. (ft)	12.90	Wetted Per. (ft)	10.64	115.30	1.22
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.02	0.11	0.00
Alpha	1.02	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	1.33	20.57	1.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.68	3.01	0.90

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	665.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.085	0.065	0.085
W.S. Elev (ft)	665.53	Reach Len. (ft)	12.90	12.90	12.90
Crit W.S. (ft)	656.44	Flow Area (sq ft)	32.46	921.39	4.94
E.G. Slope (ft/ft)	*0.000304	Area (sq ft)	32.46	921.39	4.94
Q Total (cfs)	1484.00	Flow (cfs)	15.29	1467.32	1.38
Top Width (ft)	127.76	Top Width (ft)	16.40	106.06	5.30
Vel Total (ft/s)	1.55	Avg. Vel. (ft/s)	0.47	1.59	0.28
Max Chl Dpth (ft)	12.64	Hydr. Depth (ft)	1.98	8.69	0.93
Conv. Total (cfs)	85149.9	Conv. (cfs)	877.5	84193.1	79.4
Length Wtd. (ft)	12.90	Wetted Per. (ft)	16.87	115.30	5.61
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.04	0.15	0.02
Alpha	1.05	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	2.38	24.71	2.86
C & E Loss (ft)	0.00	Cum SA (acres)	0.87	3.02	1.73

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50yr

E.G. Elev (ft)	666.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.085	0.065	0.085
W.S. Elev (ft)	666.43	Reach Len. (ft)	12.90	12.90	12.90
Crit W.S. (ft)	656.88	Flow Area (sq ft)	48.91	1016.90	10.86
E.G. Slope (ft/ft)	*0.000336	Area (sq ft)	48.91	1016.90	10.86
Q Total (cfs)	1852.00	Flow (cfs)	27.80	1820.04	4.16
Top Width (ft)	134.05	Top Width (ft)	20.14	106.06	7.85
Vel Total (ft/s)	1.72	Avg. Vel. (ft/s)	0.57	1.79	0.38
Max Chl Dpth (ft)	13.54	Hydr. Depth (ft)	2.43	9.59	1.38
Conv. Total (cfs)	*100976.9	Conv. (cfs)	1515.9	99234.2	226.7
Length Wtd. (ft)	12.90	Wetted Per. (ft)	20.71	115.30	8.32
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.05	0.19	0.03
Alpha	1.07	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	3.21	27.27	4.91
C & E Loss (ft)	0.00	Cum SA (acres)	1.09	3.02	2.38

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	666.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.085	0.065	0.085
W.S. Elev (ft)	666.74	Reach Len. (ft)	12.90	12.90	12.90
Crit W.S. (ft)	657.02	Flow Area (sq ft)	55.36	1049.83	13.35
E.G. Slope (ft/ft)	*0.000349	Area (sq ft)	55.36	1049.83	13.44
Q Total (cfs)	1994.00	Flow (cfs)	33.40	1954.72	5.88
Top Width (ft)	136.21	Top Width (ft)	21.42	106.06	8.73
Vel Total (ft/s)	1.78	Avg. Vel. (ft/s)	0.60	1.86	0.44
Max Chl Dpth (ft)	13.85	Hydr. Depth (ft)	2.58	9.90	1.66
Conv. Total (cfs)	*106751.9	Conv. (cfs)	1788.3	*104648.8	314.8
Length Wtd. (ft)	12.90	Wetted Per. (ft)	22.04	115.30	8.53
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.05	0.20	0.03
Alpha	1.07	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	3.54	28.14	5.59
C & E Loss (ft)	0.00	Cum SA (acres)	1.18	3.02	2.49

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	666.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.085	0.065	0.085
W.S. Elev (ft)	666.90	Reach Len. (ft)	12.90	12.90	12.90
Crit W.S. (ft)	657.12	Flow Area (sq ft)	58.89	1067.05	14.66
E.G. Slope (ft/ft)	*0.000356	Area (sq ft)	58.89	1067.05	14.89
Q Total (cfs)	2071.00	Flow (cfs)	36.62	2027.45	6.93
Top Width (ft)	137.35	Top Width (ft)	22.10	106.06	9.19
Vel Total (ft/s)	1.82	Avg. Vel. (ft/s)	0.62	1.90	0.47
Max Chl Dpth (ft)	14.01	Hydr. Depth (ft)	2.67	10.06	1.82
Conv. Total (cfs)	*109833.8	Conv. (cfs)	1942.1	*107524.0	367.7
Length Wtd. (ft)	12.90	Wetted Per. (ft)	22.73	115.30	8.53
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.06	0.21	0.04
Alpha	1.07	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	3.72	28.59	5.96
C & E Loss (ft)	0.00	Cum SA (acres)	1.23	3.02	2.54

CROSS SECTION OUTPUT Profile #500yr

E.G. Elev (ft)	667.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.085	0.065	0.085
W.S. Elev (ft)	667.35	Reach Len. (ft)	12.90	12.90	12.90
Crit W.S. (ft)	657.37	Flow Area (sq ft)	68.96	1114.58	18.26

* E.G. Slope (ft/ft)	*0.000377	* Area (sq ft)	*	69.21	* 1114.58	*	19.29	*
* Q Total (cfs)	* 2303.00	* Flow (cfs)	*	48.44	* 2244.26	*	10.30	*
* Top Width (ft)	* 140.48	* Top Width (ft)	*	23.95	* 106.06	*	10.46	*
* Vel Total (ft/s)	* 1.92	* Avg. Vel. (ft/s)	*	0.70	* 2.01	*	0.56	*
* Max Chl Dpth (ft)	* 14.46	* Hydr. Depth (ft)	*	3.06	* 10.51	*	2.27	*
* Conv. Total (cfs)	*118651.5	* Conv. (cfs)	*	2495.9	*115625.2	*	530.4	*
* Length Wtd. (ft)	* 12.90	* Wetted Per. (ft)	*	23.15	* 115.30	*	8.53	*
* Min Ch El (ft)	* 652.89	* Shear (lb/sq ft)	*	0.07	* 0.23	*	0.05	*
* Alpha	* 1.08	* Stream Power (lb/ft s)	*	147.20	* 0.00	*	0.00	*
* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	*	4.18	* 29.68	*	6.98	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	1.32	* 2.67	*	2.65	*

****

BRIDGE

RIVER: Salt Creek
REACH: A RS: 95964

INPUT
Description: St. Charles Bridge
Distance from Upstream XS = 12.9
Deck/Roadway Width = 68
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 14

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
-108	670.83	-81	671.19	-66.9	671.45
-66.8	674.12	-55.4	674.52	669.27	-38	674.59	669.3
-19	674.71	669.4	0	674.78	669.45	19	674.69	669.5
38	674.64	669.5	55.4	674.57	669.5	66	674.27	
66.1	671.6	108	671.52					

Upstream Bridge Cross Section Data
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-88.4	670.76	-83.4	670.64	-45.8	661.57	-20.75	661.57	-20.25	653.42
-5	653.42	7.7	652.89	35.7	655	60.26	663.66	78.1	669.95
85.2	670.79	104.5	670.78	147.2	671.56				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-88.4	.085	-45.8	.065	60.26	.085

Bank Sta: Left Right Coeff Contr. Expan.
-45.8 60.26 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-88.4	-68.3	671.45	F
68.3	147.2	671.45	F

Downstream Deck/Roadway Coordinates
num= 14

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
-108	670.83	-81	671.19	-66.9	671.45
-66.8	674.12	-55.4	674.52	669.27	-38	674.59	669.3
-19	674.71	669.4	0	674.78	669.45	19	674.69	669.5
38	674.64	669.5	55.4	674.57	669.5	66	674.27	
66.1	671.6	108	671.52					

Downstream Bridge Cross Section Data
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-88.4	670.76	-83.4	670.64	-45.8	661.57	-20.75	661.57	-20.25	653.42
-5	653.42	7.7	652.89	35.7	655	60.26	663.66	78.1	669.95
85.2	670.79	104.5	670.78	147.2	671.56				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-88.4	.085	-45.8	.065	60.26	.085

Bank Sta: Left Right Coeff Contr. Expan.
-45.8 60.26 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-88.4	-60.2	671.45	F
60.2	147.2	671.45	F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins = 671.45
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Abutments = 2

Abutment Data
Upstream num= 2

Sta	Elev	Sta	Elev
-55.4	668.58	-33.67	655

Downstream num= 2

Sta	Elev	Sta	Elev
-55.4	668.58	-33.67	655

Abutment Data
Upstream num= 2

Sta	Elev	Sta	Elev

```
   33.65     655    55.4  668.68
Downstream     num=       2
     Sta    Elev     Sta    Elev
*********************************
   33.65     655    55.4  668.68

Number of Piers =  2

Pier Data
Pier Station     Upstream=     -19    Downstream=     -19
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5   651.2     2.5   669.4
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5   651.2     2.5   669.4

Pier Data
Pier Station     Upstream=      19    Downstream=      19
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5   651.2     2.5   669.5
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5   651.2     2.5   669.5

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
       W.S. Pro Method

  W.S.Pro Data
    Left Embankment
       El of the top of the embankment = 671.3
       El of the toe of the abutment   = 669.5
    Right Embankment
       El of the top of the embankment = 671.3
       El of the toe of the abutment   = 669.5
    Abtument Type                      = 3 Sloping abutments and sloping embankments
    Slope of abutments                 = 1.5
    Top with of embankment             = 110.75
    Centroid station of bridge opening =
    Wing Wall Type                     = Angular wing walls
       Width                           = 13.5
       Angle                           = 45
       Radius                          =
    Guide Banks Type                   = No Guide Bank present
       Length                          =
       Offset                          =
       Angle                           =

Selected Low Flow Methods = Energy

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2yr
*******************************************************************************************
* E.G. US. (ft)          *     664.09  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     664.06  * E.G. Elev (ft)         *     664.09  *     664.04  *
* Q Total (cfs)          *     994.00  * W.S. Elev (ft)         *     664.05  *     664.00  *
* Q Bridge (cfs)         *     994.00  * Crit W.S. (ft)         *     656.01  *     656.01  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      11.16  *      11.11  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       1.60  *       1.61  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *     622.39  *     618.30  *
* Weir Submerg           *             * Froude # Chl           *       0.08  *       0.09  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *    2900.35  *    2874.88  *
* Min El Weir Flow (ft)  *     671.46  * Hydr Depth (ft)        *       6.91  *       6.88  *
* Min El Prs (ft)        *     669.50  * W.P. Total (ft)        *     131.17  *     130.63  *
* Delta EG (ft)          *       0.12  * Conv. Total (cfs)      *    40658.8  *    40298.4  *
* Delta WS (ft)          *       0.06  * Top Width (ft)         *      90.06  *      89.91  *
* BR Open Area (sq ft)   *    1154.68  * Frctn Loss (ft)        *       0.04  *       0.01  *
* BR Open Vel (ft/s)     *       1.61  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *       0.95  * Shear Total (lb/sq ft) *       0.18  *       0.18  *
* Br Sel Method          *      WSPRO  * Power Total (lb/ft s)  *     -88.40  *     -88.40  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT  Profile #10yr
*******************************************************************************************
* E.G. US. (ft)          *     665.57  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     665.53  * E.G. Elev (ft)         *     665.56  *     665.51  *
* Q Total (cfs)          *    1484.00  * W.S. Elev (ft)         *     665.50  *     665.44  *
* Q Bridge (cfs)         *    1484.00  * Crit W.S. (ft)         *     656.75  *     656.75  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      12.61  *      12.55  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       1.96  *       1.98  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *     756.90  *     751.17  *
* Weir Submerg           *             * Froude # Chl           *       0.10  *       0.10  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *    3943.40  *    3902.36  *
* Min El Weir Flow (ft)  *     671.46  * Hydr Depth (ft)        *       7.97  *       7.92  *
```

* Min El Prs (ft)	* 669.50	* W.P. Total (ft)	* 148.28	* 147.57	*
* Delta EG (ft)	* 0.15	* Conv. Total (cfs)	* 52755.9	* 52231.6	*
* Delta WS (ft)	* 0.07	* Top Width (ft)	* 95.00	* 94.79	*
* BR Open Area (sq ft)	* 1154.68	* Frctn Loss (ft)	* 0.05	* 0.01	*
* BR Open Vel (ft/s)	* 1.98	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.96	* Shear Total (lb/sq ft)	* 0.25	* 0.26	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -88.40	* -88.40	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #50yr

			*Inside BR US	*Inside BR DS	
* E.G. US. (ft)	* 666.48	* Element			
* W.S. US. (ft)	* 666.43	* E.G. Elev (ft)	* 666.47	* 666.41	*
* Q Total (cfs)	* 1852.00	* W.S. Elev (ft)	* 666.39	* 666.32	*
* Q Bridge (cfs)	* 1852.00	* Crit W.S. (ft)	* 657.23	* 657.23	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 13.50	* 13.43	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.20	* 2.21	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 843.18	* 836.24	*
* Weir Submerg	*	* Froude # Chl	* 0.11	* 0.11	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 4694.71	* 4641.09	*
* Min El Weir Flow (ft)	* 671.46	* Hydr Depth (ft)	* 8.60	* 8.55	*
* Min El Prs (ft)	* 669.50	* W.P. Total (ft)	* 158.80	* 157.97	*
* Delta EG (ft)	* 0.18	* Conv. Total (cfs)	* 60742.5	* 60094.2	*
* Delta WS (ft)	* 0.09	* Top Width (ft)	* 98.03	* 97.79	*
* BR Open Area (sq ft)	* 1154.68	* Frctn Loss (ft)	* 0.06	* 0.01	*
* BR Open Vel (ft/s)	* 2.21	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.96	* Shear Total (lb/sq ft)	* 0.31	* 0.31	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -88.40	* -88.40	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #100yr

			*Inside BR US	*Inside BR DS	
* E.G. US. (ft)	* 666.79	* Element			
* W.S. US. (ft)	* 666.74	* E.G. Elev (ft)	* 666.78	* 666.72	*
* Q Total (cfs)	* 1994.00	* W.S. Elev (ft)	* 666.70	* 666.63	*
* Q Bridge (cfs)	* 1994.00	* Crit W.S. (ft)	* 657.43	* 657.43	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 13.81	* 13.74	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.28	* 2.30	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 873.53	* 866.10	*
* Weir Submerg	*	* Froude # Chl	* 0.11	* 0.11	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 4974.20	* 4915.41	*
* Min El Weir Flow (ft)	* 671.46	* Hydr Depth (ft)	* 8.82	* 8.76	*
* Min El Prs (ft)	* 669.50	* W.P. Total (ft)	* 162.43	* 161.54	*
* Delta EG (ft)	* 0.18	* Conv. Total (cfs)	* 63590.0	* 62891.8	*
* Delta WS (ft)	* 0.09	* Top Width (ft)	* 99.08	* 98.83	*
* BR Open Area (sq ft)	* 1154.68	* Frctn Loss (ft)	* 0.07	* 0.01	*
* BR Open Vel (ft/s)	* 2.30	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.96	* Shear Total (lb/sq ft)	* 0.33	* 0.34	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -88.40	* -88.40	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #200yr

			*Inside BR US	*Inside BR DS	
* E.G. US. (ft)	* 666.96	* Element			
* W.S. US. (ft)	* 666.90	* E.G. Elev (ft)	* 666.95	* 666.88	*
* Q Total (cfs)	* 2071.00	* W.S. Elev (ft)	* 666.86	* 666.78	*
* Q Bridge (cfs)	* 2071.00	* Crit W.S. (ft)	* 657.52	* 657.52	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 13.97	* 13.89	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.33	* 2.35	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 889.51	* 881.83	*
* Weir Submerg	*	* Froude # Chl	* 0.11	* 0.12	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 5124.51	* 5062.90	*
* Min El Weir Flow (ft)	* 671.46	* Hydr Depth (ft)	* 8.93	* 8.87	*
* Min El Prs (ft)	* 669.50	* W.P. Total (ft)	* 164.32	* 163.41	*
* Delta EG (ft)	* 0.19	* Conv. Total (cfs)	* 65097.3	* 64372.3	*
* Delta WS (ft)	* 0.09	* Top Width (ft)	* 99.63	* 99.36	*
* BR Open Area (sq ft)	* 1154.68	* Frctn Loss (ft)	* 0.07	* 0.01	*
* BR Open Vel (ft/s)	* 2.35	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.96	* Shear Total (lb/sq ft)	* 0.34	* 0.35	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -88.40	* -88.40	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #500yr

			*Inside BR US	*Inside BR DS	
* E.G. US. (ft)	* 667.41	* Element			
* W.S. US. (ft)	* 667.35	* E.G. Elev (ft)	* 667.40	* 667.33	*
* Q Total (cfs)	* 2303.00	* W.S. Elev (ft)	* 667.31	* 667.22	*
* Q Bridge (cfs)	* 2303.00	* Crit W.S. (ft)	* 657.78	* 657.78	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 14.42	* 14.33	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.47	* 2.49	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 934.03	* 925.52	*
* Weir Submerg	*	* Froude # Chl	* 0.12	* 0.12	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 5555.75	* 5485.22	*
* Min El Weir Flow (ft)	* 671.46	* Hydr Depth (ft)	* 9.24	* 9.18	*
* Min El Prs (ft)	* 669.50	* W.P. Total (ft)	* 169.54	* 168.55	*
* Delta EG (ft)	* 0.20	* Conv. Total (cfs)	* 69322.3	* 68512.0	*
* Delta WS (ft)	* 0.10	* Top Width (ft)	* 101.13	* 100.85	*
* BR Open Area (sq ft)	* 1154.68	* Frctn Loss (ft)	* 0.08	* 0.01	*
* BR Open Vel (ft/s)	* 2.49	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.96	* Shear Total (lb/sq ft)	* 0.38	* 0.39	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -88.40	* -88.40	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95911

INPUT
Description: D/S St. Charles (surveyed x-section)
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-88.4	670.76	-83.4	670.64	-45.8	661.57	-20.75	661.57	-20.25	653.42
-5	653.42	7.7	652.89	35.7	655	60.26	663.66	78.1	669.95
85.2	670.79	104.5	670.78	147.2	671.56				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-88.4	.085	-45.8	.065	60.26	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-45.8	60.26	160	254	353	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-88.4	-60.2	671.45	F
60.2	147.2	671.45	F

CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	663.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.085	0.065	
W.S. Elev (ft)	664.01	Reach Len. (ft)	160.00	254.00	353.00
Crit W.S. (ft)	655.77	Flow Area (sq ft)	12.33	760.32	
E.G. Slope (ft/ft)	0.000262	Area (sq ft)	12.33	760.34	0.17
Q Total (cfs)	994.00	Flow (cfs)	3.91	990.09	
Top Width (ft)	117.16	Top Width (ft)	10.11	106.06	0.99
Vel Total (ft/s)	1.29	Avg. Vel. (ft/s)	0.32	1.30	
Max Chl Dpth (ft)	11.12	Hydr. Depth (ft)	1.22	7.17	
Conv. Total (cfs)	61385.6	Conv. (cfs)	241.3	61144.3	
Length Wtd. (ft)	253.64	Wetted Per. (ft)	10.40	115.23	
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.02	0.11	
Alpha	1.10	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	1.33	19.10	1.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.67	2.80	0.90

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	665.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.085	0.065	
W.S. Elev (ft)	665.45	Reach Len. (ft)	160.00	254.00	353.00
Crit W.S. (ft)	656.44	Flow Area (sq ft)	30.92	913.51	
E.G. Slope (ft/ft)	0.000313	Area (sq ft)	31.26	913.62	4.56
Q Total (cfs)	1484.00	Flow (cfs)	15.61	1468.39	
Top Width (ft)	127.25	Top Width (ft)	16.10	106.06	5.09
Vel Total (ft/s)	1.57	Avg. Vel. (ft/s)	0.50	1.61	
Max Chl Dpth (ft)	12.56	Hydr. Depth (ft)	2.15	8.62	
Conv. Total (cfs)	83909.2	Conv. (cfs)	882.6	83026.6	
Length Wtd. (ft)	253.03	Wetted Per. (ft)	14.81	115.23	
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.04	0.15	
Alpha	1.09	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	2.36	22.94	2.85
C & E Loss (ft)	0.00	Cum SA (acres)	0.85	2.80	1.73

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50yr

E.G. Elev (ft)	666.30	Element	Left OB	Channel	Riqht OB
Vel Head (ft)	0.05	Wt. n-Val.	0.085	0.065	
W.S. Elev (ft)	666.34	Reach Len. (ft)	160.00	254.00	353.00
Crit W.S. (ft)	656.88	Flow Area (sq ft)	43.70	1007.65	
E.G. Slope (ft/ft)	0.000348	Area (sq ft)	47.20	1007.81	10.20
Q Total (cfs)	1852.00	Flow (cfs)	29.30	1822.70	
Top Width (ft)	133.45	Top Width (ft)	19.78	106.06	7.61
Vel Total (ft/s)	1.76	Avg. Vel. (ft/s)	0.67	1.81	
Max Chl Dpth (ft)	13.45	Hydr. Depth (ft)	3.04	9.51	
Conv. Total (cfs)	99343.1	Conv. (cfs)	1571.7	97771.4	
Length Wtd. (ft)	252.54	Wetted Per. (ft)	14.81	115.23	
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.06	0.19	
Alpha	1.09	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	3.17	25.30	4.90
C & E Loss (ft)	0.00	Cum SA (acres)	1.07	2.80	2.38

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	666.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.085	0.065	
W.S. Elev (ft)	666.65	Reach Len. (ft)	160.00	254.00	353.00
Crit W.S. (ft)	657.02	Flow Area (sq ft)	48.11	1040.05	
E.G. Slope (ft/ft)	0.000361	Area (sq ft)	53.44	1040.23	12.66
Q Total (cfs)	1994.00	Flow (cfs)	35.05	1958.95	
Top Width (ft)	135.58	Top Width (ft)	21.05	106.06	8.47
Vel Total (ft/s)	1.83	Avg. Vel. (ft/s)	0.73	1.88	
Max Chl Dpth (ft)	13.76	Hydr. Depth (ft)	3.34	9.81	
Conv. Total (cfs)	104910.1	Conv. (cfs)	1844.2	103065.9	
Length Wtd. (ft)	252.37	Wetted Per. (ft)	14.81	115.23	
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.07	0.20	
Alpha	1.09	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	3.49	26.10	5.59
C & E Loss (ft)	0.00	Cum SA (acres)	1.16	2.80	2.49

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	666.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.085	0.065	
W.S. Elev (ft)	666.81	Reach Len. (ft)	160.00	254.00	353.00
Crit W.S. (ft)	657.12	Flow Area (sq ft)	50.40	1056.97	
E.G. Slope (ft/ft)	*0.000369	Area (sq ft)	56.85	1057.16	14.05
Q Total (cfs)	2071.00	Flow (cfs)	38.27	2032.73	
Top Width (ft)	136.70	Top Width (ft)	21.71	106.06	8.93
Vel Total (ft/s)	1.87	Avg. Vel. (ft/s)	0.76	1.92	
Max Chl Dpth (ft)	13.92	Hydr. Depth (ft)	3.50	9.97	
Conv. Total (cfs)	*107869.8	Conv. (cfs)	1993.4	*105876.4	
Length Wtd. (ft)	252.29	Wetted Per. (ft)	14.81	115.23	
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.08	0.21	
Alpha	1.09	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	3.67	26.52	5.96
C & E Loss (ft)	0.00	Cum SA (acres)	1.21	2.80	2.53

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500yr

E.G. Elev (ft)	667.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.085	0.065	
W.S. Elev (ft)	667.25	Reach Len. (ft)	160.00	254.00	353.00
Crit W.S. (ft)	657.37	Flow Area (sq ft)	56.73	1103.57	
E.G. Slope (ft/ft)	*0.000393	Area (sq ft)	66.79	1103.78	18.24
Q Total (cfs)	2303.00	Flow (cfs)	48.12	2254.88	
Top Width (ft)	139.77	Top Width (ft)	23.53	106.06	10.17
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)	0.85	2.04	
Max Chl Dpth (ft)	14.36	Hydr. Depth (ft)	3.94	10.41	
Conv. Total (cfs)	*116197.0	Conv. (cfs)	2427.9	*113769.2	
Length Wtd. (ft)	252.06	Wetted Per. (ft)	14.81	115.23	
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.09	0.23	
Alpha	1.09	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	4.12	27.52	6.97
C & E Loss (ft)	0.01	Cum SA (acres)	1.29	2.45	2.65

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95657

INPUT
Description: u/s Ped. bridge, copy of section 95497.4
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.515	670.25	-119.151	670.7	-70	662.3	-45.031	661.25	-28.749	660.58
-28.749	658.23	-23.321	655.72	-22.219	655.41	-17.894	655.75	-7.972	654.83
8.48	655.8	15.01	656.13	19.76	657.93	20.608	661.35	27.986	664.03
66.063	664.5	108.041	667.76	117.031	667.7				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-130.515	.085	-70	.12	-28.749	.065	20.608	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

	-28.749	20.608	34	34	34	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-130.515	-101	669.49	T
101	117.031	669.49	T

Skew Angle = 32

CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	663.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.119	0.065	0.085
W.S. Elev (ft)	663.76	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	658.12	Flow Area (sq ft)	102.24	390.70	8.01
E.G. Slope (ft/ft)	*0.000799	Area (sq ft)	102.24	390.70	8.01
Q Total (cfs)	994.00	Flow (cfs)	61.44	928.26	4.30
Top Width (ft)	105.81	Top Width (ft)	49.81	49.36	6.64
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)	0.60	2.38	0.54
Max Chl Dpth (ft)	8.93	Hydr. Depth (ft)	2.05	7.92	1.21
Conv. Total (cfs)	35171.8	Conv. (cfs)	2173.8	32845.7	152.3
Length Wtd. (ft)	10.00	Wetted Per. (ft)	49.97	55.40	7.07
Min Ch El (ft)	654.83	Shear (lb/sq ft)	0.10	0.35	0.06
Alpha	1.34	Stream Power (lb/ft s)	117.03	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	1.12	15.74	1.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.56	2.35	0.87

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	665.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.116	0.065	0.085
W.S. Elev (ft)	665.16	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	658.84	Flow Area (sq ft)	177.55	459.66	55.09
E.G. Slope (ft/ft)	*0.000912	Area (sq ft)	177.55	459.66	55.09
Q Total (cfs)	1484.00	Flow (cfs)	153.85	1300.84	29.31
Top Width (ft)	161.29	Top Width (ft)	57.98	49.36	53.95
Vel Total (ft/s)	2.14	Avg. Vel. (ft/s)	0.87	2.83	0.53
Max Chl Dpth (ft)	10.33	Hydr. Depth (ft)	3.06	9.31	1.02
Conv. Total (cfs)	49129.7	Conv. (cfs)	5093.4	43065.9	970.5
Length Wtd. (ft)	10.00	Wetted Per. (ft)	58.26	55.40	54.45
Min Ch El (ft)	654.83	Shear (lb/sq ft)	0.17	0.47	0.06
Alpha	1.55	Stream Power (lb/ft s)	117.03	0.00	0.00

* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	* 1.98	* 18.93	* 2.61 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.72	* 2.35	* 1.49 *

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	* 666.15	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.12	* Wt. n-Val.	* 0.115	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 666.03	* Reach Len. (ft)	* 10.00	* 10.00	* 10.00 *
* Crit W.S. (ft)	* 659.35	* Flow Area (sq ft)	* 229.91	* 502.37	* 106.59 *
* E.G. Slope (ft/ft)	*0.000951	* Area (sq ft)	* 229.91	* 502.37	* 106.59 *
* Q Total (cfs)	* 1852.00	* Flow (cfs)	* 232.37	* 1540.22	* 79.41 *
* Top Width (ft)	* 177.50	* Top Width (ft)	* 63.05	* 49.36	* 65.09 *
* Vel Total (ft/s)	* 2.21	* Avg. Vel. (ft/s)	* 1.01	* 3.07	* 0.74 *
* Max Chl Dpth (ft)	* 11.19	* Hydr. Depth (ft)	* 3.65	* 10.18	* 1.64 *
* Conv. Total (cfs)	* 60048.9	* Conv. (cfs)	* 7534.3	* 49939.8	* 2574.7 *
* Length Wtd. (ft)	* 10.00	* Wetted Per. (ft)	* 63.40	* 55.40	* 65.63 *
* Min Ch El (ft)	* 654.83	* Shear (lb/sq ft)	* 0.22	* 0.54	* 0.10 *
* Alpha	* 1.64	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	* 2.66	* 20.90	* 4.43 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.92	* 2.35	* 2.09 *

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	* 666.45	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.13	* Wt. n-Val.	* 0.115	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 666.32	* Reach Len. (ft)	* 10.00	* 10.00	* 10.00 *
* Crit W.S. (ft)	* 659.53	* Flow Area (sq ft)	* 248.92	* 517.04	* 126.51 *
* E.G. Slope (ft/ft)	*0.000965	* Area (sq ft)	* 248.92	* 517.04	* 126.51 *
* Q Total (cfs)	* 1994.00	* Flow (cfs)	* 263.75	* 1627.78	* 102.47 *
* Top Width (ft)	* 183.06	* Top Width (ft)	* 64.79	* 49.36	* 68.92 *
* Vel Total (ft/s)	* 2.23	* Avg. Vel. (ft/s)	* 1.06	* 3.15	* 0.81 *
* Max Chl Dpth (ft)	* 11.49	* Hydr. Depth (ft)	* 3.84	* 10.48	* 1.84 *
* Conv. Total (cfs)	* 64182.5	* Conv. (cfs)	* 8489.6	* 52394.6	* 3298.3 *
* Length Wtd. (ft)	* 10.00	* Wetted Per. (ft)	* 65.16	* 55.40	* 69.46 *
* Min Ch El (ft)	* 654.83	* Shear (lb/sq ft)	* 0.23	* 0.56	* 0.11 *
* Alpha	* 1.66	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	* 2.94	* 21.56	* 5.03 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.00	* 2.35	* 2.18 *

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	* 666.61	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.13	* Wt. n-Val.	* 0.114	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 666.48	* Reach Len. (ft)	* 10.00	* 10.00	* 10.00 *
* Crit W.S. (ft)	* 659.62	* Flow Area (sq ft)	* 259.06	* 524.72	* 137.38 *
* E.G. Slope (ft/ft)	*0.000972	* Area (sq ft)	* 259.06	* 524.72	* 137.38 *
* Q Total (cfs)	* 2071.00	* Flow (cfs)	* 281.03	* 1674.21	* 115.76 *
* Top Width (ft)	* 185.97	* Top Width (ft)	* 65.70	* 49.36	* 70.92 *
* Vel Total (ft/s)	* 2.25	* Avg. Vel. (ft/s)	* 1.08	* 3.19	* 0.84 *
* Max Chl Dpth (ft)	* 11.65	* Hydr. Depth (ft)	* 3.94	* 10.63	* 1.94 *
* Conv. Total (cfs)	* 66423.2	* Conv. (cfs)	* 9013.5	* 53696.9	* 3712.8 *
* Length Wtd. (ft)	* 10.00	* Wetted Per. (ft)	* 66.09	* 55.40	* 71.47 *
* Min Ch El (ft)	* 654.83	* Shear (lb/sq ft)	* 0.24	* 0.57	* 0.12 *
* Alpha	* 1.67	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	* 3.09	* 21.91	* 5.34 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.05	* 2.35	* 2.21 *

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 667.04	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.14	* Wt. n-Val.	* 0.114	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 666.90	* Reach Len. (ft)	* 10.00	* 10.00	* 10.00 *
* Crit W.S. (ft)	* 659.89	* Flow Area (sq ft)	* 287.52	* 545.70	* 168.70 *
* E.G. Slope (ft/ft)	*0.001000	* Area (sq ft)	* 287.52	* 545.70	* 168.70 *
* Q Total (cfs)	* 2303.00	* Flow (cfs)	* 333.06	* 1812.59	* 157.36 *
* Top Width (ft)	* 193.94	* Top Width (ft)	* 68.18	* 49.36	* 76.40 *
* Vel Total (ft/s)	* 2.30	* Avg. Vel. (ft/s)	* 1.16	* 3.32	* 0.93 *
* Max Chl Dpth (ft)	* 12.07	* Hydr. Depth (ft)	* 4.22	* 11.06	* 2.21 *
* Conv. Total (cfs)	* 72833.8	* Conv. (cfs)	* 10533.2	* 57324.2	* 4976.5 *
* Length Wtd. (ft)	* 10.00	* Wetted Per. (ft)	* 68.61	* 55.40	* 76.96 *
* Min Ch El (ft)	* 654.83	* Shear (lb/sq ft)	* 0.26	* 0.61	* 0.14 *
* Alpha	* 1.69	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	* 3.47	* 22.71	* 6.21 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.13	* 1.99	* 2.30 *

BRIDGE

RIVER: Salt Creek
REACH: A RS: 95640

INPUT
Description: Pedestrian Bridge
Distance from Upstream XS = 10
Deck/Roadway Width = 14
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew = 32
Bridge Pier Skew = 32
Upstream Deck/Roadway Coordinates
num= 7

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-118	668.7		-99.2	669.4		-96.7	669.49	668.09
19.3	670.21	668.81	85.3	669.9	668.5	87.8	669.9	
123	669.61							

Upstream Bridge Cross Section Data
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.515	670.25	-119.151	670.7	-70	662.3	-45.031	661.25	-28.749	660.58
-28.749	658.23	-23.321	655.72	-22.219	655.41	-17.894	655.75	-7.972	654.83
8.48	655.8	15.01	656.13	19.76	657.93	20.608	661.35	27.986	664.03

```
  66.063   664.5 108.041  667.76 117.031   667.7

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************************
-130.515    .085     -70     .12 -28.749    .065  20.608    .085

Bank Sta: Left   Right    Coeff Contr.   Expan.
       -28.749  20.608           .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-130.515    -101  669.49       T
     101 117.031  669.49       T
Skew Angle = 32

Downstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**************************************************************************
    -118   668.7           -99.2   669.4           -96.7   669.4     668
    19.3  670.21  668.81    85.3   669.9   668.5    87.8   669.9
     123  669.61

Downstream Bridge Cross Section Data
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
-130.515  670.25-119.151   670.7     -70   662.3 -45.031  661.25 -28.749  660.58
 -28.749  658.23 -23.321  655.72 -22.219  655.41 -17.894  655.75  -7.972  654.81
    8.48   655.8   15.01  656.13   19.76  657.93  20.608  661.35  27.986  662.05
  66.063  663.85 108.041  667.76 117.031   667.7

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************************
-130.515    .085     -70     .12 -28.749    .065  20.608    .085

Bank Sta: Left   Right    Coeff Contr.   Expan.
       -28.749  20.608           .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-130.515   -93.5  669.49       T
    93.5 117.031  669.49       T
Skew Angle = 32

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =  669.49
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  1

Pier Data
Pier Station     Upstream=    19.3    Downstream=    19.3
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.12     654    3.12  668.81
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.12     654    3.12  668.81

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
       W.S. Pro Method

  W.S.Pro Data
    Left Embankment
       El of the top of the embankment = 669.49
       El of the toe of the abutment   = 668.09
    Right Embankment
       El of the top of the embankment = 669.9
       El of the toe of the abutment   = 668.5
    Abtument Type                      = 1 Vert. abutments and vert. embankments with or without wingwalls
    Slope of abutments                 =
    Top with of embankment             = 182
    Centroid station of bridge opening =
    Wing Wall Type                     = No wing walls present
       Width                           =
       Angle                           =
       Radius                          =
    Guide Banks Type                   = No Guide Bank present
       Length                          =
       Offset                          =
       Angle                           =

Selected Low Flow Methods = Energy

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line
```

BRIDGE OUTPUT Profile #2yr

E.G. US. (ft)	663.84	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	663.76	E.G. Elev (ft)	663.84	663.82
Q Total (cfs)	994.00	W.S. Elev (ft)	663.75	663.76
Q Bridge (cfs)	994.00	Crit W.S. (ft)	658.12	658.12
Q Weir (cfs)		Max Chl Dpth (ft)	8.92	8.95
Weir Sta Lft (ft)		Vel Total (ft/s)	2.06	1.90
Weir Sta Rgt (ft)		Flow Area (sq ft)	482.76	522.16
Weir Submerg		Froude # Chl	0.15	0.15
Weir Max Depth (ft)		Specif Force (cu ft)	1710.84	1736.00
Min El Weir Flow (ft)	669.49	Hydr Depth (ft)	4.71	3.74
Min El Prs (ft)	668.81	W.P. Total (ft)	115.24	151.97
Delta EG (ft)	0.08	Conv. Total (cfs)	32466.2	33261.0
Delta WS (ft)	0.01	Top Width (ft)	102.56	139.53
BR Open Area (sq ft)	1259.32	Frctn Loss (ft)	0.01	0.01
BR Open Vel (ft/s)	2.06	C & E Loss (ft)	0.00	0.00
Coef of Q	0.93	Shear Total (lb/sq ft)	0.25	0.19
Br Sel Method	WSPRO	Power Total (lb/ft s)	-130.52	-130.52

BRIDGE OUTPUT Profile #10yr

E.G. US. (ft)	665.27	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	665.16	E.G. Elev (ft)	665.26	665.25
Q Total (cfs)	1484.00	W.S. Elev (ft)	665.14	665.17
Q Bridge (cfs)	1484.00	Crit W.S. (ft)	658.87	658.86
Q Weir (cfs)		Max Chl Dpth (ft)	10.31	10.36
Weir Sta Lft (ft)		Vel Total (ft/s)	2.22	2.01
Weir Sta Rgt (ft)		Flow Area (sq ft)	668.60	737.52
Weir Submerg		Froude # Chl	0.17	0.16
Weir Max Depth (ft)		Specif Force (cu ft)	2553.39	2659.69
Min El Weir Flow (ft)	669.49	Hydr Depth (ft)	4.24	4.50
Min El Prs (ft)	668.81	W.P. Total (ft)	173.52	179.41
Delta EG (ft)	0.09	Conv. Total (cfs)	44728.8	47310.4
Delta WS (ft)	-0.01	Top Width (ft)	157.85	163.96
BR Open Area (sq ft)	1259.32	Frctn Loss (ft)	0.01	0.01
BR Open Vel (ft/s)	2.22	C & E Loss (ft)	0.00	0.00
Coef of Q	0.93	Shear Total (lb/sq ft)	0.26	0.25
Br Sel Method	WSPRO	Power Total (lb/ft s)	-130.52	-130.52

BRIDGE OUTPUT Profile #50yr

E.G. US. (ft)	666.15	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	666.03	E.G. Elev (ft)	666.14	666.12
Q Total (cfs)	1852.00	W.S. Elev (ft)	666.01	666.04
Q Bridge (cfs)	1852.00	Crit W.S. (ft)	659.36	659.37
Q Weir (cfs)		Max Chl Dpth (ft)	11.18	11.23
Weir Sta Lft (ft)		Vel Total (ft/s)	2.28	2.09
Weir Sta Rgt (ft)		Flow Area (sq ft)	812.25	885.48
Weir Submerg		Froude # Chl	0.15	0.12
Weir Max Depth (ft)		Specif Force (cu ft)	3230.29	3396.11
Min El Weir Flow (ft)	669.49	Hydr Depth (ft)	4.67	5.09
Min El Prs (ft)	668.81	W.P. Total (ft)	191.40	191.77
Delta EG (ft)	0.09	Conv. Total (cfs)	54334.7	57894.5
Delta WS (ft)	-0.01	Top Width (ft)	173.88	174.08
BR Open Area (sq ft)	1259.32	Frctn Loss (ft)	0.02	0.01
BR Open Vel (ft/s)	2.28	C & E Loss (ft)	0.00	0.00
Coef of Q	0.92	Shear Total (lb/sq ft)	0.31	0.29
Br Sel Method	WSPRO	Power Total (lb/ft s)	-130.52	-130.52

BRIDGE OUTPUT Profile #100yr

E.G. US. (ft)	666.45	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	666.32	E.G. Elev (ft)	666.44	666.42
Q Total (cfs)	1994.00	W.S. Elev (ft)	666.31	666.34
Q Bridge (cfs)	1994.00	Crit W.S. (ft)	659.55	659.55
Q Weir (cfs)		Max Chl Dpth (ft)	11.48	11.53
Weir Sta Lft (ft)		Vel Total (ft/s)	2.31	2.13
Weir Sta Rgt (ft)		Flow Area (sq ft)	864.33	937.78
Weir Submerg		Froude # Chl	0.15	0.12
Weir Max Depth (ft)		Specif Force (cu ft)	3494.38	3681.00
Min El Weir Flow (ft)	669.49	Hydr Depth (ft)	4.92	5.34
Min El Prs (ft)	668.81	W.P. Total (ft)	194.06	194.29
Delta EG (ft)	0.09	Conv. Total (cfs)	58054.9	61912.2
Delta WS (ft)	-0.01	Top Width (ft)	175.63	175.83
BR Open Area (sq ft)	1259.32	Frctn Loss (ft)	0.02	0.01
BR Open Vel (ft/s)	2.31	C & E Loss (ft)	0.00	0.00
Coef of Q	0.92	Shear Total (lb/sq ft)	0.33	0.31
Br Sel Method	WSPRO	Power Total (lb/ft s)	-130.52	-130.52

BRIDGE OUTPUT Profile #200yr

E.G. US. (ft)	666.61	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	666.48	E.G. Elev (ft)	666.60	666.58
Q Total (cfs)	2071.00	W.S. Elev (ft)	666.46	666.50
Q Bridge (cfs)	2071.00	Crit W.S. (ft)	659.65	659.65
Q Weir (cfs)		Max Chl Dpth (ft)	11.63	11.69
Weir Sta Lft (ft)		Vel Total (ft/s)	2.32	2.15
Weir Sta Rgt (ft)		Flow Area (sq ft)	891.77	965.21
Weir Submerg		Froude # Chl	0.15	0.12
Weir Max Depth (ft)		Specif Force (cu ft)	3639.01	3836.44
Min El Weir Flow (ft)	669.49	Hydr Depth (ft)	5.05	5.49
Min El Prs (ft)	668.81	W.P. Total (ft)	195.46	194.76
Delta EG (ft)	0.09	Conv. Total (cfs)	60065.8	64101.2
Delta WS (ft)	-0.01	Top Width (ft)	176.54	176.74
BR Open Area (sq ft)	1259.32	Frctn Loss (ft)	0.02	0.01
BR Open Vel (ft/s)	2.32	C & E Loss (ft)	0.00	0.00
Coef of Q	0.92	Shear Total (lb/sq ft)	0.34	0.32
Br Sel Method	WSPRO	Power Total (lb/ft s)	-130.52	-130.52

BRIDGE OUTPUT Profile #500yr

E.G. US. (ft)	667.04	Element	Inside BR US	Inside BR DS

* W.S. US. (ft)	* 666.90	* E.G. Elev (ft)	* 667.03	* 667.01	*
* Q Total (cfs)	* 2303.00	* W.S. Elev (ft)	* 666.89	* 666.92	*
* Q Bridge (cfs)	* 2303.00	* Crit W.S. (ft)	* 659.95	* 659.95	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 12.06	* 12.11	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.38	* 2.21	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 967.50	* 1040.21	*
* Weir Submerg	*	* Froude # Chl	* 0.15	* 0.12	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 4059.70	* 4286.57	*
* Min El Weir Flow (ft)	* 669.49	* Hydr Depth (ft)	* 5.41	* 5.92	*
* Min El Prs (ft)	* 668.81	* W.P. Total (ft)	* 199.14	* 196.04	*
* Delta EG (ft)	* 0.10	* Conv. Total (cfs)	* 65792.4	* 70289.5	*
* Delta WS (ft)	* -0.02	* Top Width (ft)	* 178.88	* 178.88	*
* BR Open Area (sq ft)	* 1259.32	* Frctn Loss (ft)	* 0.02	* 0.01	*
* BR Open Vel (ft/s)	* 2.38	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.92	* Shear Total (lb/sq ft)	* 0.37	* 0.36	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.52	* -130.52	*

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95623

INPUT
Description: d/s Ped. bridge, copy of section 95497.4
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.515	670.25	-119.151	670.7	-70	662.3	-45.031	661.25	-28.749	660.58
-28.749	658.23	-23.321	655.72	-22.219	655.41	-17.894	655.75	-7.972	654.81
8.48	655.8	15.01	656.13	19.76	657.93	20.608	661.35	27.986	662.05
66.063	663.85	108.041	667.76	117.031	667.7				

Manninq's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-130.515	.085	-70	.12	-28.749	.065	20.608	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-28.749	20.608	105	60.81	42 .3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-130.515	-93.5	669.49	T
93.5	117.031	669.49	T

Skew Angle = 32

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	* 663.77	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.06	* Wt. n-Val.	* 0.119	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 663.75	* Reach Len. (ft)	* 105.00	* 60.81	* 42.00 *
* Crit W.S. (ft)	* 658.11	* Flow Area (sq ft)	* 101.79	* 390.52	* 45.84 *
* E.G. Slope (ft/ft)	*0.000771	* Area (sq ft)	* 101.79	* 390.52	* 45.84 *
* Q Total (cfs)	* 994.00	* Flow (cfs)	* 59.93	* 911.03	* 23.04 *
* Top Width (ft)	* 142.52	* Top Width (ft)	* 49.76	* 49.36	* 43.41 *
* Vel Total (ft/s)	* 1.85	* Avg. Vel. (ft/s)	* 0.59	* 2.33	* 0.50 *
* Max Chl Dpth (ft)	* 8.94	* Hydr. Depth (ft)	* 2.05	* 7.91	* 1.06 *
* Conv. Total (cfs)	* 35808.0	* Conv. (cfs)	* 2158.9	* 32819.0	* 830.1 *
* Length Wtd. (ft)	* 63.01	* Wetted Per. (ft)	* 49.91	* 55.40	* 43.49 *
* Min Ch El (ft)	* 654.81	* Shear (lb/sq ft)	* 0.10	* 0.34	* 0.05 *
* Alpha	* 1.16	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.05	* Cum Volume (acre-ft)	* 1.04	* 15.44	* 1.02 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.52	* 2.31	* 0.85 *

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	* 665.18	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.07	* Wt. n-Val.	* 0.116	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 665.17	* Reach Len. (ft)	* 105.00	* 60.81	* 42.00 *
* Crit W.S. (ft)	* 658.85	* Flow Area (sq ft)	* 178.02	* 460.32	* 119.35 *
* E.G. Slope (ft/ft)	*0.000827	* Area (sq ft)	* 178.02	* 460.32	* 119.35 *
* Q Total (cfs)	* 1484.00	* Flow (cfs)	* 147.10	* 1241.70	* 95.20 *
* Top Width (ft)	* 166.99	* Top Width (ft)	* 58.03	* 49.36	* 59.60 *
* Vel Total (ft/s)	* 1.96	* Avg. Vel. (ft/s)	* 0.83	* 2.70	* 0.80 *
* Max Chl Dpth (ft)	* 10.36	* Hydr. Depth (ft)	* 3.07	* 9.33	* 2.00 *
* Conv. Total (cfs)	* 51591.7	* Conv. (cfs)	* 5114.0	* 43168.1	* 3309.6 *
* Length Wtd. (ft)	* 63.96	* Wetted Per. (ft)	* 58.31	* 55.40	* 59.74 *
* Min Ch El (ft)	* 654.81	* Shear (lb/sq ft)	* 0.16	* 0.43	* 0.10 *
* Alpha	* 1.15	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.05	* Cum Volume (acre-ft)	* 1.84	* 18.59	* 2.55 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.67	* 2.31	* 1.44 *

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	* 666.06	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.08	* Wt. n-Val.	* 0.115	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 666.04	* Reach Len. (ft)	* 105.00	* 60.81	* 42.00 *
* Crit W.S. (ft)	* 659.35	* Flow Area (sq ft)	* 230.68	* 503.24	* 175.23 *
* E.G. Slope (ft/ft)	*0.000855	* Area (sq ft)	* 230.68	* 503.24	* 175.23 *
* Q Total (cfs)	* 1852.00	* Flow (cfs)	* 221.37	* 1464.12	* 166.51 *
* Top Width (ft)	* 181.41	* Top Width (ft)	* 63.12	* 49.36	* 68.94 *
* Vel Total (ft/s)	* 2.04	* Avg. Vel. (ft/s)	* 0.96	* 2.91	* 0.95 *
* Max Chl Dpth (ft)	* 11.23	* Hydr. Depth (ft)	* 3.65	* 10.20	* 2.54 *
* Conv. Total (cfs)	* 63349.7	* Conv. (cfs)	* 7572.3	* 50081.6	* 5695.7 *
* Length Wtd. (ft)	* 64.38	* Wetted Per. (ft)	* 63.47	* 55.40	* 69.11 *
* Min Ch El (ft)	* 654.81	* Shear (lb/sq ft)	* 0.19	* 0.48	* 0.14 *
* Alpha	* 1.19	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 2.48	* 20.52	* 4.32 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.87	* 2.31	* 2.04 *

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	* 666.36	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.08	* Wt. n-Val.	* 0.115	* 0.065	* 0.085 *

* W.S. Elev (ft)	* 666.34	* Reach Len. (ft)	* 105.00	* 60.81	* 42.00	*
* Crit W.S. (ft)	* 659.53	* Flow Area (sq ft)	* 249.83	* 518.00	* 196.34	*
* E.G. Slope (ft/ft)	*0.000866	* Area (sq ft)	* 249.83	* 518.00	* 196.34	*
* Q Total (cfs)	* 1994.00	* Flow (cfs)	* 251.28	* 1546.24	* 196.48	*
* Top Width (ft)	* 186.37	* Top Width (ft)	* 64.87	* 49.36	* 72.15	*
* Vel Total (ft/s)	* 2.07	* Avg. Vel. (ft/s)	* 1.01	* 2.98	* 1.00	*
* Max Chl Dpth (ft)	* 11.53	* Hydr. Depth (ft)	* 3.86	* 10.50	* 2.72	*
* Conv. Total (cfs)	* 67773.9	* Conv. (cfs)	* 8540.8	* 52554.9	* 6678.2	*
* Length Wtd. (ft)	* 64.51	* Wetted Per. (ft)	* 65.13	* 55.40	* 72.34	*
* Min Ch El (ft)	* 654.81	* Shear (lb/sq ft)	* 0.21	* 0.51	* 0.15	*
* Alpha	* 1.19	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 2.74	* 21.17	* 4.90	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.95	* 2.31	* 2.13	*

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	* 666.52	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.08	* Wt. n-Val.	* 0.114	* 0.065	* 0.085	*
* W.S. Elev (ft)	* 666.49	* Reach Len. (ft)	* 105.00	* 60.81	* 42.00	*
* Crit W.S. (ft)	* 659.62	* Flow Area (sq ft)	* 259.95	* 525.72	* 207.70	*
* E.G. Slope (ft/ft)	*0.000869	* Area (sq ft)	* 260.04	* 525.72	* 207.75	*
* Q Total (cfs)	* 2071.00	* Flow (cfs)	* 268.34	* 1587.91	* 214.75	*
* Top Width (ft)	* 188.97	* Top Width (ft)	* 65.78	* 49.36	* 73.83	*
* Vel Total (ft/s)	* 2.08	* Avg. Vel. (ft/s)	* 1.03	* 3.02	* 1.03	*
* Max Chl Dpth (ft)	* 11.68	* Hydr. Depth (ft)	* 4.01	* 10.65	* 2.85	*
* Conv. Total (cfs)	* 70253.7	* Conv. (cfs)	* 9102.8	* 53866.0	* 7285.0	*
* Length Wtd. (ft)	* 64.57	* Wetted Per. (ft)	* 65.13	* 55.40	* 73.09	*
* Min Ch El (ft)	* 654.81	* Shear (lb/sq ft)	* 0.22	* 0.51	* 0.15	*
* Alpha	* 1.19	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 2.89	* 21.52	* 5.21	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.00	* 2.31	* 2.16	*

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 666.95	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.08	* Wt. n-Val.	* 0.113	* 0.065	* 0.085	*
* W.S. Elev (ft)	* 666.92	* Reach Len. (ft)	* 105.00	* 60.81	* 42.00	*
* Crit W.S. (ft)	* 659.88	* Flow Area (sq ft)	* 287.62	* 546.81	* 238.85	*
* E.G. Slope (ft/ft)	*0.000885	* Area (sq ft)	* 288.68	* 546.81	* 240.27	*
* Q Total (cfs)	* 2303.00	* Flow (cfs)	* 318.91	* 1710.60	* 273.48	*
* Top Width (ft)	* 196.06	* Top Width (ft)	* 68.28	* 49.36	* 78.41	*
* Vel Total (ft/s)	* 2.15	* Avg. Vel. (ft/s)	* 1.11	* 3.13	* 1.14	*
* Max Chl Dpth (ft)	* 12.11	* Hydr. Depth (ft)	* 4.44	* 11.08	* 3.28	*
* Conv. Total (cfs)	* 77433.7	* Conv. (cfs)	* 10722.9	* 57515.5	* 9195.3	*
* Length Wtd. (ft)	* 64.68	* Wetted Per. (ft)	* 65.13	* 55.40	* 73.09	*
* Min Ch El (ft)	* 654.81	* Shear (lb/sq ft)	* 0.24	* 0.55	* 0.18	*
* Alpha	* 1.19	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 3.25	* 22.29	* 6.06	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.07	* 1.96	* 2.24	*

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95562.19

INPUT
Description: 3111 (Regulatory Section)
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-238.64	669.76	-208.71	669.74	-178.65	668.89	-148.72	669.79	-118.68	670.81
-71.74	670.26	-53.99	661.86	-44.08	659.72	-28.62	661.13	-25.77	656.97
-16.57	655.29	.34	655.36	7.37	655.98	20.03	657.23	30.4	663.83
69.88	663.97	82.52	666.85	95.15	668.56	107.91	670.13	354.15	667.66
600.4	670.38	846.67	673.69	1092.92	674.57	1339.17	670.45	1585.42	673.33
1831.67	676.41	2077.92	682.07						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-238.64	.085	-28.62	.065	30.4	.085	107.91	.2

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-28.62	30.4	102	64.79	39	.1	.3

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	* 663.71	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.08	* Wt. n-Val.	* 0.085	* 0.065	*	*
* W.S. Elev (ft)	* 663.63	* Reach Len. (ft)	* 102.00	* 64.79	* 39.00	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 81.15	* 399.86	*	*
* E.G. Slope (ft/ft)	*0.000850	* Area (sq ft)	* 81.15	* 399.86	*	*
* Q Total (cfs)	* 994.00	* Flow (cfs)	* 80.62	* 913.38	*	*
* Top Width (ft)	* 87.83	* Top Width (ft)	* 29.12	* 58.71	*	*
* Vel Total (ft/s)	* 2.07	* Avg. Vel. (ft/s)	* 0.99	* 2.28	*	*
* Max Chl Dpth (ft)	* 8.34	* Hydr. Depth (ft)	* 2.79	* 6.81	*	*
* Conv. Total (cfs)	* 34096.2	* Conv. (cfs)	* 2765.5	* 31330.6	*	*
* Length Wtd. (ft)	* 66.89	* Wetted Per. (ft)	* 29.81	* 63.01	*	*
* Min Ch El (ft)	* 655.29	* Shear (lb/sq ft)	* 0.14	* 0.34	*	*
* Alpha	* 1.14	* Stream Power (lb/ft s)	* 2077.92	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.05	* Cum Volume (acre-ft)	* 0.82	* 14.89	* 1.00	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.42	* 2.24	* 0.83	*

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	* 665.12	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.10	* Wt. n-Val.	* 0.085	* 0.065	* 0.085	*
* W.S. Elev (ft)	* 665.02	* Reach Len. (ft)	* 102.00	* 64.79	* 39.00	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 123.59	* 481.72	* 46.75	*
* E.G. Slope (ft/ft)	*0.000931	* Area (sq ft)	* 123.59	* 481.72	* 46.75	*
* Q Total (cfs)	* 1484.00	* Flow (cfs)	* 158.84	* 1299.28	* 25.88	*
* Top Width (ft)	* 135.17	* Top Width (ft)	* 32.05	* 59.02	* 44.10	*
* Vel Total (ft/s)	* 2.28	* Avg. Vel. (ft/s)	* 1.29	* 2.70	* 0.55	*

* Max Chl Dpth (ft)	* 9.73	* Hydr. Depth (ft)	* 3.86	* 8.16	* 1.06	*
* Conv. Total (cfs)	* 48624.6	* Conv. (cfs)	* 5204.5	* 42572.0	* 848.1	*
* Length Wtd. (ft)	* 67.31	* Wetted Per. (ft)	* 33.06	* 63.38	* 44.22	*
* Min Ch El (ft)	* 655.29	* Shear (lb/sq ft)	* 0.22	* 0.44	* 0.06	*
* Alpha	* 1.26	* Stream Power (lb/ft s)	* 2077.92	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 1.47	* 17.93	* 2.47	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.57	* 2.24	* 1.39	*

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	* 666.00	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.12	* Wt. n-Val.	* 0.085	* 0.065	* 0.085	*
* W.S. Elev (ft)	* 665.88	* Reach Len. (ft)	* 102.00	* 64.79	* 39.00	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 151.79	* 532.22	* 86.09	*
* E.G. Slope (ft/ft)	*0.000968	* Area (sq ft)	* 151.79	* 532.22	* 86.09	*
* Q Total (cfs)	* 1852.00	* Flow (cfs)	* 219.28	* 1563.68	* 69.04	*
* Top Width (ft)	* 140.74	* Top Width (ft)	* 33.86	* 59.02	* 47.86	*
* Vel Total (ft/s)	* 2.40	* Avg. Vel. (ft/s)	* 1.44	* 2.94	* 0.80	*
* Max Chl Dpth (ft)	* 10.59	* Hydr. Depth (ft)	* 4.48	* 9.02	* 1.80	*
* Conv. Total (cfs)	* 59536.7	* Conv. (cfs)	* 7049.2	* 50267.9	* 2219.5	*
* Length Wtd. (ft)	* 67.17	* Wetted Per. (ft)	* 35.06	* 63.38	* 48.07	*
* Min Ch El (ft)	* 655.29	* Shear (lb/sq ft)	* 0.26	* 0.51	* 0.11	*
* Alpha	* 1.31	* Stream Power (lb/ft s)	* 2077.92	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 2.02	* 19.79	* 4.20	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.75	* 2.24	* 1.98	*

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	* 666.29	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.12	* Wt. n-Val.	* 0.085	* 0.065	* 0.085	*
* W.S. Elev (ft)	* 666.17	* Reach Len. (ft)	* 102.00	* 64.79	* 39.00	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 161.80	* 549.52	* 100.30	*
* E.G. Slope (ft/ft)	*0.000984	* Area (sq ft)	* 161.80	* 549.52	* 100.30	*
* Q Total (cfs)	* 1994.00	* Flow (cfs)	* 242.79	* 1663.01	* 88.20	*
* Top Width (ft)	* 142.64	* Top Width (ft)	* 34.48	* 59.02	* 49.14	*
* Vel Total (ft/s)	* 2.46	* Avg. Vel. (ft/s)	* 1.50	* 3.03	* 0.88	*
* Max Chl Dpth (ft)	* 10.88	* Hydr. Depth (ft)	* 4.69	* 9.31	* 2.04	*
* Conv. Total (cfs)	* 63572.3	* Conv. (cfs)	* 7740.7	* 53019.7	* 2812.0	*
* Length Wtd. (ft)	* 67.09	* Wetted Per. (ft)	* 35.74	* 63.38	* 49.39	*
* Min Ch El (ft)	* 655.29	* Shear (lb/sq ft)	* 0.28	* 0.53	* 0.12	*
* Alpha	* 1.32	* Stream Power (lb/ft s)	* 2077.92	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 2.25	* 20.43	* 4.76	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.83	* 2.24	* 2.07	*

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	* 666.45	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.13	* Wt. n-Val.	* 0.085	* 0.065	* 0.085	*
* W.S. Elev (ft)	* 666.32	* Reach Len. (ft)	* 102.00	* 64.79	* 39.00	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 167.11	* 558.56	* 107.89	*
* E.G. Slope (ft/ft)	*0.000992	* Area (sq ft)	* 167.11	* 558.56	* 107.89	*
* Q Total (cfs)	* 2071.00	* Flow (cfs)	* 255.62	* 1716.28	* 99.10	*
* Top Width (ft)	* 143.64	* Top Width (ft)	* 34.80	* 59.02	* 49.81	*
* Vel Total (ft/s)	* 2.48	* Avg. Vel. (ft/s)	* 1.53	* 3.07	* 0.92	*
* Max Chl Dpth (ft)	* 11.03	* Hydr. Depth (ft)	* 4.80	* 9.46	* 2.17	*
* Conv. Total (cfs)	* 65742.6	* Conv. (cfs)	* 8114.5	* 54482.2	* 3145.9	*
* Length Wtd. (ft)	* 67.04	* Wetted Per. (ft)	* 36.10	* 63.38	* 50.08	*
* Min Ch El (ft)	* 655.29	* Shear (lb/sq ft)	* 0.29	* 0.55	* 0.13	*
* Alpha	* 1.32	* Stream Power (lb/ft s)	* 2077.92	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 2.37	* 20.76	* 5.06	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.87	* 2.24	* 2.10	*

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 666.88	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.14	* Wt. n-Val.	* 0.085	* 0.065	* 0.085	*
* W.S. Elev (ft)	* 666.74	* Reach Len. (ft)	* 102.00	* 64.79	* 39.00	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 181.82	* 583.20	* 129.06	*
* E.G. Slope (ft/ft)	*0.001027	* Area (sq ft)	* 181.82	* 583.20	* 129.06	*
* Q Total (cfs)	* 2303.00	* Flow (cfs)	* 294.05	* 1876.33	* 132.62	*
* Top Width (ft)	* 146.35	* Top Width (ft)	* 35.69	* 59.02	* 51.65	*
* Vel Total (ft/s)	* 2.58	* Avg. Vel. (ft/s)	* 1.62	* 3.22	* 1.03	*
* Max Chl Dpth (ft)	* 11.45	* Hydr. Depth (ft)	* 5.10	* 9.88	* 2.50	*
* Conv. Total (cfs)	* 71858.1	* Conv. (cfs)	* 9174.9	* 58545.2	* 4138.0	*
* Length Wtd. (ft)	* 66.92	* Wetted Per. (ft)	* 37.08	* 63.38	* 51.96	*
* Min Ch El (ft)	* 655.29	* Shear (lb/sq ft)	* 0.31	* 0.59	* 0.16	*
* Alpha	* 1.33	* Stream Power (lb/ft s)	* 2077.92	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 2.68	* 21.51	* 5.88	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.95	* 1.88	* 2.18	*

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95497.4

INPUT
Description: Surveyed x-section
Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-153.9	670.25	-140.5	670.7	-126.2	671.07	-109.9	671.06	-85.5	670.53
-53.1	661.25	-33.9	660.58	-33.9	658.23	-27.5	655.72	-26.2	655.41
-21.1	655.75	-9.4	654.78	10	655.8	17.7	656.13	23.3	657.93
24.3	661.35	33	664.03	77.9	664.5	104.6	668.75	110.3	669.27
116.6	668.95	127.4	667.76	138	667.7	140.3	667.57	154.2	664.17
200.5	663.29	253.7	663.16	305.9	663.39	359.7	663.56	412.1	664.75
460.4	664.23	515.1	665.31	537.8	664.88	541.5	664.81	550.7	664.87
552	664.42	566.7	664.59	583.9	664.36	592.2	664.85	597.7	664.99
608.5	665	608.9	664.75	627.6	664.36	647.4	665.92	670.3	665.3
698.2	666.26	704.7	666.09	724.9	665.68	725.9	665.28	749.3	665.79
772.3	665.77								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-153.9	.085	-109.9	.12	-33.9	.065	24.3	.085	127.4	.2
515.1	.2								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-33.9	24.3	147	203.1	327	.1	.3

Right Levee Station= 110.3 Elevation= 669.27

CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	663.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.120	0.065	0.085
W.S. Elev (ft)	663.59	Reach Len. (ft)	147.00	203.10	327.00
Crit W.S. (ft)	657.86	Flow Area (sq ft)	60.98	451.56	8.16
E.G. Slope (ft/ft)	*0.000634	Area (sq ft)	60.98	451.56	8.16
Q Total (cfs)	994.00	Flow (cfs)	34.11	956.13	3.76
Top Width (ft)	92.86	Top Width (ft)	27.38	58.20	7.28
Vel Total (ft/s)	1.91	Avg. Vel. (ft/s)	0.56	2.12	0.46
Max Chl Dpth (ft)	8.81	Hydr. Depth (ft)	2.23	7.76	1.12
Conv. Total (cfs)	39482.1	Conv. (cfs)	1354.9	37977.8	149.3
Length Wtd. (ft)	207.61	Wetted Per. (ft)	27.72	63.99	7.62
Min Ch El (ft)	654.78	Shear (lb/sq ft)	0.09	0.28	0.04
Alpha	1.19	Stream Power (lb/ft s)	772.30	0.00	110.30
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.65	14.26	0.99
C & E Loss (ft)	0.00	Cum SA (acres)	0.36	2.15	0.83

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	665.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.120	0.065	0.085
W.S. Elev (ft)	664.97	Reach Len. (ft)	147.00	203.10	327.00
Crit W.S. (ft)	658.51	Flow Area (sq ft)	102.02	531.77	52.20
E.G. Slope (ft/ft)	*0.000754	Area (sq ft)	102.02	531.77	52.20
Q Total (cfs)	1477.00	Flow (cfs)	79.40	1369.43	28.17
Top Width (ft)	146.94	Top Width (ft)	32.19	58.20	56.55
Vel Total (ft/s)	2.15	Avg. Vel. (ft/s)	0.78	2.58	0.54
Max Chl Dpth (ft)	10.19	Hydr. Depth (ft)	3.17	9.14	0.92
Conv. Total (cfs)	53791.8	Conv. (cfs)	2891.6	49874.2	1026.1
Length Wtd. (ft)	208.01	Wetted Per. (ft)	32.72	63.99	57.00
Min Ch El (ft)	654.78	Shear (lb/sq ft)	0.15	0.39	0.04
Alpha	1.33	Stream Power (lb/ft s)	772.30	0.00	110.30
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	1.21	17.18	2.42
C & E Loss (ft)	0.00	Cum SA (acres)	0.49	2.15	1.35

CROSS SECTION OUTPUT Profile #50yr

E.G. Elev (ft)	665.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.120	0.065	0.085
W.S. Elev (ft)	665.82	Reach Len. (ft)	147.00	203.10	327.00
Crit W.S. (ft)	658.96	Flow Area (sq ft)	130.72	581.37	102.68
E.G. Slope (ft/ft)	*0.000808	Area (sq ft)	130.72	581.37	102.68
Q Total (cfs)	1839.00	Flow (cfs)	117.44	1644.69	76.87
Top Width (ft)	155.27	Top Width (ft)	35.16	58.20	61.91
Vel Total (ft/s)	2.26	Avg. Vel. (ft/s)	0.90	2.83	0.75
Max Chl Dpth (ft)	11.04	Hydr. Depth (ft)	3.72	9.99	1.66
Conv. Total (cfs)	64702.4	Conv. (cfs)	4132.0	57866.0	2704.4
Length Wtd. (ft)	208.13	Wetted Per. (ft)	35.82	63.99	62.42
Min Ch El (ft)	654.78	Shear (lb/sq ft)	0.18	0.46	0.08
Alpha	1.42	Stream Power (lb/ft s)	772.30	0.00	110.30
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	1.69	18.97	4.11
C & E Loss (ft)	0.00	Cum SA (acres)	0.67	2.15	1.93

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	666.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.120	0.065	0.085
W.S. Elev (ft)	666.11	Reach Len. (ft)	147.00	203.10	327.00
Crit W.S. (ft)	659.11	Flow Area (sq ft)	141.14	598.36	121.02
E.G. Slope (ft/ft)	*0.000828	Area (sq ft)	141.14	598.36	121.02
Q Total (cfs)	1979.00	Flow (cfs)	132.63	1746.87	99.50
Top Width (ft)	158.13	Top Width (ft)	36.18	58.20	63.74
Vel Total (ft/s)	2.30	Avg. Vel. (ft/s)	0.94	2.92	0.82
Max Chl Dpth (ft)	11.33	Hydr. Depth (ft)	3.90	10.28	1.90
Conv. Total (cfs)	68779.6	Conv. (cfs)	4609.6	60711.9	3458.2
Length Wtd. (ft)	208.27	Wetted Per. (ft)	36.88	63.99	64.28
Min Ch El (ft)	654.78	Shear (lb/sq ft)	0.20	0.48	0.10
Alpha	1.44	Stream Power (lb/ft s)	772.30	0.00	110.30
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	1.89	19.57	4.66
C & E Loss (ft)	0.00	Cum SA (acres)	0.75	2.15	2.02

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	666.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.120	0.065	0.085
W.S. Elev (ft)	666.27	Reach Len. (ft)	147.00	203.10	327.00
Crit W.S. (ft)	659.20	Flow Area (sq ft)	146.70	607.24	130.82
E.G. Slope (ft/ft)	*0.000839	Area (sq ft)	146.70	607.24	130.82
Q Total (cfs)	2056.00	Flow (cfs)	141.07	1802.33	112.60
Top Width (ft)	159.62	Top Width (ft)	36.72	58.20	64.70
Vel Total (ft/s)	2.32	Avg. Vel. (ft/s)	0.96	2.97	0.86
Max Chl Dpth (ft)	11.49	Hydr. Depth (ft)	4.00	10.43	2.02
Conv. Total (cfs)	70978.3	Conv. (cfs)	4870.1	62221.0	3887.1
Length Wtd. (ft)	208.27	Wetted Per. (ft)	37.43	63.99	65.25
Min Ch El (ft)	654.78	Shear (lb/sq ft)	0.21	0.50	0.11
Alpha	1.45	Stream Power (lb/ft s)	772.30	0.00	110.30
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	2.01	19.89	4.95
C & E Loss (ft)	0.00	Cum SA (acres)	0.79	2.15	2.05

CROSS SECTION OUTPUT Profile #500yr

E.G. Elev (ft)	666.81	Element	Left OB	Channel	Right OB

* Vel Head (ft)	*	0.13	* Wt. n-Val.	*	0.120	*	0.065	*	0.085	*
* W.S. Elev (ft)	*	666.68	* Reach Len. (ft)	*	147.00	*	203.10	*	327.00	*
* Crit W.S. (ft)	*	659.44	* Flow Area (sq ft)	*	162.25	*	631.41	*	158.23	*
* E.G. Slope (ft/ft)	*	0.000877	* Area (sq ft)	*	162.25	*	631.41	*	158.23	*
* Q Total (cfs)	*	2286.00	* Flow (cfs)	*	166.35	*	1966.41	*	153.24	*
* Top Width (ft)	*	163.68	* Top Width (ft)	*	38.17	*	58.20	*	67.31	*
* Vel Total (ft/s)	*	2.40	* Avg. Vel. (ft/s)	*	1.03	*	3.11	*	0.97	*
* Max Chl Dpth (ft)	*	11.90	* Hydr. Depth (ft)	*	4.25	*	10.85	*	2.35	*
* Conv. Total (cfs)	*	77194.4	* Conv. (cfs)	*	5617.3	*	66402.5	*	5174.6	*
* Length Wtd. (ft)	*	205.72	* Wetted Per. (ft)	*	38.94	*	63.99	*	67.89	*
* Min Ch El (ft)	*	654.78	* Shear (lb/sq ft)	*	0.23	*	0.54	*	0.13	*
* Alpha	*	1.47	* Stream Power (lb/ft s)	*	772.30	*	0.00	*	110.30	*
* Frctn Loss (ft)	*	0.13	* Cum Volume (acre-ft)	*	2.28	*	20.60	*	5.75	*
* C & E Loss (ft)	*	0.02	* Cum SA (acres)	*	0.86	*	1.79	*	2.13	*

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95294.3

INPUT
Description: U/S Rt. 83 (surveyed x-section)
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.8	669.58	-101.8	669.28	-77	667.14	-69.6	663.71	-60.6	662.25
-50.2	660.47	-45.9	658.26	-42.7	657.91	-34.4	657.44	-21.6	656.96
-18.6	656.68	-10.7	656.56	13	657.11	24.699	657.55	38.4	657.44
51.2	657.99	53.8	660.77	62	662.34	73	663.23	75.4	665.14
102.4	667.73	124	667.52	163.6	665.77				

Manninq's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-130.8	.085	-45.9	.055	51.2	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-60.6	62	187.3	187.3	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-130.8	-91	670.92	F
91	163.6	670.92	F

Right Levee Station= 102.4 Elevation= 667.73

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	*	663.56	* Element	*	Left OB	*	Channel	*	Right OB	*
* Vel Head (ft)	*	0.03	* Wt. n-Val.	*	0.085	*	0.062	*	0.085	*
* W.S. Elev (ft)	*	663.52	* Reach Len. (ft)	*	32.30	*	32.30	*	32.30	*
* Crit W.S. (ft)	*	658.73	* Flow Area (sq ft)	*	4.99	*	676.61	*	8.16	*
* E.G. Slope (ft/ft)	*	0.000394	* Area (sq ft)	*	4.99	*	676.61	*	8.16	*
* Q Total (cfs)	*	994.00	* Flow (cfs)	*	1.27	*	990.48	*	2.25	*
* Top Width (ft)	*	141.81	* Top Width (ft)	*	7.84	*	122.60	*	11.37	*
* Vel Total (ft/s)	*	1.44	* Avg. Vel. (ft/s)	*	0.25	*	1.46	*	0.28	*
* Max Chl Dpth (ft)	*	6.96	* Hydr. Depth (ft)	*	0.64	*	5.52	*	0.72	*
* Conv. Total (cfs)	*	50060.3	* Conv. (cfs)	*	64.0	*	49882.8	*	113.5	*
* Lenqth Wtd. (ft)	*	32.30	* Wetted Per. (ft)	*	7.95	*	124.72	*	11.51	*
* Min Ch El (ft)	*	656.56	* Shear (lb/sq ft)	*	0.02	*	0.13	*	0.02	*
* Alpha	*	1.03	* Stream Power (lb/ft s)	*	163.60	*	0.00	*	102.40	*
* Frctn Loss (ft)	*	0.01	* Cum Volume (acre-ft)	*	0.54	*	11.63	*	0.93	*
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.30	*	1.73	*	0.76	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	*	664.95	* Element	*	Left OB	*	Channel	*	Right OB	*
* Vel Head (ft)	*	0.05	* Wt. n-Val.	*	0.085	*	0.062	*	0.085	*
* W.S. Elev (ft)	*	664.91	* Reach Len. (ft)	*	32.30	*	32.30	*	32.30	*
* Crit W.S. (ft)	*	659.17	* Flow Area (sq ft)	*	18.88	*	846.28	*	25.10	*
* E.G. Slope (ft/ft)	*	0.000403	* Area (sq ft)	*	18.88	*	846.28	*	25.10	*
* Q Total (cfs)	*	1477.00	* Flow (cfs)	*	8.99	*	1454.84	*	13.18	*
* Top Width (ft)	*	147.29	* Top Width (ft)	*	11.58	*	122.60	*	13.11	*
* Vel Total (ft/s)	*	1.66	* Avg. Vel. (ft/s)	*	0.48	*	1.72	*	0.53	*
* Max Chl Dpth (ft)	*	8.35	* Hydr. Depth (ft)	*	1.63	*	6.90	*	1.92	*
* Conv. Total (cfs)	*	73531.7	* Conv. (cfs)	*	447.4	*	72428.3	*	656.1	*
* Length Wtd. (ft)	*	32.30	* Wetted Per. (ft)	*	11.96	*	124.72	*	13.73	*
* Min Ch El (ft)	*	656.56	* Shear (lb/sq ft)	*	0.04	*	0.17	*	0.05	*
* Alpha	*	1.06	* Stream Power (lb/ft s)	*	163.60	*	0.00	*	102.40	*
* Frctn Loss (ft)	*	0.01	* Cum Volume (acre-ft)	*	1.01	*	13.96	*	2.13	*
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.42	*	1.73	*	1.09	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	*	665.81	* Element	*	Left OB	*	Channel	*	Right OB	*
* Vel Head (ft)	*	0.05	* Wt. n-Val.	*	0.085	*	0.062	*	0.085	*
* W.S. Elev (ft)	*	665.76	* Reach Len. (ft)	*	32.30	*	32.30	*	32.30	*
* Crit W.S. (ft)	*	659.47	* Flow Area (sq ft)	*	29.54	*	950.84	*	38.49	*
* E.G. Slope (ft/ft)	*	0.000419	* Area (sq ft)	*	29.54	*	950.84	*	38.49	*
* Q Total (cfs)	*	1839.00	* Flow (cfs)	*	17.40	*	1800.69	*	20.91	*
* Top Width (ft)	*	155.87	* Top Width (ft)	*	13.42	*	122.60	*	19.85	*
* Vel Total (ft/s)	*	1.80	* Avg. Vel. (ft/s)	*	0.59	*	1.89	*	0.54	*
* Max Chl Dpth (ft)	*	9.20	* Hydr. Depth (ft)	*	2.20	*	7.76	*	1.94	*
* Conv. Total (cfs)	*	89819.9	* Conv. (cfs)	*	850.0	*	87948.7	*	1021.2	*
* Length Wtd. (ft)	*	32.30	* Wetted Per. (ft)	*	13.99	*	124.72	*	20.59	*
* Min Ch El (ft)	*	656.56	* Shear (lb/sq ft)	*	0.06	*	0.20	*	0.05	*
* Alpha	*	1.08	* Stream Power (lb/ft s)	*	163.60	*	0.00	*	102.40	*
* Frctn Loss (ft)	*	0.02	* Cum Volume (acre-ft)	*	1.42	*	15.39	*	3.58	*
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.59	*	1.73	*	1.62	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	666.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.085	0.062	0.085
W.S. Elev (ft)	666.05	Reach Len. (ft)	32.30	32.30	32.30
Crit W.S. (ft)	659.60	Flow Area (sq ft)	33.54	986.56	44.72
E.G. Slope (ft/ft)	*0.000427	Area (sq ft)	33.54	986.56	44.72
Q Total (cfs)	1979.00	Flow (cfs)	21.02	1933.26	24.72
Top Width (ft)	159.54	Top Width (ft)	14.05	122.60	22.89
Vel Total (ft/s)	1.86	Avg. Vel. (ft/s)	0.63	1.96	0.55
Max Chl Dpth (ft)	9.49	Hydr. Depth (ft)	2.39	8.05	1.95
Conv. Total (cfs)	95737.4	Conv. (cfs)	1017.1	93524.6	1195.7
Length Wtd. (ft)	32.30	Wetted Per. (ft)	14.68	124.72	23.64
Min Ch El (ft)	656.56	Shear (lb/sq ft)	0.06	0.21	0.05
Alpha	1.09	Stream Power (lb/ft s)	163.60	0.00	102.40
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	1.60	15.88	4.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.66	1.73	1.69

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	666.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.085	0.062	0.085
W.S. Elev (ft)	666.20	Reach Len. (ft)	32.30	32.30	32.30
Crit W.S. (ft)	659.65	Flow Area (sq ft)	35.71	1005.22	48.32
E.G. Slope (ft/ft)	*0.000432	Area (sq ft)	35.71	1005.22	48.32
Q Total (cfs)	2056.00	Flow (cfs)	23.09	2005.83	27.08
Top Width (ft)	161.46	Top Width (ft)	14.38	122.60	24.48
Vel Total (ft/s)	1.89	Avg. Vel. (ft/s)	0.65	2.00	0.56
Max Chl Dpth (ft)	9.64	Hydr. Depth (ft)	2.48	8.20	1.97
Conv. Total (cfs)	98903.8	Conv. (cfs)	1110.6	96490.5	1302.7
Length Wtd. (ft)	32.30	Wetted Per. (ft)	15.04	124.72	25.23
Min Ch El (ft)	656.56	Shear (lb/sq ft)	0.06	0.22	0.05
Alpha	1.09	Stream Power (lb/ft s)	163.60	0.00	102.40
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	1.70	16.13	4.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.70	1.73	1.71

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500yr

E.G. Elev (ft)	666.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.085	0.062	0.085
W.S. Elev (ft)	666.60	Reach Len. (ft)	32.30	32.30	32.30
Crit W.S. (ft)	659.82	Flow Area (sq ft)	41.63	1054.26	58.95
E.G. Slope (ft/ft)	*0.000452	Area (sq ft)	41.63	1054.26	58.95
Q Total (cfs)	2286.00	Flow (cfs)	29.29	2221.88	34.83
Top Width (ft)	166.49	Top Width (ft)	15.24	122.60	28.65
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)	0.70	2.11	0.59
Max Chl Dpth (ft)	10.04	Hydr. Depth (ft)	2.73	8.60	2.06
Conv. Total (cfs)	*107478.1	Conv. (cfs)	1376.9	*104463.5	1637.8
Length Wtd. (ft)	32.30	Wetted Per. (ft)	16.00	124.72	29.42
Min Ch El (ft)	656.56	Shear (lb/sq ft)	0.07	0.24	0.06
Alpha	1.10	Stream Power (lb/ft s)	163.60	0.00	102.40
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	1.93	16.67	4.94
C & E Loss (ft)	0.01	Cum SA (acres)	0.77	1.37	1.77

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Manninq's n values were composited to a sinqle value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE

RIVER: Salt Creek
REACH: A RS: 95200

INPUT
Description: Route 83 Bridge
Distance from Upstream XS = 32.3
Deck/Roadway Width = 124
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 8

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
-380	671.72	-61.7	670.92	-58.7	670.92
-23.5	670.98	23.5	671.07	58.7	671.13
61.7	671.13	325	671.02		
	666.22		666.37		666.43

Upstream Bridge Cross Section Data
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.8	669.58	-101.8	669.28	-77	667.14	-69.6	663.71	-60.6	662.25
-50.2	660.47	-45.9	658.26	-42.7	657.91	-34.4	657.44	-21.6	656.96
-18.6	656.68	-10.7	656.56	13	657.11	24.699	657.55	38.4	657.44
51.2	657.99	53.8	660.77	62	662.34	73	663.23	75.4	665.14
102.4	667.73	124	667.52	163.6	665.77				

Manninq's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-130.8	.085	-45.9	.055	51.2	.085

Bank Sta: Left Right Coeff Contr. Expan.
-60.6 62 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-130.8	-91	670.92	F
91	163.6	670.92	F

Right Levee Station= 102.4 Elevation= 667.73

```
Downstream  Deck/Roadway Coordinates
    num=       8
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**************************************************************************
    -380  671.72           -61.7  670.92           -58.7  670.92  666.22
   -23.5  670.98  666.28    23.5  671.07  666.37    58.7  671.13  666.43
    61.7  671.13             325  671.02

Downstream Bridge Cross Section Data
Station Elevation Data    num=      20
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**************************************************************************************
  -204.8  667.52  -150.7  667.28  -102.8   665.8   -77.3   664.7   -49.5  659.78
   -45.6  657.67   -33.9  656.29   -16.4  656.62       0  656.61    16.4  656.43
    31.7  657.26    41.5   656.7    54.9  657.05    56.7  660.72  70.299  663.29
    85.8  663.89 139.599  665.01   179.5     666   192.9     668   248.7     670

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -204.8    .085   -49.5    .055    56.7    .085

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -49.5    56.7             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  -204.8   -66.5  670.92       F
    66.5   248.7  670.92       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =  670.92
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream=   -23.5    Downstream=   -23.5
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5  652.22       2  666.28
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5  652.22       2  666.28

Pier Data
Pier Station     Upstream=    23.5    Downstream=    23.5
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5  652.22       2  666.37
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5  652.22       2  666.37

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
       W.S. Pro Method

  W.S.Pro Data
    Left Embankment
       El of the top of the embankment = 670.25
       El of the toe of the abutment   = 656.5
    Right Embankment
       El of the top of the embankment = 670.43
       El of the toe of the abutment   = 656.5
    Abtument Type                      = 4 Vert. abutments and sloping embankments with wingwalls
    Slope of abutments                 =
    Top with of embankment             = 109
    Centroid station of bridge opening =
    Wing Wall Type                     = Angular wing walls
       Width                           = 24
       Angle                           = 30
       Radius                          =
    Guide Banks Type                   = No Guide Bank present
       Length                          =
       Offset                          =
       Angle                           =

Selected Low Flow Methods = Energy

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2yr
*********************************************************************************************
* E.G. US. (ft)          *     663.56  * Element               *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     663.52  * E.G. Elev (ft)        *     663.54  *     663.49  *
```

* Q Total (cfs)	* 994.00	* W.S. Elev (ft)	* 663.50	* 663.46 *
* Q Bridge (cfs)	* 994.00	* Crit W.S. (ft)	* 658.78	* 658.22 *
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 6.94	* 7.17 *
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 1.55	* 1.41 *
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 639.28	* 705.64 *
* Weir Submerg	*	* Froude # Chl	* 0.10	* 0.09 *
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 1966.67	* 2337.51 *
* Min El Weir Flow (ft)	* 670.93	* Hydr Depth (ft)	* 5.65	* 6.23 *
* Min El Prs (ft)	* 666.43	* W.P. Total (ft)	* 143.13	* 147.52 *
* Delta EG (ft)	* 0.18	* Conv. Total (cfs)	* 46841.9	* 54995.0 *
* Delta WS (ft)	* 0.06	* Top Width (ft)	* 113.21	* 113.21 *
* BR Open Area (sq ft)	* 958.87	* Frctn Loss (ft)	* 0.05	* 0.01 *
* BR Open Vel (ft/s)	* 1.55	* C & E Loss (ft)	* 0.00	* 0.00 *
* Coef of Q	* 0.98	* Shear Total (lb/sq ft)	* 0.13	* 0.10 *
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.80	* -204.80 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #10yr

* E.G. US. (ft)	* 664.95	* Element	*Inside BR US	*Inside BR DS *
* W.S. US. (ft)	* 664.91	* E.G. Elev (ft)	* 664.94	* 664.88 *
* Q Total (cfs)	* 1477.00	* W.S. Elev (ft)	* 664.88	* 664.83 *
* Q Bridge (cfs)	* 1477.00	* Crit W.S. (ft)	* 659.25	* 658.68 *
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 8.32	* 8.54 *
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 1.86	* 1.72 *
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 795.45	* 860.86 *
* Weir Submerg	*	* Froude # Chl	* 0.11	* 0.11 *
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 2993.01	* 3446.81 *
* Min El Weir Flow (ft)	* 670.93	* Hydr Depth (ft)	* 7.02	* 7.60 *
* Min El Prs (ft)	* 666.43	* W.P. Total (ft)	* 151.40	* 155.75 *
* Delta EG (ft)	* 0.21	* Conv. Total (cfs)	* 64947.8	* 73674.9 *
* Delta WS (ft)	* 0.08	* Top Width (ft)	* 113.30	* 113.30 *
* BR Open Area (sq ft)	* 958.87	* Frctn Loss (ft)	* 0.06	* 0.01 *
* BR Open Vel (ft/s)	* 1.86	* C & E Loss (ft)	* 0.00	* 0.00 *
* Coef of Q	* 0.98	* Shear Total (lb/sq ft)	* 0.17	* 0.14 *
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.80	* -204.80 *

Warning: When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the largest [smallest] user entered n value. The n value has been set to the largest [smallest] entered value. The user may wish to examine this cross section and enter a single n value for the entire channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #50yr

* E.G. US. (ft)	* 665.81	* Element	*Inside BR US	*Inside BR DS *
* W.S. US. (ft)	* 665.76	* E.G. Elev (ft)	* 665.80	* 665.73 *
* Q Total (cfs)	* 1839.00	* W.S. Elev (ft)	* 665.73	* 665.67 *
* Q Bridge (cfs)	* 1839.00	* Crit W.S. (ft)	* 659.55	* 658.98 *
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 9.17	* 9.38 *
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.06	* 1.92 *
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 891.63	* 956.28 *
* Weir Submerg	*	* Froude # Chl	* 0.12	* 0.11 *
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 3741.49	* 4243.51 *
* Min El Weir Flow (ft)	* 670.93	* Hydr Depth (ft)	* 7.87	* 8.44 *
* Min El Prs (ft)	* 666.43	* W.P. Total (ft)	* 156.50	* 160.80 *
* Delta EG (ft)	* 0.23	* Conv. Total (cfs)	* 76842.8	* 85908.2 *
* Delta WS (ft)	* 0.08	* Top Width (ft)	* 113.36	* 113.36 *
* BR Open Area (sq ft)	* 958.87	* Frctn Loss (ft)	* 0.06	* 0.01 *
* BR Open Vel (ft/s)	* 2.06	* C & E Loss (ft)	* 0.00	* 0.00 *
* Coef of Q	* 0.98	* Shear Total (lb/sq ft)	* 0.20	* 0.17 *
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.80	* -204.80 *

Warning: When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the largest [smallest] user entered n value. The n value has been set to the largest [smallest] entered value. The user may wish to examine this cross section and enter a single n value for the entire channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #100yr

* E.G. US. (ft)	* 666.11	* Element	*Inside BR US	*Inside BR DS *
* W.S. US. (ft)	* 666.05	* E.G. Elev (ft)	* 666.09	* 666.03 *
* Q Total (cfs)	* 1979.00	* W.S. Elev (ft)	* 666.02	* 665.96 *
* Q Bridge (cfs)	* 1979.00	* Crit W.S. (ft)	* 659.67	* 659.10 *
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 9.46	* 9.67 *
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.14	* 2.00 *
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 924.45	* 988.78 *
* Weir Submerg	*	* Froude # Chl	* 0.12	* 0.12 *
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 4018.13	* 4535.74 *
* Min El Weir Flow (ft)	* 670.93	* Hydr Depth (ft)	* 8.15	* 8.72 *
* Min El Prs (ft)	* 666.43	* W.P. Total (ft)	* 158.23	* 162.52 *
* Delta EG (ft)	* 0.24	* Conv. Total (cfs)	* 81016.2	* 90192.2 *
* Delta WS (ft)	* 0.09	* Top Width (ft)	* 113.38	* 113.38 *
* BR Open Area (sq ft)	* 958.87	* Frctn Loss (ft)	* 0.07	* 0.01 *
* BR Open Vel (ft/s)	* 2.14	* C & E Loss (ft)	* 0.00	* 0.00 *
* Coef of Q	* 0.98	* Shear Total (lb/sq ft)	* 0.22	* 0.18 *
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.80	* -204.80 *

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disreqarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #200yr

* E.G. US. (ft)	* 666.26	* Element	*Inside BR US	*Inside BR DS *
* W.S. US. (ft)	* 666.20	* E.G. Elev (ft)	* 666.25	* 666.18 *
* Q Total (cfs)	* 2056.00	* W.S. Elev (ft)	* 666.17	* 666.11 *
* Q Bridge (cfs)	* 2056.00	* Crit W.S. (ft)	* 659.74	* 659.15 *
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 9.61	* 9.82 *
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.18	* 2.04 *

* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 941.58	* 1005.74	*
* Weir Submerg	*	* Froude # Chl	* 0.12	* 0.12	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 4166.98	* 4692.59	*
* Min El Weir Flow (ft)	* 670.93	* Hydr Depth (ft)	* 8.30	* 8.87	*
* Min El Prs (ft)	* 666.43	* W.P. Total (ft)	* 159.14	* 163.42	*
* Delta EG (ft)	* 0.24	* Conv. Total (cfs)	* 83217.1	* 92450.4	*
* Delta WS (ft)	* 0.09	* Top Width (ft)	* 113.39	* 113.39	*
* BR Open Area (sq ft)	* 958.87	* Frctn Loss (ft)	* 0.07	* 0.01	*
* BR Open Vel (ft/s)	* 2.18	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.98	* Shear Total (lb/sq ft)	* 0.23	* 0.19	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.80	* -204.80	*

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #500yr

* E.G. US. (ft)	* 666.67	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 666.60	* E.G. Elev (ft)	* 666.64	* 666.48	*
* Q Total (cfs)	* 2286.00	* W.S. Elev (ft)	* 666.55	* 666.40	*
* Q Bridge (cfs)	* 2286.00	* Crit W.S. (ft)	* 659.91	* 659.33	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 9.99	* 10.11	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.38	* 2.22	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 958.87	* 1029.73	*
* Weir Submerg	*	* Froude # Chl	* 0.13	* 0.13	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 4558.37	* 5016.08	*
* Min El Weir Flow (ft)	* 670.93	* Hydr Depth (ft)	*	* 59.91	*
* Min El Prs (ft)	* 666.43	* W.P. Total (ft)	* 273.45	* 260.88	*
* Delta EG (ft)	* 0.21	* Conv. Total (cfs)	* 59792.5	* 69799.8	*
* Delta WS (ft)	* 0.21	* Top Width (ft)	*	* 17.19	*
* BR Open Area (sq ft)	* 958.87	* Frctn Loss (ft)	* 0.15	* 0.02	*
* BR Open Vel (ft/s)	* 2.38	* C & E Loss (ft)	* 0.00	* 0.01	*
* Coef of Q	*	* Shear Total (lb/sq ft)	* 0.32	* 0.26	*
* Br Sel Method	*Energy only	* Power Total (lb/ft s)	* -130.80	* -204.80	*

Warning: The sluice gate calculations did not converge during the pressure flow only calculation.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The downstream water surface is below the minimum elevation for pressure flow. The sluice gate equations were used for pressure flow.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95107

INPUT
Description: D/S Rt. 83 (surveyed x-section)
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-204.8	667.52	-150.7	667.28	-102.8	665.8	-77.3	664.7	-49.5	659.78
-45.6	657.67	-33.9	656.29	-16.4	656.62	0	656.61	16.4	656.43
31.7	657.26	41.5	656.7	54.9	657.05	56.7	660.72	70.299	663.29
85.8	663.89	139.599	665.01	179.5	666	192.9	668	248.7	670

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-204.8	.085	-49.5	.055	56.7	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-49.5	56.7	606	488.66	279	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-204.8	-66.5	670.92	F
66.5	248.7	670.92	F

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	* 663.38	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.03	* Wt. n-Val.	* 0.085	* 0.055	* 0.085 *
* W.S. Elev (ft)	* 663.46	* Reach Len. (ft)	* 606.00	* 488.66	* 279.00 *
* Crit W.S. (ft)	* 658.17	* Flow Area (sq ft)	* 36.96	* 703.97	* 17.76 *
* E.G. Slope (ft/ft)	*0.000217	* Area (sq ft)	* 38.23	* 703.97	* 20.13 *
* Q Total (cfs)	* 994.00	* Flow (cfs)	* 15.82	* 971.45	* 6.73 *
* Top Width (ft)	* 144.94	* Top Width (ft)	* 20.78	* 106.20	* 17.95 *
* Vel Total (ft/s)	* 1.31	* Avg. Vel. (ft/s)	* 0.43	* 1.38	* 0.38 *
* Max Chl Dpth (ft)	* 7.17	* Hydr. Depth (ft)	* 2.17	* 6.63	* 1.81 *
* Conv. Total (cfs)	* 67427.0	* Conv. (cfs)	* 1073.2	* 65897.5	* 456.2 *
* Length Wtd. (ft)	* 489.11	* Wetted Per. (ft)	* 17.26	* 109.15	* 9.97 *
* Min Ch El (ft)	* 656.29	* Shear (lb/sq ft)	* 0.03	* 0.09	* 0.02 *
* Alpha	* 1.04	* Stream Power (lb/ft s)	* 248.70	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.11	* Cum Volume (acre-ft)	* 0.48	* 8.78	* 0.91 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.27	* 1.26	* 0.75 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	* 664.75	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.04	* Wt. n-Val.	* 0.085	* 0.055	* 0.085 *
* W.S. Elev (ft)	* 664.83	* Reach Len. (ft)	* 606.00	* 488.66	* 279.00 *
* Crit W.S. (ft)	* 658.60	* Flow Area (sq ft)	* 60.29	* 849.72	* 31.21 *
* E.G. Slope (ft/ft)	*0.000248	* Area (sq ft)	* 72.22	* 849.72	* 78.92 *
* Q Total (cfs)	* 1477.00	* Flow (cfs)	* 38.22	* 1420.40	* 18.39 *
* Top Width (ft)	* 211.33	* Top Width (ft)	* 30.83	* 106.20	* 74.29 *

* Vel Total (ft/s)	* 1.57	* Avg. Vel. (ft/s)	* 0.63	* 1.67	* 0.59	*
* Max Chl Dpth (ft)	* 8.54	* Hydr. Depth (ft)	* 3.55	* 8.00	* 3.18	*
* Conv. Total (cfs)	* 93766.1	* Conv. (cfs)	* 2426.1	* 90172.7	* 1167.4	*
* Length Wtd. (ft)	* 489.09	* Wetted Per. (ft)	* 17.26	* 109.15	* 9.97	*
* Min Ch El (ft)	* 656.29	* Shear (lb/sq ft)	* 0.05	* 0.12	* 0.05	*
* Alpha	* 1.04	* Stream Power (lb/ft s)	* 248.70	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.12	* Cum Volume (acre-ft)	* 0.90	* 10.47	* 2.08	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.38	* 1.26	* 1.05	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	* 665.59	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.05	* Wt. n-Val.	* 0.085	* 0.055	* 0.085 *
* W.S. Elev (ft)	* 665.67	* Reach Len. (ft)	* 606.00	* 488.66	* 279.00 *
* Crit W.S. (ft)	* 658.90	* Flow Area (sq ft)	* 74.63	* 939.30	* 39.48 *
* E.G. Slope (ft/ft)	*0.000271	* Area (sq ft)	* 106.48	* 939.30	* 156.97 *
* Q Total (cfs)	* 1839.00	* Flow (cfs)	* 56.97	* 1753.61	* 28.42 *
* Top Width (ft)	* 266.26	* Top Width (ft)	* 50.39	* 106.20	* 109.68 *
* Vel Total (ft/s)	* 1.75	* Avg. Vel. (ft/s)	* 0.76	* 1.87	* 0.72 *
* Max Chl Dpth (ft)	* 9.38	* Hydr. Depth (ft)	* 4.39	* 8.84	* 4.03 *
* Conv. Total (cfs)	*111756.0	* Conv. (cfs)	* 3462.1	*106567.0	* 1726.9 *
* Length Wtd. (ft)	* 489.06	* Wetted Per. (ft)	* 17.26	* 109.15	* 9.97 *
* Min Ch El (ft)	* 656.29	* Shear (lb/sq ft)	* 0.07	* 0.15	* 0.07 *
* Alpha	* 1.04	* Stream Power (lb/ft s)	* 248.70	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.14	* Cum Volume (acre-ft)	* 1.29	* 11.51	* 3.50 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.55	* 1.26	* 1.57 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	* 665.87	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.05	* Wt. n-Val.	* 0.085	* 0.055	* 0.085 *
* W.S. Elev (ft)	* 665.96	* Reach Len. (ft)	* 606.00	* 488.66	* 279.00 *
* Crit W.S. (ft)	* 659.00	* Flow Area (sq ft)	* 79.52	* 969.82	* 42.29 *
* E.G. Slope (ft/ft)	*0.000280	* Area (sq ft)	* 122.04	* 969.82	* 190.15 *
* Q Total (cfs)	* 1979.00	* Flow (cfs)	* 64.43	* 1882.13	* 32.44 *
* Top Width (ft)	* 285.99	* Top Width (ft)	* 58.53	* 106.20	* 121.26 *
* Vel Total (ft/s)	* 1.81	* Avg. Vel. (ft/s)	* 0.81	* 1.94	* 0.77 *
* Max Chl Dpth (ft)	* 9.67	* Hydr. Depth (ft)	* 4.68	* 9.13	* 4.32 *
* Conv. Total (cfs)	*118184.8	* Conv. (cfs)	* 3848.0	*112399.7	* 1937.1 *
* Length Wtd. (ft)	* 489.05	* Wetted Per. (ft)	* 17.26	* 109.15	* 9.97 *
* Min Ch El (ft)	* 656.29	* Shear (lb/sq ft)	* 0.08	* 0.16	* 0.07 *
* Alpha	* 1.04	* Stream Power (lb/ft s)	* 248.70	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.14	* Cum Volume (acre-ft)	* 1.45	* 11.86	* 3.94 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.62	* 1.26	* 1.64 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	* 666.02	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.06	* Wt. n-Val.	* 0.085	* 0.055	* 0.085 *
* W.S. Elev (ft)	* 666.11	* Reach Len. (ft)	* 606.00	* 488.66	* 279.00 *
* Crit W.S. (ft)	* 659.08	* Flow Area (sq ft)	* 82.06	* 985.73	* 43.76 *
* E.G. Slope (ft/ft)	*0.000286	* Area (sq ft)	* 131.17	* 985.73	* 208.57 *
* Q Total (cfs)	* 2056.00	* Flow (cfs)	* 68.57	* 1952.76	* 34.67 *
* Top Width (ft)	* 293.13	* Top Width (ft)	* 63.38	* 106.20	* 123.55 *
* Vel Total (ft/s)	* 1.85	* Avg. Vel. (ft/s)	* 0.84	* 1.98	* 0.79 *
* Max Chl Dpth (ft)	* 9.82	* Hydr. Depth (ft)	* 4.83	* 9.28	* 4.47 *
* Conv. Total (cfs)	*121596.4	* Conv. (cfs)	* 4055.6	*115490.3	* 2050.5 *
* Length Wtd. (ft)	* 489.04	* Wetted Per. (ft)	* 17.26	* 109.15	* 9.97 *
* Min Ch El (ft)	* 656.29	* Shear (lb/sq ft)	* 0.08	* 0.16	* 0.08 *
* Alpha	* 1.04	* Stream Power (lb/ft s)	* 248.70	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.14	* Cum Volume (acre-ft)	* 1.55	* 12.04	* 4.17 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.66	* 1.26	* 1.66 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 666.46	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.07	* Wt. n-Val.	* 0.085	* 0.055	* 0.085 *
* W.S. Elev (ft)	* 666.39	* Reach Len. (ft)	* 606.00	* 488.66	* 279.00 *
* Crit W.S. (ft)	* 659.24	* Flow Area (sq ft)	* 86.81	* 1015.37	* 46.50 *
* E.G. Slope (ft/ft)	*0.000319	* Area (sq ft)	* 150.12	* 1015.37	* 243.30 *
* Q Total (cfs)	* 2286.00	* Flow (cfs)	* 79.51	* 2166.00	* 40.49 *
* Top Width (ft)	* 304.03	* Top Width (ft)	* 72.42	* 106.20	* 125.42 *
* Vel Total (ft/s)	* 1.99	* Avg. Vel. (ft/s)	* 0.92	* 2.13	* 0.87 *
* Max Chl Dpth (ft)	* 10.10	* Hydr. Depth (ft)	* 5.11	* 9.56	* 4.74 *
* Conv. Total (cfs)	*128057.3	* Conv. (cfs)	* 4453.9	*121335.1	* 2268.4 *
* Length Wtd. (ft)	* 480.70	* Wetted Per. (ft)	* 17.26	* 109.15	* 9.97 *
* Min Ch El (ft)	* 656.29	* Shear (lb/sq ft)	* 0.10	* 0.19	* 0.09 *
* Alpha	* 1.10	* Stream Power (lb/ft s)	* 248.70	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.19	* Cum Volume (acre-ft)	* 1.77	* 12.48	* 4.81 *
* C & E Loss (ft)	* 0.03	* Cum SA (acres)	* 0.74	* 1.26	* 1.71 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 94618.34

INPUT
Description: 3109 (Regulatory Section)
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-2672.13	679.78	-2347.13	673.85	-2022.14	669.62	-1697.1	669.18	-1372.1	665

```
-1047.11  665.93  -722.1  669.66 -397.12  669.79  -72.11  669.02   -49.4  667.74
  -38.11  662.32  -28.71  660.22  -22.16   657.4  -15.68  655.28   -1.43  654.75
   11.49  654.72   20.61   656.3   30.13  657.55   33.07  661.32   39.44  662.15
   47.73   663.1   58.34  659.93   67.29  660.63   77.74  661.07  102.78  664.42
  127.73  665.18  152.75  667.78  459.01  666.32  765.27  667.31 1071.48  667.74
 1377.74  667.45    1684  668.05 1990.26  671.76 2296.53  676.79 2602.79  680.18

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
-2672.13      .2  -72.11     .12  -28.71    .045   33.07     .12  152.75      .2

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -28.71   33.07              188   228.2     283             .1       .3
Left Levee      Station=  -722.1      Elevation=  669.66
```

CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	663.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	663.16	Reach Len. (ft)	188.00	228.20	283.00
Crit W.S. (ft)	657.79	Flow Area (sq ft)	18.46	437.47	97.00
E.G. Slope (ft/ft)	*0.000344	Area (sq ft)	18.46	437.47	97.00
Q Total (cfs)	994.00	Flow (cfs)	5.80	957.84	30.36
Top Width (ft)	133.19	Top Width (ft)	11.14	61.78	60.27
Vel Total (ft/s)	1.80	Avg. Vel. (ft/s)	0.31	2.19	0.31
Max Chl Dpth (ft)	8.44	Hydr. Depth (ft)	1.66	7.08	1.61
Conv. Total (cfs)	53565.6	Conv. (cfs)	312.3	51617.1	1636.2
Length Wtd. (ft)	229.14	Wetted Per. (ft)	11.56	64.77	61.01
Min Ch El (ft)	654.72	Shear (lb/sq ft)	0.03	0.15	0.03
Alpha	1.43	Stream Power (lb/ft s)	2602.79	-722.10	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.08	2.38	0.54
C & E Loss (ft)	0.00	Cum SA (acres)	0.05	0.32	0.50

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	664.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	664.47	Reach Len. (ft)	188.00	228.20	283.00
Crit W.S. (ft)	658.49	Flow Area (sq ft)	34.89	518.61	182.63
E.G. Slope (ft/ft)	*0.000404	Area (sq ft)	34.89	518.61	182.63
Q Total (cfs)	1477.00	Flow (cfs)	15.52	1377.11	84.37
Top Width (ft)	147.01	Top Width (ft)	13.88	61.78	71.35
Vel Total (ft/s)	2.01	Avg. Vel. (ft/s)	0.44	2.66	0.46
Max Chl Dpth (ft)	9.75	Hydr. Depth (ft)	2.51	8.39	2.56
Conv. Total (cfs)	73511.8	Conv. (cfs)	772.4	68540.3	4199.1
Length Wtd. (ft)	230.65	Wetted Per. (ft)	14.60	64.77	72.18
Min Ch El (ft)	654.72	Shear (lb/sq ft)	0.06	0.20	0.06
Alpha	1.64	Stream Power (lb/ft s)	2602.79	-722.10	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.16	2.80	1.24
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	0.32	0.58

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50yr

E.G. Elev (ft)	665.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	665.27	Reach Len. (ft)	188.00	228.20	283.00
Crit W.S. (ft)	658.94	Flow Area (sq ft)	46.62	567.88	249.88
E.G. Slope (ft/ft)	*0.000450	Area (sq ft)	46.62	567.88	249.88
Q Total (cfs)	1839.00	Flow (cfs)	24.52	1690.63	123.85
Top Width (ft)	172.82	Top Width (ft)	15.54	61.78	95.50
Vel Total (ft/s)	2.13	Avg. Vel. (ft/s)	0.53	2.98	0.50
Max Chl Dpth (ft)	10.55	Hydr. Depth (ft)	3.00	9.19	2.62
Conv. Total (cfs)	86730.4	Conv. (cfs)	1156.6	79732.8	5840.9
Length Wtd. (ft)	232.11	Wetted Per. (ft)	16.44	64.77	96.35
Min Ch El (ft)	654.72	Shear (lb/sq ft)	0.08	0.25	0.07
Alpha	1.80	Stream Power (lb/ft s)	2602.79	-722.10	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.23	3.05	2.19
C & E Loss (ft)	0.01	Cum SA (acres)	0.09	0.32	0.92

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	665.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	665.54	Reach Len. (ft)	188.00	228.20	283.00
Crit W.S. (ft)	659.12	Flow Area (sq ft)	50.91	584.61	276.11
E.G. Slope (ft/ft)	*0.000465	Area (sq ft)	50.91	584.61	276.11
Q Total (cfs)	1979.00	Flow (cfs)	28.17	1804.72	146.11
Top Width (ft)	175.99	Top Width (ft)	16.10	61.78	98.11
Vel Total (ft/s)	2.17	Avg. Vel. (ft/s)	0.55	3.09	0.53
Max Chl Dpth (ft)	10.82	Hydr. Depth (ft)	3.16	9.46	2.81
Conv. Total (cfs)	91768.9	Conv. (cfs)	1306.3	83687.2	6775.5
Length Wtd. (ft)	232.57	Wetted Per. (ft)	17.07	64.77	98.97
Min Ch El (ft)	654.72	Shear (lb/sq ft)	0.09	0.26	0.08
Alpha	1.85	Stream Power (lb/ft s)	2602.79	-722.10	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.25	3.14	2.44
C & E Loss (ft)	0.01	Cum SA (acres)	0.10	0.32	0.93

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	665.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	665.68	Reach Len. (ft)	188.00	228.20	283.00
Crit W.S. (ft)	659.21	Flow Area (sq ft)	53.19	593.29	289.97
E.G. Slope (ft/ft)	*0.000474	Area (sq ft)	53.19	593.29	289.97
Q Total (cfs)	2056.00	Flow (cfs)	30.21	1867.18	158.61

* Top Width (ft)	* 177.64	* Top Width (ft)	* 16.40	* 61.78	* 99.46	*		
* Vel Total (ft/s)	* 2.20	* Avg. Vel. (ft/s)	* 0.57	* 3.15	* 0.55	*		
* Max Chl Dpth (ft)	* 10.96	* Hydr. Depth (ft)	* 3.24	* 9.60	* 2.92	*		
* Conv. Total (cfs)	* 94439.9	* Conv. (cfs)	* 1387.7	* 85766.6	* 7285.6	*		
* Length Wtd. (ft)	* 232.80	* Wetted Per. (ft)	* 17.39	* 64.77	* 100.33	*		
* Min Ch El (ft)	* 654.72	* Shear (lb/sq ft)	* 0.09	* 0.27	* 0.09	*		
* Alpha	* 1.87	* Stream Power (lb/ft s)	* 2602.79	* -722.10	* 0.00	*		
* Frctn Loss (ft)	* 0.10	* Cum Volume (acre-ft)	* 0.27	* 3.18	* 2.57	*		
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	* 0.10	* 0.32	* 0.94	*		

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 666.24	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.15	* Wt. n-Val.	* 0.120	* 0.045	* 0.120 *
* W.S. Elev (ft)	* 666.09	* Reach Len. (ft)	* 188.00	* 228.20	* 283.00 *
* Crit W.S. (ft)	* 659.48	* Flow Area (sq ft)	* 60.10	* 618.67	* 331.65 *
* E.G. Slope (ft/ft)	*0.000497	* Area (sq ft)	* 60.10	* 618.67	* 331.65 *
* Q Total (cfs)	* 2286.00	* Flow (cfs)	* 36.62	* 2051.31	* 198.07 *
* Top Width (ft)	* 182.45	* Top Width (ft)	* 17.25	* 61.78	* 103.41 *
* Vel Total (ft/s)	* 2.26	* Avg. Vel. (ft/s)	* 0.61	* 3.32	* 0.60 *
* Max Chl Dpth (ft)	* 11.37	* Hydr. Depth (ft)	* 3.48	* 10.01	* 3.21 *
* Conv. Total (cfs)	*102491.6	* Conv. (cfs)	* 1641.9	* 91969.5	* 8880.2 *
* Length Wtd. (ft)	* 233.44	* Wetted Per. (ft)	* 18.34	* 64.77	* 104.30 *
* Min Ch El (ft)	* 654.72	* Shear (lb/sq ft)	* 0.10	* 0.30	* 0.10 *
* Alpha	* 1.93	* Stream Power (lb/ft s)	* 2602.79	* -722.10	* 0.00 *
* Frctn Loss (ft)	* 0.10	* Cum Volume (acre-ft)	* 0.31	* 3.31	* 2.97 *
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	* 0.12	* 0.32	* 0.98 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 94390.14

INPUT
Description: Most d/s surveyed x-section
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-157.3	668.97	-135.9	669.85	-104.6	669.06	-80.7	667.69	-52.4	665.01
-39.9	663.69	-26.4	659.7	-25.2	657.09	-13.7	655.1	4.5	654.53
16.5	653.94	25.3	655.15	31.8	657.27	33.8	660.97	43.6	661.62
52.44	662.009	77.9	663.13	101.1	662.32	119.6	662.32	142.7	664.43
155.1	662.82	187	663.13	201.9	663.24	226.5	665.82	245	666.6
261.8	666.74	268.1	666.9						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-157.3	.035	-104.6	.12	-26.4	.045	33.8	.12

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

-26.4	33.8	0	0	0	.1	.3

Right Levee Station= 142.7 Elevation= 664.43

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	* 663.16	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.07	* Wt. n-Val.	* 0.120	* 0.045	* 0.120 *
* W.S. Elev (ft)	* 663.09	* Reach Len. (ft)	*	*	* *
* Crit W.S. (ft)	* 657.16	* Flow Area (sq ft)	* 19.44	* 470.80	* 68.12 *
* E.G. Slope (ft/ft)	*0.000280	* Area (sq ft)	* 19.44	* 470.80	* 68.12 *
* Q Total (cfs)	* 994.00	* Flow (cfs)	* 5.57	* 976.33	* 12.10 *
* Top Width (ft)	* 163.85	* Top Width (ft)	* 11.47	* 60.20	* 92.18 *
* Vel Total (ft/s)	* 1.78	* Avg. Vel. (ft/s)	* 0.29	* 2.07	* 0.18 *
* Max Chl Dpth (ft)	* 9.15	* Hydr. Depth (ft)	* 1.70	* 7.82	* 0.74 *
* Conv. Total (cfs)	* 59437.3	* Conv. (cfs)	* 332.8	* 58381.0	* 723.5 *
* Length Wtd. (ft)	*	* Wetted Per. (ft)	* 11.96	* 64.69	* 92.28 *
* Min Ch El (ft)	* 653.94	* Shear (lb/sq ft)	* 0.03	* 0.13	* 0.01 *
* Alpha	* 1.33	* Stream Power (lb/ft s)	* 268.10	* 0.00	* 142.70 *
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*	*	* *
* C & E Loss (ft)	*	* Cum SA (acres)	*	*	* *

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	* 664.48	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.09	* Wt. n-Val.	* 0.120	* 0.045	* 0.120 *
* W.S. Elev (ft)	* 664.39	* Reach Len. (ft)	*	*	* *
* Crit W.S. (ft)	* 657.83	* Flow Area (sq ft)	* 38.70	* 549.06	* 199.83 *
* E.G. Slope (ft/ft)	*0.000341	* Area (sq ft)	* 38.70	* 549.06	* 199.83 *
* Q Total (cfs)	* 1475.00	* Flow (cfs)	* 13.41	* 1392.99	* 68.60 *
* Top Width (ft)	* 188.79	* Top Width (ft)	* 20.13	* 60.20	* 108.46 *
* Vel Total (ft/s)	* 1.87	* Avg. Vel. (ft/s)	* 0.35	* 2.54	* 0.34 *
* Max Chl Dpth (ft)	* 10.45	* Hydr. Depth (ft)	* 1.92	* 9.12	* 1.84 *
* Conv. Total (cfs)	* 79876.9	* Conv. (cfs)	* 726.3	* 75435.6	* 3715.0 *
* Length Wtd. (ft)	*	* Wetted Per. (ft)	* 20.74	* 64.69	* 108.63 *
* Min Ch El (ft)	* 653.94	* Shear (lb/sq ft)	* 0.04	* 0.18	* 0.04 *
* Alpha	* 1.73	* Stream Power (lb/ft s)	* 268.10	* 0.00	* 142.70 *
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*	*	* *
* C & E Loss (ft)	*	* Cum SA (acres)	*	*	* *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	* 665.30	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.11	* Wt. n-Val.	* 0.120	* 0.045	* 0.120 *

W.S. Elev (ft)	665.19	Reach Len. (ft)				
Crit W.S. (ft)	658.26	Flow Area (sq ft)	57.85	597.22	425.01	
E.G. Slope (ft/ft)	0.000357	Area (sq ft)	57.85	597.22	425.01	
Q Total (cfs)	1834.00	Flow (cfs)	21.68	1640.40	171.92	
Top Width (ft)	274.79	Top Width (ft)	27.90	60.20	186.69	
Vel Total (ft/s)	1.70	Avg. Vel. (ft/s)	0.37	2.75	0.40	
Max Chl Dpth (ft)	11.25	Hydr. Depth (ft)	2.07	9.92	2.28	
Conv. Total (cfs)	97024.8	Conv. (cfs)	1147.0	86782.7	9095.1	
Lenqth Wtd. (ft)		Wetted Per. (ft)	28.56	64.69	187.07	
Min Ch El (ft)	653.94	Shear (lb/sq ft)	0.05	0.21	0.05	
Alpha	2.35	Stream Power (lb/ft s)	268.10	0.00	142.70	
Frctn Loss (ft)		Cum Volume (acre-ft)				
C & E Loss (ft)		Cum SA (acres)				

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	665.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	665.46	Reach Len. (ft)			
Crit W.S. (ft)	658.42	Flow Area (sq ft)	65.77	613.47	475.76
E.G. Slope (ft/ft)	0.000367	Area (sq ft)	65.77	613.47	475.76
Q Total (cfs)	1973.00	Flow (cfs)	25.54	1739.05	208.42
Top Width (ft)	280.22	Top Width (ft)	30.75	60.20	189.27
Vel Total (ft/s)	1.71	Avg. Vel. (ft/s)	0.39	2.83	0.44
Max Chl Dpth (ft)	11.52	Hydr. Depth (ft)	2.14	10.19	2.51
Conv. Total (cfs)	102964.3	Conv. (cfs)	1332.7	90755.1	10876.5
Length Wtd. (ft)		Wetted Per. (ft)	31.42	64.69	189.65
Min Ch El (ft)	653.94	Shear (lb/sq ft)	0.05	0.22	0.06
Alpha	2.43	Stream Power (lb/ft s)	268.10	0.00	142.70
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	665.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	665.60	Reach Len. (ft)			
Crit W.S. (ft)	658.51	Flow Area (sq ft)	70.18	621.90	502.35
E.G. Slope (ft/ft)	0.000373	Area (sq ft)	70.18	621.90	502.35
Q Total (cfs)	2049.00	Flow (cfs)	27.80	1792.38	228.82
Top Width (ft)	283.03	Top Width (ft)	32.23	60.20	190.60
Vel Total (ft/s)	1.72	Avg. Vel. (ft/s)	0.40	2.88	0.46
Max Chl Dpth (ft)	11.66	Hydr. Depth (ft)	2.18	10.33	2.64
Conv. Total (cfs)	106134.1	Conv. (cfs)	1439.9	92841.9	11852.3
Length Wtd. (ft)		Wetted Per. (ft)	32.90	64.69	191.00
Min Ch El (ft)	653.94	Shear (lb/sq ft)	0.05	0.22	0.06
Alpha	2.48	Stream Power (lb/ft s)	268.10	0.00	142.70
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500yr

E.G. Elev (ft)	666.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	666.01	Reach Len. (ft)			
Crit W.S. (ft)	658.76	Flow Area (sq ft)	84.28	646.58	581.56
E.G. Slope (ft/ft)	0.000388	Area (sq ft)	84.28	646.58	581.56
Q Total (cfs)	2277.00	Flow (cfs)	35.41	1950.43	291.16
Top Width (ft)	293.97	Top Width (ft)	36.56	60.20	197.21
Vel Total (ft/s)	1.73	Avg. Vel. (ft/s)	0.42	3.02	0.50
Max Chl Dpth (ft)	12.07	Hydr. Depth (ft)	2.31	10.74	2.95
Conv. Total (cfs)	115651.4	Conv. (cfs)	1798.6	99064.5	14788.3
Lenqth Wtd. (ft)		Wetted Per. (ft)	37.25	64.69	197.62
Min Ch El (ft)	653.94	Shear (lb/sq ft)	0.05	0.24	0.07
Alpha	2.60	Stream Power (lb/ft s)	268.10	0.00	142.70
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

SUMMARY OF MANNING'S N VALUES

River:Salt Creek

Reach	River Sta.	n1	n2	n3	n4	n5	n6
A	96139.5	.12	.065	.12			
A	96071.51	.085	.2	.12	.065	.12	.2
A	96010.9	.085	.065	.085			
A	95964	Bridge					
A	95911	.085	.065	.085			
A	95657	.085	.12	.065	.085		
A	95640	Bridge					
A	95623	.085	.12	.065	.085		
A	95562.19	.085	.065	.085	.2		
A	95497.4	.085	.12	.065	.085	.2	.2
A	95294.3	.085	.055	.085			
A	95200	Bridge					
A	95107	.085	.055	.085			
A	94618.34	.2	.12	.045	.12	.2	
A	94390.14	.035	.12	.045	.12		

SUMMARY OF REACH LENGTHS

River: Salt Creek

Reach	River Sta.	Left	Channel	Right
A	96139.5	32	67.99	75
A	96071.51	87	60.61	39
A	96010.9	99.9	99.9	99.9
A	95964	Bridge		
A	95911	160	254	353
A	95657	34	34	34
A	95640	Bridge		
A	95623	105	60.81	42
A	95562.19	102	64.79	39
A	95497.4	147	203.1	327
A	95294.3	187.3	187.3	187.3
A	95200	Bridge		
A	95107	606	488.66	279
A	94618.34	188	228.2	283
A	94390.14	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Salt Creek

Reach	River Sta.	Contr.	Expan.
A	96139.5	.1	.3
A	96071.51	.1	.3
A	96010.9	.3	.5
A	95964	Bridge	
A	95911	.3	.5
A	95657	.3	.5
A	95640	Bridge	
A	95623	.3	.5
A	95562.19	.1	.3
A	95497.4	.1	.3
A	95294.3	.3	.5
A	95200	Bridge	
A	95107	.3	.5
A	94618.34	.1	.3
A	94390.14	.1	.3

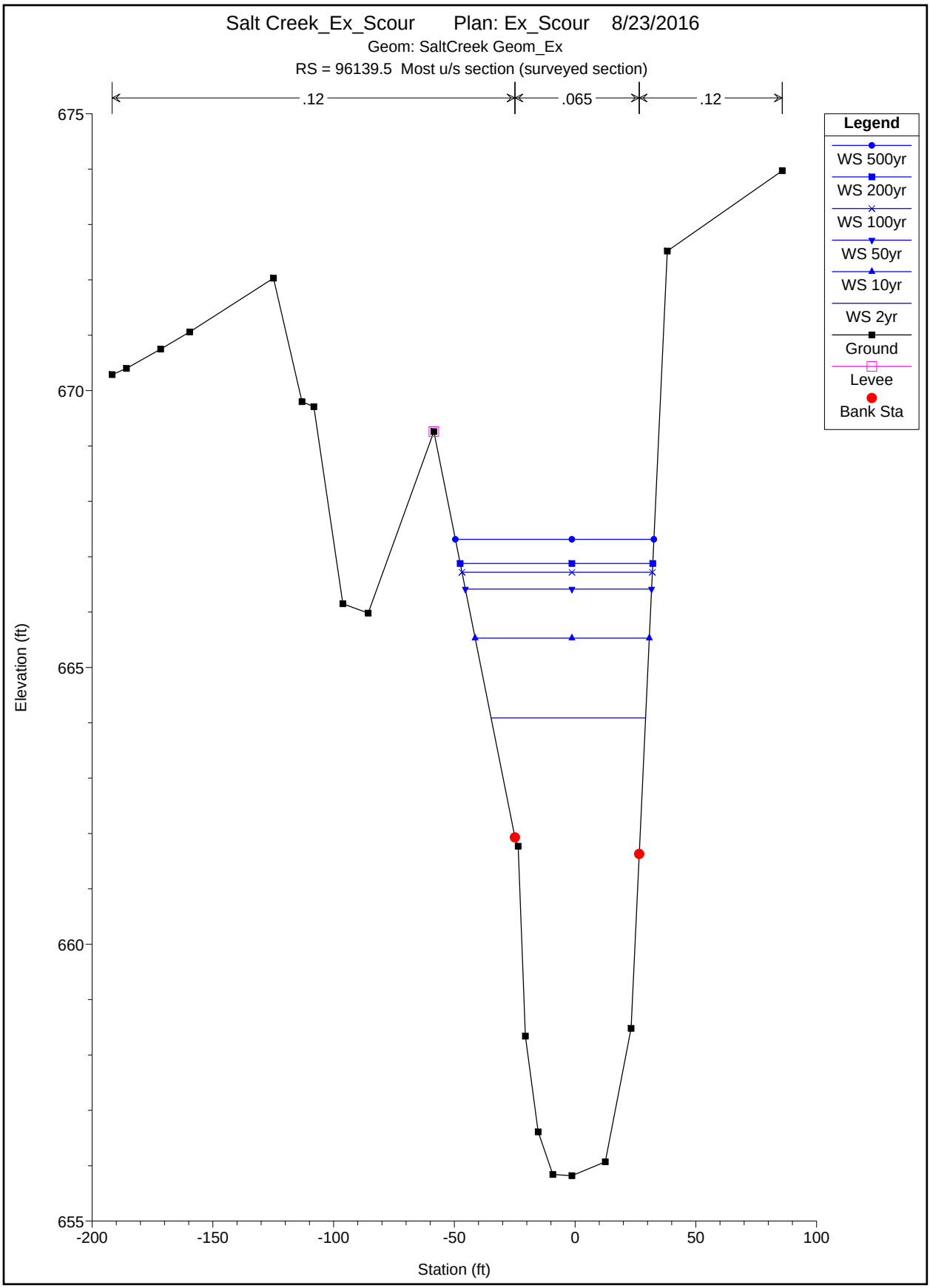
Existing Conditions

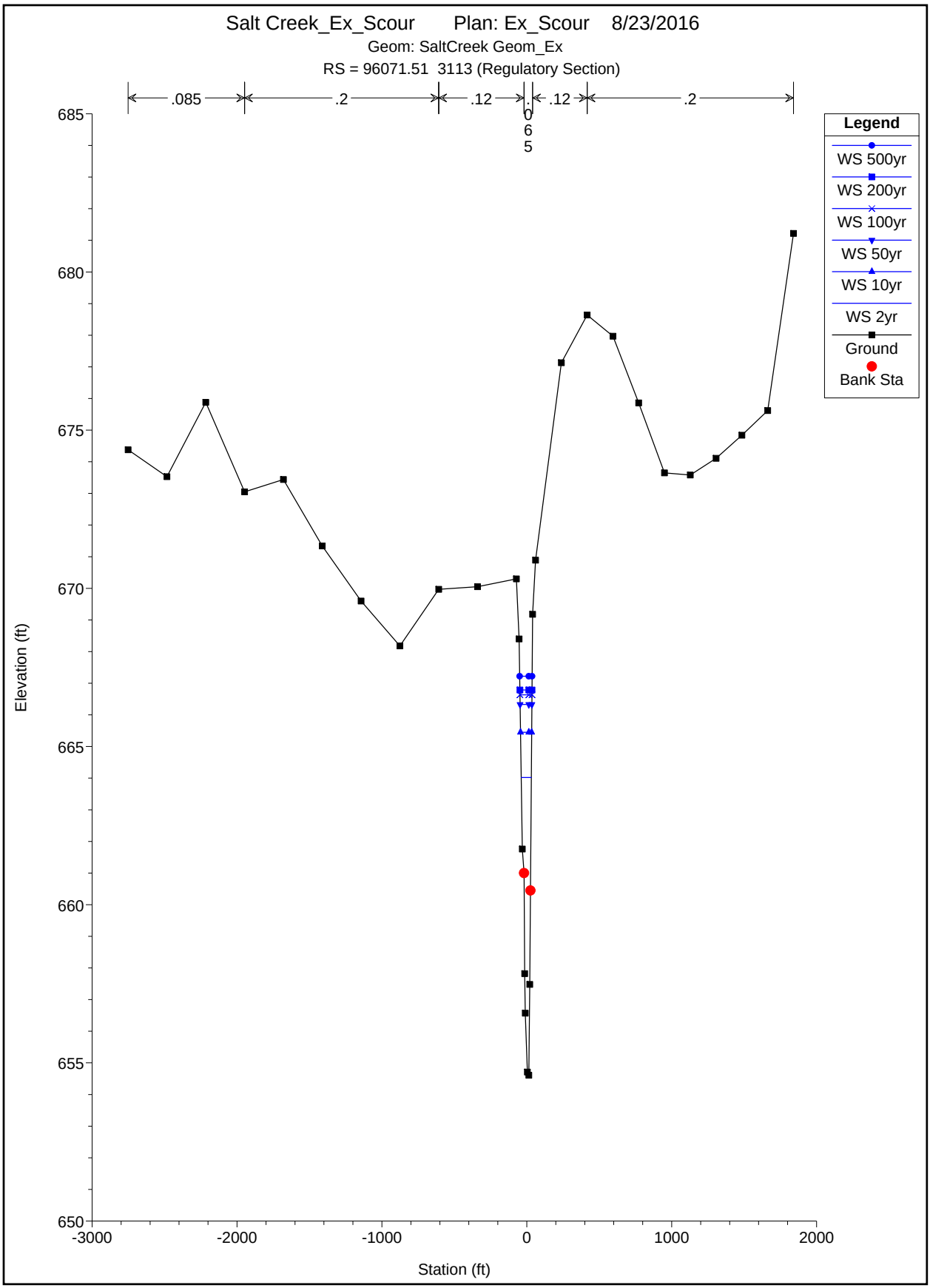
HEC-RAS Plan: Ex Scour River: Salt Creek Reach: A

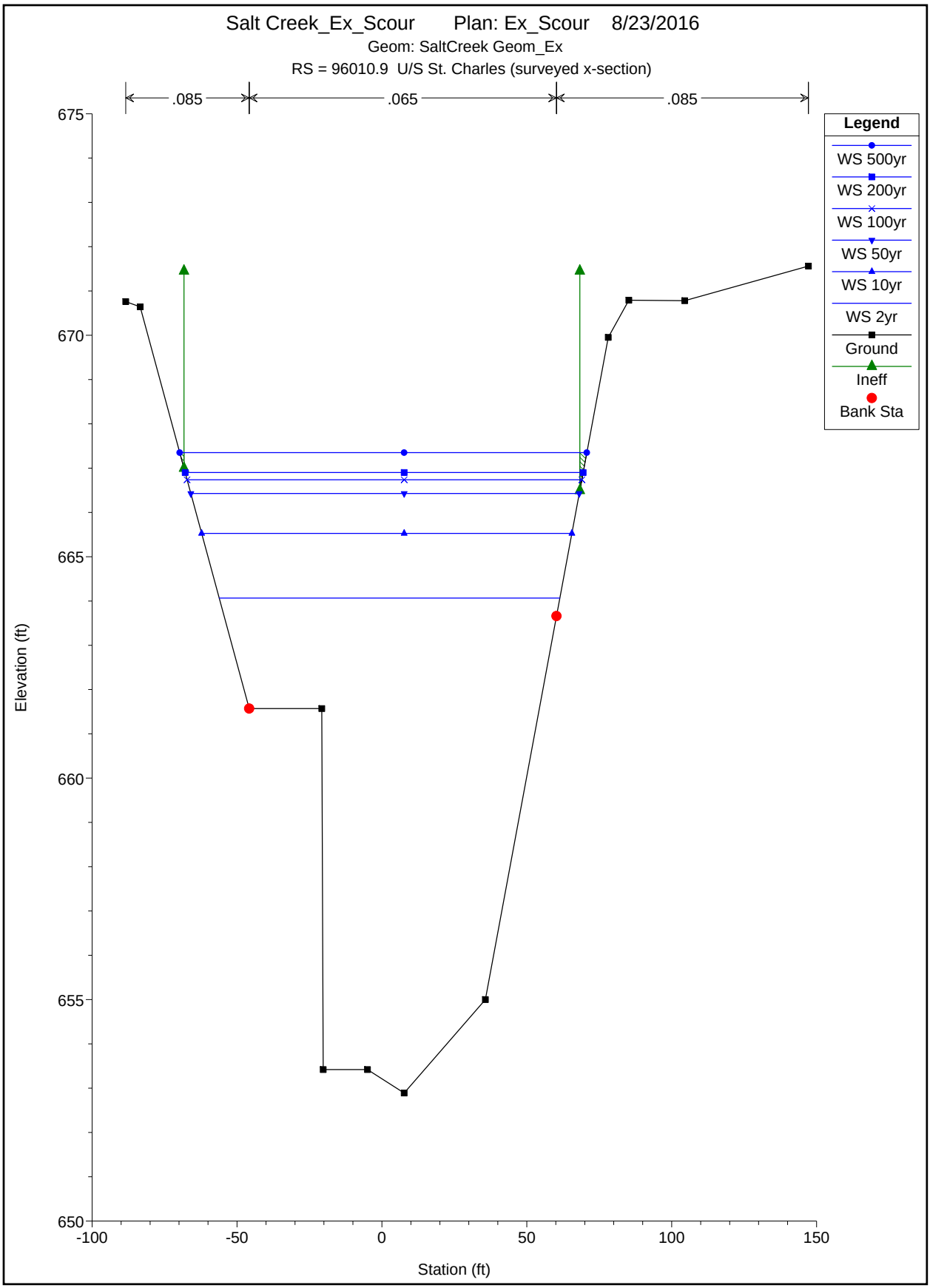
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
A	96139.5	2yr	940.00	655.82	664.09	658.92	664.19	0.001030	2.58	375.94	63.98	0.17
A	96139.5	10yr	1414.00	655.82	665.53	659.68	665.68	0.001225	3.19	474.12	72.13	0.19
A	96139.5	50yr	1756.00	655.82	666.42	660.19	666.61	0.001334	3.55	540.23	77.14	0.20
A	96139.5	100yr	1893.00	655.82	666.72	660.37	666.93	0.001385	3.70	563.96	78.86	0.21
A	96139.5	200yr	1970.00	655.82	666.88	660.48	667.09	0.001416	3.78	576.52	79.75	0.21
A	96139.5	500yr	2201.00	655.82	667.31	660.77	667.56	0.001515	4.03	611.90	82.22	0.22
A	96071.51	2yr	941.00	654.61	664.02	658.43	664.12	0.000952	2.64	393.67	70.02	0.17
A	96071.51	10yr	1417.00	654.61	665.45	659.30	665.60	0.001154	3.25	498.96	77.09	0.19
A	96071.51	50yr	1763.00	654.61	666.33	659.87	666.52	0.001268	3.63	568.70	81.44	0.20
A	96071.51	100yr	1900.00	654.61	666.63	660.10	666.84	0.001317	3.77	593.50	82.93	0.21
A	96071.51	200yr	1977.00	654.61	666.79	660.22	667.00	0.001347	3.85	606.58	83.71	0.21
A	96071.51	500yr	2209.00	654.61	667.22	660.53	667.46	0.001444	4.10	643.17	85.84	0.22
A	96010.9	2yr	994.00	652.89	664.06	655.77	664.09	0.000256	1.29	779.43	117.55	0.08
A	96010.9	10yr	1484.00	652.89	665.53	656.44	665.57	0.000304	1.59	958.79	127.76	0.10
A	96010.9	50yr	1852.00	652.89	666.43	656.88	666.48	0.000336	1.79	1076.66	134.05	0.10
A	96010.9	100yr	1994.00	652.89	666.74	657.02	666.79	0.000349	1.86	1118.54	136.21	0.10
A	96010.9	200yr	2071.00	652.89	666.90	657.12	666.96	0.000356	1.90	1140.59	137.35	0.11
A	96010.9	500yr	2303.00	652.89	667.35	657.37	667.41	0.000377	2.01	1201.80	140.48	0.11
A	95964		Bridge									
A	95911	2yr	994.00	652.89	664.01	655.77	663.97	0.000262	1.30	772.65	117.16	0.09
A	95911	10yr	1484.00	652.89	665.45	656.44	665.41	0.000313	1.61	944.43	127.25	0.10
A	95911	50yr	1852.00	652.89	666.34	656.88	666.30	0.000348	1.81	1051.36	133.45	0.10
A	95911	100yr	1994.00	652.89	666.65	657.02	666.61	0.000361	1.88	1088.15	135.58	0.11
A	95911	200yr	2071.00	652.89	666.81	657.12	666.77	0.000369	1.92	1107.38	136.70	0.11
A	95911	500yr	2303.00	652.89	667.25	657.37	667.21	0.000393	2.04	1160.30	139.77	0.11
A	95657	2yr	994.00	654.83	663.76	658.12	663.84	0.000799	2.38	500.95	105.81	0.15
A	95657	10yr	1484.00	654.83	665.16	658.84	665.27	0.000912	2.83	692.29	161.29	0.16
A	95657	50yr	1852.00	654.83	666.03	659.35	666.15	0.000951	3.07	838.87	177.50	0.17
A	95657	100yr	1994.00	654.83	666.32	659.53	666.45	0.000965	3.15	892.47	183.06	0.17
A	95657	200yr	2071.00	654.83	666.48	659.62	666.61	0.000972	3.19	921.16	185.97	0.17
A	95657	500yr	2303.00	654.83	666.90	659.89	667.04	0.001000	3.32	1001.93	193.94	0.18
A	95640		Bridge									
A	95623	2yr	994.00	654.81	663.75	658.11	663.77	0.000771	2.33	538.15	142.52	0.15
A	95623	10yr	1484.00	654.81	665.17	658.85	665.18	0.000827	2.70	757.69	166.99	0.16
A	95623	50yr	1852.00	654.81	666.04	659.35	666.06	0.000855	2.91	909.15	181.41	0.16
A	95623	100yr	1994.00	654.81	666.34	659.53	666.36	0.000866	2.98	964.17	186.37	0.16
A	95623	200yr	2071.00	654.81	666.49	659.62	666.52	0.000869	3.02	993.37	188.97	0.16
A	95623	500yr	2303.00	654.81	666.92	659.88	666.95	0.000885	3.13	1073.28	196.06	0.17
A	95562.19	2yr	994.00	655.29	663.63		663.71	0.000850	2.28	481.00	87.83	0.15
A	95562.19	10yr	1484.00	655.29	665.02		665.12	0.000931	2.70	652.06	135.17	0.17
A	95562.19	50yr	1852.00	655.29	665.88		666.00	0.000968	2.94	770.11	140.74	0.17
A	95562.19	100yr	1994.00	655.29	666.17		666.29	0.000984	3.03	811.63	142.64	0.17
A	95562.19	200yr	2071.00	655.29	666.32		666.45	0.000992	3.07	833.56	143.64	0.18
A	95562.19	500yr	2303.00	655.29	666.74		666.88	0.001027	3.22	894.08	146.35	0.18
A	95497.4	2yr	994.00	654.78	663.59	657.86	663.66	0.000634	2.12	520.70	92.86	0.13
A	95497.4	10yr	1477.00	654.78	664.97	658.51	665.07	0.000754	2.58	685.99	146.94	0.15
A	95497.4	50yr	1839.00	654.78	665.82	658.96	665.93	0.000808	2.83	814.77	155.27	0.16
A	95497.4	100yr	1979.00	654.78	666.11	659.11	666.23	0.000828	2.92	860.52	158.13	0.16
A	95497.4	200yr	2056.00	654.78	666.27	659.20	666.39	0.000839	2.97	884.76	159.62	0.16
A	95497.4	500yr	2286.00	654.78	666.68	659.44	666.81	0.000877	3.11	951.88	163.68	0.17
A	95294.3	2yr	994.00	656.56	663.52	658.73	663.56	0.000394	1.46	689.76	141.81	0.11
A	95294.3	10yr	1477.00	656.56	664.91	659.17	664.95	0.000403	1.72	890.26	147.29	0.12
A	95294.3	50yr	1839.00	656.56	665.76	659.47	665.81	0.000419	1.89	1018.87	155.87	0.12
A	95294.3	100yr	1979.00	656.56	666.05	659.60	666.11	0.000427	1.96	1064.82	159.54	0.12
A	95294.3	200yr	2056.00	656.56	666.20	659.65	666.26	0.000432	2.00	1089.24	161.46	0.12
A	95294.3	500yr	2286.00	656.56	666.60	659.82	666.67	0.000452	2.11	1154.84	166.49	0.13
A	95200		Bridge									
A	95107	2yr	994.00	656.29	663.46	658.17	663.38	0.000217	1.38	758.69	144.94	0.09
A	95107	10yr	1477.00	656.29	664.83	658.60	664.75	0.000248	1.67	941.22	211.33	0.10
A	95107	50yr	1839.00	656.29	665.67	658.90	665.59	0.000271	1.87	1053.41	266.26	0.11
A	95107	100yr	1979.00	656.29	665.96	659.00	665.87	0.000280	1.94	1091.63	285.99	0.11
A	95107	200yr	2056.00	656.29	666.11	659.08	666.02	0.000286	1.98	1111.56	293.13	0.11
A	95107	500yr	2286.00	656.29	666.39	659.24	666.46	0.000319	2.13	1148.67	304.03	0.12
A	94618.34	2yr	994.00	654.72	663.16	657.79	663.23	0.000344	2.19	552.94	133.19	0.14
A	94618.34	10yr	1477.00	654.72	664.47	658.49	664.57	0.000404	2.66	736.14	147.01	0.16
A	94618.34	50yr	1839.00	654.72	665.27	658.94	665.39	0.000450	2.98	864.39	172.82	0.17

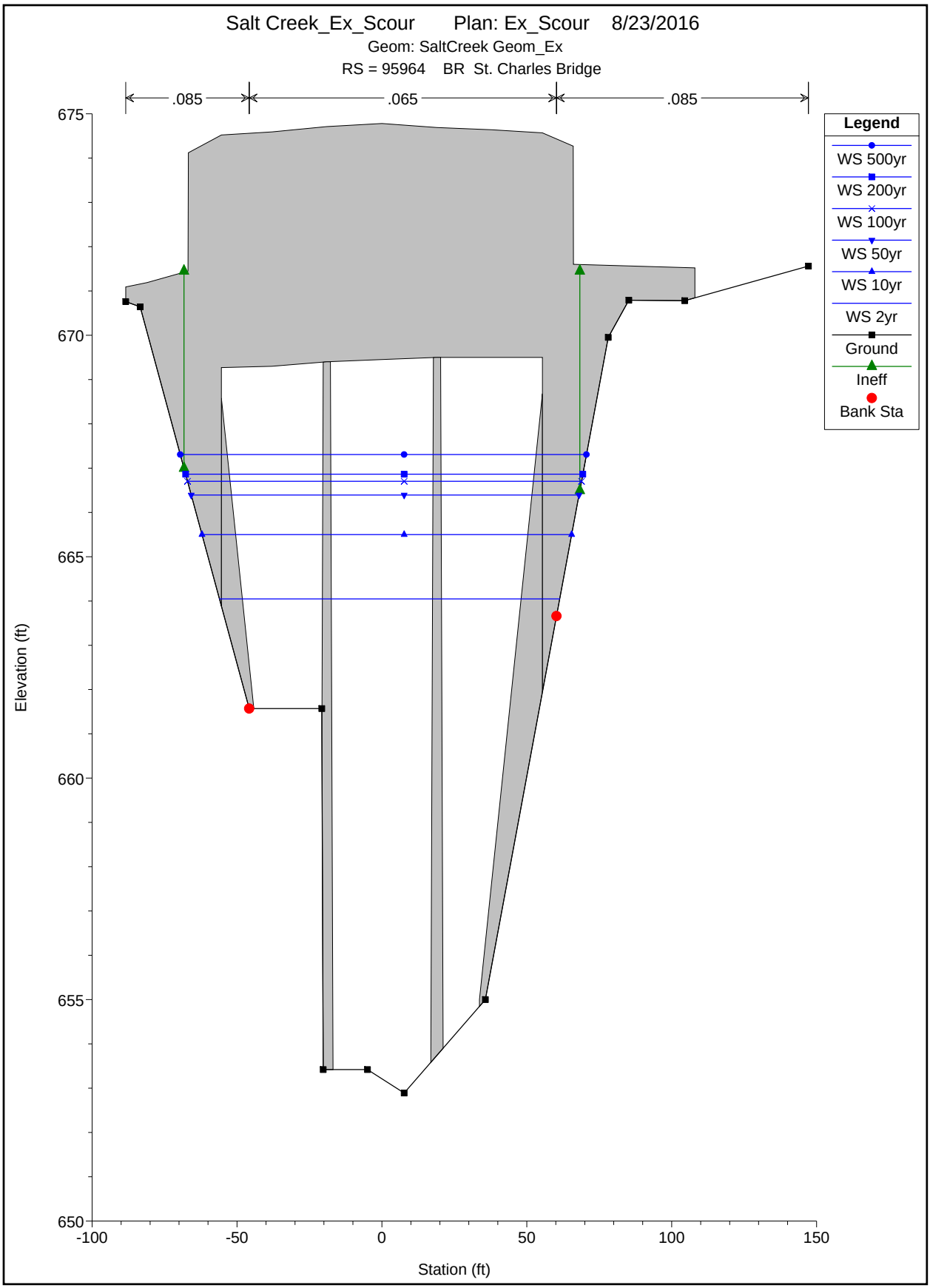
HEC-RAS Plan: Ex Scour River: Salt Creek Reach: A (Continued)

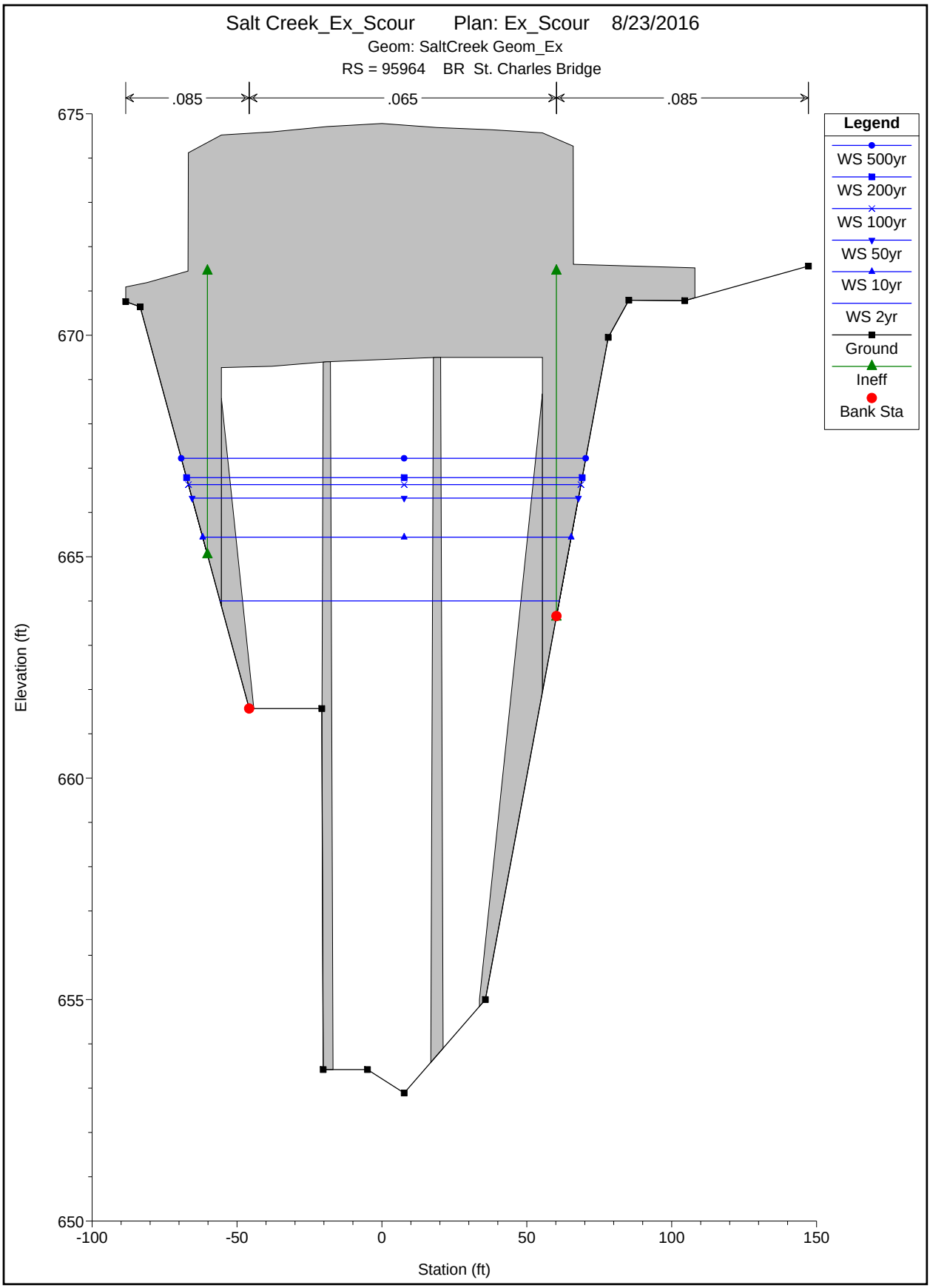
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
A	94618.34	100yr	1979.00	654.72	665.54	659.12	665.67	0.000465	3.09	911.63	175.99	0.18
A	94618.34	200yr	2056.00	654.72	665.68	659.21	665.82	0.000474	3.15	936.45	177.64	0.18
A	94618.34	500yr	2286.00	654.72	666.09	659.48	666.24	0.000497	3.32	1010.43	182.45	0.18
A	94390.14	2yr	994.00	653.94	663.09	657.16	663.16	0.000280	2.07	558.36	163.85	0.13
A	94390.14	10yr	1475.00	653.94	664.39	657.83	664.48	0.000341	2.54	787.59	188.79	0.15
A	94390.14	50yr	1834.00	653.94	665.19	658.26	665.30	0.000357	2.75	1080.08	274.79	0.15
A	94390.14	100yr	1973.00	653.94	665.46	658.42	665.57	0.000367	2.83	1155.01	280.22	0.16
A	94390.14	200yr	2049.00	653.94	665.60	658.51	665.71	0.000373	2.88	1194.42	283.03	0.16
A	94390.14	500yr	2277.00	653.94	666.01	658.76	666.13	0.000388	3.02	1312.42	293.97	0.16

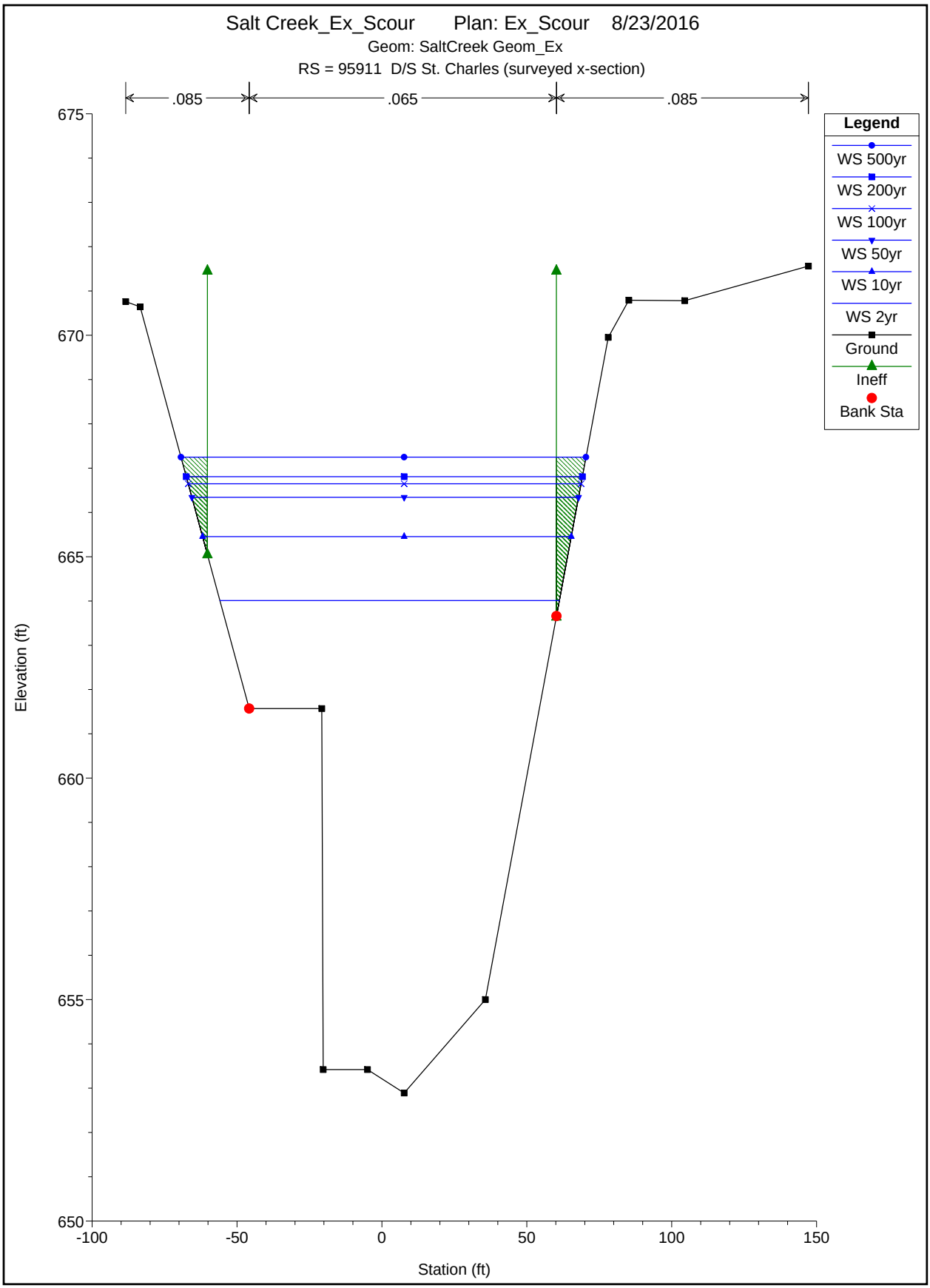

Salt Creek_Ex_Scour Plan: Ex_Scour 8/23/2016
Geom: SaltCreek Geom_Ex
RS = 96139.5 Most u/s section (surveyed section)
.12
.065
.12
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Bank Sta
Elevation (ft)
675
670
665
660
655
-200
-150
-100
-50
0
50
100
Station (ft)

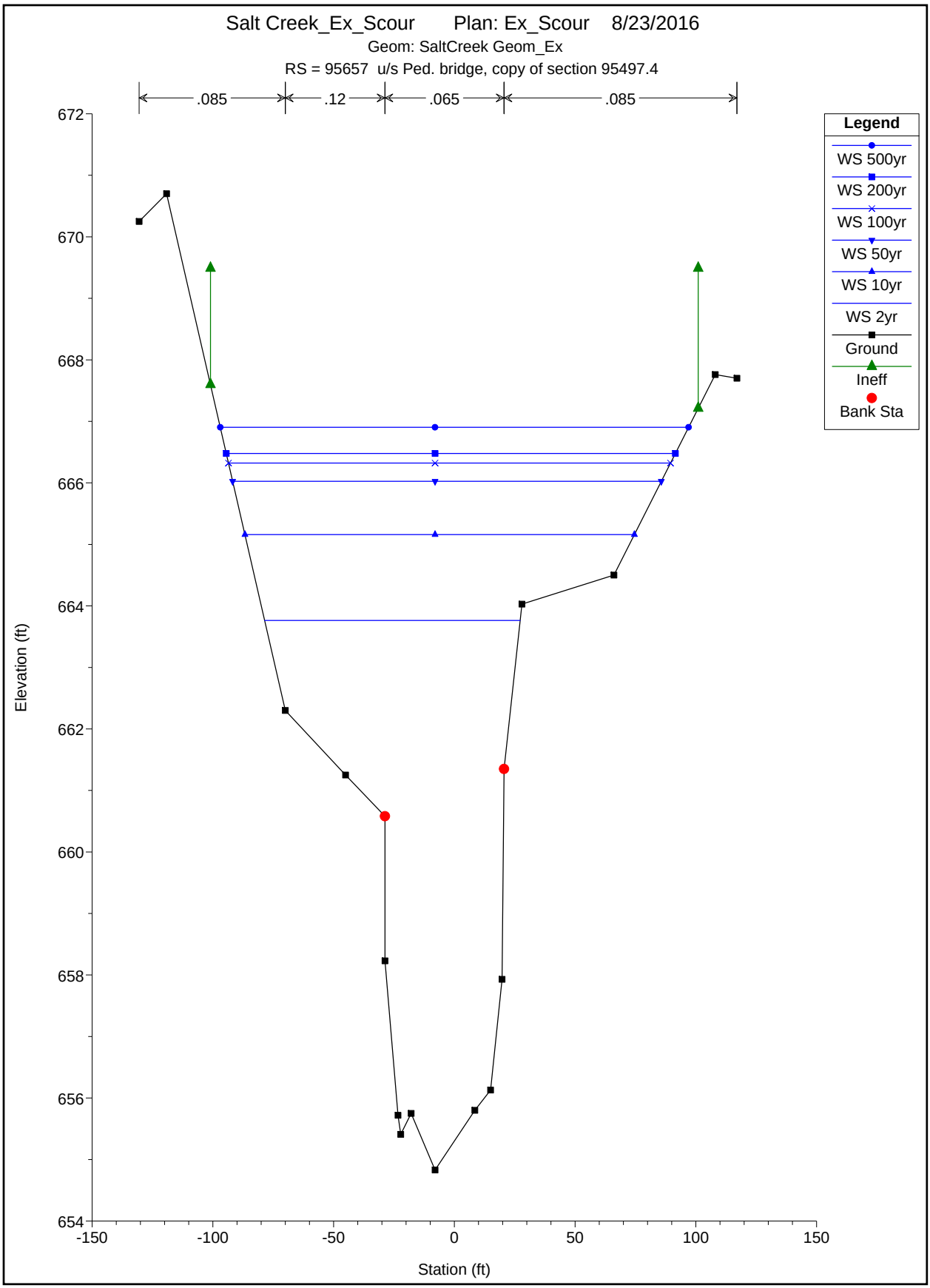

Salt Creek_Ex_Scour Plan: Ex_Scour 8/23/2016
Geom: SaltCreek Geom_Ex
RS = 96071.51 3113 (Regulatory Section)
.085
.2
.12
.12
.2
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
685
680
675
670
665
660
655
650
-3000
-2000
-1000
0
1000
2000

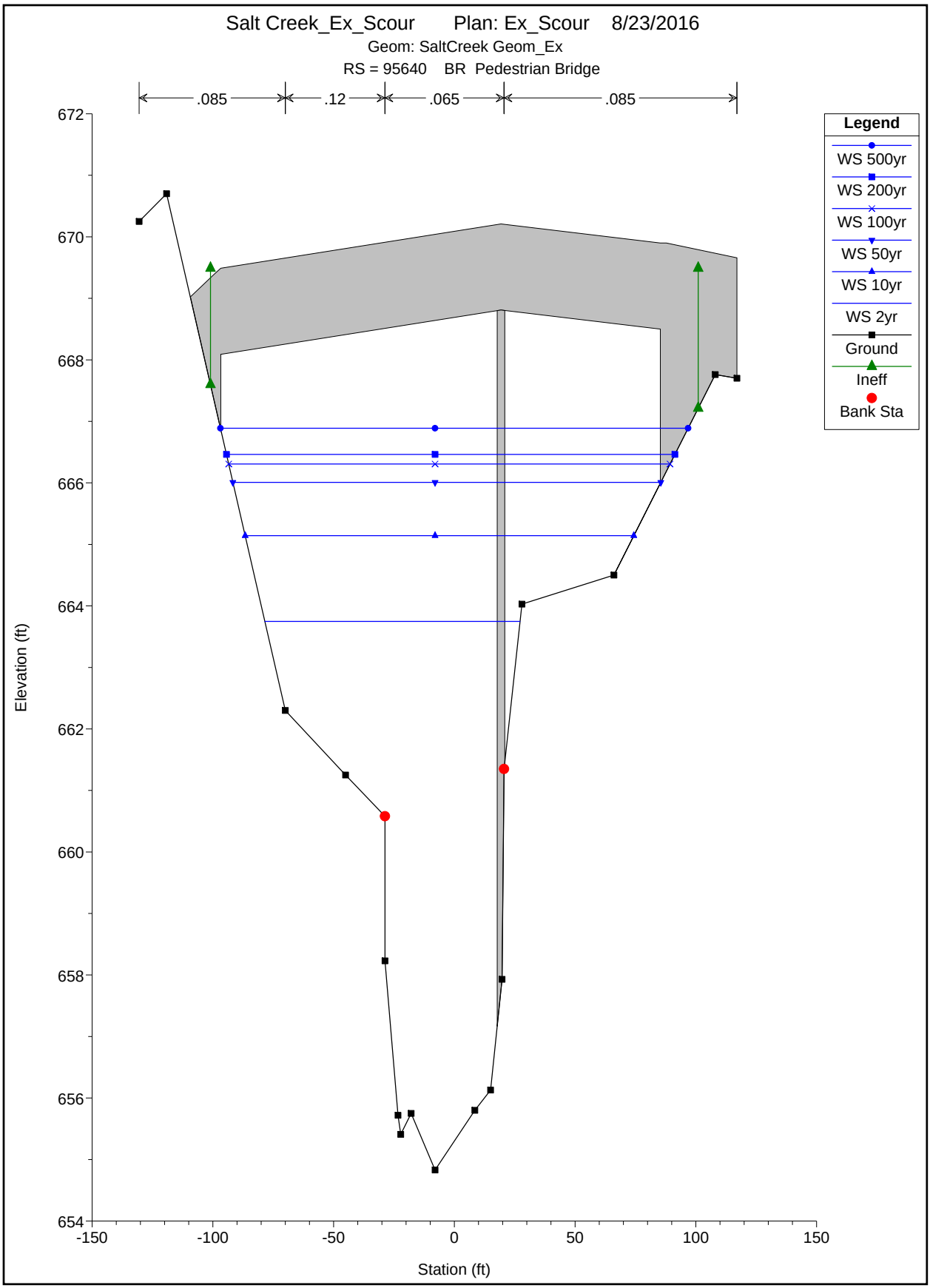

Salt Creek_Ex_Scour Plan: Ex_Scour 8/23/2016
Geom: SaltCreek Geom_Ex
RS = 96010.9 U/S St. Charles (surveyed x-section)
.085
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
675
670
665
660
655
650
Elevation (ft)
-100
-50
0
50
100
150
Station (ft)

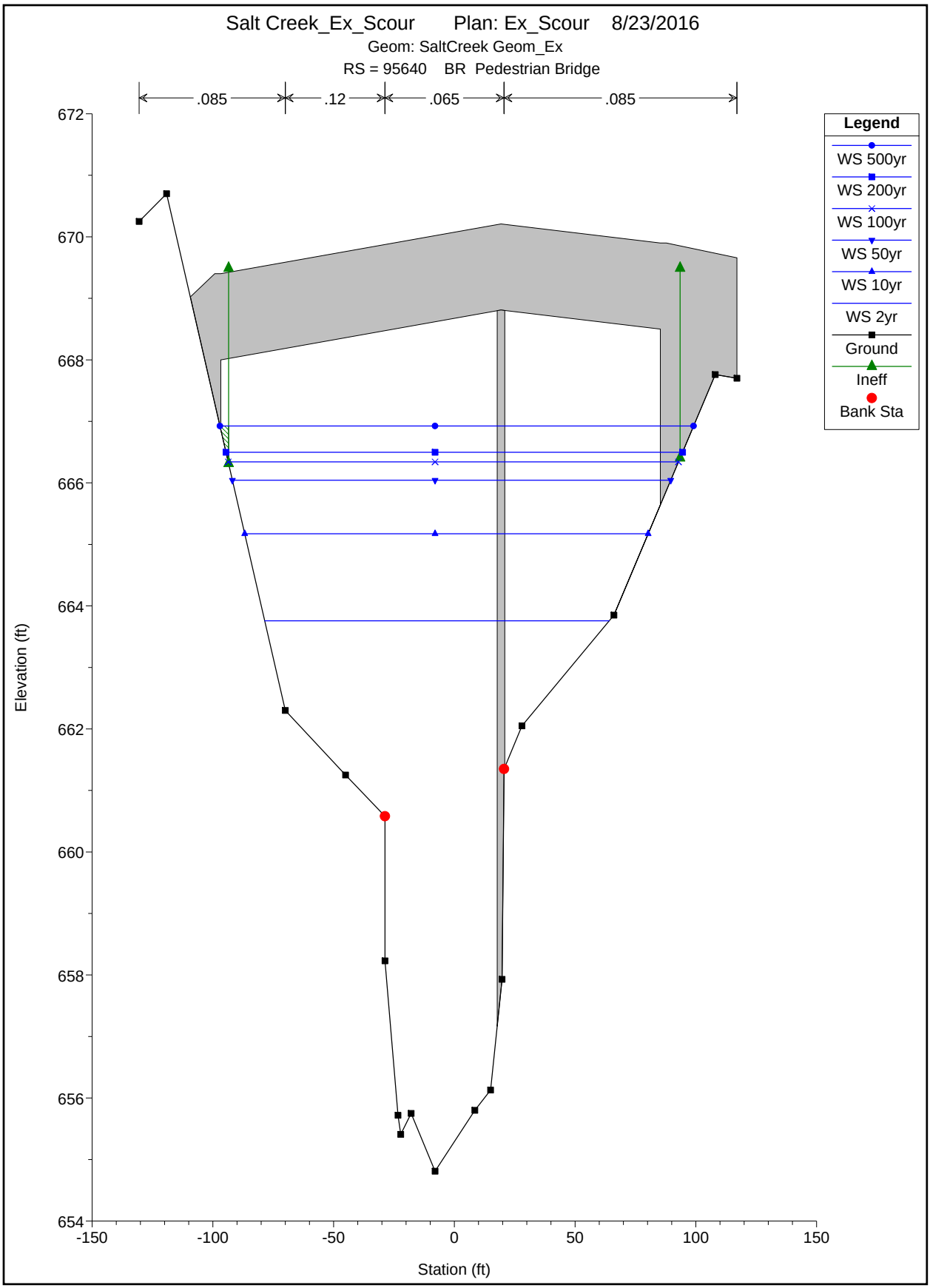

Salt Creek_Ex_Scour Plan: Ex_Scour 8/23/2016
Geom: SaltCreek Geom_Ex
RS = 95964 BR St. Charles Bridge
.085
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
675
670
665
660
655
650
Elevation (ft)
-100
-50
0
50
100
150
Station (ft)

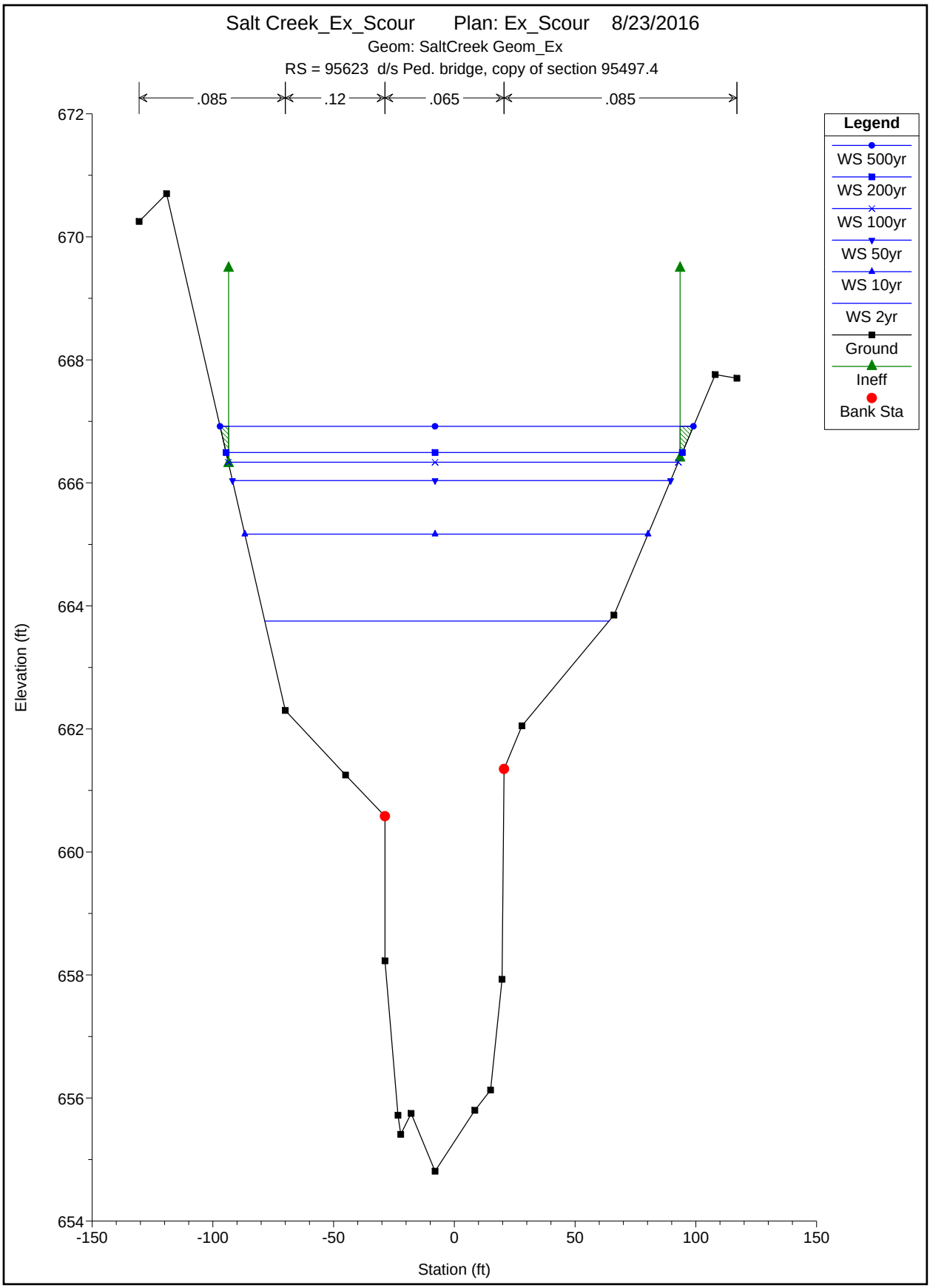

Salt Creek_Ex_Scour Plan: Ex_Scour 8/23/2016
Geom: SaltCreek Geom_Ex
RS = 95964 BR St. Charles Bridge
.085
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
675
670
665
660
655
650
Elevation (ft)
-100
-50
0
50
100
150
Station (ft)

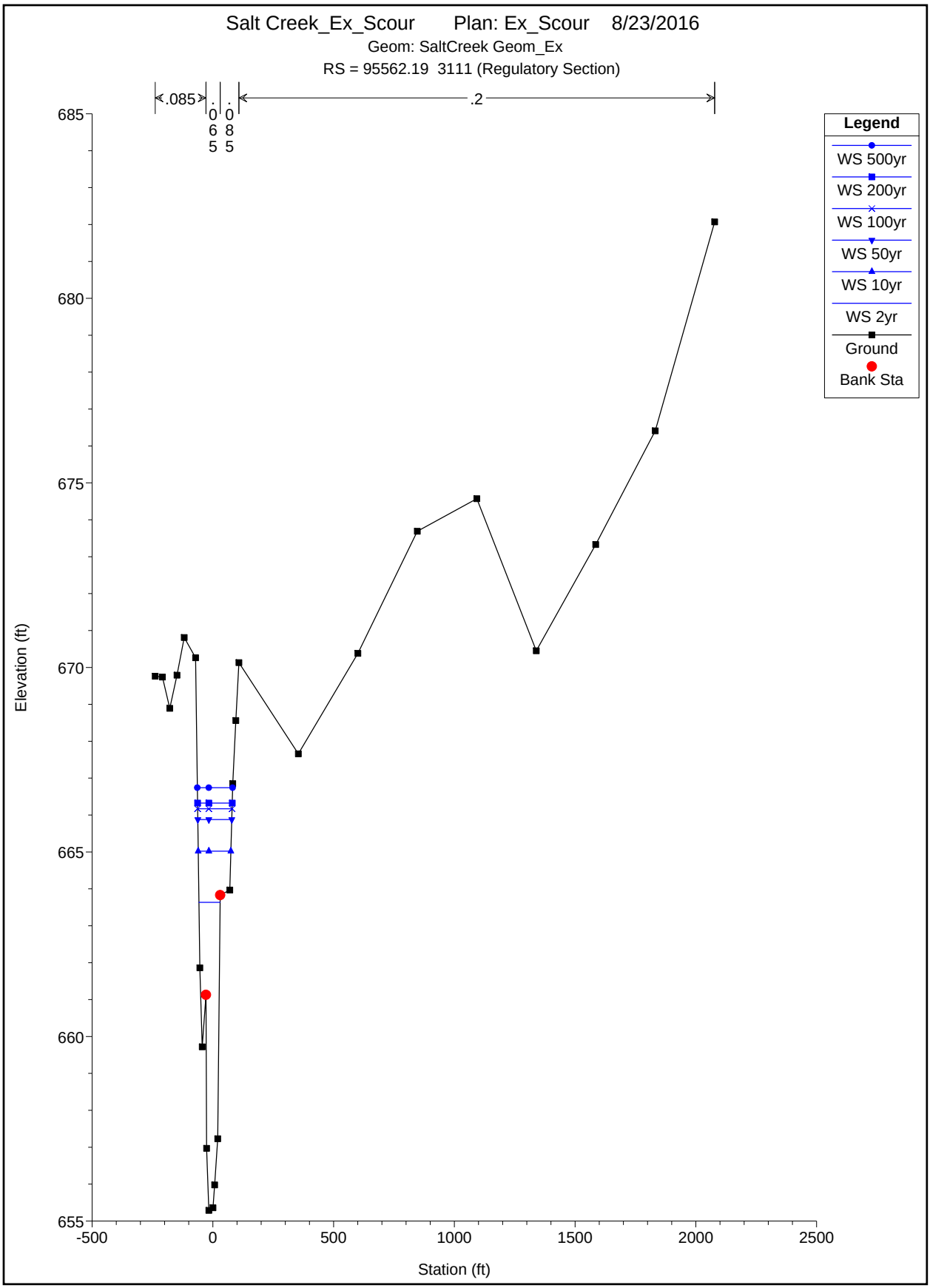

Salt Creek_Ex_Scour Plan: Ex_Scour 8/23/2016
Geom: SaltCreek Geom_Ex
RS = 95911 D/S St. Charles (surveyed x-section)
.085
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
675
670
665
660
655
650
Elevation (ft)
-100
-50
0
50
100
150
Station (ft)

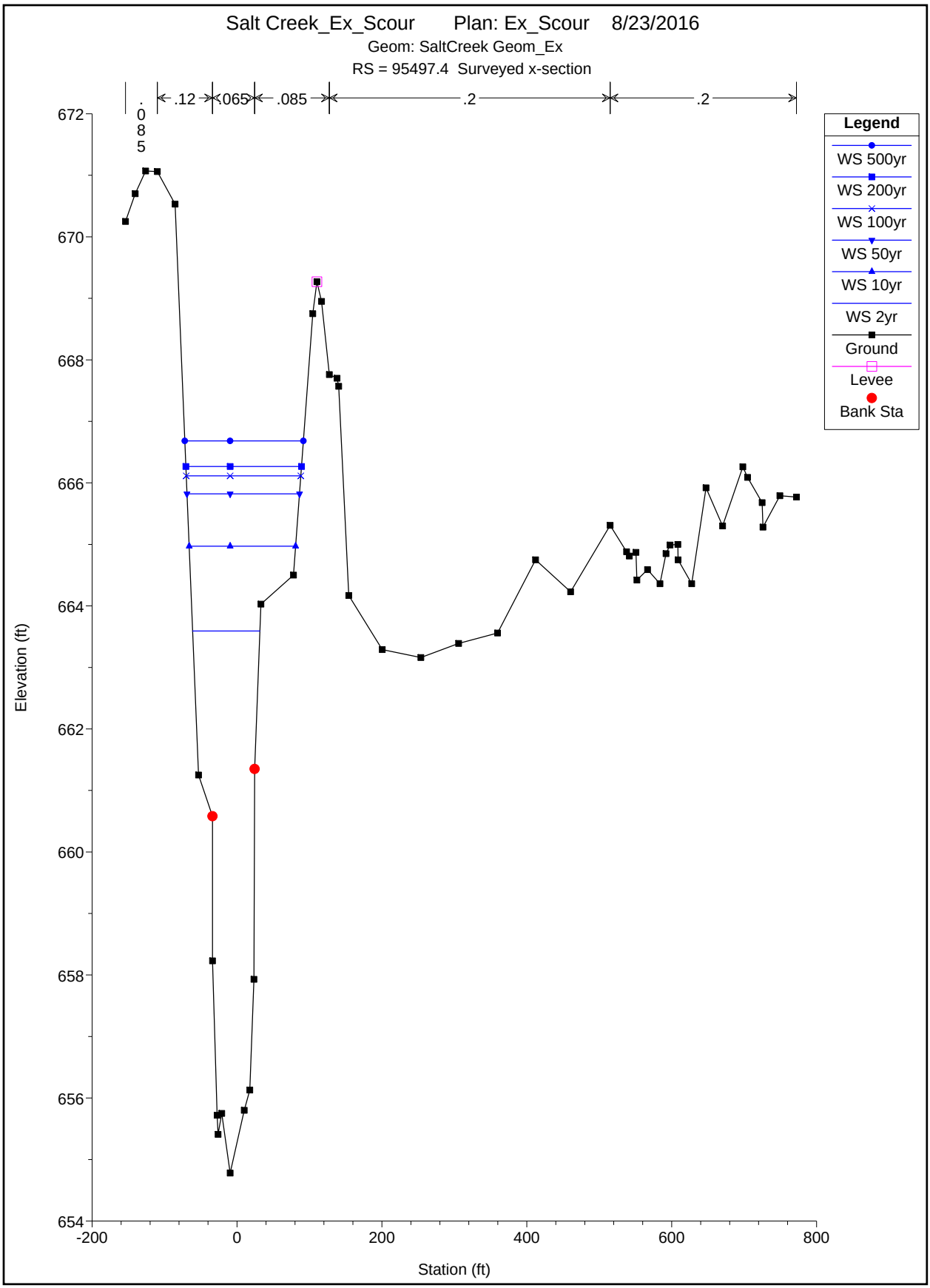

Salt Creek_Ex_Scour Plan: Ex_Scour 8/23/2016
Geom: SaltCreek Geom_Ex
RS = 95657 u/s Ped. bridge, copy of section 95497.4
.085
.12
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
654
-150
-100
-50
0
50
100
150
Station (ft)


Salt Creek_Ex_Scour Plan: Ex_Scour 8/23/2016
Geom: SaltCreek Geom_Ex
RS = 95640 BR Pedestrian Bridge
.085
.12
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
654
-150
-100
-50
0
50
100
150
Station (ft)


Salt Creek_Ex_Scour Plan: Ex_Scour 8/23/2016
Geom: SaltCreek Geom_Ex
RS = 95640 BR Pedestrian Bridge
.085
.12
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
654
-150
-100
-50
0
50
100
150
Station (ft)


Salt Creek_Ex_Scour Plan: Ex_Scour 8/23/2016
Geom: SaltCreek Geom_Ex
RS = 95623 d/s Ped. bridge, copy of section 95497.4
.085
.12
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
654
-150
-100
-50
0
50
100
150
Station (ft)


Salt Creek_Ex_Scour Plan: Ex_Scour 8/23/2016
Geom: SaltCreek Geom_Ex
RS = 95562.19 3111 (Regulatory Section)
.085
.065
.085
.2
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Bank Sta
Elevation (ft)
685
680
675
670
665
660
655
-500
0
500
1000
1500
2000
2500
Station (ft)


Salt Creek_Ex_Scour Plan: Ex_Scour 8/23/2016
Geom: SaltCreek Geom_Ex
RS = 95497.4 Surveyed x-section
.085
.12
.065
.085
.2
.2
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Bank Sta
Elevation (ft)
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666
664
662
660
658
656
654
-200
0
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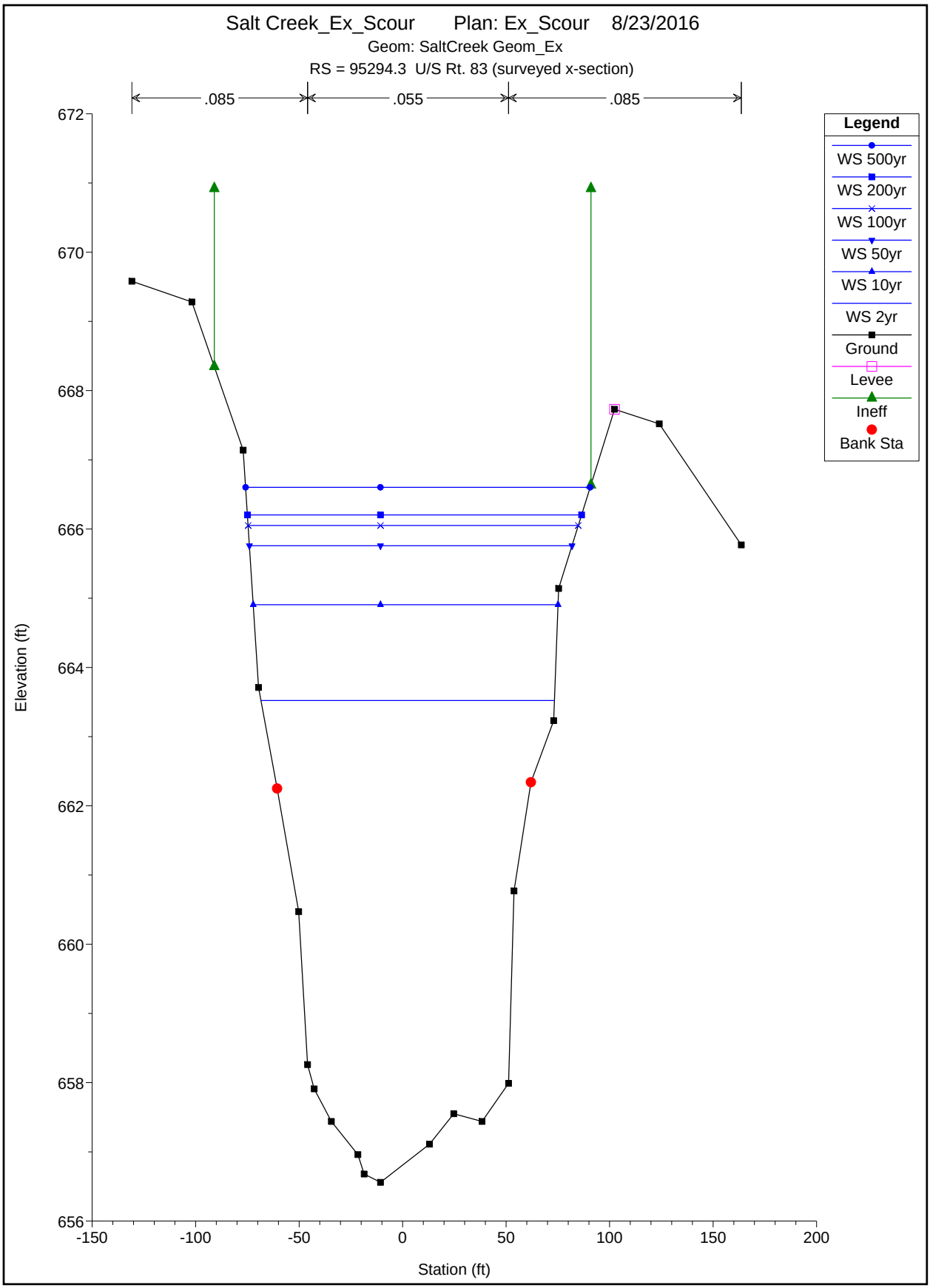
400
600
800
Station (ft)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Geom: SaltCreek Geom_Ex
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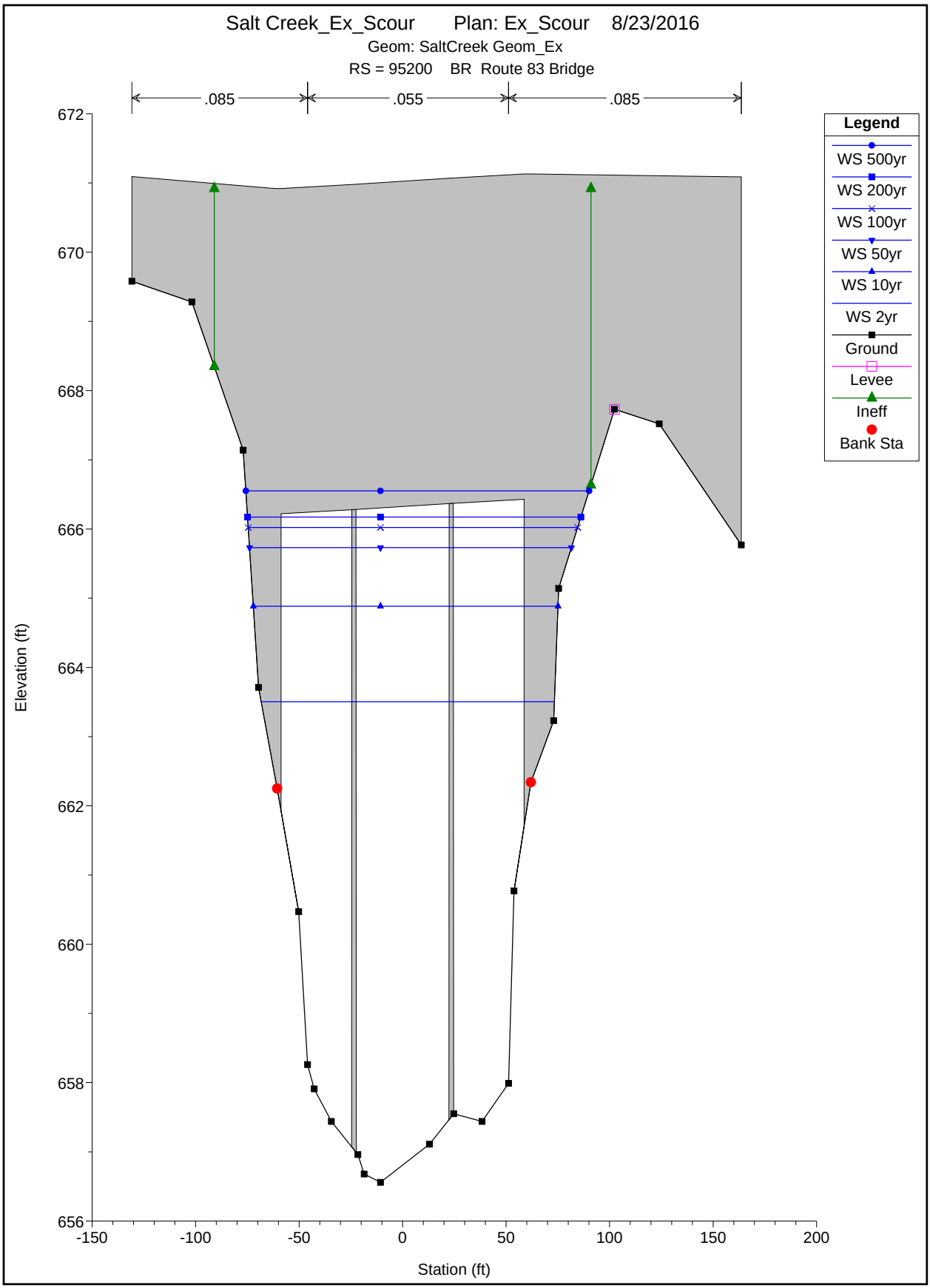
.055
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
-150
-100
-50
0
50
100
150
200
Station (ft)


Salt Creek_Ex_Scour Plan: Ex_Scour 8/23/2016
Geom: SaltCreek Geom_Ex
RS = 95200 BR Route 83 Bridge
.085
.055
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
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660
658
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-150
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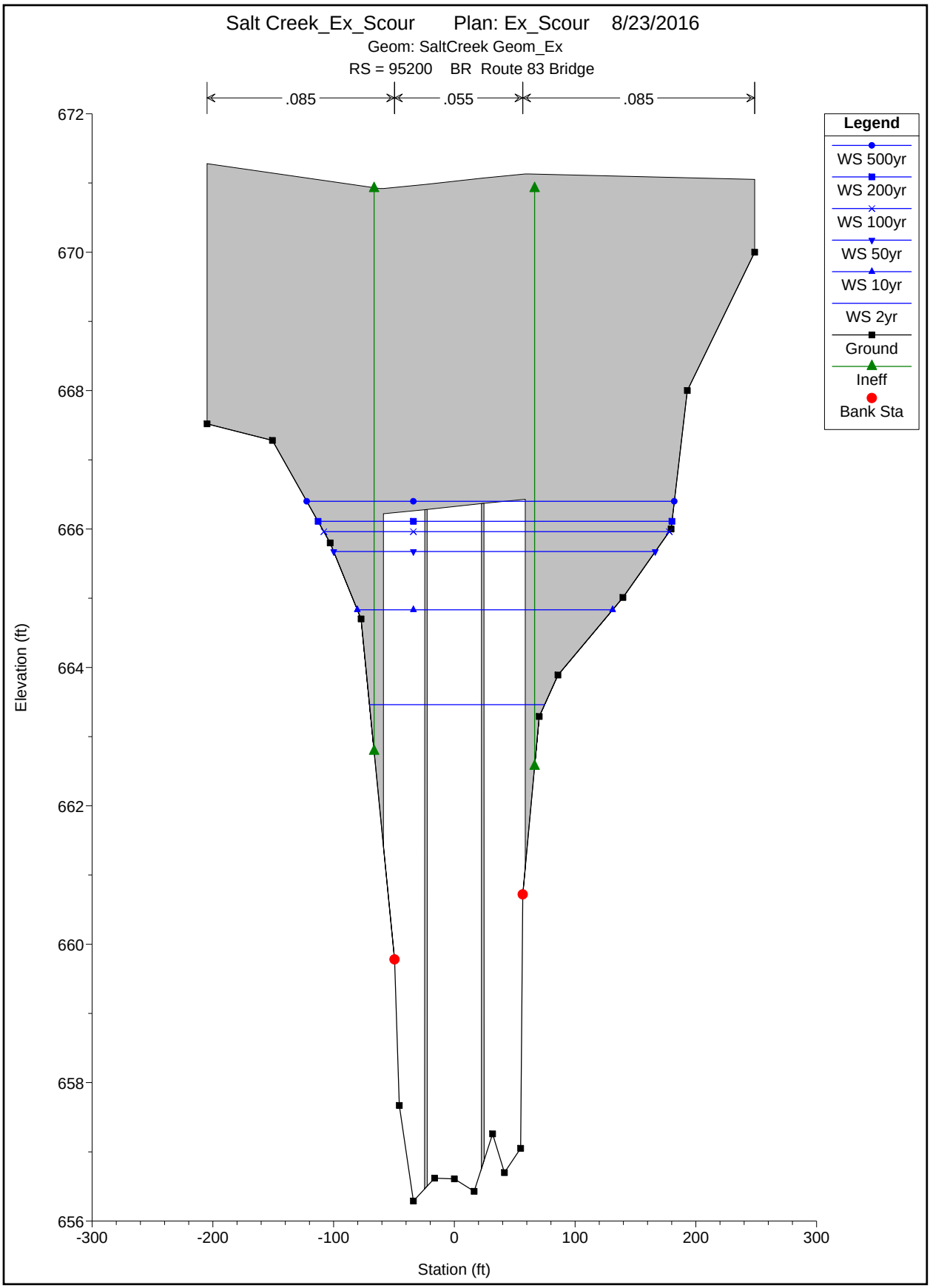
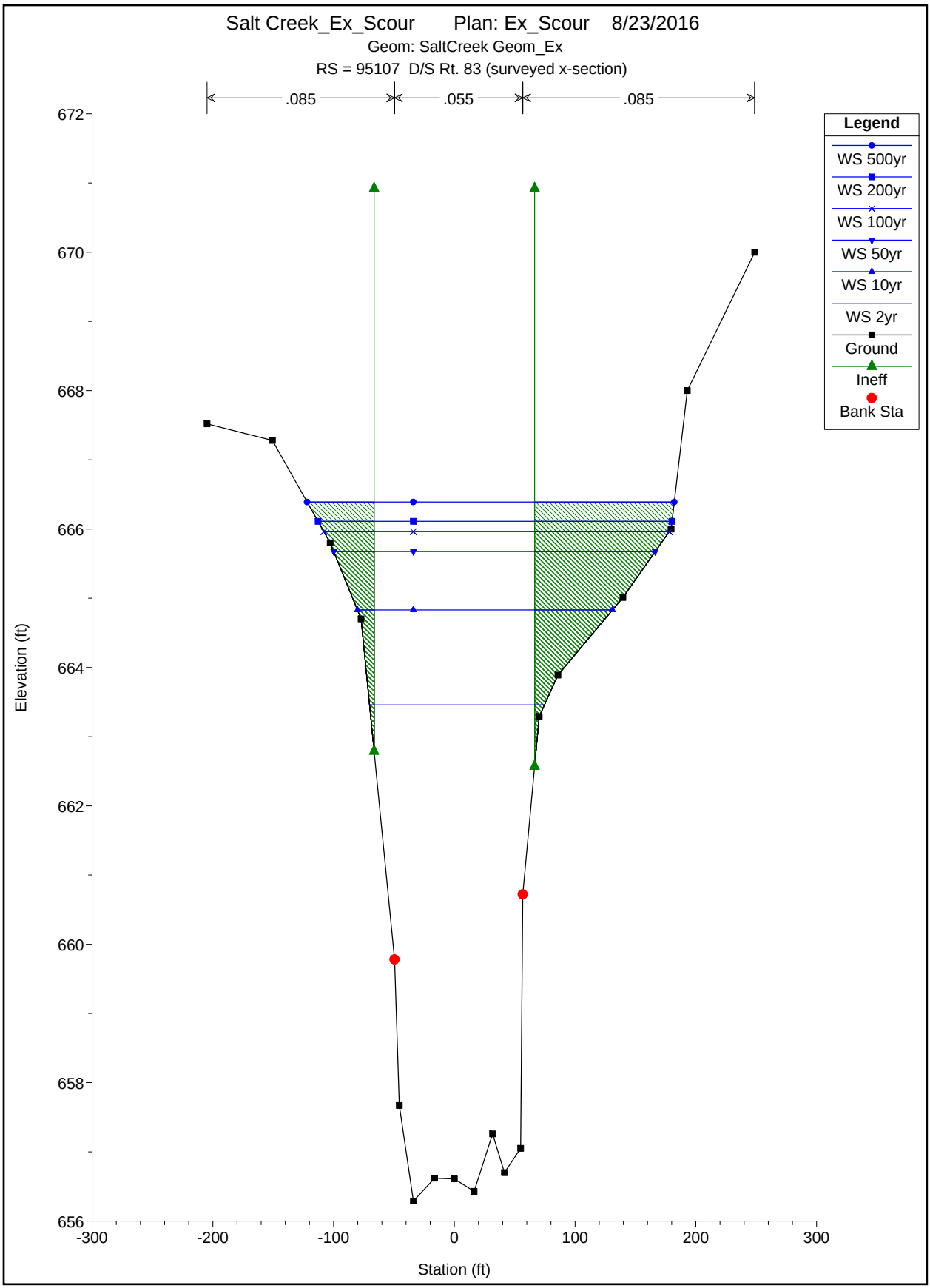
-50
0
50
100
150
200
Station (ft)


Salt Creek_Ex_Scour Plan: Ex_Scour 8/23/2016
Geom: SaltCreek Geom_Ex
RS = 95200 BR Route 83 Bridge
.085
.055
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
-300
-200
-100
0
100
200
300
Station (ft)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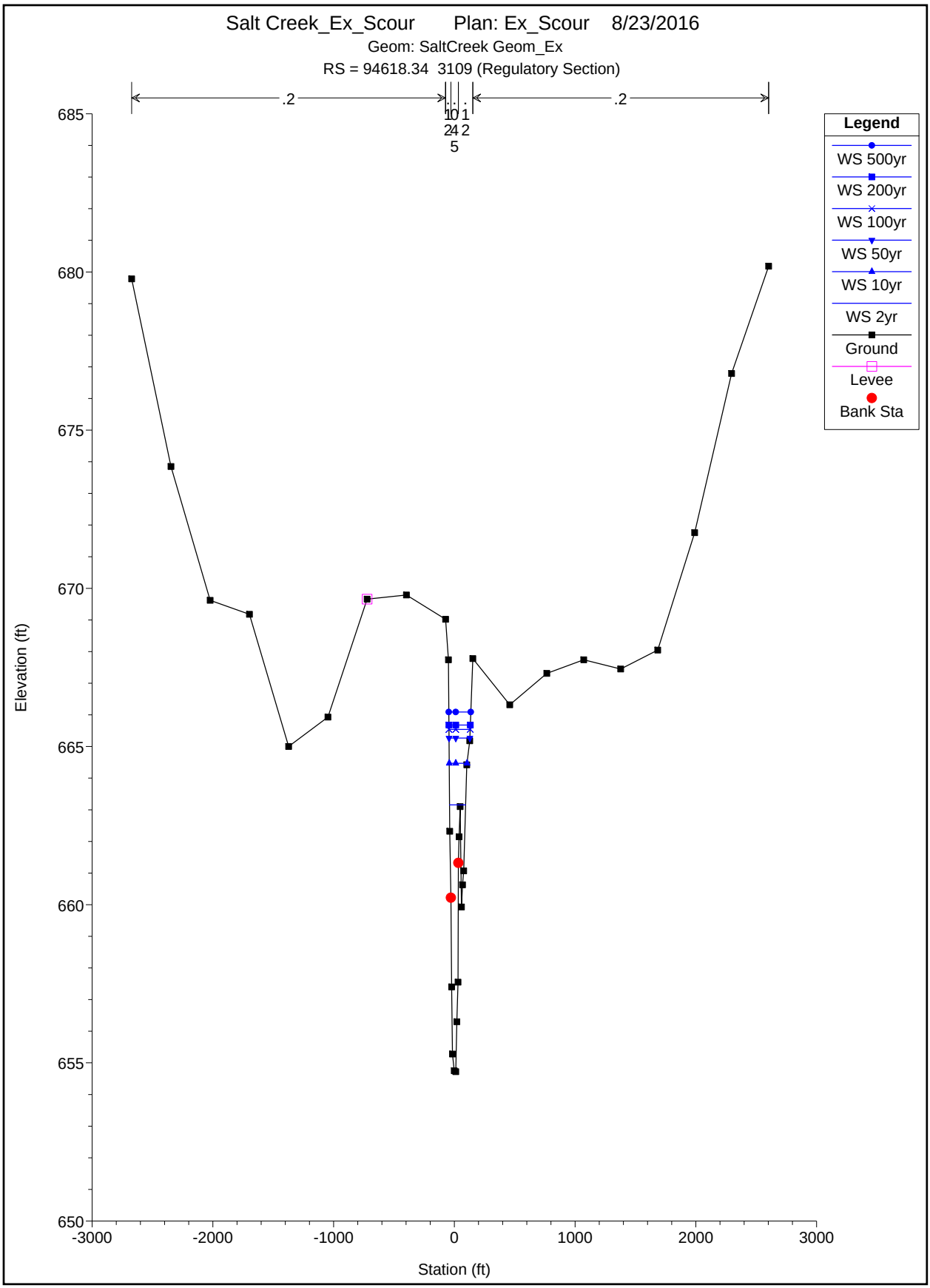
.085
.055
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
-300
-200
-100
0
100
200
300
Station (ft)


Salt Creek_Ex_Scour Plan: Ex_Scour 8/23/2016
Geom: SaltCreek Geom_Ex
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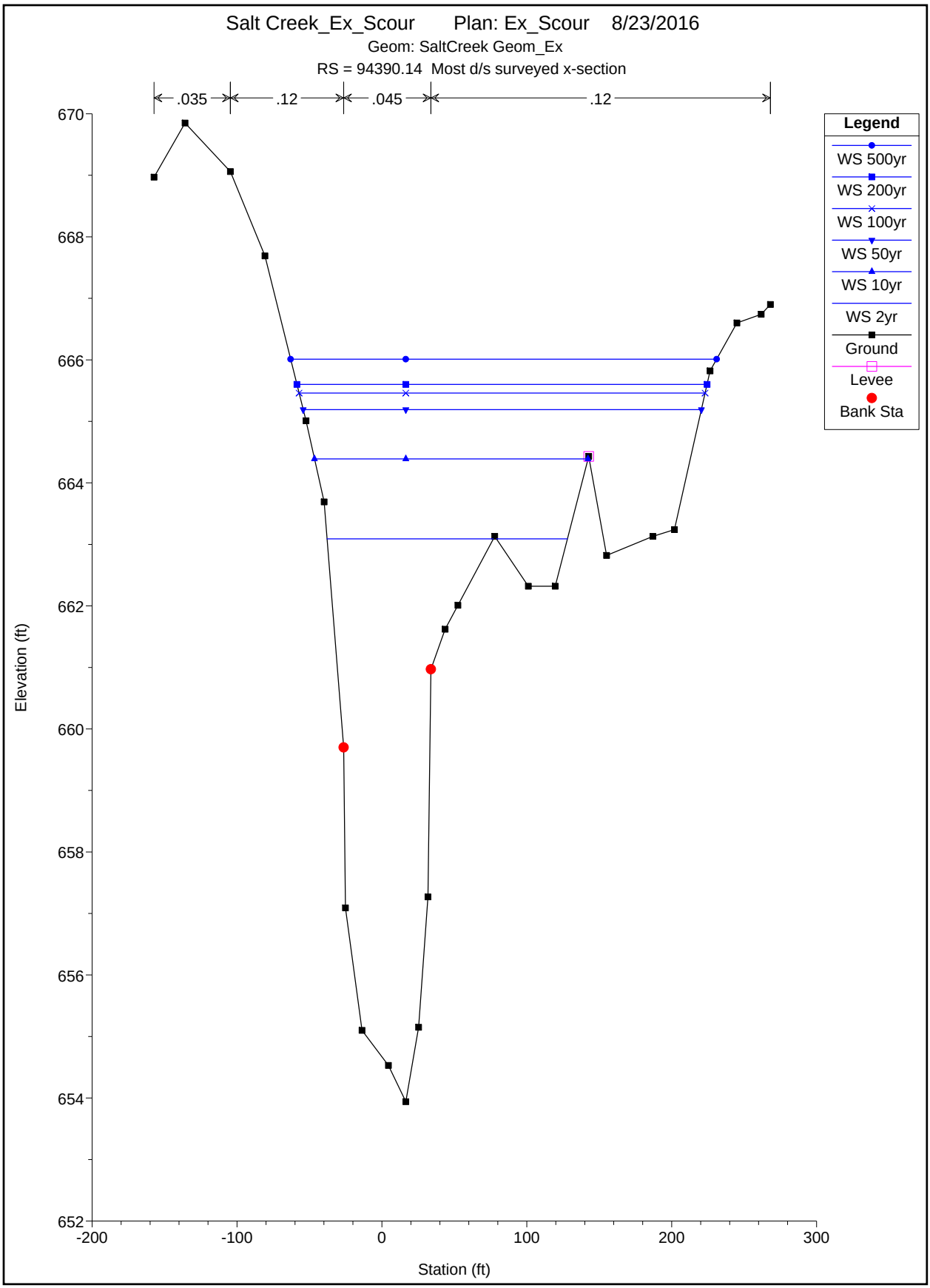
.2
.2
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
685
680
675
670
665
660
655
650
-3000
-2000
-1000
0
1000
2000
3000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Geom: SaltCreek Geom_Ex
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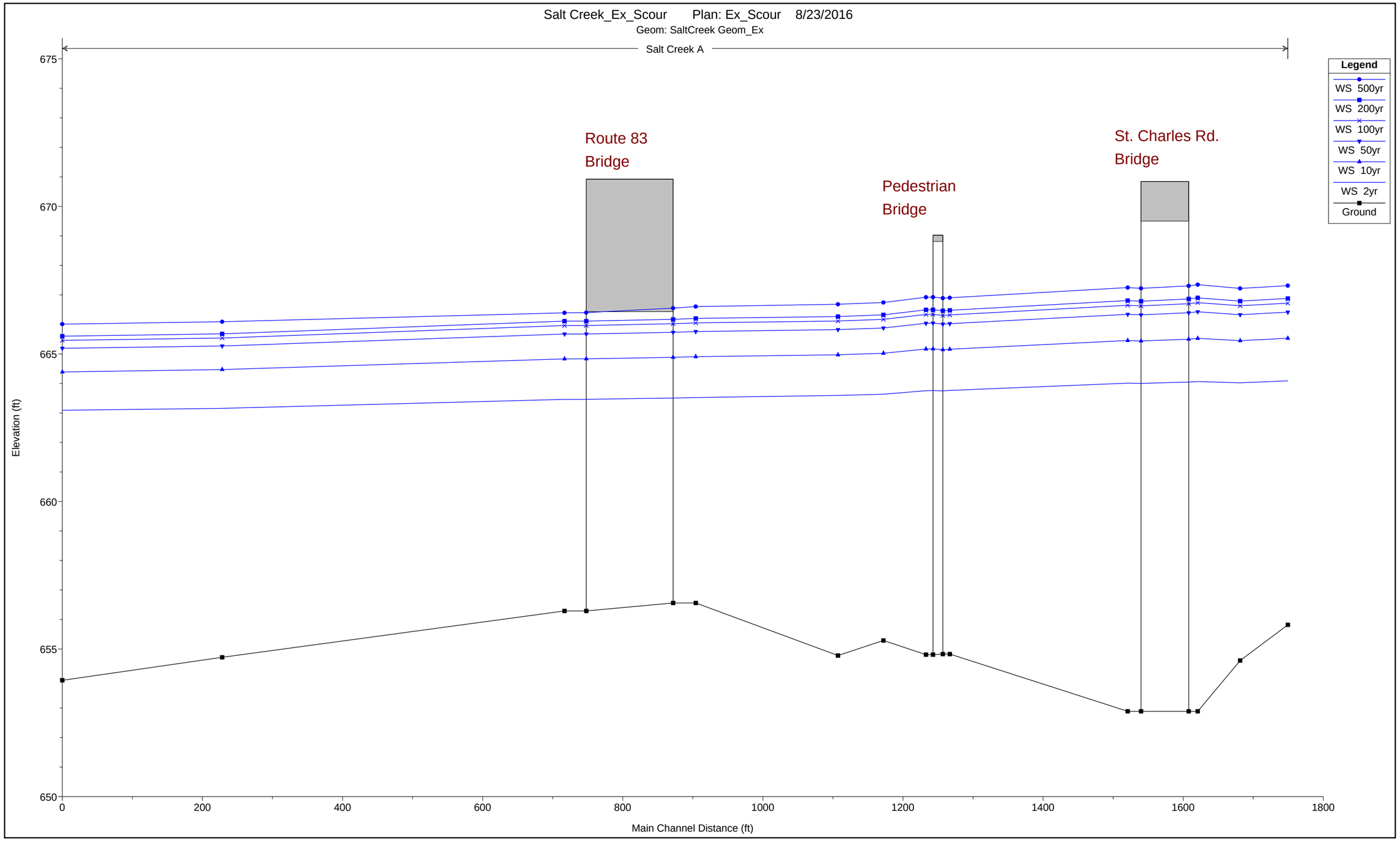
.12
.045
.12
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Bank Sta
Elevation (ft)
670
668
666
664
662
660
658
656
654
652
-200
-100
0
100
200
300
Station (ft)

Existing Conditions



HEC-RAS
HYDRAULIC CALULATIONS

NATURAL CONDITIONS

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
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PROJECT DATA
Project Title: Salt Creek Nat Cond
Project File : SaltCreek Nat Cond.prj
Run Date and Time: 8/23/2016 8:41:51 AM

Project in English units

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PLAN DATA

Plan Title: Natural
Plan File : e:\2015\15228\Calcs&Data\NR\Storm\Hydraulic Report\HEC-RAS\Scour Run\Natural Cond Run\SaltCreek_Nat_Cond.p04

Geometry Title: SaltCreek Geom Nat
Geometry File : e:\2015\15228\Calcs&Data\NR\Storm\Hydraulic Report\HEC-RAS\Scour Run\Natural Cond Run\SaltCreek_Nat_Cond.g02

Flow Title   : SaltCreek Reg Q
Flow File   : e:\2015\15228\Calcs&Data\NR\Storm\Hydraulic Report\HEC-RAS\Scour Run\Natural Cond Run\SaltCreek_Nat_Cond.f01

Plan Summary Information:
Number of: Cross Sections =   12   Multiple Openings =   0
            Culverts   =   0   Inline Structures =   0
            Bridges   =   2   Lateral Structures =   0

Computational Information
    Water surface calculation tolerance = 0.01
    Critical depth calculation tolerance = 0.01
    Maximum number of iterations   = 20
    Maximum difference tolerance   = 0.3
    Flow tolerance factor   = 0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method: Average Conveyance
    Computational Flow Regime: Subcritical Flow

****

FLOW DATA

Flow Title: SaltCreek Reg Q
Flow File : e:\2015\15228\Calcs&Data\NR\Storm\Hydraulic Report\HEC-RAS\Scour Run\Natural Cond Run\SaltCreek_Nat_Cond.f01

Flow Data (cfs)

River	Reach	RS	2yr	10yr	50yr	100yr	200yr	500yr
Salt Creek	A	96139.5	940	1414	1756	1893	1970	2201
Salt Creek	A	96071.51	941	1417	1763	1900	1977	2209
Salt Creek	A	96010.9	994	1484	1852	1994	2071	2303
Salt Creek	A	95497.4	994	1477	1839	1979	2056	2286
Salt Creek	A	94390.14	994	1475	1834	1973	2049	2277

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Salt Creek	A	2yr		Known WS = 663.09
Salt Creek	A	10yr		Known WS = 664.39
Salt Creek	A	50yr		Known WS = 665.19
Salt Creek	A	100yr		Known WS = 665.46
Salt Creek	A	200yr		Known WS = 665.6
Salt Creek	A	500yr		Known WS = 666.01

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GEOMETRY DATA

Geometry Title: SaltCreek Geom Nat
Geometry File : e:\2015\15228\Calcs&Data\NR\Storm\Hydraulic Report\HEC-RAS\Scour Run\Natural Cond Run\SaltCreek_Nat_Cond.g02

CROSS SECTION

RIVER: Salt Creek
REACH: A   RS: 96139.5

INPUT
Description: Most u/s section (surveyed section)
Station Elevation Data   num=   21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-191.7	670.29	-185.8	670.4	-171.6	670.75	-159.6	671.06	-124.9	672.03
-113.1	669.8	-108.2	669.71	-96.2	666.15	-85.7	665.98	-58.5	669.26
-24.9	661.93	-23.6	661.77	-20.6	658.34	-15.3	656.61	-9.2	655.84

```
    -1.3  655.82    12.5  656.07    23.2  658.48   26.57  661.63    38.2  672.52
    85.8  673.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
  -191.7     .12   -24.9    .065   26.57     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -24.9   26.57              32   67.99      75             .1       .3
Left Levee      Station=   -58.5      Elevation=  669.26
```

CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	664.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.120	0.065	0.120
W.S. Elev (ft)	664.03	Reach Len. (ft)	32.00	67.99	75.00
Crit W.S. (ft)	658.92	Flow Area (sq ft)	10.12	359.19	3.08
E.G. Slope (ft/ft)	0.001058	Area (sq ft)	10.12	359.19	3.08
Q Total (cfs)	940.00	Flow (cfs)	4.15	934.72	1.14
Top Width (ft)	63.67	Top Width (ft)	9.63	51.47	2.56
Vel Total (ft/s)	2.52	Avg. Vel. (ft/s)	0.41	2.60	0.37
Max Chl Dpth (ft)	8.21	Hydr. Depth (ft)	1.05	6.98	1.20
Conv. Total (cfs)	28895.7	Conv. (cfs)	127.5	28733.3	34.9
Length Wtd. (ft)	67.49	Wetted Per. (ft)	9.86	54.87	3.51
Min Ch El (ft)	655.82	Shear (lb/sq ft)	0.07	0.43	0.06
Alpha	1.06	Stream Power (lb/ft s)	85.80	-58.50	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	1.62	21.42	1.09
C & E Loss (ft)	0.00	Cum SA (acres)	0.84	3.10	0.92

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	665.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.	0.120	0.065	0.120
W.S. Elev (ft)	665.46	Reach Len. (ft)	32.00	67.99	75.00
Crit W.S. (ft)	659.68	Flow Area (sq ft)	28.58	432.80	7.84
E.G. Slope (ft/ft)	0.001260	Area (sq ft)	28.58	432.80	7.84
Q Total (cfs)	1414.00	Flow (cfs)	18.07	1391.62	4.31
Top Width (ft)	71.75	Top Width (ft)	16.19	51.47	4.09
Vel Total (ft/s)	3.01	Avg. Vel. (ft/s)	0.63	3.22	0.55
Max Chl Dpth (ft)	9.64	Hydr. Depth (ft)	1.77	8.41	1.92
Conv. Total (cfs)	39832.9	Conv. (cfs)	509.0	39202.6	121.4
Length Wtd. (ft)	67.08	Wetted Per. (ft)	16.57	54.87	5.61
Min Ch El (ft)	655.82	Shear (lb/sq ft)	0.14	0.62	0.11
Alpha	1.12	Stream Power (lb/ft s)	85.80	-58.50	0.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	2.92	25.68	2.90
C & E Loss (ft)	0.00	Cum SA (acres)	1.06	3.10	1.75

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50yr

E.G. Elev (ft)	666.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.	0.120	0.065	0.120
W.S. Elev (ft)	666.34	Reach Len. (ft)	32.00	67.99	75.00
Crit W.S. (ft)	660.19	Flow Area (sq ft)	44.50	477.85	11.83
E.G. Slope (ft/ft)	0.001374	Area (sq ft)	44.50	477.85	11.83
Q Total (cfs)	1756.00	Flow (cfs)	34.06	1714.15	7.79
Top Width (ft)	76.70	Top Width (ft)	20.20	51.47	5.03
Vel Total (ft/s)	3.29	Avg. Vel. (ft/s)	0.77	3.59	0.66
Max Chl Dpth (ft)	10.52	Hydr. Depth (ft)	2.20	9.28	2.35
Conv. Total (cfs)	47366.5	Conv. (cfs)	918.7	46237.7	210.1
Length Wtd. (ft)	66.80	Wetted Per. (ft)	20.67	54.87	6.89
Min Ch El (ft)	655.82	Shear (lb/sq ft)	0.18	0.75	0.15
Alpha	1.16	Stream Power (lb/ft s)	85.80	-58.50	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	3.92	28.29	4.98
C & E Loss (ft)	0.00	Cum SA (acres)	1.29	3.10	2.42

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	666.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.	0.120	0.065	0.120
W.S. Elev (ft)	666.64	Reach Len. (ft)	32.00	67.99	75.00
Crit W.S. (ft)	660.37	Flow Area (sq ft)	50.77	493.30	13.38
E.G. Slope (ft/ft)	0.001428	Area (sq ft)	50.77	493.30	13.38
Q Total (cfs)	1893.00	Flow (cfs)	41.38	1842.26	9.36
Top Width (ft)	78.39	Top Width (ft)	21.57	51.47	5.35
Vel Total (ft/s)	3.40	Avg. Vel. (ft/s)	0.82	3.73	0.70
Max Chl Dpth (ft)	10.82	Hydr. Depth (ft)	2.35	9.58	2.50
Conv. Total (cfs)	50098.5	Conv. (cfs)	1095.2	48755.5	247.7
Length Wtd. (ft)	66.71	Wetted Per. (ft)	22.08	54.87	7.32
Min Ch El (ft)	655.82	Shear (lb/sq ft)	0.20	0.80	0.16
Alpha	1.18	Stream Power (lb/ft s)	85.80	-58.50	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	4.31	29.19	5.67
C & E Loss (ft)	0.00	Cum SA (acres)	1.38	3.10	2.53

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	667.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.	0.120	0.065	0.120
W.S. Elev (ft)	666.79	Reach Len. (ft)	32.00	67.99	75.00
Crit W.S. (ft)	660.48	Flow Area (sq ft)	54.21	501.36	14.23
E.G. Slope (ft/ft)	0.001460	Area (sq ft)	54.21	501.36	14.23
Q Total (cfs)	1970.00	Flow (cfs)	45.67	1914.06	10.28
Top Width (ft)	79.28	Top Width (ft)	22.29	51.47	5.51
Vel Total (ft/s)	3.46	Avg. Vel. (ft/s)	0.84	3.82	0.72
Max Chl Dpth (ft)	10.97	Hydr. Depth (ft)	2.43	9.74	2.58
Conv. Total (cfs)	51554.1	Conv. (cfs)	1195.0	50090.1	268.9

* Length Wtd. (ft)	*	66.66	* Wetted Per. (ft)	*	22.82	*	54.87	*	7.55	*
* Min Ch El (ft)	*	655.82	* Shear (lb/sq ft)	*	0.22	*	0.83	*	0.17	*
* Alpha	*	1.19	* Stream Power (lb/ft s)	*	85.80	*	-58.50	*	0.00	*
* Frctn Loss (ft)	*	0.10	* Cum Volume (acre-ft)	*	4.52	*	29.65	*	6.05	*
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	1.43	*	3.10	*	2.58	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	*	667.47	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.25	* Wt. n-Val.	*	0.120	*	0.065	*	0.120	*	
* W.S. Elev (ft)	*	667.22	* Reach Len. (ft)	*	32.00	*	67.99	*	75.00	*	
* Crit W.S. (ft)	*	660.77	* Flow Area (sq ft)	*	64.23	*	523.52	*	16.71	*	
* E.G. Slope (ft/ft)	*	0.001563	* Area (sq ft)	*	64.23	*	523.52	*	16.71	*	
* Q Total (cfs)	*	2201.00	* Flow (cfs)	*	59.25	*	2128.59	*	13.17	*	
* Top Width (ft)	*	81.71	* Top Width (ft)	*	24.27	*	51.47	*	5.97	*	
* Vel Total (ft/s)	*	3.64	* Avg. Vel. (ft/s)	*	0.92	*	4.07	*	0.79	*	
* Max Chl Dpth (ft)	*	11.40	* Hydr. Depth (ft)	*	2.65	*	10.17	*	2.80	*	
* Conv. Total (cfs)	*	55666.7	* Conv. (cfs)	*	1498.5	*	53835.3	*	333.0	*	
* Length Wtd. (ft)	*	66.52	* Wetted Per. (ft)	*	24.84	*	54.87	*	8.18	*	
* Min Ch El (ft)	*	655.82	* Shear (lb/sq ft)	*	0.25	*	0.93	*	0.20	*	
* Alpha	*	1.21	* Stream Power (lb/ft s)	*	85.80	*	-58.50	*	0.00	*	
* Frctn Loss (ft)	*	0.10	* Cum Volume (acre-ft)	*	5.07	*	30.77	*	7.08	*	
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	1.53	*	2.74	*	2.69	*	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 96071.51

INPUT
Description: 3113 (Regulatory Section)
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-2751.5	674.38	-2483.48	673.53	-2215.48	675.88	-1947.49	673.05	-1679.45	673.44
-1411.47	671.34	-1143.5	669.6	-875.5	668.18	-607.51	669.97	-339.48	670.05
-71.5	670.3	-53.02	668.4	-31.16	661.76	-19.15	661	-14.75	657.82
-10.95	656.57	3.76	654.71	14.14	654.61	20.62	657.48	25.53	660.45
39.94	669.18	60.44	670.89	238.42	677.13	416.46	678.64	594.44	677.97
772.42	675.86	950.46	673.65	1128.44	673.58	1306.41	674.11	1484.46	674.84
1662.44	675.62	1840.47	681.22						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-2751.5	.085	-1947.49	.2	-607.51	.12	-19.15	.065	39.94	.12
416.46	.2								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-19.15	25.53	87	60.61	39	.1	.3

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	*	664.07	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.11	* Wt. n-Val.	*	0.120	*	0.065	*	0.065	*	
* W.S. Elev (ft)	*	663.96	* Reach Len. (ft)	*	87.00	*	60.61	*	39.00	*	
* Crit W.S. (ft)	*		* Flow Area (sq ft)	*	38.95	*	340.46	*	10.17	*	
* E.G. Slope (ft/ft)	*	0.000983	* Area (sq ft)	*	38.95	*	340.46	*	10.17	*	
* Q Total (cfs)	*	941.00	* Flow (cfs)	*	23.90	*	907.55	*	9.55	*	
* Top Width (ft)	*	69.73	* Top Width (ft)	*	19.25	*	44.68	*	5.79	*	
* Vel Total (ft/s)	*	2.42	* Avg. Vel. (ft/s)	*	0.61	*	2.67	*	0.94	*	
* Max Chl Dpth (ft)	*	9.35	* Hydr. Depth (ft)	*	2.02	*	7.62	*	1.75	*	
* Conv. Total (cfs)	*	30015.7	* Conv. (cfs)	*	762.3	*	28948.6	*	304.7	*	
* Length Wtd. (ft)	*	61.13	* Wetted Per. (ft)	*	19.60	*	47.46	*	6.77	*	
* Min Ch El (ft)	*	654.61	* Shear (lb/sq ft)	*	0.12	*	0.44	*	0.09	*	
* Alpha	*	1.18	* Stream Power (lb/ft s)	*	1840.47	*	0.00	*	0.00	*	
* Frctn Loss (ft)	*	0.03	* Cum Volume (acre-ft)	*	1.60	*	20.87	*	1.08	*	
* C & E Loss (ft)	*	0.02	* Cum SA (acres)	*	0.83	*	3.02	*	0.91	*	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	*	665.54	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.16	* Wt. n-Val.	*	0.120	*	0.065	*	0.065	*	
* W.S. Elev (ft)	*	665.38	* Reach Len. (ft)	*	87.00	*	60.61	*	39.00	*	
* Crit W.S. (ft)	*		* Flow Area (sq ft)	*	69.54	*	403.78	*	20.04	*	
* E.G. Slope (ft/ft)	*	0.001198	* Area (sq ft)	*	69.54	*	403.78	*	20.04	*	
* Q Total (cfs)	*	1417.00	* Flow (cfs)	*	59.77	*	1331.18	*	26.05	*	
* Top Width (ft)	*	76.73	* Top Width (ft)	*	23.92	*	44.68	*	8.13	*	
* Vel Total (ft/s)	*	2.87	* Avg. Vel. (ft/s)	*	0.86	*	3.30	*	1.30	*	
* Max Chl Dpth (ft)	*	10.77	* Hydr. Depth (ft)	*	2.91	*	9.04	*	2.46	*	
* Conv. Total (cfs)	*	40946.8	* Conv. (cfs)	*	1727.2	*	38466.8	*	752.8	*	
* Length Wtd. (ft)	*	61.55	* Wetted Per. (ft)	*	24.48	*	47.46	*	9.51	*	
* Min Ch El (ft)	*	654.61	* Shear (lb/sq ft)	*	0.21	*	0.64	*	0.16	*	
* Alpha	*	1.25	* Stream Power (lb/ft s)	*	1840.47	*	0.00	*	0.00	*	
* Frctn Loss (ft)	*	0.04	* Cum Volume (acre-ft)	*	2.89	*	25.02	*	2.87	*	
* C & E Loss (ft)	*	0.03	* Cum SA (acres)	*	1.04	*	3.03	*	1.74	*	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	*	666.44	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.20	* Wt. n-Val.	*	0.120	*	0.065	*	0.065	*	
* W.S. Elev (ft)	*	666.25	* Reach Len. (ft)	*	87.00	*	60.61	*	39.00	*	
* Crit W.S. (ft)	*		* Flow Area (sq ft)	*	91.56	*	442.58	*	27.72	*	

* E.G. Slope (ft/ft)	*0.001321	* Area (sq ft)	* 91.56	* 442.58	* 27.72	*
* Q Total (cfs)	* 1763.00	* Flow (cfs)	* 91.93	* 1628.89	* 42.18	*
* Top Width (ft)	* 81.02	* Top Width (ft)	* 26.78	* 44.68	* 9.57	*
* Vel Total (ft/s)	* 3.14	* Avg. Vel. (ft/s)	* 1.00	* 3.68	* 1.52	*
* Max Chl Dpth (ft)	* 11.64	* Hydr. Depth (ft)	* 3.42	* 9.91	* 2.90	*
* Conv. Total (cfs)	* 48514.1	* Conv. (cfs)	* 2529.8	* 44823.8	* 1160.6	*
* Length Wtd. (ft)	* 61.78	* Wetted Per. (ft)	* 27.47	* 47.46	* 11.19	*
* Min Ch El (ft)	* 654.61	* Shear (lb/sq ft)	* 0.27	* 0.77	* 0.20	*
* Alpha	* 1.28	* Stream Power (lb/ft s)	* 1840.47	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.04	* Cum Volume (acre-ft)	* 3.87	* 27.58	* 4.94	*
* C & E Loss (ft)	* 0.04	* Cum SA (acres)	* 1.27	* 3.03	* 2.41	*

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	* 666.75	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.21	* Wt. n-Val.	* 0.120	* 0.065	* 0.065	*
* W.S. Elev (ft)	* 666.54	* Reach Len. (ft)	* 87.00	* 60.61	* 39.00	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 99.66	* 455.87	* 30.64	*
* E.G. Slope (ft/ft)	*0.001374	* Area (sq ft)	* 99.66	* 455.87	* 30.64	*
* Q Total (cfs)	* 1900.00	* Flow (cfs)	* 105.41	* 1745.43	* 49.16	*
* Top Width (ft)	* 82.49	* Top Width (ft)	* 27.76	* 44.68	* 10.06	*
* Vel Total (ft/s)	* 3.24	* Avg. Vel. (ft/s)	* 1.06	* 3.83	* 1.60	*
* Max Chl Dpth (ft)	* 11.93	* Hydr. Depth (ft)	* 3.59	* 10.20	* 3.05	*
* Conv. Total (cfs)	* 51258.9	* Conv. (cfs)	* 2843.9	* 47088.8	* 1326.3	*
* Length Wtd. (ft)	* 61.85	* Wetted Per. (ft)	* 28.49	* 47.46	* 11.76	*
* Min Ch El (ft)	* 654.61	* Shear (lb/sq ft)	* 0.30	* 0.82	* 0.22	*
* Alpha	* 1.29	* Stream Power (lb/ft s)	* 1840.47	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.04	* Cum Volume (acre-ft)	* 4.25	* 28.45	* 5.63	*
* C & E Loss (ft)	* 0.04	* Cum SA (acres)	* 1.36	* 3.03	* 2.52	*

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	* 666.92	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.22	* Wt. n-Val.	* 0.120	* 0.065	* 0.065	*
* W.S. Elev (ft)	* 666.70	* Reach Len. (ft)	* 87.00	* 60.61	* 39.00	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 104.00	* 462.79	* 32.22	*
* E.G. Slope (ft/ft)	*0.001406	* Area (sq ft)	* 104.00	* 462.79	* 32.22	*
* Q Total (cfs)	* 1977.00	* Flow (cfs)	* 113.09	* 1810.73	* 53.18	*
* Top Width (ft)	* 83.26	* Top Width (ft)	* 28.27	* 44.68	* 10.31	*
* Vel Total (ft/s)	* 3.30	* Avg. Vel. (ft/s)	* 1.09	* 3.91	* 1.65	*
* Max Chl Dpth (ft)	* 12.09	* Hydr. Depth (ft)	* 3.68	* 10.36	* 3.12	*
* Conv. Total (cfs)	* 52719.6	* Conv. (cfs)	* 3015.6	* 48285.9	* 1418.1	*
* Length Wtd. (ft)	* 61.89	* Wetted Per. (ft)	* 29.02	* 47.46	* 12.06	*
* Min Ch El (ft)	* 654.61	* Shear (lb/sq ft)	* 0.31	* 0.86	* 0.23	*
* Alpha	* 1.30	* Stream Power (lb/ft s)	* 1840.47	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.04	* Cum Volume (acre-ft)	* 4.46	* 28.90	* 6.01	*
* C & E Loss (ft)	* 0.04	* Cum SA (acres)	* 1.42	* 3.03	* 2.56	*

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 667.37	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.25	* Wt. n-Val.	* 0.120	* 0.065	* 0.065	*
* W.S. Elev (ft)	* 667.12	* Reach Len. (ft)	* 87.00	* 60.61	* 39.00	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 116.30	* 481.75	* 36.74	*
* E.G. Slope (ft/ft)	*0.001511	* Area (sq ft)	* 116.30	* 481.75	* 36.74	*
* Q Total (cfs)	* 2209.00	* Flow (cfs)	* 136.66	* 2006.67	* 65.68	*
* Top Width (ft)	* 85.36	* Top Width (ft)	* 29.66	* 44.68	* 11.01	*
* Vel Total (ft/s)	* 3.48	* Avg. Vel. (ft/s)	* 1.18	* 4.17	* 1.79	*
* Max Chl Dpth (ft)	* 12.51	* Hydr. Depth (ft)	* 3.92	* 10.78	* 3.34	*
* Conv. Total (cfs)	* 56834.7	* Conv. (cfs)	* 3516.0	* 51628.9	* 1689.8	*
* Length Wtd. (ft)	* 61.99	* Wetted Per. (ft)	* 30.48	* 47.46	* 12.88	*
* Min Ch El (ft)	* 654.61	* Shear (lb/sq ft)	* 0.36	* 0.96	* 0.27	*
* Alpha	* 1.32	* Stream Power (lb/ft s)	* 1840.47	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.05	* Cum Volume (acre-ft)	* 5.00	* 29.98	* 7.03	*
* C & E Loss (ft)	* 0.05	* Cum SA (acres)	* 1.51	* 2.67	* 2.68	*

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 96010.9

INPUT
Description: U/S St. Charles (surveyed x-section)
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-88.4	670.76	-83.4	670.64	-45.8	661.57	-32.3	661.57	-27.9	663.7
-24.3	663.66	-5	653.42	7.7	652.89	35.7	655	60.26	663.66
78.1	669.95	85.2	670.79	104.5	670.78	147.2	671.56		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-88.4	.085	-24.3	.065	60.26	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
-24.3 60.26 99.9 99.9 99.9 .3 .5

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	* 664.01	* Element	* Left OB	* Channel	* Right OB	*

* Vel Head (ft)	* 0.04	* Wt. n-Val.	* 0.085	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 663.98	* Reach Len. (ft)	* 99.90	* 99.90	* 99.90 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 51.53	* 637.53	* 0.14 *
* E.G. Slope (ft/ft)	*0.000321	* Area (sq ft)	* 51.53	* 637.53	* 0.14 *
* Q Total (cfs)	* 994.00	* Flow (cfs)	* 22.04	* 971.95	* 0.01 *
* Top Width (ft)	* 116.95	* Top Width (ft)	* 31.48	* 84.56	* 0.90 *
* Vel Total (ft/s)	* 1.44	* Avg. Vel. (ft/s)	* 0.43	* 1.52	* 0.09 *
* Max Chl Dpth (ft)	* 11.09	* Hydr. Depth (ft)	* 1.64	* 7.54	* 0.16 *
* Conv. Total (cfs)	* 55519.1	* Conv. (cfs)	* 1230.8	* 54287.6	* 0.7 *
* Length Wtd. (ft)	* 99.90	* Wetted Per. (ft)	* 32.26	* 88.68	* 0.96 *
* Min Ch El (ft)	* 652.89	* Shear (lb/sq ft)	* 0.03	* 0.14	* 0.00 *
* Alpha	* 1.09	* Stream Power (lb/ft s)	* 147.20	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.03	* Cum Volume (acre-ft)	* 1.51	* 20.19	* 1.07 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.78	* 2.93	* 0.91 *

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	* 665.47	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.05	* Wt. n-Val.	* 0.085	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 665.41	* Reach Len. (ft)	* 99.90	* 99.90	* 99.90 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 101.01	* 758.94	* 4.36 *
* E.G. Slope (ft/ft)	*0.000381	* Area (sq ft)	* 101.01	* 758.94	* 4.36 *
* Q Total (cfs)	* 1484.00	* Flow (cfs)	* 65.70	* 1416.99	* 1.31 *
* Top Width (ft)	* 126.97	* Top Width (ft)	* 37.44	* 84.56	* 4.98 *
* Vel Total (ft/s)	* 1.72	* Avg. Vel. (ft/s)	* 0.65	* 1.87	* 0.30 *
* Max Chl Dpth (ft)	* 12.52	* Hydr. Depth (ft)	* 2.70	* 8.98	* 0.88 *
* Conv. Total (cfs)	* 76023.1	* Conv. (cfs)	* 3365.6	* 72590.3	* 67.2 *
* Length Wtd. (ft)	* 99.90	* Wetted Per. (ft)	* 38.38	* 88.68	* 5.28 *
* Min Ch El (ft)	* 652.89	* Shear (lb/sq ft)	* 0.06	* 0.20	* 0.02 *
* Alpha	* 1.14	* Stream Power (lb/ft s)	* 147.20	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.04	* Cum Volume (acre-ft)	* 2.72	* 24.21	* 2.86 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.98	* 2.94	* 1.74 *

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	* 666.36	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.06	* Wt. n-Val.	* 0.085	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 666.30	* Reach Len. (ft)	* 99.90	* 99.90	* 99.90 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 135.61	* 833.47	* 9.85 *
* E.G. Slope (ft/ft)	*0.000421	* Area (sq ft)	* 135.61	* 833.47	* 9.85 *
* Q Total (cfs)	* 1852.00	* Flow (cfs)	* 106.07	* 1741.84	* 4.09 *
* Top Width (ft)	* 133.13	* Top Width (ft)	* 41.09	* 84.56	* 7.48 *
* Vel Total (ft/s)	* 1.89	* Avg. Vel. (ft/s)	* 0.78	* 2.09	* 0.41 *
* Max Chl Dpth (ft)	* 13.41	* Hydr. Depth (ft)	* 3.30	* 9.86	* 1.32 *
* Conv. Total (cfs)	* 90221.8	* Conv. (cfs)	* 5167.3	* 84855.4	* 199.1 *
* Length Wtd. (ft)	* 99.90	* Wetted Per. (ft)	* 42.14	* 88.68	* 7.93 *
* Min Ch El (ft)	* 652.89	* Shear (lb/sq ft)	* 0.08	* 0.25	* 0.03 *
* Alpha	* 1.16	* Stream Power (lb/ft s)	* 147.20	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.04	* Cum Volume (acre-ft)	* 3.64	* 26.69	* 4.92 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.21	* 2.94	* 2.40 *

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	* 666.67	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.07	* Wt. n-Val.	* 0.085	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 666.60	* Reach Len. (ft)	* 99.90	* 99.90	* 99.90 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 148.25	* 859.08	* 12.25 *
* E.G. Slope (ft/ft)	*0.000437	* Area (sq ft)	* 148.25	* 859.08	* 12.25 *
* Q Total (cfs)	* 1994.00	* Flow (cfs)	* 122.81	* 1865.63	* 5.56 *
* Top Width (ft)	* 135.24	* Top Width (ft)	* 42.35	* 84.56	* 8.33 *
* Vel Total (ft/s)	* 1.96	* Avg. Vel. (ft/s)	* 0.83	* 2.17	* 0.45 *
* Max Chl Dpth (ft)	* 13.71	* Hydr. Depth (ft)	* 3.50	* 10.16	* 1.47 *
* Conv. Total (cfs)	* 95386.2	* Conv. (cfs)	* 5874.9	* 89245.3	* 266.1 *
* Length Wtd. (ft)	* 99.90	* Wetted Per. (ft)	* 43.43	* 88.68	* 8.84 *
* Min Ch El (ft)	* 652.89	* Shear (lb/sq ft)	* 0.09	* 0.26	* 0.04 *
* Alpha	* 1.16	* Stream Power (lb/ft s)	* 147.20	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.04	* Cum Volume (acre-ft)	* 4.00	* 27.53	* 5.61 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.29	* 2.94	* 2.51 *

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	* 666.83	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.07	* Wt. n-Val.	* 0.085	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 666.76	* Reach Len. (ft)	* 99.90	* 99.90	* 99.90 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 154.99	* 872.45	* 13.60 *
* E.G. Slope (ft/ft)	*0.000445	* Area (sq ft)	* 154.99	* 872.45	* 13.60 *
* Q Total (cfs)	* 2071.00	* Flow (cfs)	* 132.16	* 1932.39	* 6.46 *
* Top Width (ft)	* 136.34	* Top Width (ft)	* 43.00	* 84.56	* 8.78 *
* Vel Total (ft/s)	* 1.99	* Avg. Vel. (ft/s)	* 0.85	* 2.21	* 0.47 *
* Max Chl Dpth (ft)	* 13.87	* Hydr. Depth (ft)	* 3.60	* 10.32	* 1.55 *
* Conv. Total (cfs)	* 98141.3	* Conv. (cfs)	* 6262.7	* 91572.6	* 306.0 *
* Length Wtd. (ft)	* 99.90	* Wetted Per. (ft)	* 44.11	* 88.68	* 9.31 *
* Min Ch El (ft)	* 652.89	* Shear (lb/sq ft)	* 0.10	* 0.27	* 0.04 *
* Alpha	* 1.17	* Stream Power (lb/ft s)	* 147.20	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.04	* Cum Volume (acre-ft)	* 4.20	* 27.97	* 5.99 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.34	* 2.94	* 2.55 *

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 667.27	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.08	* Wt. n-Val.	* 0.085	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 667.19	* Reach Len. (ft)	* 99.90	* 99.90	* 99.90 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 174.09	* 909.24	* 17.69 *
* E.G. Slope (ft/ft)	*0.000473	* Area (sq ft)	* 174.09	* 909.24	* 17.69 *
* Q Total (cfs)	* 2303.00	* Flow (cfs)	* 160.78	* 2132.78	* 9.45 *
* Top Width (ft)	* 139.38	* Top Width (ft)	* 44.80	* 84.56	* 10.02 *
* Vel Total (ft/s)	* 2.09	* Avg. Vel. (ft/s)	* 0.92	* 2.35	* 0.53 *
* Max Chl Dpth (ft)	* 14.30	* Hydr. Depth (ft)	* 3.89	* 10.75	* 1.77 *
* Conv. Total (cfs)	*105926.7	* Conv. (cfs)	* 7395.0	* 98097.2	* 434.5 *
* Length Wtd. (ft)	* 99.90	* Wetted Per. (ft)	* 45.96	* 88.68	* 10.62 *
* Min Ch El (ft)	* 652.89	* Shear (lb/sq ft)	* 0.11	* 0.30	* 0.05 *
* Alpha	* 1.18	* Stream Power (lb/ft s)	* 147.20	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.05	* Cum Volume (acre-ft)	* 4.71	* 29.02	* 7.01 *

* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	1.44	*	2.58	*	2.67	*	

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95911

INPUT
Description: D/S St. Charles (surveyed x-section)
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-88.4	670.76	-83.4	670.64	-45.8	661.57	-32.3	661.57	-27.9	663.7
-24.3	663.66	-5	653.42	7.7	652.89	35.7	655	60.26	663.66
78.1	669.95	85.2	670.79	104.5	670.78	147.2	671.56		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-88.4	.085	-24.3	.065	60.26	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-24.3	60.26	160	254	353	.3	.5

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	*	663.98	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.04	* Wt. n-Val.	*	0.085	*	0.065	*	0.085	*	
* W.S. Elev (ft)	*	663.95	* Reach Len. (ft)	*	160.00	*	254.00	*	353.00	*	
* Crit W.S. (ft)	*	656.27	* Flow Area (sq ft)	*	50.51	*	634.80	*	0.12	*	
* E.G. Slope (ft/ft)	*	0.000324	* Area (sq ft)	*	50.51	*	634.80	*	0.12	*	
* Q Total (cfs)	*	994.00	* Flow (cfs)	*	24.17	*	969.82	*	0.01	*	
* Top Width (ft)	*	116.72	* Top Width (ft)	*	31.35	*	84.56	*	0.81	*	
* Vel Total (ft/s)	*	1.45	* Avg. Vel. (ft/s)	*	0.48	*	1.53	*	0.08	*	
* Max Chl Dpth (ft)	*	11.06	* Hydr. Depth (ft)	*	1.61	*	7.51	*	0.14	*	
* Conv. Total (cfs)	*	55243.9	* Conv. (cfs)	*	1343.4	*	53900.0	*	0.5	*	
* Length Wtd. (ft)	*	269.48	* Wetted Per. (ft)	*	32.12	*	88.68	*	0.86	*	
* Min Ch El (ft)	*	652.89	* Shear (lb/sq ft)	*	0.03	*	0.14	*	0.00	*	
* Alpha	*	1.09	* Stream Power (lb/ft s)	*	147.20	*	0.00	*	0.00	*	
* Frctn Loss (ft)	*	0.14	* Cum Volume (acre-ft)	*	1.40	*	18.73	*	1.07	*	
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.71	*	2.74	*	0.90	*	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	*	665.43	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.05	* Wt. n-Val.	*	0.085	*	0.065	*	0.085	*	
* W.S. Elev (ft)	*	665.38	* Reach Len. (ft)	*	160.00	*	254.00	*	353.00	*	
* Crit W.S. (ft)	*	657.02	* Flow Area (sq ft)	*	99.57	*	755.69	*	4.18	*	
* E.G. Slope (ft/ft)	*	0.000385	* Area (sq ft)	*	99.57	*	755.69	*	4.18	*	
* Q Total (cfs)	*	1484.00	* Flow (cfs)	*	68.99	*	1413.77	*	1.24	*	
* Top Width (ft)	*	126.70	* Top Width (ft)	*	37.28	*	84.56	*	4.87	*	
* Vel Total (ft/s)	*	1.73	* Avg. Vel. (ft/s)	*	0.69	*	1.87	*	0.30	*	
* Max Chl Dpth (ft)	*	12.49	* Hydr. Depth (ft)	*	2.67	*	8.94	*	0.86	*	
* Conv. Total (cfs)	*	75652.3	* Conv. (cfs)	*	3517.0	*	72071.9	*	63.4	*	
* Length Wtd. (ft)	*	266.80	* Wetted Per. (ft)	*	38.22	*	88.68	*	5.16	*	
* Min Ch El (ft)	*	652.89	* Shear (lb/sq ft)	*	0.06	*	0.20	*	0.02	*	
* Alpha	*	1.13	* Stream Power (lb/ft s)	*	147.20	*	0.00	*	0.00	*	
* Frctn Loss (ft)	*	0.16	* Cum Volume (acre-ft)	*	2.49	*	22.48	*	2.85	*	
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.89	*	2.74	*	1.72	*	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	*	666.32	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.06	* Wt. n-Val.	*	0.085	*	0.065	*	0.085	*	
* W.S. Elev (ft)	*	666.25	* Reach Len. (ft)	*	160.00	*	254.00	*	353.00	*	
* Crit W.S. (ft)	*	657.51	* Flow Area (sq ft)	*	133.87	*	829.87	*	9.54	*	
* E.G. Slope (ft/ft)	*	0.000425	* Area (sq ft)	*	133.87	*	829.87	*	9.54	*	
* Q Total (cfs)	*	1852.00	* Flow (cfs)	*	111.02	*	1737.05	*	3.93	*	
* Top Width (ft)	*	132.83	* Top Width (ft)	*	40.91	*	84.56	*	7.35	*	
* Vel Total (ft/s)	*	1.90	* Avg. Vel. (ft/s)	*	0.83	*	2.09	*	0.41	*	
* Max Chl Dpth (ft)	*	13.36	* Hydr. Depth (ft)	*	3.27	*	9.81	*	1.30	*	
* Conv. Total (cfs)	*	89820.9	* Conv. (cfs)	*	5384.4	*	84245.9	*	190.6	*	
* Length Wtd. (ft)	*	265.66	* Wetted Per. (ft)	*	41.96	*	88.68	*	7.80	*	
* Min Ch El (ft)	*	652.89	* Shear (lb/sq ft)	*	0.08	*	0.25	*	0.03	*	
* Alpha	*	1.15	* Stream Power (lb/ft s)	*	147.20	*	0.00	*	0.00	*	
* Frctn Loss (ft)	*	0.17	* Cum Volume (acre-ft)	*	3.33	*	24.78	*	4.90	*	
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	1.11	*	2.74	*	2.38	*	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	*	666.62	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.07	* Wt. n-Val.	*	0.085	*	0.065	*	0.085	*	
* W.S. Elev (ft)	*	666.55	* Reach Len. (ft)	*	160.00	*	254.00	*	353.00	*	
* Crit W.S. (ft)	*	657.70	* Flow Area (sq ft)	*	146.38	*	855.35	*	11.88	*	
* E.G. Slope (ft/ft)	*	0.000441	* Area (sq ft)	*	146.38	*	855.35	*	11.88	*	
* Q Total (cfs)	*	1994.00	* Flow (cfs)	*	128.50	*	1860.13	*	5.37	*	
* Top Width (ft)	*	134.93	* Top Width (ft)	*	42.16	*	84.56	*	8.21	*	
* Vel Total (ft/s)	*	1.97	* Avg. Vel. (ft/s)	*	0.88	*	2.17	*	0.45	*	
* Max Chl Dpth (ft)	*	13.66	* Hydr. Depth (ft)	*	3.47	*	10.12	*	1.45	*	
* Conv. Total (cfs)	*	94977.4	* Conv. (cfs)	*	6120.8	*	88601.0	*	255.6	*	
* Length Wtd. (ft)	*	265.30	* Wetted Per. (ft)	*	43.24	*	88.68	*	8.70	*	
* Min Ch El (ft)	*	652.89	* Shear (lb/sq ft)	*	0.09	*	0.27	*	0.04	*	
* Alpha	*	1.15	* Stream Power (lb/ft s)	*	147.20	*	0.00	*	0.00	*	
* Frctn Loss (ft)	*	0.17	* Cum Volume (acre-ft)	*	3.66	*	25.57	*	5.59	*	

* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.20	* 2.74	* 2.49 *

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	* 666.78	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.07	* Wt. n-Val.	* 0.085	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 666.71	* Reach Len. (ft)	* 160.00	* 254.00	* 353.00 *
* Crit W.S. (ft)	* 657.80	* Flow Area (sq ft)	* 153.07	* 868.66	* 13.21 *
* E.G. Slope (ft/ft)	*0.000449	* Area (sq ft)	* 153.07	* 868.66	* 13.21 *
* Q Total (cfs)	* 2071.00	* Flow (cfs)	* 138.27	* 1926.49	* 6.24 *
* Top Width (ft)	* 136.03	* Top Width (ft)	* 42.82	* 84.56	* 8.66 *
* Vel Total (ft/s)	* 2.00	* Avg. Vel. (ft/s)	* 0.90	* 2.22	* 0.47 *
* Max Chl Dpth (ft)	* 13.82	* Hydr. Depth (ft)	* 3.58	* 10.27	* 1.53 *
* Conv. Total (cfs)	* 97729.3	* Conv. (cfs)	* 6525.0	* 90910.0	* 294.3 *
* Length Wtd. (ft)	* 265.05	* Wetted Per. (ft)	* 43.92	* 88.68	* 9.18 *
* Min Ch El (ft)	* 652.89	* Shear (lb/sq ft)	* 0.10	* 0.27	* 0.04 *
* Alpha	* 1.16	* Stream Power (lb/ft s)	* 147.20	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.18	* Cum Volume (acre-ft)	* 3.85	* 25.97	* 5.95 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.25	* 2.74	* 2.53 *

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 667.22	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.08	* Wt. n-Val.	* 0.085	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 667.14	* Reach Len. (ft)	* 160.00	* 254.00	* 353.00 *
* Crit W.S. (ft)	* 658.08	* Flow Area (sq ft)	* 171.96	* 905.21	* 17.21 *
* E.G. Slope (ft/ft)	*0.000477	* Area (sq ft)	* 171.96	* 905.21	* 17.21 *
* Q Total (cfs)	* 2303.00	* Flow (cfs)	* 168.20	* 2125.65	* 9.15 *
* Top Width (ft)	* 139.05	* Top Width (ft)	* 44.61	* 84.56	* 9.88 *
* Vel Total (ft/s)	* 2.10	* Avg. Vel. (ft/s)	* 0.98	* 2.35	* 0.53 *
* Max Chl Dpth (ft)	* 14.25	* Hydr. Depth (ft)	* 3.86	* 10.70	* 1.74 *
* Conv. Total (cfs)	*105498.6	* Conv. (cfs)	* 7705.1	* 97374.4	* 419.0 *
* Length Wtd. (ft)	* 264.38	* Wetted Per. (ft)	* 45.76	* 88.68	* 10.48 *
* Min Ch El (ft)	* 652.89	* Shear (lb/sq ft)	* 0.11	* 0.30	* 0.05 *
* Alpha	* 1.17	* Stream Power (lb/ft s)	* 147.20	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.18	* Cum Volume (acre-ft)	* 4.32	* 26.94	* 6.97 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.33	* 2.38	* 2.65 *

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95657

INPUT
Description: u/s Ped. bridge, copy of section 95497.4
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.515	670.25	-119.151	670.7	-70	662.3	-45.031	661.25	-28.749	660.58
-28.749	658.23	-23.321	655.72	-22.219	655.41	-17.894	655.75	-7.972	654.83
8.48	655.8	15.01	656.13	19.76	657.93	20.608	661.35	27.986	664.03
66.063	664.5	108.041	667.76	117.031	667.7				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-130.515	.085	-70	.12	-28.749	.065	20.608	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-28.749	20.608	34	34	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-130.515	-101	669.49	T
101	117.031	669.49	T

Skew Angle = 32

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	* 663.84	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.08	* Wt. n-Val.	* 0.119	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 663.76	* Reach Len. (ft)	* 10.00	* 10.00	* 10.00 *
* Crit W.S. (ft)	* 658.12	* Flow Area (sq ft)	* 102.24	* 390.70	* 8.01 *
* E.G. Slope (ft/ft)	*0.000799	* Area (sq ft)	* 102.24	* 390.70	* 8.01 *
* Q Total (cfs)	* 994.00	* Flow (cfs)	* 61.44	* 928.26	* 4.30 *
* Top Width (ft)	* 105.81	* Top Width (ft)	* 49.81	* 49.36	* 6.64 *
* Vel Total (ft/s)	* 1.98	* Avg. Vel. (ft/s)	* 0.60	* 2.38	* 0.54 *
* Max Chl Dpth (ft)	* 8.93	* Hydr. Depth (ft)	* 2.05	* 7.92	* 1.21 *
* Conv. Total (cfs)	* 35171.8	* Conv. (cfs)	* 2173.8	* 32845.7	* 152.3 *
* Length Wtd. (ft)	* 10.00	* Wetted Per. (ft)	* 49.97	* 55.40	* 7.07 *
* Min Ch El (ft)	* 654.83	* Shear (lb/sq ft)	* 0.10	* 0.35	* 0.06 *
* Alpha	* 1.34	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	* 1.12	* 15.74	* 1.04 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.56	* 2.35	* 0.87 *

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	* 665.27	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.11	* Wt. n-Val.	* 0.116	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 665.16	* Reach Len. (ft)	* 10.00	* 10.00	* 10.00 *
* Crit W.S. (ft)	* 658.84	* Flow Area (sq ft)	* 177.55	* 459.66	* 55.09 *
* E.G. Slope (ft/ft)	*0.000912	* Area (sq ft)	* 177.55	* 459.66	* 55.09 *
* Q Total (cfs)	* 1484.00	* Flow (cfs)	* 153.85	* 1300.84	* 29.31 *
* Top Width (ft)	* 161.29	* Top Width (ft)	* 57.98	* 49.36	* 53.95 *
* Vel Total (ft/s)	* 2.14	* Avg. Vel. (ft/s)	* 0.87	* 2.83	* 0.53 *

* Max Chl Dpth (ft)	* 10.33	* Hydr. Depth (ft)	* 3.06	* 9.31	* 1.02	*		
* Conv. Total (cfs)	* 49129.7	* Conv. (cfs)	* 5093.4	* 43065.9	* 970.5	*		
* Length Wtd. (ft)	* 10.00	* Wetted Per. (ft)	* 58.26	* 55.40	* 54.45	*		
* Min Ch El (ft)	* 654.83	* Shear (lb/sq ft)	* 0.17	* 0.47	* 0.06	*		
* Alpha	* 1.55	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00	*		
* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	* 1.98	* 18.93	* 2.61	*		
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.72	* 2.35	* 1.49	*		

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	* 666.15	* Element	* Left OB	* Channel	* Right OB	*		
* Vel Head (ft)	* 0.12	* Wt. n-Val.	* 0.115	* 0.065	* 0.085	*		
* W.S. Elev (ft)	* 666.03	* Reach Len. (ft)	* 10.00	* 10.00	* 10.00	*		
* Crit W.S. (ft)	* 659.35	* Flow Area (sq ft)	* 229.91	* 502.37	* 106.59	*		
* E.G. Slope (ft/ft)	*0.000951	* Area (sq ft)	* 229.91	* 502.37	* 106.59	*		
* Q Total (cfs)	* 1852.00	* Flow (cfs)	* 232.37	* 1540.22	* 79.41	*		
* Top Width (ft)	* 177.50	* Top Width (ft)	* 63.05	* 49.36	* 65.09	*		
* Vel Total (ft/s)	* 2.21	* Avg. Vel. (ft/s)	* 1.01	* 3.07	* 0.74	*		
* Max Chl Dpth (ft)	* 11.19	* Hydr. Depth (ft)	* 3.65	* 10.18	* 1.64	*		
* Conv. Total (cfs)	* 60048.9	* Conv. (cfs)	* 7534.3	* 49939.8	* 2574.7	*		
* Length Wtd. (ft)	* 10.00	* Wetted Per. (ft)	* 63.40	* 55.40	* 65.63	*		
* Min Ch El (ft)	* 654.83	* Shear (lb/sq ft)	* 0.22	* 0.54	* 0.10	*		
* Alpha	* 1.64	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00	*		
* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	* 2.66	* 20.90	* 4.43	*		
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.92	* 2.35	* 2.09	*		

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	* 666.45	* Element	* Left OB	* Channel	* Right OB	*		
* Vel Head (ft)	* 0.13	* Wt. n-Val.	* 0.115	* 0.065	* 0.085	*		
* W.S. Elev (ft)	* 666.32	* Reach Len. (ft)	* 10.00	* 10.00	* 10.00	*		
* Crit W.S. (ft)	* 659.51	* Flow Area (sq ft)	* 248.92	* 517.04	* 126.51	*		
* E.G. Slope (ft/ft)	*0.000965	* Area (sq ft)	* 248.92	* 517.04	* 126.51	*		
* Q Total (cfs)	* 1994.00	* Flow (cfs)	* 263.75	* 1627.78	* 102.47	*		
* Top Width (ft)	* 183.06	* Top Width (ft)	* 64.79	* 49.36	* 68.92	*		
* Vel Total (ft/s)	* 2.23	* Avg. Vel. (ft/s)	* 1.06	* 3.15	* 0.81	*		
* Max Chl Dpth (ft)	* 11.49	* Hydr. Depth (ft)	* 3.84	* 10.48	* 1.84	*		
* Conv. Total (cfs)	* 64182.5	* Conv. (cfs)	* 8489.6	* 52394.6	* 3298.3	*		
* Length Wtd. (ft)	* 10.00	* Wetted Per. (ft)	* 65.16	* 55.40	* 69.46	*		
* Min Ch El (ft)	* 654.83	* Shear (lb/sq ft)	* 0.23	* 0.56	* 0.11	*		
* Alpha	* 1.66	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00	*		
* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	* 2.94	* 21.56	* 5.03	*		
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.00	* 2.35	* 2.18	*		

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	* 666.61	* Element	* Left OB	* Channel	* Right OB	*		
* Vel Head (ft)	* 0.13	* Wt. n-Val.	* 0.114	* 0.065	* 0.085	*		
* W.S. Elev (ft)	* 666.48	* Reach Len. (ft)	* 10.00	* 10.00	* 10.00	*		
* Crit W.S. (ft)	* 659.62	* Flow Area (sq ft)	* 259.06	* 524.72	* 137.38	*		
* E.G. Slope (ft/ft)	*0.000972	* Area (sq ft)	* 259.06	* 524.72	* 137.38	*		
* Q Total (cfs)	* 2071.00	* Flow (cfs)	* 281.03	* 1674.21	* 115.76	*		
* Top Width (ft)	* 185.97	* Top Width (ft)	* 65.70	* 49.36	* 70.92	*		
* Vel Total (ft/s)	* 2.25	* Avg. Vel. (ft/s)	* 1.08	* 3.19	* 0.84	*		
* Max Chl Dpth (ft)	* 11.65	* Hydr. Depth (ft)	* 3.94	* 10.63	* 1.94	*		
* Conv. Total (cfs)	* 66423.2	* Conv. (cfs)	* 9013.5	* 53696.9	* 3712.8	*		
* Length Wtd. (ft)	* 10.00	* Wetted Per. (ft)	* 66.09	* 55.40	* 71.47	*		
* Min Ch El (ft)	* 654.83	* Shear (lb/sq ft)	* 0.24	* 0.57	* 0.12	*		
* Alpha	* 1.67	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00	*		
* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	* 3.09	* 21.91	* 5.34	*		
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.05	* 2.35	* 2.21	*		

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 667.04	* Element	* Left OB	* Channel	* Right OB	*		
* Vel Head (ft)	* 0.14	* Wt. n-Val.	* 0.114	* 0.065	* 0.085	*		
* W.S. Elev (ft)	* 666.90	* Reach Len. (ft)	* 10.00	* 10.00	* 10.00	*		
* Crit W.S. (ft)	* 659.89	* Flow Area (sq ft)	* 287.52	* 545.70	* 168.70	*		
* E.G. Slope (ft/ft)	*0.001000	* Area (sq ft)	* 287.52	* 545.70	* 168.70	*		
* Q Total (cfs)	* 2303.00	* Flow (cfs)	* 333.06	* 1812.59	* 157.36	*		
* Top Width (ft)	* 193.94	* Top Width (ft)	* 68.18	* 49.36	* 76.40	*		
* Vel Total (ft/s)	* 2.30	* Avg. Vel. (ft/s)	* 1.16	* 3.32	* 0.93	*		
* Max Chl Dpth (ft)	* 12.07	* Hydr. Depth (ft)	* 4.22	* 11.06	* 2.21	*		
* Conv. Total (cfs)	* 72833.8	* Conv. (cfs)	* 10533.2	* 57324.2	* 4976.5	*		
* Length Wtd. (ft)	* 10.00	* Wetted Per. (ft)	* 68.61	* 55.40	* 76.96	*		
* Min Ch El (ft)	* 654.83	* Shear (lb/sq ft)	* 0.26	* 0.61	* 0.14	*		
* Alpha	* 1.69	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00	*		
* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	* 3.47	* 22.71	* 6.21	*		
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.13	* 1.99	* 2.30	*		

BRIDGE

RIVER: Salt Creek
REACH: A RS: 95640

INPUT
Description: Pedestrian Bridge
Distance from Upstream XS = 10
Deck/Roadway Width = 14
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew = 32
Bridge Pier Skew = 32
Upstream Deck/Roadway Coordinates
num= 7

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
-118	668.7	-99.2	669.4	-96.7	669.49
19.3	670.21	668.81	85.3	669.9	668.5
123	669.61				

668.09
87.8 669.9

Upstream Bridge Cross Section Data
Station Elevation Data num= 18

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
-130.515  670.25-119.151   670.7     -70   662.3 -45.031  661.25 -28.749  660.58
 -28.749  658.23 -23.321  655.72 -22.219  655.41 -17.894  655.75  -7.972  654.83
    8.48   655.8   15.01  656.13   19.76  657.93  20.608  661.35  27.986  664.03
  66.063   664.5 108.041  667.76 117.031   667.7

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************************
-130.515    .085     -70     .12 -28.749    .065  20.608    .085

Bank Sta: Left   Right    Coeff Contr.   Expan.
       -28.749  20.608            .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-130.515    -101  669.49       T
     101 117.031  669.49       T
Skew Angle = 32

Downstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
    -118   668.7           -99.2   669.4           -96.7   669.4     668
    19.3  670.21  668.81    85.3   669.9   668.5    87.8   669.9
     123  669.61

Downstream Bridge Cross Section Data
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
-130.515  670.25-119.151   670.7     -70   662.3 -45.031  661.25 -28.749  660.58
 -28.749  658.23 -23.321  655.72 -22.219  655.41 -17.894  655.75  -7.972  654.81
    8.48   655.8   15.01  656.13   19.76  657.93  20.608  661.35  27.986  662.05
  66.063  663.85 108.041  667.76 117.031   667.7

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************************
-130.515    .085     -70     .12 -28.749    .065  20.608    .085

Bank Sta: Left   Right    Coeff Contr.   Expan.
       -28.749  20.608            .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-130.515   -93.5  669.49       T
    93.5 117.031  669.49       T
Skew Angle = 32

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =  669.49
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  1

Pier Data
Pier Station     Upstream=    19.3    Downstream=    19.3
Upstream     num=       2
    Width   Elev    Width   Elev
*******************************
    3.12     654    3.12  668.81
Downstream     num=       2
    Width   Elev    Width   Elev
*******************************
    3.12     654    3.12  668.81

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
       W.S. Pro Method

  W.S.Pro Data
    Left Embankment
       El of the top of the embankment = 669.49
       El of the toe of the abutment   = 668.09
    Right Embankment
       El of the top of the embankment = 669.9
       El of the toe of the abutment   = 668.5
    Abtument Type                      = 1 Vert. abutments and vert. embankments with or without wingwalls
    Slope of abutments                 =
    Top with of embankment             = 182
    Centroid station of bridge opening =
    Wing Wall Type                     = No wing walls present
       Width                           =
       Angle                           =
       Radius                          =
    Guide Banks Type                   = No Guide Bank present
       Length                          =
       Offset                          =
       Angle                           =

Selected Low Flow Methods = Energy

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
```

Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT Profile #2yr

* E.G. US. (ft)	* 663.84	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 663.76	* E.G. Elev (ft)	* 663.84	* 663.82	*
* Q Total (cfs)	* 994.00	* W.S. Elev (ft)	* 663.75	* 663.76	*
* Q Bridge (cfs)	* 994.00	* Crit W.S. (ft)	* 658.12	* 658.12	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 8.92	* 8.95	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.06	* 1.90	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 482.76	* 522.16	*
* Weir Submerg	*	* Froude # Chl	* 0.15	* 0.15	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 1710.84	* 1736.00	*
* Min El Weir Flow (ft)	* 669.49	* Hydr Depth (ft)	* 4.71	* 3.74	*
* Min El Prs (ft)	* 668.81	* W.P. Total (ft)	* 115.24	* 151.97	*
* Delta EG (ft)	* 0.08	* Conv. Total (cfs)	* 32466.2	* 33261.0	*
* Delta WS (ft)	* 0.01	* Top Width (ft)	* 102.56	* 139.53	*
* BR Open Area (sq ft)	* 1259.32	* Frctn Loss (ft)	* 0.01	* 0.01	*
* BR Open Vel (ft/s)	* 2.06	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.93	* Shear Total (lb/sq ft)	* 0.25	* 0.19	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.52	* -130.52	*

BRIDGE OUTPUT Profile #10yr

* E.G. US. (ft)	* 665.27	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 665.16	* E.G. Elev (ft)	* 665.26	* 665.25	*
* Q Total (cfs)	* 1484.00	* W.S. Elev (ft)	* 665.14	* 665.17	*
* Q Bridge (cfs)	* 1484.00	* Crit W.S. (ft)	* 658.87	* 658.86	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 10.31	* 10.36	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.22	* 2.01	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 668.60	* 737.52	*
* Weir Submerg	*	* Froude # Chl	* 0.17	* 0.16	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 2553.39	* 2659.69	*
* Min El Weir Flow (ft)	* 669.49	* Hydr Depth (ft)	* 4.24	* 4.50	*
* Min El Prs (ft)	* 668.81	* W.P. Total (ft)	* 173.52	* 179.41	*
* Delta EG (ft)	* 0.09	* Conv. Total (cfs)	* 44728.8	* 47310.4	*
* Delta WS (ft)	* -0.01	* Top Width (ft)	* 157.85	* 163.96	*
* BR Open Area (sq ft)	* 1259.32	* Frctn Loss (ft)	* 0.01	* 0.01	*
* BR Open Vel (ft/s)	* 2.22	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.93	* Shear Total (lb/sq ft)	* 0.26	* 0.25	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.52	* -130.52	*

BRIDGE OUTPUT Profile #50yr

* E.G. US. (ft)	* 666.15	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 666.03	* E.G. Elev (ft)	* 666.14	* 666.12	*
* Q Total (cfs)	* 1852.00	* W.S. Elev (ft)	* 666.01	* 666.04	*
* Q Bridge (cfs)	* 1852.00	* Crit W.S. (ft)	* 659.36	* 659.37	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 11.18	* 11.23	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.28	* 2.09	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 812.25	* 885.48	*
* Weir Submerg	*	* Froude # Chl	* 0.15	* 0.12	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 3230.29	* 3396.11	*
* Min El Weir Flow (ft)	* 669.49	* Hydr Depth (ft)	* 4.67	* 5.09	*
* Min El Prs (ft)	* 668.81	* W.P. Total (ft)	* 191.40	* 191.77	*
* Delta EG (ft)	* 0.09	* Conv. Total (cfs)	* 54334.7	* 57894.5	*
* Delta WS (ft)	* -0.01	* Top Width (ft)	* 173.88	* 174.08	*
* BR Open Area (sq ft)	* 1259.32	* Frctn Loss (ft)	* 0.02	* 0.01	*
* BR Open Vel (ft/s)	* 2.28	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.92	* Shear Total (lb/sq ft)	* 0.31	* 0.29	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.52	* -130.52	*

BRIDGE OUTPUT Profile #100yr

* E.G. US. (ft)	* 666.45	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 666.32	* E.G. Elev (ft)	* 666.44	* 666.42	*
* Q Total (cfs)	* 1994.00	* W.S. Elev (ft)	* 666.31	* 666.34	*
* Q Bridge (cfs)	* 1994.00	* Crit W.S. (ft)	* 659.55	* 659.55	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 11.48	* 11.53	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.31	* 2.13	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 864.33	* 937.78	*
* Weir Submerg	*	* Froude # Chl	* 0.15	* 0.12	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 3494.38	* 3681.00	*
* Min El Weir Flow (ft)	* 669.49	* Hydr Depth (ft)	* 4.92	* 5.34	*
* Min El Prs (ft)	* 668.81	* W.P. Total (ft)	* 194.06	* 194.29	*
* Delta EG (ft)	* 0.09	* Conv. Total (cfs)	* 58054.9	* 61912.2	*
* Delta WS (ft)	* -0.01	* Top Width (ft)	* 175.63	* 175.83	*
* BR Open Area (sq ft)	* 1259.32	* Frctn Loss (ft)	* 0.02	* 0.01	*
* BR Open Vel (ft/s)	* 2.31	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.92	* Shear Total (lb/sq ft)	* 0.33	* 0.31	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.52	* -130.52	*

BRIDGE OUTPUT Profile #200yr

* E.G. US. (ft)	* 666.61	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 666.48	* E.G. Elev (ft)	* 666.60	* 666.58	*
* Q Total (cfs)	* 2071.00	* W.S. Elev (ft)	* 666.46	* 666.50	*
* Q Bridge (cfs)	* 2071.00	* Crit W.S. (ft)	* 659.65	* 659.65	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 11.63	* 11.69	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.32	* 2.15	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 891.77	* 965.21	*
* Weir Submerg	*	* Froude # Chl	* 0.15	* 0.12	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 3639.01	* 3836.44	*
* Min El Weir Flow (ft)	* 669.49	* Hydr Depth (ft)	* 5.05	* 5.49	*
* Min El Prs (ft)	* 668.81	* W.P. Total (ft)	* 195.46	* 194.76	*
* Delta EG (ft)	* 0.09	* Conv. Total (cfs)	* 60065.8	* 64101.2	*
* Delta WS (ft)	* -0.01	* Top Width (ft)	* 176.54	* 176.74	*
* BR Open Area (sq ft)	* 1259.32	* Frctn Loss (ft)	* 0.02	* 0.01	*
* BR Open Vel (ft/s)	* 2.32	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.92	* Shear Total (lb/sq ft)	* 0.34	* 0.32	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.52	* -130.52	*

BRIDGE OUTPUT Profile #500yr

E.G. US. (ft)	667.04	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	666.90	E.G. Elev (ft)	667.03	667.01
Q Total (cfs)	2303.00	W.S. Elev (ft)	666.89	666.92
Q Bridge (cfs)	2303.00	Crit W.S. (ft)	659.95	659.95
Q Weir (cfs)		Max Chl Dpth (ft)	12.06	12.11
Weir Sta Lft (ft)		Vel Total (ft/s)	2.38	2.21
Weir Sta Rgt (ft)		Flow Area (sq ft)	967.50	1040.21
Weir Submerg		Froude # Chl	0.15	0.12
Weir Max Depth (ft)		Specif Force (cu ft)	4059.70	4286.57
Min El Weir Flow (ft)	669.49	Hydr Depth (ft)	5.41	5.92
Min El Prs (ft)	668.81	W.P. Total (ft)	199.14	196.04
Delta EG (ft)	0.10	Conv. Total (cfs)	65792.4	70289.5
Delta WS (ft)	-0.02	Top Width (ft)	178.88	178.88
BR Open Area (sq ft)	1259.32	Frctn Loss (ft)	0.02	0.01
BR Open Vel (ft/s)	2.38	C & E Loss (ft)	0.00	0.00
Coef of Q	0.92	Shear Total (lb/sq ft)	0.37	0.36
Br Sel Method	WSPRO	Power Total (lb/ft s)	-130.52	-130.52

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95623

INPUT
Description: d/s Ped. bridge, copy of section 95497.4
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.515	670.25	-119.151	670.7	-70	662.3	-45.031	661.25	-28.749	660.58
-28.749	658.23	-23.321	655.72	-22.219	655.41	-17.894	655.75	-7.972	654.81
8.48	655.8	15.01	656.13	19.76	657.93	20.608	661.35	27.986	662.05
66.063	663.85	108.041	667.76	117.031	667.7				

Manninq's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-130.515	.085	-70	.12	-28.749	.065	20.608	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
-28.749 20.608 105 60.81 42 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-130.515	-93.5	669.49	T
93.5	117.031	669.49	T

Skew Angle = 32

CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	663.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.119	0.065	0.085
W.S. Elev (ft)	663.75	Reach Len. (ft)	105.00	60.81	42.00
Crit W.S. (ft)	658.11	Flow Area (sq ft)	101.79	390.52	45.84
E.G. Slope (ft/ft)	0.000771	Area (sq ft)	101.79	390.52	45.84
Q Total (cfs)	994.00	Flow (cfs)	59.93	911.03	23.04
Top Width (ft)	142.52	Top Width (ft)	49.76	49.36	43.41
Vel Total (ft/s)	1.85	Avg. Vel. (ft/s)	0.59	2.33	0.50
Max Chl Dpth (ft)	8.94	Hydr. Depth (ft)	2.05	7.91	1.06
Conv. Total (cfs)	35808.0	Conv. (cfs)	2158.9	32819.0	830.1
Lenqth Wtd. (ft)	63.01	Wetted Per. (ft)	49.91	55.40	43.49
Min Ch El (ft)	654.81	Shear (lb/sq ft)	0.10	0.34	0.05
Alpha	1.16	Stream Power (lb/ft s)	117.03	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	1.04	15.44	1.02
C & E Loss (ft)	0.00	Cum SA (acres)	0.52	2.31	0.85

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	665.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.116	0.065	0.085
W.S. Elev (ft)	665.17	Reach Len. (ft)	105.00	60.81	42.00
Crit W.S. (ft)	658.85	Flow Area (sq ft)	178.02	460.32	119.35
E.G. Slope (ft/ft)	0.000827	Area (sq ft)	178.02	460.32	119.35
Q Total (cfs)	1484.00	Flow (cfs)	147.10	1241.70	95.20
Top Width (ft)	166.99	Top Width (ft)	58.03	49.36	59.60
Vel Total (ft/s)	1.96	Avg. Vel. (ft/s)	0.83	2.70	0.80
Max Chl Dpth (ft)	10.36	Hydr. Depth (ft)	3.07	9.33	2.00
Conv. Total (cfs)	51591.7	Conv. (cfs)	5114.0	43168.1	3309.6
Lenqth Wtd. (ft)	63.96	Wetted Per. (ft)	58.31	55.40	59.74
Min Ch El (ft)	654.81	Shear (lb/sq ft)	0.16	0.43	0.10
Alpha	1.15	Stream Power (lb/ft s)	117.03	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	1.84	18.59	2.55
C & E Loss (ft)	0.00	Cum SA (acres)	0.67	2.31	1.44

CROSS SECTION OUTPUT Profile #50yr

E.G. Elev (ft)	666.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.115	0.065	0.085
W.S. Elev (ft)	666.04	Reach Len. (ft)	105.00	60.81	42.00
Crit W.S. (ft)	659.35	Flow Area (sq ft)	230.68	503.24	175.23
E.G. Slope (ft/ft)	0.000855	Area (sq ft)	230.68	503.24	175.23
Q Total (cfs)	1852.00	Flow (cfs)	221.37	1464.12	166.51
Top Width (ft)	181.41	Top Width (ft)	63.12	49.36	68.94
Vel Total (ft/s)	2.04	Avg. Vel. (ft/s)	0.96	2.91	0.95
Max Chl Dpth (ft)	11.23	Hydr. Depth (ft)	3.65	10.20	2.54
Conv. Total (cfs)	63349.7	Conv. (cfs)	7572.3	50081.6	5695.7
Lenqth Wtd. (ft)	64.38	Wetted Per. (ft)	63.47	55.40	69.11
Min Ch El (ft)	654.81	Shear (lb/sq ft)	0.19	0.48	0.14
Alpha	1.19	Stream Power (lb/ft s)	117.03	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	2.48	20.52	4.32
C & E Loss (ft)	0.00	Cum SA (acres)	0.87	2.31	2.04

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	666.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.115	0.065	0.085
W.S. Elev (ft)	666.34	Reach Len. (ft)	105.00	60.81	42.00
Crit W.S. (ft)	659.52	Flow Area (sq ft)	249.83	518.00	196.34
E.G. Slope (ft/ft)	*0.000866	Area (sq ft)	249.83	518.00	196.34
Q Total (cfs)	1994.00	Flow (cfs)	251.28	1546.24	196.48
Top Width (ft)	186.37	Top Width (ft)	64.87	49.36	72.15
Vel Total (ft/s)	2.07	Avg. Vel. (ft/s)	1.01	2.98	1.00
Max Chl Dpth (ft)	11.53	Hydr. Depth (ft)	3.86	10.50	2.72
Conv. Total (cfs)	67773.9	Conv. (cfs)	8540.8	52554.9	6678.2
Length Wtd. (ft)	64.51	Wetted Per. (ft)	65.13	55.40	72.34
Min Ch El (ft)	654.81	Shear (lb/sq ft)	0.21	0.51	0.15
Alpha	1.19	Stream Power (lb/ft s)	117.03	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	2.74	21.17	4.90
C & E Loss (ft)	0.00	Cum SA (acres)	0.95	2.31	2.13

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	666.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.114	0.065	0.085
W.S. Elev (ft)	666.49	Reach Len. (ft)	105.00	60.81	42.00
Crit W.S. (ft)	659.62	Flow Area (sq ft)	259.95	525.72	207.70
E.G. Slope (ft/ft)	*0.000869	Area (sq ft)	260.04	525.72	207.75
Q Total (cfs)	2071.00	Flow (cfs)	268.34	1587.91	214.75
Top Width (ft)	188.97	Top Width (ft)	65.78	49.36	73.83
Vel Total (ft/s)	2.08	Avg. Vel. (ft/s)	1.03	3.02	1.03
Max Chl Dpth (ft)	11.68	Hydr. Depth (ft)	4.01	10.65	2.85
Conv. Total (cfs)	70253.7	Conv. (cfs)	9102.8	53866.0	7285.0
Length Wtd. (ft)	64.57	Wetted Per. (ft)	65.13	55.40	73.09
Min Ch El (ft)	654.81	Shear (lb/sq ft)	0.22	0.51	0.15
Alpha	1.19	Stream Power (lb/ft s)	117.03	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	2.89	21.52	5.21
C & E Loss (ft)	0.00	Cum SA (acres)	1.00	2.31	2.16

CROSS SECTION OUTPUT Profile #500yr

E.G. Elev (ft)	666.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.113	0.065	0.085
W.S. Elev (ft)	666.92	Reach Len. (ft)	105.00	60.81	42.00
Crit W.S. (ft)	659.88	Flow Area (sq ft)	287.62	546.81	238.85
E.G. Slope (ft/ft)	*0.000885	Area (sq ft)	288.68	546.81	240.27
Q Total (cfs)	2303.00	Flow (cfs)	318.91	1710.60	273.48
Top Width (ft)	196.06	Top Width (ft)	68.28	49.36	78.41
Vel Total (ft/s)	2.15	Avg. Vel. (ft/s)	1.11	3.13	1.14
Max Chl Dpth (ft)	12.11	Hydr. Depth (ft)	4.44	11.08	3.28
Conv. Total (cfs)	77433.7	Conv. (cfs)	10722.9	57515.5	9195.3
Length Wtd. (ft)	64.68	Wetted Per. (ft)	65.13	55.40	73.09
Min Ch El (ft)	654.81	Shear (lb/sq ft)	0.24	0.55	0.18
Alpha	1.19	Stream Power (lb/ft s)	117.03	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	3.25	22.29	6.06
C & E Loss (ft)	0.00	Cum SA (acres)	1.07	1.96	2.24

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95562.19

INPUT
Description: 3111 (Requlatory Section)
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-238.64	669.76	-208.71	669.74	-178.65	668.89	-148.72	669.79	-118.68	670.81
-71.74	670.26	-53.99	661.86	-44.08	659.72	-28.62	661.13	-25.77	656.97
-16.57	655.29	.34	655.36	7.37	655.98	20.03	657.23	30.4	663.83
69.88	663.97	82.52	666.85	95.15	668.56	107.91	670.13	354.15	667.66
600.4	670.38	846.67	673.69	1092.92	674.57	1339.17	670.45	1585.42	673.33
1831.67	676.41	2077.92	682.07						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-238.64	.085	-28.62	.065	30.4	.085	107.91	.2

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-28.62	30.4	102	64.79	39	.1	.3

CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	663.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.085	0.065	
W.S. Elev (ft)	663.63	Reach Len. (ft)	102.00	64.79	39.00
Crit W.S. (ft)		Flow Area (sq ft)	81.15	399.86	
E.G. Slope (ft/ft)	*0.000850	Area (sq ft)	81.15	399.86	
Q Total (cfs)	994.00	Flow (cfs)	80.62	913.38	
Top Width (ft)	87.83	Top Width (ft)	29.12	58.71	
Vel Total (ft/s)	2.07	Avg. Vel. (ft/s)	0.99	2.28	
Max Chl Dpth (ft)	8.34	Hydr. Depth (ft)	2.79	6.81	
Conv. Total (cfs)	34096.2	Conv. (cfs)	2765.5	31330.6	
Length Wtd. (ft)	66.89	Wetted Per. (ft)	29.81	63.01	
Min Ch El (ft)	655.29	Shear (lb/sq ft)	0.14	0.34	
Alpha	1.14	Stream Power (lb/ft s)	2077.92	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.82	14.89	1.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.42	2.24	0.83

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	665.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.085	0.065	0.085
W.S. Elev (ft)	665.02	Reach Len. (ft)	102.00	64.79	39.00

* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 123.59	* 481.72	* 46.75	*
* E.G. Slope (ft/ft)	*0.000931	* Area (sq ft)	* 123.59	* 481.72	* 46.75	*
* Q Total (cfs)	* 1484.00	* Flow (cfs)	* 158.84	* 1299.28	* 25.88	*
* Top Width (ft)	* 135.17	* Top Width (ft)	* 32.05	* 59.02	* 44.10	*
* Vel Total (ft/s)	* 2.28	* Avg. Vel. (ft/s)	* 1.29	* 2.70	* 0.55	*
* Max Chl Dpth (ft)	* 9.73	* Hydr. Depth (ft)	* 3.86	* 8.16	* 1.06	*
* Conv. Total (cfs)	* 48624.6	* Conv. (cfs)	* 5204.5	* 42572.0	* 848.1	*
* Length Wtd. (ft)	* 67.31	* Wetted Per. (ft)	* 33.06	* 63.38	* 44.22	*
* Min Ch El (ft)	* 655.29	* Shear (lb/sq ft)	* 0.22	* 0.44	* 0.06	*
* Alpha	* 1.26	* Stream Power (lb/ft s)	* 2077.92	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 1.47	* 17.93	* 2.47	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.57	* 2.24	* 1.39	*

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	* 666.00	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.12	* Wt. n-Val.	* 0.085	* 0.065	* 0.085	*
* W.S. Elev (ft)	* 665.88	* Reach Len. (ft)	* 102.00	* 64.79	* 39.00	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 151.79	* 532.22	* 86.09	*
* E.G. Slope (ft/ft)	*0.000968	* Area (sq ft)	* 151.79	* 532.22	* 86.09	*
* Q Total (cfs)	* 1852.00	* Flow (cfs)	* 219.28	* 1563.68	* 69.04	*
* Top Width (ft)	* 140.74	* Top Width (ft)	* 33.86	* 59.02	* 47.86	*
* Vel Total (ft/s)	* 2.40	* Avg. Vel. (ft/s)	* 1.44	* 2.94	* 0.80	*
* Max Chl Dpth (ft)	* 10.59	* Hydr. Depth (ft)	* 4.48	* 9.02	* 1.80	*
* Conv. Total (cfs)	* 59536.7	* Conv. (cfs)	* 7049.2	* 50267.9	* 2219.5	*
* Length Wtd. (ft)	* 67.17	* Wetted Per. (ft)	* 35.06	* 63.38	* 48.07	*
* Min Ch El (ft)	* 655.29	* Shear (lb/sq ft)	* 0.26	* 0.51	* 0.11	*
* Alpha	* 1.31	* Stream Power (lb/ft s)	* 2077.92	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 2.02	* 19.79	* 4.20	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.75	* 2.24	* 1.98	*

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	* 666.29	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.12	* Wt. n-Val.	* 0.085	* 0.065	* 0.085	*
* W.S. Elev (ft)	* 666.17	* Reach Len. (ft)	* 102.00	* 64.79	* 39.00	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 161.80	* 549.52	* 100.30	*
* E.G. Slope (ft/ft)	*0.000984	* Area (sq ft)	* 161.80	* 549.52	* 100.30	*
* Q Total (cfs)	* 1994.00	* Flow (cfs)	* 242.79	* 1663.01	* 88.20	*
* Top Width (ft)	* 142.64	* Top Width (ft)	* 34.48	* 59.02	* 49.14	*
* Vel Total (ft/s)	* 2.46	* Avg. Vel. (ft/s)	* 1.50	* 3.03	* 0.88	*
* Max Chl Dpth (ft)	* 10.88	* Hydr. Depth (ft)	* 4.69	* 9.31	* 2.04	*
* Conv. Total (cfs)	* 63572.3	* Conv. (cfs)	* 7740.7	* 53019.7	* 2812.0	*
* Length Wtd. (ft)	* 67.09	* Wetted Per. (ft)	* 35.74	* 63.38	* 49.39	*
* Min Ch El (ft)	* 655.29	* Shear (lb/sq ft)	* 0.28	* 0.53	* 0.12	*
* Alpha	* 1.32	* Stream Power (lb/ft s)	* 2077.92	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 2.25	* 20.43	* 4.76	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.83	* 2.24	* 2.07	*

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	* 666.45	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.13	* Wt. n-Val.	* 0.085	* 0.065	* 0.085	*
* W.S. Elev (ft)	* 666.32	* Reach Len. (ft)	* 102.00	* 64.79	* 39.00	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 167.11	* 558.56	* 107.89	*
* E.G. Slope (ft/ft)	*0.000992	* Area (sq ft)	* 167.11	* 558.56	* 107.89	*
* Q Total (cfs)	* 2071.00	* Flow (cfs)	* 255.62	* 1716.28	* 99.10	*
* Top Width (ft)	* 143.64	* Top Width (ft)	* 34.80	* 59.02	* 49.81	*
* Vel Total (ft/s)	* 2.48	* Avg. Vel. (ft/s)	* 1.53	* 3.07	* 0.92	*
* Max Chl Dpth (ft)	* 11.03	* Hydr. Depth (ft)	* 4.80	* 9.46	* 2.17	*
* Conv. Total (cfs)	* 65742.6	* Conv. (cfs)	* 8114.5	* 54482.2	* 3145.9	*
* Length Wtd. (ft)	* 67.04	* Wetted Per. (ft)	* 36.10	* 63.38	* 50.08	*
* Min Ch El (ft)	* 655.29	* Shear (lb/sq ft)	* 0.29	* 0.55	* 0.13	*
* Alpha	* 1.32	* Stream Power (lb/ft s)	* 2077.92	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 2.37	* 20.76	* 5.06	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.87	* 2.24	* 2.10	*

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 666.88	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.14	* Wt. n-Val.	* 0.085	* 0.065	* 0.085	*
* W.S. Elev (ft)	* 666.74	* Reach Len. (ft)	* 102.00	* 64.79	* 39.00	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 181.82	* 583.20	* 129.06	*
* E.G. Slope (ft/ft)	*0.001027	* Area (sq ft)	* 181.82	* 583.20	* 129.06	*
* Q Total (cfs)	* 2303.00	* Flow (cfs)	* 294.05	* 1876.33	* 132.62	*
* Top Width (ft)	* 146.35	* Top Width (ft)	* 35.69	* 59.02	* 51.65	*
* Vel Total (ft/s)	* 2.58	* Avg. Vel. (ft/s)	* 1.62	* 3.22	* 1.03	*
* Max Chl Dpth (ft)	* 11.45	* Hydr. Depth (ft)	* 5.10	* 9.88	* 2.50	*
* Conv. Total (cfs)	* 71858.1	* Conv. (cfs)	* 9174.9	* 58545.2	* 4138.0	*
* Length Wtd. (ft)	* 66.92	* Wetted Per. (ft)	* 37.08	* 63.38	* 51.96	*
* Min Ch El (ft)	* 655.29	* Shear (lb/sq ft)	* 0.31	* 0.59	* 0.16	*
* Alpha	* 1.33	* Stream Power (lb/ft s)	* 2077.92	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 2.68	* 21.51	* 5.88	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.95	* 1.88	* 2.18	*

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95497.4

INPUT
Description: Surveyed x-section
Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-153.9	670.25	-140.5	670.7	-126.2	671.07	-109.9	671.06	-85.5	670.53
-53.1	661.25	-33.9	660.58	-33.9	658.23	-27.5	655.72	-26.2	655.41
-21.1	655.75	-9.4	654.78	10	655.8	17.7	656.13	23.3	657.93
24.3	661.35	33	664.03	77.9	664.5	104.6	668.75	110.3	669.27
116.6	668.95	127.4	667.76	138	667.7	140.3	667.57	154.2	664.17
200.5	663.29	253.7	663.16	305.9	663.39	359.7	663.56	412.1	664.75
460.4	664.23	515.1	665.31	537.8	664.88	541.5	664.81	550.7	664.87

```
     552  664.42   566.7  664.59   583.9  664.36   592.2  664.85   597.7  664.99
   608.5     665   608.9  664.75   627.6  664.36   647.4  665.92   670.3   665.3
   698.2  666.26   704.7  666.09   724.9  665.68   725.9  665.28   749.3  665.79
   772.3  665.77

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
  -153.9    .085  -109.9     .12   -33.9    .065    24.3    .085   127.4      .2
   515.1      .2

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -33.9    24.3             147   203.1     327            .1       .3
Right Levee     Station=   110.3      Elevation=  669.27
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CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	663.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.120	0.065	0.085
W.S. Elev (ft)	663.59	Reach Len. (ft)	147.00	203.10	327.00
Crit W.S. (ft)	657.86	Flow Area (sq ft)	60.98	451.56	8.16
E.G. Slope (ft/ft)	*0.000634	Area (sq ft)	60.98	451.56	8.16
Q Total (cfs)	994.00	Flow (cfs)	34.11	956.13	3.76
Top Width (ft)	92.86	Top Width (ft)	27.38	58.20	7.28
Vel Total (ft/s)	1.91	Avg. Vel. (ft/s)	0.56	2.12	0.46
Max Chl Dpth (ft)	8.81	Hydr. Depth (ft)	2.23	7.76	1.12
Conv. Total (cfs)	39482.1	Conv. (cfs)	1354.9	37977.8	149.3
Length Wtd. (ft)	207.61	Wetted Per. (ft)	27.72	63.99	7.62
Min Ch El (ft)	654.78	Shear (lb/sq ft)	0.09	0.28	0.04
Alpha	1.19	Stream Power (lb/ft s)	772.30	0.00	110.30
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.65	14.26	0.99
C & E Loss (ft)	0.00	Cum SA (acres)	0.36	2.15	0.83

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	665.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.120	0.065	0.085
W.S. Elev (ft)	664.97	Reach Len. (ft)	147.00	203.10	327.00
Crit W.S. (ft)	658.51	Flow Area (sq ft)	102.02	531.77	52.20
E.G. Slope (ft/ft)	*0.000754	Area (sq ft)	102.02	531.77	52.20
Q Total (cfs)	1477.00	Flow (cfs)	79.40	1369.43	28.17
Top Width (ft)	146.94	Top Width (ft)	32.19	58.20	56.55
Vel Total (ft/s)	2.15	Avg. Vel. (ft/s)	0.78	2.58	0.54
Max Chl Dpth (ft)	10.19	Hydr. Depth (ft)	3.17	9.14	0.92
Conv. Total (cfs)	53791.8	Conv. (cfs)	2891.6	49874.2	1026.1
Length Wtd. (ft)	208.01	Wetted Per. (ft)	32.72	63.99	57.00
Min Ch El (ft)	654.78	Shear (lb/sq ft)	0.15	0.39	0.04
Alpha	1.33	Stream Power (lb/ft s)	772.30	0.00	110.30
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	1.21	17.18	2.42
C & E Loss (ft)	0.00	Cum SA (acres)	0.49	2.15	1.35

CROSS SECTION OUTPUT Profile #50yr

E.G. Elev (ft)	665.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.120	0.065	0.085
W.S. Elev (ft)	665.82	Reach Len. (ft)	147.00	203.10	327.00
Crit W.S. (ft)	658.96	Flow Area (sq ft)	130.72	581.37	102.68
E.G. Slope (ft/ft)	*0.000808	Area (sq ft)	130.72	581.37	102.68
Q Total (cfs)	1839.00	Flow (cfs)	117.44	1644.69	76.87
Top Width (ft)	155.27	Top Width (ft)	35.16	58.20	61.91
Vel Total (ft/s)	2.26	Avg. Vel. (ft/s)	0.90	2.83	0.75
Max Chl Dpth (ft)	11.04	Hydr. Depth (ft)	3.72	9.99	1.66
Conv. Total (cfs)	64702.4	Conv. (cfs)	4132.0	57866.0	2704.4
Length Wtd. (ft)	208.13	Wetted Per. (ft)	35.82	63.99	62.42
Min Ch El (ft)	654.78	Shear (lb/sq ft)	0.18	0.46	0.08
Alpha	1.42	Stream Power (lb/ft s)	772.30	0.00	110.30
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	1.69	18.97	4.11
C & E Loss (ft)	0.00	Cum SA (acres)	0.67	2.15	1.93

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	666.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.120	0.065	0.085
W.S. Elev (ft)	666.11	Reach Len. (ft)	147.00	203.10	327.00
Crit W.S. (ft)	659.11	Flow Area (sq ft)	141.14	598.36	121.02
E.G. Slope (ft/ft)	*0.000828	Area (sq ft)	141.14	598.36	121.02
Q Total (cfs)	1979.00	Flow (cfs)	132.63	1746.87	99.50
Top Width (ft)	158.13	Top Width (ft)	36.18	58.20	63.74
Vel Total (ft/s)	2.30	Avg. Vel. (ft/s)	0.94	2.92	0.82
Max Chl Dpth (ft)	11.33	Hydr. Depth (ft)	3.90	10.28	1.90
Conv. Total (cfs)	68779.6	Conv. (cfs)	4609.6	60711.9	3458.2
Length Wtd. (ft)	208.27	Wetted Per. (ft)	36.88	63.99	64.28
Min Ch El (ft)	654.78	Shear (lb/sq ft)	0.20	0.48	0.10
Alpha	1.44	Stream Power (lb/ft s)	772.30	0.00	110.30
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	1.89	19.57	4.66
C & E Loss (ft)	0.00	Cum SA (acres)	0.75	2.15	2.02

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	666.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.120	0.065	0.085
W.S. Elev (ft)	666.27	Reach Len. (ft)	147.00	203.10	327.00
Crit W.S. (ft)	659.20	Flow Area (sq ft)	146.70	607.24	130.82
E.G. Slope (ft/ft)	*0.000839	Area (sq ft)	146.70	607.24	130.82
Q Total (cfs)	2056.00	Flow (cfs)	141.07	1802.33	112.60
Top Width (ft)	159.62	Top Width (ft)	36.72	58.20	64.70
Vel Total (ft/s)	2.32	Avg. Vel. (ft/s)	0.96	2.97	0.86
Max Chl Dpth (ft)	11.49	Hydr. Depth (ft)	4.00	10.43	2.02
Conv. Total (cfs)	70978.3	Conv. (cfs)	4870.1	62221.0	3887.1
Length Wtd. (ft)	208.27	Wetted Per. (ft)	37.43	63.99	65.25
Min Ch El (ft)	654.78	Shear (lb/sq ft)	0.21	0.50	0.11
Alpha	1.45	Stream Power (lb/ft s)	772.30	0.00	110.30
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	2.01	19.89	4.95
C & E Loss (ft)	0.00	Cum SA (acres)	0.79	2.15	2.05

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CROSS SECTION OUTPUT Profile #500yr

E.G. Elev (ft)	666.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.120	0.065	0.085
W.S. Elev (ft)	666.68	Reach Len. (ft)	147.00	203.10	327.00
Crit W.S. (ft)	659.44	Flow Area (sq ft)	162.25	631.41	158.23
E.G. Slope (ft/ft)	*0.000877	Area (sq ft)	162.25	631.41	158.23
Q Total (cfs)	2286.00	Flow (cfs)	166.35	1966.41	153.24
Top Width (ft)	163.68	Top Width (ft)	38.17	58.20	67.31
Vel Total (ft/s)	2.40	Avg. Vel. (ft/s)	1.03	3.11	0.97
Max Chl Dpth (ft)	11.90	Hydr. Depth (ft)	4.25	10.85	2.35
Conv. Total (cfs)	77194.4	Conv. (cfs)	5617.3	66402.5	5174.6
Lenqth Wtd. (ft)	205.72	Wetted Per. (ft)	38.94	63.99	67.89
Min Ch El (ft)	654.78	Shear (lb/sq ft)	0.23	0.54	0.13
Alpha	1.47	Stream Power (lb/ft s)	772.30	0.00	110.30
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	2.28	20.60	5.75
C & E Loss (ft)	0.02	Cum SA (acres)	0.86	1.79	2.13

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CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95294.3

INPUT
Description: U/S Rt. 83 (surveyed x-section)
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.8	669.58	-101.8	669.28	-77	667.14	-69.6	663.71	-60.6	662.25
-50.2	660.47	-45.9	658.26	-42.7	657.91	-34.4	657.44	-21.6	656.96
-18.6	656.68	-10.7	656.56	13	657.11	24.699	657.55	38.4	657.44
51.2	657.99	53.8	660.77	62	662.34	73	663.23	75.4	665.14
102.4	667.73	124	667.52	163.6	665.77				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-130.8	.085	-45.9	.055	51.2	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
-60.6 62 187.3 187.3 187.3 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-130.8	-91	670.92	F
91	163.6	670.92	F

Right Levee Station= 102.4 Elevation= 667.73

CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	663.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.085	0.062	0.085
W.S. Elev (ft)	663.52	Reach Len. (ft)	32.30	32.30	32.30
Crit W.S. (ft)	658.73	Flow Area (sq ft)	4.99	676.61	8.16
E.G. Slope (ft/ft)	*0.000394	Area (sq ft)	4.99	676.61	8.16
Q Total (cfs)	994.00	Flow (cfs)	1.27	990.48	2.25
Top Width (ft)	141.81	Top Width (ft)	7.84	122.60	11.37
Vel Total (ft/s)	1.44	Avg. Vel. (ft/s)	0.25	1.46	0.28
Max Chl Dpth (ft)	6.96	Hydr. Depth (ft)	0.64	5.52	0.72
Conv. Total (cfs)	50060.3	Conv. (cfs)	64.0	49882.8	113.5
Length Wtd. (ft)	32.30	Wetted Per. (ft)	7.95	124.72	11.51
Min Ch El (ft)	656.56	Shear (lb/sq ft)	0.02	0.13	0.02
Alpha	1.03	Stream Power (lb/ft s)	163.60	0.00	102.40
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.54	11.63	0.93
C & E Loss (ft)	0.00	Cum SA (acres)	0.30	1.73	0.76

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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	664.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.085	0.062	0.085
W.S. Elev (ft)	664.91	Reach Len. (ft)	32.30	32.30	32.30
Crit W.S. (ft)	659.17	Flow Area (sq ft)	18.88	846.28	25.10
E.G. Slope (ft/ft)	*0.000403	Area (sq ft)	18.88	846.28	25.10
Q Total (cfs)	1477.00	Flow (cfs)	8.99	1454.84	13.18
Top Width (ft)	147.29	Top Width (ft)	11.58	122.60	13.11
Vel Total (ft/s)	1.66	Avg. Vel. (ft/s)	0.48	1.72	0.53
Max Chl Dpth (ft)	8.35	Hydr. Depth (ft)	1.63	6.90	1.92
Conv. Total (cfs)	73531.7	Conv. (cfs)	447.4	72428.3	656.1
Lenqth Wtd. (ft)	32.30	Wetted Per. (ft)	11.96	124.72	13.73
Min Ch El (ft)	656.56	Shear (lb/sq ft)	0.04	0.17	0.05
Alpha	1.06	Stream Power (lb/ft s)	163.60	0.00	102.40
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	1.01	13.96	2.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.42	1.73	1.09

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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50yr

E.G. Elev (ft)	665.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.085	0.062	0.085
W.S. Elev (ft)	665.76	Reach Len. (ft)	32.30	32.30	32.30
Crit W.S. (ft)	659.47	Flow Area (sq ft)	29.54	950.84	38.49
E.G. Slope (ft/ft)	*0.000419	Area (sq ft)	29.54	950.84	38.49
Q Total (cfs)	1839.00	Flow (cfs)	17.40	1800.69	20.91
Top Width (ft)	155.87	Top Width (ft)	13.42	122.60	19.85
Vel Total (ft/s)	1.80	Avg. Vel. (ft/s)	0.59	1.89	0.54
Max Chl Dpth (ft)	9.20	Hydr. Depth (ft)	2.20	7.76	1.94
Conv. Total (cfs)	89819.9	Conv. (cfs)	850.0	87948.7	1021.2
Length Wtd. (ft)	32.30	Wetted Per. (ft)	13.99	124.72	20.59
Min Ch El (ft)	656.56	Shear (lb/sq ft)	0.06	0.20	0.05
Alpha	1.08	Stream Power (lb/ft s)	163.60	0.00	102.40

* Frctn Loss (ft)	* 0.02	* Cum Volume (acre-ft)	* 1.42	* 15.39	* 3.58	*		
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.59	* 1.73	* 1.62	*		

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	* 666.11	* Element	* Left OB	* Channel	* Right OB	*		
* Vel Head (ft)	* 0.06	* Wt. n-Val.	* 0.085	* 0.062	* 0.085	*		
* W.S. Elev (ft)	* 666.05	* Reach Len. (ft)	* 32.30	* 32.30	* 32.30	*		
* Crit W.S. (ft)	* 659.60	* Flow Area (sq ft)	* 33.54	* 986.56	* 44.72	*		
* E.G. Slope (ft/ft)	*0.000427	* Area (sq ft)	* 33.54	* 986.56	* 44.72	*		
* Q Total (cfs)	* 1979.00	* Flow (cfs)	* 21.02	* 1933.26	* 24.72	*		
* Top Width (ft)	* 159.54	* Top Width (ft)	* 14.05	* 122.60	* 22.89	*		
* Vel Total (ft/s)	* 1.86	* Avg. Vel. (ft/s)	* 0.63	* 1.96	* 0.55	*		
* Max Chl Dpth (ft)	* 9.49	* Hydr. Depth (ft)	* 2.39	* 8.05	* 1.95	*		
* Conv. Total (cfs)	* 95737.4	* Conv. (cfs)	* 1017.1	* 93524.6	* 1195.7	*		
* Length Wtd. (ft)	* 32.30	* Wetted Per. (ft)	* 14.68	* 124.72	* 23.64	*		
* Min Ch El (ft)	* 656.56	* Shear (lb/sq ft)	* 0.06	* 0.21	* 0.05	*		
* Alpha	* 1.09	* Stream Power (lb/ft s)	* 163.60	* 0.00	* 102.40	*		
* Frctn Loss (ft)	* 0.02	* Cum Volume (acre-ft)	* 1.60	* 15.88	* 4.04	*		
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.66	* 1.73	* 1.69	*		

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	* 666.26	* Element	* Left OB	* Channel	* Right OB	*		
* Vel Head (ft)	* 0.06	* Wt. n-Val.	* 0.085	* 0.062	* 0.085	*		
* W.S. Elev (ft)	* 666.20	* Reach Len. (ft)	* 32.30	* 32.30	* 32.30	*		
* Crit W.S. (ft)	* 659.65	* Flow Area (sq ft)	* 35.71	* 1005.22	* 48.32	*		
* E.G. Slope (ft/ft)	*0.000432	* Area (sq ft)	* 35.71	* 1005.22	* 48.32	*		
* Q Total (cfs)	* 2056.00	* Flow (cfs)	* 23.09	* 2005.83	* 27.08	*		
* Top Width (ft)	* 161.46	* Top Width (ft)	* 14.38	* 122.60	* 24.48	*		
* Vel Total (ft/s)	* 1.89	* Avg. Vel. (ft/s)	* 0.65	* 2.00	* 0.56	*		
* Max Chl Dpth (ft)	* 9.64	* Hydr. Depth (ft)	* 2.48	* 8.20	* 1.97	*		
* Conv. Total (cfs)	* 98903.8	* Conv. (cfs)	* 1110.6	* 96490.5	* 1302.7	*		
* Lenqth Wtd. (ft)	* 32.30	* Wetted Per. (ft)	* 15.04	* 124.72	* 25.23	*		
* Min Ch El (ft)	* 656.56	* Shear (lb/sq ft)	* 0.06	* 0.22	* 0.05	*		
* Alpha	* 1.09	* Stream Power (lb/ft s)	* 163.60	* 0.00	* 102.40	*		
* Frctn Loss (ft)	* 0.02	* Cum Volume (acre-ft)	* 1.70	* 16.13	* 4.28	*		
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.70	* 1.73	* 1.71	*		

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 666.67	* Element	* Left OB	* Channel	* Right OB	*		
* Vel Head (ft)	* 0.07	* Wt. n-Val.	* 0.085	* 0.062	* 0.085	*		
* W.S. Elev (ft)	* 666.60	* Reach Len. (ft)	* 32.30	* 32.30	* 32.30	*		
* Crit W.S. (ft)	* 659.82	* Flow Area (sq ft)	* 41.63	* 1054.26	* 58.95	*		
* E.G. Slope (ft/ft)	*0.000452	* Area (sq ft)	* 41.63	* 1054.26	* 58.95	*		
* Q Total (cfs)	* 2286.00	* Flow (cfs)	* 29.29	* 2221.88	* 34.83	*		
* Top Width (ft)	* 166.49	* Top Width (ft)	* 15.24	* 122.60	* 28.65	*		
* Vel Total (ft/s)	* 1.98	* Avg. Vel. (ft/s)	* 0.70	* 2.11	* 0.59	*		
* Max Chl Dpth (ft)	* 10.04	* Hydr. Depth (ft)	* 2.73	* 8.60	* 2.06	*		
* Conv. Total (cfs)	*107478.1	* Conv. (cfs)	* 1376.9	*104463.5	* 1637.8	*		
* Length Wtd. (ft)	* 32.30	* Wetted Per. (ft)	* 16.00	* 124.72	* 29.42	*		
* Min Ch El (ft)	* 656.56	* Shear (lb/sq ft)	* 0.07	* 0.24	* 0.06	*		
* Alpha	* 1.10	* Stream Power (lb/ft s)	* 163.60	* 0.00	* 102.40	*		
* Frctn Loss (ft)	* 0.02	* Cum Volume (acre-ft)	* 1.93	* 16.67	* 4.94	*		
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	* 0.77	* 1.37	* 1.77	*		

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE

RIVER: Salt Creek
REACH: A RS: 95200

INPUT
Description: Route 83 Bridge
Distance from Upstream XS = 32.3
Deck/Roadway Width = 124
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 8

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord		
-380	671.72	-61.7	670.92	-58.7	670.92	666.22	
-23.5	670.98	666.28	23.5	671.07	666.37	58.7	671.13	666.43
61.7	671.13		325	671.02				

Upstream Bridge Cross Section Data
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.8	669.58	-101.8	669.28	-77	667.14	-69.6	663.71	-60.6	662.25
-50.2	660.47	-45.9	658.26	-42.7	657.91	-34.4	657.44	-21.6	656.96
-18.6	656.68	-10.7	656.56	13	657.11	24.699	657.55	38.4	657.44
51.2	657.99	53.8	660.77	62	662.34	73	663.23	75.4	665.14
102.4	667.73	124	667.52	163.6	665.77				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-130.8	.085	-45.9	.055	51.2	.085

Bank Sta: Left Right Coeff Contr. Expan.
-60.6 62 .3 .5

```
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  -130.8     -91  670.92       F
      91   163.6  670.92       F
Right Levee     Station=   102.4      Elevation=  667.73

Downstream  Deck/Roadway Coordinates
    num=       8
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**************************************************************************
    -380  671.72           -61.7  670.92           -58.7  670.92  666.22
   -23.5  670.98  666.28    23.5  671.07  666.37    58.7  671.13  666.43
    61.7  671.13             325  671.02

Downstream Bridge Cross Section Data
Station Elevation Data    num=      20
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**************************************************************************
  -204.8  667.52  -150.7  667.28  -102.8   665.8   -77.3   664.7   -49.5  659.78
   -45.6  657.67   -33.9  656.29   -16.4  656.62       0  656.61    16.4  656.43
    31.7  657.26    41.5   656.7    54.9  657.05    56.7  660.72  70.299  663.29
    85.8  663.89 139.599  665.01   179.5     666   192.9     668   248.7     670

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
  -204.8    .085   -49.5    .055    56.7    .085

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -49.5    56.7            .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  -204.8   -66.5  670.92       F
    66.5   248.7  670.92       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =  670.92
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream=   -23.5    Downstream=   -23.5
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5  652.22       2  666.28
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5  652.22       2  666.28

Pier Data
Pier Station     Upstream=    23.5    Downstream=    23.5
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5  652.22       2  666.37
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5  652.22       2  666.37

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
       W.S. Pro Method

  W.S.Pro Data
    Left Embankment
       El of the top of the embankment = 670.25
       El of the toe of the abutment   = 656.5
    Right Embankment
       El of the top of the embankment = 670.43
       El of the toe of the abutment   = 656.5
    Abtument Type                      = 4 Vert. abutments and sloping embankments with wingwalls
    Slope of abutments                 =
    Top with of embankment             = 109
    Centroid station of bridge opening =
    Wing Wall Type                     = Angular wing walls
       Width                           = 24
       Angle                           = 30
       Radius                          =
    Guide Banks Type                   = No Guide Bank present
       Length                          =
       Offset                          =
       Angle                           =

Selected Low Flow Methods = Energy

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line
```

BRIDGE OUTPUT Profile #2yr

E.G. US. (ft)	663.56	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	663.52	E.G. Elev (ft)	663.54	663.49
Q Total (cfs)	994.00	W.S. Elev (ft)	663.50	663.46
Q Bridge (cfs)	994.00	Crit W.S. (ft)	658.78	658.22
Q Weir (cfs)		Max Chl Dpth (ft)	6.94	7.17
Weir Sta Lft (ft)		Vel Total (ft/s)	1.55	1.41
Weir Sta Rgt (ft)		Flow Area (sq ft)	639.28	705.64
Weir Submerg		Froude # Chl	0.10	0.09
Weir Max Depth (ft)		Specif Force (cu ft)	1966.67	2337.51
Min El Weir Flow (ft)	670.93	Hydr Depth (ft)	5.65	6.23
Min El Prs (ft)	666.43	W.P. Total (ft)	143.13	147.52
Delta EG (ft)	0.18	Conv. Total (cfs)	46841.9	54995.0
Delta WS (ft)	0.06	Top Width (ft)	113.21	113.21
BR Open Area (sq ft)	958.87	Frctn Loss (ft)	0.05	0.01
BR Open Vel (ft/s)	1.55	C & E Loss (ft)	0.00	0.00
Coef of Q	0.98	Shear Total (lb/sq ft)	0.13	0.10
Br Sel Method	WSPRO	Power Total (lb/ft s)	-130.80	-204.80

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #10yr

E.G. US. (ft)	664.95	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	664.91	E.G. Elev (ft)	664.94	664.88
Q Total (cfs)	1477.00	W.S. Elev (ft)	664.88	664.83
Q Bridge (cfs)	1477.00	Crit W.S. (ft)	659.25	658.68
Q Weir (cfs)		Max Chl Dpth (ft)	8.32	8.54
Weir Sta Lft (ft)		Vel Total (ft/s)	1.86	1.72
Weir Sta Rgt (ft)		Flow Area (sq ft)	795.45	860.86
Weir Submerg		Froude # Chl	0.11	0.11
Weir Max Depth (ft)		Specif Force (cu ft)	2993.01	3446.81
Min El Weir Flow (ft)	670.93	Hydr Depth (ft)	7.02	7.60
Min El Prs (ft)	666.43	W.P. Total (ft)	151.40	155.75
Delta EG (ft)	0.21	Conv. Total (cfs)	64947.8	73674.9
Delta WS (ft)	0.08	Top Width (ft)	113.30	113.30
BR Open Area (sq ft)	958.87	Frctn Loss (ft)	0.06	0.01
BR Open Vel (ft/s)	1.86	C & E Loss (ft)	0.00	0.00
Coef of Q	0.98	Shear Total (lb/sq ft)	0.17	0.14
Br Sel Method	WSPRO	Power Total (lb/ft s)	-130.80	-204.80

Warning: When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the largest [smallest] user entered n value. The n value has been set to the largest [smallest] entered value. The user may wish to examine this cross section and enter a single n value for the entire channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #50yr

E.G. US. (ft)	665.81	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	665.76	E.G. Elev (ft)	665.80	665.73
Q Total (cfs)	1839.00	W.S. Elev (ft)	665.73	665.67
Q Bridge (cfs)	1839.00	Crit W.S. (ft)	659.55	658.98
Q Weir (cfs)		Max Chl Dpth (ft)	9.17	9.38
Weir Sta Lft (ft)		Vel Total (ft/s)	2.06	1.92
Weir Sta Rgt (ft)		Flow Area (sq ft)	891.63	956.28
Weir Submerg		Froude # Chl	0.12	0.11
Weir Max Depth (ft)		Specif Force (cu ft)	3741.49	4243.51
Min El Weir Flow (ft)	670.93	Hydr Depth (ft)	7.87	8.44
Min El Prs (ft)	666.43	W.P. Total (ft)	156.50	160.80
Delta EG (ft)	0.23	Conv. Total (cfs)	76842.8	85908.2
Delta WS (ft)	0.08	Top Width (ft)	113.36	113.36
BR Open Area (sq ft)	958.87	Frctn Loss (ft)	0.06	0.01
BR Open Vel (ft/s)	2.06	C & E Loss (ft)	0.00	0.00
Coef of Q	0.98	Shear Total (lb/sq ft)	0.20	0.17
Br Sel Method	WSPRO	Power Total (lb/ft s)	-130.80	-204.80

Warning: When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the largest [smallest] user entered n value. The n value has been set to the largest [smallest] entered value. The user may wish to examine this cross section and enter a single n value for the entire channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #100yr

E.G. US. (ft)	666.11	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	666.05	E.G. Elev (ft)	666.09	666.03
Q Total (cfs)	1979.00	W.S. Elev (ft)	666.02	665.96
Q Bridge (cfs)	1979.00	Crit W.S. (ft)	659.67	659.10
Q Weir (cfs)		Max Chl Dpth (ft)	9.46	9.67
Weir Sta Lft (ft)		Vel Total (ft/s)	2.14	2.00
Weir Sta Rgt (ft)		Flow Area (sq ft)	924.45	988.78
Weir Submerg		Froude # Chl	0.12	0.12
Weir Max Depth (ft)		Specif Force (cu ft)	4018.13	4535.74
Min El Weir Flow (ft)	670.93	Hydr Depth (ft)	8.15	8.72
Min El Prs (ft)	666.43	W.P. Total (ft)	158.23	162.52
Delta EG (ft)	0.24	Conv. Total (cfs)	81016.2	90192.2
Delta WS (ft)	0.09	Top Width (ft)	113.38	113.38
BR Open Area (sq ft)	958.87	Frctn Loss (ft)	0.07	0.01
BR Open Vel (ft/s)	2.14	C & E Loss (ft)	0.00	0.00
Coef of Q	0.98	Shear Total (lb/sq ft)	0.22	0.18
Br Sel Method	WSPRO	Power Total (lb/ft s)	-130.80	-204.80

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #200yr

E.G. US. (ft)	666.26	Element	Inside BR US	Inside BR DS

* W.S. US. (ft)	* 666.20	* E.G. Elev (ft)	* 666.25	* 666.18	*
* Q Total (cfs)	* 2056.00	* W.S. Elev (ft)	* 666.17	* 666.11	*
* Q Bridge (cfs)	* 2056.00	* Crit W.S. (ft)	* 659.74	* 659.15	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 9.61	* 9.82	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.18	* 2.04	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 941.58	* 1005.74	*
* Weir Submerg	*	* Froude # Chl	* 0.12	* 0.12	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 4166.98	* 4692.59	*
* Min El Weir Flow (ft)	* 670.93	* Hydr Depth (ft)	* 8.30	* 8.87	*
* Min El Prs (ft)	* 666.43	* W.P. Total (ft)	* 159.14	* 163.42	*
* Delta EG (ft)	* 0.24	* Conv. Total (cfs)	* 83217.1	* 92450.4	*
* Delta WS (ft)	* 0.09	* Top Width (ft)	* 113.39	* 113.39	*
* BR Open Area (sq ft)	* 958.87	* Frctn Loss (ft)	* 0.07	* 0.01	*
* BR Open Vel (ft/s)	* 2.18	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.98	* Shear Total (lb/sq ft)	* 0.23	* 0.19	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.80	* -204.80	*

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #500yr

* E.G. US. (ft)	* 666.67	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 666.60	* E.G. Elev (ft)	* 666.64	* 666.48	*
* Q Total (cfs)	* 2286.00	* W.S. Elev (ft)	* 666.55	* 666.40	*
* Q Bridge (cfs)	* 2286.00	* Crit W.S. (ft)	* 659.91	* 659.33	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 9.99	* 10.11	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.38	* 2.22	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 958.87	* 1029.73	*
* Weir Submerg	*	* Froude # Chl	* 0.13	* 0.13	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 4558.37	* 5016.08	*
* Min El Weir Flow (ft)	* 670.93	* Hydr Depth (ft)	*	* 59.91	*
* Min El Prs (ft)	* 666.43	* W.P. Total (ft)	* 273.45	* 260.88	*
* Delta EG (ft)	* 0.21	* Conv. Total (cfs)	* 59792.5	* 69799.8	*
* Delta WS (ft)	* 0.21	* Top Width (ft)	*	* 17.19	*
* BR Open Area (sq ft)	* 958.87	* Frctn Loss (ft)	* 0.15	* 0.02	*
* BR Open Vel (ft/s)	* 2.38	* C & E Loss (ft)	* 0.00	* 0.01	*
* Coef of Q	*	* Shear Total (lb/sq ft)	* 0.32	* 0.26	*
* Br Sel Method	*Energy only	* Power Total (lb/ft s)	* -130.80	* -204.80	*

Warning: The sluice gate calculations did not converge during the pressure flow only calculation.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The downstream water surface is below the minimum elevation for pressure flow. The sluice gate equations were used for pressure flow.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95107

INPUT
Description: D/S Rt. 83 (surveyed x-section)
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-204.8	667.52	-150.7	667.28	-102.8	665.8	-77.3	664.7	-49.5	659.78
-45.6	657.67	-33.9	656.29	-16.4	656.62	0	656.61	16.4	656.43
31.7	657.26	41.5	656.7	54.9	657.05	56.7	660.72	70.299	663.29
85.8	663.89	139.599	665.01	179.5	666	192.9	668	248.7	670

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-204.8	.085	-49.5	.055	56.7	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
-49.5 56.7 606 488.66 279 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-204.8	-66.5	670.92	F
66.5	248.7	670.92	F

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	* 663.38	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.03	* Wt. n-Val.	* 0.085	* 0.055	* 0.085 *
* W.S. Elev (ft)	* 663.46	* Reach Len. (ft)	* 606.00	* 488.66	* 279.00 *
* Crit W.S. (ft)	* 658.17	* Flow Area (sq ft)	* 36.96	* 703.97	* 17.76 *
* E.G. Slope (ft/ft)	*0.000217	* Area (sq ft)	* 38.23	* 703.97	* 20.13 *
* Q Total (cfs)	* 994.00	* Flow (cfs)	* 15.82	* 971.45	* 6.73 *
* Top Width (ft)	* 144.94	* Top Width (ft)	* 20.78	* 106.20	* 17.95 *
* Vel Total (ft/s)	* 1.31	* Avg. Vel. (ft/s)	* 0.43	* 1.38	* 0.38 *
* Max Chl Dpth (ft)	* 7.17	* Hydr. Depth (ft)	* 2.17	* 6.63	* 1.81 *
* Conv. Total (cfs)	* 67427.0	* Conv. (cfs)	* 1073.2	* 65897.5	* 456.2 *
* Length Wtd. (ft)	* 489.11	* Wetted Per. (ft)	* 17.26	* 109.15	* 9.97 *
* Min Ch El (ft)	* 656.29	* Shear (lb/sq ft)	* 0.03	* 0.09	* 0.02 *
* Alpha	* 1.04	* Stream Power (lb/ft s)	* 248.70	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.11	* Cum Volume (acre-ft)	* 0.48	* 8.78	* 0.91 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.27	* 1.26	* 0.75 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	* 664.75	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.04	* Wt. n-Val.	* 0.085	* 0.055	* 0.085 *

* W.S. Elev (ft)	* 664.83	* Reach Len. (ft)	* 606.00	* 488.66	* 279.00 *
* Crit W.S. (ft)	* 658.60	* Flow Area (sq ft)	* 60.29	* 849.72	* 31.21 *
* E.G. Slope (ft/ft)	*0.000248	* Area (sq ft)	* 72.22	* 849.72	* 78.92 *
* Q Total (cfs)	* 1477.00	* Flow (cfs)	* 38.22	* 1420.40	* 18.39 *
* Top Width (ft)	* 211.33	* Top Width (ft)	* 30.83	* 106.20	* 74.29 *
* Vel Total (ft/s)	* 1.57	* Avg. Vel. (ft/s)	* 0.63	* 1.67	* 0.59 *
* Max Chl Dpth (ft)	* 8.54	* Hydr. Depth (ft)	* 3.55	* 8.00	* 3.18 *
* Conv. Total (cfs)	* 93766.1	* Conv. (cfs)	* 2426.1	* 90172.7	* 1167.4 *
* Length Wtd. (ft)	* 489.09	* Wetted Per. (ft)	* 17.26	* 109.15	* 9.97 *
* Min Ch El (ft)	* 656.29	* Shear (lb/sq ft)	* 0.05	* 0.12	* 0.05 *
* Alpha	* 1.04	* Stream Power (lb/ft s)	* 248.70	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.12	* Cum Volume (acre-ft)	* 0.90	* 10.47	* 2.08 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.38	* 1.26	* 1.05 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	* 665.59	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.05	* Wt. n-Val.	* 0.085	* 0.055	* 0.085 *
* W.S. Elev (ft)	* 665.67	* Reach Len. (ft)	* 606.00	* 488.66	* 279.00 *
* Crit W.S. (ft)	* 658.90	* Flow Area (sq ft)	* 74.63	* 939.30	* 39.48 *
* E.G. Slope (ft/ft)	*0.000271	* Area (sq ft)	* 106.48	* 939.30	* 156.97 *
* Q Total (cfs)	* 1839.00	* Flow (cfs)	* 56.97	* 1753.61	* 28.42 *
* Top Width (ft)	* 266.26	* Top Width (ft)	* 50.39	* 106.20	* 109.68 *
* Vel Total (ft/s)	* 1.75	* Avg. Vel. (ft/s)	* 0.76	* 1.87	* 0.72 *
* Max Chl Dpth (ft)	* 9.38	* Hydr. Depth (ft)	* 4.39	* 8.84	* 4.03 *
* Conv. Total (cfs)	*111756.0	* Conv. (cfs)	* 3462.1	*106567.0	* 1726.9 *
* Length Wtd. (ft)	* 489.06	* Wetted Per. (ft)	* 17.26	* 109.15	* 9.97 *
* Min Ch El (ft)	* 656.29	* Shear (lb/sq ft)	* 0.07	* 0.15	* 0.07 *
* Alpha	* 1.04	* Stream Power (lb/ft s)	* 248.70	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.14	* Cum Volume (acre-ft)	* 1.29	* 11.51	* 3.50 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.55	* 1.26	* 1.57 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	* 665.87	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.05	* Wt. n-Val.	* 0.085	* 0.055	* 0.085 *
* W.S. Elev (ft)	* 665.96	* Reach Len. (ft)	* 606.00	* 488.66	* 279.00 *
* Crit W.S. (ft)	* 659.00	* Flow Area (sq ft)	* 79.52	* 969.82	* 42.29 *
* E.G. Slope (ft/ft)	*0.000280	* Area (sq ft)	* 122.04	* 969.82	* 190.15 *
* Q Total (cfs)	* 1979.00	* Flow (cfs)	* 64.43	* 1882.13	* 32.44 *
* Top Width (ft)	* 285.99	* Top Width (ft)	* 58.53	* 106.20	* 121.26 *
* Vel Total (ft/s)	* 1.81	* Avg. Vel. (ft/s)	* 0.81	* 1.94	* 0.77 *
* Max Chl Dpth (ft)	* 9.67	* Hydr. Depth (ft)	* 4.68	* 9.13	* 4.32 *
* Conv. Total (cfs)	*118184.8	* Conv. (cfs)	* 3848.0	*112399.7	* 1937.1 *
* Length Wtd. (ft)	* 489.05	* Wetted Per. (ft)	* 17.26	* 109.15	* 9.97 *
* Min Ch El (ft)	* 656.29	* Shear (lb/sq ft)	* 0.08	* 0.16	* 0.07 *
* Alpha	* 1.04	* Stream Power (lb/ft s)	* 248.70	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.14	* Cum Volume (acre-ft)	* 1.45	* 11.86	* 3.94 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.62	* 1.26	* 1.64 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	* 666.02	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.06	* Wt. n-Val.	* 0.085	* 0.055	* 0.085 *
* W.S. Elev (ft)	* 666.11	* Reach Len. (ft)	* 606.00	* 488.66	* 279.00 *
* Crit W.S. (ft)	* 659.08	* Flow Area (sq ft)	* 82.06	* 985.73	* 43.76 *
* E.G. Slope (ft/ft)	*0.000286	* Area (sq ft)	* 131.17	* 985.73	* 208.57 *
* Q Total (cfs)	* 2056.00	* Flow (cfs)	* 68.57	* 1952.76	* 34.67 *
* Top Width (ft)	* 293.13	* Top Width (ft)	* 63.38	* 106.20	* 123.55 *
* Vel Total (ft/s)	* 1.85	* Avg. Vel. (ft/s)	* 0.84	* 1.98	* 0.79 *
* Max Chl Dpth (ft)	* 9.82	* Hydr. Depth (ft)	* 4.83	* 9.28	* 4.47 *
* Conv. Total (cfs)	*121596.4	* Conv. (cfs)	* 4055.6	*115490.3	* 2050.5 *
* Length Wtd. (ft)	* 489.04	* Wetted Per. (ft)	* 17.26	* 109.15	* 9.97 *
* Min Ch El (ft)	* 656.29	* Shear (lb/sq ft)	* 0.08	* 0.16	* 0.08 *
* Alpha	* 1.04	* Stream Power (lb/ft s)	* 248.70	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.14	* Cum Volume (acre-ft)	* 1.55	* 12.04	* 4.17 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.66	* 1.26	* 1.66 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 666.46	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.07	* Wt. n-Val.	* 0.085	* 0.055	* 0.085 *
* W.S. Elev (ft)	* 666.39	* Reach Len. (ft)	* 606.00	* 488.66	* 279.00 *
* Crit W.S. (ft)	* 659.24	* Flow Area (sq ft)	* 86.81	* 1015.37	* 46.50 *
* E.G. Slope (ft/ft)	*0.000319	* Area (sq ft)	* 150.12	* 1015.37	* 243.30 *
* Q Total (cfs)	* 2286.00	* Flow (cfs)	* 79.51	* 2166.00	* 40.49 *
* Top Width (ft)	* 304.03	* Top Width (ft)	* 72.42	* 106.20	* 125.42 *
* Vel Total (ft/s)	* 1.99	* Avg. Vel. (ft/s)	* 0.92	* 2.13	* 0.87 *
* Max Chl Dpth (ft)	* 10.10	* Hydr. Depth (ft)	* 5.11	* 9.56	* 4.74 *
* Conv. Total (cfs)	*128057.3	* Conv. (cfs)	* 4453.9	*121335.1	* 2268.4 *
* Length Wtd. (ft)	* 480.70	* Wetted Per. (ft)	* 17.26	* 109.15	* 9.97 *
* Min Ch El (ft)	* 656.29	* Shear (lb/sq ft)	* 0.10	* 0.19	* 0.09 *
* Alpha	* 1.10	* Stream Power (lb/ft s)	* 248.70	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.19	* Cum Volume (acre-ft)	* 1.77	* 12.48	* 4.81 *
* C & E Loss (ft)	* 0.03	* Cum SA (acres)	* 0.74	* 1.26	* 1.71 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 94618.34

INPUT

Description: 3109 (Regulatory Section)
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-2672.13	679.78	-2347.13	673.85	-2022.14	669.62	-1697.1	669.18	-1372.1	665
-1047.11	665.93	-722.1	669.66	-397.12	669.79	-72.11	669.02	-49.4	667.74
-38.11	662.32	-28.71	660.22	-22.16	657.4	-15.68	655.28	-1.43	654.75
11.49	654.72	20.61	656.3	30.13	657.55	33.07	661.32	39.44	662.15
47.73	663.1	58.34	659.93	67.29	660.63	77.74	661.07	102.78	664.42
127.73	665.18	152.75	667.78	459.01	666.32	765.27	667.31	1071.48	667.74
1377.74	667.45	1684	668.05	1990.26	671.76	2296.53	676.79	2602.79	680.18

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-2672.13	.2	-72.11	.12	-28.71	.045	33.07	.12	152.75	.2

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-28.71	33.07	188	228.2	283	.1	.3

Left Levee Station= -722.1 Elevation= 669.66

CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	663.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	663.16	Reach Len. (ft)	188.00	228.20	283.00
Crit W.S. (ft)	657.79	Flow Area (sq ft)	18.46	437.47	97.00
E.G. Slope (ft/ft)	*0.000344	Area (sq ft)	18.46	437.47	97.00
Q Total (cfs)	994.00	Flow (cfs)	5.80	957.84	30.36
Top Width (ft)	133.19	Top Width (ft)	11.14	61.78	60.27
Vel Total (ft/s)	1.80	Avg. Vel. (ft/s)	0.31	2.19	0.31
Max Chl Dpth (ft)	8.44	Hydr. Depth (ft)	1.66	7.08	1.61
Conv. Total (cfs)	53565.6	Conv. (cfs)	312.3	51617.1	1636.2
Lenqth Wtd. (ft)	229.14	Wetted Per. (ft)	11.56	64.77	61.01
Min Ch El (ft)	654.72	Shear (lb/sq ft)	0.03	0.15	0.03
Alpha	1.43	Stream Power (lb/ft s)	2602.79	-722.10	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.08	2.38	0.54
C & E Loss (ft)	0.00	Cum SA (acres)	0.05	0.32	0.50

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	664.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	664.47	Reach Len. (ft)	188.00	228.20	283.00
Crit W.S. (ft)	658.49	Flow Area (sq ft)	34.89	518.61	182.63
E.G. Slope (ft/ft)	*0.000404	Area (sq ft)	34.89	518.61	182.63
Q Total (cfs)	1477.00	Flow (cfs)	15.52	1377.11	84.37
Top Width (ft)	147.01	Top Width (ft)	13.88	61.78	71.35
Vel Total (ft/s)	2.01	Avg. Vel. (ft/s)	0.44	2.66	0.46
Max Chl Dpth (ft)	9.75	Hydr. Depth (ft)	2.51	8.39	2.56
Conv. Total (cfs)	73511.8	Conv. (cfs)	772.4	68540.3	4199.1
Length Wtd. (ft)	230.65	Wetted Per. (ft)	14.60	64.77	72.18
Min Ch El (ft)	654.72	Shear (lb/sq ft)	0.06	0.20	0.06
Alpha	1.64	Stream Power (lb/ft s)	2602.79	-722.10	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.16	2.80	1.24
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	0.32	0.58

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50yr

E.G. Elev (ft)	665.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	665.27	Reach Len. (ft)	188.00	228.20	283.00
Crit W.S. (ft)	658.94	Flow Area (sq ft)	46.62	567.88	249.88
E.G. Slope (ft/ft)	*0.000450	Area (sq ft)	46.62	567.88	249.88
Q Total (cfs)	1839.00	Flow (cfs)	24.52	1690.63	123.85
Top Width (ft)	172.82	Top Width (ft)	15.54	61.78	95.50
Vel Total (ft/s)	2.13	Avg. Vel. (ft/s)	0.53	2.98	0.50
Max Chl Dpth (ft)	10.55	Hydr. Depth (ft)	3.00	9.19	2.62
Conv. Total (cfs)	86730.4	Conv. (cfs)	1156.6	79732.8	5840.9
Length Wtd. (ft)	232.11	Wetted Per. (ft)	16.44	64.77	96.35
Min Ch El (ft)	654.72	Shear (lb/sq ft)	0.08	0.25	0.07
Alpha	1.80	Stream Power (lb/ft s)	2602.79	-722.10	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.23	3.05	2.19
C & E Loss (ft)	0.01	Cum SA (acres)	0.09	0.32	0.92

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	665.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	665.54	Reach Len. (ft)	188.00	228.20	283.00
Crit W.S. (ft)	659.12	Flow Area (sq ft)	50.91	584.61	276.11
E.G. Slope (ft/ft)	*0.000465	Area (sq ft)	50.91	584.61	276.11
Q Total (cfs)	1979.00	Flow (cfs)	28.17	1804.72	146.11
Top Width (ft)	175.99	Top Width (ft)	16.10	61.78	98.11
Vel Total (ft/s)	2.17	Avg. Vel. (ft/s)	0.55	3.09	0.53
Max Chl Dpth (ft)	10.82	Hydr. Depth (ft)	3.16	9.46	2.81
Conv. Total (cfs)	91768.9	Conv. (cfs)	1306.3	83687.2	6775.5
Lenqth Wtd. (ft)	232.57	Wetted Per. (ft)	17.07	64.77	98.97
Min Ch El (ft)	654.72	Shear (lb/sq ft)	0.09	0.26	0.08
Alpha	1.85	Stream Power (lb/ft s)	2602.79	-722.10	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.25	3.14	2.44
C & E Loss (ft)	0.01	Cum SA (acres)	0.10	0.32	0.93

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	665.82	Element	Left OB	Channel	Right OB

* Vel Head (ft)	* 0.14	* Wt. n-Val.	* 0.120	* 0.045	* 0.120 *
* W.S. Elev (ft)	* 665.68	* Reach Len. (ft)	* 188.00	* 228.20	* 283.00 *
* Crit W.S. (ft)	* 659.21	* Flow Area (sq ft)	* 53.19	* 593.29	* 289.97 *
* E.G. Slope (ft/ft)	*0.000474	* Area (sq ft)	* 53.19	* 593.29	* 289.97 *
* Q Total (cfs)	* 2056.00	* Flow (cfs)	* 30.21	* 1867.18	* 158.61 *
* Top Width (ft)	* 177.64	* Top Width (ft)	* 16.40	* 61.78	* 99.46 *
* Vel Total (ft/s)	* 2.20	* Avg. Vel. (ft/s)	* 0.57	* 3.15	* 0.55 *
* Max Chl Dpth (ft)	* 10.96	* Hydr. Depth (ft)	* 3.24	* 9.60	* 2.92 *
* Conv. Total (cfs)	* 94439.9	* Conv. (cfs)	* 1387.7	* 85766.6	* 7285.6 *
* Length Wtd. (ft)	* 232.80	* Wetted Per. (ft)	* 17.39	* 64.77	* 100.33 *
* Min Ch El (ft)	* 654.72	* Shear (lb/sq ft)	* 0.09	* 0.27	* 0.09 *
* Alpha	* 1.87	* Stream Power (lb/ft s)	* 2602.79	* -722.10	* 0.00 *
* Frctn Loss (ft)	* 0.10	* Cum Volume (acre-ft)	* 0.27	* 3.18	* 2.57 *
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	* 0.10	* 0.32	* 0.94 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 666.24	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.15	* Wt. n-Val.	* 0.120	* 0.045	* 0.120 *
* W.S. Elev (ft)	* 666.09	* Reach Len. (ft)	* 188.00	* 228.20	* 283.00 *
* Crit W.S. (ft)	* 659.48	* Flow Area (sq ft)	* 60.10	* 618.67	* 331.65 *
* E.G. Slope (ft/ft)	*0.000497	* Area (sq ft)	* 60.10	* 618.67	* 331.65 *
* Q Total (cfs)	* 2286.00	* Flow (cfs)	* 36.62	* 2051.31	* 198.07 *
* Top Width (ft)	* 182.45	* Top Width (ft)	* 17.25	* 61.78	* 103.41 *
* Vel Total (ft/s)	* 2.26	* Avg. Vel. (ft/s)	* 0.61	* 3.32	* 0.60 *
* Max Chl Dpth (ft)	* 11.37	* Hydr. Depth (ft)	* 3.48	* 10.01	* 3.21 *
* Conv. Total (cfs)	*102491.6	* Conv. (cfs)	* 1641.9	* 91969.5	* 8880.2 *
* Length Wtd. (ft)	* 233.44	* Wetted Per. (ft)	* 18.34	* 64.77	* 104.30 *
* Min Ch El (ft)	* 654.72	* Shear (lb/sq ft)	* 0.10	* 0.30	* 0.10 *
* Alpha	* 1.93	* Stream Power (lb/ft s)	* 2602.79	* -722.10	* 0.00 *
* Frctn Loss (ft)	* 0.10	* Cum Volume (acre-ft)	* 0.31	* 3.31	* 2.97 *
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	* 0.12	* 0.32	* 0.98 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 94390.14

INPUT
Description: Most d/s surveyed x-section
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-157.3	668.97	-135.9	669.85	-104.6	669.06	-80.7	667.69	-52.4	665.01
-39.9	663.69	-26.4	659.7	-25.2	657.09	-13.7	655.1	4.5	654.53
16.5	653.94	25.3	655.15	31.8	657.27	33.8	660.97	43.6	661.62
52.44	662.009	77.9	663.13	101.1	662.32	119.6	662.32	142.7	664.43
155.1	662.82	187	663.13	201.9	663.24	226.5	665.82	245	666.6
261.8	666.74	268.1	666.9						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-157.3	.035	-104.6	.12	-26.4	.045	33.8	.12

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-26.4	33.8	0	0	.1	.3

Right Levee Station= 142.7 Elevation= 664.43

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	* 663.16	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.07	* Wt. n-Val.	* 0.120	* 0.045	* 0.120 *
* W.S. Elev (ft)	* 663.09	* Reach Len. (ft)	*	*	* *
* Crit W.S. (ft)	* 657.16	* Flow Area (sq ft)	* 19.44	* 470.80	* 68.12 *
* E.G. Slope (ft/ft)	*0.000280	* Area (sq ft)	* 19.44	* 470.80	* 68.12 *
* Q Total (cfs)	* 994.00	* Flow (cfs)	* 5.57	* 976.33	* 12.10 *
* Top Width (ft)	* 163.85	* Top Width (ft)	* 11.47	* 60.20	* 92.18 *
* Vel Total (ft/s)	* 1.78	* Avg. Vel. (ft/s)	* 0.29	* 2.07	* 0.18 *
* Max Chl Dpth (ft)	* 9.15	* Hydr. Depth (ft)	* 1.70	* 7.82	* 0.74 *
* Conv. Total (cfs)	* 59437.3	* Conv. (cfs)	* 332.8	* 58381.0	* 723.5 *
* Length Wtd. (ft)	*	* Wetted Per. (ft)	* 11.96	* 64.69	* 92.28 *
* Min Ch El (ft)	* 653.94	* Shear (lb/sq ft)	* 0.03	* 0.13	* 0.01 *
* Alpha	* 1.33	* Stream Power (lb/ft s)	* 268.10	* 0.00	* 142.70 *
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*	*	* *
* C & E Loss (ft)	*	* Cum SA (acres)	*	*	* *

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	* 664.48	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.09	* Wt. n-Val.	* 0.120	* 0.045	* 0.120 *
* W.S. Elev (ft)	* 664.39	* Reach Len. (ft)	*	*	* *
* Crit W.S. (ft)	* 657.83	* Flow Area (sq ft)	* 38.70	* 549.06	* 199.83 *
* E.G. Slope (ft/ft)	*0.000341	* Area (sq ft)	* 38.70	* 549.06	* 199.83 *
* Q Total (cfs)	* 1475.00	* Flow (cfs)	* 13.41	* 1392.99	* 68.60 *
* Top Width (ft)	* 188.79	* Top Width (ft)	* 20.13	* 60.20	* 108.46 *
* Vel Total (ft/s)	* 1.87	* Avg. Vel. (ft/s)	* 0.35	* 2.54	* 0.34 *
* Max Chl Dpth (ft)	* 10.45	* Hydr. Depth (ft)	* 1.92	* 9.12	* 1.84 *
* Conv. Total (cfs)	* 79876.9	* Conv. (cfs)	* 726.3	* 75435.6	* 3715.0 *
* Length Wtd. (ft)	*	* Wetted Per. (ft)	* 20.74	* 64.69	* 108.63 *
* Min Ch El (ft)	* 653.94	* Shear (lb/sq ft)	* 0.04	* 0.18	* 0.04 *
* Alpha	* 1.73	* Stream Power (lb/ft s)	* 268.10	* 0.00	* 142.70 *
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*	*	* *
* C & E Loss (ft)	*	* Cum SA (acres)	*	*	* *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50yr

E.G. Elev (ft)	665.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	665.19	Reach Len. (ft)			
Crit W.S. (ft)	658.26	Flow Area (sq ft)	57.85	597.22	425.01
E.G. Slope (ft/ft)	0.000357	Area (sq ft)	57.85	597.22	425.01
Q Total (cfs)	1834.00	Flow (cfs)	21.68	1640.40	171.92
Top Width (ft)	274.79	Top Width (ft)	27.90	60.20	186.69
Vel Total (ft/s)	1.70	Avg. Vel. (ft/s)	0.37	2.75	0.40
Max Chl Dpth (ft)	11.25	Hydr. Depth (ft)	2.07	9.92	2.28
Conv. Total (cfs)	97024.8	Conv. (cfs)	1147.0	86782.7	9095.1
Length Wtd. (ft)		Wetted Per. (ft)	28.56	64.69	187.07
Min Ch El (ft)	653.94	Shear (lb/sq ft)	0.05	0.21	0.05
Alpha	2.35	Stream Power (lb/ft s)	268.10	0.00	142.70
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	665.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	665.46	Reach Len. (ft)			
Crit W.S. (ft)	658.42	Flow Area (sq ft)	65.77	613.47	475.76
E.G. Slope (ft/ft)	0.000367	Area (sq ft)	65.77	613.47	475.76
Q Total (cfs)	1973.00	Flow (cfs)	25.54	1739.05	208.42
Top Width (ft)	280.22	Top Width (ft)	30.75	60.20	189.27
Vel Total (ft/s)	1.71	Avg. Vel. (ft/s)	0.39	2.83	0.44
Max Chl Dpth (ft)	11.52	Hydr. Depth (ft)	2.14	10.19	2.51
Conv. Total (cfs)	102964.3	Conv. (cfs)	1332.7	90755.1	10876.5
Length Wtd. (ft)		Wetted Per. (ft)	31.42	64.69	189.65
Min Ch El (ft)	653.94	Shear (lb/sq ft)	0.05	0.22	0.06
Alpha	2.43	Stream Power (lb/ft s)	268.10	0.00	142.70
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	665.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	665.60	Reach Len. (ft)			
Crit W.S. (ft)	658.51	Flow Area (sq ft)	70.18	621.90	502.35
E.G. Slope (ft/ft)	0.000373	Area (sq ft)	70.18	621.90	502.35
Q Total (cfs)	2049.00	Flow (cfs)	27.80	1792.38	228.82
Top Width (ft)	283.03	Top Width (ft)	32.23	60.20	190.60
Vel Total (ft/s)	1.72	Avg. Vel. (ft/s)	0.40	2.88	0.46
Max Chl Dpth (ft)	11.66	Hydr. Depth (ft)	2.18	10.33	2.64
Conv. Total (cfs)	106134.1	Conv. (cfs)	1439.9	92841.9	11852.3
Length Wtd. (ft)		Wetted Per. (ft)	32.90	64.69	191.00
Min Ch El (ft)	653.94	Shear (lb/sq ft)	0.05	0.22	0.06
Alpha	2.48	Stream Power (lb/ft s)	268.10	0.00	142.70
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500yr

E.G. Elev (ft)	666.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	666.01	Reach Len. (ft)			
Crit W.S. (ft)	658.76	Flow Area (sq ft)	84.28	646.58	581.56
E.G. Slope (ft/ft)	0.000388	Area (sq ft)	84.28	646.58	581.56
Q Total (cfs)	2277.00	Flow (cfs)	35.41	1950.43	291.16
Top Width (ft)	293.97	Top Width (ft)	36.56	60.20	197.21
Vel Total (ft/s)	1.73	Avg. Vel. (ft/s)	0.42	3.02	0.50
Max Chl Dpth (ft)	12.07	Hydr. Depth (ft)	2.31	10.74	2.95
Conv. Total (cfs)	115651.4	Conv. (cfs)	1798.6	99064.5	14788.3
Length Wtd. (ft)		Wetted Per. (ft)	37.25	64.69	197.62
Min Ch El (ft)	653.94	Shear (lb/sq ft)	0.05	0.24	0.07
Alpha	2.60	Stream Power (lb/ft s)	268.10	0.00	142.70
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

SUMMARY OF MANNING'S N VALUES

River:Salt Creek

Reach	River Sta.	n1	n2	n3	n4	n5	n6
A	96139.5	.12	.065	.12			
A	96071.51	.085	.2	.12	.065	.12	.2
A	96010.9	.085	.065	.085			
A	95911	.085	.065	.085			
A	95657	.085	.12	.065	.085		
A	95640	Bridge					
A	95623	.085	.12	.065	.085		
A	95562.19	.085	.065	.085	.2		
A	95497.4	.085	.12	.065	.085	.2	.2
A	95294.3	.085	.055	.085			
A	95200	Bridge					
A	95107	.085	.055	.085			
A	94618.34	.2	.12	.045	.12	.2	
A	94390.14	.035	.12	.045	.12		

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SUMMARY OF REACH LENGTHS

River: Salt Creek

Reach	River Sta.	Left	Channel	Right
A	96139.5	32	67.99	75
A	96071.51	87	60.61	39
A	96010.9	99.9	99.9	99.9
A	95911	160	254	353
A	95657	34	34	34
A	95640	Bridge		
A	95623	105	60.81	42
A	95562.19	102	64.79	39
A	95497.4	147	203.1	327
A	95294.3	187.3	187.3	187.3
A	95200	Bridge		
A	95107	606	488.66	279
A	94618.34	188	228.2	283
A	94390.14	0	0	0

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SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Salt Creek

Reach	River Sta.	Contr.	Expan.
A	96139.5	.1	.3
A	96071.51	.1	.3
A	96010.9	.3	.5
A	95911	.3	.5
A	95657	.3	.5
A	95640	Bridge	
A	95623	.3	.5
A	95562.19	.1	.3
A	95497.4	.1	.3
A	95294.3	.3	.5
A	95200	Bridge	
A	95107	.3	.5
A	94618.34	.1	.3
A	94390.14	.1	.3

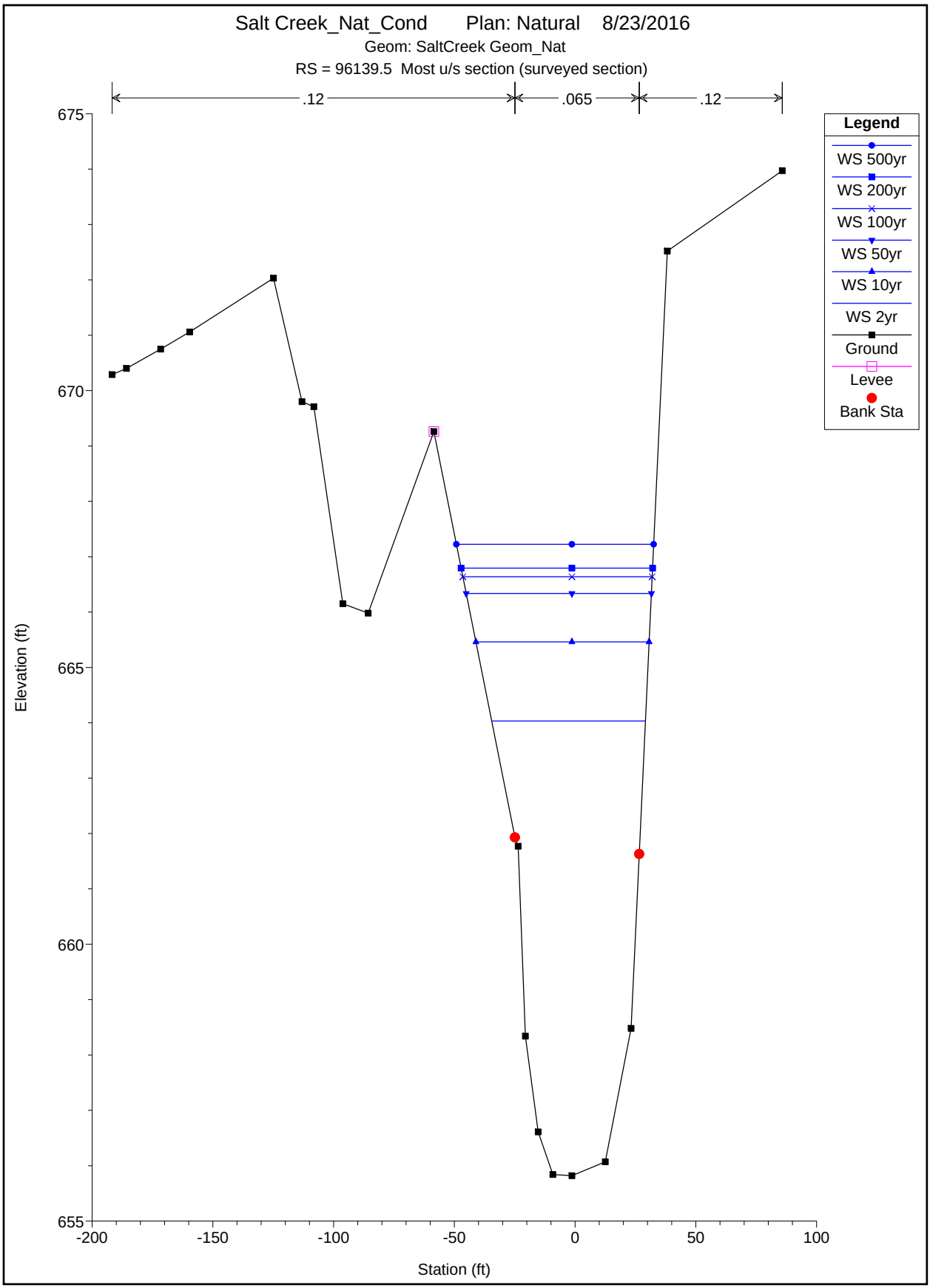
Natural Conditions

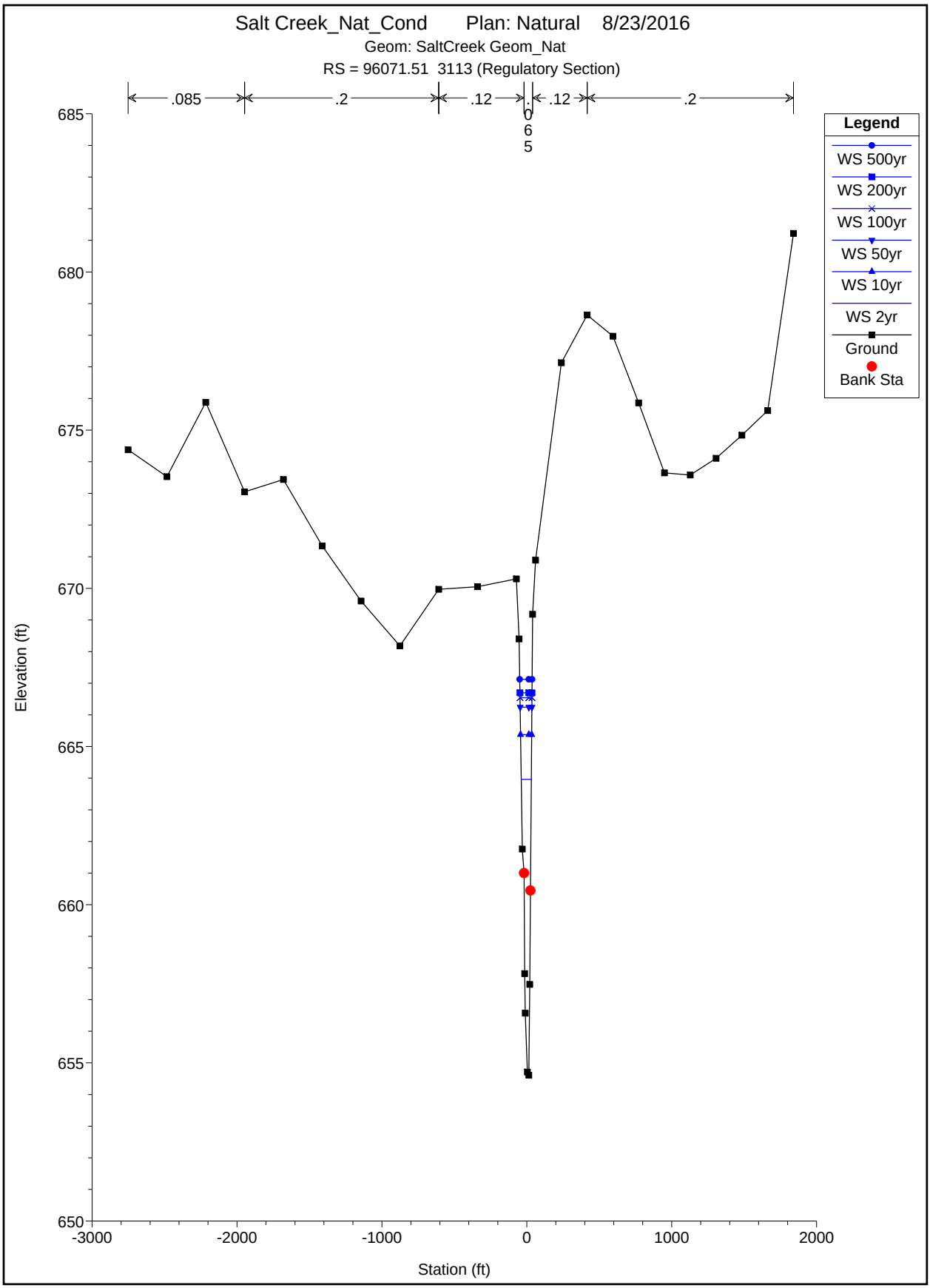
HEC-RAS Plan: Nat River: Salt Creek Reach: A

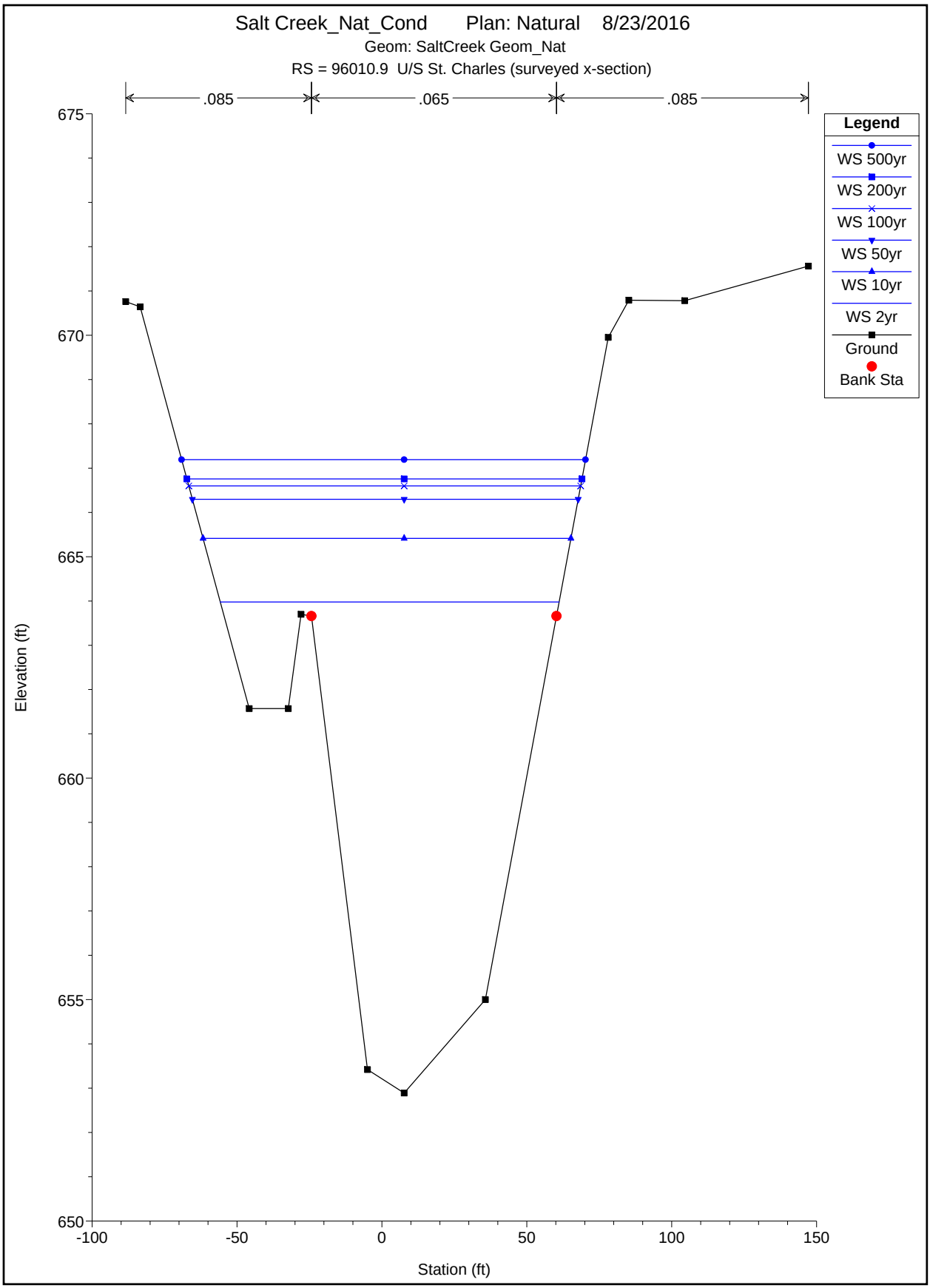
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
A	96139.5	2yr	940.00	655.82	664.03	658.92	664.14	0.001058	2.60	372.39	63.67	0.17
A	96139.5	10yr	1414.00	655.82	665.46	659.68	665.62	0.001260	3.22	469.21	71.75	0.20
A	96139.5	50yr	1756.00	655.82	666.34	660.19	666.53	0.001374	3.59	534.18	76.70	0.21
A	96139.5	100yr	1893.00	655.82	666.64	660.37	666.85	0.001428	3.73	557.46	78.39	0.21
A	96139.5	200yr	1970.00	655.82	666.79	660.48	667.01	0.001460	3.82	569.80	79.28	0.22
A	96139.5	500yr	2201.00	655.82	667.22	660.77	667.47	0.001563	4.07	604.46	81.71	0.22
A	96071.51	2yr	941.00	654.61	663.96		664.07	0.000983	2.67	389.58	69.73	0.17
A	96071.51	10yr	1417.00	654.61	665.38		665.54	0.001198	3.30	493.35	76.73	0.19
A	96071.51	50yr	1763.00	654.61	666.25		666.44	0.001321	3.68	561.86	81.02	0.21
A	96071.51	100yr	1900.00	654.61	666.54		666.75	0.001374	3.83	586.17	82.49	0.21
A	96071.51	200yr	1977.00	654.61	666.70		666.92	0.001406	3.91	599.01	83.26	0.21
A	96071.51	500yr	2209.00	654.61	667.12		667.37	0.001511	4.17	634.79	85.36	0.22
A	96010.9	2yr	994.00	652.89	663.98		664.01	0.000321	1.52	689.20	116.95	0.10
A	96010.9	10yr	1484.00	652.89	665.41		665.47	0.000381	1.87	864.31	126.97	0.11
A	96010.9	50yr	1852.00	652.89	666.30		666.36	0.000421	2.09	978.93	133.13	0.12
A	96010.9	100yr	1994.00	652.89	666.60		666.67	0.000437	2.17	1019.57	135.24	0.12
A	96010.9	200yr	2071.00	652.89	666.76		666.83	0.000445	2.21	1041.05	136.34	0.12
A	96010.9	500yr	2303.00	652.89	667.19		667.27	0.000473	2.35	1101.02	139.38	0.13
A	95911	2yr	994.00	652.89	663.95	656.27	663.98	0.000324	1.53	685.43	116.72	0.10
A	95911	10yr	1484.00	652.89	665.38	657.02	665.43	0.000385	1.87	859.43	126.70	0.11
A	95911	50yr	1852.00	652.89	666.25	657.51	666.32	0.000425	2.09	973.28	132.83	0.12
A	95911	100yr	1994.00	652.89	666.55	657.70	666.62	0.000441	2.17	1013.62	134.93	0.12
A	95911	200yr	2071.00	652.89	666.71	657.80	666.78	0.000449	2.22	1034.94	136.03	0.12
A	95911	500yr	2303.00	652.89	667.14	658.08	667.22	0.000477	2.35	1094.39	139.05	0.13
A	95657	2yr	994.00	654.83	663.76	658.12	663.84	0.000799	2.38	500.95	105.81	0.15
A	95657	10yr	1484.00	654.83	665.16	658.84	665.27	0.000912	2.83	692.29	161.29	0.16
A	95657	50yr	1852.00	654.83	666.03	659.35	666.15	0.000951	3.07	838.87	177.50	0.17
A	95657	100yr	1994.00	654.83	666.32	659.51	666.45	0.000965	3.15	892.47	183.06	0.17
A	95657	200yr	2071.00	654.83	666.48	659.62	666.61	0.000972	3.19	921.16	185.97	0.17
A	95657	500yr	2303.00	654.83	666.90	659.89	667.04	0.001000	3.32	1001.93	193.94	0.18
A	95640		Bridge									
A	95623	2yr	994.00	654.81	663.75	658.11	663.77	0.000771	2.33	538.15	142.52	0.15
A	95623	10yr	1484.00	654.81	665.17	658.85	665.18	0.000827	2.70	757.69	166.99	0.16
A	95623	50yr	1852.00	654.81	666.04	659.35	666.06	0.000855	2.91	909.15	181.41	0.16
A	95623	100yr	1994.00	654.81	666.34	659.52	666.36	0.000866	2.98	964.17	186.37	0.16
A	95623	200yr	2071.00	654.81	666.49	659.62	666.52	0.000869	3.02	993.37	188.97	0.16
A	95623	500yr	2303.00	654.81	666.92	659.88	666.95	0.000885	3.13	1073.28	196.06	0.17
A	95562.19	2yr	994.00	655.29	663.63		663.71	0.000850	2.28	481.00	87.83	0.15
A	95562.19	10yr	1484.00	655.29	665.02		665.12	0.000931	2.70	652.06	135.17	0.17
A	95562.19	50yr	1852.00	655.29	665.88		666.00	0.000968	2.94	770.11	140.74	0.17
A	95562.19	100yr	1994.00	655.29	666.17		666.29	0.000984	3.03	811.63	142.64	0.17
A	95562.19	200yr	2071.00	655.29	666.32		666.45	0.000992	3.07	833.56	143.64	0.18
A	95562.19	500yr	2303.00	655.29	666.74		666.88	0.001027	3.22	894.08	146.35	0.18
A	95497.4	2yr	994.00	654.78	663.59	657.86	663.66	0.000634	2.12	520.70	92.86	0.13
A	95497.4	10yr	1477.00	654.78	664.97	658.51	665.07	0.000754	2.58	685.99	146.94	0.15
A	95497.4	50yr	1839.00	654.78	665.82	658.96	665.93	0.000808	2.83	814.77	155.27	0.16
A	95497.4	100yr	1979.00	654.78	666.11	659.11	666.23	0.000828	2.92	860.52	158.13	0.16
A	95497.4	200yr	2056.00	654.78	666.27	659.20	666.39	0.000839	2.97	884.76	159.62	0.16
A	95497.4	500yr	2286.00	654.78	666.68	659.44	666.81	0.000877	3.11	951.88	163.68	0.17
A	95294.3	2yr	994.00	656.56	663.52	658.73	663.56	0.000394	1.46	689.76	141.81	0.11
A	95294.3	10yr	1477.00	656.56	664.91	659.17	664.95	0.000403	1.72	890.26	147.29	0.12
A	95294.3	50yr	1839.00	656.56	665.76	659.47	665.81	0.000419	1.89	1018.87	155.87	0.12
A	95294.3	100yr	1979.00	656.56	666.05	659.60	666.11	0.000427	1.96	1064.82	159.54	0.12
A	95294.3	200yr	2056.00	656.56	666.20	659.65	666.26	0.000432	2.00	1089.24	161.46	0.12
A	95294.3	500yr	2286.00	656.56	666.60	659.82	666.67	0.000452	2.11	1154.84	166.49	0.13
A	95200		Bridge									
A	95107	2yr	994.00	656.29	663.46	658.17	663.38	0.000217	1.38	758.69	144.94	0.09
A	95107	10yr	1477.00	656.29	664.83	658.60	664.75	0.000248	1.67	941.22	211.33	0.10
A	95107	50yr	1839.00	656.29	665.67	658.90	665.59	0.000271	1.87	1053.41	266.26	0.11
A	95107	100yr	1979.00	656.29	665.96	659.00	665.87	0.000280	1.94	1091.63	285.99	0.11
A	95107	200yr	2056.00	656.29	666.11	659.08	666.02	0.000286	1.98	1111.56	293.13	0.11
A	95107	500yr	2286.00	656.29	666.39	659.24	666.46	0.000319	2.13	1148.67	304.03	0.12
A	94618.34	2yr	994.00	654.72	663.16	657.79	663.23	0.000344	2.19	552.94	133.19	0.14
A	94618.34	10yr	1477.00	654.72	664.47	658.49	664.57	0.000404	2.66	736.14	147.01	0.16
A	94618.34	50yr	1839.00	654.72	665.27	658.94	665.39	0.000450	2.98	864.39	172.82	0.17
A	94618.34	100yr	1979.00	654.72	665.54	659.12	665.67	0.000465	3.09	911.63	175.99	0.18
A	94618.34	200yr	2056.00	654.72	665.68	659.21	665.82	0.000474	3.15	936.45	177.64	0.18

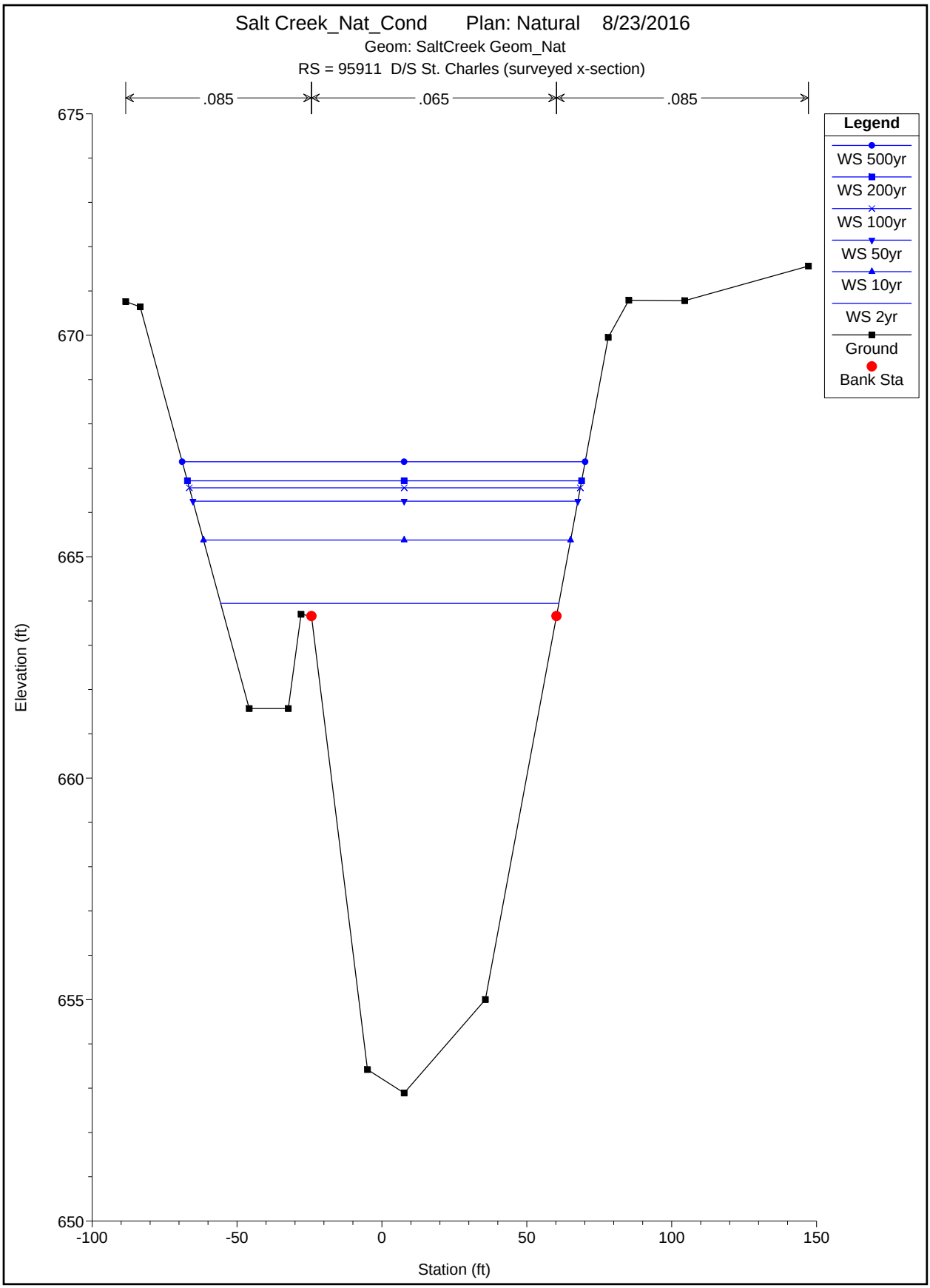
HEC-RAS Plan: Nat River: Salt Creek Reach: A (Continued)

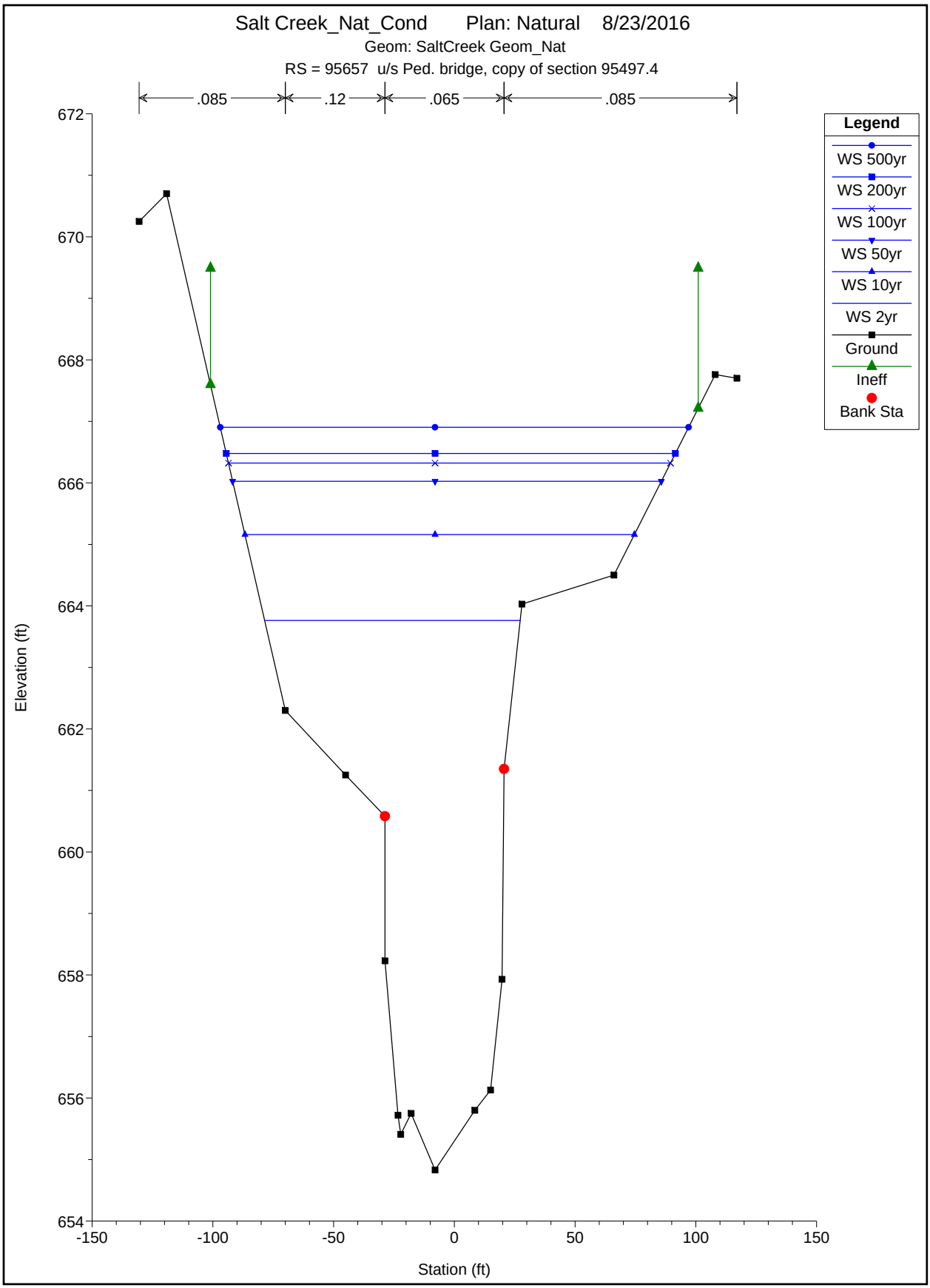
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
A	94618.34	500yr	2286.00	654.72	666.09	659.48	666.24	0.000497	3.32	1010.43	182.45	0.18
A	94390.14	2yr	994.00	653.94	663.09	657.16	663.16	0.000280	2.07	558.36	163.85	0.13
A	94390.14	10yr	1475.00	653.94	664.39	657.83	664.48	0.000341	2.54	787.59	188.79	0.15
A	94390.14	50yr	1834.00	653.94	665.19	658.26	665.30	0.000357	2.75	1080.08	274.79	0.15
A	94390.14	100yr	1973.00	653.94	665.46	658.42	665.57	0.000367	2.83	1155.01	280.22	0.16
A	94390.14	200yr	2049.00	653.94	665.60	658.51	665.71	0.000373	2.88	1194.42	283.03	0.16
A	94390.14	500yr	2277.00	653.94	666.01	658.76	666.13	0.000388	3.02	1312.42	293.97	0.16

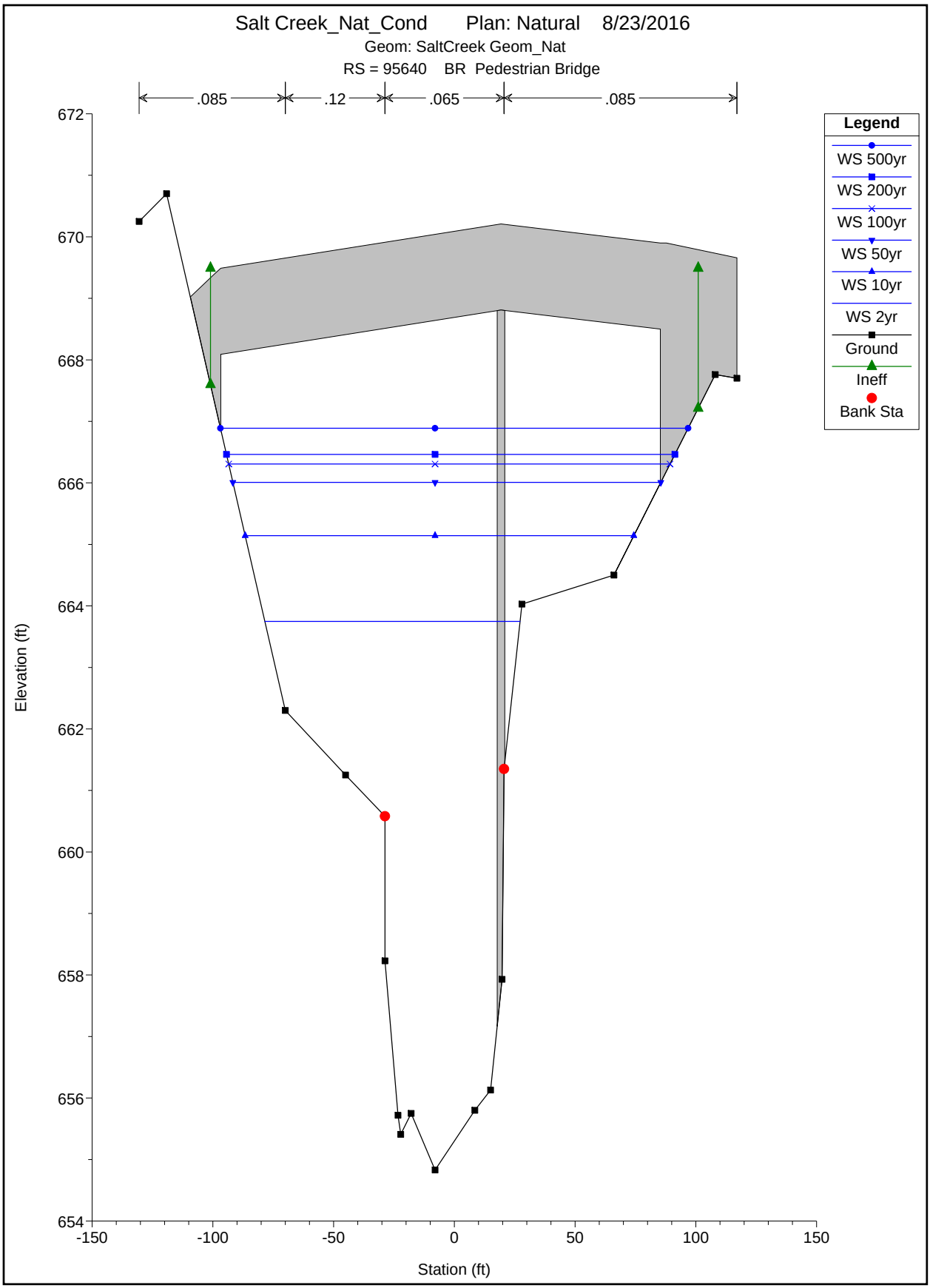

Salt Creek_Nat_Cond Plan: Natural 8/23/2016
Geom: SaltCreek Geom_Nat
RS = 96139.5 Most u/s section (surveyed section)
.12
.065
.12
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Bank Sta
Elevation (ft)
675
670
665
660
655
-200
-150
-100
-50
0
50
100
Station (ft)

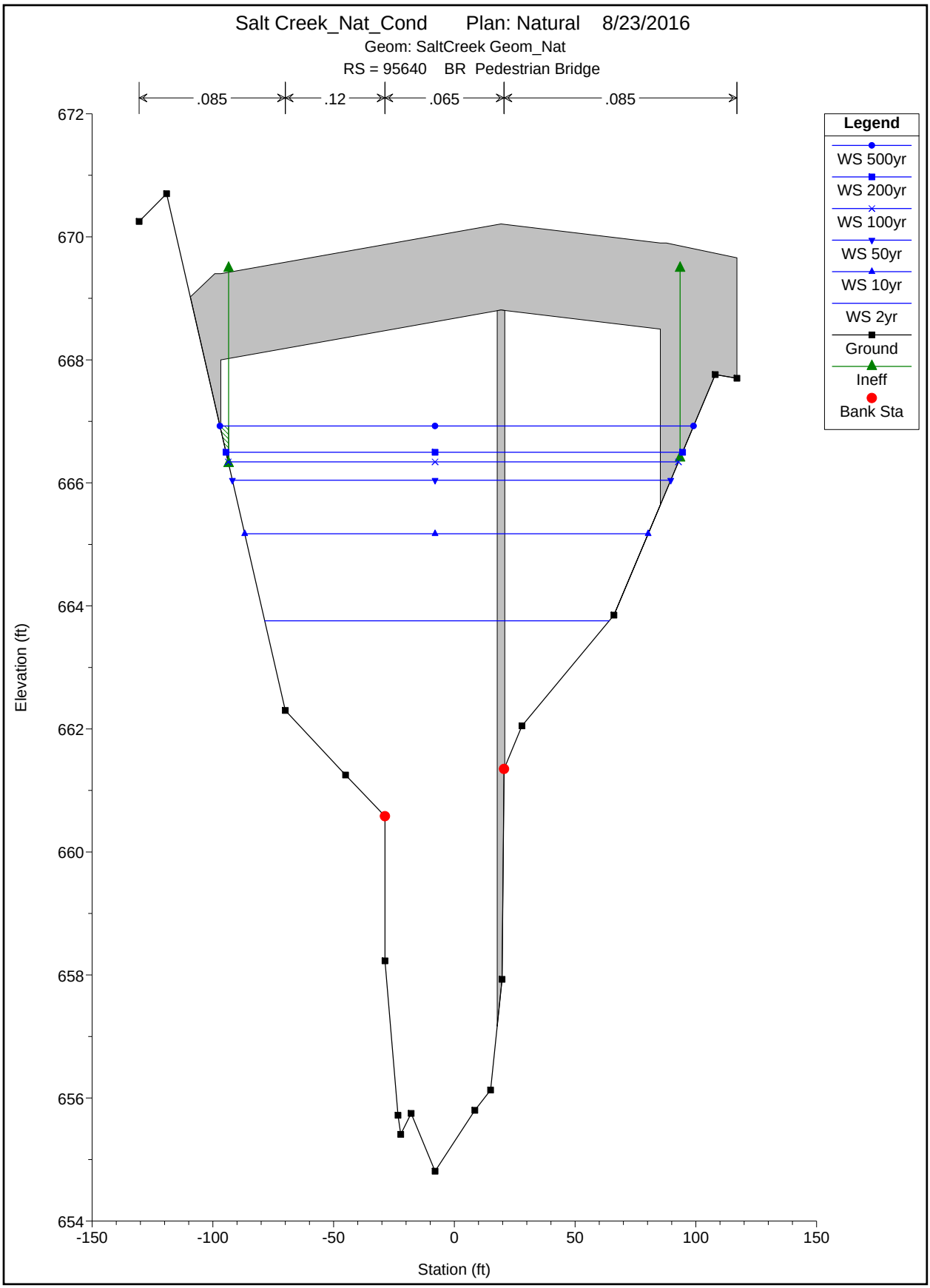

Salt Creek_Nat_Cond Plan: Natural 8/23/2016
Geom: SaltCreek Geom_Nat
RS = 96071.51 3113 (Regulatory Section)
.085
.2
.12
.12
.2
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
685
680
675
670
665
660
655
650
-3000
-2000
-1000
0
1000
2000

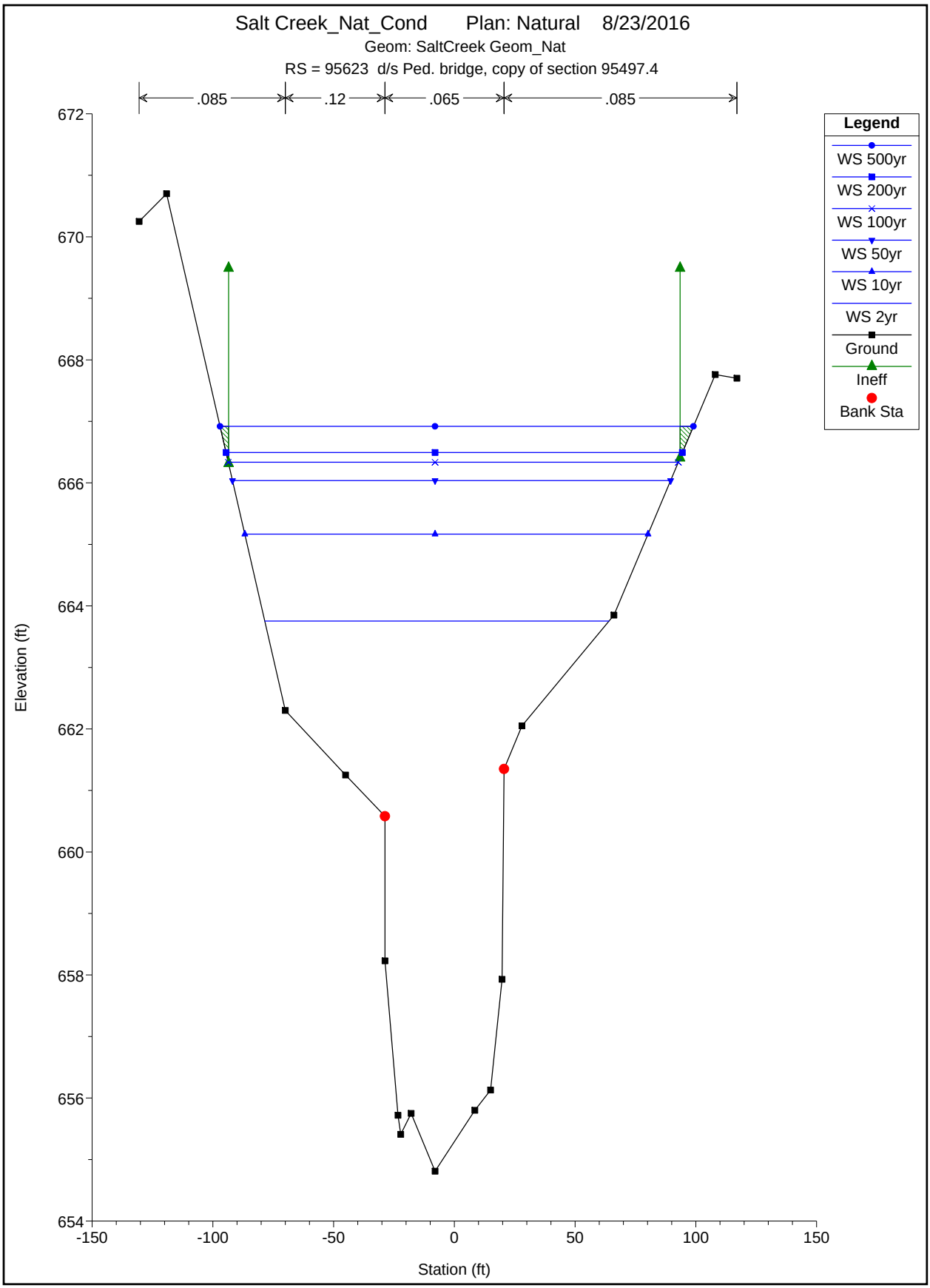

Salt Creek_Nat_Cond Plan: Natural 8/23/2016
Geom: SaltCreek Geom_Nat
RS = 96010.9 U/S St. Charles (surveyed x-section)
.085
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Bank Sta
675
670
665
660
655
650
Elevation (ft)
-100
-50
0
50
100
150
Station (ft)

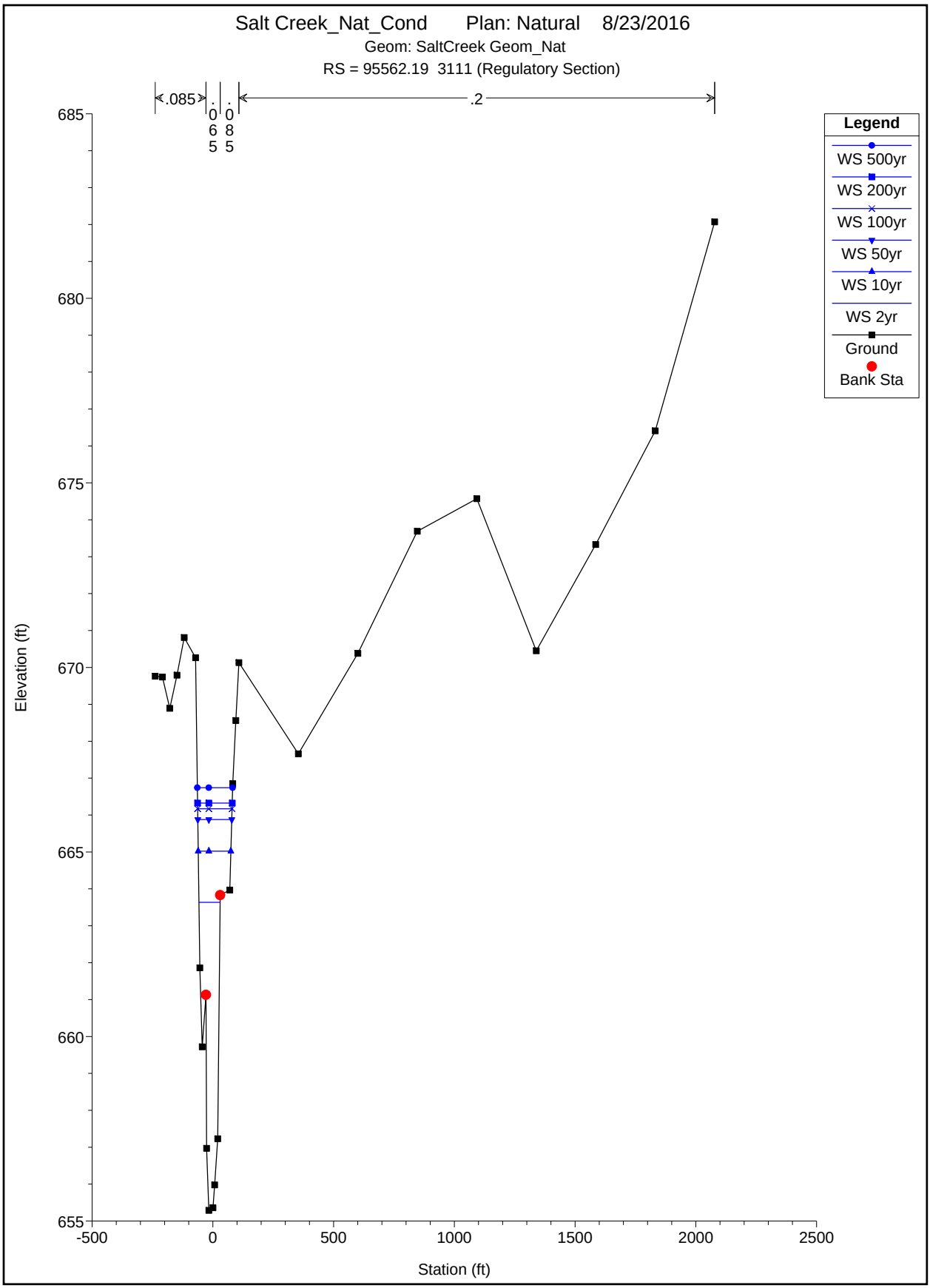

Salt Creek_Nat_Cond Plan: Natural 8/23/2016
Geom: SaltCreek Geom_Nat
RS = 95911 D/S St. Charles (surveyed x-section)
.085
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Bank Sta
675
670
665
660
655
650
Elevation (ft)
-100
-50
0
50
100
150
Station (ft)

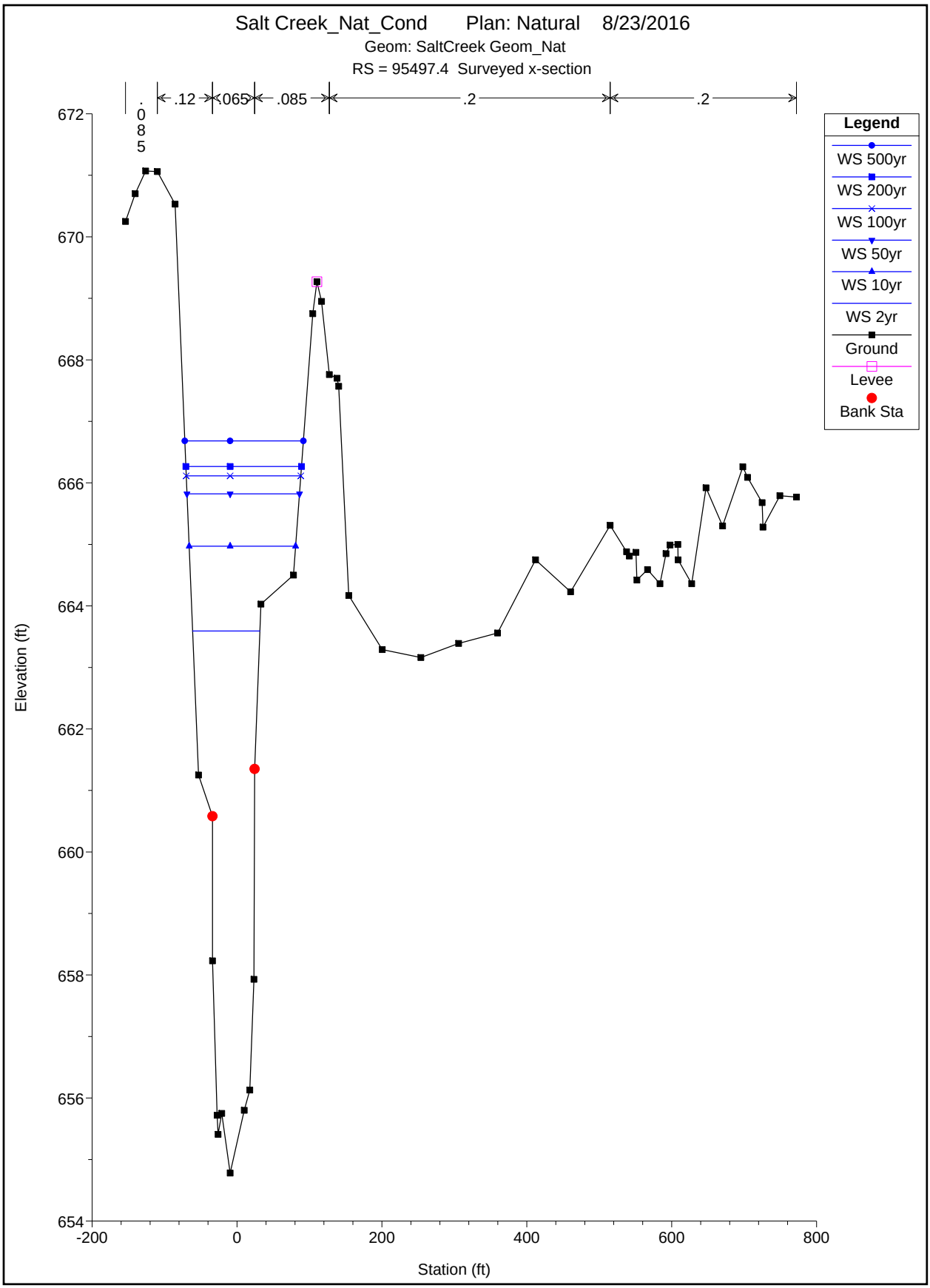

Salt Creek_Nat_Cond Plan: Natural 8/23/2016
Geom: SaltCreek Geom_Nat
RS = 95657 u/s Ped. bridge, copy of section 95497.4
.085
.12
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
654
-150
-100
-50
0
50
100
150
Station (ft)

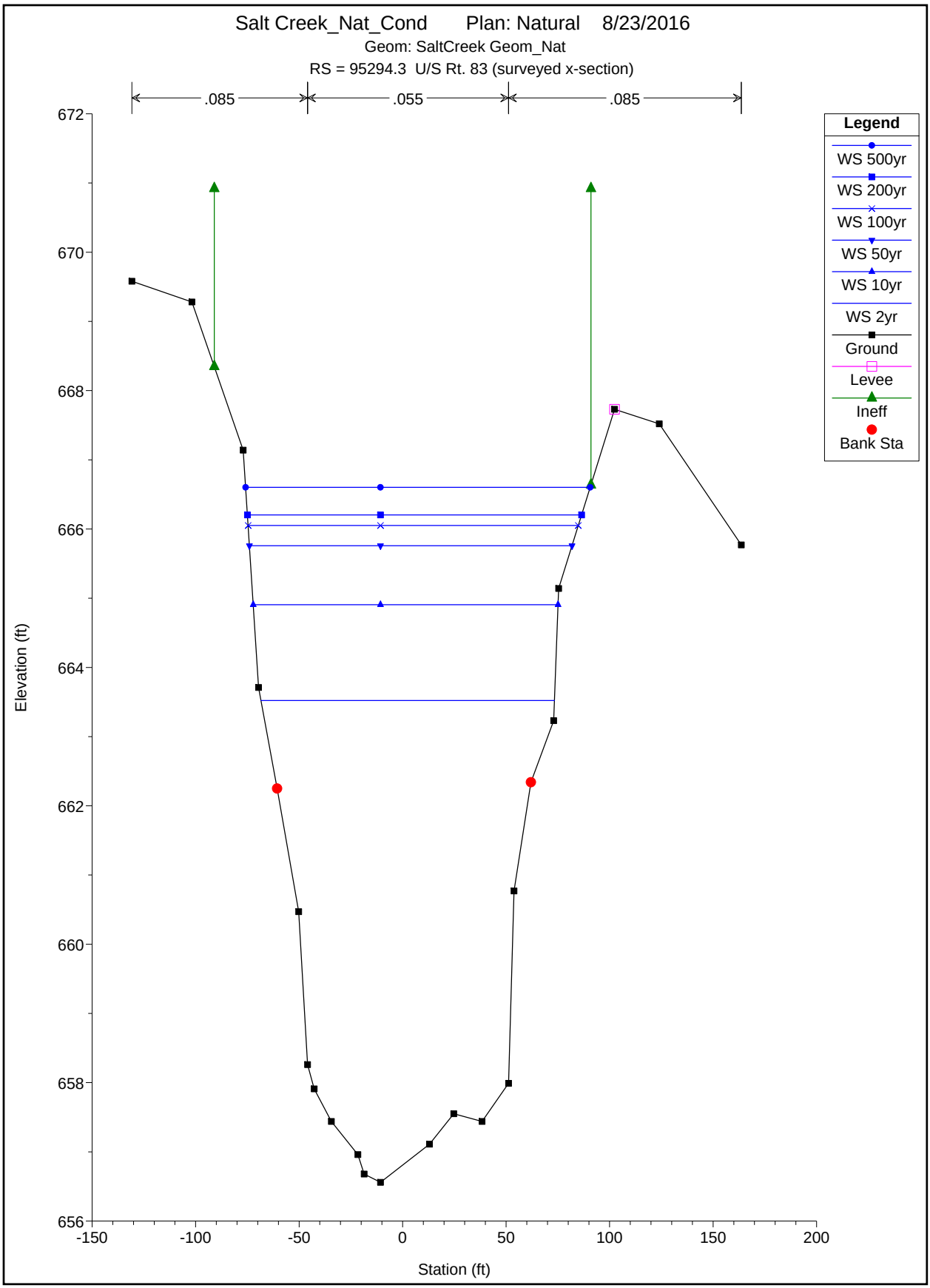

Salt Creek_Nat_Cond Plan: Natural 8/23/2016
Geom: SaltCreek Geom_Nat
RS = 95640 BR Pedestrian Bridge
.085
.12
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
654
-150
-100
-50
0
50
100
150
Station (ft)

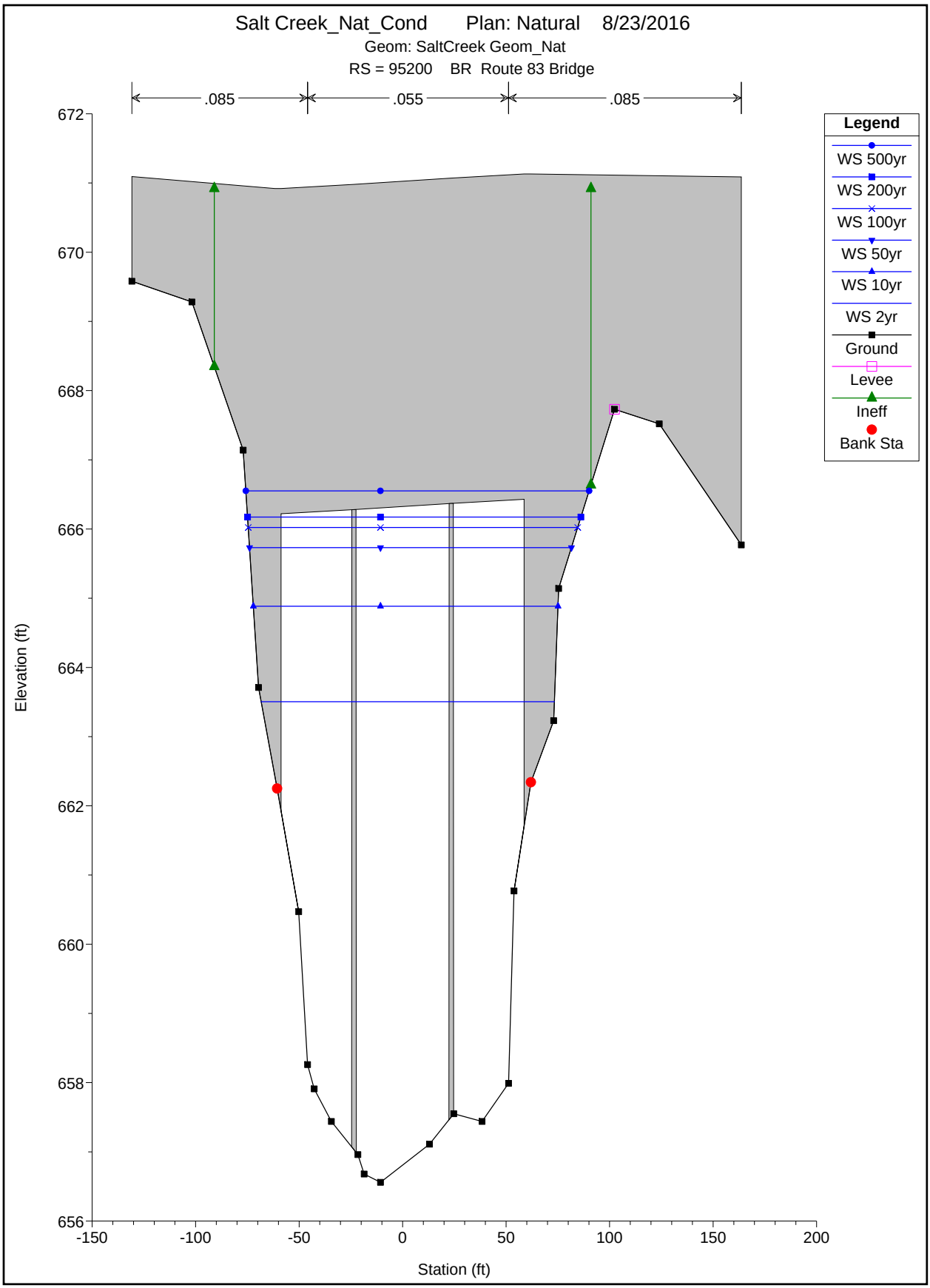

Salt Creek_Nat_Cond Plan: Natural 8/23/2016
Geom: SaltCreek Geom_Nat
RS = 95640 BR Pedestrian Bridge
.085
.12
.065
.085
672
670
668
666
664
662
660
658
656
654
Elevation (ft)
-150
-100
-50
0
50
100
150
Station (ft)
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta

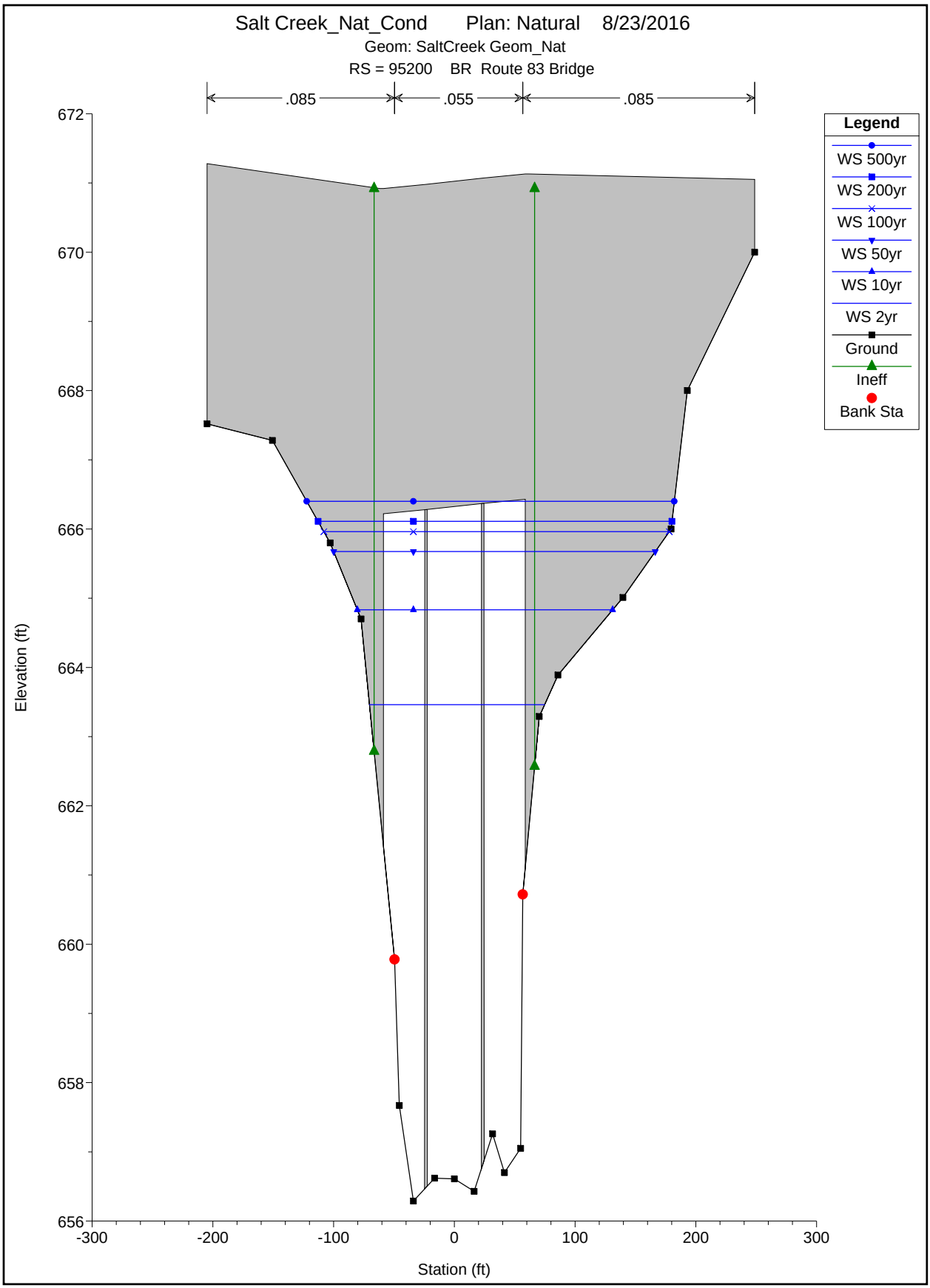

Salt Creek_Nat_Cond Plan: Natural 8/23/2016
Geom: SaltCreek Geom_Nat
RS = 95623 d/s Ped. bridge, copy of section 95497.4
.085
.12
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
654
-150
-100
-50
0
50
100
150
Station (ft)

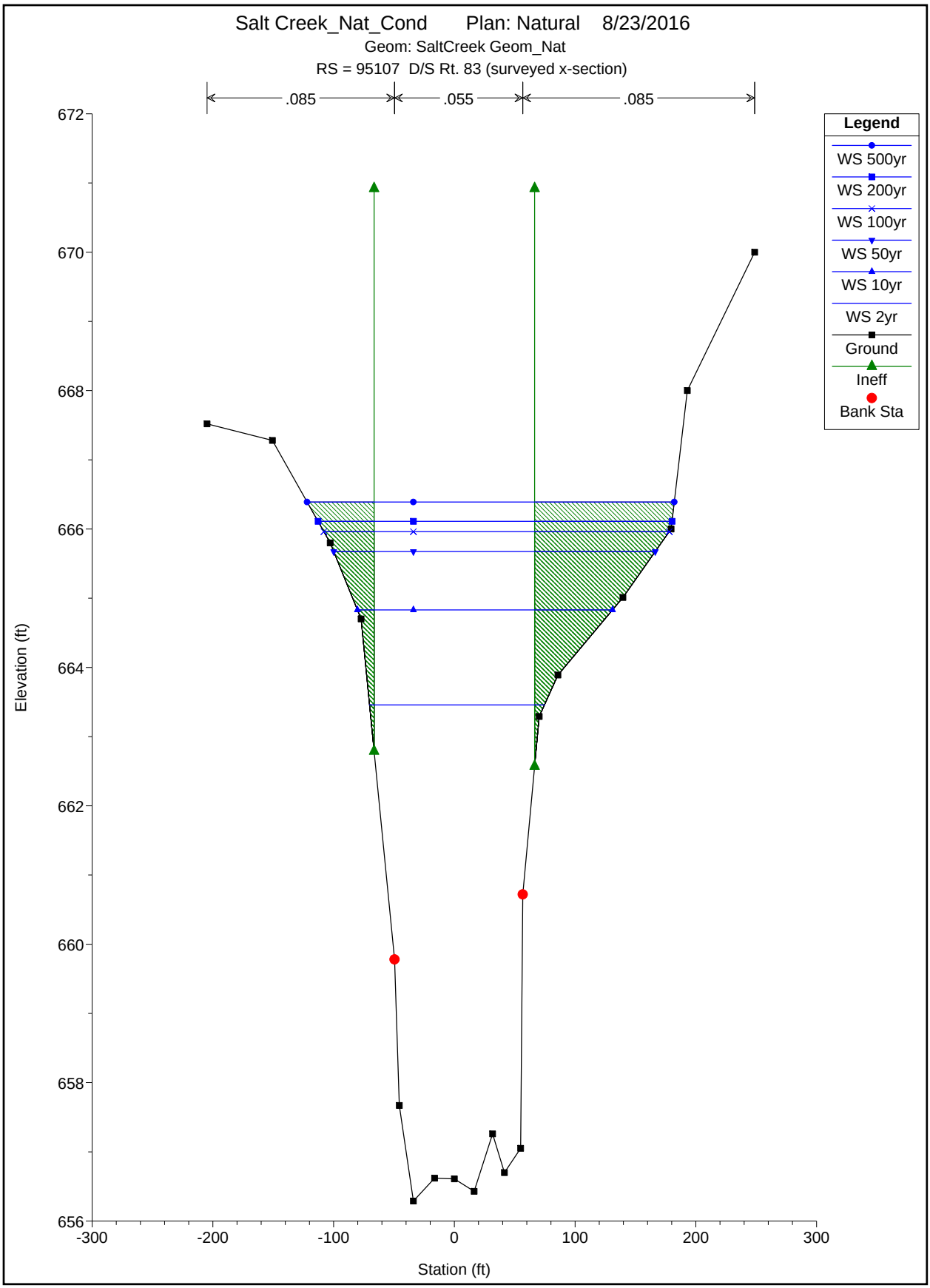

Salt Creek_Nat_Cond Plan: Natural 8/23/2016
Geom: SaltCreek Geom_Nat
RS = 95562.19 3111 (Regulatory Section)
.085
.065
.085
.2
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Bank Sta
Elevation (ft)
685
680
675
670
665
660
655
-500
0
500
1000
1500
2000
2500
Station (ft)

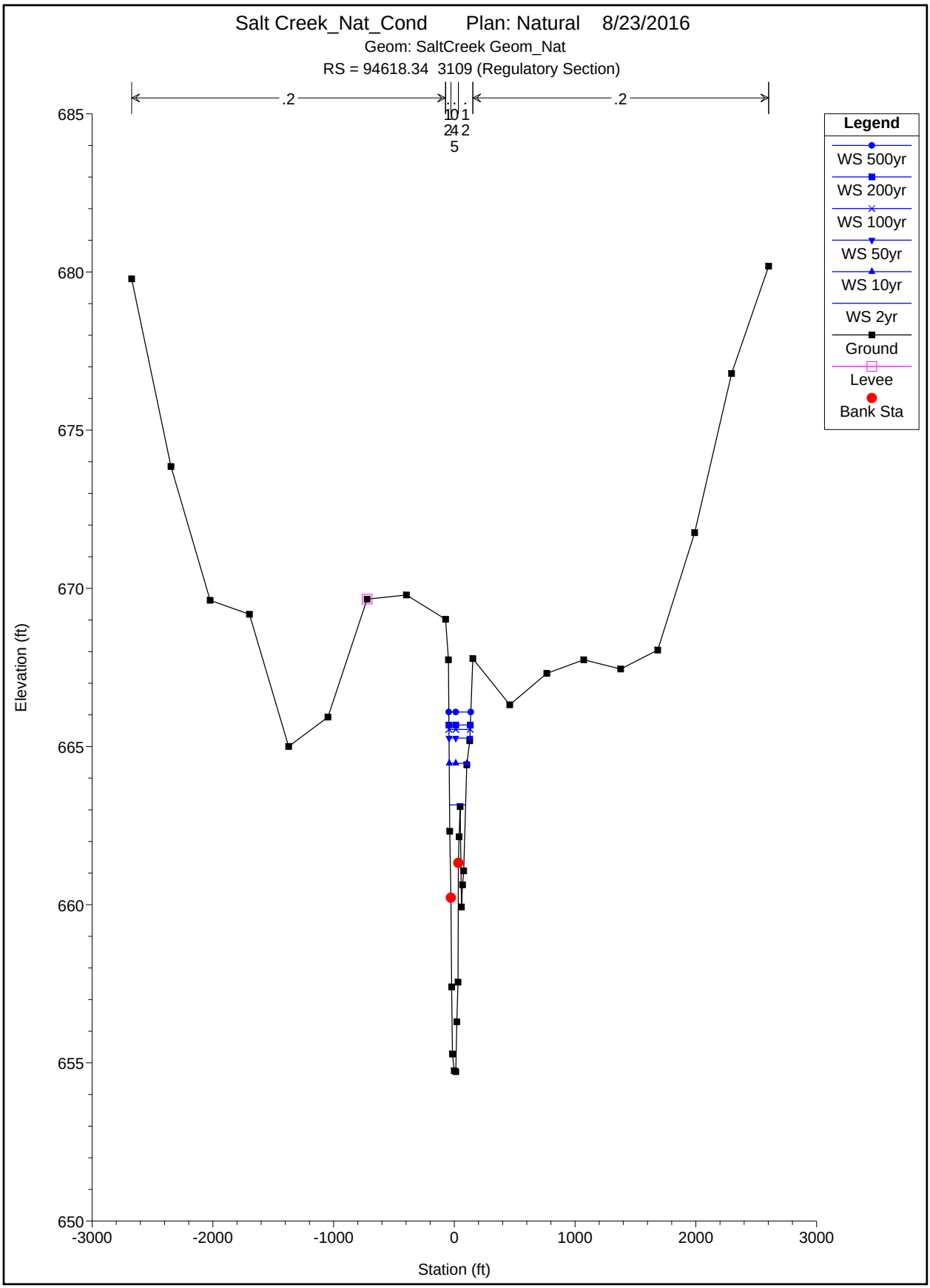

Salt Creek_Nat_Cond Plan: Natural 8/23/2016
Geom: SaltCreek Geom_Nat
RS = 95497.4 Surveyed x-section
.085
.12
.065
.085
.2
.2
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
654
-200
0
200
400
600
800
Station (ft)

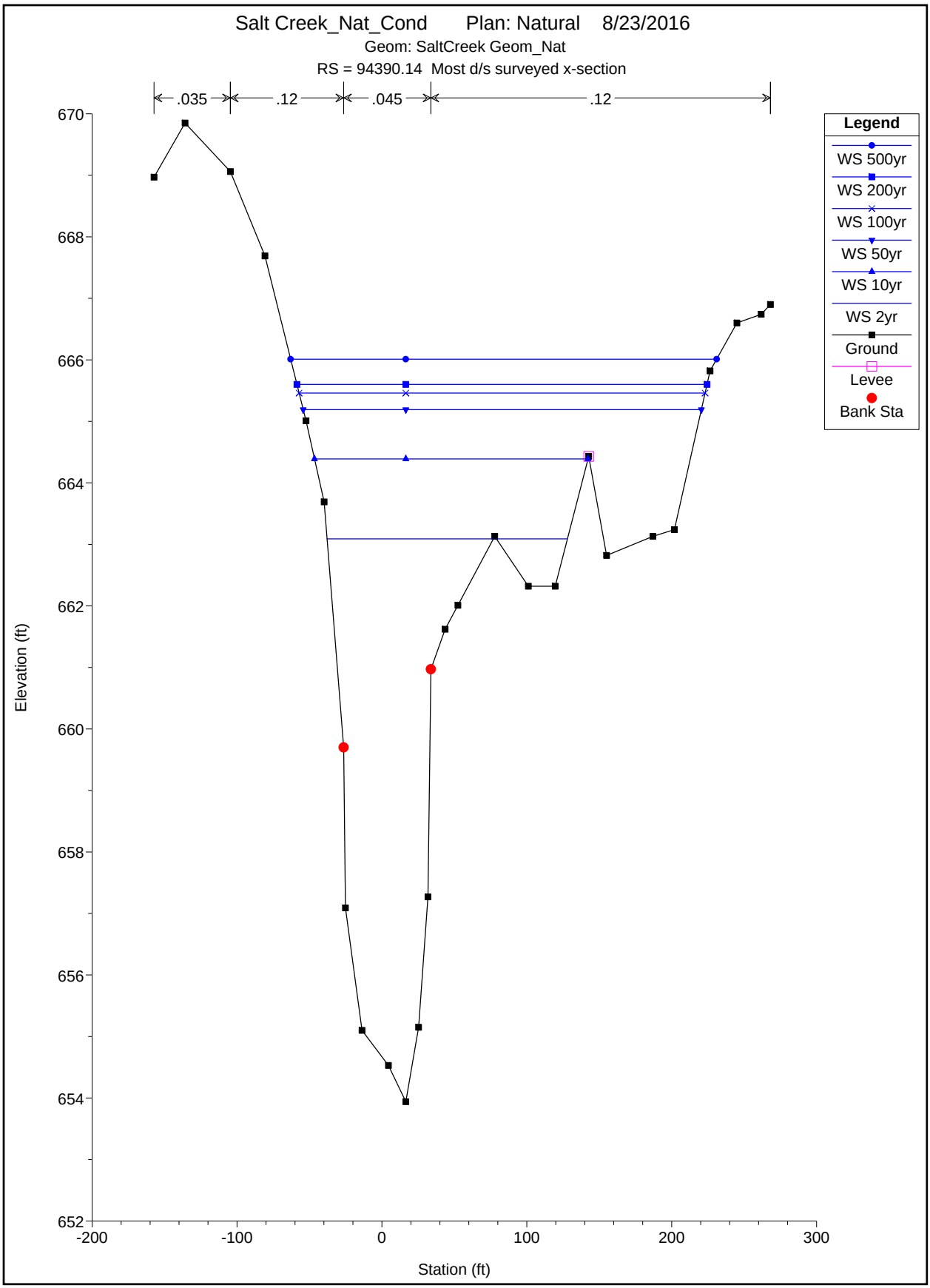

Salt Creek_Nat_Cond Plan: Natural 8/23/2016
Geom: SaltCreek Geom_Nat
RS = 95294.3 U/S Rt. 83 (surveyed x-section)
.085
.055
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
-150
-100
-50
0
50
100
150
200
Station (ft)


Salt Creek_Nat_Cond Plan: Natural 8/23/2016
Geom: SaltCreek Geom_Nat
RS = 95200 BR Route 83 Bridge
.085
.055
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
-150
-100
-50
0
50
100
150
200
Station (ft)

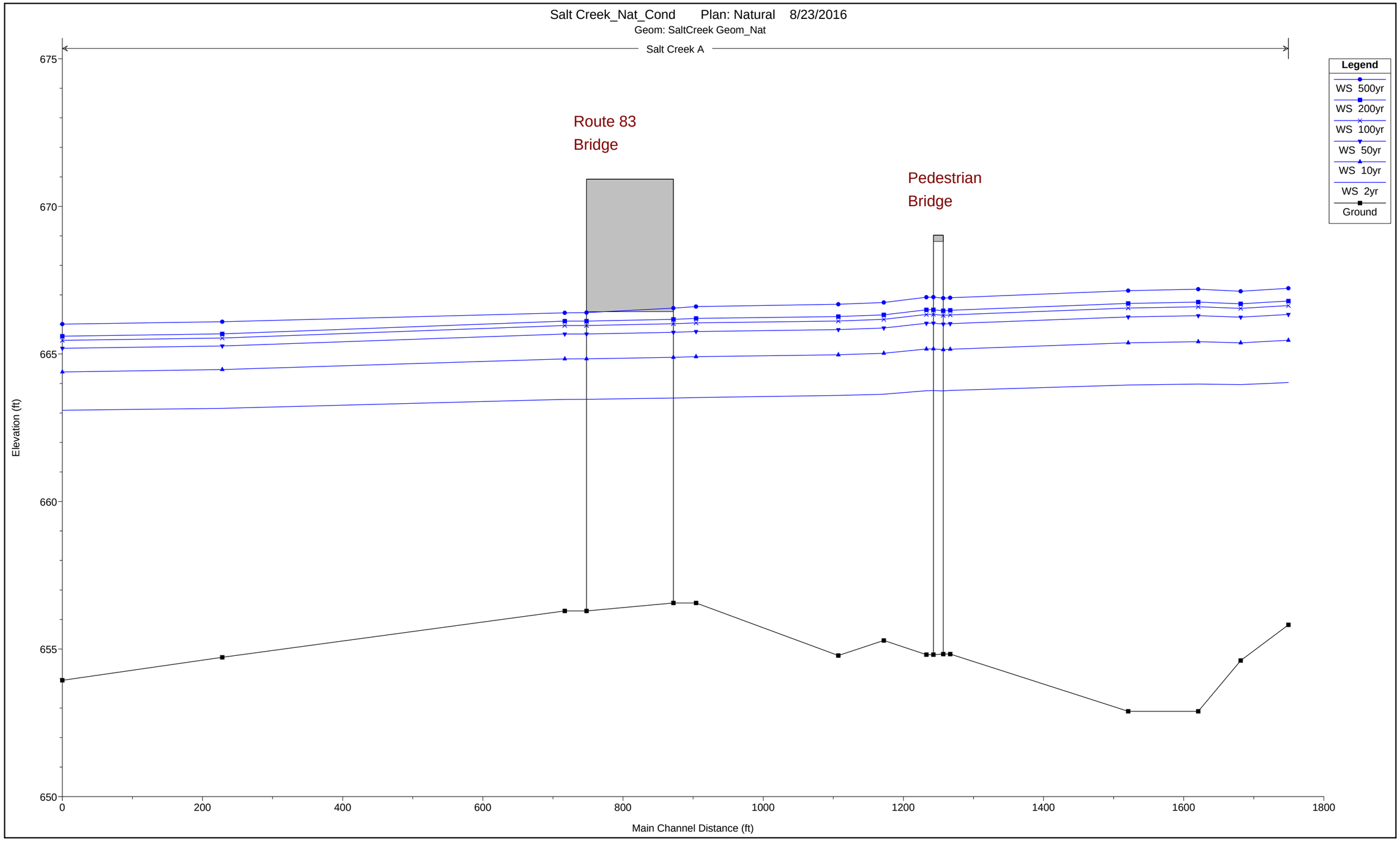

Salt Creek_Nat_Cond Plan: Natural 8/23/2016
Geom: SaltCreek Geom_Nat
RS = 95200 BR Route 83 Bridge
.085
.055
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
-300
-200
-100
0
100
200
300
Station (ft)


Salt Creek_Nat_Cond Plan: Natural 8/23/2016
Geom: SaltCreek Geom_Nat
RS = 95107 D/S Rt. 83 (surveyed x-section)
.085
.055
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
-300
-200
-100
0
100
200
300
Station (ft)


Salt Creek_Nat_Cond Plan: Natural 8/23/2016
Geom: SaltCreek Geom_Nat
RS = 94618.34 3109 (Regulatory Section)
.2
.2
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
685
680
675
670
665
660
655
650
-3000
-2000
-1000
0
1000
2000
3000


Salt Creek_Nat_Cond Plan: Natural 8/23/2016
Geom: SaltCreek Geom_Nat
RS = 94390.14 Most d/s surveyed x-section
.035
.12
.045
.12
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Bank Sta
Elevation (ft)
670
668
666
664
662
660
658
656
654
652
-200
-100
0
100
200
300
Station (ft)

Natural Conditions



HEC-RAS
HYDRAULIC CALULATIONS

PROPOSED CONDITIONS

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

****

PROJECT DATA
Project Title: Salt Creek Pr Scour
Project File : SaltCreek Pr Scour.prj
Run Date and Time: 8/23/2016 8:49:52 AM

Project in English units

****

PLAN DATA

Plan Title: Pr Cond
Plan File : e:\2015\15228\Calcs&Data\NR\Storm\Hydraulic Report\HEC-RAS\Scour Run\SaltCreek_Pr_Scour.p03

Geometry Title: SaltCreek Geom Pr
Geometry File : e:\2015\15228\Calcs&Data\NR\Storm\Hydraulic Report\HEC-RAS\Scour Run\SaltCreek_Pr_Scour.g02

Flow Title : SaltCreek Reg Q
Flow File : e:\2015\15228\Calcs&Data\NR\Storm\Hydraulic Report\HEC-RAS\Scour Run\SaltCreek_Pr_Scour.f01

Plan Summary Information:
Number of: Cross Sections = 12 Multiple Openings = 0
Culverts = 0 Inline Structures = 0
Bridges = 3 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

****

FLOW DATA

Flow Title: SaltCreek Reg Q
Flow File : e:\2015\15228\Calcs&Data\NR\Storm\Hydraulic Report\HEC-RAS\Scour Run\SaltCreek_Pr_Scour.f01

Flow Data (cfs)

River	Reach	RS	2yr	10yr	50yr	100yr	200yr	500yr
Salt Creek	A	96139.5	940	1414	1756	1893	1970	2201
Salt Creek	A	96071.51	941	1417	1763	1900	1977	2209
Salt Creek	A	96010.9	994	1484	1852	1994	2071	2303
Salt Creek	A	95497.4	994	1477	1839	1979	2056	2286
Salt Creek	A	94390.14	994	1475	1834	1973	2049	2277

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Salt Creek	A	2yr		Known WS = 663.09
Salt Creek	A	10yr		Known WS = 664.39
Salt Creek	A	50yr		Known WS = 665.19
Salt Creek	A	100yr		Known WS = 665.46
Salt Creek	A	200yr		Known WS = 665.6
Salt Creek	A	500yr		Known WS = 666.01

****

GEOMETRY DATA

Geometry Title: SaltCreek Geom Pr
Geometry File : e:\2015\15228\Calcs&Data\NR\Storm\Hydraulic Report\HEC-RAS\Scour Run\SaltCreek_Pr_Scour.g02

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 96139.5

INPUT
Description: Most u/s section (surveyed section)
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-191.7	670.29	-185.8	670.4	-171.6	670.75	-159.6	671.06	-124.9	672.03
-113.1	669.8	-108.2	669.71	-96.2	666.15	-85.7	665.98	-58.5	669.26
-24.9	661.93	-23.6	661.77	-20.6	658.34	-15.3	656.61	-9.2	655.84

```
    -1.3  655.82    12.5  656.07    23.2  658.48   26.57  661.63    38.2  672.52
    85.8  673.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
  -191.7     .12   -24.9    .065   26.57     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -24.9   26.57              32   67.99      75             .1       .3
Left Levee      Station=   -58.5      Elevation=  669.26
```

CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	664.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.120	0.065	0.120
W.S. Elev (ft)	664.09	Reach Len. (ft)	32.00	67.99	75.00
Crit W.S. (ft)	658.92	Flow Area (sq ft)	10.66	362.06	3.22
E.G. Slope (ft/ft)	0.001030	Area (sq ft)	10.66	362.06	3.22
Q Total (cfs)	940.00	Flow (cfs)	4.39	934.42	1.19
Top Width (ft)	63.98	Top Width (ft)	9.89	51.47	2.62
Vel Total (ft/s)	2.50	Avg. Vel. (ft/s)	0.41	2.58	0.37
Max Chl Dpth (ft)	8.27	Hydr. Depth (ft)	1.08	7.03	1.23
Conv. Total (cfs)	29291.0	Conv. (cfs)	136.7	29117.2	37.1
Length Wtd. (ft)	67.44	Wetted Per. (ft)	10.12	54.87	3.59
Min Ch El (ft)	655.82	Shear (lb/sq ft)	0.07	0.42	0.06
Alpha	1.06	Stream Power (lb/ft s)	85.80	-58.50	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	1.41	21.89	1.09
C & E Loss (ft)	0.00	Cum SA (acres)	0.72	3.19	0.92

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	665.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.	0.120	0.065	0.120
W.S. Elev (ft)	665.53	Reach Len. (ft)	32.00	67.99	75.00
Crit W.S. (ft)	659.68	Flow Area (sq ft)	29.70	436.32	8.12
E.G. Slope (ft/ft)	0.001225	Area (sq ft)	29.70	436.32	8.12
Q Total (cfs)	1414.00	Flow (cfs)	18.75	1390.80	4.45
Top Width (ft)	72.13	Top Width (ft)	16.50	51.47	4.16
Vel Total (ft/s)	2.98	Avg. Vel. (ft/s)	0.63	3.19	0.55
Max Chl Dpth (ft)	9.71	Hydr. Depth (ft)	1.80	8.48	1.95
Conv. Total (cfs)	40399.1	Conv. (cfs)	535.7	39736.1	127.2
Length Wtd. (ft)	66.99	Wetted Per. (ft)	16.89	54.87	5.71
Min Ch El (ft)	655.82	Shear (lb/sq ft)	0.13	0.61	0.11
Alpha	1.12	Stream Power (lb/ft s)	85.80	-58.50	0.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	2.52	26.29	2.89
C & E Loss (ft)	0.00	Cum SA (acres)	0.93	3.20	1.74

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50yr

E.G. Elev (ft)	666.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.	0.120	0.065	0.120
W.S. Elev (ft)	666.42	Reach Len. (ft)	32.00	67.99	75.00
Crit W.S. (ft)	660.19	Flow Area (sq ft)	46.11	481.92	12.23
E.G. Slope (ft/ft)	0.001334	Area (sq ft)	46.11	481.92	12.23
Q Total (cfs)	1756.00	Flow (cfs)	35.18	1712.80	8.02
Top Width (ft)	77.14	Top Width (ft)	20.56	51.47	5.11
Vel Total (ft/s)	3.25	Avg. Vel. (ft/s)	0.76	3.55	0.66
Max Chl Dpth (ft)	10.60	Hydr. Depth (ft)	2.24	9.36	2.39
Conv. Total (cfs)	48078.1	Conv. (cfs)	963.3	46895.2	219.6
Length Wtd. (ft)	66.69	Wetted Per. (ft)	21.04	54.87	7.00
Min Ch El (ft)	655.82	Shear (lb/sq ft)	0.18	0.73	0.15
Alpha	1.17	Stream Power (lb/ft s)	85.80	-58.50	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	3.41	29.01	4.96
C & E Loss (ft)	0.00	Cum SA (acres)	1.16	3.20	2.40

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	666.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.	0.120	0.065	0.120
W.S. Elev (ft)	666.72	Reach Len. (ft)	32.00	67.99	75.00
Crit W.S. (ft)	660.37	Flow Area (sq ft)	52.58	497.58	13.83
E.G. Slope (ft/ft)	0.001385	Area (sq ft)	52.58	497.58	13.83
Q Total (cfs)	1893.00	Flow (cfs)	42.70	1840.66	9.63
Top Width (ft)	78.86	Top Width (ft)	21.96	51.47	5.44
Vel Total (ft/s)	3.36	Avg. Vel. (ft/s)	0.81	3.70	0.70
Max Chl Dpth (ft)	10.90	Hydr. Depth (ft)	2.39	9.67	2.54
Conv. Total (cfs)	50868.8	Conv. (cfs)	1147.5	49462.4	258.8
Length Wtd. (ft)	66.59	Wetted Per. (ft)	22.47	54.87	7.45
Min Ch El (ft)	655.82	Shear (lb/sq ft)	0.20	0.78	0.16
Alpha	1.18	Stream Power (lb/ft s)	85.80	-58.50	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	3.75	29.93	5.65
C & E Loss (ft)	0.00	Cum SA (acres)	1.25	3.20	2.52

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	667.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.	0.120	0.065	0.120
W.S. Elev (ft)	666.88	Reach Len. (ft)	32.00	67.99	75.00
Crit W.S. (ft)	660.48	Flow Area (sq ft)	56.12	505.75	14.71
E.G. Slope (ft/ft)	0.001416	Area (sq ft)	56.12	505.75	14.71
Q Total (cfs)	1970.00	Flow (cfs)	47.10	1912.33	10.57
Top Width (ft)	79.76	Top Width (ft)	22.68	51.47	5.61
Vel Total (ft/s)	3.42	Avg. Vel. (ft/s)	0.84	3.78	0.72
Max Chl Dpth (ft)	11.06	Hydr. Depth (ft)	2.47	9.83	2.62
Conv. Total (cfs)	52355.7	Conv. (cfs)	1251.7	50823.0	280.9

* Length Wtd. (ft)	*	66.54	* Wetted Per. (ft)	*	23.22	*	54.87	*	7.68	*
* Min Ch El (ft)	*	655.82	* Shear (lb/sq ft)	*	0.21	*	0.81	*	0.17	*
* Alpha	*	1.19	* Stream Power (lb/ft s)	*	85.80	*	-58.50	*	0.00	*
* Frctn Loss (ft)	*	0.09	* Cum Volume (acre-ft)	*	3.95	*	30.42	*	6.03	*
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	1.30	*	3.20	*	2.56	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	*	667.56	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.24	* Wt. n-Val.	*	0.120	*	0.065	*	0.120	*	
* W.S. Elev (ft)	*	667.32	* Reach Len. (ft)	*	32.00	*	67.99	*	75.00	*	
* Crit W.S. (ft)	*	660.77	* Flow Area (sq ft)	*	66.46	*	528.22	*	17.26	*	
* E.G. Slope (ft/ft)	*	0.001514	* Area (sq ft)	*	66.46	*	528.22	*	17.26	*	
* Q Total (cfs)	*	2201.00	* Flow (cfs)	*	61.03	*	2126.44	*	13.53	*	
* Top Width (ft)	*	82.23	* Top Width (ft)	*	24.68	*	51.47	*	6.07	*	
* Vel Total (ft/s)	*	3.60	* Avg. Vel. (ft/s)	*	0.92	*	4.03	*	0.78	*	
* Max Chl Dpth (ft)	*	11.50	* Hydr. Depth (ft)	*	2.69	*	10.26	*	2.84	*	
* Conv. Total (cfs)	*	56558.0	* Conv. (cfs)	*	1568.3	*	54642.0	*	347.6	*	
* Length Wtd. (ft)	*	66.39	* Wetted Per. (ft)	*	25.26	*	54.87	*	8.32	*	
* Min Ch El (ft)	*	655.82	* Shear (lb/sq ft)	*	0.25	*	0.91	*	0.20	*	
* Alpha	*	1.21	* Stream Power (lb/ft s)	*	85.80	*	-58.50	*	0.00	*	
* Frctn Loss (ft)	*	0.10	* Cum Volume (acre-ft)	*	4.44	*	31.58	*	7.05	*	
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	1.39	*	2.85	*	2.68	*	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 96071.51

INPUT
Description: 3113 (Regulatory Section)
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-2751.5	674.38	-2483.48	673.53	-2215.48	675.88	-1947.49	673.05	-1679.45	673.44
-1411.47	671.34	-1143.5	669.6	-875.5	668.18	-607.51	669.97	-339.48	670.05
-71.5	670.3	-53.02	668.4	-31.16	661.76	-19.15	661	-14.75	657.82
-10.95	656.57	3.76	654.71	14.14	654.61	20.62	657.48	25.53	660.45
39.94	669.18	60.44	670.89	238.42	677.13	416.46	678.64	594.44	677.97
772.42	675.86	950.46	673.65	1128.44	673.58	1306.41	674.11	1484.46	674.84
1662.44	675.62	1840.47	681.22						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-2751.5	.085	-1947.49	.2	-607.51	.12	-19.15	.065	39.94	.12
416.46	.2								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-19.15	25.53	87	60.61	39	.1	.3

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	*	664.12	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.10	* Wt. n-Val.	*	0.120	*	0.065	*	0.065	*	
* W.S. Elev (ft)	*	664.02	* Reach Len. (ft)	*	87.00	*	60.61	*	39.00	*	
* Crit W.S. (ft)	*	658.43	* Flow Area (sq ft)	*	40.09	*	343.08	*	10.51	*	
* E.G. Slope (ft/ft)	*	0.000952	* Area (sq ft)	*	40.09	*	343.08	*	10.51	*	
* Q Total (cfs)	*	941.00	* Flow (cfs)	*	26.47	*	904.71	*	9.83	*	
* Top Width (ft)	*	70.02	* Top Width (ft)	*	19.45	*	44.68	*	5.89	*	
* Vel Total (ft/s)	*	2.39	* Avg. Vel. (ft/s)	*	0.66	*	2.64	*	0.93	*	
* Max Chl Dpth (ft)	*	9.41	* Hydr. Depth (ft)	*	2.06	*	7.68	*	1.78	*	
* Conv. Total (cfs)	*	30497.7	* Conv. (cfs)	*	857.8	*	29321.4	*	318.5	*	
* Length Wtd. (ft)	*	64.94	* Wetted Per. (ft)	*	19.81	*	47.46	*	6.89	*	
* Min Ch El (ft)	*	654.61	* Shear (lb/sq ft)	*	0.12	*	0.43	*	0.09	*	
* Alpha	*	1.17	* Stream Power (lb/ft s)	*	1840.47	*	0.00	*	0.00	*	
* Frctn Loss (ft)	*	0.03	* Cum Volume (acre-ft)	*	1.39	*	21.34	*	1.08	*	
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.70	*	3.12	*	0.91	*	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	*	665.61	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.15	* Wt. n-Val.	*	0.120	*	0.065	*	0.065	*	
* W.S. Elev (ft)	*	665.45	* Reach Len. (ft)	*	87.00	*	60.61	*	39.00	*	
* Crit W.S. (ft)	*	659.30	* Flow Area (sq ft)	*	71.30	*	407.05	*	20.64	*	
* E.G. Slope (ft/ft)	*	0.001154	* Area (sq ft)	*	71.30	*	407.05	*	20.64	*	
* Q Total (cfs)	*	1417.00	* Flow (cfs)	*	66.12	*	1324.29	*	26.60	*	
* Top Width (ft)	*	77.09	* Top Width (ft)	*	24.16	*	44.68	*	8.25	*	
* Vel Total (ft/s)	*	2.84	* Avg. Vel. (ft/s)	*	0.93	*	3.25	*	1.29	*	
* Max Chl Dpth (ft)	*	10.84	* Hydr. Depth (ft)	*	2.95	*	9.11	*	2.50	*	
* Conv. Total (cfs)	*	41717.9	* Conv. (cfs)	*	1946.6	*	38988.2	*	783.0	*	
* Length Wtd. (ft)	*	65.10	* Wetted Per. (ft)	*	24.73	*	47.46	*	9.65	*	
* Min Ch El (ft)	*	654.61	* Shear (lb/sq ft)	*	0.21	*	0.62	*	0.15	*	
* Alpha	*	1.24	* Stream Power (lb/ft s)	*	1840.47	*	0.00	*	0.00	*	
* Frctn Loss (ft)	*	0.04	* Cum Volume (acre-ft)	*	2.49	*	25.64	*	2.87	*	
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.91	*	3.12	*	1.73	*	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	*	666.52	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.19	* Wt. n-Val.	*	0.120	*	0.065	*	0.065	*	
* W.S. Elev (ft)	*	666.33	* Reach Len. (ft)	*	87.00	*	60.61	*	39.00	*	
* Crit W.S. (ft)	*	659.87	* Flow Area (sq ft)	*	93.83	*	446.37	*	28.54	*	

* E.G. Slope (ft/ft)	*0.001267	* Area (sq ft)	* 93.83	* 446.37	* 28.54	*
* Q Total (cfs)	* 1763.00	* Flow (cfs)	* 101.55	* 1618.50	* 42.95	*
* Top Width (ft)	* 81.44	* Top Width (ft)	* 27.06	* 44.68	* 9.71	*
* Vel Total (ft/s)	* 3.10	* Avg. Vel. (ft/s)	* 1.08	* 3.63	* 1.50	*
* Max Chl Dpth (ft)	* 11.72	* Hydr. Depth (ft)	* 3.47	* 9.99	* 2.94	*
* Conv. Total (cfs)	* 49523.0	* Conv. (cfs)	* 2852.7	* 45464.0	* 1206.4	*
* Length Wtd. (ft)	* 65.10	* Wetted Per. (ft)	* 27.76	* 47.46	* 11.35	*
* Min Ch El (ft)	* 654.61	* Shear (lb/sq ft)	* 0.27	* 0.74	* 0.20	*
* Alpha	* 1.27	* Stream Power (lb/ft s)	* 1840.47	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.04	* Cum Volume (acre-ft)	* 3.35	* 28.28	* 4.93	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.14	* 3.13	* 2.39	*

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	* 666.84	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.20	* Wt. n-Val.	* 0.120	* 0.065	* 0.065 *
* W.S. Elev (ft)	* 666.63	* Reach Len. (ft)	* 87.00	* 60.61	* 39.00 *
* Crit W.S. (ft)	* 660.10	* Flow Area (sq ft)	* 102.15	* 459.85	* 31.54 *
* E.G. Slope (ft/ft)	*0.001317	* Area (sq ft)	* 102.15	* 459.85	* 31.54 *
* Q Total (cfs)	* 1900.00	* Flow (cfs)	* 116.38	* 1733.59	* 50.03 *
* Top Width (ft)	* 82.93	* Top Width (ft)	* 28.05	* 44.68	* 10.20 *
* Vel Total (ft/s)	* 3.20	* Avg. Vel. (ft/s)	* 1.14	* 3.77	* 1.59 *
* Max Chl Dpth (ft)	* 12.02	* Hydr. Depth (ft)	* 3.64	* 10.29	* 3.09 *
* Conv. Total (cfs)	* 52362.8	* Conv. (cfs)	* 3207.5	* 47776.7	* 1378.7 *
* Length Wtd. (ft)	* 65.09	* Wetted Per. (ft)	* 28.80	* 47.46	* 11.93 *
* Min Ch El (ft)	* 654.61	* Shear (lb/sq ft)	* 0.29	* 0.80	* 0.22 *
* Alpha	* 1.28	* Stream Power (lb/ft s)	* 1840.47	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.04	* Cum Volume (acre-ft)	* 3.70	* 29.19	* 5.61 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.23	* 3.13	* 2.50 *

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	* 667.00	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.21	* Wt. n-Val.	* 0.120	* 0.065	* 0.065 *
* W.S. Elev (ft)	* 666.79	* Reach Len. (ft)	* 87.00	* 60.61	* 39.00 *
* Crit W.S. (ft)	* 660.22	* Flow Area (sq ft)	* 106.60	* 466.87	* 33.17 *
* E.G. Slope (ft/ft)	*0.001347	* Area (sq ft)	* 106.60	* 466.87	* 33.17 *
* Q Total (cfs)	* 1977.00	* Flow (cfs)	* 124.81	* 1798.09	* 54.09 *
* Top Width (ft)	* 83.71	* Top Width (ft)	* 28.57	* 44.68	* 10.46 *
* Vel Total (ft/s)	* 3.26	* Avg. Vel. (ft/s)	* 1.17	* 3.85	* 1.63 *
* Max Chl Dpth (ft)	* 12.18	* Hydr. Depth (ft)	* 3.73	* 10.45	* 3.17 *
* Conv. Total (cfs)	* 53873.1	* Conv. (cfs)	* 3401.2	* 48997.8	* 1474.0 *
* Length Wtd. (ft)	* 65.09	* Wetted Per. (ft)	* 29.34	* 47.46	* 12.23 *
* Min Ch El (ft)	* 654.61	* Shear (lb/sq ft)	* 0.31	* 0.83	* 0.23 *
* Alpha	* 1.29	* Stream Power (lb/ft s)	* 1840.47	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.05	* Cum Volume (acre-ft)	* 3.89	* 29.66	* 5.98 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.28	* 3.13	* 2.55 *

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 667.46	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.24	* Wt. n-Val.	* 0.120	* 0.065	* 0.065 *
* W.S. Elev (ft)	* 667.22	* Reach Len. (ft)	* 87.00	* 60.61	* 39.00 *
* Crit W.S. (ft)	* 660.53	* Flow Area (sq ft)	* 119.23	* 486.15	* 37.83 *
* E.G. Slope (ft/ft)	*0.001444	* Area (sq ft)	* 119.23	* 486.15	* 37.83 *
* Q Total (cfs)	* 2209.00	* Flow (cfs)	* 150.69	* 1991.55	* 66.76 *
* Top Width (ft)	* 85.84	* Top Width (ft)	* 29.99	* 44.68	* 11.18 *
* Vel Total (ft/s)	* 3.43	* Avg. Vel. (ft/s)	* 1.26	* 4.10	* 1.76 *
* Max Chl Dpth (ft)	* 12.61	* Hydr. Depth (ft)	* 3.98	* 10.88	* 3.39 *
* Conv. Total (cfs)	* 58139.1	* Conv. (cfs)	* 3966.2	* 52416.0	* 1757.0 *
* Length Wtd. (ft)	* 65.10	* Wetted Per. (ft)	* 30.82	* 47.46	* 13.07 *
* Min Ch El (ft)	* 654.61	* Shear (lb/sq ft)	* 0.35	* 0.92	* 0.26 *
* Alpha	* 1.30	* Stream Power (lb/ft s)	* 1840.47	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.05	* Cum Volume (acre-ft)	* 4.37	* 30.79	* 7.00 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.37	* 2.77	* 2.66 *

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 96010.9

INPUT
Description: U/S St. Charles (surveyed x-section)
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-88.4	670.76	-83.4	670.64	-45.8	661.57	-20.75	661.57	-20.25	653.42
-5	653.42	7.7	652.89	35.7	655	60.26	663.66	78.1	669.95
85.2	670.79	104.5	670.78	147.2	671.56				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-88.4	.085	-45.8	.065	60.26	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-45.8	60.26	99.9	99.9	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-88.4	-68.3	671.32	F
68.3	147.2	671.32	F

CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	664.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.085	0.065	0.085
W.S. Elev (ft)	664.06	Reach Len. (ft)	12.40	12.40	12.40
Crit W.S. (ft)	655.78	Flow Area (sq ft)	12.90	766.32	0.23
E.G. Slope (ft/ft)	*0.000256	Area (sq ft)	12.90	766.32	0.23
Q Total (cfs)	994.00	Flow (cfs)	4.10	989.88	0.02
Top Width (ft)	117.55	Top Width (ft)	10.34	106.06	1.15
Vel Total (ft/s)	1.28	Avg. Vel. (ft/s)	0.32	1.29	0.09
Max Chl Dpth (ft)	11.17	Hydr. Depth (ft)	1.25	7.23	0.20
Conv. Total (cfs)	62185.1	Conv. (cfs)	256.5	61927.3	1.3
Length Wtd. (ft)	12.40	Wetted Per. (ft)	10.64	115.30	1.22
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.02	0.11	0.00
Alpha	1.02	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1.33	20.57	1.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.68	3.01	0.90

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	665.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.085	0.065	0.085
W.S. Elev (ft)	665.53	Reach Len. (ft)	12.40	12.40	12.40
Crit W.S. (ft)	656.44	Flow Area (sq ft)	32.46	921.43	4.95
E.G. Slope (ft/ft)	*0.000304	Area (sq ft)	32.46	921.43	4.95
Q Total (cfs)	1484.00	Flow (cfs)	15.29	1467.32	1.38
Top Width (ft)	127.76	Top Width (ft)	16.41	106.06	5.30
Vel Total (ft/s)	1.55	Avg. Vel. (ft/s)	0.47	1.59	0.28
Max Chl Dpth (ft)	12.64	Hydr. Depth (ft)	1.98	8.69	0.93
Conv. Total (cfs)	85155.1	Conv. (cfs)	877.7	84198.0	79.4
Length Wtd. (ft)	12.40	Wetted Per. (ft)	16.88	115.30	5.62
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.04	0.15	0.02
Alpha	1.05	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	2.38	24.71	2.86
C & E Loss (ft)	0.00	Cum SA (acres)	0.87	3.02	1.73

CROSS SECTION OUTPUT Profile #50yr

E.G. Elev (ft)	666.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.085	0.065	0.085
W.S. Elev (ft)	666.43	Reach Len. (ft)	12.40	12.40	12.40
Crit W.S. (ft)	656.87	Flow Area (sq ft)	48.92	1016.94	10.86
E.G. Slope (ft/ft)	*0.000336	Area (sq ft)	48.92	1016.94	10.86
Q Total (cfs)	1852.00	Flow (cfs)	27.81	1820.03	4.16
Top Width (ft)	134.05	Top Width (ft)	20.14	106.06	7.85
Vel Total (ft/s)	1.72	Avg. Vel. (ft/s)	0.57	1.79	0.38
Max Chl Dpth (ft)	13.54	Hydr. Depth (ft)	2.43	9.59	1.38
Conv. Total (cfs)	*100984.8	Conv. (cfs)	1516.3	99241.7	226.8
Length Wtd. (ft)	12.40	Wetted Per. (ft)	20.72	115.30	8.32
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.05	0.19	0.03
Alpha	1.07	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	3.21	27.26	4.91
C & E Loss (ft)	0.00	Cum SA (acres)	1.09	3.02	2.38

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	666.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.085	0.065	0.085
W.S. Elev (ft)	666.74	Reach Len. (ft)	12.40	12.40	12.40
Crit W.S. (ft)	657.04	Flow Area (sq ft)	55.37	1049.88	13.36
E.G. Slope (ft/ft)	*0.000349	Area (sq ft)	55.37	1049.88	13.44
Q Total (cfs)	1994.00	Flow (cfs)	33.41	1954.71	5.88
Top Width (ft)	136.22	Top Width (ft)	21.43	106.06	8.73
Vel Total (ft/s)	1.78	Avg. Vel. (ft/s)	0.60	1.86	0.44
Max Chl Dpth (ft)	13.85	Hydr. Depth (ft)	2.58	9.90	1.66
Conv. Total (cfs)	*106761.1	Conv. (cfs)	1788.8	*104657.4	314.9
Length Wtd. (ft)	12.40	Wetted Per. (ft)	22.04	115.30	8.53
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.05	0.20	0.03
Alpha	1.07	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	3.54	28.14	5.59
C & E Loss (ft)	0.00	Cum SA (acres)	1.18	3.02	2.49

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	666.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.085	0.065	0.085
W.S. Elev (ft)	666.90	Reach Len. (ft)	12.40	12.40	12.40
Crit W.S. (ft)	657.12	Flow Area (sq ft)	58.90	1067.10	14.66
E.G. Slope (ft/ft)	*0.000355	Area (sq ft)	58.90	1067.10	14.90
Q Total (cfs)	2071.00	Flow (cfs)	36.63	2027.44	6.94
Top Width (ft)	137.35	Top Width (ft)	22.10	106.06	9.19
Vel Total (ft/s)	1.82	Avg. Vel. (ft/s)	0.62	1.90	0.47
Max Chl Dpth (ft)	14.01	Hydr. Depth (ft)	2.67	10.06	1.82
Conv. Total (cfs)	*109844.3	Conv. (cfs)	1942.6	*107533.8	367.9
Length Wtd. (ft)	12.40	Wetted Per. (ft)	22.73	115.30	8.53
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.06	0.21	0.04
Alpha	1.07	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	3.72	28.59	5.96
C & E Loss (ft)	0.00	Cum SA (acres)	1.23	3.02	2.54

CROSS SECTION OUTPUT Profile #500yr

E.G. Elev (ft)	667.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.085	0.065	0.085
W.S. Elev (ft)	667.35	Reach Len. (ft)	12.40	12.40	12.40
Crit W.S. (ft)	657.37	Flow Area (sq ft)	68.97	1114.63	18.26
E.G. Slope (ft/ft)	*0.000377	Area (sq ft)	69.22	1114.63	19.30
Q Total (cfs)	2303.00	Flow (cfs)	48.45	2244.25	10.30
Top Width (ft)	140.48	Top Width (ft)	23.96	106.06	10.46
Vel Total (ft/s)	1.92	Avg. Vel. (ft/s)	0.70	2.01	0.56

* Max Chl Dpth (ft)	* 14.46	* Hydr. Depth (ft)	* 3.07	* 10.51	* 2.27	*		
* Conv. Total (cfs)	*118661.3	* Conv. (cfs)	* 2496.5	*115634.2	* 530.6	*		
* Length Wtd. (ft)	* 12.40	* Wetted Per. (ft)	* 23.15	* 115.30	* 8.53	*		
* Min Ch El (ft)	* 652.89	* Shear (lb/sq ft)	* 0.07	* 0.23	* 0.05	*		
* Alpha	* 1.08	* Stream Power (lb/ft s)	* 147.20	* 0.00	* 0.00	*		
* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	* 4.18	* 29.68	* 6.98	*		
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.32	* 2.67	* 2.65	*		

****

BRIDGE

RIVER: Salt Creek
REACH: A RS: 95964

INPUT
Description: St. Charles Bridge
Distance from Upstream XS = 12.4
Deck/Roadway Width = 69
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 14

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
-108	670.79	-81	671.15	-66.9	671.32
-66.8	673.07	-55.4	673.24	669.27	-38	673.49	669.3
-19	673.77	669.4	0	674.1	669.45	19	673.91	669.5
38	673.72	669.5	55.4	673.55	669.5	66	673.44	
66.1	671.69		108	671.48				

Upstream Bridge Cross Section Data
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-88.4	670.76	-83.4	670.64	-45.8	661.57	-20.75	661.57	-20.25	653.42
-5	653.42	7.7	652.89	35.7	655	60.26	663.66	78.1	669.95
85.2	670.79	104.5	670.78	147.2	671.56				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-88.4	.085	-45.8	.065	60.26	.085

Bank Sta: Left Right Coeff Contr. Expan.
-45.8 60.26 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-88.4	-68.3	671.32	F
68.3	147.2	671.32	F

Downstream Deck/Roadway Coordinates
num= 14

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
-108	670.79	-81	671.15	-66.9	671.32		
-66.8	673.07	-55.4	673.24	669.27	-38	673.49	669.3
-19	673.77	669.4	0	674.1	669.45	19	673.91	669.5
38	673.72	669.5	55.4	673.55	669.5	66	673.44	
66.1	671.69		108	671.48				

Downstream Bridge Cross Section Data
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-88.4	670.76	-83.4	670.64	-45.8	661.57	-20.75	661.57	-20.25	653.42
-5	653.42	7.7	652.89	35.7	655	60.26	663.66	78.1	669.95
85.2	670.79	104.5	670.78	147.2	671.56				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-88.4	.085	-45.8	.065	60.26	.085

Bank Sta: Left Right Coeff Contr. Expan.
-45.8 60.26 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-88.4	-60.2	671.32	F
60.2	147.2	671.32	F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins = 671.32
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Abutments = 2

Abutment Data
Upstream num= 2

Sta	Elev	Sta	Elev
-55.4	668.58	-33.67	655

Downstream num= 2

Sta	Elev	Sta	Elev
-55.4	668.58	-33.67	655

Abutment Data
Upstream num= 2

Sta	Elev	Sta	Elev
33.65	655	55.4	668.68

Downstream num= 2

Sta	Elev	Sta	Elev

```
   33.65     655    55.4  668.68

Number of Piers =  2

Pier Data
Pier Station     Upstream=     -19    Downstream=     -19
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5   651.2     2.5   669.4
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5   651.2     2.5   669.4

Pier Data
Pier Station     Upstream=      19    Downstream=      19
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5   651.2     2.5   669.5
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5   651.2     2.5   669.5

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
       W.S. Pro Method

  W.S.Pro Data
    Left Embankment
       El of the top of the embankment = 671.3
       El of the toe of the abutment   = 669.5
    Right Embankment
       El of the top of the embankment = 671.3
       El of the toe of the abutment   = 669.5
    Abtument Type                      = 3 Sloping abutments and sloping embankments
    Slope of abutments                 = 1.5
    Top with of embankment             = 110.75
    Centroid station of bridge opening =
    Wing Wall Type                     = Angular wing walls
       Width                           = 13.5
       Anqle                           = 45
       Radius                          =
    Guide Banks Type                   = No Guide Bank present
       Length                          =
       Offset                          =
       Angle                           =

Selected Low Flow Methods = Energy

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerqed Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
          inside the bridqe at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2yr
*************************************************************************************************
* E.G. US. (ft)          *     664.09  * Element               *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     664.06  * E.G. Elev (ft)        *     664.09  *     664.04  *
* Q Total (cfs)          *     994.00  * W.S. Elev (ft)        *     664.05  *     664.00  *
* Q Bridge (cfs)         *     994.00  * Crit W.S. (ft)        *     656.01  *     656.01  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)     *      11.16  *      11.11  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)      *       1.60  *       1.61  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)     *     622.43  *     618.28  *
* Weir Submerq           *             * Froude # Chl          *       0.08  *       0.09  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)  *    2900.62  *    2874.77  *
* Min El Weir Flow (ft)  *     671.33  * Hydr Depth (ft)       *       6.91  *       6.88  *
* Min El Prs (ft)        *     669.50  * W.P. Total (ft)       *     131.17  *     130.63  *
* Delta EG (ft)          *       0.12  * Conv. Total (cfs)     *    40662.2  *    40296.9  *
* Delta WS (ft)          *       0.06  * Top Width (ft)        *      90.06  *      89.91  *
* BR Open Area (sq ft)   *    1154.68  * Frctn Loss (ft)       *       0.04  *       0.01  *
* BR Open Vel (ft/s)     *       1.61  * C & E Loss (ft)       *       0.00  *       0.00  *
* Coef of Q              *       0.95  * Shear Total (lb/sq ft) *      0.18  *       0.18  *
* Br Sel Method          *     WSPRO   * Power Total (lb/ft s)  *    -88.40  *     -88.40  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT  Profile #10yr
*************************************************************************************************
* E.G. US. (ft)          *     665.57  * Element               *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     665.53  * E.G. Elev (ft)        *     665.56  *     665.51  *
* Q Total (cfs)          *    1484.00  * W.S. Elev (ft)        *     665.50  *     665.44  *
* Q Bridge (cfs)         *    1484.00  * Crit W.S. (ft)        *     656.75  *     656.75  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)     *      12.61  *      12.55  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)      *       1.96  *       1.98  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)     *     756.95  *     751.15  *
* Weir Submerg           *             * Froude # Chl          *       0.10  *       0.10  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)  *    3943.81  *    3902.18  *
* Min El Weir Flow (ft)  *     671.33  * Hydr Depth (ft)       *       7.97  *       7.92  *
* Min El Prs (ft)        *     669.50  * W.P. Total (ft)       *     148.28  *     147.56  *
* Delta EG (ft)          *       0.15  * Conv. Total (cfs)     *    52760.6  *    52229.5  *
* Delta WS (ft)          *       0.07  * Top Width (ft)        *      95.00  *      94.79  *
* BR Open Area (sq ft)   *    1154.68  * Frctn Loss (ft)       *       0.06  *       0.01  *
```

* BR Open Vel (ft/s)	* 1.98	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.96	* Shear Total (lb/sq ft)	* 0.25	* 0.26	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -88.40	* -88.40	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #50yr

			*Inside BR US	*Inside BR DS	
* E.G. US. (ft)	* 666.48	* Element	* 666.47	* 666.41	*
* W.S. US. (ft)	* 666.43	* E.G. Elev (ft)	* 666.39	* 666.32	*
* Q Total (cfs)	* 1852.00	* W.S. Elev (ft)	* 657.23	* 657.23	*
* Q Bridge (cfs)	* 1852.00	* Crit W.S. (ft)	* 13.50	* 13.43	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 2.20	* 2.21	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 843.25	* 836.21	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 0.11	* 0.11	*
* Weir Submerg	*	* Froude # Chl	* 4695.27	* 4640.84	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 8.60	* 8.55	*
* Min El Weir Flow (ft)	* 671.33	* Hydr Depth (ft)	* 158.81	* 157.96	*
* Min El Prs (ft)	* 669.50	* W.P. Total (ft)	* 60748.7	* 60091.5	*
* Delta EG (ft)	* 0.18	* Conv. Total (cfs)	* 98.04	* 97.79	*
* Delta WS (ft)	* 0.09	* Top Width (ft)	* 0.06	* 0.01	*
* BR Open Area (sq ft)	* 1154.68	* Frctn Loss (ft)	* 0.00	* 0.00	*
* BR Open Vel (ft/s)	* 2.21	* C & E Loss (ft)	* 0.31	* 0.31	*
* Coef of Q	* 0.96	* Shear Total (lb/sq ft)	* -88.40	* -88.40	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)			

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #100yr

			*Inside BR US	*Inside BR DS	
* E.G. US. (ft)	* 666.79	* Element	* 666.78	* 666.72	*
* W.S. US. (ft)	* 666.74	* E.G. Elev (ft)	* 666.70	* 666.63	*
* Q Total (cfs)	* 1994.00	* W.S. Elev (ft)	* 657.43	* 657.43	*
* Q Bridge (cfs)	* 1994.00	* Crit W.S. (ft)	* 13.81	* 13.74	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 2.28	* 2.30	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 873.59	* 866.07	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 0.11	* 0.11	*
* Weir Submerg	*	* Froude # Chl	* 4974.78	* 4915.10	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 8.82	* 8.76	*
* Min El Weir Flow (ft)	* 671.33	* Hydr Depth (ft)	* 162.43	* 161.54	*
* Min El Prs (ft)	* 669.50	* W.P. Total (ft)	* 63596.3	* 62888.3	*
* Delta EG (ft)	* 0.18	* Conv. Total (cfs)	* 99.08	* 98.82	*
* Delta WS (ft)	* 0.09	* Top Width (ft)	* 0.07	* 0.01	*
* BR Open Area (sq ft)	* 1154.68	* Frctn Loss (ft)	* 0.00	* 0.00	*
* BR Open Vel (ft/s)	* 2.30	* C & E Loss (ft)	* 0.33	* 0.34	*
* Coef of Q	* 0.96	* Shear Total (lb/sq ft)	* -88.40	* -88.40	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)			

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #200yr

			*Inside BR US	*Inside BR DS	
* E.G. US. (ft)	* 666.96	* Element	* 666.95	* 666.88	*
* W.S. US. (ft)	* 666.90	* E.G. Elev (ft)	* 666.86	* 666.78	*
* Q Total (cfs)	* 2071.00	* W.S. Elev (ft)	* 657.52	* 657.52	*
* Q Bridge (cfs)	* 2071.00	* Crit W.S. (ft)	* 13.97	* 13.89	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 2.33	* 2.35	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 889.59	* 881.80	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 0.11	* 0.12	*
* Weir Submerg	*	* Froude # Chl	* 5125.15	* 5062.64	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 8.93	* 8.87	*
* Min El Weir Flow (ft)	* 671.33	* Hydr Depth (ft)	* 164.33	* 163.41	*
* Min El Prs (ft)	* 669.50	* W.P. Total (ft)	* 65104.3	* 64369.4	*
* Delta EG (ft)	* 0.19	* Conv. Total (cfs)	* 99.63	* 99.36	*
* Delta WS (ft)	* 0.09	* Top Width (ft)	* 0.07	* 0.01	*
* BR Open Area (sq ft)	* 1154.68	* Frctn Loss (ft)	* 0.00	* 0.00	*
* BR Open Vel (ft/s)	* 2.35	* C & E Loss (ft)	* 0.34	* 0.35	*
* Coef of Q	* 0.96	* Shear Total (lb/sq ft)	* -88.40	* -88.40	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)			

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #500yr

			*Inside BR US	*Inside BR DS	
* E.G. US. (ft)	* 667.41	* Element	* 667.40	* 667.33	*
* W.S. US. (ft)	* 667.35	* E.G. Elev (ft)	* 667.31	* 667.22	*
* Q Total (cfs)	* 2303.00	* W.S. Elev (ft)	* 657.78	* 657.78	*
* Q Bridge (cfs)	* 2303.00	* Crit W.S. (ft)	* 14.42	* 14.33	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 2.47	* 2.49	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 934.11	* 925.49	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 0.12	* 0.12	*
* Weir Submerg	*	* Froude # Chl	* 5556.47	* 5484.94	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 9.24	* 9.18	*
* Min El Weir Flow (ft)	* 671.33	* Hydr Depth (ft)	* 169.55	* 168.54	*
* Min El Prs (ft)	* 669.50	* W.P. Total (ft)	* 69330.0	* 68509.1	*
* Delta EG (ft)	* 0.20	* Conv. Total (cfs)	* 101.14	* 100.85	*
* Delta WS (ft)	* 0.10	* Top Width (ft)	* 0.08	* 0.01	*
* BR Open Area (sq ft)	* 1154.68	* Frctn Loss (ft)	* 0.00	* 0.00	*
* BR Open Vel (ft/s)	* 2.49	* C & E Loss (ft)	* 0.38	* 0.39	*
* Coef of Q	* 0.96	* Shear Total (lb/sq ft)	* -88.40	* -88.40	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)			

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Salt Creek

REACH: A RS: 95911

INPUT
Description: D/S St. Charles (surveyed x-section)
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-88.4	670.76	-83.4	670.64	-45.8	661.57	-20.75	661.57	-20.25	653.42
-5	653.42	7.7	652.89	35.7	655	60.26	663.66	78.1	669.95
85.2	670.79	104.5	670.78	147.2	671.56				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-88.4	.085	-45.8	.065	60.26	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-45.8	60.26	160	254	353	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-88.4	-60.2	671.32	F
60.2	147.2	671.32	F

CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	663.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.085	0.065	
W.S. Elev (ft)	664.01	Reach Len. (ft)	160.00	254.00	353.00
Crit W.S. (ft)	655.78	Flow Area (sq ft)	12.33	760.32	
E.G. Slope (ft/ft)	*0.000262	Area (sq ft)	12.33	760.34	0.17
Q Total (cfs)	994.00	Flow (cfs)	3.91	990.09	
Top Width (ft)	117.16	Top Width (ft)	10.11	106.06	0.99
Vel Total (ft/s)	1.29	Avg. Vel. (ft/s)	0.32	1.30	
Max Chl Dpth (ft)	11.12	Hydr. Depth (ft)	1.22	7.17	
Conv. Total (cfs)	61385.6	Conv. (cfs)	241.3	61144.3	
Length Wtd. (ft)	253.64	Wetted Per. (ft)	10.40	115.23	
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.02	0.11	
Alpha	1.10	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	1.33	19.10	1.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.67	2.80	0.90

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	665.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.085	0.065	
W.S. Elev (ft)	665.45	Reach Len. (ft)	160.00	254.00	353.00
Crit W.S. (ft)	656.44	Flow Area (sq ft)	30.92	913.51	
E.G. Slope (ft/ft)	*0.000313	Area (sq ft)	31.26	913.62	4.56
Q Total (cfs)	1484.00	Flow (cfs)	15.61	1468.39	
Top Width (ft)	127.25	Top Width (ft)	16.10	106.06	5.09
Vel Total (ft/s)	1.57	Avg. Vel. (ft/s)	0.50	1.61	
Max Chl Dpth (ft)	12.56	Hydr. Depth (ft)	2.15	8.62	
Conv. Total (cfs)	83909.2	Conv. (cfs)	882.6	83026.6	
Length Wtd. (ft)	253.03	Wetted Per. (ft)	14.81	115.23	
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.04	0.15	
Alpha	1.09	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	2.36	22.94	2.85
C & E Loss (ft)	0.00	Cum SA (acres)	0.85	2.80	1.73

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50yr

E.G. Elev (ft)	666.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.085	0.065	
W.S. Elev (ft)	666.34	Reach Len. (ft)	160.00	254.00	353.00
Crit W.S. (ft)	656.87	Flow Area (sq ft)	43.70	1007.65	
E.G. Slope (ft/ft)	*0.000348	Area (sq ft)	47.20	1007.81	10.20
Q Total (cfs)	1852.00	Flow (cfs)	29.30	1822.70	
Top Width (ft)	133.45	Top Width (ft)	19.78	106.06	7.61
Vel Total (ft/s)	1.76	Avg. Vel. (ft/s)	0.67	1.81	
Max Chl Dpth (ft)	13.45	Hydr. Depth (ft)	3.04	9.51	
Conv. Total (cfs)	99343.1	Conv. (cfs)	1571.7	97771.4	
Length Wtd. (ft)	252.54	Wetted Per. (ft)	14.81	115.23	
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.06	0.19	
Alpha	1.09	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	3.17	25.30	4.90
C & E Loss (ft)	0.00	Cum SA (acres)	1.07	2.80	2.38

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	666.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.085	0.065	
W.S. Elev (ft)	666.65	Reach Len. (ft)	160.00	254.00	353.00
Crit W.S. (ft)	657.04	Flow Area (sq ft)	48.11	1040.05	
E.G. Slope (ft/ft)	*0.000361	Area (sq ft)	53.44	1040.23	12.66
Q Total (cfs)	1994.00	Flow (cfs)	35.05	1958.95	
Top Width (ft)	135.58	Top Width (ft)	21.05	106.06	8.47
Vel Total (ft/s)	1.83	Avg. Vel. (ft/s)	0.73	1.88	
Max Chl Dpth (ft)	13.76	Hydr. Depth (ft)	3.34	9.81	
Conv. Total (cfs)	*104910.1	Conv. (cfs)	1844.2	*103065.9	
Length Wtd. (ft)	252.37	Wetted Per. (ft)	14.81	115.23	
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.07	0.20	
Alpha	1.09	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	3.49	26.10	5.59
C & E Loss (ft)	0.00	Cum SA (acres)	1.16	2.80	2.49

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	666.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.085	0.065	
W.S. Elev (ft)	666.81	Reach Len. (ft)	160.00	254.00	353.00
Crit W.S. (ft)	657.12	Flow Area (sq ft)	50.40	1056.97	
E.G. Slope (ft/ft)	*0.000369	Area (sq ft)	56.85	1057.16	14.05
Q Total (cfs)	2071.00	Flow (cfs)	38.27	2032.73	
Top Width (ft)	136.70	Top Width (ft)	21.71	106.06	8.93
Vel Total (ft/s)	1.87	Avg. Vel. (ft/s)	0.76	1.92	
Max Chl Dpth (ft)	13.92	Hydr. Depth (ft)	3.50	9.97	
Conv. Total (cfs)	*107869.8	Conv. (cfs)	1993.4	*105876.4	
Length Wtd. (ft)	252.29	Wetted Per. (ft)	14.81	115.23	
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.08	0.21	
Alpha	1.09	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	3.67	26.52	5.96
C & E Loss (ft)	0.00	Cum SA (acres)	1.21	2.80	2.53

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500yr

E.G. Elev (ft)	667.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.085	0.065	
W.S. Elev (ft)	667.25	Reach Len. (ft)	160.00	254.00	353.00
Crit W.S. (ft)	657.37	Flow Area (sq ft)	56.73	1103.57	
E.G. Slope (ft/ft)	*0.000393	Area (sq ft)	66.79	1103.78	18.24
Q Total (cfs)	2303.00	Flow (cfs)	48.12	2254.88	
Top Width (ft)	139.77	Top Width (ft)	23.53	106.06	10.17
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)	0.85	2.04	
Max Chl Dpth (ft)	14.36	Hydr. Depth (ft)	3.94	10.41	
Conv. Total (cfs)	*116197.0	Conv. (cfs)	2427.9	*113769.2	
Length Wtd. (ft)	252.06	Wetted Per. (ft)	14.81	115.23	
Min Ch El (ft)	652.89	Shear (lb/sq ft)	0.09	0.23	
Alpha	1.09	Stream Power (lb/ft s)	147.20	0.00	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	4.12	27.52	6.97
C & E Loss (ft)	0.01	Cum SA (acres)	1.29	2.45	2.65

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95657

INPUT
Description: u/s Ped. bridge, copy of section 95497.4
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.515	670.25	-119.151	670.7	-70	662.3	-45.031	661.25	-28.749	660.58
-28.749	658.23	-23.321	655.72	-22.219	655.41	-17.894	655.75	-7.972	654.83
8.48	655.8	15.01	656.13	19.76	657.93	20.608	661.35	27.986	664.03
66.063	664.5	108.041	667.76	117.031	667.7				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-130.515	.085	-70	.12	-28.749	.065	20.608	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-28.749	20.608	34	34	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-130.515	-101	669.49	T
101	117.031	669.49	T

Skew Angle = 32

CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	663.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.119	0.065	0.085
W.S. Elev (ft)	663.76	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	658.12	Flow Area (sq ft)	102.24	390.70	8.01
E.G. Slope (ft/ft)	*0.000799	Area (sq ft)	102.24	390.70	8.01
Q Total (cfs)	994.00	Flow (cfs)	61.44	928.26	4.30
Top Width (ft)	105.81	Top Width (ft)	49.81	49.36	6.64
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)	0.60	2.38	0.54
Max Chl Dpth (ft)	8.93	Hydr. Depth (ft)	2.05	7.92	1.21
Conv. Total (cfs)	35171.8	Conv. (cfs)	2173.8	32845.7	152.3
Length Wtd. (ft)	10.00	Wetted Per. (ft)	49.97	55.40	7.07
Min Ch El (ft)	654.83	Shear (lb/sq ft)	0.10	0.35	0.06
Alpha	1.34	Stream Power (lb/ft s)	117.03	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	1.12	15.74	1.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.56	2.35	0.87

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	665.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.116	0.065	0.085
W.S. Elev (ft)	665.16	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	658.84	Flow Area (sq ft)	177.55	459.66	55.09
E.G. Slope (ft/ft)	*0.000912	Area (sq ft)	177.55	459.66	55.09
Q Total (cfs)	1484.00	Flow (cfs)	153.85	1300.84	29.31
Top Width (ft)	161.29	Top Width (ft)	57.98	49.36	53.95
Vel Total (ft/s)	2.14	Avg. Vel. (ft/s)	0.87	2.83	0.53
Max Chl Dpth (ft)	10.33	Hydr. Depth (ft)	3.06	9.31	1.02
Conv. Total (cfs)	49129.7	Conv. (cfs)	5093.4	43065.9	970.5
Length Wtd. (ft)	10.00	Wetted Per. (ft)	58.26	55.40	54.45
Min Ch El (ft)	654.83	Shear (lb/sq ft)	0.17	0.47	0.06
Alpha	1.55	Stream Power (lb/ft s)	117.03	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	1.98	18.93	2.61
C & E Loss (ft)	0.00	Cum SA (acres)	0.72	2.35	1.49

CROSS SECTION OUTPUT Profile #50yr

E.G. Elev (ft)	666.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.115	0.065	0.085
W.S. Elev (ft)	666.03	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	659.35	Flow Area (sq ft)	229.91	502.37	106.59
E.G. Slope (ft/ft)	0.000951	Area (sq ft)	229.91	502.37	106.59
Q Total (cfs)	1852.00	Flow (cfs)	232.37	1540.22	79.41
Top Width (ft)	177.50	Top Width (ft)	63.05	49.36	65.09
Vel Total (ft/s)	2.21	Avg. Vel. (ft/s)	1.01	3.07	0.74
Max Chl Dpth (ft)	11.19	Hydr. Depth (ft)	3.65	10.18	1.64
Conv. Total (cfs)	60048.9	Conv. (cfs)	7534.3	49939.8	2574.7
Length Wtd. (ft)	10.00	Wetted Per. (ft)	63.40	55.40	65.63
Min Ch El (ft)	654.83	Shear (lb/sq ft)	0.22	0.54	0.10
Alpha	1.64	Stream Power (lb/ft s)	117.03	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	2.66	20.90	4.43
C & E Loss (ft)	0.00	Cum SA (acres)	0.92	2.35	2.09

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	666.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.115	0.065	0.085
W.S. Elev (ft)	666.32	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	659.53	Flow Area (sq ft)	248.92	517.04	126.51
E.G. Slope (ft/ft)	0.000965	Area (sq ft)	248.92	517.04	126.51
Q Total (cfs)	1994.00	Flow (cfs)	263.75	1627.78	102.47
Top Width (ft)	183.06	Top Width (ft)	64.79	49.36	68.92
Vel Total (ft/s)	2.23	Avg. Vel. (ft/s)	1.06	3.15	0.81
Max Chl Dpth (ft)	11.49	Hydr. Depth (ft)	3.84	10.48	1.84
Conv. Total (cfs)	64182.5	Conv. (cfs)	8489.6	52394.6	3298.3
Length Wtd. (ft)	10.00	Wetted Per. (ft)	65.16	55.40	69.46
Min Ch El (ft)	654.83	Shear (lb/sq ft)	0.23	0.56	0.11
Alpha	1.66	Stream Power (lb/ft s)	117.03	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	2.94	21.56	5.03
C & E Loss (ft)	0.00	Cum SA (acres)	1.00	2.35	2.18

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	666.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.114	0.065	0.085
W.S. Elev (ft)	666.48	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	659.62	Flow Area (sq ft)	259.06	524.72	137.38
E.G. Slope (ft/ft)	0.000972	Area (sq ft)	259.06	524.72	137.38
Q Total (cfs)	2071.00	Flow (cfs)	281.03	1674.21	115.76
Top Width (ft)	185.97	Top Width (ft)	65.70	49.36	70.92
Vel Total (ft/s)	2.25	Avg. Vel. (ft/s)	1.08	3.19	0.84
Max Chl Dpth (ft)	11.65	Hydr. Depth (ft)	3.94	10.63	1.94
Conv. Total (cfs)	66423.2	Conv. (cfs)	9013.5	53696.9	3712.8
Length Wtd. (ft)	10.00	Wetted Per. (ft)	66.09	55.40	71.47
Min Ch El (ft)	654.83	Shear (lb/sq ft)	0.24	0.57	0.12
Alpha	1.67	Stream Power (lb/ft s)	117.03	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	3.09	21.91	5.34
C & E Loss (ft)	0.00	Cum SA (acres)	1.05	2.35	2.21

CROSS SECTION OUTPUT Profile #500yr

E.G. Elev (ft)	667.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.114	0.065	0.085
W.S. Elev (ft)	666.90	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	659.89	Flow Area (sq ft)	287.52	545.70	168.70
E.G. Slope (ft/ft)	0.001000	Area (sq ft)	287.52	545.70	168.70
Q Total (cfs)	2303.00	Flow (cfs)	333.06	1812.59	157.36
Top Width (ft)	193.94	Top Width (ft)	68.18	49.36	76.40
Vel Total (ft/s)	2.30	Avg. Vel. (ft/s)	1.16	3.32	0.93
Max Chl Dpth (ft)	12.07	Hydr. Depth (ft)	4.22	11.06	2.21
Conv. Total (cfs)	72833.8	Conv. (cfs)	10533.2	57324.2	4976.5
Length Wtd. (ft)	10.00	Wetted Per. (ft)	68.61	55.40	76.96
Min Ch El (ft)	654.83	Shear (lb/sq ft)	0.26	0.61	0.14
Alpha	1.69	Stream Power (lb/ft s)	117.03	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	3.47	22.71	6.21
C & E Loss (ft)	0.00	Cum SA (acres)	1.13	1.99	2.30

BRIDGE

RIVER: Salt Creek
REACH: A RS: 95640

INPUT
Description: Pedestrian Bridge
Distance from Upstream XS = 10
Deck/Roadway Width = 14
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew = 32
Bridge Pier Skew = 32
Upstream Deck/Roadway Coordinates
num= 7

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-118	668.7		-99.2	669.4		-96.7	669.49	668.09
19.3	670.21	668.81	85.3	669.9	668.5	87.8	669.9	
123	669.61							

Upstream Bridge Cross Section Data
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.515	670.25	-119.151	670.7	-70	662.3	-45.031	661.25	-28.749	660.58
-28.749	658.23	-23.321	655.72	-22.219	655.41	-17.894	655.75	-7.972	654.83
8.48	655.8	15.01	656.13	19.76	657.93	20.608	661.35	27.986	664.03
66.063	664.5	108.041	667.76	117.031	667.7				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

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************************************************************
-130.515    .085     -70     .12 -28.749    .065  20.608    .085

Bank Sta: Left   Right    Coeff Contr.   Expan.
       -28.749  20.608             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-130.515    -101  669.49       T
     101 117.031  669.49       T
Skew Angle = 32

Downstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
    -118   668.7           -99.2   669.4           -96.7   669.4     668
    19.3  670.21  668.81    85.3   669.9   668.5    87.8   669.9
     123  669.61

Downstream Bridge Cross Section Data
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
-130.515  670.25-119.151   670.7     -70   662.3 -45.031  661.25 -28.749  660.58
 -28.749  658.23 -23.321  655.72 -22.219  655.41 -17.894  655.75  -7.972  654.81
    8.48   655.8   15.01  656.13   19.76  657.93  20.608  661.35  27.986  662.05
  66.063  663.85 108.041  667.76 117.031   667.7

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************************
-130.515    .085     -70     .12 -28.749    .065  20.608    .085

Bank Sta: Left   Right    Coeff Contr.   Expan.
       -28.749  20.608             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-130.515   -93.5  669.49       T
    93.5 117.031  669.49       T
Skew Angle = 32

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =  669.49
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  1

Pier Data
Pier Station     Upstream=    19.3    Downstream=    19.3
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.12     654    3.12  668.81
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.12     654    3.12  668.81

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
       W.S. Pro Method

  W.S.Pro Data
    Left Embankment
       El of the top of the embankment = 669.49
       El of the toe of the abutment   = 668.09
    Right Embankment
       El of the top of the embankment = 669.9
       El of the toe of the abutment   = 668.5
    Abtument Type                      = 1 Vert. abutments and vert. embankments with or without wingwalls
    Slope of abutments                 =
    Top with of embankment             = 182
    Centroid station of bridge opening =
    Wing Wall Type                     = No wing walls present
       Width                           =
       Angle                           =
       Radius                          =
    Guide Banks Type                   = No Guide Bank present
       Length                          =
       Offset                          =
       Angle                           =

Selected Low Flow Methods = Energy

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2yr
*************************************************************************************************
* E.G. US. (ft)          *     663.84  * Element               *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     663.76  * E.G. Elev (ft)        *     663.84  *     663.82  *
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* Q Total (cfs)	* 994.00	* W.S. Elev (ft)	* 663.75	* 663.76	*
* Q Bridge (cfs)	* 994.00	* Crit W.S. (ft)	* 658.12	* 658.12	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 8.92	* 8.95	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.06	* 1.90	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 482.76	* 522.16	*
* Weir Submerg	*	* Froude # Chl	* 0.15	* 0.15	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 1710.84	* 1736.00	*
* Min El Weir Flow (ft)	* 669.49	* Hydr Depth (ft)	* 4.71	* 3.74	*
* Min El Prs (ft)	* 668.81	* W.P. Total (ft)	* 115.24	* 151.97	*
* Delta EG (ft)	* 0.08	* Conv. Total (cfs)	* 32466.2	* 33261.0	*
* Delta WS (ft)	* 0.01	* Top Width (ft)	* 102.56	* 139.53	*
* BR Open Area (sq ft)	* 1259.32	* Frctn Loss (ft)	* 0.01	* 0.01	*
* BR Open Vel (ft/s)	* 2.06	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.93	* Shear Total (lb/sq ft)	* 0.25	* 0.19	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.52	* -130.52	*

BRIDGE OUTPUT Profile #10yr

* E.G. US. (ft)	* 665.27	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 665.16	* E.G. Elev (ft)	* 665.26	* 665.25	*
* Q Total (cfs)	* 1484.00	* W.S. Elev (ft)	* 665.14	* 665.17	*
* Q Bridge (cfs)	* 1484.00	* Crit W.S. (ft)	* 658.87	* 658.86	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 10.31	* 10.36	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.22	* 2.01	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 668.60	* 737.52	*
* Weir Submerg	*	* Froude # Chl	* 0.17	* 0.16	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 2553.39	* 2659.69	*
* Min El Weir Flow (ft)	* 669.49	* Hydr Depth (ft)	* 4.24	* 4.50	*
* Min El Prs (ft)	* 668.81	* W.P. Total (ft)	* 173.52	* 179.41	*
* Delta EG (ft)	* 0.09	* Conv. Total (cfs)	* 44728.8	* 47310.4	*
* Delta WS (ft)	* -0.01	* Top Width (ft)	* 157.85	* 163.96	*
* BR Open Area (sq ft)	* 1259.32	* Frctn Loss (ft)	* 0.01	* 0.01	*
* BR Open Vel (ft/s)	* 2.22	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.93	* Shear Total (lb/sq ft)	* 0.26	* 0.25	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.52	* -130.52	*

BRIDGE OUTPUT Profile #50yr

* E.G. US. (ft)	* 666.15	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 666.03	* E.G. Elev (ft)	* 666.14	* 666.12	*
* Q Total (cfs)	* 1852.00	* W.S. Elev (ft)	* 666.01	* 666.04	*
* Q Bridge (cfs)	* 1852.00	* Crit W.S. (ft)	* 659.36	* 659.37	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 11.18	* 11.23	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.28	* 2.09	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 812.25	* 885.48	*
* Weir Submerg	*	* Froude # Chl	* 0.15	* 0.12	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 3230.29	* 3396.11	*
* Min El Weir Flow (ft)	* 669.49	* Hydr Depth (ft)	* 4.67	* 5.09	*
* Min El Prs (ft)	* 668.81	* W.P. Total (ft)	* 191.40	* 191.77	*
* Delta EG (ft)	* 0.09	* Conv. Total (cfs)	* 54334.7	* 57894.5	*
* Delta WS (ft)	* -0.01	* Top Width (ft)	* 173.88	* 174.08	*
* BR Open Area (sq ft)	* 1259.32	* Frctn Loss (ft)	* 0.02	* 0.01	*
* BR Open Vel (ft/s)	* 2.28	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.92	* Shear Total (lb/sq ft)	* 0.31	* 0.29	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.52	* -130.52	*

BRIDGE OUTPUT Profile #100yr

* E.G. US. (ft)	* 666.45	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 666.32	* E.G. Elev (ft)	* 666.44	* 666.42	*
* Q Total (cfs)	* 1994.00	* W.S. Elev (ft)	* 666.31	* 666.34	*
* Q Bridge (cfs)	* 1994.00	* Crit W.S. (ft)	* 659.55	* 659.55	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 11.48	* 11.53	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.31	* 2.13	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 864.33	* 937.78	*
* Weir Submerg	*	* Froude # Chl	* 0.15	* 0.12	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 3494.38	* 3681.00	*
* Min El Weir Flow (ft)	* 669.49	* Hydr Depth (ft)	* 4.92	* 5.34	*
* Min El Prs (ft)	* 668.81	* W.P. Total (ft)	* 194.06	* 194.29	*
* Delta EG (ft)	* 0.09	* Conv. Total (cfs)	* 58054.9	* 61912.2	*
* Delta WS (ft)	* -0.01	* Top Width (ft)	* 175.63	* 175.83	*
* BR Open Area (sq ft)	* 1259.32	* Frctn Loss (ft)	* 0.02	* 0.01	*
* BR Open Vel (ft/s)	* 2.31	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.92	* Shear Total (lb/sq ft)	* 0.33	* 0.31	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.52	* -130.52	*

BRIDGE OUTPUT Profile #200yr

* E.G. US. (ft)	* 666.61	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 666.48	* E.G. Elev (ft)	* 666.60	* 666.58	*
* Q Total (cfs)	* 2071.00	* W.S. Elev (ft)	* 666.46	* 666.50	*
* Q Bridge (cfs)	* 2071.00	* Crit W.S. (ft)	* 659.65	* 659.65	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 11.63	* 11.69	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.32	* 2.15	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 891.77	* 965.21	*
* Weir Submerg	*	* Froude # Chl	* 0.15	* 0.12	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 3639.01	* 3836.44	*
* Min El Weir Flow (ft)	* 669.49	* Hydr Depth (ft)	* 5.05	* 5.49	*
* Min El Prs (ft)	* 668.81	* W.P. Total (ft)	* 195.46	* 194.76	*
* Delta EG (ft)	* 0.09	* Conv. Total (cfs)	* 60065.8	* 64101.2	*
* Delta WS (ft)	* -0.01	* Top Width (ft)	* 176.54	* 176.74	*
* BR Open Area (sq ft)	* 1259.32	* Frctn Loss (ft)	* 0.02	* 0.01	*
* BR Open Vel (ft/s)	* 2.32	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.92	* Shear Total (lb/sq ft)	* 0.34	* 0.32	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.52	* -130.52	*

BRIDGE OUTPUT Profile #500yr

* E.G. US. (ft)	* 667.04	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 666.90	* E.G. Elev (ft)	* 667.03	* 667.01	*
* Q Total (cfs)	* 2303.00	* W.S. Elev (ft)	* 666.89	* 666.92	*
* Q Bridge (cfs)	* 2303.00	* Crit W.S. (ft)	* 659.95	* 659.95	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 12.06	* 12.11	*

* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.38	* 2.21	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 967.50	* 1040.21	*
* Weir Submerg	*	* Froude # Chl	* 0.15	* 0.12	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 4059.70	* 4286.57	*
* Min El Weir Flow (ft)	* 669.49	* Hydr Depth (ft)	* 5.41	* 5.92	*
* Min El Prs (ft)	* 668.81	* W.P. Total (ft)	* 199.14	* 196.04	*
* Delta EG (ft)	* 0.10	* Conv. Total (cfs)	* 65792.4	* 70289.5	*
* Delta WS (ft)	* -0.02	* Top Width (ft)	* 178.88	* 178.88	*
* BR Open Area (sq ft)	* 1259.32	* Frctn Loss (ft)	* 0.02	* 0.01	*
* BR Open Vel (ft/s)	* 2.38	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.92	* Shear Total (lb/sq ft)	* 0.37	* 0.36	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.52	* -130.52	*

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95623

INPUT
Description: d/s Ped. bridge, copy of section 95497.4
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.515	670.25	-119.151	670.7	-70	662.3	-45.031	661.25	-28.749	660.58
-28.749	658.23	-23.321	655.72	-22.219	655.41	-17.894	655.75	-7.972	654.81
8.48	655.8	15.01	656.13	19.76	657.93	20.608	661.35	27.986	662.05
66.063	663.85	108.041	667.76	117.031	667.7				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-130.515	.085	-70	.12	-28.749	.065	20.608	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
-28.749 20.608 105 60.81 42 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-130.515	-93.5	669.49	T
93.5	117.031	669.49	T

Skew Angle = 32

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	* 663.77	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.06	* Wt. n-Val.	* 0.119	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 663.75	* Reach Len. (ft)	* 105.00	* 60.81	* 42.00 *
* Crit W.S. (ft)	* 658.11	* Flow Area (sq ft)	* 101.79	* 390.52	* 45.84 *
* E.G. Slope (ft/ft)	*0.000771	* Area (sq ft)	* 101.79	* 390.52	* 45.84 *
* Q Total (cfs)	* 994.00	* Flow (cfs)	* 59.93	* 911.03	* 23.04 *
* Top Width (ft)	* 142.52	* Top Width (ft)	* 49.76	* 49.36	* 43.41 *
* Vel Total (ft/s)	* 1.85	* Avg. Vel. (ft/s)	* 0.59	* 2.33	* 0.50 *
* Max Chl Dpth (ft)	* 8.94	* Hydr. Depth (ft)	* 2.05	* 7.91	* 1.06 *
* Conv. Total (cfs)	* 35808.0	* Conv. (cfs)	* 2158.9	* 32819.0	* 830.1 *
* Length Wtd. (ft)	* 63.01	* Wetted Per. (ft)	* 49.91	* 55.40	* 43.49 *
* Min Ch El (ft)	* 654.81	* Shear (lb/sq ft)	* 0.10	* 0.34	* 0.05 *
* Alpha	* 1.16	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.05	* Cum Volume (acre-ft)	* 1.04	* 15.44	* 1.02 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.52	* 2.31	* 0.85 *

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	* 665.18	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.07	* Wt. n-Val.	* 0.116	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 665.17	* Reach Len. (ft)	* 105.00	* 60.81	* 42.00 *
* Crit W.S. (ft)	* 658.85	* Flow Area (sq ft)	* 178.02	* 460.32	* 119.35 *
* E.G. Slope (ft/ft)	*0.000827	* Area (sq ft)	* 178.02	* 460.32	* 119.35 *
* Q Total (cfs)	* 1484.00	* Flow (cfs)	* 147.10	* 1241.70	* 95.20 *
* Top Width (ft)	* 166.99	* Top Width (ft)	* 58.03	* 49.36	* 59.60 *
* Vel Total (ft/s)	* 1.96	* Avg. Vel. (ft/s)	* 0.83	* 2.70	* 0.80 *
* Max Chl Dpth (ft)	* 10.36	* Hydr. Depth (ft)	* 3.07	* 9.33	* 2.00 *
* Conv. Total (cfs)	* 51591.7	* Conv. (cfs)	* 5114.0	* 43168.1	* 3309.6 *
* Length Wtd. (ft)	* 63.96	* Wetted Per. (ft)	* 58.31	* 55.40	* 59.74 *
* Min Ch El (ft)	* 654.81	* Shear (lb/sq ft)	* 0.16	* 0.43	* 0.10 *
* Alpha	* 1.15	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.05	* Cum Volume (acre-ft)	* 1.84	* 18.59	* 2.55 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.67	* 2.31	* 1.44 *

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	* 666.06	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.08	* Wt. n-Val.	* 0.115	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 666.04	* Reach Len. (ft)	* 105.00	* 60.81	* 42.00 *
* Crit W.S. (ft)	* 659.35	* Flow Area (sq ft)	* 230.68	* 503.24	* 175.23 *
* E.G. Slope (ft/ft)	*0.000855	* Area (sq ft)	* 230.68	* 503.24	* 175.23 *
* Q Total (cfs)	* 1852.00	* Flow (cfs)	* 221.37	* 1464.12	* 166.51 *
* Top Width (ft)	* 181.41	* Top Width (ft)	* 63.12	* 49.36	* 68.94 *
* Vel Total (ft/s)	* 2.04	* Avg. Vel. (ft/s)	* 0.96	* 2.91	* 0.95 *
* Max Chl Dpth (ft)	* 11.23	* Hydr. Depth (ft)	* 3.65	* 10.20	* 2.54 *
* Conv. Total (cfs)	* 63349.7	* Conv. (cfs)	* 7572.3	* 50081.6	* 5695.7 *
* Length Wtd. (ft)	* 64.38	* Wetted Per. (ft)	* 63.47	* 55.40	* 69.11 *
* Min Ch El (ft)	* 654.81	* Shear (lb/sq ft)	* 0.19	* 0.48	* 0.14 *
* Alpha	* 1.19	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 2.48	* 20.52	* 4.32 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.87	* 2.31	* 2.04 *

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	* 666.36	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.08	* Wt. n-Val.	* 0.115	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 666.34	* Reach Len. (ft)	* 105.00	* 60.81	* 42.00 *
* Crit W.S. (ft)	* 659.53	* Flow Area (sq ft)	* 249.83	* 518.00	* 196.34 *
* E.G. Slope (ft/ft)	*0.000866	* Area (sq ft)	* 249.83	* 518.00	* 196.34 *
* Q Total (cfs)	* 1994.00	* Flow (cfs)	* 251.28	* 1546.24	* 196.48 *

* Top Width (ft)	* 186.37	* Top Width (ft)	* 64.87	* 49.36	* 72.15 *
* Vel Total (ft/s)	* 2.07	* Avg. Vel. (ft/s)	* 1.01	* 2.98	* 1.00 *
* Max Chl Dpth (ft)	* 11.53	* Hydr. Depth (ft)	* 3.86	* 10.50	* 2.72 *
* Conv. Total (cfs)	* 67773.9	* Conv. (cfs)	* 8540.8	* 52554.9	* 6678.2 *
* Length Wtd. (ft)	* 64.51	* Wetted Per. (ft)	* 65.13	* 55.40	* 72.34 *
* Min Ch El (ft)	* 654.81	* Shear (lb/sq ft)	* 0.21	* 0.51	* 0.15 *
* Alpha	* 1.19	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 2.74	* 21.17	* 4.90 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.95	* 2.31	* 2.13 *

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	* 666.52	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.08	* Wt. n-Val.	* 0.114	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 666.49	* Reach Len. (ft)	* 105.00	* 60.81	* 42.00 *
* Crit W.S. (ft)	* 659.62	* Flow Area (sq ft)	* 259.95	* 525.72	* 207.70 *
* E.G. Slope (ft/ft)	*0.000869	* Area (sq ft)	* 260.04	* 525.72	* 207.75 *
* Q Total (cfs)	* 2071.00	* Flow (cfs)	* 268.34	* 1587.91	* 214.75 *
* Top Width (ft)	* 188.97	* Top Width (ft)	* 65.78	* 49.36	* 73.83 *
* Vel Total (ft/s)	* 2.08	* Avg. Vel. (ft/s)	* 1.03	* 3.02	* 1.03 *
* Max Chl Dpth (ft)	* 11.68	* Hydr. Depth (ft)	* 4.01	* 10.65	* 2.85 *
* Conv. Total (cfs)	* 70253.7	* Conv. (cfs)	* 9102.8	* 53866.0	* 7285.0 *
* Length Wtd. (ft)	* 64.57	* Wetted Per. (ft)	* 65.13	* 55.40	* 73.09 *
* Min Ch El (ft)	* 654.81	* Shear (lb/sq ft)	* 0.22	* 0.51	* 0.15 *
* Alpha	* 1.19	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 2.89	* 21.52	* 5.21 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.00	* 2.31	* 2.16 *

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 666.95	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.08	* Wt. n-Val.	* 0.113	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 666.92	* Reach Len. (ft)	* 105.00	* 60.81	* 42.00 *
* Crit W.S. (ft)	* 659.88	* Flow Area (sq ft)	* 287.62	* 546.81	* 238.85 *
* E.G. Slope (ft/ft)	*0.000885	* Area (sq ft)	* 288.68	* 546.81	* 240.27 *
* Q Total (cfs)	* 2303.00	* Flow (cfs)	* 318.91	* 1710.60	* 273.48 *
* Top Width (ft)	* 196.06	* Top Width (ft)	* 68.28	* 49.36	* 78.41 *
* Vel Total (ft/s)	* 2.15	* Avg. Vel. (ft/s)	* 1.11	* 3.13	* 1.14 *
* Max Chl Dpth (ft)	* 12.11	* Hydr. Depth (ft)	* 4.44	* 11.08	* 3.28 *
* Conv. Total (cfs)	* 77433.7	* Conv. (cfs)	* 10722.9	* 57515.5	* 9195.3 *
* Length Wtd. (ft)	* 64.68	* Wetted Per. (ft)	* 65.13	* 55.40	* 73.09 *
* Min Ch El (ft)	* 654.81	* Shear (lb/sq ft)	* 0.24	* 0.55	* 0.18 *
* Alpha	* 1.19	* Stream Power (lb/ft s)	* 117.03	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 3.25	* 22.29	* 6.06 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 1.07	* 1.96	* 2.24 *

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95562.19

INPUT
Description: 3111 (Regulatory Section)
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-238.64	669.76	-208.71	669.74	-178.65	668.89	-148.72	669.79	-118.68	670.81
-71.74	670.26	-53.99	661.86	-44.08	659.72	-28.62	661.13	-25.77	656.97
-16.57	655.29	.34	655.36	7.37	655.98	20.03	657.23	30.4	663.83
69.88	663.97	82.52	666.85	95.15	668.56	107.91	670.13	354.15	667.66
600.4	670.38	846.67	673.69	1092.92	674.57	1339.17	670.45	1585.42	673.33
1831.67	676.41	2077.92	682.07						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-238.64	.085	-28.62	.065	30.4	.085	107.91	.2

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-28.62	30.4	102	64.79	39	.1 .3

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	* 663.71	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.08	* Wt. n-Val.	* 0.085	* 0.065	* *
* W.S. Elev (ft)	* 663.63	* Reach Len. (ft)	* 102.00	* 64.79	* 39.00 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 81.15	* 399.86	* *
* E.G. Slope (ft/ft)	*0.000850	* Area (sq ft)	* 81.15	* 399.86	* *
* Q Total (cfs)	* 994.00	* Flow (cfs)	* 80.62	* 913.38	* *
* Top Width (ft)	* 87.83	* Top Width (ft)	* 29.12	* 58.71	* *
* Vel Total (ft/s)	* 2.07	* Avg. Vel. (ft/s)	* 0.99	* 2.28	* *
* Max Chl Dpth (ft)	* 8.34	* Hydr. Depth (ft)	* 2.79	* 6.81	* *
* Conv. Total (cfs)	* 34096.2	* Conv. (cfs)	* 2765.5	* 31330.6	* *
* Length Wtd. (ft)	* 66.89	* Wetted Per. (ft)	* 29.81	* 63.01	* *
* Min Ch El (ft)	* 655.29	* Shear (lb/sq ft)	* 0.14	* 0.34	* *
* Alpha	* 1.14	* Stream Power (lb/ft s)	* 2077.92	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.05	* Cum Volume (acre-ft)	* 0.82	* 14.89	* 1.00 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.42	* 2.24	* 0.83 *

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	* 665.12	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.10	* Wt. n-Val.	* 0.085	* 0.065	* 0.085 *
* W.S. Elev (ft)	* 665.02	* Reach Len. (ft)	* 102.00	* 64.79	* 39.00 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 123.59	* 481.72	* 46.75 *
* E.G. Slope (ft/ft)	*0.000931	* Area (sq ft)	* 123.59	* 481.72	* 46.75 *
* Q Total (cfs)	* 1484.00	* Flow (cfs)	* 158.84	* 1299.28	* 25.88 *
* Top Width (ft)	* 135.17	* Top Width (ft)	* 32.05	* 59.02	* 44.10 *
* Vel Total (ft/s)	* 2.28	* Avg. Vel. (ft/s)	* 1.29	* 2.70	* 0.55 *
* Max Chl Dpth (ft)	* 9.73	* Hydr. Depth (ft)	* 3.86	* 8.16	* 1.06 *
* Conv. Total (cfs)	* 48624.6	* Conv. (cfs)	* 5204.5	* 42572.0	* 848.1 *
* Length Wtd. (ft)	* 67.31	* Wetted Per. (ft)	* 33.06	* 63.38	* 44.22 *
* Min Ch El (ft)	* 655.29	* Shear (lb/sq ft)	* 0.22	* 0.44	* 0.06 *

* Alpha	*	1.26	* Stream Power (lb/ft s)	*	2077.92	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.06	* Cum Volume (acre-ft)	*	1.47	*	17.93	*	2.47	*
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.57	*	2.24	*	1.39	*

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	*	666.00	* Element	*	Left OB	*	Channel	*	Right OB	*
* Vel Head (ft)	*	0.12	* Wt. n-Val.	*	0.085	*	0.065	*	0.085	*
* W.S. Elev (ft)	*	665.88	* Reach Len. (ft)	*	102.00	*	64.79	*	39.00	*
* Crit W.S. (ft)	*		* Flow Area (sq ft)	*	151.79	*	532.22	*	86.09	*
* E.G. Slope (ft/ft)	*	0.000968	* Area (sq ft)	*	151.79	*	532.22	*	86.09	*
* Q Total (cfs)	*	1852.00	* Flow (cfs)	*	219.28	*	1563.68	*	69.04	*
* Top Width (ft)	*	140.74	* Top Width (ft)	*	33.86	*	59.02	*	47.86	*
* Vel Total (ft/s)	*	2.40	* Avg. Vel. (ft/s)	*	1.44	*	2.94	*	0.80	*
* Max Chl Dpth (ft)	*	10.59	* Hydr. Depth (ft)	*	4.48	*	9.02	*	1.80	*
* Conv. Total (cfs)	*	59536.7	* Conv. (cfs)	*	7049.2	*	50267.9	*	2219.5	*
* Length Wtd. (ft)	*	67.17	* Wetted Per. (ft)	*	35.06	*	63.38	*	48.07	*
* Min Ch El (ft)	*	655.29	* Shear (lb/sq ft)	*	0.26	*	0.51	*	0.11	*
* Alpha	*	1.31	* Stream Power (lb/ft s)	*	2077.92	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.06	* Cum Volume (acre-ft)	*	2.02	*	19.79	*	4.20	*
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.75	*	2.24	*	1.98	*

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	*	666.29	* Element	*	Left OB	*	Channel	*	Right OB	*
* Vel Head (ft)	*	0.12	* Wt. n-Val.	*	0.085	*	0.065	*	0.085	*
* W.S. Elev (ft)	*	666.17	* Reach Len. (ft)	*	102.00	*	64.79	*	39.00	*
* Crit W.S. (ft)	*		* Flow Area (sq ft)	*	161.80	*	549.52	*	100.30	*
* E.G. Slope (ft/ft)	*	0.000984	* Area (sq ft)	*	161.80	*	549.52	*	100.30	*
* Q Total (cfs)	*	1994.00	* Flow (cfs)	*	242.79	*	1663.01	*	88.20	*
* Top Width (ft)	*	142.64	* Top Width (ft)	*	34.48	*	59.02	*	49.14	*
* Vel Total (ft/s)	*	2.46	* Avg. Vel. (ft/s)	*	1.50	*	3.03	*	0.88	*
* Max Chl Dpth (ft)	*	10.88	* Hydr. Depth (ft)	*	4.69	*	9.31	*	2.04	*
* Conv. Total (cfs)	*	63572.3	* Conv. (cfs)	*	7740.7	*	53019.7	*	2812.0	*
* Length Wtd. (ft)	*	67.09	* Wetted Per. (ft)	*	35.74	*	63.38	*	49.39	*
* Min Ch El (ft)	*	655.29	* Shear (lb/sq ft)	*	0.28	*	0.53	*	0.12	*
* Alpha	*	1.32	* Stream Power (lb/ft s)	*	2077.92	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.06	* Cum Volume (acre-ft)	*	2.25	*	20.43	*	4.76	*
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.83	*	2.24	*	2.07	*

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	*	666.45	* Element	*	Left OB	*	Channel	*	Right OB	*
* Vel Head (ft)	*	0.13	* Wt. n-Val.	*	0.085	*	0.065	*	0.085	*
* W.S. Elev (ft)	*	666.32	* Reach Len. (ft)	*	102.00	*	64.79	*	39.00	*
* Crit W.S. (ft)	*		* Flow Area (sq ft)	*	167.11	*	558.56	*	107.89	*
* E.G. Slope (ft/ft)	*	0.000992	* Area (sq ft)	*	167.11	*	558.56	*	107.89	*
* Q Total (cfs)	*	2071.00	* Flow (cfs)	*	255.62	*	1716.28	*	99.10	*
* Top Width (ft)	*	143.64	* Top Width (ft)	*	34.80	*	59.02	*	49.81	*
* Vel Total (ft/s)	*	2.48	* Avg. Vel. (ft/s)	*	1.53	*	3.07	*	0.92	*
* Max Chl Dpth (ft)	*	11.03	* Hydr. Depth (ft)	*	4.80	*	9.46	*	2.17	*
* Conv. Total (cfs)	*	65742.6	* Conv. (cfs)	*	8114.5	*	54482.2	*	3145.9	*
* Length Wtd. (ft)	*	67.04	* Wetted Per. (ft)	*	36.10	*	63.38	*	50.08	*
* Min Ch El (ft)	*	655.29	* Shear (lb/sq ft)	*	0.29	*	0.55	*	0.13	*
* Alpha	*	1.32	* Stream Power (lb/ft s)	*	2077.92	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.06	* Cum Volume (acre-ft)	*	2.37	*	20.76	*	5.06	*
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.87	*	2.24	*	2.10	*

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	*	666.88	* Element	*	Left OB	*	Channel	*	Right OB	*
* Vel Head (ft)	*	0.14	* Wt. n-Val.	*	0.085	*	0.065	*	0.085	*
* W.S. Elev (ft)	*	666.74	* Reach Len. (ft)	*	102.00	*	64.79	*	39.00	*
* Crit W.S. (ft)	*		* Flow Area (sq ft)	*	181.82	*	583.20	*	129.06	*
* E.G. Slope (ft/ft)	*	0.001027	* Area (sq ft)	*	181.82	*	583.20	*	129.06	*
* Q Total (cfs)	*	2303.00	* Flow (cfs)	*	294.05	*	1876.33	*	132.62	*
* Top Width (ft)	*	146.35	* Top Width (ft)	*	35.69	*	59.02	*	51.65	*
* Vel Total (ft/s)	*	2.58	* Avg. Vel. (ft/s)	*	1.62	*	3.22	*	1.03	*
* Max Chl Dpth (ft)	*	11.45	* Hydr. Depth (ft)	*	5.10	*	9.88	*	2.50	*
* Conv. Total (cfs)	*	71858.1	* Conv. (cfs)	*	9174.9	*	58545.2	*	4138.0	*
* Length Wtd. (ft)	*	66.92	* Wetted Per. (ft)	*	37.08	*	63.38	*	51.96	*
* Min Ch El (ft)	*	655.29	* Shear (lb/sq ft)	*	0.31	*	0.59	*	0.16	*
* Alpha	*	1.33	* Stream Power (lb/ft s)	*	2077.92	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.06	* Cum Volume (acre-ft)	*	2.68	*	21.51	*	5.88	*
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.95	*	1.88	*	2.18	*

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95497.4

INPUT
Description: Surveyed x-section
Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-153.9	670.25	-140.5	670.7	-126.2	671.07	-109.9	671.06	-85.5	670.53
-53.1	661.25	-33.9	660.58	-33.9	658.23	-27.5	655.72	-26.2	655.41
-21.1	655.75	-9.4	654.78	10	655.8	17.7	656.13	23.3	657.93
24.3	661.35	33	664.03	77.9	664.5	104.6	668.75	110.3	669.27
116.6	668.95	127.4	667.76	138	667.7	140.3	667.57	154.2	664.17
200.5	663.29	253.7	663.16	305.9	663.39	359.7	663.56	412.1	664.75
460.4	664.23	515.1	665.31	537.8	664.88	541.5	664.81	550.7	664.87
552	664.42	566.7	664.59	583.9	664.36	592.2	664.85	597.7	664.99
608.5	665	608.9	664.75	627.6	664.36	647.4	665.92	670.3	665.3
698.2	666.26	704.7	666.09	724.9	665.68	725.9	665.28	749.3	665.79
772.3	665.77								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-153.9	.085	-109.9	.12	-33.9	.065	24.3	.085	127.4	.2

515.1 .2

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
-33.9 24.3 147 203.1 327 .1 .3
Right Levee Station= 110.3 Elevation= 669.27

CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	663.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.120	0.065	0.085
W.S. Elev (ft)	663.59	Reach Len. (ft)	147.00	203.10	327.00
Crit W.S. (ft)	657.86	Flow Area (sq ft)	60.98	451.56	8.16
E.G. Slope (ft/ft)	0.000634	Area (sq ft)	60.98	451.56	8.16
Q Total (cfs)	994.00	Flow (cfs)	34.11	956.13	3.76
Top Width (ft)	92.86	Top Width (ft)	27.38	58.20	7.28
Vel Total (ft/s)	1.91	Avg. Vel. (ft/s)	0.56	2.12	0.46
Max Chl Dpth (ft)	8.81	Hydr. Depth (ft)	2.23	7.76	1.12
Conv. Total (cfs)	39482.1	Conv. (cfs)	1354.9	37977.8	149.3
Length Wtd. (ft)	207.61	Wetted Per. (ft)	27.72	63.99	7.62
Min Ch El (ft)	654.78	Shear (lb/sq ft)	0.09	0.28	0.04
Alpha	1.19	Stream Power (lb/ft s)	772.30	0.00	110.30
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.65	14.26	0.99
C & E Loss (ft)	0.00	Cum SA (acres)	0.36	2.15	0.83

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	665.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.120	0.065	0.085
W.S. Elev (ft)	664.97	Reach Len. (ft)	147.00	203.10	327.00
Crit W.S. (ft)	658.51	Flow Area (sq ft)	102.02	531.77	52.20
E.G. Slope (ft/ft)	0.000754	Area (sq ft)	102.02	531.77	52.20
Q Total (cfs)	1477.00	Flow (cfs)	79.40	1369.43	28.17
Top Width (ft)	146.94	Top Width (ft)	32.19	58.20	56.55
Vel Total (ft/s)	2.15	Avg. Vel. (ft/s)	0.78	2.58	0.54
Max Chl Dpth (ft)	10.19	Hydr. Depth (ft)	3.17	9.14	0.92
Conv. Total (cfs)	53791.8	Conv. (cfs)	2891.6	49874.2	1026.1
Length Wtd. (ft)	208.01	Wetted Per. (ft)	32.72	63.99	57.00
Min Ch El (ft)	654.78	Shear (lb/sq ft)	0.15	0.39	0.04
Alpha	1.33	Stream Power (lb/ft s)	772.30	0.00	110.30
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	1.21	17.18	2.42
C & E Loss (ft)	0.00	Cum SA (acres)	0.49	2.15	1.35

CROSS SECTION OUTPUT Profile #50yr

E.G. Elev (ft)	665.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.120	0.065	0.085
W.S. Elev (ft)	665.82	Reach Len. (ft)	147.00	203.10	327.00
Crit W.S. (ft)	658.96	Flow Area (sq ft)	130.72	581.37	102.68
E.G. Slope (ft/ft)	0.000808	Area (sq ft)	130.72	581.37	102.68
Q Total (cfs)	1839.00	Flow (cfs)	117.44	1644.69	76.87
Top Width (ft)	155.27	Top Width (ft)	35.16	58.20	61.91
Vel Total (ft/s)	2.26	Avg. Vel. (ft/s)	0.90	2.83	0.75
Max Chl Dpth (ft)	11.04	Hydr. Depth (ft)	3.72	9.99	1.66
Conv. Total (cfs)	64702.4	Conv. (cfs)	4132.0	57866.0	2704.4
Length Wtd. (ft)	208.13	Wetted Per. (ft)	35.82	63.99	62.42
Min Ch El (ft)	654.78	Shear (lb/sq ft)	0.18	0.46	0.08
Alpha	1.42	Stream Power (lb/ft s)	772.30	0.00	110.30
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	1.69	18.97	4.11
C & E Loss (ft)	0.00	Cum SA (acres)	0.67	2.15	1.93

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	666.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.120	0.065	0.085
W.S. Elev (ft)	666.11	Reach Len. (ft)	147.00	203.10	327.00
Crit W.S. (ft)	659.11	Flow Area (sq ft)	141.14	598.36	121.02
E.G. Slope (ft/ft)	0.000828	Area (sq ft)	141.14	598.36	121.02
Q Total (cfs)	1979.00	Flow (cfs)	132.63	1746.87	99.50
Top Width (ft)	158.13	Top Width (ft)	36.18	58.20	63.74
Vel Total (ft/s)	2.30	Avg. Vel. (ft/s)	0.94	2.92	0.82
Max Chl Dpth (ft)	11.33	Hydr. Depth (ft)	3.90	10.28	1.90
Conv. Total (cfs)	68779.6	Conv. (cfs)	4609.6	60711.9	3458.2
Length Wtd. (ft)	208.27	Wetted Per. (ft)	36.88	63.99	64.28
Min Ch El (ft)	654.78	Shear (lb/sq ft)	0.20	0.48	0.10
Alpha	1.44	Stream Power (lb/ft s)	772.30	0.00	110.30
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	1.89	19.57	4.66
C & E Loss (ft)	0.00	Cum SA (acres)	0.75	2.15	2.02

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	666.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.120	0.065	0.085
W.S. Elev (ft)	666.27	Reach Len. (ft)	147.00	203.10	327.00
Crit W.S. (ft)	659.20	Flow Area (sq ft)	146.70	607.24	130.82
E.G. Slope (ft/ft)	0.000839	Area (sq ft)	146.70	607.24	130.82
Q Total (cfs)	2056.00	Flow (cfs)	141.07	1802.33	112.60
Top Width (ft)	159.62	Top Width (ft)	36.72	58.20	64.70
Vel Total (ft/s)	2.32	Avg. Vel. (ft/s)	0.96	2.97	0.86
Max Chl Dpth (ft)	11.49	Hydr. Depth (ft)	4.00	10.43	2.02
Conv. Total (cfs)	70978.3	Conv. (cfs)	4870.1	62221.0	3887.1
Length Wtd. (ft)	208.27	Wetted Per. (ft)	37.43	63.99	65.25
Min Ch El (ft)	654.78	Shear (lb/sq ft)	0.21	0.50	0.11
Alpha	1.45	Stream Power (lb/ft s)	772.30	0.00	110.30
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	2.01	19.89	4.95
C & E Loss (ft)	0.00	Cum SA (acres)	0.79	2.15	2.05

CROSS SECTION OUTPUT Profile #500yr

E.G. Elev (ft)	666.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.120	0.065	0.085
W.S. Elev (ft)	666.68	Reach Len. (ft)	147.00	203.10	327.00
Crit W.S. (ft)	659.44	Flow Area (sq ft)	162.25	631.41	158.23
E.G. Slope (ft/ft)	0.000877	Area (sq ft)	162.25	631.41	158.23

* Q Total (cfs)	* 2286.00	* Flow (cfs)	* 166.35	* 1966.41	* 153.24	*
* Top Width (ft)	* 163.68	* Top Width (ft)	* 38.17	* 58.20	* 67.31	*
* Vel Total (ft/s)	* 2.40	* Avg. Vel. (ft/s)	* 1.03	* 3.11	* 0.97	*
* Max Chl Dpth (ft)	* 11.90	* Hydr. Depth (ft)	* 4.25	* 10.85	* 2.35	*
* Conv. Total (cfs)	* 77194.4	* Conv. (cfs)	* 5617.3	* 66402.5	* 5174.6	*
* Length Wtd. (ft)	* 205.72	* Wetted Per. (ft)	* 38.94	* 63.99	* 67.89	*
* Min Ch El (ft)	* 654.78	* Shear (lb/sq ft)	* 0.23	* 0.54	* 0.13	*
* Alpha	* 1.47	* Stream Power (lb/ft s)	* 772.30	* 0.00	* 110.30	*
* Frctn Loss (ft)	* 0.13	* Cum Volume (acre-ft)	* 2.28	* 20.60	* 5.75	*
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	* 0.86	* 1.79	* 2.13	*

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95294.3

INPUT
Description: U/S Rt. 83 (surveyed x-section)
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.8	669.58	-101.8	669.28	-77	667.14	-69.6	663.71	-60.6	662.25
-50.2	660.47	-45.9	658.26	-42.7	657.91	-34.4	657.44	-21.6	656.96
-18.6	656.68	-10.7	656.56	13	657.11	24.699	657.55	38.4	657.44
51.2	657.99	53.8	660.77	62	662.34	73	663.23	75.4	665.14
102.4	667.73	124	667.52	163.6	665.77				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-130.8	.085	-45.9	.055	51.2	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

-60.6	62	187.3	187.3	187.3	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-130.8	-91	670.92	F
91	163.6	670.92	F

Right Levee Station= 102.4 Elevation= 667.73

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	* 663.56	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.03	* Wt. n-Val.	* 0.085	* 0.062	* 0.085 *
* W.S. Elev (ft)	* 663.52	* Reach Len. (ft)	* 32.30	* 32.30	* 32.30 *
* Crit W.S. (ft)	* 658.73	* Flow Area (sq ft)	* 4.99	* 676.61	* 8.16 *
* E.G. Slope (ft/ft)	*0.000394	* Area (sq ft)	* 4.99	* 676.61	* 8.16 *
* Q Total (cfs)	* 994.00	* Flow (cfs)	* 1.27	* 990.48	* 2.25 *
* Top Width (ft)	* 141.81	* Top Width (ft)	* 7.84	* 122.60	* 11.37 *
* Vel Total (ft/s)	* 1.44	* Avg. Vel. (ft/s)	* 0.25	* 1.46	* 0.28 *
* Max Chl Dpth (ft)	* 6.96	* Hydr. Depth (ft)	* 0.64	* 5.52	* 0.72 *
* Conv. Total (cfs)	* 50060.3	* Conv. (cfs)	* 64.0	* 49882.8	* 113.5 *
* Length Wtd. (ft)	* 32.30	* Wetted Per. (ft)	* 7.95	* 124.72	* 11.51 *
* Min Ch El (ft)	* 656.56	* Shear (lb/sq ft)	* 0.02	* 0.13	* 0.02 *
* Alpha	* 1.03	* Stream Power (lb/ft s)	* 163.60	* 0.00	* 102.40 *
* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	* 0.54	* 11.63	* 0.93 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.30	* 1.73	* 0.76 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	* 664.95	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.05	* Wt. n-Val.	* 0.085	* 0.062	* 0.085 *
* W.S. Elev (ft)	* 664.91	* Reach Len. (ft)	* 32.30	* 32.30	* 32.30 *
* Crit W.S. (ft)	* 659.17	* Flow Area (sq ft)	* 18.88	* 846.28	* 25.10 *
* E.G. Slope (ft/ft)	*0.000403	* Area (sq ft)	* 18.88	* 846.28	* 25.10 *
* Q Total (cfs)	* 1477.00	* Flow (cfs)	* 8.99	* 1454.84	* 13.18 *
* Top Width (ft)	* 147.29	* Top Width (ft)	* 11.58	* 122.60	* 13.11 *
* Vel Total (ft/s)	* 1.66	* Avg. Vel. (ft/s)	* 0.48	* 1.72	* 0.53 *
* Max Chl Dpth (ft)	* 8.35	* Hydr. Depth (ft)	* 1.63	* 6.90	* 1.92 *
* Conv. Total (cfs)	* 73531.7	* Conv. (cfs)	* 447.4	* 72428.3	* 656.1 *
* Length Wtd. (ft)	* 32.30	* Wetted Per. (ft)	* 11.96	* 124.72	* 13.73 *
* Min Ch El (ft)	* 656.56	* Shear (lb/sq ft)	* 0.04	* 0.17	* 0.05 *
* Alpha	* 1.06	* Stream Power (lb/ft s)	* 163.60	* 0.00	* 102.40 *
* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	* 1.01	* 13.96	* 2.13 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.42	* 1.73	* 1.09 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	* 665.81	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.05	* Wt. n-Val.	* 0.085	* 0.062	* 0.085 *
* W.S. Elev (ft)	* 665.76	* Reach Len. (ft)	* 32.30	* 32.30	* 32.30 *
* Crit W.S. (ft)	* 659.47	* Flow Area (sq ft)	* 29.54	* 950.84	* 38.49 *
* E.G. Slope (ft/ft)	*0.000419	* Area (sq ft)	* 29.54	* 950.84	* 38.49 *
* Q Total (cfs)	* 1839.00	* Flow (cfs)	* 17.40	* 1800.69	* 20.91 *
* Top Width (ft)	* 155.87	* Top Width (ft)	* 13.42	* 122.60	* 19.85 *
* Vel Total (ft/s)	* 1.80	* Avg. Vel. (ft/s)	* 0.59	* 1.89	* 0.54 *
* Max Chl Dpth (ft)	* 9.20	* Hydr. Depth (ft)	* 2.20	* 7.76	* 1.94 *
* Conv. Total (cfs)	* 89819.9	* Conv. (cfs)	* 850.0	* 87948.7	* 1021.2 *
* Length Wtd. (ft)	* 32.30	* Wetted Per. (ft)	* 13.99	* 124.72	* 20.59 *
* Min Ch El (ft)	* 656.56	* Shear (lb/sq ft)	* 0.06	* 0.20	* 0.05 *
* Alpha	* 1.08	* Stream Power (lb/ft s)	* 163.60	* 0.00	* 102.40 *
* Frctn Loss (ft)	* 0.02	* Cum Volume (acre-ft)	* 1.42	* 15.39	* 3.58 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.59	* 1.73	* 1.62 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	* 666.11	* Element	* Left OB	* Channel	* Right OB *

* Vel Head (ft)	* 0.06	* Wt. n-Val.	* 0.085	* 0.062	* 0.085		
* W.S. Elev (ft)	* 666.05	* Reach Len. (ft)	* 32.30	* 32.30	* 32.30		
* Crit W.S. (ft)	* 659.60	* Flow Area (sq ft)	* 33.54	* 986.56	* 44.72		
* E.G. Slope (ft/ft)	*0.000427	* Area (sq ft)	* 33.54	* 986.56	* 44.72		
* Q Total (cfs)	* 1979.00	* Flow (cfs)	* 21.02	* 1933.26	* 24.72		
* Top Width (ft)	* 159.54	* Top Width (ft)	* 14.05	* 122.60	* 22.89		
* Vel Total (ft/s)	* 1.86	* Avg. Vel. (ft/s)	* 0.63	* 1.96	* 0.55		
* Max Chl Dpth (ft)	* 9.49	* Hydr. Depth (ft)	* 2.39	* 8.05	* 1.95		
* Conv. Total (cfs)	* 95737.4	* Conv. (cfs)	* 1017.1	* 93524.6	* 1195.7		
* Length Wtd. (ft)	* 32.30	* Wetted Per. (ft)	* 14.68	* 124.72	* 23.64		
* Min Ch El (ft)	* 656.56	* Shear (lb/sq ft)	* 0.06	* 0.21	* 0.05		
* Alpha	* 1.09	* Stream Power (lb/ft s)	* 163.60	* 0.00	* 102.40		
* Frctn Loss (ft)	* 0.02	* Cum Volume (acre-ft)	* 1.60	* 15.88	* 4.04		
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.66	* 1.73	* 1.69		

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	* 666.26	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.06	* Wt. n-Val.	* 0.085	* 0.062	* 0.085 *
* W.S. Elev (ft)	* 666.20	* Reach Len. (ft)	* 32.30	* 32.30	* 32.30 *
* Crit W.S. (ft)	* 659.65	* Flow Area (sq ft)	* 35.71	* 1005.22	* 48.32 *
* E.G. Slope (ft/ft)	*0.000432	* Area (sq ft)	* 35.71	* 1005.22	* 48.32 *
* Q Total (cfs)	* 2056.00	* Flow (cfs)	* 23.09	* 2005.83	* 27.08 *
* Top Width (ft)	* 161.46	* Top Width (ft)	* 14.38	* 122.60	* 24.48 *
* Vel Total (ft/s)	* 1.89	* Avg. Vel. (ft/s)	* 0.65	* 2.00	* 0.56 *
* Max Chl Dpth (ft)	* 9.64	* Hydr. Depth (ft)	* 2.48	* 8.20	* 1.97 *
* Conv. Total (cfs)	* 98903.8	* Conv. (cfs)	* 1110.6	* 96490.5	* 1302.7 *
* Length Wtd. (ft)	* 32.30	* Wetted Per. (ft)	* 15.04	* 124.72	* 25.23 *
* Min Ch El (ft)	* 656.56	* Shear (lb/sq ft)	* 0.06	* 0.22	* 0.05 *
* Alpha	* 1.09	* Stream Power (lb/ft s)	* 163.60	* 0.00	* 102.40 *
* Frctn Loss (ft)	* 0.02	* Cum Volume (acre-ft)	* 1.70	* 16.13	* 4.28 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.70	* 1.73	* 1.71 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 666.67	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.07	* Wt. n-Val.	* 0.085	* 0.062	* 0.085 *
* W.S. Elev (ft)	* 666.60	* Reach Len. (ft)	* 32.30	* 32.30	* 32.30 *
* Crit W.S. (ft)	* 659.82	* Flow Area (sq ft)	* 41.63	* 1054.26	* 58.95 *
* E.G. Slope (ft/ft)	*0.000452	* Area (sq ft)	* 41.63	* 1054.26	* 58.95 *
* Q Total (cfs)	* 2286.00	* Flow (cfs)	* 29.29	* 2221.88	* 34.83 *
* Top Width (ft)	* 166.49	* Top Width (ft)	* 15.24	* 122.60	* 28.65 *
* Vel Total (ft/s)	* 1.98	* Avg. Vel. (ft/s)	* 0.70	* 2.11	* 0.59 *
* Max Chl Dpth (ft)	* 10.04	* Hydr. Depth (ft)	* 2.73	* 8.60	* 2.06 *
* Conv. Total (cfs)	*107478.1	* Conv. (cfs)	* 1376.9	*104463.5	* 1637.8 *
* Length Wtd. (ft)	* 32.30	* Wetted Per. (ft)	* 16.00	* 124.72	* 29.42 *
* Min Ch El (ft)	* 656.56	* Shear (lb/sq ft)	* 0.07	* 0.24	* 0.06 *
* Alpha	* 1.10	* Stream Power (lb/ft s)	* 163.60	* 0.00	* 102.40 *
* Frctn Loss (ft)	* 0.02	* Cum Volume (acre-ft)	* 1.93	* 16.67	* 4.94 *
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	* 0.77	* 1.37	* 1.77 *

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE

RIVER: Salt Creek
REACH: A RS: 95200

INPUT
Description: Route 83 Bridge
Distance from Upstream XS = 32.3
Deck/Roadway Width = 124
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 8

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord		
-380	671.72	-61.7	670.92	-58.7	670.92	666.22	
-23.5	670.98	666.28	23.5	671.07	666.37	58.7	671.13	666.43
61.7	671.13		325	671.02				

Upstream Bridge Cross Section Data
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.8	669.58	-101.8	669.28	-77	667.14	-69.6	663.71	-60.6	662.25
-50.2	660.47	-45.9	658.26	-42.7	657.91	-34.4	657.44	-21.6	656.96
-18.6	656.68	-10.7	656.56	13	657.11	24.699	657.55	38.4	657.44
51.2	657.99	53.8	660.77	62	662.34	73	663.23	75.4	665.14
102.4	667.73	124	667.52	163.6	665.77				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-130.8	.085	-45.9	.055	51.2	.085

Bank Sta: Left Right Coeff Contr. Expan.
-60.6 62 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-130.8	-91	670.92	F
91	163.6	670.92	F

Right Levee Station= 102.4 Elevation= 667.73

Downstream Deck/Roadway Coordinates
num= 8

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord

```
**********************************************************************
    -380  671.72           -61.7  670.92           -58.7  670.92  666.22
   -23.5  670.98  666.28    23.5  671.07  666.37    58.7  671.13  666.43
    61.7  671.13             325  671.02

Downstream Bridge Cross Section Data
Station Elevation Data    num=      20
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
  -204.8  667.52  -150.7  667.28  -102.8   665.8   -77.3   664.7   -49.5  659.78
   -45.6  657.67   -33.9  656.29   -16.4  656.62       0  656.61    16.4  656.43
    31.7  657.26    41.5   656.7    54.9  657.05    56.7  660.72  70.299  663.29
    85.8  663.89 139.599  665.01   179.5     666   192.9     668   248.7     670

Manninq's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
  -204.8    .085   -49.5    .055    56.7    .085

Bank Sta: Left   Right    Coeff Contr.   Expan.
          -49.5    56.7             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  -204.8   -66.5  670.92       F
    66.5   248.7  670.92       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =  670.92
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream=   -23.5    Downstream=   -23.5
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5  652.22       2  666.28
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5  652.22       2  666.28

Pier Data
Pier Station     Upstream=    23.5    Downstream=    23.5
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5  652.22       2  666.37
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5  652.22       2  666.37

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
       W.S. Pro Method

  W.S.Pro Data
    Left Embankment
       El of the top of the embankment = 670.25
       El of the toe of the abutment   = 656.5
    Right Embankment
       El of the top of the embankment = 670.43
       El of the toe of the abutment   = 656.5
    Abtument Type                      = 4 Vert. abutments and sloping embankments with wingwalls
    Slope of abutments                 =
    Top with of embankment             = 109
    Centroid station of bridge opening =
    Wing Wall Type                     = Angular wing walls
       Width                           = 24
       Angle                           = 30
       Radius                          =
    Guide Banks Type                   = No Guide Bank present
       Length                          =
       Offset                          =
       Angle                           =

Selected Low Flow Methods = Energy

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2yr
*************************************************************************************************
* E.G. US. (ft)          *     663.56  * Element               *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     663.52  * E.G. Elev (ft)        *     663.54  *     663.49  *
* Q Total (cfs)          *     994.00  * W.S. Elev (ft)        *     663.50  *     663.46  *
* Q Bridge (cfs)         *     994.00  * Crit W.S. (ft)        *     658.78  *     658.22  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)     *       6.94  *       7.17  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)      *       1.55  *       1.41  *
```

* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 639.28	* 705.64	*
* Weir Submerg	*	* Froude # Chl	* 0.10	* 0.09	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 1966.67	* 2337.51	*
* Min El Weir Flow (ft)	* 670.93	* Hydr Depth (ft)	* 5.65	* 6.23	*
* Min El Prs (ft)	* 666.43	* W.P. Total (ft)	* 143.13	* 147.52	*
* Delta EG (ft)	* 0.18	* Conv. Total (cfs)	* 46841.9	* 54995.0	*
* Delta WS (ft)	* 0.06	* Top Width (ft)	* 113.21	* 113.21	*
* BR Open Area (sq ft)	* 958.87	* Frctn Loss (ft)	* 0.05	* 0.01	*
* BR Open Vel (ft/s)	* 1.55	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.98	* Shear Total (lb/sq ft)	* 0.13	* 0.10	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.80	* -204.80	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #10yr

* E.G. US. (ft)	* 664.95	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 664.91	* E.G. Elev (ft)	* 664.94	* 664.88	*
* Q Total (cfs)	* 1477.00	* W.S. Elev (ft)	* 664.88	* 664.83	*
* Q Bridge (cfs)	* 1477.00	* Crit W.S. (ft)	* 659.25	* 658.68	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 8.32	* 8.54	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 1.86	* 1.72	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 795.45	* 860.86	*
* Weir Submerg	*	* Froude # Chl	* 0.11	* 0.11	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 2993.01	* 3446.81	*
* Min El Weir Flow (ft)	* 670.93	* Hydr Depth (ft)	* 7.02	* 7.60	*
* Min El Prs (ft)	* 666.43	* W.P. Total (ft)	* 151.40	* 155.75	*
* Delta EG (ft)	* 0.21	* Conv. Total (cfs)	* 64947.8	* 73674.9	*
* Delta WS (ft)	* 0.08	* Top Width (ft)	* 113.30	* 113.30	*
* BR Open Area (sq ft)	* 958.87	* Frctn Loss (ft)	* 0.06	* 0.01	*
* BR Open Vel (ft/s)	* 1.86	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.98	* Shear Total (lb/sq ft)	* 0.17	* 0.14	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.80	* -204.80	*

Warning: When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the largest [smallest] user entered n value. The n value has been set to the largest [smallest] entered value. The user may wish to examine this cross section and enter a single n value for the entire channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #50yr

* E.G. US. (ft)	* 665.81	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 665.76	* E.G. Elev (ft)	* 665.80	* 665.73	*
* Q Total (cfs)	* 1839.00	* W.S. Elev (ft)	* 665.73	* 665.67	*
* Q Bridge (cfs)	* 1839.00	* Crit W.S. (ft)	* 659.55	* 658.98	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 9.17	* 9.38	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.06	* 1.92	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 891.63	* 956.28	*
* Weir Submerg	*	* Froude # Chl	* 0.12	* 0.11	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 3741.49	* 4243.51	*
* Min El Weir Flow (ft)	* 670.93	* Hydr Depth (ft)	* 7.87	* 8.44	*
* Min El Prs (ft)	* 666.43	* W.P. Total (ft)	* 156.50	* 160.80	*
* Delta EG (ft)	* 0.23	* Conv. Total (cfs)	* 76842.8	* 85908.2	*
* Delta WS (ft)	* 0.08	* Top Width (ft)	* 113.36	* 113.36	*
* BR Open Area (sq ft)	* 958.87	* Frctn Loss (ft)	* 0.06	* 0.01	*
* BR Open Vel (ft/s)	* 2.06	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.98	* Shear Total (lb/sq ft)	* 0.20	* 0.17	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.80	* -204.80	*

Warning: When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the largest [smallest] user entered n value. The n value has been set to the largest [smallest] entered value. The user may wish to examine this cross section and enter a single n value for the entire channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #100yr

* E.G. US. (ft)	* 666.11	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 666.05	* E.G. Elev (ft)	* 666.09	* 666.03	*
* Q Total (cfs)	* 1979.00	* W.S. Elev (ft)	* 666.02	* 665.96	*
* Q Bridge (cfs)	* 1979.00	* Crit W.S. (ft)	* 659.67	* 659.10	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 9.46	* 9.67	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.14	* 2.00	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 924.45	* 988.78	*
* Weir Submerg	*	* Froude # Chl	* 0.12	* 0.12	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 4018.13	* 4535.74	*
* Min El Weir Flow (ft)	* 670.93	* Hydr Depth (ft)	* 8.15	* 8.72	*
* Min El Prs (ft)	* 666.43	* W.P. Total (ft)	* 158.23	* 162.52	*
* Delta EG (ft)	* 0.24	* Conv. Total (cfs)	* 81016.2	* 90192.2	*
* Delta WS (ft)	* 0.09	* Top Width (ft)	* 113.38	* 113.38	*
* BR Open Area (sq ft)	* 958.87	* Frctn Loss (ft)	* 0.07	* 0.01	*
* BR Open Vel (ft/s)	* 2.14	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.98	* Shear Total (lb/sq ft)	* 0.22	* 0.18	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.80	* -204.80	*

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #200yr

* E.G. US. (ft)	* 666.26	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 666.20	* E.G. Elev (ft)	* 666.25	* 666.18	*
* Q Total (cfs)	* 2056.00	* W.S. Elev (ft)	* 666.17	* 666.11	*
* Q Bridge (cfs)	* 2056.00	* Crit W.S. (ft)	* 659.74	* 659.15	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 9.61	* 9.82	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.18	* 2.04	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 941.58	* 1005.74	*
* Weir Submerg	*	* Froude # Chl	* 0.12	* 0.12	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 4166.98	* 4692.59	*
* Min El Weir Flow (ft)	* 670.93	* Hydr Depth (ft)	* 8.30	* 8.87	*

* Min El Prs (ft)	* 666.43	* W.P. Total (ft)	* 159.14	* 163.42	*
* Delta EG (ft)	* 0.24	* Conv. Total (cfs)	* 83217.1	* 92450.4	*
* Delta WS (ft)	* 0.09	* Top Width (ft)	* 113.39	* 113.39	*
* BR Open Area (sq ft)	* 958.87	* Frctn Loss (ft)	* 0.07	* 0.01	*
* BR Open Vel (ft/s)	* 2.18	* C & E Loss (ft)	* 0.00	* 0.00	*
* Coef of Q	* 0.98	* Shear Total (lb/sq ft)	* 0.23	* 0.19	*
* Br Sel Method	* WSPRO	* Power Total (lb/ft s)	* -130.80	* -204.80	*

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE OUTPUT Profile #500yr

* E.G. US. (ft)	* 666.67	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 666.60	* E.G. Elev (ft)	* 666.64	* 666.48	*
* Q Total (cfs)	* 2286.00	* W.S. Elev (ft)	* 666.55	* 666.40	*
* Q Bridge (cfs)	* 2286.00	* Crit W.S. (ft)	* 659.91	* 659.33	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 9.99	* 10.11	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 2.38	* 2.22	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 958.87	* 1029.73	*
* Weir Submerg	*	* Froude # Chl	* 0.13	* 0.13	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 4558.37	* 5016.08	*
* Min El Weir Flow (ft)	* 670.93	* Hydr Depth (ft)	*	* 59.91	*
* Min El Prs (ft)	* 666.43	* W.P. Total (ft)	* 273.45	* 260.88	*
* Delta EG (ft)	* 0.21	* Conv. Total (cfs)	* 59792.5	* 69799.8	*
* Delta WS (ft)	* 0.21	* Top Width (ft)	*	* 17.19	*
* BR Open Area (sq ft)	* 958.87	* Frctn Loss (ft)	* 0.15	* 0.02	*
* BR Open Vel (ft/s)	* 2.38	* C & E Loss (ft)	* 0.00	* 0.01	*
* Coef of Q	*	* Shear Total (lb/sq ft)	* 0.32	* 0.26	*
* Br Sel Method	*Energy only	* Power Total (lb/ft s)	* -130.80	* -204.80	*

Warning: The sluice gate calculations did not converge during the pressure flow only calculation.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The downstream water surface is below the minimum elevation for pressure flow. The sluice gate equations were used for pressure flow.
Note: Manninq's n values were composited to a sinqle value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 95107

INPUT
Description: D/S Rt. 83 (surveyed x-section)
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-204.8	667.52	-150.7	667.28	-102.8	665.8	-77.3	664.7	-49.5	659.78
-45.6	657.67	-33.9	656.29	-16.4	656.62	0	656.61	16.4	656.43
31.7	657.26	41.5	656.7	54.9	657.05	56.7	660.72	70.299	663.29
85.8	663.89	139.599	665.01	179.5	666	192.9	668	248.7	670

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-204.8	.085	-49.5	.055	56.7	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-49.5	56.7	606	488.66	279	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-204.8	-66.5	670.92	F
66.5	248.7	670.92	F

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	* 663.38	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.03	* Wt. n-Val.	* 0.085	* 0.055	* 0.085 *
* W.S. Elev (ft)	* 663.46	* Reach Len. (ft)	* 606.00	* 488.66	* 279.00 *
* Crit W.S. (ft)	* 658.17	* Flow Area (sq ft)	* 36.96	* 703.97	* 17.76 *
* E.G. Slope (ft/ft)	*0.000217	* Area (sq ft)	* 38.23	* 703.97	* 20.13 *
* Q Total (cfs)	* 994.00	* Flow (cfs)	* 15.82	* 971.45	* 6.73 *
* Top Width (ft)	* 144.94	* Top Width (ft)	* 20.78	* 106.20	* 17.95 *
* Vel Total (ft/s)	* 1.31	* Avq. Vel. (ft/s)	* 0.43	* 1.38	* 0.38 *
* Max Chl Dpth (ft)	* 7.17	* Hydr. Depth (ft)	* 2.17	* 6.63	* 1.81 *
* Conv. Total (cfs)	* 67427.0	* Conv. (cfs)	* 1073.2	* 65897.5	* 456.2 *
* Length Wtd. (ft)	* 489.11	* Wetted Per. (ft)	* 17.26	* 109.15	* 9.97 *
* Min Ch El (ft)	* 656.29	* Shear (lb/sq ft)	* 0.03	* 0.09	* 0.02 *
* Alpha	* 1.04	* Stream Power (lb/ft s)	* 248.70	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.11	* Cum Volume (acre-ft)	* 0.48	* 8.78	* 0.91 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.27	* 1.26	* 0.75 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	* 664.75	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.04	* Wt. n-Val.	* 0.085	* 0.055	* 0.085 *
* W.S. Elev (ft)	* 664.83	* Reach Len. (ft)	* 606.00	* 488.66	* 279.00 *
* Crit W.S. (ft)	* 658.60	* Flow Area (sq ft)	* 60.29	* 849.72	* 31.21 *
* E.G. Slope (ft/ft)	*0.000248	* Area (sq ft)	* 72.22	* 849.72	* 78.92 *
* Q Total (cfs)	* 1477.00	* Flow (cfs)	* 38.22	* 1420.40	* 18.39 *
* Top Width (ft)	* 211.33	* Top Width (ft)	* 30.83	* 106.20	* 74.29 *
* Vel Total (ft/s)	* 1.57	* Avq. Vel. (ft/s)	* 0.63	* 1.67	* 0.59 *
* Max Chl Dpth (ft)	* 8.54	* Hydr. Depth (ft)	* 3.55	* 8.00	* 3.18 *
* Conv. Total (cfs)	* 93766.1	* Conv. (cfs)	* 2426.1	* 90172.7	* 1167.4 *
* Length Wtd. (ft)	* 489.09	* Wetted Per. (ft)	* 17.26	* 109.15	* 9.97 *

* Min Ch El (ft)	*	656.29	* Shear (lb/sq ft)	*	0.05	*	0.12	*	0.05	*
* Alpha	*	1.04	* Stream Power (lb/ft s)	*	248.70	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.12	* Cum Volume (acre-ft)	*	0.90	*	10.47	*	2.08	*
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.38	*	1.26	*	1.05	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	*	665.59	* Element	*	Left OB	*	Channel	*	Right OB	*
* Vel Head (ft)	*	0.05	* Wt. n-Val.	*	0.085	*	0.055	*	0.085	*
* W.S. Elev (ft)	*	665.67	* Reach Len. (ft)	*	606.00	*	488.66	*	279.00	*
* Crit W.S. (ft)	*	658.90	* Flow Area (sq ft)	*	74.63	*	939.30	*	39.48	*
* E.G. Slope (ft/ft)	*	0.000271	* Area (sq ft)	*	106.48	*	939.30	*	156.97	*
* Q Total (cfs)	*	1839.00	* Flow (cfs)	*	56.97	*	1753.61	*	28.42	*
* Top Width (ft)	*	266.26	* Top Width (ft)	*	50.39	*	106.20	*	109.68	*
* Vel Total (ft/s)	*	1.75	* Avg. Vel. (ft/s)	*	0.76	*	1.87	*	0.72	*
* Max Chl Dpth (ft)	*	9.38	* Hydr. Depth (ft)	*	4.39	*	8.84	*	4.03	*
* Conv. Total (cfs)	*	111756.0	* Conv. (cfs)	*	3462.1	*	106567.0	*	1726.9	*
* Length Wtd. (ft)	*	489.06	* Wetted Per. (ft)	*	17.26	*	109.15	*	9.97	*
* Min Ch El (ft)	*	656.29	* Shear (lb/sq ft)	*	0.07	*	0.15	*	0.07	*
* Alpha	*	1.04	* Stream Power (lb/ft s)	*	248.70	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.14	* Cum Volume (acre-ft)	*	1.29	*	11.51	*	3.50	*
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.55	*	1.26	*	1.57	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	*	665.87	* Element	*	Left OB	*	Channel	*	Right OB	*
* Vel Head (ft)	*	0.05	* Wt. n-Val.	*	0.085	*	0.055	*	0.085	*
* W.S. Elev (ft)	*	665.96	* Reach Len. (ft)	*	606.00	*	488.66	*	279.00	*
* Crit W.S. (ft)	*	659.00	* Flow Area (sq ft)	*	79.52	*	969.82	*	42.29	*
* E.G. Slope (ft/ft)	*	0.000280	* Area (sq ft)	*	122.04	*	969.82	*	190.15	*
* Q Total (cfs)	*	1979.00	* Flow (cfs)	*	64.43	*	1882.13	*	32.44	*
* Top Width (ft)	*	285.99	* Top Width (ft)	*	58.53	*	106.20	*	121.26	*
* Vel Total (ft/s)	*	1.81	* Avg. Vel. (ft/s)	*	0.81	*	1.94	*	0.77	*
* Max Chl Dpth (ft)	*	9.67	* Hydr. Depth (ft)	*	4.68	*	9.13	*	4.32	*
* Conv. Total (cfs)	*	118184.8	* Conv. (cfs)	*	3848.0	*	112399.7	*	1937.1	*
* Length Wtd. (ft)	*	489.05	* Wetted Per. (ft)	*	17.26	*	109.15	*	9.97	*
* Min Ch El (ft)	*	656.29	* Shear (lb/sq ft)	*	0.08	*	0.16	*	0.07	*
* Alpha	*	1.04	* Stream Power (lb/ft s)	*	248.70	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.14	* Cum Volume (acre-ft)	*	1.45	*	11.86	*	3.94	*
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.62	*	1.26	*	1.64	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	*	666.02	* Element	*	Left OB	*	Channel	*	Right OB	*
* Vel Head (ft)	*	0.06	* Wt. n-Val.	*	0.085	*	0.055	*	0.085	*
* W.S. Elev (ft)	*	666.11	* Reach Len. (ft)	*	606.00	*	488.66	*	279.00	*
* Crit W.S. (ft)	*	659.08	* Flow Area (sq ft)	*	82.06	*	985.73	*	43.76	*
* E.G. Slope (ft/ft)	*	0.000286	* Area (sq ft)	*	131.17	*	985.73	*	208.57	*
* Q Total (cfs)	*	2056.00	* Flow (cfs)	*	68.57	*	1952.76	*	34.67	*
* Top Width (ft)	*	293.13	* Top Width (ft)	*	63.38	*	106.20	*	123.55	*
* Vel Total (ft/s)	*	1.85	* Avg. Vel. (ft/s)	*	0.84	*	1.98	*	0.79	*
* Max Chl Dpth (ft)	*	9.82	* Hydr. Depth (ft)	*	4.83	*	9.28	*	4.47	*
* Conv. Total (cfs)	*	121596.4	* Conv. (cfs)	*	4055.6	*	115490.3	*	2050.5	*
* Length Wtd. (ft)	*	489.04	* Wetted Per. (ft)	*	17.26	*	109.15	*	9.97	*
* Min Ch El (ft)	*	656.29	* Shear (lb/sq ft)	*	0.08	*	0.16	*	0.08	*
* Alpha	*	1.04	* Stream Power (lb/ft s)	*	248.70	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.14	* Cum Volume (acre-ft)	*	1.55	*	12.04	*	4.17	*
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	0.66	*	1.26	*	1.66	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	*	666.46	* Element	*	Left OB	*	Channel	*	Right OB	*
* Vel Head (ft)	*	0.07	* Wt. n-Val.	*	0.085	*	0.055	*	0.085	*
* W.S. Elev (ft)	*	666.39	* Reach Len. (ft)	*	606.00	*	488.66	*	279.00	*
* Crit W.S. (ft)	*	659.24	* Flow Area (sq ft)	*	86.81	*	1015.37	*	46.50	*
* E.G. Slope (ft/ft)	*	0.000319	* Area (sq ft)	*	150.12	*	1015.37	*	243.30	*
* Q Total (cfs)	*	2286.00	* Flow (cfs)	*	79.51	*	2166.00	*	40.49	*
* Top Width (ft)	*	304.03	* Top Width (ft)	*	72.42	*	106.20	*	125.42	*
* Vel Total (ft/s)	*	1.99	* Avg. Vel. (ft/s)	*	0.92	*	2.13	*	0.87	*
* Max Chl Dpth (ft)	*	10.10	* Hydr. Depth (ft)	*	5.11	*	9.56	*	4.74	*
* Conv. Total (cfs)	*	128057.3	* Conv. (cfs)	*	4453.9	*	121335.1	*	2268.4	*
* Length Wtd. (ft)	*	480.70	* Wetted Per. (ft)	*	17.26	*	109.15	*	9.97	*
* Min Ch El (ft)	*	656.29	* Shear (lb/sq ft)	*	0.10	*	0.19	*	0.09	*
* Alpha	*	1.10	* Stream Power (lb/ft s)	*	248.70	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.19	* Cum Volume (acre-ft)	*	1.77	*	12.48	*	4.81	*
* C & E Loss (ft)	*	0.03	* Cum SA (acres)	*	0.74	*	1.26	*	1.71	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 94618.34

INPUT
Description: 3109 (Regulatory Section)
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-2672.13	679.78	-2347.13	673.85	-2022.14	669.62	-1697.1	669.18	-1372.1	665
-1047.11	665.93	-722.1	669.66	-397.12	669.79	-72.11	669.02	-49.4	667.74
-38.11	662.32	-28.71	660.22	-22.16	657.4	-15.68	655.28	-1.43	654.75
11.49	654.72	20.61	656.3	30.13	657.55	33.07	661.32	39.44	662.15
47.73	663.1	58.34	659.93	67.29	660.63	77.74	661.07	102.78	664.42

```
  127.73  665.18  152.75  667.78  459.01  666.32  765.27  667.31 1071.48  667.74
 1377.74  667.45    1684  668.05 1990.26  671.76 2296.53  676.79 2602.79  680.18

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
-2672.13      .2  -72.11     .12  -28.71    .045   33.07     .12  152.75      .2

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -28.71   33.07             188   228.2     283             .1       .3
Left Levee      Station=  -722.1      Elevation=  669.66
```

CROSS SECTION OUTPUT Profile #2yr

E.G. Elev (ft)	663.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	663.16	Reach Len. (ft)	188.00	228.20	283.00
Crit W.S. (ft)	657.79	Flow Area (sq ft)	18.46	437.47	97.00
E.G. Slope (ft/ft)	0.000344	Area (sq ft)	18.46	437.47	97.00
Q Total (cfs)	994.00	Flow (cfs)	5.80	957.84	30.36
Top Width (ft)	133.19	Top Width (ft)	11.14	61.78	60.27
Vel Total (ft/s)	1.80	Avg. Vel. (ft/s)	0.31	2.19	0.31
Max Chl Dpth (ft)	8.44	Hydr. Depth (ft)	1.66	7.08	1.61
Conv. Total (cfs)	53565.6	Conv. (cfs)	312.3	51617.1	1636.2
Length Wtd. (ft)	229.14	Wetted Per. (ft)	11.56	64.77	61.01
Min Ch El (ft)	654.72	Shear (lb/sq ft)	0.03	0.15	0.03
Alpha	1.43	Stream Power (lb/ft s)	2602.79	-722.10	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.08	2.38	0.54
C & E Loss (ft)	0.00	Cum SA (acres)	0.05	0.32	0.50

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10yr

E.G. Elev (ft)	664.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	664.47	Reach Len. (ft)	188.00	228.20	283.00
Crit W.S. (ft)	658.49	Flow Area (sq ft)	34.89	518.61	182.63
E.G. Slope (ft/ft)	0.000404	Area (sq ft)	34.89	518.61	182.63
Q Total (cfs)	1477.00	Flow (cfs)	15.52	1377.11	84.37
Top Width (ft)	147.01	Top Width (ft)	13.88	61.78	71.35
Vel Total (ft/s)	2.01	Avg. Vel. (ft/s)	0.44	2.66	0.46
Max Chl Dpth (ft)	9.75	Hydr. Depth (ft)	2.51	8.39	2.56
Conv. Total (cfs)	73511.8	Conv. (cfs)	772.4	68540.3	4199.1
Length Wtd. (ft)	230.65	Wetted Per. (ft)	14.60	64.77	72.18
Min Ch El (ft)	654.72	Shear (lb/sq ft)	0.06	0.20	0.06
Alpha	1.64	Stream Power (lb/ft s)	2602.79	-722.10	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.16	2.80	1.24
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	0.32	0.58

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50yr

E.G. Elev (ft)	665.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	665.27	Reach Len. (ft)	188.00	228.20	283.00
Crit W.S. (ft)	658.94	Flow Area (sq ft)	46.62	567.88	249.88
E.G. Slope (ft/ft)	0.000450	Area (sq ft)	46.62	567.88	249.88
Q Total (cfs)	1839.00	Flow (cfs)	24.52	1690.63	123.85
Top Width (ft)	172.82	Top Width (ft)	15.54	61.78	95.50
Vel Total (ft/s)	2.13	Avg. Vel. (ft/s)	0.53	2.98	0.50
Max Chl Dpth (ft)	10.55	Hydr. Depth (ft)	3.00	9.19	2.62
Conv. Total (cfs)	86730.4	Conv. (cfs)	1156.6	79732.8	5840.9
Length Wtd. (ft)	232.11	Wetted Per. (ft)	16.44	64.77	96.35
Min Ch El (ft)	654.72	Shear (lb/sq ft)	0.08	0.25	0.07
Alpha	1.80	Stream Power (lb/ft s)	2602.79	-722.10	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.23	3.05	2.19
C & E Loss (ft)	0.01	Cum SA (acres)	0.09	0.32	0.92

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100yr

E.G. Elev (ft)	665.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	665.54	Reach Len. (ft)	188.00	228.20	283.00
Crit W.S. (ft)	659.12	Flow Area (sq ft)	50.91	584.61	276.11
E.G. Slope (ft/ft)	0.000465	Area (sq ft)	50.91	584.61	276.11
Q Total (cfs)	1979.00	Flow (cfs)	28.17	1804.72	146.11
Top Width (ft)	175.99	Top Width (ft)	16.10	61.78	98.11
Vel Total (ft/s)	2.17	Avg. Vel. (ft/s)	0.55	3.09	0.53
Max Chl Dpth (ft)	10.82	Hydr. Depth (ft)	3.16	9.46	2.81
Conv. Total (cfs)	91768.9	Conv. (cfs)	1306.3	83687.2	6775.5
Length Wtd. (ft)	232.57	Wetted Per. (ft)	17.07	64.77	98.97
Min Ch El (ft)	654.72	Shear (lb/sq ft)	0.09	0.26	0.08
Alpha	1.85	Stream Power (lb/ft s)	2602.79	-722.10	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.25	3.14	2.44
C & E Loss (ft)	0.01	Cum SA (acres)	0.10	0.32	0.93

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200yr

E.G. Elev (ft)	665.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.120	0.045	0.120
W.S. Elev (ft)	665.68	Reach Len. (ft)	188.00	228.20	283.00
Crit W.S. (ft)	659.21	Flow Area (sq ft)	53.19	593.29	289.97
E.G. Slope (ft/ft)	0.000474	Area (sq ft)	53.19	593.29	289.97
Q Total (cfs)	2056.00	Flow (cfs)	30.21	1867.18	158.61
Top Width (ft)	177.64	Top Width (ft)	16.40	61.78	99.46
Vel Total (ft/s)	2.20	Avg. Vel. (ft/s)	0.57	3.15	0.55
Max Chl Dpth (ft)	10.96	Hydr. Depth (ft)	3.24	9.60	2.92
Conv. Total (cfs)	94439.9	Conv. (cfs)	1387.7	85766.6	7285.6

* Length Wtd. (ft)	*	232.80	* Wetted Per. (ft)	*	17.39	*	64.77	*	100.33	*
* Min Ch El (ft)	*	654.72	* Shear (lb/sq ft)	*	0.09	*	0.27	*	0.09	*
* Alpha	*	1.87	* Stream Power (lb/ft s)	*	2602.79	*	-722.10	*	0.00	*
* Frctn Loss (ft)	*	0.10	* Cum Volume (acre-ft)	*	0.27	*	3.18	*	2.57	*
* C & E Loss (ft)	*	0.01	* Cum SA (acres)	*	0.10	*	0.32	*	0.94	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	*	666.24	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.15	* Wt. n-Val.	*	0.120	*	0.045	*	0.120	*	
* W.S. Elev (ft)	*	666.09	* Reach Len. (ft)	*	188.00	*	228.20	*	283.00	*	
* Crit W.S. (ft)	*	659.48	* Flow Area (sq ft)	*	60.10	*	618.67	*	331.65	*	
* E.G. Slope (ft/ft)	*0.000497	* Area (sq ft)	*	60.10	*	618.67	*	331.65	*		
* Q Total (cfs)	* 2286.00	* Flow (cfs)	*	36.62	*	2051.31	*	198.07	*		
* Top Width (ft)	*	182.45	* Top Width (ft)	*	17.25	*	61.78	*	103.41	*	
* Vel Total (ft/s)	*	2.26	* Avg. Vel. (ft/s)	*	0.61	*	3.32	*	0.60	*	
* Max Chl Dpth (ft)	*	11.37	* Hydr. Depth (ft)	*	3.48	*	10.01	*	3.21	*	
* Conv. Total (cfs)	*102491.6	* Conv. (cfs)	*	1641.9	*	91969.5	*	8880.2	*		
* Length Wtd. (ft)	*	233.44	* Wetted Per. (ft)	*	18.34	*	64.77	*	104.30	*	
* Min Ch El (ft)	*	654.72	* Shear (lb/sq ft)	*	0.10	*	0.30	*	0.10	*	
* Alpha	*	1.93	* Stream Power (lb/ft s)	*	2602.79	*	-722.10	*	0.00	*	
* Frctn Loss (ft)	*	0.10	* Cum Volume (acre-ft)	*	0.31	*	3.31	*	2.97	*	
* C & E Loss (ft)	*	0.01	* Cum SA (acres)	*	0.12	*	0.32	*	0.98	*	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Salt Creek
REACH: A RS: 94390.14

INPUT
Description: Most d/s surveyed x-section
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-157.3	668.97	-135.9	669.85	-104.6	669.06	-80.7	667.69	-52.4	665.01
-39.9	663.69	-26.4	659.7	-25.2	657.09	-13.7	655.1	4.5	654.53
16.5	653.94	25.3	655.15	31.8	657.27	33.8	660.97	43.6	661.62
52.44	662.009	77.9	663.13	101.1	662.32	119.6	662.32	142.7	664.43
155.1	662.82	187	663.13	201.9	663.24	226.5	665.82	245	666.6
261.8	666.74	268.1	666.9						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-157.3	.035	-104.6	.12	-26.4	.045	33.8	.12

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-26.4	33.8	0	0	.1	.3

Right Levee Station= 142.7 Elevation= 664.43

CROSS SECTION OUTPUT Profile #2yr

* E.G. Elev (ft)	*	663.16	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.07	* Wt. n-Val.	*	0.120	*	0.045	*	0.120	*	
* W.S. Elev (ft)	*	663.09	* Reach Len. (ft)	*		*		*		*	
* Crit W.S. (ft)	*	657.16	* Flow Area (sq ft)	*	19.44	*	470.80	*	68.12	*	
* E.G. Slope (ft/ft)	*0.000280	* Area (sq ft)	*	19.44	*	470.80	*	68.12	*		
* Q Total (cfs)	* 994.00	* Flow (cfs)	*	5.57	*	976.33	*	12.10	*		
* Top Width (ft)	*	163.85	* Top Width (ft)	*	11.47	*	60.20	*	92.18	*	
* Vel Total (ft/s)	*	1.78	* Avg. Vel. (ft/s)	*	0.29	*	2.07	*	0.18	*	
* Max Chl Dpth (ft)	*	9.15	* Hydr. Depth (ft)	*	1.70	*	7.82	*	0.74	*	
* Conv. Total (cfs)	* 59437.3	* Conv. (cfs)	*	332.8	*	58381.0	*	723.5	*		
* Length Wtd. (ft)	*	* Wetted Per. (ft)	*	11.96	*	64.69	*	92.28	*		
* Min Ch El (ft)	*	653.94	* Shear (lb/sq ft)	*	0.03	*	0.13	*	0.01	*	
* Alpha	*	1.33	* Stream Power (lb/ft s)	*	268.10	*	0.00	*	142.70	*	
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*		*		*				
* C & E Loss (ft)	*	* Cum SA (acres)	*		*		*				

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10yr

* E.G. Elev (ft)	*	664.48	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.09	* Wt. n-Val.	*	0.120	*	0.045	*	0.120	*	
* W.S. Elev (ft)	*	664.39	* Reach Len. (ft)	*		*		*		*	
* Crit W.S. (ft)	*	657.83	* Flow Area (sq ft)	*	38.70	*	549.06	*	199.83	*	
* E.G. Slope (ft/ft)	*0.000341	* Area (sq ft)	*	38.70	*	549.06	*	199.83	*		
* Q Total (cfs)	* 1475.00	* Flow (cfs)	*	13.41	*	1392.99	*	68.60	*		
* Top Width (ft)	*	188.79	* Top Width (ft)	*	20.13	*	60.20	*	108.46	*	
* Vel Total (ft/s)	*	1.87	* Avg. Vel. (ft/s)	*	0.35	*	2.54	*	0.34	*	
* Max Chl Dpth (ft)	*	10.45	* Hydr. Depth (ft)	*	1.92	*	9.12	*	1.84	*	
* Conv. Total (cfs)	* 79876.9	* Conv. (cfs)	*	726.3	*	75435.6	*	3715.0	*		
* Length Wtd. (ft)	*	* Wetted Per. (ft)	*	20.74	*	64.69	*	108.63	*		
* Min Ch El (ft)	*	653.94	* Shear (lb/sq ft)	*	0.04	*	0.18	*	0.04	*	
* Alpha	*	1.73	* Stream Power (lb/ft s)	*	268.10	*	0.00	*	142.70	*	
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*		*		*				
* C & E Loss (ft)	*	* Cum SA (acres)	*		*		*				

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50yr

* E.G. Elev (ft)	*	665.30	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.11	* Wt. n-Val.	*	0.120	*	0.045	*	0.120	*	
* W.S. Elev (ft)	*	665.19	* Reach Len. (ft)	*		*		*		*	
* Crit W.S. (ft)	*	658.26	* Flow Area (sq ft)	*	57.85	*	597.22	*	425.01	*	
* E.G. Slope (ft/ft)	*0.000357	* Area (sq ft)	*	57.85	*	597.22	*	425.01	*		
* Q Total (cfs)	* 1834.00	* Flow (cfs)	*	21.68	*	1640.40	*	171.92	*		

* Top Width (ft)	* 274.79	* Top Width (ft)	* 27.90	* 60.20	* 186.69	*		
* Vel Total (ft/s)	* 1.70	* Avg. Vel. (ft/s)	* 0.37	* 2.75	* 0.40	*		
* Max Chl Dpth (ft)	* 11.25	* Hydr. Depth (ft)	* 2.07	* 9.92	* 2.28	*		
* Conv. Total (cfs)	* 97024.8	* Conv. (cfs)	* 1147.0	* 86782.7	* 9095.1	*		
* Length Wtd. (ft)	*	* Wetted Per. (ft)	* 28.56	* 64.69	* 187.07	*		
* Min Ch El (ft)	* 653.94	* Shear (lb/sq ft)	* 0.05	* 0.21	* 0.05	*		
* Alpha	* 2.35	* Stream Power (lb/ft s)	* 268.10	* 0.00	* 142.70	*		
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*	*	*	*		
* C & E Loss (ft)	*	* Cum SA (acres)	*	*	*	*		

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100yr

* E.G. Elev (ft)	* 665.57	* Element	* Left OB	* Channel	* Right OB	*		
* Vel Head (ft)	* 0.11	* Wt. n-Val.	* 0.120	* 0.045	* 0.120	*		
* W.S. Elev (ft)	* 665.46	* Reach Len. (ft)	*	*	*	*		
* Crit W.S. (ft)	* 658.42	* Flow Area (sq ft)	* 65.77	* 613.47	* 475.76	*		
* E.G. Slope (ft/ft)	*0.000367	* Area (sq ft)	* 65.77	* 613.47	* 475.76	*		
* Q Total (cfs)	* 1973.00	* Flow (cfs)	* 25.54	* 1739.05	* 208.42	*		
* Top Width (ft)	* 280.22	* Top Width (ft)	* 30.75	* 60.20	* 189.27	*		
* Vel Total (ft/s)	* 1.71	* Avg. Vel. (ft/s)	* 0.39	* 2.83	* 0.44	*		
* Max Chl Dpth (ft)	* 11.52	* Hydr. Depth (ft)	* 2.14	* 10.19	* 2.51	*		
* Conv. Total (cfs)	*102964.3	* Conv. (cfs)	* 1332.7	* 90755.1	* 10876.5	*		
* Length Wtd. (ft)	*	* Wetted Per. (ft)	* 31.42	* 64.69	* 189.65	*		
* Min Ch El (ft)	* 653.94	* Shear (lb/sq ft)	* 0.05	* 0.22	* 0.06	*		
* Alpha	* 2.43	* Stream Power (lb/ft s)	* 268.10	* 0.00	* 142.70	*		
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*	*	*	*		
* C & E Loss (ft)	*	* Cum SA (acres)	*	*	*	*		

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200yr

* E.G. Elev (ft)	* 665.71	* Element	* Left OB	* Channel	* Right OB	*		
* Vel Head (ft)	* 0.11	* Wt. n-Val.	* 0.120	* 0.045	* 0.120	*		
* W.S. Elev (ft)	* 665.60	* Reach Len. (ft)	*	*	*	*		
* Crit W.S. (ft)	* 658.51	* Flow Area (sq ft)	* 70.18	* 621.90	* 502.35	*		
* E.G. Slope (ft/ft)	*0.000373	* Area (sq ft)	* 70.18	* 621.90	* 502.35	*		
* Q Total (cfs)	* 2049.00	* Flow (cfs)	* 27.80	* 1792.38	* 228.82	*		
* Top Width (ft)	* 283.03	* Top Width (ft)	* 32.23	* 60.20	* 190.60	*		
* Vel Total (ft/s)	* 1.72	* Avg. Vel. (ft/s)	* 0.40	* 2.88	* 0.46	*		
* Max Chl Dpth (ft)	* 11.66	* Hydr. Depth (ft)	* 2.18	* 10.33	* 2.64	*		
* Conv. Total (cfs)	*106134.1	* Conv. (cfs)	* 1439.9	* 92841.9	* 11852.3	*		
* Length Wtd. (ft)	*	* Wetted Per. (ft)	* 32.90	* 64.69	* 191.00	*		
* Min Ch El (ft)	* 653.94	* Shear (lb/sq ft)	* 0.05	* 0.22	* 0.06	*		
* Alpha	* 2.48	* Stream Power (lb/ft s)	* 268.10	* 0.00	* 142.70	*		
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*	*	*	*		
* C & E Loss (ft)	*	* Cum SA (acres)	*	*	*	*		

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500yr

* E.G. Elev (ft)	* 666.13	* Element	* Left OB	* Channel	* Right OB	*		
* Vel Head (ft)	* 0.12	* Wt. n-Val.	* 0.120	* 0.045	* 0.120	*		
* W.S. Elev (ft)	* 666.01	* Reach Len. (ft)	*	*	*	*		
* Crit W.S. (ft)	* 658.76	* Flow Area (sq ft)	* 84.28	* 646.58	* 581.56	*		
* E.G. Slope (ft/ft)	*0.000388	* Area (sq ft)	* 84.28	* 646.58	* 581.56	*		
* Q Total (cfs)	* 2277.00	* Flow (cfs)	* 35.41	* 1950.43	* 291.16	*		
* Top Width (ft)	* 293.97	* Top Width (ft)	* 36.56	* 60.20	* 197.21	*		
* Vel Total (ft/s)	* 1.73	* Avg. Vel. (ft/s)	* 0.42	* 3.02	* 0.50	*		
* Max Chl Dpth (ft)	* 12.07	* Hydr. Depth (ft)	* 2.31	* 10.74	* 2.95	*		
* Conv. Total (cfs)	*115651.4	* Conv. (cfs)	* 1798.6	* 99064.5	* 14788.3	*		
* Length Wtd. (ft)	*	* Wetted Per. (ft)	* 37.25	* 64.69	* 197.62	*		
* Min Ch El (ft)	* 653.94	* Shear (lb/sq ft)	* 0.05	* 0.24	* 0.07	*		
* Alpha	* 2.60	* Stream Power (lb/ft s)	* 268.10	* 0.00	* 142.70	*		
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*	*	*	*		
* C & E Loss (ft)	*	* Cum SA (acres)	*	*	*	*		

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

SUMMARY OF MANNING'S N VALUES

River:Salt Creek

* Reach	* River Sta.	* n1	* n2	* n3	* n4	* n5	* n6	*
*A	* 96139.5	* .12*	.065*	.12*	*	*	*	
*A	* 96071.51	* .085*	.2*	.12*	.065*	.12*	.2*	
*A	* 96010.9	* .085*	.065*	.085*	*	*	*	
*A	* 95964	*Bridge *	*	*	*	*	*	
*A	* 95911	* .085*	.065*	.085*	*	*	*	
*A	* 95657	* .085*	.12*	.065*	.085*	*	*	
*A	* 95640	*Bridge *	*	*	*	*	*	
*A	* 95623	* .085*	.12*	.065*	.085*	*	*	
*A	* 95562.19	* .085*	.065*	.085*	.2*	*	*	
*A	* 95497.4	* .085*	.12*	.065*	.085*	.2*	.2*	
*A	* 95294.3	* .085*	.055*	.085*	*	*	*	
*A	* 95200	*Bridge *	*	*	*	*	*	
*A	* 95107	* .085*	.055*	.085*	*	*	*	
*A	* 94618.34	* .2*	.12*	.045*	.12*	.2*	*	
*A	* 94390.14	* .035*	.12*	.045*	.12*	*	*	

SUMMARY OF REACH LENGTHS

River: Salt Creek

* Reach	* River Sta.	* Left	* Channel	* Right	*

*A	*	96139.5	*	32*	67.99*	75*
*A	*	96071.51	*	87*	60.61*	39*
*A	*	96010.9	*	99.9*	99.9*	99.9*
*A	*	95964	*Bridge	*	*	*
*A	*	95911	*	160*	254*	353*
*A	*	95657	*	34*	34*	34*
*A	*	95640	*Bridge	*	*	*
*A	*	95623	*	105*	60.81*	42*
*A	*	95562.19	*	102*	64.79*	39*
*A	*	95497.4	*	147*	203.1*	327*
*A	*	95294.3	*	187.3*	187.3*	187.3*
*A	*	95200	*Bridge	*	*	*
*A	*	95107	*	606*	488.66*	279*
*A	*	94618.34	*	188*	228.2*	283*
*A	*	94390.14	*	0*	0*	0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Salt Creek

*A	*	96139.5	*	.1*	.3*
*A	*	96071.51	*	.1*	.3*
*A	*	96010.9	*	.3*	.5*
*A	*	95964	*Bridge	*	*
*A	*	95911	*	.3*	.5*
*A	*	95657	*	.3*	.5*
*A	*	95640	*Bridge	*	*
*A	*	95623	*	.3*	.5*
*A	*	95562.19	*	.1*	.3*
*A	*	95497.4	*	.1*	.3*
*A	*	95294.3	*	.3*	.5*
*A	*	95200	*Bridge	*	*
*A	*	95107	*	.3*	.5*
*A	*	94618.34	*	.1*	.3*
*A	*	94390.14	*	.1*	.3*

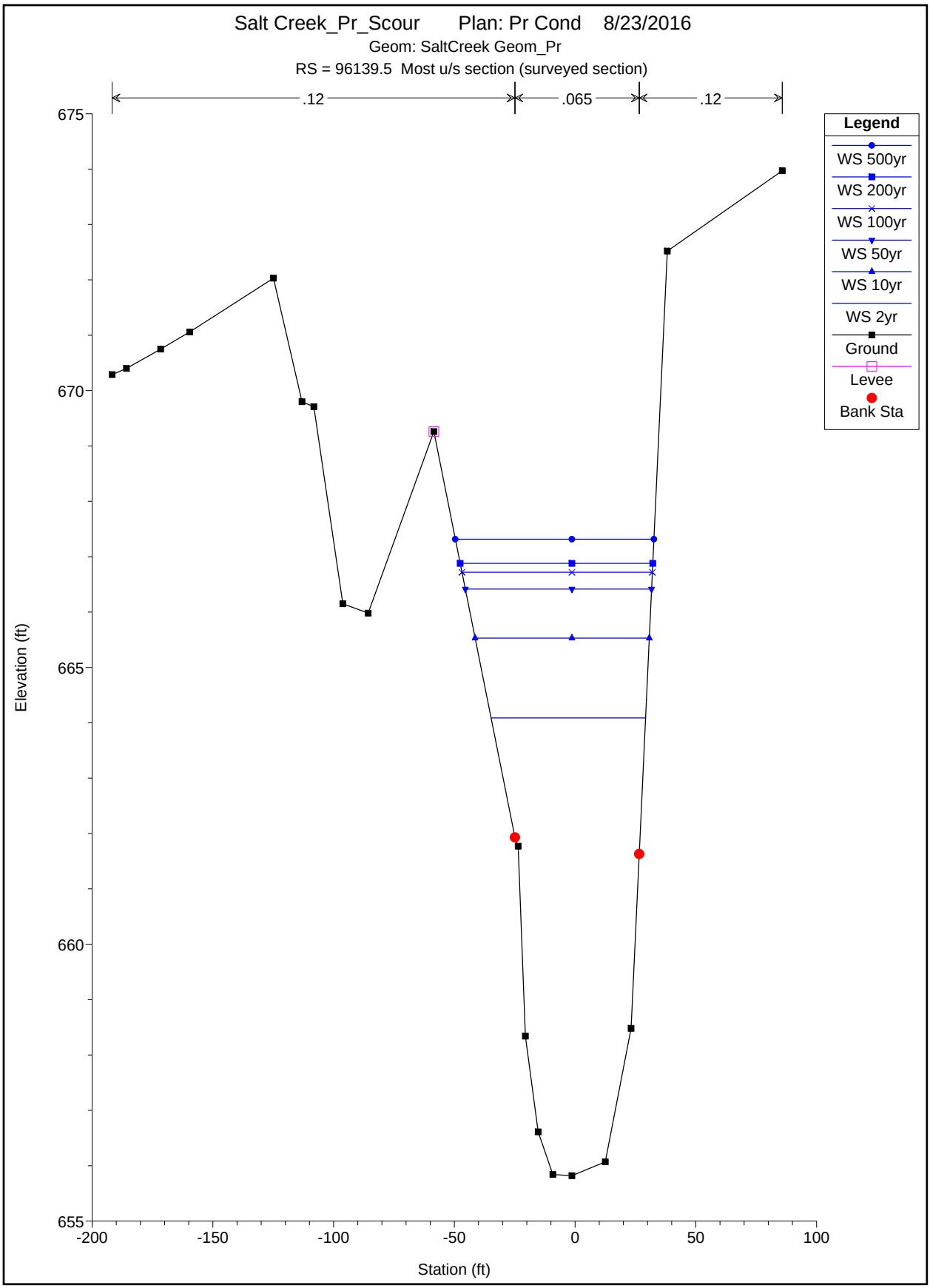
Proposed Condition

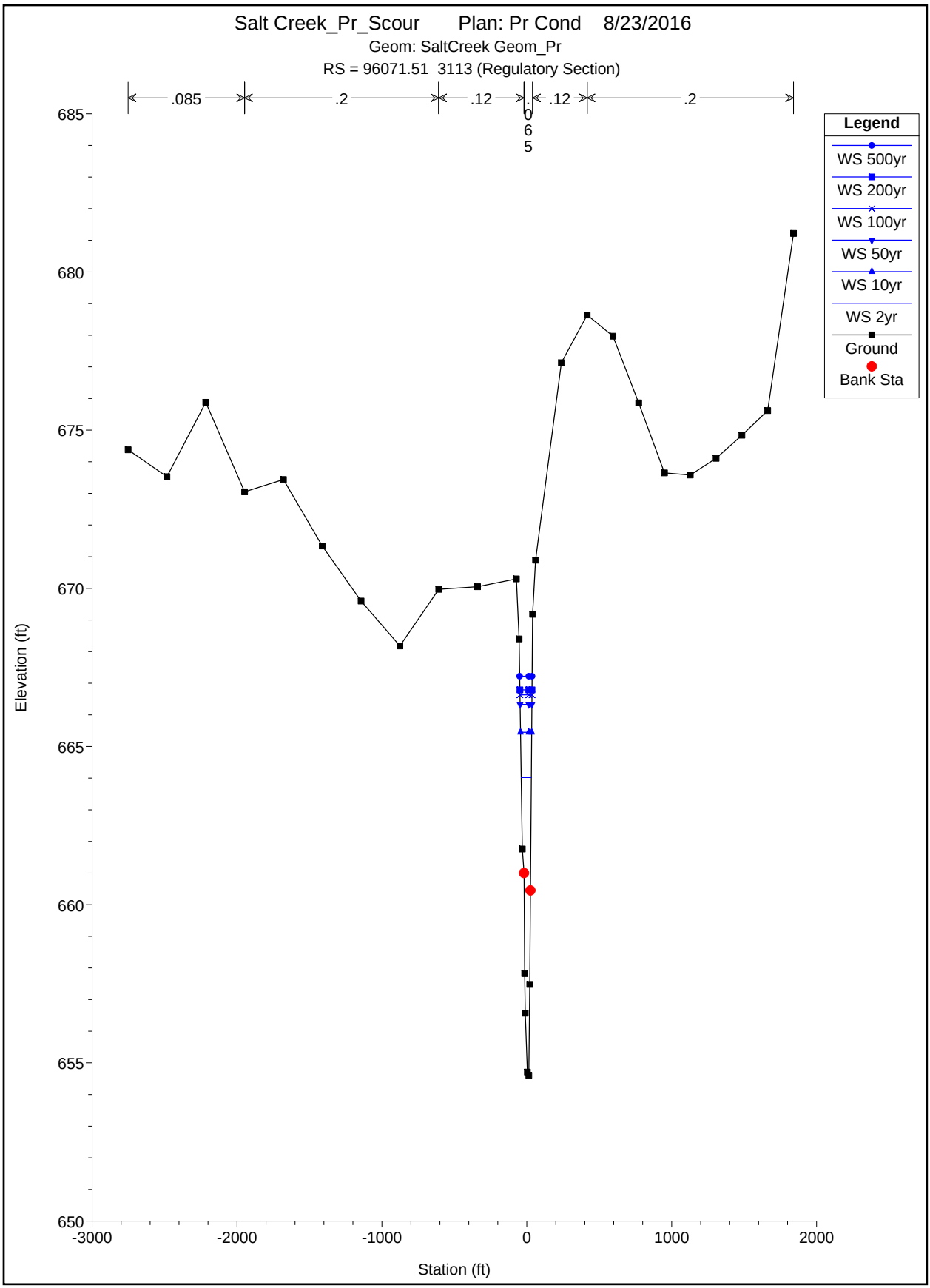
HEC-RAS Plan: Pr River: Salt Creek Reach: A

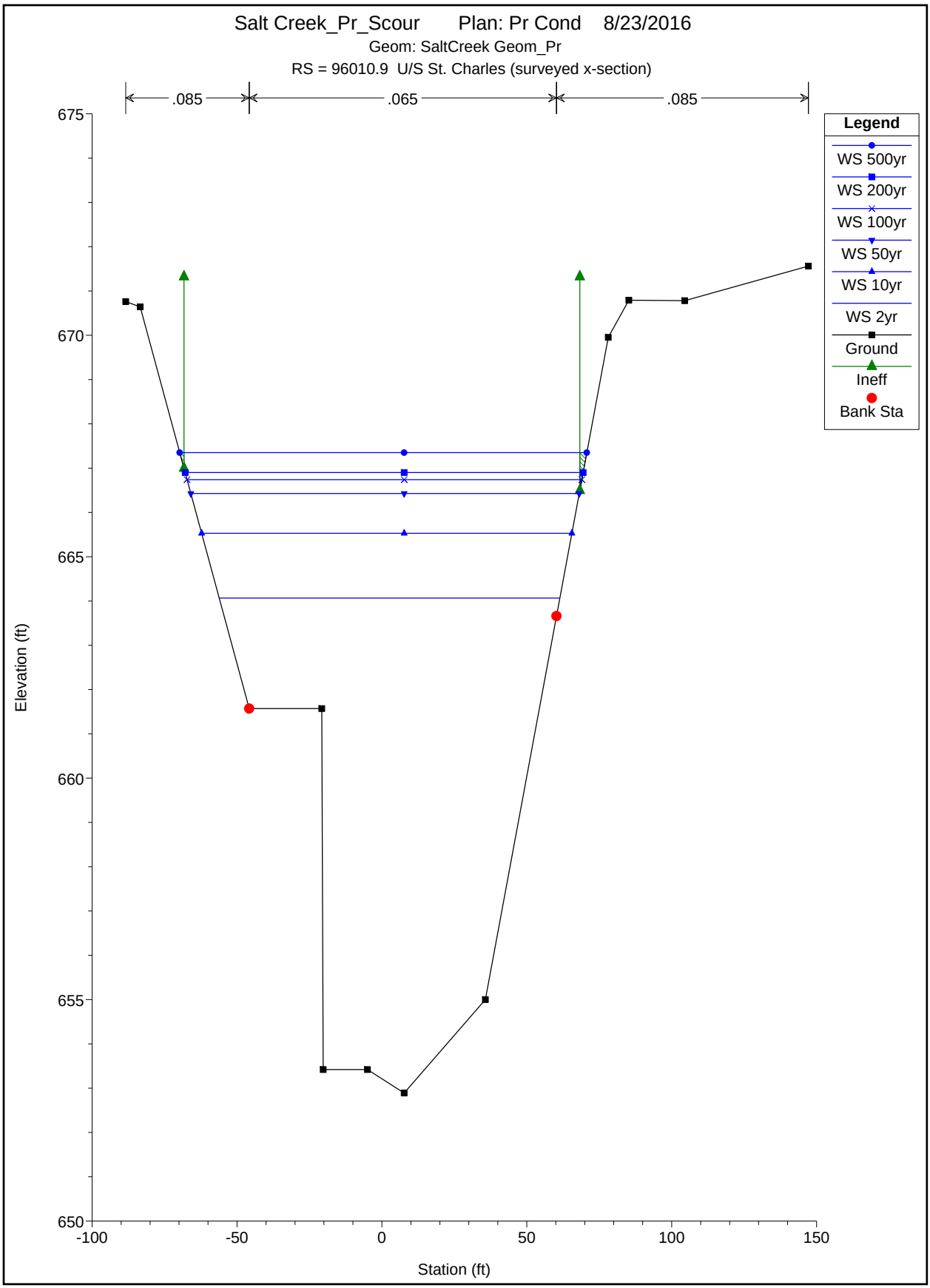
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
A	96139.5	2yr	940.00	655.82	664.09	658.92	664.19	0.001030	2.58	375.95	63.98	0.17
A	96139.5	10yr	1414.00	655.82	665.53	659.68	665.68	0.001225	3.19	474.14	72.13	0.19
A	96139.5	50yr	1756.00	655.82	666.42	660.19	666.61	0.001334	3.55	540.26	77.14	0.20
A	96139.5	100yr	1893.00	655.82	666.72	660.37	666.93	0.001385	3.70	563.99	78.86	0.21
A	96139.5	200yr	1970.00	655.82	666.88	660.48	667.09	0.001416	3.78	576.58	79.76	0.21
A	96139.5	500yr	2201.00	655.82	667.32	660.77	667.56	0.001514	4.03	611.94	82.23	0.22
A	96071.51	2yr	941.00	654.61	664.02	658.43	664.12	0.000952	2.64	393.68	70.02	0.17
A	96071.51	10yr	1417.00	654.61	665.45	659.30	665.61	0.001154	3.25	498.99	77.09	0.19
A	96071.51	50yr	1763.00	654.61	666.33	659.87	666.52	0.001267	3.63	568.74	81.44	0.20
A	96071.51	100yr	1900.00	654.61	666.63	660.10	666.84	0.001317	3.77	593.55	82.93	0.21
A	96071.51	200yr	1977.00	654.61	666.79	660.22	667.00	0.001347	3.85	606.63	83.71	0.21
A	96071.51	500yr	2209.00	654.61	667.22	660.53	667.46	0.001444	4.10	643.21	85.84	0.22
A	96010.9	2yr	994.00	652.89	664.06	655.78	664.09	0.000256	1.29	779.45	117.55	0.08
A	96010.9	10yr	1484.00	652.89	665.53	656.44	665.57	0.000304	1.59	958.83	127.76	0.10
A	96010.9	50yr	1852.00	652.89	666.43	656.87	666.48	0.000336	1.79	1076.72	134.05	0.10
A	96010.9	100yr	1994.00	652.89	666.74	657.04	666.79	0.000349	1.86	1118.61	136.22	0.10
A	96010.9	200yr	2071.00	652.89	666.90	657.12	666.96	0.000355	1.90	1140.67	137.35	0.11
A	96010.9	500yr	2303.00	652.89	667.35	657.37	667.41	0.000377	2.01	1201.86	140.48	0.11
A	95964		Bridge									
A	95911	2yr	994.00	652.89	664.01	655.78	663.97	0.000262	1.30	772.65	117.16	0.09
A	95911	10yr	1484.00	652.89	665.45	656.44	665.41	0.000313	1.61	944.43	127.25	0.10
A	95911	50yr	1852.00	652.89	666.34	656.87	666.30	0.000348	1.81	1051.36	133.45	0.10
A	95911	100yr	1994.00	652.89	666.65	657.04	666.61	0.000361	1.88	1088.15	135.58	0.11
A	95911	200yr	2071.00	652.89	666.81	657.12	666.77	0.000369	1.92	1107.38	136.70	0.11
A	95911	500yr	2303.00	652.89	667.25	657.37	667.21	0.000393	2.04	1160.30	139.77	0.11
A	95657	2yr	994.00	654.83	663.76	658.12	663.84	0.000799	2.38	500.95	105.81	0.15
A	95657	10yr	1484.00	654.83	665.16	658.84	665.27	0.000912	2.83	692.29	161.29	0.16
A	95657	50yr	1852.00	654.83	666.03	659.35	666.15	0.000951	3.07	838.87	177.50	0.17
A	95657	100yr	1994.00	654.83	666.32	659.53	666.45	0.000965	3.15	892.47	183.06	0.17
A	95657	200yr	2071.00	654.83	666.48	659.62	666.61	0.000972	3.19	921.16	185.97	0.17
A	95657	500yr	2303.00	654.83	666.90	659.89	667.04	0.001000	3.32	1001.93	193.94	0.18
A	95640		Bridge									
A	95623	2yr	994.00	654.81	663.75	658.11	663.77	0.000771	2.33	538.15	142.52	0.15
A	95623	10yr	1484.00	654.81	665.17	658.85	665.18	0.000827	2.70	757.69	166.99	0.16
A	95623	50yr	1852.00	654.81	666.04	659.35	666.06	0.000855	2.91	909.15	181.41	0.16
A	95623	100yr	1994.00	654.81	666.34	659.53	666.36	0.000866	2.98	964.17	186.37	0.16
A	95623	200yr	2071.00	654.81	666.49	659.62	666.52	0.000869	3.02	993.37	188.97	0.16
A	95623	500yr	2303.00	654.81	666.92	659.88	666.95	0.000885	3.13	1073.28	196.06	0.17
A	95562.19	2yr	994.00	655.29	663.63		663.71	0.000850	2.28	481.00	87.83	0.15
A	95562.19	10yr	1484.00	655.29	665.02		665.12	0.000931	2.70	652.06	135.17	0.17
A	95562.19	50yr	1852.00	655.29	665.88		666.00	0.000968	2.94	770.11	140.74	0.17
A	95562.19	100yr	1994.00	655.29	666.17		666.29	0.000984	3.03	811.63	142.64	0.17
A	95562.19	200yr	2071.00	655.29	666.32		666.45	0.000992	3.07	833.56	143.64	0.18
A	95562.19	500yr	2303.00	655.29	666.74		666.88	0.001027	3.22	894.08	146.35	0.18
A	95497.4	2yr	994.00	654.78	663.59	657.86	663.66	0.000634	2.12	520.70	92.86	0.13
A	95497.4	10yr	1477.00	654.78	664.97	658.51	665.07	0.000754	2.58	685.99	146.94	0.15
A	95497.4	50yr	1839.00	654.78	665.82	658.96	665.93	0.000808	2.83	814.77	155.27	0.16
A	95497.4	100yr	1979.00	654.78	666.11	659.11	666.23	0.000828	2.92	860.52	158.13	0.16
A	95497.4	200yr	2056.00	654.78	666.27	659.20	666.39	0.000839	2.97	884.76	159.62	0.16
A	95497.4	500yr	2286.00	654.78	666.68	659.44	666.81	0.000877	3.11	951.88	163.68	0.17
A	95294.3	2yr	994.00	656.56	663.52	658.73	663.56	0.000394	1.46	689.76	141.81	0.11
A	95294.3	10yr	1477.00	656.56	664.91	659.17	664.95	0.000403	1.72	890.26	147.29	0.12
A	95294.3	50yr	1839.00	656.56	665.76	659.47	665.81	0.000419	1.89	1018.87	155.87	0.12
A	95294.3	100yr	1979.00	656.56	666.05	659.60	666.11	0.000427	1.96	1064.82	159.54	0.12
A	95294.3	200yr	2056.00	656.56	666.20	659.65	666.26	0.000432	2.00	1089.24	161.46	0.12
A	95294.3	500yr	2286.00	656.56	666.60	659.82	666.67	0.000452	2.11	1154.84	166.49	0.13
A	95200		Bridge									
A	95107	2yr	994.00	656.29	663.46	658.17	663.38	0.000217	1.38	758.69	144.94	0.09
A	95107	10yr	1477.00	656.29	664.83	658.60	664.75	0.000248	1.67	941.22	211.33	0.10
A	95107	50yr	1839.00	656.29	665.67	658.90	665.59	0.000271	1.87	1053.41	266.26	0.11
A	95107	100yr	1979.00	656.29	665.96	659.00	665.87	0.000280	1.94	1091.63	285.99	0.11
A	95107	200yr	2056.00	656.29	666.11	659.08	666.02	0.000286	1.98	1111.56	293.13	0.11
A	95107	500yr	2286.00	656.29	666.39	659.24	666.46	0.000319	2.13	1148.67	304.03	0.12
A	94618.34	2yr	994.00	654.72	663.16	657.79	663.23	0.000344	2.19	552.94	133.19	0.14
A	94618.34	10yr	1477.00	654.72	664.47	658.49	664.57	0.000404	2.66	736.14	147.01	0.16
A	94618.34	50yr	1839.00	654.72	665.27	658.94	665.39	0.000450	2.98	864.39	172.82	0.17

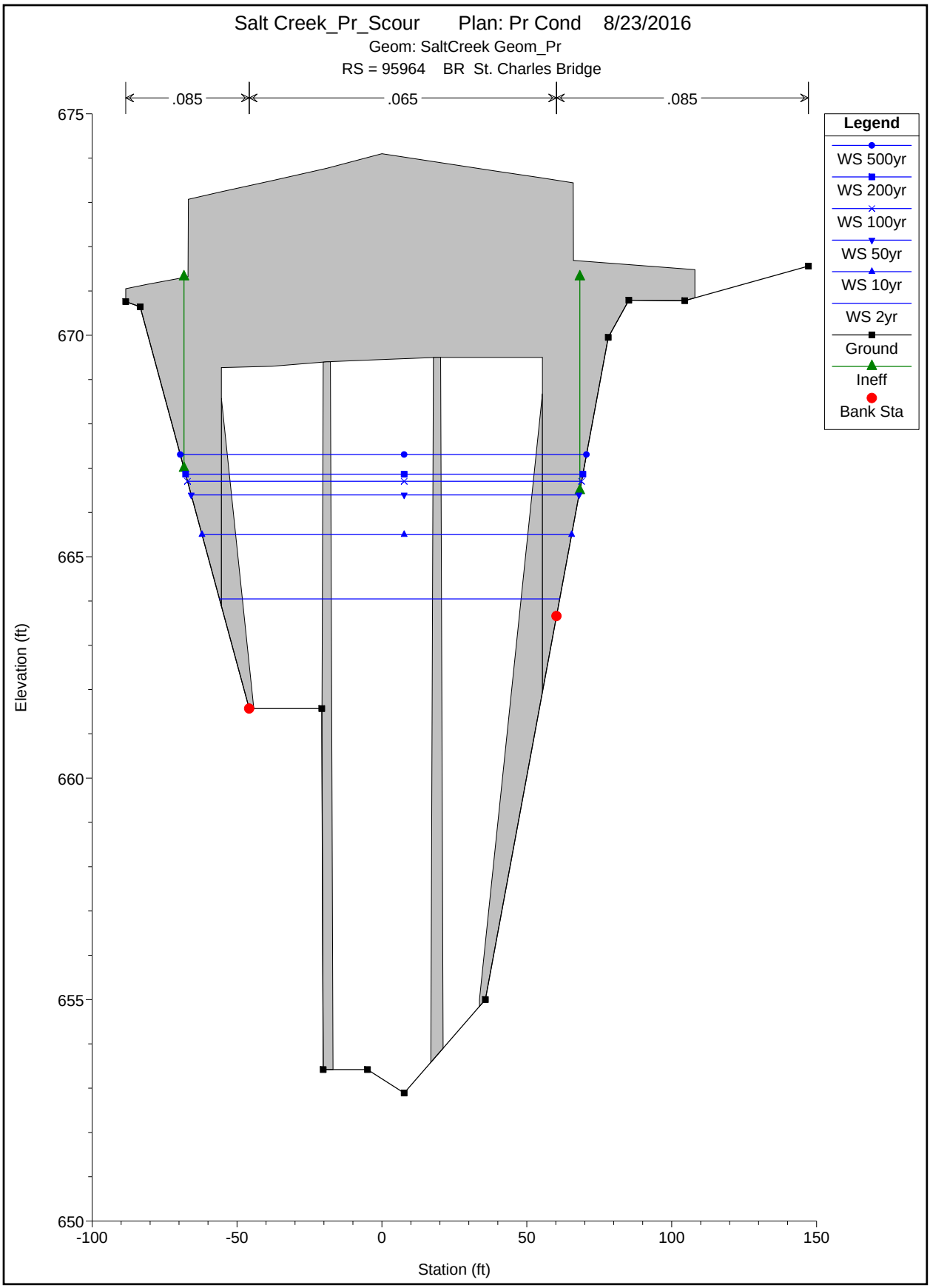
HEC-RAS Plan: Pr River: Salt Creek Reach: A (Continued)

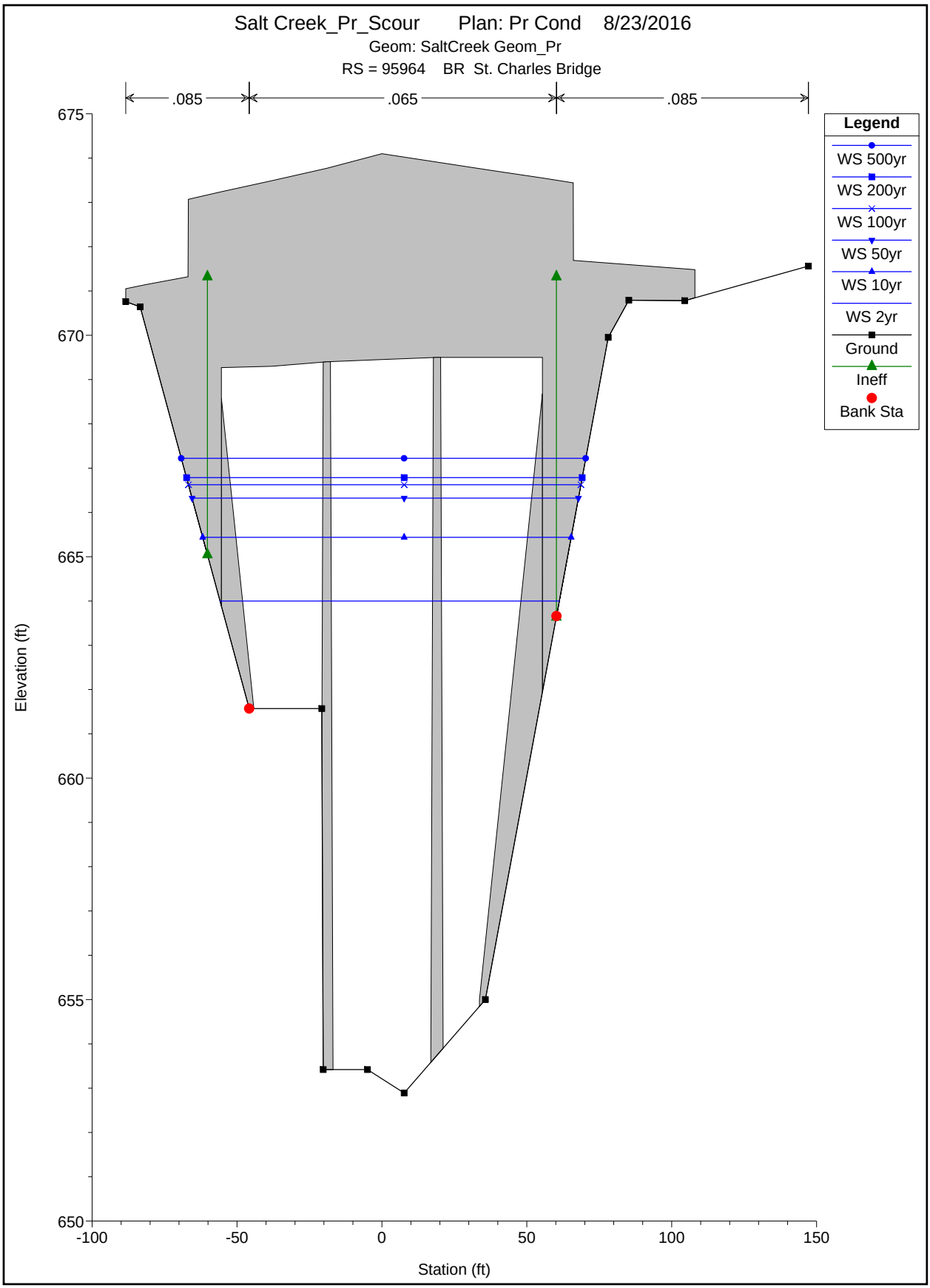
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
A	94618.34	100yr	1979.00	654.72	665.54	659.12	665.67	0.000465	3.09	911.63	175.99	0.18
A	94618.34	200yr	2056.00	654.72	665.68	659.21	665.82	0.000474	3.15	936.45	177.64	0.18
A	94618.34	500yr	2286.00	654.72	666.09	659.48	666.24	0.000497	3.32	1010.43	182.45	0.18
A	94390.14	2yr	994.00	653.94	663.09	657.16	663.16	0.000280	2.07	558.36	163.85	0.13
A	94390.14	10yr	1475.00	653.94	664.39	657.83	664.48	0.000341	2.54	787.59	188.79	0.15
A	94390.14	50yr	1834.00	653.94	665.19	658.26	665.30	0.000357	2.75	1080.08	274.79	0.15
A	94390.14	100yr	1973.00	653.94	665.46	658.42	665.57	0.000367	2.83	1155.01	280.22	0.16
A	94390.14	200yr	2049.00	653.94	665.60	658.51	665.71	0.000373	2.88	1194.42	283.03	0.16
A	94390.14	500yr	2277.00	653.94	666.01	658.76	666.13	0.000388	3.02	1312.42	293.97	0.16

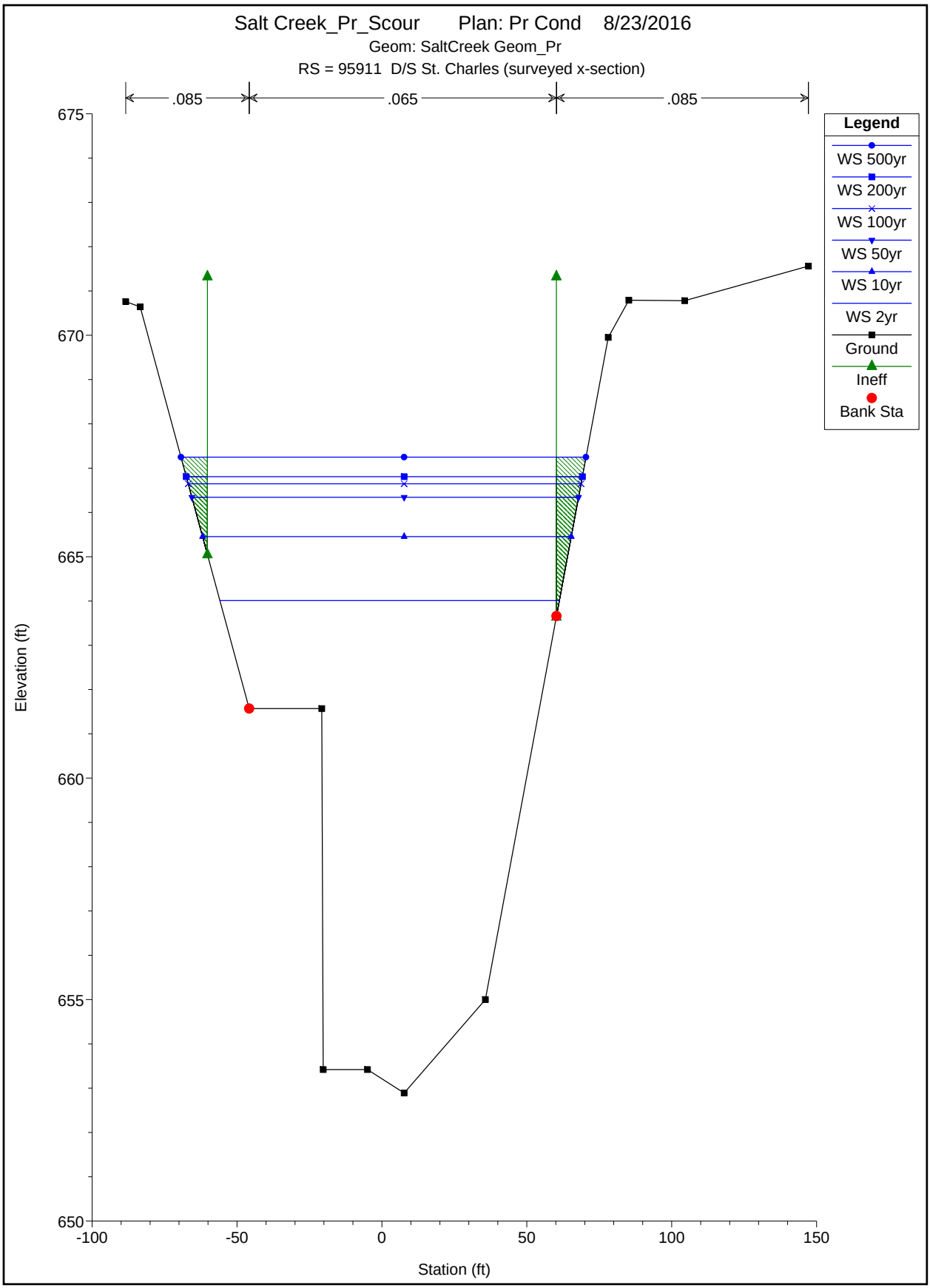

Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 96139.5 Most u/s section (surveyed section)
.12
.065
.12
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Bank Sta
675
670
665
660
655
Elevation (ft)
-200
-150
-100
-50
0
50
100
Station (ft)

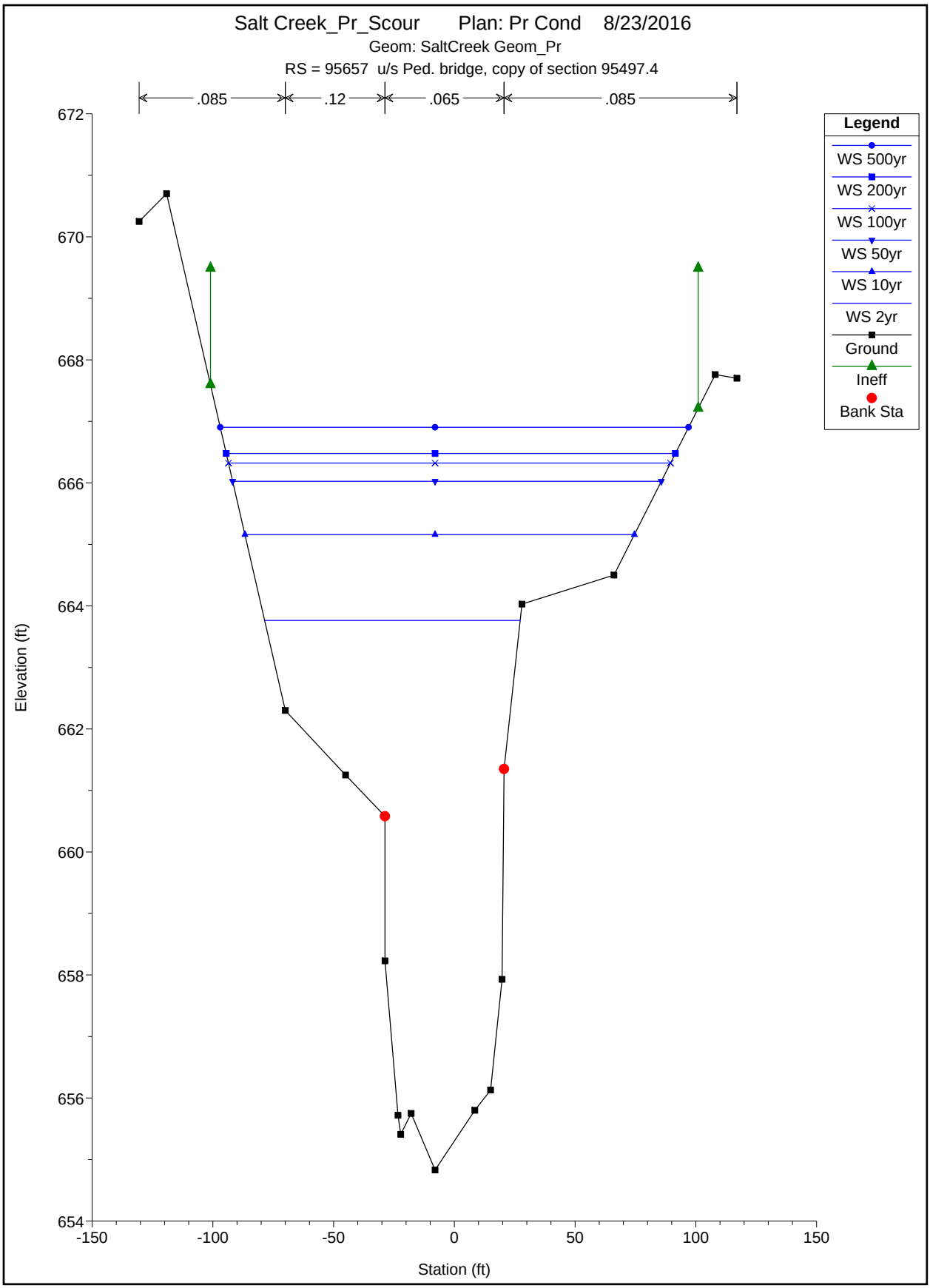

Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 96071.51 3113 (Regulatory Section)
.085
.2
.12
.12
.2
0
6
5
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Bank Sta
Elevation (ft)
685
680
675
670
665
660
655
650
-3000
-2000
-1000
0
1000
2000
Station (ft)

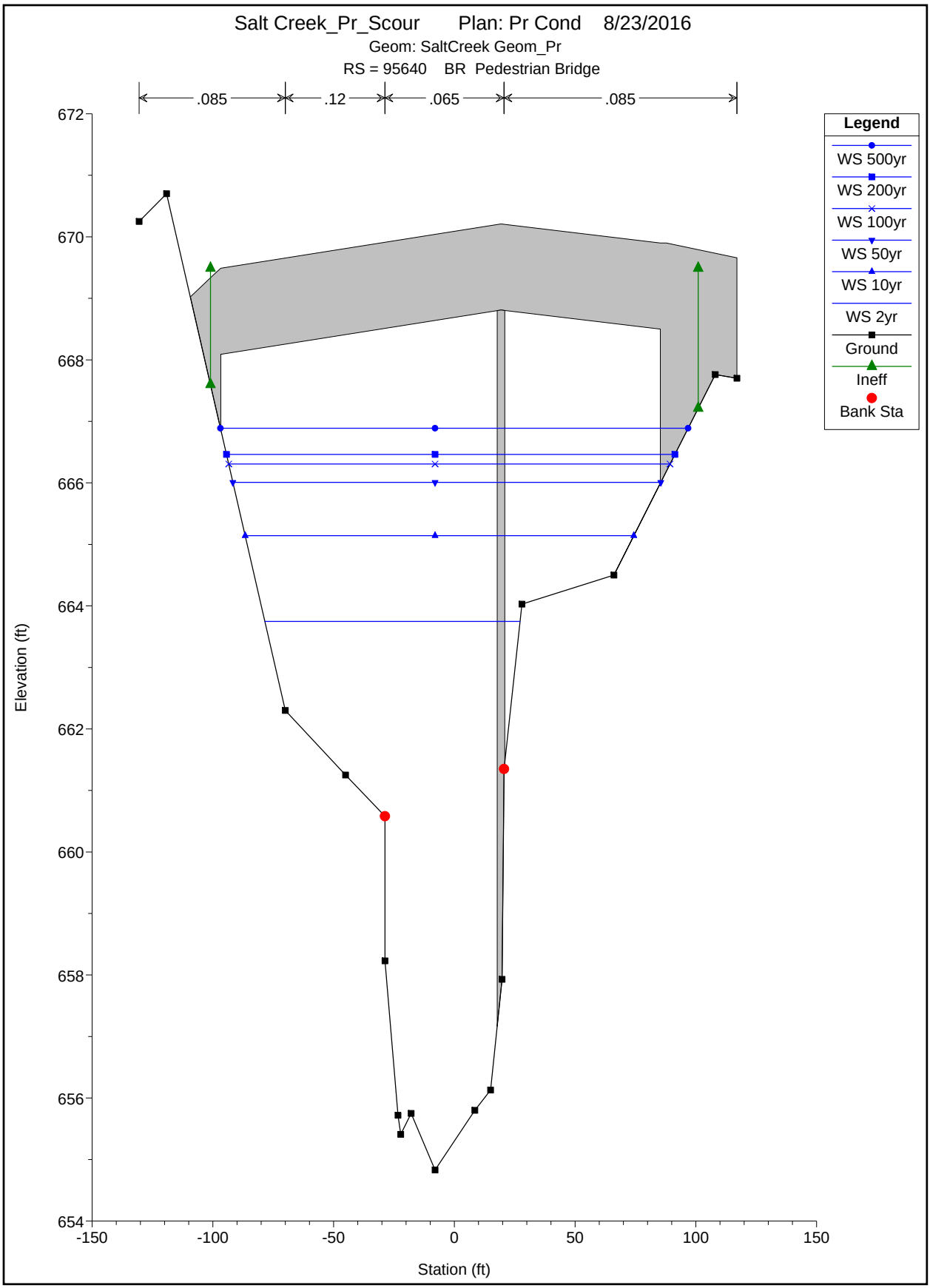

Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 96010.9 U/S St. Charles (surveyed x-section)
.085
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
675
670
665
660
655
650
-100
-50
0
50
100
150
Station (ft)

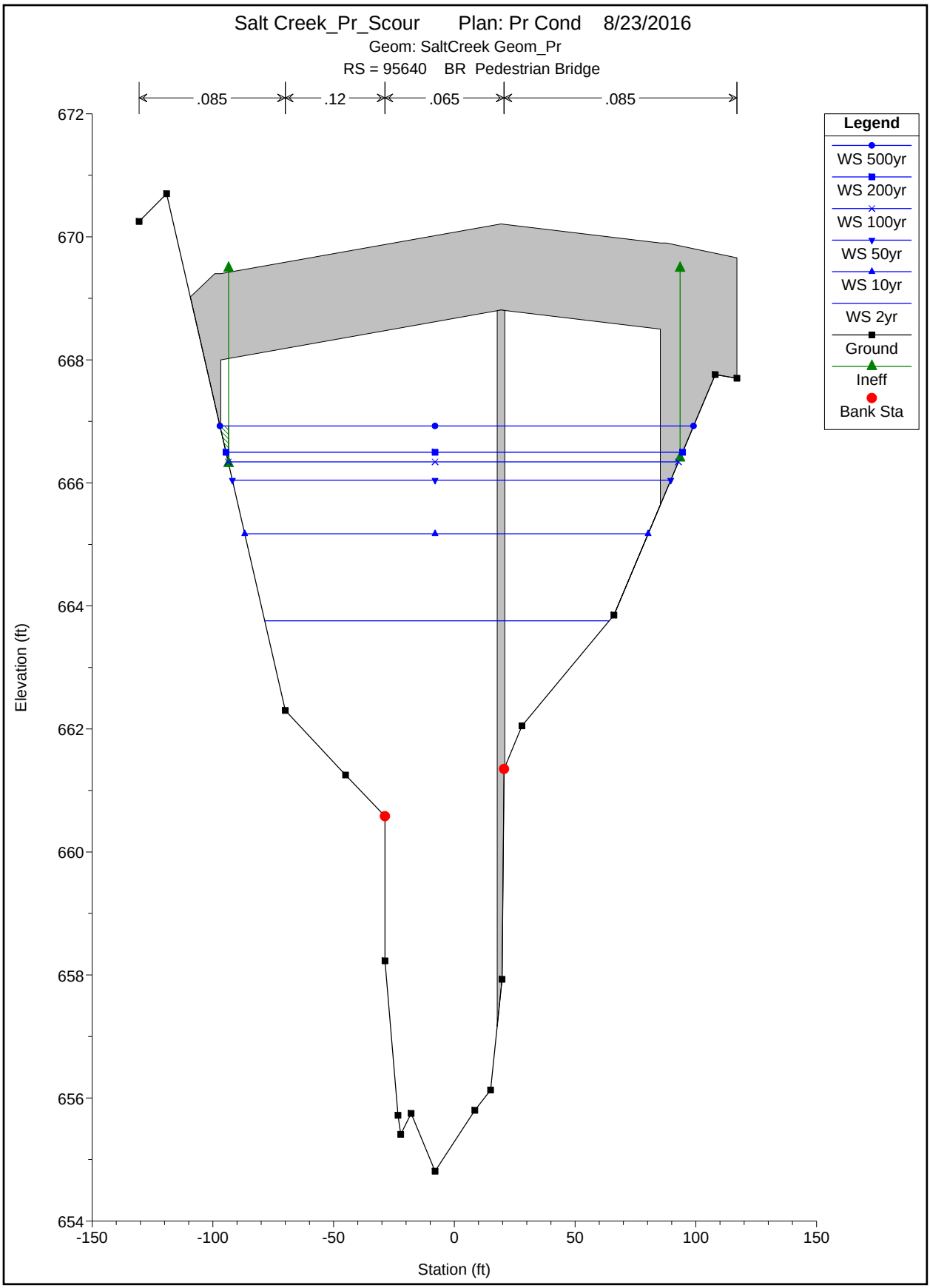

Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 95964 BR St. Charles Bridge
.085
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
675
670
665
660
655
650
Elevation (ft)
-100
-50
0
50
100
150
Station (ft)

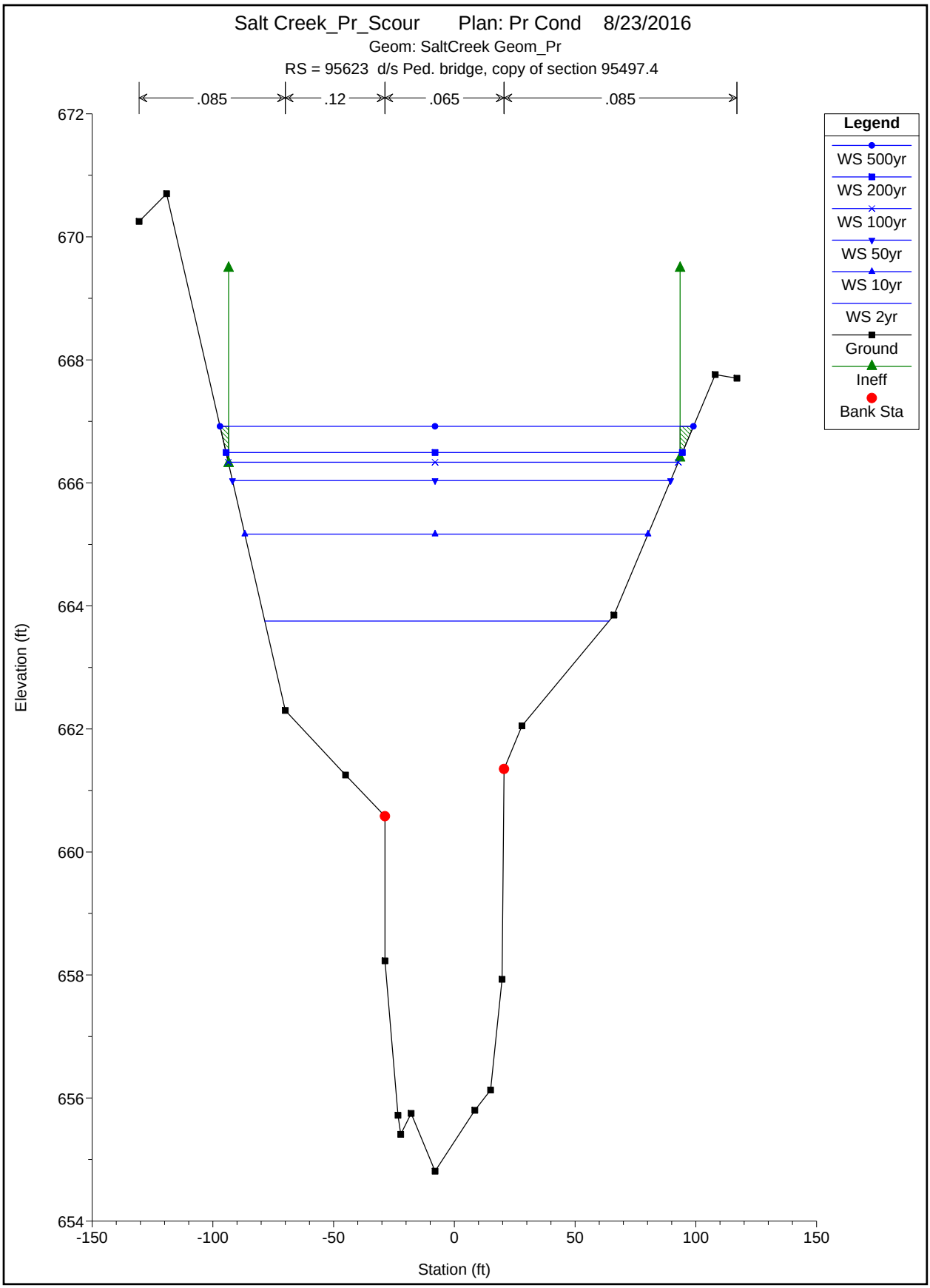

Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 95964 BR St. Charles Bridge
.085
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
675
670
665
660
655
650
Elevation (ft)
-100
-50
0
50
100
150
Station (ft)

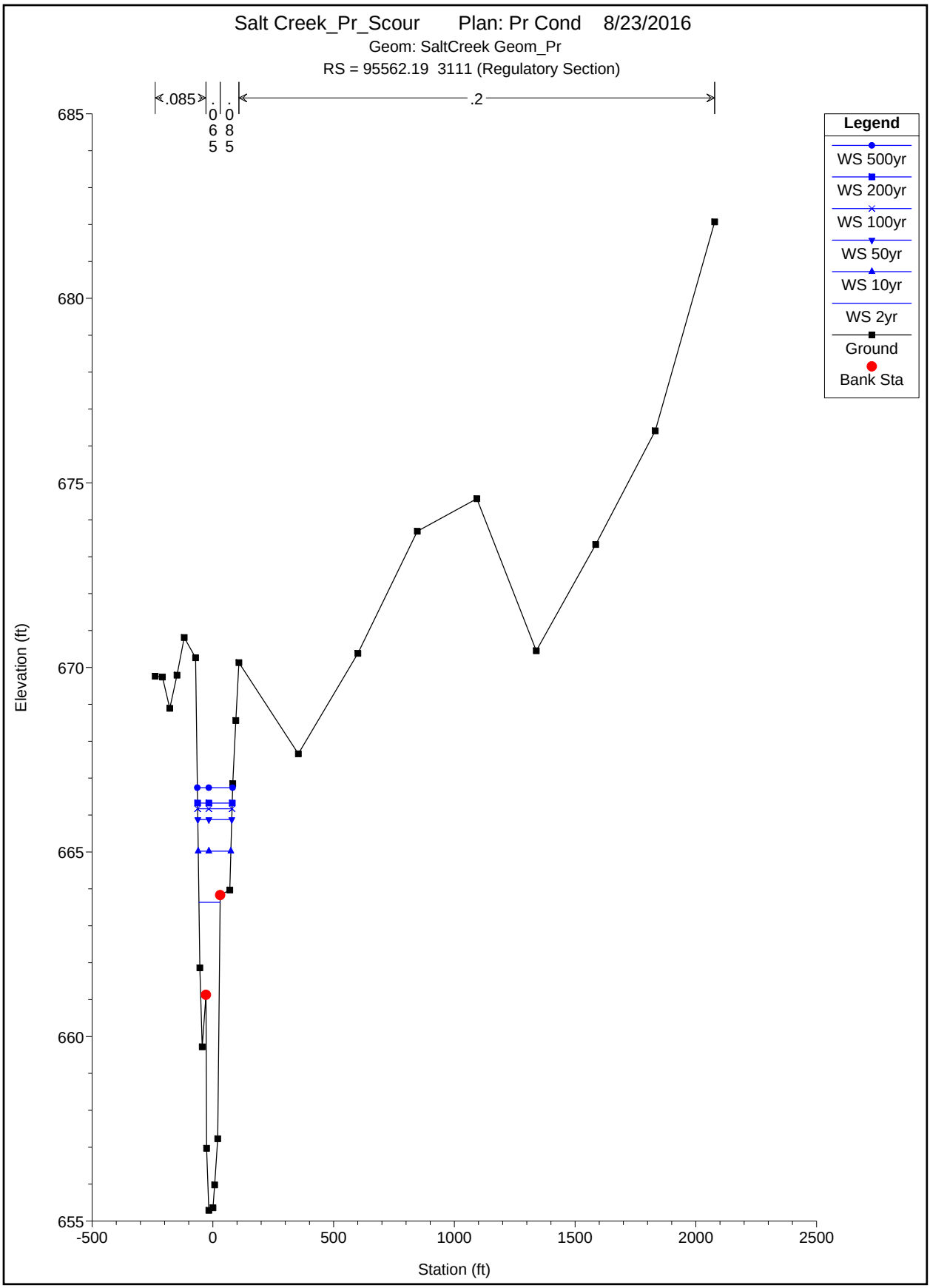

Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 95911 D/S St. Charles (surveyed x-section)
.085
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
675
670
665
660
655
650
-100
-50
0
50
100
150
Station (ft)

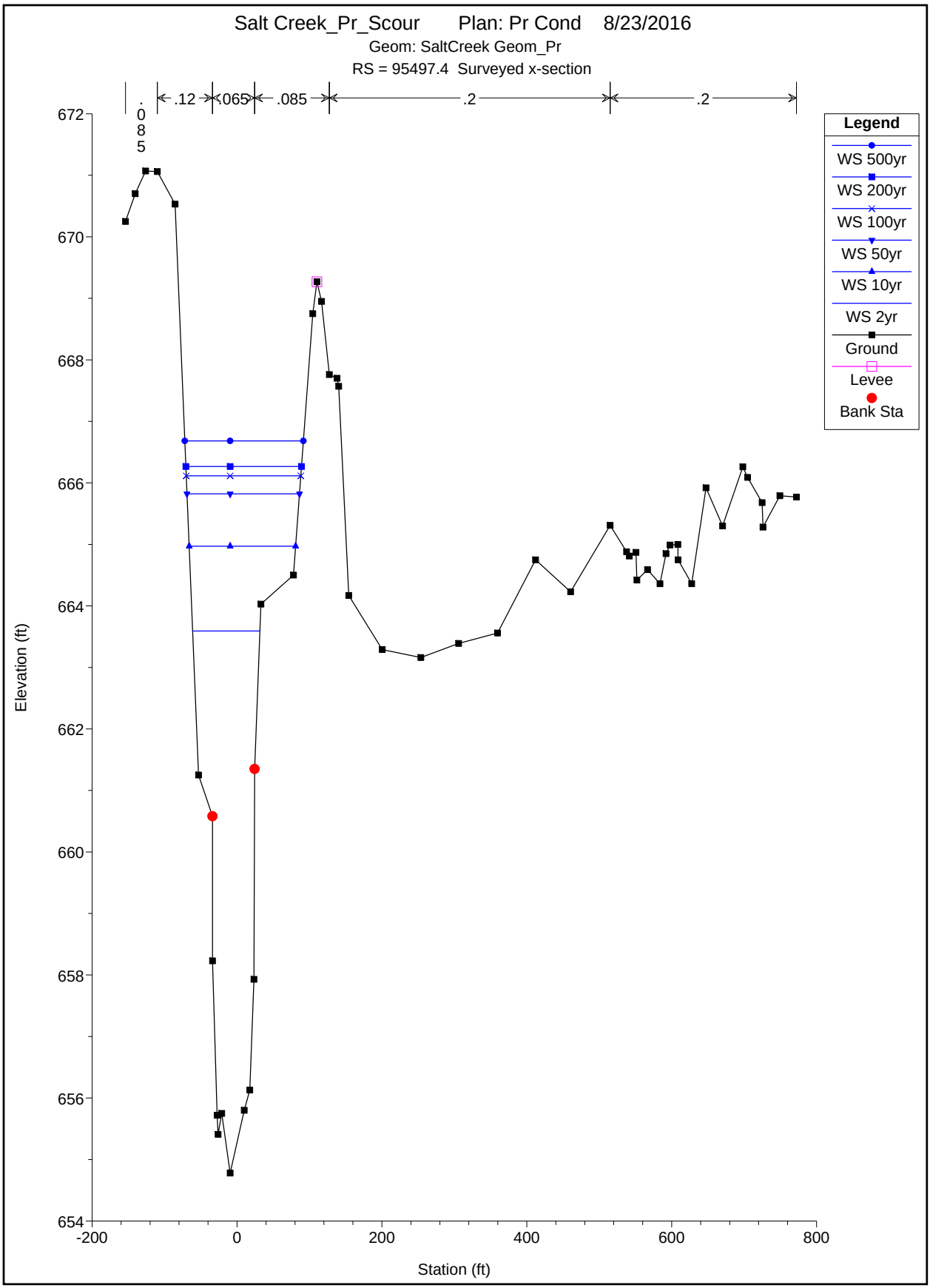

Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 95657 u/s Ped. bridge, copy of section 95497.4
.085
.12
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
654
-150
-100
-50
0
50
100
150
Station (ft)

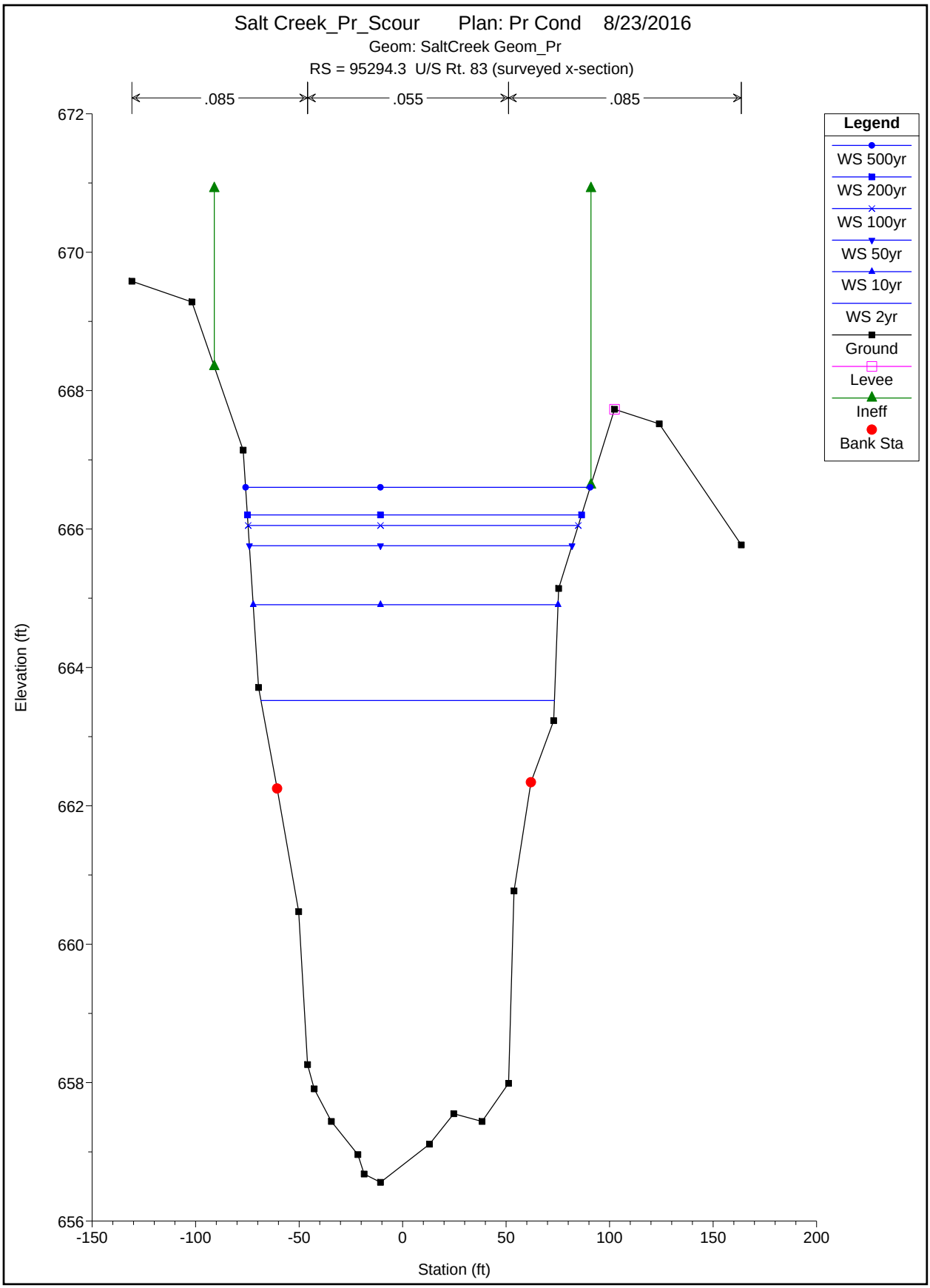

Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 95640 BR Pedestrian Bridge
.085
.12
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
654
-150
-100
-50
0
50
100
150
Station (ft)

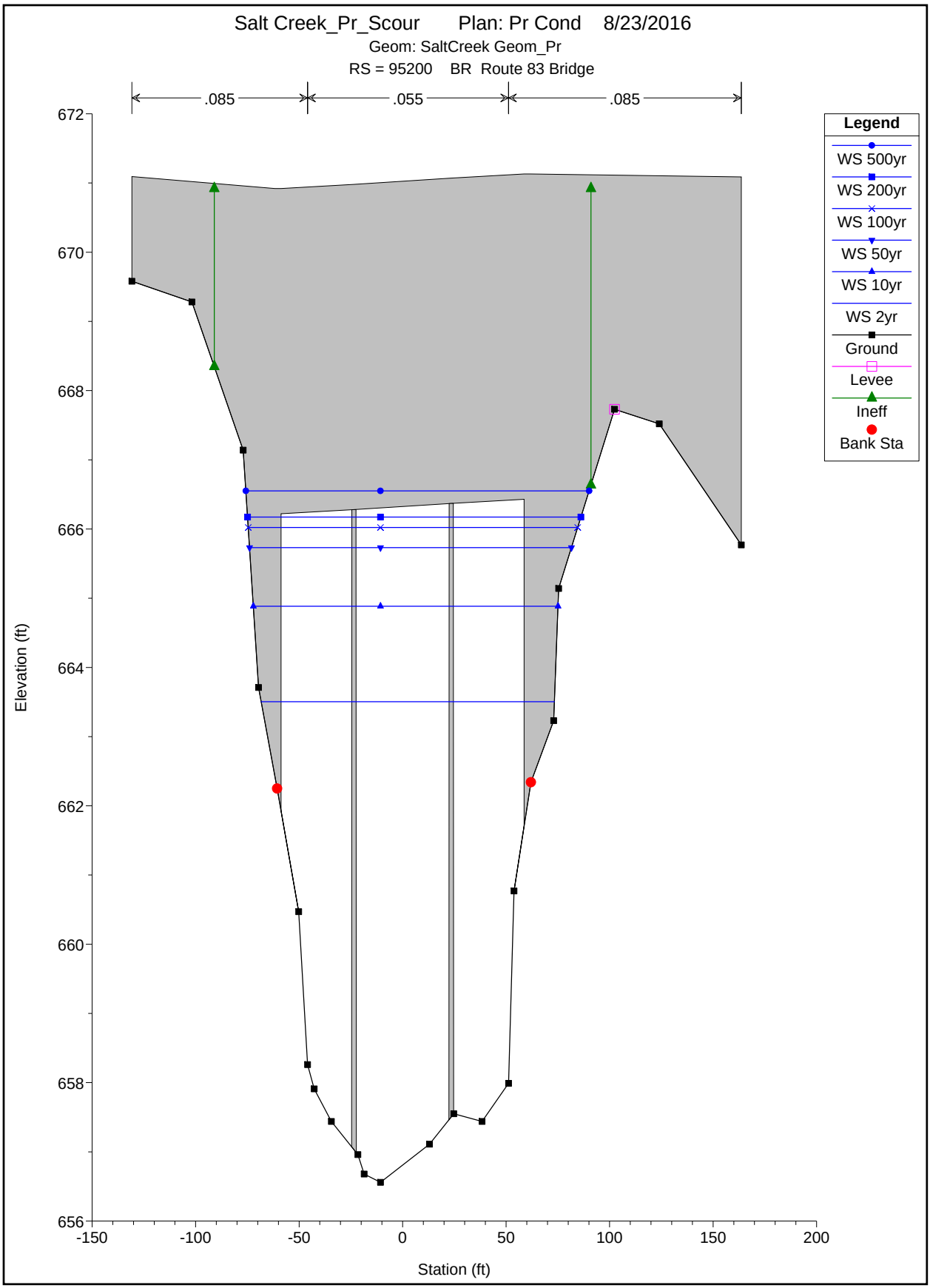

Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 95640 BR Pedestrian Bridge
.085
.12
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
654
-150
-100
-50
0
50
100
150
Station (ft)

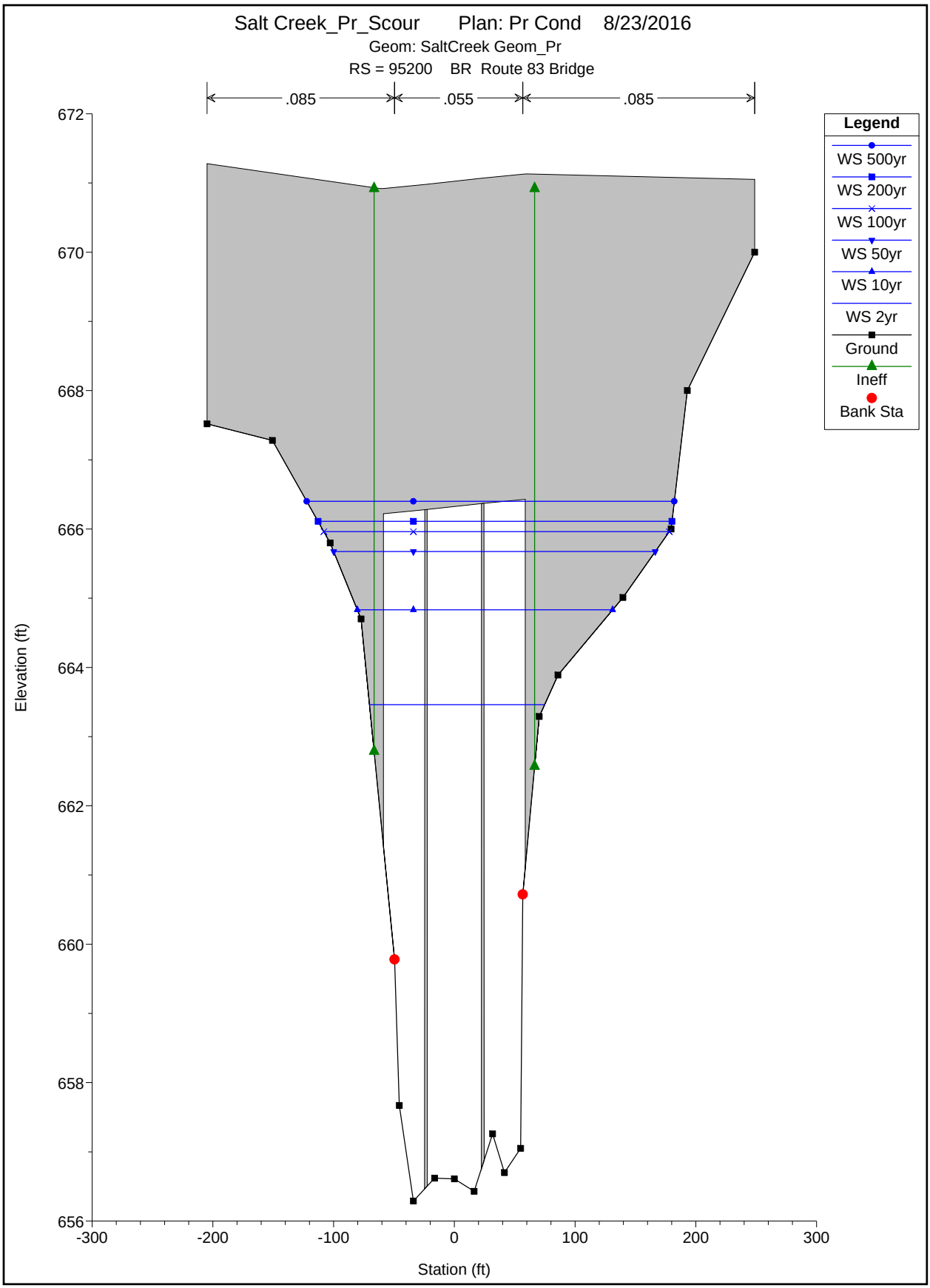

Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 95623 d/s Ped. bridge, copy of section 95497.4
.085
.12
.065
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
654
-150
-100
-50
0
50
100
150
Station (ft)

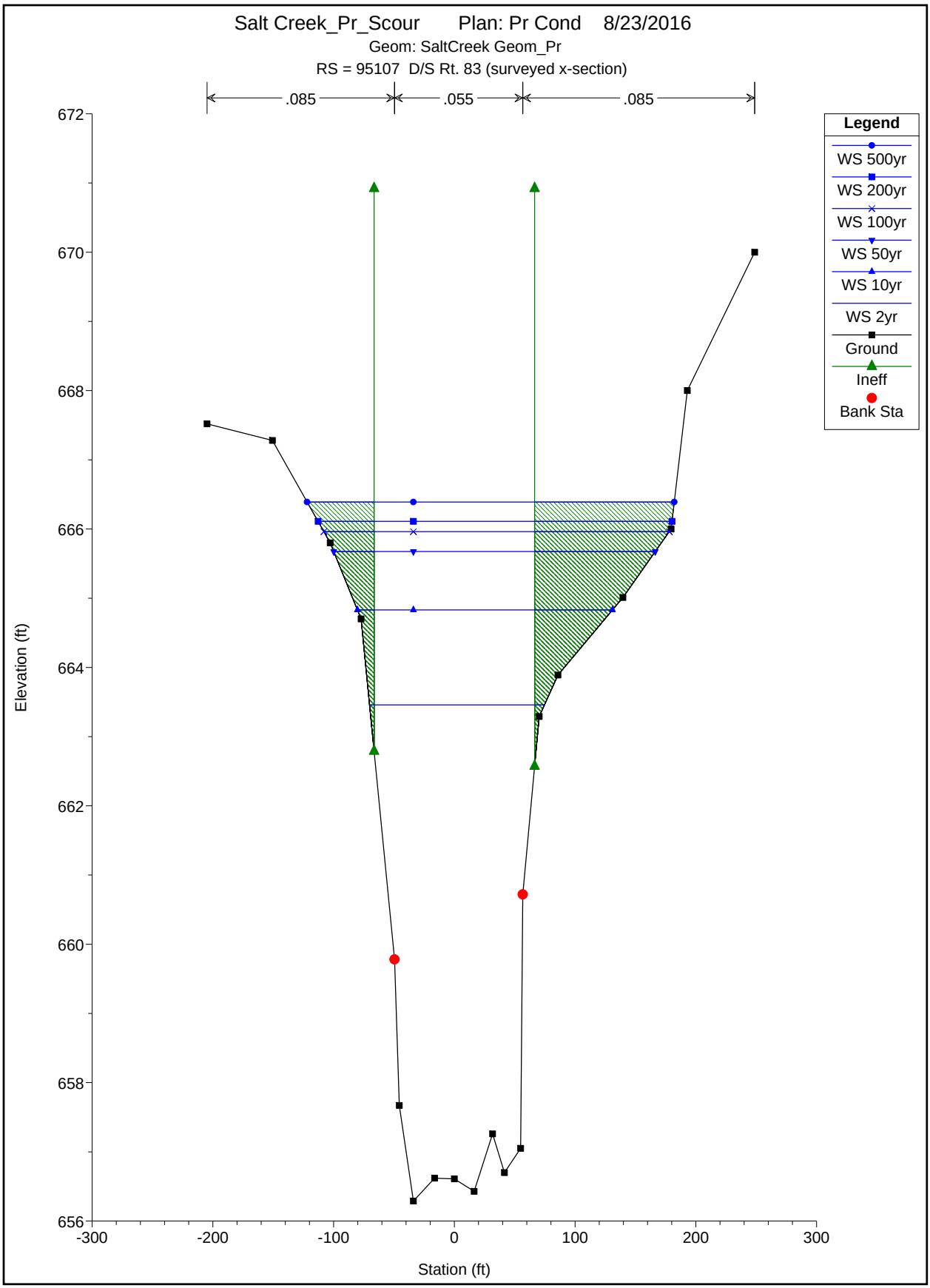

Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 95562.19 3111 (Regulatory Section)
.085
.065
.085
.2
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Bank Sta
Elevation (ft)
685
680
675
670
665
660
655
-500
0
500
1000
1500
2000
2500
Station (ft)

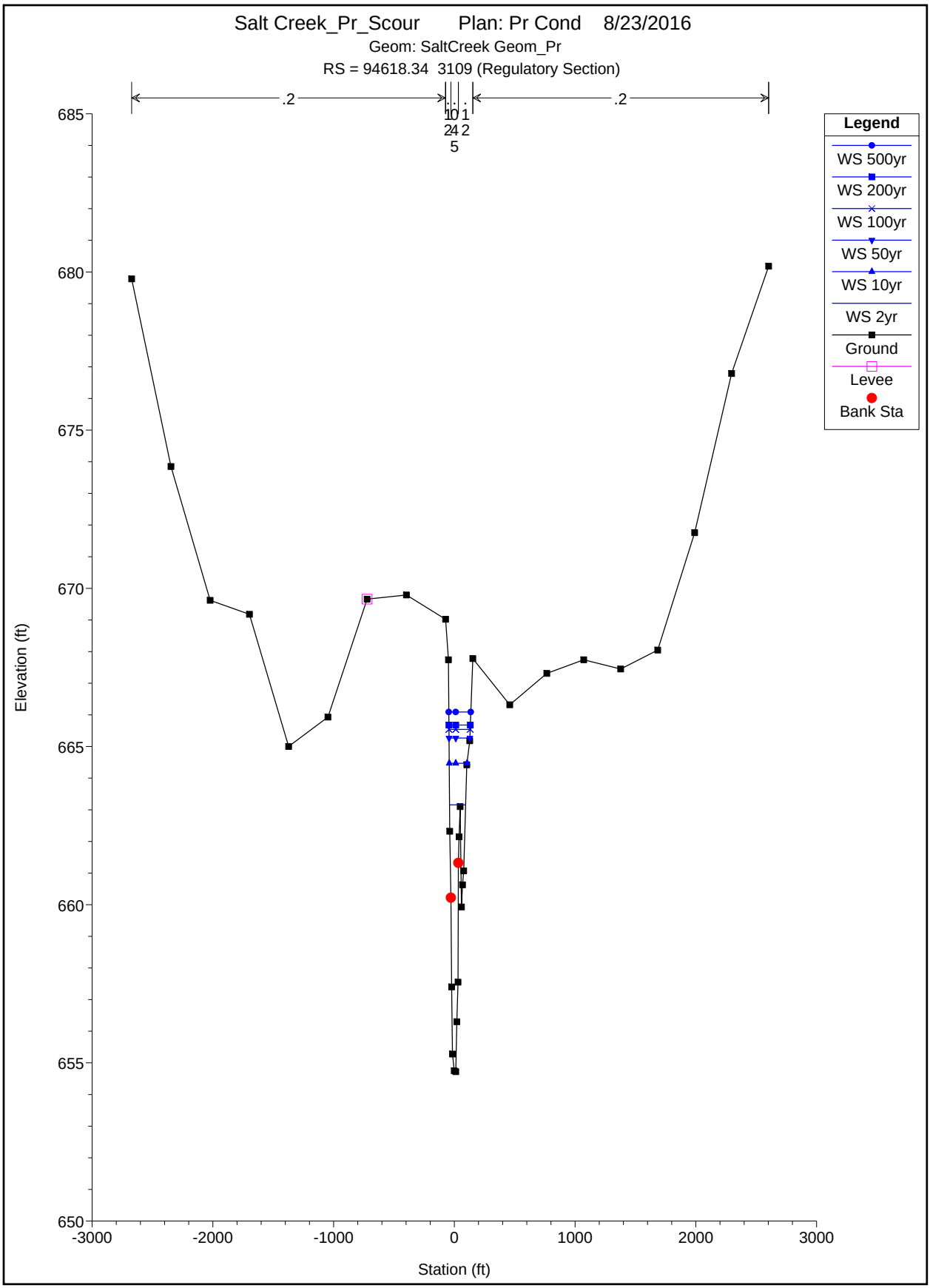

Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 95497.4 Surveyed x-section
.085
.12
.065
.085
.2
.2
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
654
-200
0
200
400
600
800
Station (ft)

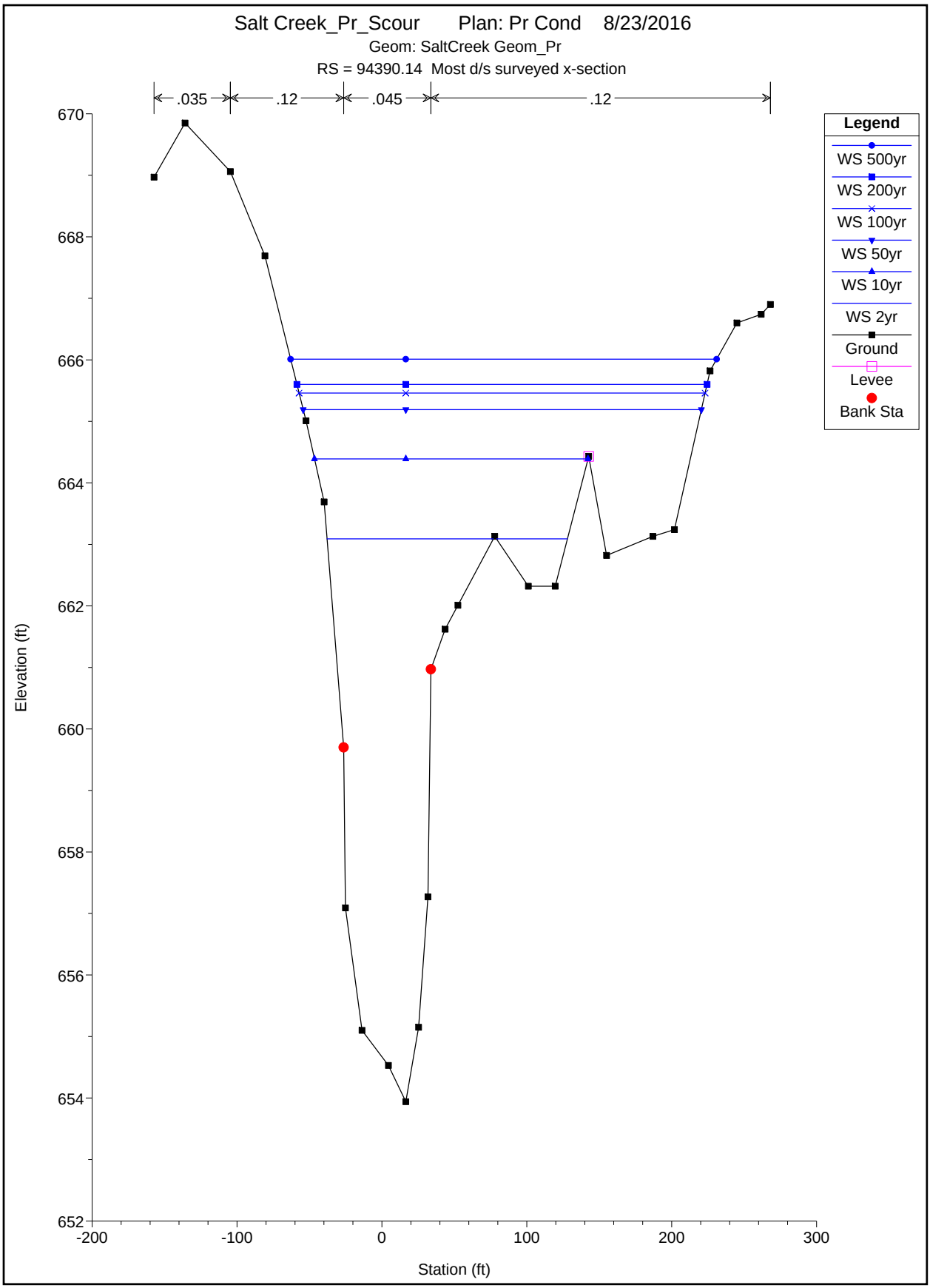

Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 95294.3 U/S Rt. 83 (surveyed x-section)
.085
.055
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
-150
-100
-50
0
50
100
150
200
Station (ft)


Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 95200 BR Route 83 Bridge
.085
.055
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
-150
-100
-50
0
50
100
150
200
Station (ft)

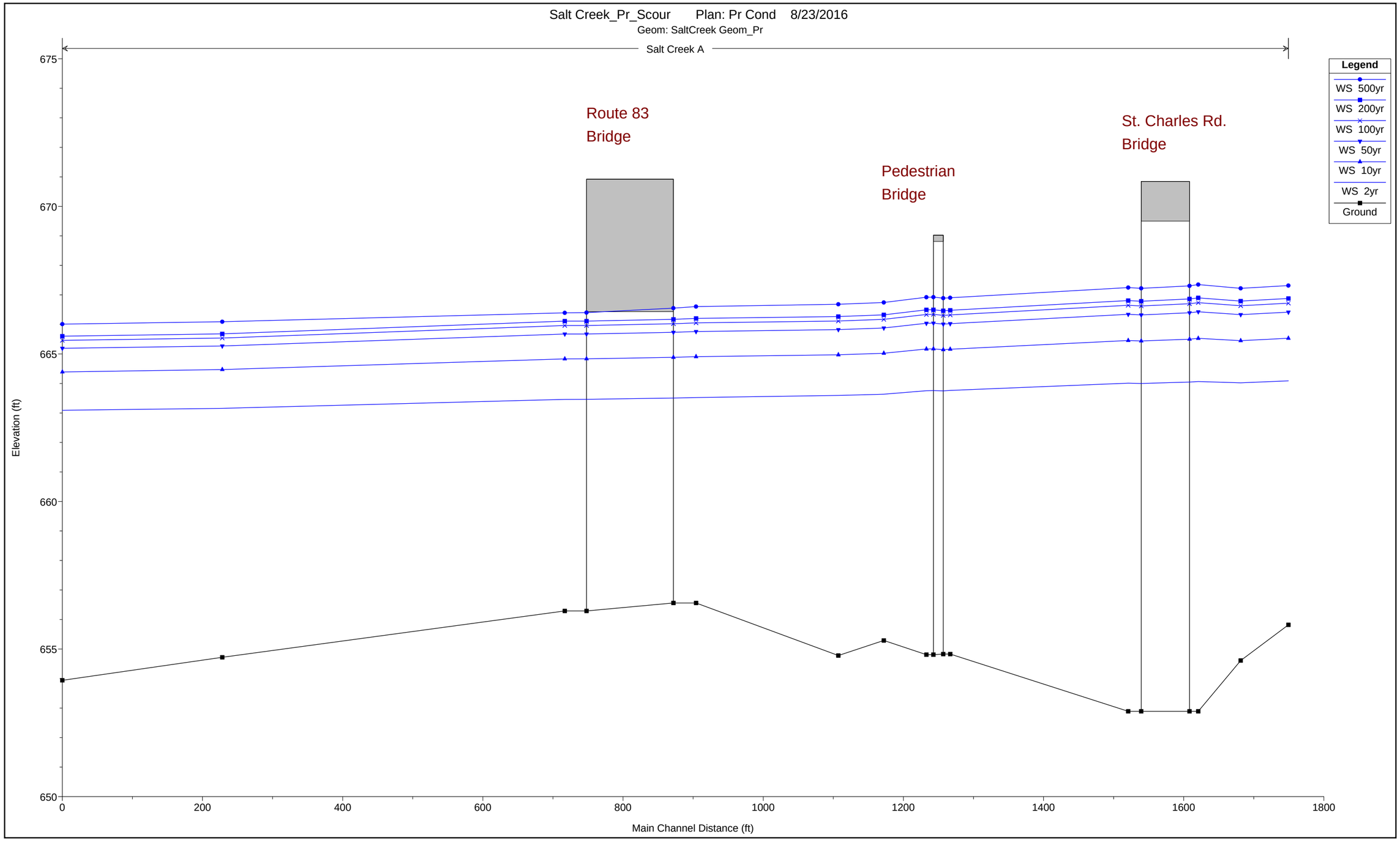

Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 95200 BR Route 83 Bridge
.085
.055
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
-300
-200
-100
0
100
200
300
Station (ft)


Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 95107 D/S Rt. 83 (surveyed x-section)
.085
.055
.085
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Ineff
Bank Sta
Elevation (ft)
672
670
668
666
664
662
660
658
656
-300
-200
-100
0
100
200
300
Station (ft)


Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 94618.34 3109 (Regulatory Section)
.2
.2
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
685
680
675
670
665
660
655
650
-3000
-2000
-1000
0
1000
2000
3000


Salt Creek_Pr_Scour Plan: Pr Cond 8/23/2016
Geom: SaltCreek Geom_Pr
RS = 94390.14 Most d/s surveyed x-section
.035
.12
.045
.12
Legend
WS 500yr
WS 200yr
WS 100yr
WS 50yr
WS 10yr
WS 2yr
Ground
Levee
Bank Sta
Elevation (ft)
670
668
666
664
662
660
658
656
654
652
-200
-100
0
100
200
300
Station (ft)

Proposed Condition



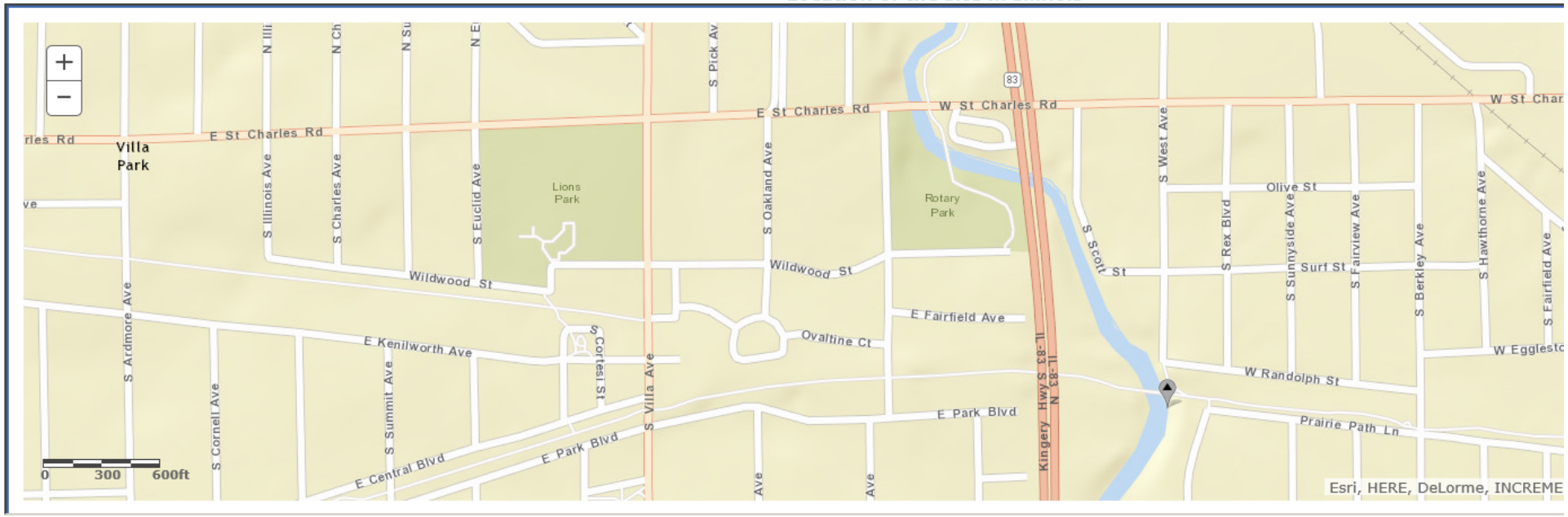
APRIL 2013 ELMHURST
GAGE DATA

USGS 05531300 SALT CREEK AT ELMHURST, IL

Available data for this site | Location map | GO

Dupage County, Illinois
Hydrologic Unit Code 07120004
Latitude 41°53'10", Longitude 87°57'33" NAD27
Drainage area 91.5 square miles
Gage datum 651.93 feet above NGVD29

Location of the site in Illinois

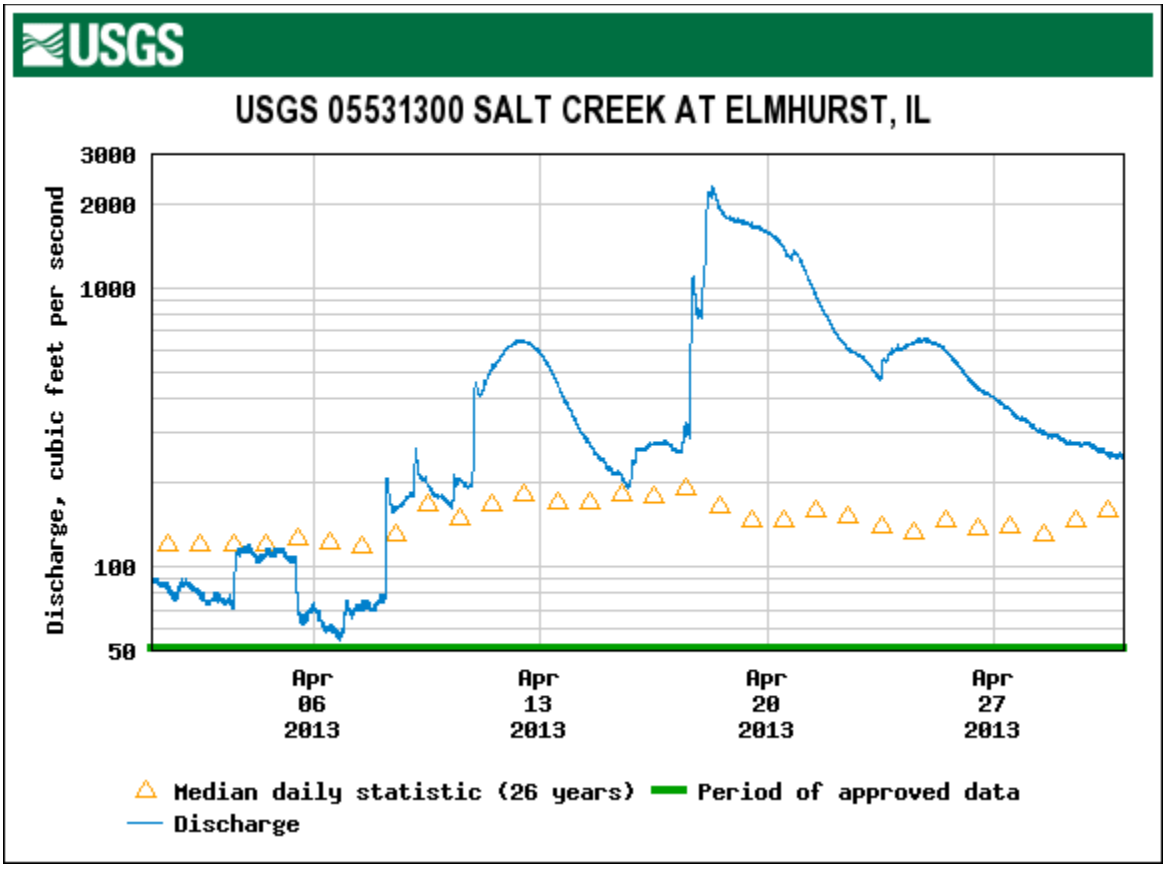


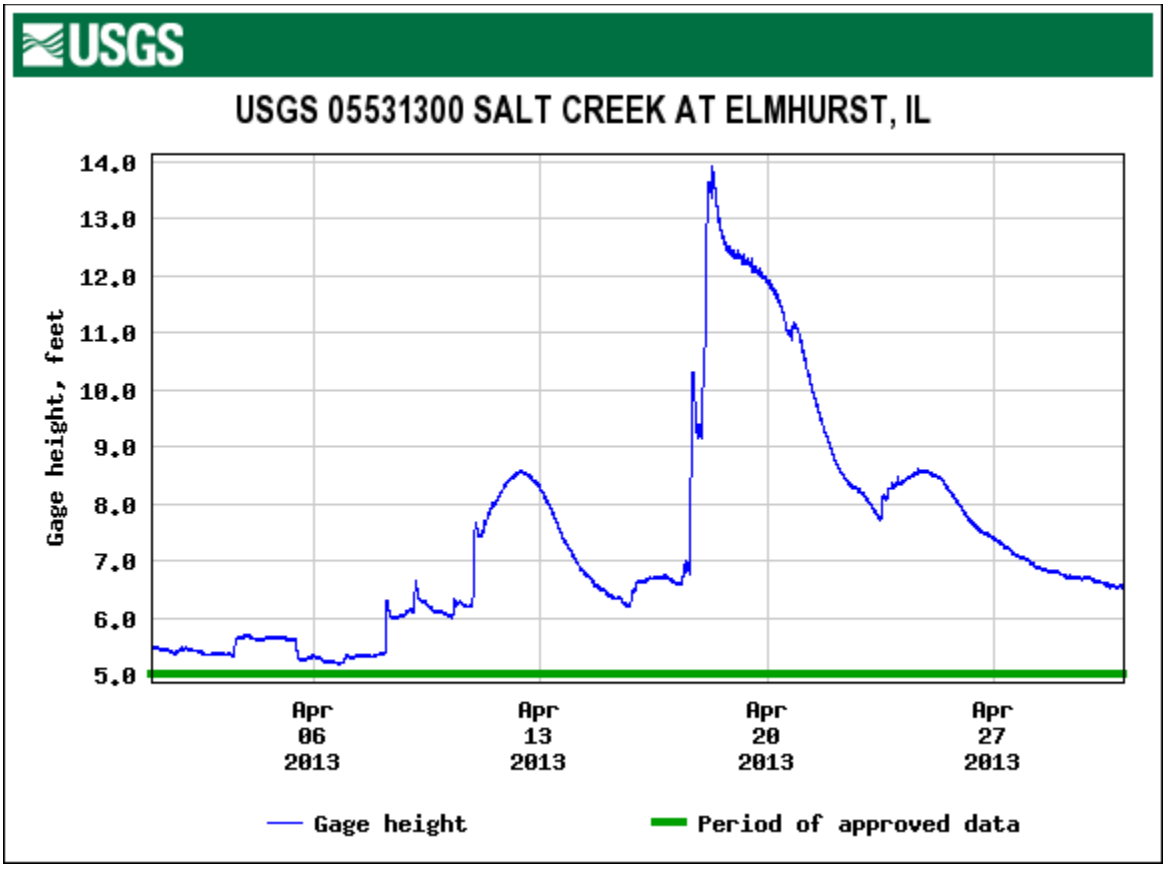
Summary Gage Data:

Elmhurst Gage
April 2013 Flood Data:

Gage location is just downstream of the HEC-RAS models most downstream cross-section 94390.14

Gage Peak Discharge =	2290 cfs	(4/18/2013)	
94390.14 X-Section 500-Yr Q =	2277 cfs		April 2013 was a 500-year event per the regulatory model Q's
94390.14 X-Section 100-Yr Q =	1973 cfs		
Gage Peak Elevation =	665.54	(4/18/2013)	
94390.14 X-Section 500-Yr Elev =	666.29		
94390.14 X-Section 100-Yr Elev =	665.74		
Gage Datum	651.93	NGVD29	
Gage Peak Height =	13.90	(4/18/2013)	
Datum correction to NGVD88	-0.29		
	665.54		
Bridge 500-year WSEL via model (u/s end, 95964) =	667.54		
Bridge 100-year WSEL via model (u/s end, 95964) =	666.93		
Gage elevation extrapolated to bridge location =	**666.74**		April 2013 was a 100-year event per the regulatory model WSEL's


USGS
USGS 05531300 SALT CREEK AT ELMHURST, IL
Discharge, cubic feet per second
3000
2000
1000
100
50
Apr 06 2013
Apr 13 2013
Apr 20 2013
Apr 27 2013
Median daily statistic (26 years)
Period of approved data
Discharge


USGS
USGS 05531300 SALT CREEK AT ELMHURST, IL
Gage height, feet
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
Apr 06 2013
Apr 13 2013
Apr 20 2013
Apr 27 2013
Gage height
Period of approved data

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/16/2013	17:20	6.73	279
USGS	4/16/2013	17:25	6.73	279
USGS	4/16/2013	17:30	6.74	280
USGS	4/16/2013	17:35	6.73	279
USGS	4/16/2013	17:40	6.73	279
USGS	4/16/2013	17:45	6.71	275
USGS	4/16/2013	17:50	6.74	280
USGS	4/16/2013	17:55	6.73	279
USGS	4/16/2013	18:00	6.72	277
USGS	4/16/2013	18:05	6.74	280
USGS	4/16/2013	18:10	6.73	279
USGS	4/16/2013	18:15	6.73	279
USGS	4/16/2013	18:20	6.72	277
USGS	4/16/2013	18:25	6.72	277
USGS	4/16/2013	18:30	6.74	280
USGS	4/16/2013	18:35	6.74	280
USGS	4/16/2013	18:40	6.75	282
USGS	4/16/2013	18:45	6.74	280
USGS	4/16/2013	18:50	6.72	277
USGS	4/16/2013	18:55	6.73	279
USGS	4/16/2013	19:00	6.73	279
USGS	4/16/2013	19:05	6.73	279
USGS	4/16/2013	19:10	6.72	277
USGS	4/16/2013	19:15	6.71	275
USGS	4/16/2013	19:20	6.74	280
USGS	4/16/2013	19:25	6.74	280
USGS	4/16/2013	19:30	6.73	279
USGS	4/16/2013	19:35	6.73	279
USGS	4/16/2013	19:40	6.74	280
USGS	4/16/2013	19:45	6.74	280
USGS	4/16/2013	19:50	6.75	282
USGS	4/16/2013	19:55	6.75	282
USGS	4/16/2013	20:00	6.74	280
USGS	4/16/2013	20:05	6.74	280
USGS	4/16/2013	20:10	6.74	280
USGS	4/16/2013	20:15	6.73	279
USGS	4/16/2013	20:20	6.74	280
USGS	4/16/2013	20:25	6.74	280
USGS	4/16/2013	20:30	6.74	280
USGS	4/16/2013	20:35	6.75	282
USGS	4/16/2013	20:40	6.74	280
USGS	4/16/2013	20:45	6.73	279
USGS	4/16/2013	20:50	6.73	279
USGS	4/16/2013	20:55	6.74	280

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/16/2013	21:00	6.73	279
USGS	4/16/2013	21:05	6.73	279
USGS	4/16/2013	21:10	6.72	277
USGS	4/16/2013	21:15	6.73	279
USGS	4/16/2013	21:20	6.70	273
USGS	4/16/2013	21:25	6.72	277
USGS	4/16/2013	21:30	6.73	279
USGS	4/16/2013	21:35	6.72	277
USGS	4/16/2013	21:40	6.72	277
USGS	4/16/2013	21:45	6.71	275
USGS	4/16/2013	21:50	6.72	277
USGS	4/16/2013	21:55	6.70	273
USGS	4/16/2013	22:00	6.70	273
USGS	4/16/2013	22:05	6.71	275
USGS	4/16/2013	22:10	6.71	275
USGS	4/16/2013	22:15	6.71	275
USGS	4/16/2013	22:20	6.72	277
USGS	4/16/2013	22:25	6.71	275
USGS	4/16/2013	22:30	6.69	272
USGS	4/16/2013	22:35	6.70	273
USGS	4/16/2013	22:40	6.70	273
USGS	4/16/2013	22:45	6.70	273
USGS	4/16/2013	22:50	6.69	272
USGS	4/16/2013	22:55	6.70	273
USGS	4/16/2013	23:00	6.71	275
USGS	4/16/2013	23:05	6.70	273
USGS	4/16/2013	23:10	6.71	275
USGS	4/16/2013	23:15	6.68	270
USGS	4/16/2013	23:20	6.70	273
USGS	4/16/2013	23:25	6.68	270
USGS	4/16/2013	23:30	6.69	272
USGS	4/16/2013	23:35	6.69	272
USGS	4/16/2013	23:40	6.70	273
USGS	4/16/2013	23:45	6.69	272
USGS	4/16/2013	23:50	6.71	275
USGS	4/16/2013	23:55	6.70	273
USGS	4/17/2013	0:00	6.70	273
USGS	4/17/2013	0:05	6.68	270
USGS	4/17/2013	0:10	6.68	270
USGS	4/17/2013	0:15	6.69	272
USGS	4/17/2013	0:20	6.67	268
USGS	4/17/2013	0:30	6.69	272
USGS	4/17/2013	0:35	6.68	270
USGS	4/17/2013	0:40	6.67	268

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/17/2013	0:45	6.68	270
USGS	4/17/2013	0:50	6.67	268
USGS	4/17/2013	0:55	6.66	267
USGS	4/17/2013	1:00	6.67	268
USGS	4/17/2013	1:05	6.66	267
USGS	4/17/2013	1:10	6.65	265
USGS	4/17/2013	1:15	6.64	263
USGS	4/17/2013	1:20	6.64	263
USGS	4/17/2013	1:25	6.66	267
USGS	4/17/2013	1:30	6.66	267
USGS	4/17/2013	1:35	6.67	268
USGS	4/17/2013	1:40	6.65	265
USGS	4/17/2013	1:45	6.65	265
USGS	4/17/2013	1:50	6.65	265
USGS	4/17/2013	1:55	6.63	261
USGS	4/17/2013	2:00	6.65	265
USGS	4/17/2013	2:05	6.66	267
USGS	4/17/2013	2:10	6.62	260
USGS	4/17/2013	2:15	6.65	265
USGS	4/17/2013	2:20	6.63	261
USGS	4/17/2013	2:25	6.63	261
USGS	4/17/2013	2:30	6.64	263
USGS	4/17/2013	2:35	6.63	261
USGS	4/17/2013	2:40	6.63	261
USGS	4/17/2013	2:45	6.65	265
USGS	4/17/2013	2:50	6.66	267
USGS	4/17/2013	2:55	6.63	261
USGS	4/17/2013	3:00	6.63	261
USGS	4/17/2013	3:05	6.62	260
USGS	4/17/2013	3:10	6.63	261
USGS	4/17/2013	3:15	6.63	261
USGS	4/17/2013	3:20	6.62	260
USGS	4/17/2013	3:25	6.63	261
USGS	4/17/2013	3:30	6.63	261
USGS	4/17/2013	3:35	6.64	263
USGS	4/17/2013	3:40	6.64	263
USGS	4/17/2013	3:45	6.62	260
USGS	4/17/2013	3:50	6.63	261
USGS	4/17/2013	3:55	6.63	261
USGS	4/17/2013	4:00	6.63	261
USGS	4/17/2013	4:05	6.62	260
USGS	4/17/2013	4:10	6.62	260
USGS	4/17/2013	4:15	6.62	260
USGS	4/17/2013	4:20	6.60	256

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/17/2013	4:25	6.60	256
USGS	4/17/2013	4:30	6.62	260
USGS	4/17/2013	4:35	6.62	260
USGS	4/17/2013	4:40	6.64	263
USGS	4/17/2013	4:45	6.64	263
USGS	4/17/2013	4:50	6.61	258
USGS	4/17/2013	4:55	6.63	261
USGS	4/17/2013	5:00	6.61	258
USGS	4/17/2013	5:05	6.62	260
USGS	4/17/2013	5:10	6.62	260
USGS	4/17/2013	5:15	6.62	260
USGS	4/17/2013	5:20	6.62	260
USGS	4/17/2013	5:25	6.62	260
USGS	4/17/2013	5:30	6.60	256
USGS	4/17/2013	5:35	6.62	260
USGS	4/17/2013	5:40	6.60	256
USGS	4/17/2013	5:45	6.61	258
USGS	4/17/2013	5:50	6.62	260
USGS	4/17/2013	5:55	6.60	256
USGS	4/17/2013	6:00	6.60	256
USGS	4/17/2013	6:05	6.61	258
USGS	4/17/2013	6:10	6.60	256
USGS	4/17/2013	6:15	6.59	255
USGS	4/17/2013	6:20	6.60	256
USGS	4/17/2013	6:25	6.60	256
USGS	4/17/2013	6:30	6.61	258
USGS	4/17/2013	6:35	6.61	258
USGS	4/17/2013	6:40	6.59	255
USGS	4/17/2013	6:45	6.61	258
USGS	4/17/2013	6:50	6.61	258
USGS	4/17/2013	6:55	6.61	258
USGS	4/17/2013	7:00	6.60	256
USGS	4/17/2013	7:05	6.62	260
USGS	4/17/2013	7:10	6.61	258
USGS	4/17/2013	7:15	6.60	256
USGS	4/17/2013	7:20	6.60	256
USGS	4/17/2013	7:25	6.60	256
USGS	4/17/2013	7:30	6.60	256
USGS	4/17/2013	7:35	6.60	256
USGS	4/17/2013	7:40	6.60	256
USGS	4/17/2013	7:45	6.59	255
USGS	4/17/2013	7:50	6.60	256
USGS	4/17/2013	7:55	6.62	260
USGS	4/17/2013	8:00	6.60	256

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/17/2013	8:05	6.60	256
USGS	4/17/2013	8:10	6.63	261
USGS	4/17/2013	8:15	6.61	258
USGS	4/17/2013	8:20	6.61	258
USGS	4/17/2013	8:25	6.60	256
USGS	4/17/2013	8:30	6.61	258
USGS	4/17/2013	8:35	6.62	260
USGS	4/17/2013	8:40	6.62	260
USGS	4/17/2013	8:45	6.60	256
USGS	4/17/2013	8:50	6.61	258
USGS	4/17/2013	8:55	6.64	263
USGS	4/17/2013	9:00	6.65	265
USGS	4/17/2013	9:05	6.66	267
USGS	4/17/2013	9:10	6.68	270
USGS	4/17/2013	9:15	6.73	279
USGS	4/17/2013	9:20	6.72	277
USGS	4/17/2013	9:25	6.76	284
USGS	4/17/2013	9:30	6.77	286
USGS	4/17/2013	9:35	6.77	286
USGS	4/17/2013	9:40	6.79	289
USGS	4/17/2013	9:45	6.78	287
USGS	4/17/2013	9:50	6.81	293
USGS	4/17/2013	9:55	6.83	296
USGS	4/17/2013	10:00	6.83	296
USGS	4/17/2013	10:05	6.87	303
USGS	4/17/2013	10:10	6.89	307
USGS	4/17/2013	10:15	6.91	311
USGS	4/17/2013	10:20	6.91	311
USGS	4/17/2013	10:25	6.94	316
USGS	4/17/2013	10:30	6.94	316
USGS	4/17/2013	10:35	6.95	318
USGS	4/17/2013	10:40	6.96	320
USGS	4/17/2013	10:45	6.94	316
USGS	4/17/2013	10:50	6.93	314
USGS	4/17/2013	10:55	6.92	312
USGS	4/17/2013	11:00	6.91	311
USGS	4/17/2013	11:05	6.91	311
USGS	4/17/2013	11:10	6.89	307
USGS	4/17/2013	11:15	6.87	303
USGS	4/17/2013	11:20	6.88	305
USGS	4/17/2013	11:25	6.87	303
USGS	4/17/2013	11:30	6.85	300
USGS	4/17/2013	11:35	6.84	298
USGS	4/17/2013	11:40	6.83	296

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/17/2013	11:45	6.83	296
USGS	4/17/2013	11:50	6.82	295
USGS	4/17/2013	11:55	6.81	293
USGS	4/17/2013	12:00	6.82	295
USGS	4/17/2013	12:05	6.87	303
USGS	4/17/2013	12:10	6.95	318
USGS	4/17/2013	12:15	7.02	331
USGS	4/17/2013	12:20	6.95	318
USGS	4/17/2013	12:25	6.92	312
USGS	4/17/2013	12:30	6.92	312
USGS	4/17/2013	12:35	6.90	309
USGS	4/17/2013	12:40	6.89	307
USGS	4/17/2013	12:45	6.89	307
USGS	4/17/2013	12:50	6.87	303
USGS	4/17/2013	12:55	6.88	305
USGS	4/17/2013	13:00	6.87	303
USGS	4/17/2013	13:05	6.86	302
USGS	4/17/2013	13:10	6.85	300
USGS	4/17/2013	13:15	6.84	298
USGS	4/17/2013	13:20	6.84	298
USGS	4/17/2013	13:25	6.84	298
USGS	4/17/2013	13:30	6.84	298
USGS	4/17/2013	13:35	6.84	298
USGS	4/17/2013	13:40	6.82	295
USGS	4/17/2013	13:45	6.83	296
USGS	4/17/2013	13:50	6.82	295
USGS	4/17/2013	13:55	6.82	295
USGS	4/17/2013	14:00	6.80	291
USGS	4/17/2013	14:05	6.80	291
USGS	4/17/2013	14:10	6.80	291
USGS	4/17/2013	14:15	6.78	287
USGS	4/17/2013	14:20	6.81	293
USGS	4/17/2013	14:25	6.81	293
USGS	4/17/2013	14:30	6.89	307
USGS	4/17/2013	14:35	7.01	329
USGS	4/17/2013	14:40	7.30	383
USGS	4/17/2013	14:45	7.59	439
USGS	4/17/2013	14:50	7.74	469
USGS	4/17/2013	14:55	7.89	500
USGS	4/17/2013	15:00	8.01	525
USGS	4/17/2013	15:05	8.09	542
USGS	4/17/2013	15:10	8.20	565
USGS	4/17/2013	15:15	8.39	606
USGS	4/17/2013	15:20	8.56	643

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/17/2013	15:25	8.86	710
USGS	4/17/2013	15:30	9.22	794
USGS	4/17/2013	15:35	9.63	895
USGS	4/17/2013	15:40	9.91	972
USGS	4/17/2013	15:45	10.05	1010
USGS	4/17/2013	15:50	10.18	1050
USGS	4/17/2013	15:55	10.22	1060
USGS	4/17/2013	16:00	10.25	1070
USGS	4/17/2013	16:05	10.27	1070
USGS	4/17/2013	16:10	10.29	1080
USGS	4/17/2013	16:15	10.25	1070
USGS	4/17/2013	16:20	10.26	1070
USGS	4/17/2013	16:25	10.24	1070
USGS	4/17/2013	16:30	10.25	1070
USGS	4/17/2013	16:35	10.28	1080
USGS	4/17/2013	16:40	10.30	1080
USGS	4/17/2013	16:45	10.31	1090
USGS	4/17/2013	16:50	10.28	1080
USGS	4/17/2013	16:55	10.23	1060
USGS	4/17/2013	17:00	10.22	1060
USGS	4/17/2013	17:05	10.23	1060
USGS	4/17/2013	17:10	10.23	1060
USGS	4/17/2013	17:15	10.25	1070
USGS	4/17/2013	17:20	10.22	1060
USGS	4/17/2013	17:25	10.19	1050
USGS	4/17/2013	17:30	10.18	1050
USGS	4/17/2013	17:35	10.16	1040
USGS	4/17/2013	17:40	10.15	1040
USGS	4/17/2013	17:45	10.11	1030
USGS	4/17/2013	17:50	10.01	1000
USGS	4/17/2013	17:55	9.95	983
USGS	4/17/2013	18:00	9.87	961
USGS	4/17/2013	18:05	9.82	947
USGS	4/17/2013	18:10	9.81	944
USGS	4/17/2013	18:15	9.79	939
USGS	4/17/2013	18:20	9.76	930
USGS	4/17/2013	18:25	9.69	911
USGS	4/17/2013	18:30	9.63	895
USGS	4/17/2013	18:35	9.59	884
USGS	4/17/2013	18:40	9.59	884
USGS	4/17/2013	18:45	9.59	884
USGS	4/17/2013	18:50	9.59	884
USGS	4/17/2013	18:55	9.53	868
USGS	4/17/2013	19:00	9.49	858

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/17/2013	19:05	9.42	841
USGS	4/17/2013	19:10	9.42	841
USGS	4/17/2013	19:15	9.41	838
USGS	4/17/2013	19:20	9.41	838
USGS	4/17/2013	19:25	9.39	834
USGS	4/17/2013	19:30	9.33	819
USGS	4/17/2013	19:35	9.27	805
USGS	4/17/2013	19:40	9.24	798
USGS	4/17/2013	19:45	9.19	787
USGS	4/17/2013	19:50	9.16	780
USGS	4/17/2013	19:55	9.15	777
USGS	4/17/2013	20:00	9.18	784
USGS	4/17/2013	20:05	9.21	791
USGS	4/17/2013	20:10	9.24	798
USGS	4/17/2013	20:15	9.24	798
USGS	4/17/2013	20:20	9.19	787
USGS	4/17/2013	20:25	9.19	787
USGS	4/17/2013	20:30	9.24	798
USGS	4/17/2013	20:35	9.30	812
USGS	4/17/2013	20:40	9.29	810
USGS	4/17/2013	20:45	9.27	805
USGS	4/17/2013	20:50	9.27	805
USGS	4/17/2013	20:55	9.32	817
USGS	4/17/2013	21:00	9.36	827
USGS	4/17/2013	21:05	9.41	838
USGS	4/17/2013	21:10	9.38	831
USGS	4/17/2013	21:15	9.36	827
USGS	4/17/2013	21:20	9.34	822
USGS	4/17/2013	21:25	9.33	819
USGS	4/17/2013	21:30	9.36	827
USGS	4/17/2013	21:35	9.39	834
USGS	4/17/2013	21:40	9.36	827
USGS	4/17/2013	21:45	9.30	812
USGS	4/17/2013	21:50	9.29	810
USGS	4/17/2013	21:55	9.26	803
USGS	4/17/2013	22:00	9.22	794
USGS	4/17/2013	22:05	9.20	789
USGS	4/17/2013	22:10	9.21	791
USGS	4/17/2013	22:15	9.23	796
USGS	4/17/2013	22:20	9.27	805
USGS	4/17/2013	22:25	9.20	789
USGS	4/17/2013	22:30	9.19	787
USGS	4/17/2013	22:35	9.18	784
USGS	4/17/2013	22:40	9.16	780

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/17/2013	22:45	9.20	789
USGS	4/17/2013	22:50	9.26	803
USGS	4/17/2013	22:55	9.30	812
USGS	4/17/2013	23:00	9.27	805
USGS	4/17/2013	23:05	9.25	801
USGS	4/17/2013	23:10	9.27	805
USGS	4/17/2013	23:15	9.37	829
USGS	4/17/2013	23:20	9.44	846
USGS	4/17/2013	23:25	9.52	865
USGS	4/17/2013	23:30	9.57	879
USGS	4/17/2013	23:35	9.55	873
USGS	4/17/2013	23:40	9.63	895
USGS	4/17/2013	23:45	9.69	911
USGS	4/17/2013	23:50	9.78	936
USGS	4/17/2013	23:55	9.89	966
USGS	4/18/2013	0:00	9.92	975
USGS	4/18/2013	0:05	10.01	1000
USGS	4/18/2013	0:10	10.06	1010
USGS	4/18/2013	0:15	10.11	1030
USGS	4/18/2013	0:20	10.17	1050
USGS	4/18/2013	0:25	10.23	1060
USGS	4/18/2013	0:30	10.28	1080
USGS	4/18/2013	0:35	10.33	1090
USGS	4/18/2013	0:40	10.36	1100
USGS	4/18/2013	0:45	10.40	1110
USGS	4/18/2013	0:50	10.41	1110
USGS	4/18/2013	0:55	10.44	1120
USGS	4/18/2013	1:00	10.41	1110
USGS	4/18/2013	1:05	10.42	1120
USGS	4/18/2013	1:10	10.48	1140
USGS	4/18/2013	1:15	10.51	1140
USGS	4/18/2013	1:20	10.58	1160
USGS	4/18/2013	1:25	10.61	1170
USGS	4/18/2013	1:30	10.67	1190
USGS	4/18/2013	1:35	10.70	1200
USGS	4/18/2013	1:40	10.76	1220
USGS	4/18/2013	1:45	10.81	1230
USGS	4/18/2013	1:50	10.88	1260
USGS	4/18/2013	1:55	10.90	1260
USGS	4/18/2013	2:00	10.97	1280
USGS	4/18/2013	2:05	11.04	1300
USGS	4/18/2013	2:10	11.13	1330
USGS	4/18/2013	2:15	11.24	1370
USGS	4/18/2013	2:20	11.33	1400

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/18/2013	2:25	11.51	1450
USGS	4/18/2013	2:30	11.65	1500
USGS	4/18/2013	2:35	11.87	1570
USGS	4/18/2013	2:40	12.08	1640
USGS	4/18/2013	2:45	12.29	1710
USGS	4/18/2013	2:50	12.45	1770
USGS	4/18/2013	2:55	12.59	1810
USGS	4/18/2013	3:00	12.73	1860
USGS	4/18/2013	3:05	12.84	1900
USGS	4/18/2013	3:10	12.96	1940
USGS	4/18/2013	3:15	13.08	1990
USGS	4/18/2013	3:20	13.17	2020
USGS	4/18/2013	3:25	13.27	2060
USGS	4/18/2013	3:30	13.32	2070
USGS	4/18/2013	3:35	13.41	2110
USGS	4/18/2013	3:40	13.46	2130
USGS	4/18/2013	3:45	13.51	2140
USGS	4/18/2013	3:50	13.48	2130
USGS	4/18/2013	3:55	13.53	2150
USGS	4/18/2013	4:00	13.55	2160
USGS	4/18/2013	4:05	13.55	2160
USGS	4/18/2013	4:10	13.58	2170
USGS	4/18/2013	4:15	13.57	2170
USGS	4/18/2013	4:20	13.60	2180
USGS	4/18/2013	4:25	13.59	2170
USGS	4/18/2013	4:30	13.65	2200
USGS	4/18/2013	4:35	13.64	2190
USGS	4/18/2013	4:40	13.65	2200
USGS	4/18/2013	4:45	13.64	2190
USGS	4/18/2013	4:50	13.63	2190
USGS	4/18/2013	4:55	13.62	2180
USGS	4/18/2013	5:00	13.63	2190
USGS	4/18/2013	5:05	13.59	2170
USGS	4/18/2013	5:10	13.62	2180
USGS	4/18/2013	5:15	13.61	2180
USGS	4/18/2013	5:20	13.59	2170
USGS	4/18/2013	5:25	13.58	2170
USGS	4/18/2013	5:30	13.53	2150
USGS	4/18/2013	5:35	13.57	2170
USGS	4/18/2013	5:40	13.55	2160
USGS	4/18/2013	5:45	13.54	2150
USGS	4/18/2013	5:50	13.52	2150
USGS	4/18/2013	5:55	13.50	2140
USGS	4/18/2013	6:00	13.46	2130

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/18/2013	6:05	13.43	2110
USGS	4/18/2013	6:10	13.42	2110
USGS	4/18/2013	6:15	13.39	2100
USGS	4/18/2013	6:20	13.36	2090
USGS	4/18/2013	6:25	13.44	2120
USGS	4/18/2013	6:30	13.56	2160
USGS	4/18/2013	6:35	13.69	2210
USGS	4/18/2013	6:40	13.74	2230
USGS	4/18/2013	6:45	13.84	2270
USGS	4/18/2013	6:50	13.86	2270
USGS	4/18/2013	6:55	13.90	2290
USGS	4/18/2013	7:00	13.89	2290
USGS	4/18/2013	7:05	13.89	2290
USGS	4/18/2013	7:10	13.88	2280
USGS	4/18/2013	7:15	13.87	2280
USGS	4/18/2013	7:20	13.87	2280
USGS	4/18/2013	7:25	13.86	2270
USGS	4/18/2013	7:30	13.82	2260
USGS	4/18/2013	7:35	13.81	2260
USGS	4/18/2013	7:40	13.78	2240
USGS	4/18/2013	7:45	13.76	2240
USGS	4/18/2013	7:50	13.73	2230
USGS	4/18/2013	7:55	13.69	2210
USGS	4/18/2013	8:00	13.67	2200
USGS	4/18/2013	8:05	13.65	2200
USGS	4/18/2013	8:10	13.66	2200
USGS	4/18/2013	8:15	13.65	2200
USGS	4/18/2013	8:20	13.62	2180
USGS	4/18/2013	8:25	13.62	2180
USGS	4/18/2013	8:30	13.61	2180
USGS	4/18/2013	8:35	13.61	2180
USGS	4/18/2013	8:40	13.59	2170
USGS	4/18/2013	8:45	13.55	2160
USGS	4/18/2013	8:50	13.58	2170
USGS	4/18/2013	8:55	13.55	2160
USGS	4/18/2013	9:00	13.54	2150
USGS	4/18/2013	9:05	13.52	2150
USGS	4/18/2013	9:10	13.41	2110
USGS	4/18/2013	9:15	13.47	2130
USGS	4/18/2013	9:20	13.47	2130
USGS	4/18/2013	9:25	13.46	2130
USGS	4/18/2013	9:30	13.45	2120
USGS	4/18/2013	9:35	13.42	2110
USGS	4/18/2013	9:40	13.42	2110

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/18/2013	9:45	13.37	2090
USGS	4/18/2013	9:50	13.35	2080
USGS	4/18/2013	9:55	13.34	2080
USGS	4/18/2013	10:00	13.28	2060
USGS	4/18/2013	10:05	13.25	2050
USGS	4/18/2013	10:10	13.28	2060
USGS	4/18/2013	10:15	13.27	2060
USGS	4/18/2013	10:20	13.26	2050
USGS	4/18/2013	10:25	13.23	2040
USGS	4/18/2013	10:30	13.23	2040
USGS	4/18/2013	10:35	13.22	2040
USGS	4/18/2013	10:40	13.22	2040
USGS	4/18/2013	10:45	13.17	2020
USGS	4/18/2013	10:50	13.18	2020
USGS	4/18/2013	10:55	13.17	2020
USGS	4/18/2013	11:00	13.14	2010
USGS	4/18/2013	11:05	13.12	2000
USGS	4/18/2013	11:10	13.05	1980
USGS	4/18/2013	11:15	13.07	1980
USGS	4/18/2013	11:20	13.03	1970
USGS	4/18/2013	11:25	13.04	1970
USGS	4/18/2013	11:30	13.07	1980
USGS	4/18/2013	11:35	13.08	1990
USGS	4/18/2013	11:40	13.04	1970
USGS	4/18/2013	11:45	13.05	1980
USGS	4/18/2013	11:50	13.02	1970
USGS	4/18/2013	11:55	12.94	1940
USGS	4/18/2013	12:00	12.97	1950
USGS	4/18/2013	12:05	12.98	1950
USGS	4/18/2013	12:10	13.00	1960
USGS	4/18/2013	12:15	12.97	1950
USGS	4/18/2013	12:20	12.96	1940
USGS	4/18/2013	12:25	12.93	1930
USGS	4/18/2013	12:30	12.91	1930
USGS	4/18/2013	12:35	12.91	1930
USGS	4/18/2013	12:40	12.90	1920
USGS	4/18/2013	12:45	12.88	1920
USGS	4/18/2013	12:50	12.89	1920
USGS	4/18/2013	12:55	12.89	1920
USGS	4/18/2013	13:00	12.87	1910
USGS	4/18/2013	13:05	12.85	1910
USGS	4/18/2013	13:10	12.85	1910
USGS	4/18/2013	13:15	12.82	1890
USGS	4/18/2013	13:20	12.83	1900

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	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/18/2013	13:25	12.80	1890
USGS	4/18/2013	13:30	12.81	1890
USGS	4/18/2013	13:35	12.81	1890
USGS	4/18/2013	13:40	12.79	1880
USGS	4/18/2013	13:45	12.79	1880
USGS	4/18/2013	13:50	12.76	1870
USGS	4/18/2013	13:55	12.78	1880
USGS	4/18/2013	14:00	12.74	1870
USGS	4/18/2013	14:05	12.70	1850
USGS	4/18/2013	14:10	12.72	1860
USGS	4/18/2013	14:15	12.73	1860
USGS	4/18/2013	14:20	12.72	1860
USGS	4/18/2013	14:25	12.73	1860
USGS	4/18/2013	14:30	12.71	1860
USGS	4/18/2013	14:35	12.71	1860
USGS	4/18/2013	14:40	12.69	1850
USGS	4/18/2013	14:45	12.70	1850
USGS	4/18/2013	14:50	12.70	1850
USGS	4/18/2013	14:55	12.65	1830
USGS	4/18/2013	15:00	12.67	1840
USGS	4/18/2013	15:05	12.68	1850
USGS	4/18/2013	15:10	12.65	1830
USGS	4/18/2013	15:15	12.66	1840
USGS	4/18/2013	15:20	12.65	1830
USGS	4/18/2013	15:25	12.64	1830
USGS	4/18/2013	15:30	12.61	1820
USGS	4/18/2013	15:35	12.65	1830
USGS	4/18/2013	15:40	12.57	1810
USGS	4/18/2013	15:45	12.63	1830
USGS	4/18/2013	15:50	12.56	1800
USGS	4/18/2013	15:55	12.60	1820
USGS	4/18/2013	16:00	12.57	1810
USGS	4/18/2013	16:05	12.57	1810
USGS	4/18/2013	16:10	12.56	1800
USGS	4/18/2013	16:15	12.60	1820
USGS	4/18/2013	16:20	12.58	1810
USGS	4/18/2013	16:25	12.55	1800
USGS	4/18/2013	16:30	12.54	1800
USGS	4/18/2013	16:35	12.54	1800
USGS	4/18/2013	16:40	12.49	1780
USGS	4/18/2013	16:45	12.49	1780
USGS	4/18/2013	16:50	12.53	1790
USGS	4/18/2013	16:55	12.54	1800
USGS	4/18/2013	17:00	12.53	1790

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/18/2013	17:05	12.55	1800
USGS	4/18/2013	17:10	12.59	1810
USGS	4/18/2013	17:15	12.52	1790
USGS	4/18/2013	17:20	12.53	1790
USGS	4/18/2013	17:25	12.51	1790
USGS	4/18/2013	17:30	12.47	1770
USGS	4/18/2013	17:35	12.51	1790
USGS	4/18/2013	17:40	12.53	1790
USGS	4/18/2013	17:45	12.46	1770
USGS	4/18/2013	17:50	12.51	1790
USGS	4/18/2013	17:55	12.49	1780
USGS	4/18/2013	18:00	12.47	1770
USGS	4/18/2013	18:05	12.45	1770
USGS	4/18/2013	18:10	12.47	1770
USGS	4/18/2013	18:15	12.42	1760
USGS	4/18/2013	18:20	12.50	1780
USGS	4/18/2013	18:25	12.45	1770
USGS	4/18/2013	18:30	12.43	1760
USGS	4/18/2013	18:35	12.47	1770
USGS	4/18/2013	18:40	12.49	1780
USGS	4/18/2013	18:45	12.47	1770
USGS	4/18/2013	18:50	12.47	1770
USGS	4/18/2013	18:55	12.47	1770
USGS	4/18/2013	19:00	12.46	1770
USGS	4/18/2013	19:05	12.43	1760
USGS	4/18/2013	19:10	12.46	1770
USGS	4/18/2013	19:15	12.44	1760
USGS	4/18/2013	19:20	12.42	1760
USGS	4/18/2013	19:25	12.45	1770
USGS	4/18/2013	19:30	12.43	1760
USGS	4/18/2013	19:35	12.45	1770
USGS	4/18/2013	19:40	12.42	1760
USGS	4/18/2013	19:45	12.45	1770
USGS	4/18/2013	19:50	12.45	1770
USGS	4/18/2013	19:55	12.47	1770
USGS	4/18/2013	20:00	12.49	1780
USGS	4/18/2013	20:05	12.53	1790
USGS	4/18/2013	20:10	12.50	1780
USGS	4/18/2013	20:15	12.48	1780
USGS	4/18/2013	20:20	12.45	1770
USGS	4/18/2013	20:25	12.43	1760
USGS	4/18/2013	20:30	12.45	1770
USGS	4/18/2013	20:35	12.45	1770
USGS	4/18/2013	20:40	12.42	1760

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/18/2013	20:45	12.37	1740
USGS	4/18/2013	20:50	12.36	1730
USGS	4/18/2013	20:55	12.40	1750
USGS	4/18/2013	21:00	12.39	1740
USGS	4/18/2013	21:05	12.40	1750
USGS	4/18/2013	21:10	12.39	1740
USGS	4/18/2013	21:15	12.39	1740
USGS	4/18/2013	21:20	12.34	1730
USGS	4/18/2013	21:25	12.43	1760
USGS	4/18/2013	21:30	12.37	1740
USGS	4/18/2013	21:35	12.39	1740
USGS	4/18/2013	21:40	12.44	1760
USGS	4/18/2013	21:45	12.39	1740
USGS	4/18/2013	21:50	12.36	1730
USGS	4/18/2013	21:55	12.38	1740
USGS	4/18/2013	22:00	12.41	1750
USGS	4/18/2013	22:05	12.41	1750
USGS	4/18/2013	22:10	12.41	1750
USGS	4/18/2013	22:15	12.39	1740
USGS	4/18/2013	22:20	12.37	1740
USGS	4/18/2013	22:25	12.38	1740
USGS	4/18/2013	22:30	12.38	1740
USGS	4/18/2013	22:35	12.32	1720
USGS	4/18/2013	22:40	12.30	1710
USGS	4/18/2013	22:45	12.37	1740
USGS	4/18/2013	22:50	12.35	1730
USGS	4/18/2013	22:55	12.41	1750
USGS	4/18/2013	23:00	12.35	1730
USGS	4/18/2013	23:05	12.35	1730
USGS	4/18/2013	23:10	12.38	1740
USGS	4/18/2013	23:15	12.38	1740
USGS	4/18/2013	23:20	12.34	1730
USGS	4/18/2013	23:25	12.38	1740
USGS	4/18/2013	23:30	12.42	1760
USGS	4/18/2013	23:35	12.45	1770
USGS	4/18/2013	23:40	12.39	1740
USGS	4/18/2013	23:45	12.37	1740
USGS	4/18/2013	23:50	12.37	1740
USGS	4/18/2013	23:55	12.37	1740
USGS	4/19/2013	0:00	12.35	1730
USGS	4/19/2013	0:05	12.34	1730
USGS	4/19/2013	0:10	12.37	1740
USGS	4/19/2013	0:15	12.38	1740
USGS	4/19/2013	0:20	12.37	1740

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/19/2013	0:25	12.34	1730
USGS	4/19/2013	0:30	12.30	1710
USGS	4/19/2013	0:35	12.38	1740
USGS	4/19/2013	0:40	12.34	1730
USGS	4/19/2013	0:45	12.31	1720
USGS	4/19/2013	0:50	12.37	1740
USGS	4/19/2013	0:55	12.29	1710
USGS	4/19/2013	1:00	12.39	1740
USGS	4/19/2013	1:05	12.36	1730
USGS	4/19/2013	1:10	12.37	1740
USGS	4/19/2013	1:15	12.35	1730
USGS	4/19/2013	1:20	12.32	1720
USGS	4/19/2013	1:25	12.36	1730
USGS	4/19/2013	1:30	12.36	1730
USGS	4/19/2013	1:35	12.36	1730
USGS	4/19/2013	1:40	12.43	1760
USGS	4/19/2013	1:45	12.37	1740
USGS	4/19/2013	1:50	12.34	1730
USGS	4/19/2013	1:55	12.39	1740
USGS	4/19/2013	2:00	12.35	1730
USGS	4/19/2013	2:05	12.36	1730
USGS	4/19/2013	2:10	12.32	1720
USGS	4/19/2013	2:15	12.33	1720
USGS	4/19/2013	2:20	12.34	1730
USGS	4/19/2013	2:25	12.34	1730
USGS	4/19/2013	2:30	12.37	1740
USGS	4/19/2013	2:35	12.32	1720
USGS	4/19/2013	2:40	12.37	1740
USGS	4/19/2013	2:45	12.35	1730
USGS	4/19/2013	2:50	12.31	1720
USGS	4/19/2013	2:55	12.34	1730
USGS	4/19/2013	3:00	12.35	1730
USGS	4/19/2013	3:05	12.33	1720
USGS	4/19/2013	3:10	12.31	1720
USGS	4/19/2013	3:15	12.32	1720
USGS	4/19/2013	3:20	12.31	1720
USGS	4/19/2013	3:25	12.30	1710
USGS	4/19/2013	3:30	12.29	1710
USGS	4/19/2013	3:35	12.33	1720
USGS	4/19/2013	3:40	12.33	1720
USGS	4/19/2013	3:45	12.33	1720
USGS	4/19/2013	3:50	12.35	1730
USGS	4/19/2013	3:55	12.37	1740
USGS	4/19/2013	4:00	12.35	1730

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/19/2013	4:05	12.31	1720
USGS	4/19/2013	4:10	12.31	1720
USGS	4/19/2013	4:15	12.30	1710
USGS	4/19/2013	4:20	12.34	1730
USGS	4/19/2013	4:25	12.31	1720
USGS	4/19/2013	4:30	12.30	1710
USGS	4/19/2013	4:35	12.32	1720
USGS	4/19/2013	4:40	12.35	1730
USGS	4/19/2013	4:45	12.21	1680
USGS	4/19/2013	4:50	12.29	1710
USGS	4/19/2013	4:55	12.30	1710
USGS	4/19/2013	5:00	12.30	1710
USGS	4/19/2013	5:05	12.31	1720
USGS	4/19/2013	5:10	12.32	1720
USGS	4/19/2013	5:15	12.30	1710
USGS	4/19/2013	5:20	12.27	1700
USGS	4/19/2013	5:25	12.27	1700
USGS	4/19/2013	5:30	12.31	1720
USGS	4/19/2013	5:35	12.30	1710
USGS	4/19/2013	5:40	12.30	1710
USGS	4/19/2013	5:45	12.28	1710
USGS	4/19/2013	5:50	12.30	1710
USGS	4/19/2013	5:55	12.31	1720
USGS	4/19/2013	6:00	12.26	1700
USGS	4/19/2013	6:05	12.23	1690
USGS	4/19/2013	6:10	12.30	1710
USGS	4/19/2013	6:15	12.29	1710
USGS	4/19/2013	6:20	12.36	1730
USGS	4/19/2013	6:25	12.38	1740
USGS	4/19/2013	6:30	12.31	1720
USGS	4/19/2013	6:35	12.33	1720
USGS	4/19/2013	6:40	12.21	1680
USGS	4/19/2013	6:45	12.27	1700
USGS	4/19/2013	6:50	12.29	1710
USGS	4/19/2013	6:55	12.27	1700
USGS	4/19/2013	7:00	12.28	1710
USGS	4/19/2013	7:05	12.32	1720
USGS	4/19/2013	7:10	12.29	1710
USGS	4/19/2013	7:15	12.28	1710
USGS	4/19/2013	7:20	12.28	1710
USGS	4/19/2013	7:25	12.25	1700
USGS	4/19/2013	7:30	12.23	1690
USGS	4/19/2013	7:35	12.24	1690
USGS	4/19/2013	7:40	12.25	1700

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/19/2013	7:45	12.23	1690
USGS	4/19/2013	7:50	12.27	1700
USGS	4/19/2013	7:55	12.26	1700
USGS	4/19/2013	8:00	12.24	1690
USGS	4/19/2013	8:05	12.27	1700
USGS	4/19/2013	8:10	12.25	1700
USGS	4/19/2013	8:15	12.25	1700
USGS	4/19/2013	8:20	12.25	1700
USGS	4/19/2013	8:25	12.25	1700
USGS	4/19/2013	8:30	12.26	1700
USGS	4/19/2013	8:35	12.21	1680
USGS	4/19/2013	8:40	12.25	1700
USGS	4/19/2013	8:45	12.19	1680
USGS	4/19/2013	8:50	12.24	1690
USGS	4/19/2013	8:55	12.22	1690
USGS	4/19/2013	9:00	12.26	1700
USGS	4/19/2013	9:05	12.28	1710
USGS	4/19/2013	9:10	12.29	1710
USGS	4/19/2013	9:15	12.21	1680
USGS	4/19/2013	9:20	12.24	1690
USGS	4/19/2013	9:25	12.25	1700
USGS	4/19/2013	9:30	12.26	1700
USGS	4/19/2013	9:35	12.23	1690
USGS	4/19/2013	9:40	12.23	1690
USGS	4/19/2013	9:45	12.21	1680
USGS	4/19/2013	9:50	12.22	1690
USGS	4/19/2013	9:55	12.22	1690
USGS	4/19/2013	10:00	12.25	1700
USGS	4/19/2013	10:05	12.24	1690
USGS	4/19/2013	10:10	12.20	1680
USGS	4/19/2013	10:15	12.23	1690
USGS	4/19/2013	10:20	12.24	1690
USGS	4/19/2013	10:25	12.21	1680
USGS	4/19/2013	10:30	12.22	1690
USGS	4/19/2013	10:35	12.21	1680
USGS	4/19/2013	10:40	12.18	1670
USGS	4/19/2013	10:45	12.20	1680
USGS	4/19/2013	10:50	12.21	1680
USGS	4/19/2013	10:55	12.19	1680
USGS	4/19/2013	11:00	12.21	1680
USGS	4/19/2013	11:05	12.19	1680
USGS	4/19/2013	11:10	12.21	1680
USGS	4/19/2013	11:15	12.17	1670
USGS	4/19/2013	11:20	12.16	1670

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/19/2013	11:25	12.16	1670
USGS	4/19/2013	11:30	12.18	1670
USGS	4/19/2013	11:35	12.15	1660
USGS	4/19/2013	11:40	12.20	1680
USGS	4/19/2013	11:45	12.12	1650
USGS	4/19/2013	11:50	12.23	1690
USGS	4/19/2013	11:55	12.30	1710
USGS	4/19/2013	12:00	12.23	1690
USGS	4/19/2013	12:05	12.18	1670
USGS	4/19/2013	12:10	12.16	1670
USGS	4/19/2013	12:15	12.19	1680
USGS	4/19/2013	12:20	12.21	1680
USGS	4/19/2013	12:25	12.16	1670
USGS	4/19/2013	12:30	12.17	1670
USGS	4/19/2013	12:35	12.17	1670
USGS	4/19/2013	12:40	12.14	1660
USGS	4/19/2013	12:45	12.16	1670
USGS	4/19/2013	12:50	12.18	1670
USGS	4/19/2013	12:55	12.16	1670
USGS	4/19/2013	13:00	12.14	1660
USGS	4/19/2013	13:05	12.13	1660
USGS	4/19/2013	13:10	12.05	1630
USGS	4/19/2013	13:15	12.15	1660
USGS	4/19/2013	13:20	12.15	1660
USGS	4/19/2013	13:25	12.15	1660
USGS	4/19/2013	13:30	12.12	1650
USGS	4/19/2013	13:35	12.11	1650
USGS	4/19/2013	13:40	12.15	1660
USGS	4/19/2013	13:45	12.15	1660
USGS	4/19/2013	13:50	12.10	1650
USGS	4/19/2013	13:55	12.08	1640
USGS	4/19/2013	14:00	12.11	1650
USGS	4/19/2013	14:05	12.07	1640
USGS	4/19/2013	14:10	12.09	1640
USGS	4/19/2013	14:15	12.07	1640
USGS	4/19/2013	14:20	12.13	1660
USGS	4/19/2013	14:25	12.10	1650
USGS	4/19/2013	14:30	12.14	1660
USGS	4/19/2013	14:35	12.13	1660
USGS	4/19/2013	14:40	12.11	1650
USGS	4/19/2013	14:45	12.13	1660
USGS	4/19/2013	14:50	12.17	1670
USGS	4/19/2013	14:55	12.13	1660
USGS	4/19/2013	15:00	12.11	1650

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/19/2013	15:05	12.09	1640
USGS	4/19/2013	15:10	12.11	1650
USGS	4/19/2013	15:15	12.08	1640
USGS	4/19/2013	15:20	12.12	1650
USGS	4/19/2013	15:25	12.12	1650
USGS	4/19/2013	15:30	12.07	1640
USGS	4/19/2013	15:35	12.08	1640
USGS	4/19/2013	15:40	12.09	1640
USGS	4/19/2013	15:45	12.08	1640
USGS	4/19/2013	15:50	12.12	1650
USGS	4/19/2013	15:55	12.09	1640
USGS	4/19/2013	16:00	12.08	1640
USGS	4/19/2013	16:05	12.06	1630
USGS	4/19/2013	16:10	12.09	1640
USGS	4/19/2013	16:15	12.08	1640
USGS	4/19/2013	16:20	12.04	1630
USGS	4/19/2013	16:25	12.02	1620
USGS	4/19/2013	16:30	12.05	1630
USGS	4/19/2013	16:35	12.05	1630
USGS	4/19/2013	16:40	12.05	1630
USGS	4/19/2013	16:45	12.07	1640
USGS	4/19/2013	16:50	12.06	1630
USGS	4/19/2013	16:55	12.10	1650
USGS	4/19/2013	17:00	12.03	1620
USGS	4/19/2013	17:05	12.05	1630
USGS	4/19/2013	17:10	12.08	1640
USGS	4/19/2013	17:15	12.02	1620
USGS	4/19/2013	17:20	12.03	1620
USGS	4/19/2013	17:25	12.04	1630
USGS	4/19/2013	17:30	12.06	1630
USGS	4/19/2013	17:35	12.06	1630
USGS	4/19/2013	17:40	12.05	1630
USGS	4/19/2013	17:45	12.06	1630
USGS	4/19/2013	17:50	12.07	1640
USGS	4/19/2013	17:55	12.06	1630
USGS	4/19/2013	18:00	12.04	1630
USGS	4/19/2013	18:05	12.04	1630
USGS	4/19/2013	18:10	12.10	1650
USGS	4/19/2013	18:15	12.11	1650
USGS	4/19/2013	18:20	12.08	1640
USGS	4/19/2013	18:25	12.09	1640
USGS	4/19/2013	18:30	12.06	1630
USGS	4/19/2013	18:35	12.08	1640
USGS	4/19/2013	18:40	12.05	1630

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/19/2013	18:45	12.05	1630
USGS	4/19/2013	18:50	12.05	1630
USGS	4/19/2013	18:55	12.03	1620
USGS	4/19/2013	19:00	12.05	1630
USGS	4/19/2013	19:05	11.99	1610
USGS	4/19/2013	19:10	12.05	1630
USGS	4/19/2013	19:15	12.02	1620
USGS	4/19/2013	19:20	12.01	1620
USGS	4/19/2013	19:25	12.05	1630
USGS	4/19/2013	19:30	12.02	1620
USGS	4/19/2013	19:35	12.05	1630
USGS	4/19/2013	19:40	12.01	1620
USGS	4/19/2013	19:45	12.02	1620
USGS	4/19/2013	19:50	11.99	1610
USGS	4/19/2013	19:55	12.01	1620
USGS	4/19/2013	20:00	12.03	1620
USGS	4/19/2013	20:05	12.03	1620
USGS	4/19/2013	20:10	11.96	1600
USGS	4/19/2013	20:15	11.97	1600
USGS	4/19/2013	20:20	11.98	1610
USGS	4/19/2013	20:25	11.98	1610
USGS	4/19/2013	20:30	12.00	1610
USGS	4/19/2013	20:35	11.98	1610
USGS	4/19/2013	20:40	11.96	1600
USGS	4/19/2013	20:45	11.99	1610
USGS	4/19/2013	20:50	11.98	1610
USGS	4/19/2013	20:55	11.97	1600
USGS	4/19/2013	21:00	11.94	1590
USGS	4/19/2013	21:05	11.97	1600
USGS	4/19/2013	21:10	11.99	1610
USGS	4/19/2013	21:15	11.97	1600
USGS	4/19/2013	21:20	11.98	1610
USGS	4/19/2013	21:25	11.98	1610
USGS	4/19/2013	21:30	11.98	1610
USGS	4/19/2013	21:35	11.96	1600
USGS	4/19/2013	21:40	11.97	1600
USGS	4/19/2013	21:45	11.99	1610
USGS	4/19/2013	21:50	11.99	1610
USGS	4/19/2013	21:55	11.97	1600
USGS	4/19/2013	22:00	11.97	1600
USGS	4/19/2013	22:05	11.95	1600
USGS	4/19/2013	22:10	11.97	1600
USGS	4/19/2013	22:15	11.95	1600
USGS	4/19/2013	22:20	11.92	1590

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	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/19/2013	22:25	11.95	1600
USGS	4/19/2013	22:30	11.95	1600
USGS	4/19/2013	22:35	11.97	1600
USGS	4/19/2013	22:40	11.89	1580
USGS	4/19/2013	22:45	11.92	1590
USGS	4/19/2013	22:50	11.94	1590
USGS	4/19/2013	22:55	11.92	1590
USGS	4/19/2013	23:00	11.96	1600
USGS	4/19/2013	23:05	11.95	1600
USGS	4/19/2013	23:10	11.91	1580
USGS	4/19/2013	23:15	11.91	1580
USGS	4/19/2013	23:20	11.91	1580
USGS	4/19/2013	23:25	11.89	1580
USGS	4/19/2013	23:30	11.94	1590
USGS	4/19/2013	23:35	11.92	1590
USGS	4/19/2013	23:40	11.89	1580
USGS	4/19/2013	23:45	11.85	1560
USGS	4/19/2013	23:50	11.91	1580
USGS	4/19/2013	23:55	11.90	1580
USGS	4/20/2013	0:00	11.90	1580
USGS	4/20/2013	0:05	11.90	1580
USGS	4/20/2013	0:10	11.85	1560
USGS	4/20/2013	0:15	11.87	1570
USGS	4/20/2013	0:20	11.87	1570
USGS	4/20/2013	0:25	11.86	1570
USGS	4/20/2013	0:30	11.90	1580
USGS	4/20/2013	0:35	11.85	1560
USGS	4/20/2013	0:40	11.88	1570
USGS	4/20/2013	0:45	11.84	1560
USGS	4/20/2013	0:50	11.83	1560
USGS	4/20/2013	0:55	11.87	1570
USGS	4/20/2013	1:00	11.87	1570
USGS	4/20/2013	1:05	11.86	1570
USGS	4/20/2013	1:10	11.88	1570
USGS	4/20/2013	1:15	11.85	1560
USGS	4/20/2013	1:20	11.86	1570
USGS	4/20/2013	1:25	11.86	1570
USGS	4/20/2013	1:30	11.85	1560
USGS	4/20/2013	1:35	11.86	1570
USGS	4/20/2013	1:40	11.82	1550
USGS	4/20/2013	1:45	11.81	1550
USGS	4/20/2013	1:50	11.89	1580
USGS	4/20/2013	1:55	11.90	1580
USGS	4/20/2013	2:00	11.81	1550

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	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/20/2013	2:05	11.84	1560
USGS	4/20/2013	2:10	11.82	1550
USGS	4/20/2013	2:15	11.85	1560
USGS	4/20/2013	2:20	11.79	1540
USGS	4/20/2013	2:25	11.86	1570
USGS	4/20/2013	2:30	11.81	1550
USGS	4/20/2013	2:35	11.82	1550
USGS	4/20/2013	2:40	11.77	1540
USGS	4/20/2013	2:45	11.82	1550
USGS	4/20/2013	2:50	11.83	1560
USGS	4/20/2013	2:55	11.81	1550
USGS	4/20/2013	3:00	11.82	1550
USGS	4/20/2013	3:05	11.75	1530
USGS	4/20/2013	3:10	11.79	1540
USGS	4/20/2013	3:15	11.78	1540
USGS	4/20/2013	3:20	11.77	1540
USGS	4/20/2013	3:25	11.76	1530
USGS	4/20/2013	3:30	11.80	1550
USGS	4/20/2013	3:35	11.78	1540
USGS	4/20/2013	3:40	11.75	1530
USGS	4/20/2013	3:45	11.78	1540
USGS	4/20/2013	3:50	11.76	1530
USGS	4/20/2013	3:55	11.79	1540
USGS	4/20/2013	4:00	11.74	1530
USGS	4/20/2013	4:05	11.75	1530
USGS	4/20/2013	4:10	11.76	1530
USGS	4/20/2013	4:15	11.74	1530
USGS	4/20/2013	4:20	11.72	1520
USGS	4/20/2013	4:25	11.75	1530
USGS	4/20/2013	4:30	11.74	1530
USGS	4/20/2013	4:35	11.74	1530
USGS	4/20/2013	4:40	11.68	1510
USGS	4/20/2013	4:45	11.74	1530
USGS	4/20/2013	4:50	11.76	1530
USGS	4/20/2013	4:55	11.73	1520
USGS	4/20/2013	5:00	11.70	1510
USGS	4/20/2013	5:05	11.72	1520
USGS	4/20/2013	5:10	11.73	1520
USGS	4/20/2013	5:15	11.73	1520
USGS	4/20/2013	5:20	11.71	1520
USGS	4/20/2013	5:25	11.69	1510
USGS	4/20/2013	5:30	11.66	1500
USGS	4/20/2013	5:35	11.69	1510
USGS	4/20/2013	5:40	11.71	1520

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/20/2013	5:45	11.72	1520
USGS	4/20/2013	5:50	11.70	1510
USGS	4/20/2013	5:55	11.66	1500
USGS	4/20/2013	6:00	11.68	1510
USGS	4/20/2013	6:05	11.66	1500
USGS	4/20/2013	6:10	11.68	1510
USGS	4/20/2013	6:15	11.71	1520
USGS	4/20/2013	6:20	11.73	1520
USGS	4/20/2013	6:25	11.69	1510
USGS	4/20/2013	6:30	11.64	1490
USGS	4/20/2013	6:35	11.65	1500
USGS	4/20/2013	6:40	11.68	1510
USGS	4/20/2013	6:45	11.68	1510
USGS	4/20/2013	6:50	11.67	1500
USGS	4/20/2013	6:55	11.61	1480
USGS	4/20/2013	7:00	11.66	1500
USGS	4/20/2013	7:05	11.65	1500
USGS	4/20/2013	7:10	11.64	1490
USGS	4/20/2013	7:15	11.63	1490
USGS	4/20/2013	7:20	11.61	1480
USGS	4/20/2013	7:25	11.63	1490
USGS	4/20/2013	7:30	11.62	1490
USGS	4/20/2013	7:35	11.59	1480
USGS	4/20/2013	7:40	11.57	1470
USGS	4/20/2013	7:45	11.63	1490
USGS	4/20/2013	7:50	11.60	1480
USGS	4/20/2013	7:55	11.55	1470
USGS	4/20/2013	8:00	11.59	1480
USGS	4/20/2013	8:05	11.61	1480
USGS	4/20/2013	8:10	11.57	1470
USGS	4/20/2013	8:15	11.53	1460
USGS	4/20/2013	8:20	11.57	1470
USGS	4/20/2013	8:25	11.59	1480
USGS	4/20/2013	8:30	11.57	1470
USGS	4/20/2013	8:35	11.55	1470
USGS	4/20/2013	8:40	11.57	1470
USGS	4/20/2013	8:45	11.53	1460
USGS	4/20/2013	8:50	11.56	1470
USGS	4/20/2013	8:55	11.57	1470
USGS	4/20/2013	9:00	11.55	1470
USGS	4/20/2013	9:05	11.52	1460
USGS	4/20/2013	9:10	11.55	1470
USGS	4/20/2013	9:15	11.50	1450
USGS	4/20/2013	9:20	11.50	1450

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/20/2013	9:25	11.51	1450
USGS	4/20/2013	9:30	11.48	1440
USGS	4/20/2013	9:35	11.51	1450
USGS	4/20/2013	9:40	11.49	1450
USGS	4/20/2013	9:45	11.48	1440
USGS	4/20/2013	9:50	11.47	1440
USGS	4/20/2013	9:55	11.47	1440
USGS	4/20/2013	10:00	11.44	1430
USGS	4/20/2013	10:05	11.42	1420
USGS	4/20/2013	10:10	11.45	1430
USGS	4/20/2013	10:15	11.43	1430
USGS	4/20/2013	10:20	11.44	1430
USGS	4/20/2013	10:25	11.41	1420
USGS	4/20/2013	10:30	11.44	1430
USGS	4/20/2013	10:35	11.41	1420
USGS	4/20/2013	10:40	11.37	1410
USGS	4/20/2013	10:45	11.39	1410
USGS	4/20/2013	10:50	11.40	1420
USGS	4/20/2013	10:55	11.41	1420
USGS	4/20/2013	11:00	11.43	1430
USGS	4/20/2013	11:05	11.40	1420
USGS	4/20/2013	11:10	11.41	1420
USGS	4/20/2013	11:15	11.40	1420
USGS	4/20/2013	11:20	11.36	1400
USGS	4/20/2013	11:25	11.36	1400
USGS	4/20/2013	11:30	11.31	1390
USGS	4/20/2013	11:35	11.35	1400
USGS	4/20/2013	11:40	11.35	1400
USGS	4/20/2013	11:45	11.31	1390
USGS	4/20/2013	11:50	11.32	1390
USGS	4/20/2013	11:55	11.25	1370
USGS	4/20/2013	12:00	11.26	1370
USGS	4/20/2013	12:05	11.31	1390
USGS	4/20/2013	12:10	11.27	1380
USGS	4/20/2013	12:15	11.26	1370
USGS	4/20/2013	12:20	11.27	1380
USGS	4/20/2013	12:25	11.26	1370
USGS	4/20/2013	12:30	11.26	1370
USGS	4/20/2013	12:35	11.26	1370
USGS	4/20/2013	12:40	11.22	1360
USGS	4/20/2013	12:45	11.23	1360
USGS	4/20/2013	12:50	11.22	1360
USGS	4/20/2013	12:55	11.18	1350
USGS	4/20/2013	13:00	11.18	1350

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/20/2013	13:05	11.16	1340
USGS	4/20/2013	13:10	11.15	1340
USGS	4/20/2013	13:15	11.14	1340
USGS	4/20/2013	13:20	11.10	1320
USGS	4/20/2013	13:25	11.15	1340
USGS	4/20/2013	13:30	11.13	1330
USGS	4/20/2013	13:35	11.12	1330
USGS	4/20/2013	13:40	11.14	1340
USGS	4/20/2013	13:45	11.10	1320
USGS	4/20/2013	13:50	11.08	1320
USGS	4/20/2013	13:55	11.12	1330
USGS	4/20/2013	14:00	11.08	1320
USGS	4/20/2013	14:05	11.08	1320
USGS	4/20/2013	14:10	11.04	1300
USGS	4/20/2013	14:15	11.06	1310
USGS	4/20/2013	14:20	11.05	1310
USGS	4/20/2013	14:25	11.05	1310
USGS	4/20/2013	14:30	11.03	1300
USGS	4/20/2013	14:35	11.00	1290
USGS	4/20/2013	14:40	11.00	1290
USGS	4/20/2013	14:45	11.00	1290
USGS	4/20/2013	14:50	11.02	1300
USGS	4/20/2013	14:55	11.01	1290
USGS	4/20/2013	15:00	11.01	1290
USGS	4/20/2013	15:05	11.04	1300
USGS	4/20/2013	15:10	11.03	1300
USGS	4/20/2013	15:15	11.03	1300
USGS	4/20/2013	15:20	11.03	1300
USGS	4/20/2013	15:25	11.05	1310
USGS	4/20/2013	15:30	11.03	1300
USGS	4/20/2013	15:35	10.98	1290
USGS	4/20/2013	15:40	11.00	1290
USGS	4/20/2013	15:45	11.00	1290
USGS	4/20/2013	15:50	11.02	1300
USGS	4/20/2013	15:55	11.03	1300
USGS	4/20/2013	16:00	11.02	1300
USGS	4/20/2013	16:05	11.01	1290
USGS	4/20/2013	16:10	10.99	1290
USGS	4/20/2013	16:15	10.98	1290
USGS	4/20/2013	16:20	10.99	1290
USGS	4/20/2013	16:25	10.99	1290
USGS	4/20/2013	16:30	10.95	1280
USGS	4/20/2013	16:35	10.98	1290
USGS	4/20/2013	16:40	10.96	1280

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/20/2013	16:45	10.96	1280
USGS	4/20/2013	16:50	10.96	1280
USGS	4/20/2013	16:55	10.94	1270
USGS	4/20/2013	17:00	10.98	1290
USGS	4/20/2013	17:05	10.96	1280
USGS	4/20/2013	17:10	10.97	1280
USGS	4/20/2013	17:15	10.94	1270
USGS	4/20/2013	17:20	10.93	1270
USGS	4/20/2013	17:25	10.93	1270
USGS	4/20/2013	17:30	10.90	1260
USGS	4/20/2013	17:35	10.91	1260
USGS	4/20/2013	17:40	10.90	1260
USGS	4/20/2013	17:45	10.88	1260
USGS	4/20/2013	17:50	10.93	1270
USGS	4/20/2013	17:55	10.90	1260
USGS	4/20/2013	18:00	10.95	1280
USGS	4/20/2013	18:05	10.99	1290
USGS	4/20/2013	18:10	10.98	1290
USGS	4/20/2013	18:15	11.00	1290
USGS	4/20/2013	18:20	11.03	1300
USGS	4/20/2013	18:25	11.06	1310
USGS	4/20/2013	18:30	11.08	1320
USGS	4/20/2013	18:35	11.07	1310
USGS	4/20/2013	18:40	11.10	1320
USGS	4/20/2013	18:45	11.08	1320
USGS	4/20/2013	18:50	11.08	1320
USGS	4/20/2013	18:55	11.13	1330
USGS	4/20/2013	19:00	11.10	1320
USGS	4/20/2013	19:05	11.14	1340
USGS	4/20/2013	19:10	11.16	1340
USGS	4/20/2013	19:15	11.17	1340
USGS	4/20/2013	19:20	11.13	1330
USGS	4/20/2013	19:25	11.16	1340
USGS	4/20/2013	19:30	11.16	1340
USGS	4/20/2013	19:35	11.16	1340
USGS	4/20/2013	19:40	11.17	1340
USGS	4/20/2013	19:45	11.16	1340
USGS	4/20/2013	19:50	11.17	1340
USGS	4/20/2013	19:55	11.14	1340
USGS	4/20/2013	20:00	11.16	1340
USGS	4/20/2013	20:05	11.19	1350
USGS	4/20/2013	20:10	11.17	1340
USGS	4/20/2013	20:15	11.15	1340
USGS	4/20/2013	20:20	11.16	1340

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/20/2013	20:25	11.15	1340
USGS	4/20/2013	20:30	11.15	1340
USGS	4/20/2013	20:35	11.15	1340
USGS	4/20/2013	20:40	11.15	1340
USGS	4/20/2013	20:45	11.15	1340
USGS	4/20/2013	20:50	11.13	1330
USGS	4/20/2013	20:55	11.10	1320
USGS	4/20/2013	21:00	11.11	1330
USGS	4/20/2013	21:05	11.14	1340
USGS	4/20/2013	21:10	11.12	1330
USGS	4/20/2013	21:15	11.11	1330
USGS	4/20/2013	21:20	11.12	1330
USGS	4/20/2013	21:25	11.12	1330
USGS	4/20/2013	21:30	11.09	1320
USGS	4/20/2013	21:35	11.11	1330
USGS	4/20/2013	21:40	11.10	1320
USGS	4/20/2013	21:45	11.08	1320
USGS	4/20/2013	21:50	11.08	1320
USGS	4/20/2013	21:55	11.06	1310
USGS	4/20/2013	22:00	11.07	1310
USGS	4/20/2013	22:05	11.08	1320
USGS	4/20/2013	22:10	11.06	1310
USGS	4/20/2013	22:15	11.05	1310
USGS	4/20/2013	22:20	11.06	1310
USGS	4/20/2013	22:25	11.02	1300
USGS	4/20/2013	22:30	11.05	1310
USGS	4/20/2013	22:35	11.02	1300
USGS	4/20/2013	22:40	10.99	1290
USGS	4/20/2013	22:45	11.01	1290
USGS	4/20/2013	22:50	11.03	1300
USGS	4/20/2013	22:55	11.02	1300
USGS	4/20/2013	23:00	10.99	1290
USGS	4/20/2013	23:05	10.99	1290
USGS	4/20/2013	23:10	11.02	1300
USGS	4/20/2013	23:15	11.01	1290
USGS	4/20/2013	23:20	10.97	1280
USGS	4/20/2013	23:25	10.96	1280
USGS	4/20/2013	23:30	10.93	1270
USGS	4/20/2013	23:35	10.97	1280
USGS	4/20/2013	23:40	10.97	1280
USGS	4/20/2013	23:45	10.95	1280
USGS	4/20/2013	23:50	10.94	1270
USGS	4/20/2013	23:55	10.92	1270
USGS	4/21/2013	0:00	10.92	1270

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/21/2013	0:05	10.91	1260
USGS	4/21/2013	0:10	10.90	1260
USGS	4/21/2013	0:15	10.89	1260
USGS	4/21/2013	0:20	10.89	1260
USGS	4/21/2013	0:25	10.89	1260
USGS	4/21/2013	0:30	10.85	1250
USGS	4/21/2013	0:35	10.84	1240
USGS	4/21/2013	0:40	10.84	1240
USGS	4/21/2013	0:45	10.85	1250
USGS	4/21/2013	0:50	10.82	1240
USGS	4/21/2013	0:55	10.80	1230
USGS	4/21/2013	1:00	10.82	1240
USGS	4/21/2013	1:05	10.80	1230
USGS	4/21/2013	1:10	10.79	1230
USGS	4/21/2013	1:15	10.78	1220
USGS	4/21/2013	1:20	10.78	1220
USGS	4/21/2013	1:25	10.76	1220
USGS	4/21/2013	1:30	10.77	1220
USGS	4/21/2013	1:35	10.74	1210
USGS	4/21/2013	1:40	10.74	1210
USGS	4/21/2013	1:45	10.73	1210
USGS	4/21/2013	1:50	10.74	1210
USGS	4/21/2013	1:55	10.68	1190
USGS	4/21/2013	2:00	10.71	1200
USGS	4/21/2013	2:05	10.67	1190
USGS	4/21/2013	2:10	10.69	1200
USGS	4/21/2013	2:15	10.69	1200
USGS	4/21/2013	2:20	10.66	1190
USGS	4/21/2013	2:25	10.67	1190
USGS	4/21/2013	2:30	10.65	1190
USGS	4/21/2013	2:35	10.64	1180
USGS	4/21/2013	2:40	10.66	1190
USGS	4/21/2013	2:45	10.62	1180
USGS	4/21/2013	2:50	10.66	1190
USGS	4/21/2013	2:55	10.59	1170
USGS	4/21/2013	3:00	10.60	1170
USGS	4/21/2013	3:05	10.59	1170
USGS	4/21/2013	3:10	10.58	1160
USGS	4/21/2013	3:15	10.59	1170
USGS	4/21/2013	3:20	10.56	1160
USGS	4/21/2013	3:25	10.56	1160
USGS	4/21/2013	3:30	10.55	1160
USGS	4/21/2013	3:35	10.56	1160
USGS	4/21/2013	3:40	10.53	1150

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/21/2013	3:45	10.54	1150
USGS	4/21/2013	3:50	10.51	1140
USGS	4/21/2013	3:55	10.52	1150
USGS	4/21/2013	4:00	10.51	1140
USGS	4/21/2013	4:05	10.49	1140
USGS	4/21/2013	4:10	10.49	1140
USGS	4/21/2013	4:15	10.48	1140
USGS	4/21/2013	4:20	10.46	1130
USGS	4/21/2013	4:25	10.44	1120
USGS	4/21/2013	4:30	10.44	1120
USGS	4/21/2013	4:35	10.45	1130
USGS	4/21/2013	4:40	10.43	1120
USGS	4/21/2013	4:45	10.43	1120
USGS	4/21/2013	4:50	10.40	1110
USGS	4/21/2013	4:55	10.39	1110
USGS	4/21/2013	5:00	10.39	1110
USGS	4/21/2013	5:05	10.39	1110
USGS	4/21/2013	5:10	10.39	1110
USGS	4/21/2013	5:15	10.34	1090
USGS	4/21/2013	5:20	10.35	1100
USGS	4/21/2013	5:25	10.34	1090
USGS	4/21/2013	5:30	10.30	1080
USGS	4/21/2013	5:35	10.33	1090
USGS	4/21/2013	5:40	10.33	1090
USGS	4/21/2013	5:45	10.31	1090
USGS	4/21/2013	5:50	10.33	1090
USGS	4/21/2013	5:55	10.32	1090
USGS	4/21/2013	6:00	10.29	1080
USGS	4/21/2013	6:05	10.28	1080
USGS	4/21/2013	6:10	10.25	1070
USGS	4/21/2013	6:15	10.26	1070
USGS	4/21/2013	6:20	10.27	1070
USGS	4/21/2013	6:25	10.25	1070
USGS	4/21/2013	6:30	10.27	1070
USGS	4/21/2013	6:35	10.24	1070
USGS	4/21/2013	6:40	10.24	1070
USGS	4/21/2013	6:45	10.21	1060
USGS	4/21/2013	6:50	10.24	1070
USGS	4/21/2013	6:55	10.23	1060
USGS	4/21/2013	7:00	10.27	1070
USGS	4/21/2013	7:05	10.26	1070
USGS	4/21/2013	7:10	10.23	1060
USGS	4/21/2013	7:15	10.20	1050
USGS	4/21/2013	7:20	10.17	1050

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/21/2013	7:25	10.18	1050
USGS	4/21/2013	7:30	10.16	1040
USGS	4/21/2013	7:35	10.15	1040
USGS	4/21/2013	7:40	10.12	1030
USGS	4/21/2013	7:45	10.14	1040
USGS	4/21/2013	7:50	10.13	1030
USGS	4/21/2013	7:55	10.13	1030
USGS	4/21/2013	8:00	10.11	1030
USGS	4/21/2013	8:05	10.10	1030
USGS	4/21/2013	8:10	10.09	1020
USGS	4/21/2013	8:15	10.08	1020
USGS	4/21/2013	8:20	10.10	1030
USGS	4/21/2013	8:25	10.06	1010
USGS	4/21/2013	8:30	10.05	1010
USGS	4/21/2013	8:35	10.08	1020
USGS	4/21/2013	8:40	10.03	1010
USGS	4/21/2013	8:45	10.02	1000
USGS	4/21/2013	8:50	10.03	1010
USGS	4/21/2013	8:55	10.03	1010
USGS	4/21/2013	9:00	10.03	1010
USGS	4/21/2013	9:05	10.02	1000
USGS	4/21/2013	9:10	10.03	1010
USGS	4/21/2013	9:15	9.99	994
USGS	4/21/2013	9:20	10.00	997
USGS	4/21/2013	9:25	9.99	994
USGS	4/21/2013	9:30	9.97	989
USGS	4/21/2013	9:35	9.97	989
USGS	4/21/2013	9:40	9.97	989
USGS	4/21/2013	9:45	9.97	989
USGS	4/21/2013	9:50	9.95	983
USGS	4/21/2013	9:55	9.95	983
USGS	4/21/2013	10:00	9.94	980
USGS	4/21/2013	10:05	9.91	972
USGS	4/21/2013	10:10	9.92	975
USGS	4/21/2013	10:15	9.94	980
USGS	4/21/2013	10:20	9.90	969
USGS	4/21/2013	10:25	9.91	972
USGS	4/21/2013	10:30	9.90	969
USGS	4/21/2013	10:35	9.90	969
USGS	4/21/2013	10:40	9.89	966
USGS	4/21/2013	10:45	9.87	961
USGS	4/21/2013	10:50	9.88	963
USGS	4/21/2013	10:55	9.87	961
USGS	4/21/2013	11:00	9.87	961

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	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/21/2013	11:05	9.84	952
USGS	4/21/2013	11:10	9.85	955
USGS	4/21/2013	11:15	9.84	952
USGS	4/21/2013	11:20	9.81	944
USGS	4/21/2013	11:25	9.82	947
USGS	4/21/2013	11:30	9.81	944
USGS	4/21/2013	11:35	9.81	944
USGS	4/21/2013	11:40	9.81	944
USGS	4/21/2013	11:45	9.80	941
USGS	4/21/2013	11:50	9.80	941
USGS	4/21/2013	11:55	9.78	936
USGS	4/21/2013	12:00	9.75	928
USGS	4/21/2013	12:05	9.78	936
USGS	4/21/2013	12:10	9.76	930
USGS	4/21/2013	12:15	9.76	930
USGS	4/21/2013	12:20	9.75	928
USGS	4/21/2013	12:25	9.73	922
USGS	4/21/2013	12:30	9.73	922
USGS	4/21/2013	12:35	9.71	917
USGS	4/21/2013	12:40	9.73	922
USGS	4/21/2013	12:45	9.71	917
USGS	4/21/2013	12:50	9.70	914
USGS	4/21/2013	12:55	9.71	917
USGS	4/21/2013	13:00	9.68	908
USGS	4/21/2013	13:05	9.65	900
USGS	4/21/2013	13:10	9.65	900
USGS	4/21/2013	13:15	9.68	908
USGS	4/21/2013	13:20	9.65	900
USGS	4/21/2013	13:25	9.65	900
USGS	4/21/2013	13:30	9.62	892
USGS	4/21/2013	13:35	9.62	892
USGS	4/21/2013	13:40	9.60	887
USGS	4/21/2013	13:45	9.63	895
USGS	4/21/2013	13:50	9.62	892
USGS	4/21/2013	13:55	9.61	890
USGS	4/21/2013	14:00	9.60	887
USGS	4/21/2013	14:05	9.59	884
USGS	4/21/2013	14:10	9.58	881
USGS	4/21/2013	14:15	9.58	881
USGS	4/21/2013	14:20	9.57	879
USGS	4/21/2013	14:25	9.57	879
USGS	4/21/2013	14:30	9.56	876
USGS	4/21/2013	14:35	9.56	876
USGS	4/21/2013	14:40	9.53	868

April 2013 Elmhurst Gage Data

	Date	Time	Gage Height (feet)	Discharge (cfs)
USGS	4/21/2013	14:45	9.55	873
USGS	4/21/2013	14:50	9.52	865
USGS	4/21/2013	14:55	9.54	871
USGS	4/21/2013	15:00	9.53	868
USGS	4/21/2013	15:05	9.52	865
USGS	4/21/2013	15:10	9.49	858
USGS	4/21/2013	15:15	9.52	865
USGS	4/21/2013	15:20	9.52	865
USGS	4/21/2013	15:25	9.48	855
USGS	4/21/2013	15:30	9.48	855
USGS	4/21/2013	15:35	9.46	850
USGS	4/21/2013	15:40	9.49	858
USGS	4/21/2013	15:45	9.48	855
USGS	4/21/2013	15:50	9.47	853
USGS	4/21/2013	15:55	9.46	850
USGS	4/21/2013	16:00	9.45	848
USGS	4/21/2013	16:05	9.45	848
USGS	4/21/2013	16:10	9.43	843
USGS	4/21/2013	16:15	9.43	843
USGS	4/21/2013	16:20	9.42	841
USGS	4/21/2013	16:25	9.42	841
USGS	4/21/2013	16:30	9.41	838
USGS	4/21/2013	16:35	9.39	834
USGS	4/21/2013	16:40	9.40	836
USGS	4/21/2013	16:45	9.42	841
USGS	4/21/2013	16:50	9.40	836
USGS	4/21/2013	16:55	9.39	834
USGS	4/21/2013	17:00	9.38	831
USGS	4/21/2013	17:05	9.37	829
USGS	4/21/2013	17:10	9.36	827
USGS	4/21/2013	17:15	9.37	829
USGS	4/21/2013	17:20	9.37	829
USGS	4/21/2013	17:25	9.36	827
USGS	4/21/2013	17:30	9.36	827
USGS	4/21/2013	17:35	9.35	824
USGS	4/21/2013	17:40	9.32	817
USGS	4/21/2013	17:45	9.33	819
USGS	4/21/2013	17:50	9.35	824
USGS	4/21/2013	17:55	9.32	817
USGS	4/21/2013	18:00	9.33	819
USGS	4/21/2013	18:05	9.30	812
USGS	4/21/2013	18:10	9.29	810
USGS	4/21/2013	18:15	9.32	817
USGS	4/21/2013	18:20	9.28	808

SCOUR
CALULATIONS

St. Charles Road Bridge Scour Depth Summary

Design Scour Depths (ft)				
	West Abutment	West Pier	East Pier	East Abutment
Q100	9.32	4.74	4.76	6.23
Q200	9.54	4.79	4.81	6.46

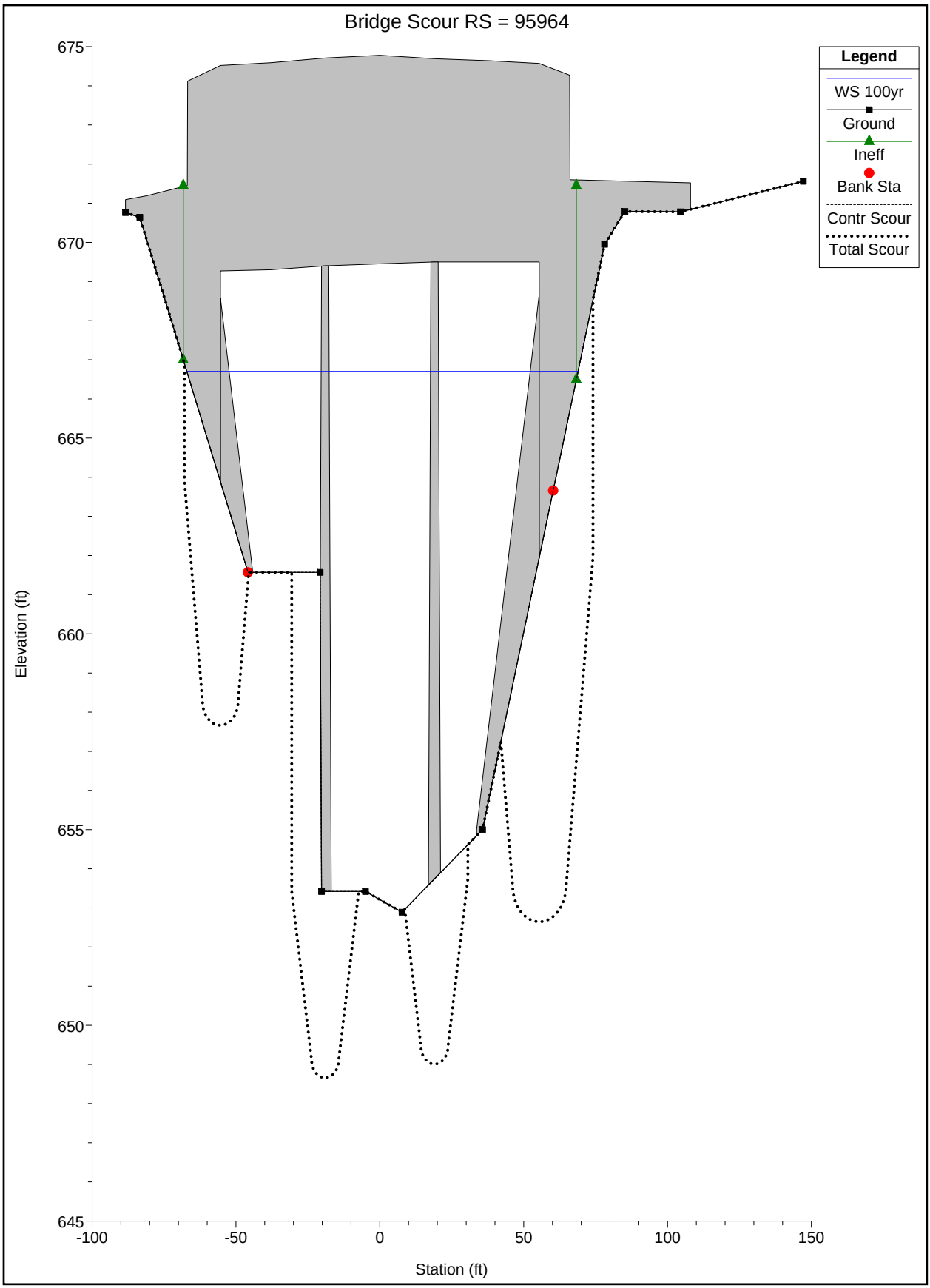
Design Scour Elevations (ft)				
	West Abutment	West Pier	East Pier	East Abutment
Q100	652.65	649.02	648.66	657.66
Q200	652.43	648.97	648.61	657.43

Notes:

1. Scour depths calculated via HEC-RAS

2. The following particle sizes were used: D50 = 1.1 mm, D95 = 17 mm which were extracted from soil boring B-2.

100-YR SCOUR SECTION



100-YR HEC-RAS SCOUR REPORT

Contraction Scour

		Left	Channel	Right
Input Data				
	Average Depth (ft):	3.64	10.29	3.09
	Approach Velocity (ft/s):	1.14	3.77	1.59
	Br Average Depth (ft):	2.07	9.30	
	BR Opening Flow (cfs):	10.81	1983.20	
	BR Top WD (ft):	6.61	92.47	
	Grain Size D50 (mm):	1.10	1.10	1.10
	Approach Flow (cfs):	116.37	1733.61	50.02
	Approach Top WD (ft):	28.05	44.68	10.20
	K1 Coefficient:	0.640	0.640	0.640
Results				
	Scour Depth Ys (ft):	0.00	0.00	
	Critical Velocity (ft/s):	2.13	2.53	
	Equation:	Clear	Live	

Pier Scour

Pier: #1 (CL = -19)

Input Data		
	Pier Shape:	Square nose
	Pier Width (ft):	4.26
	Grain Size D50 (mm):	1.10000
	Depth Upstream (ft):	9.90
	Velocity Upstream (ft/s):	1.86
	K1 Nose Shape:	1.00
	Pier Angle:	
	Pier Length (ft):	68.00
	K2 Angle Coef:	1.00
	K3 Bed Cond Coef:	1.10
	Grain Size D90 (mm):	17.00000
	K4 Armouring Coef:	1.00
	Set K1 value to 1.0 because angle > 5 degrees	
Results		
	Scour Depth Ys (ft):	4.76
	Froude #:	0.10
	Equation:	CSU equation

Pier: #2 (CL = 19)

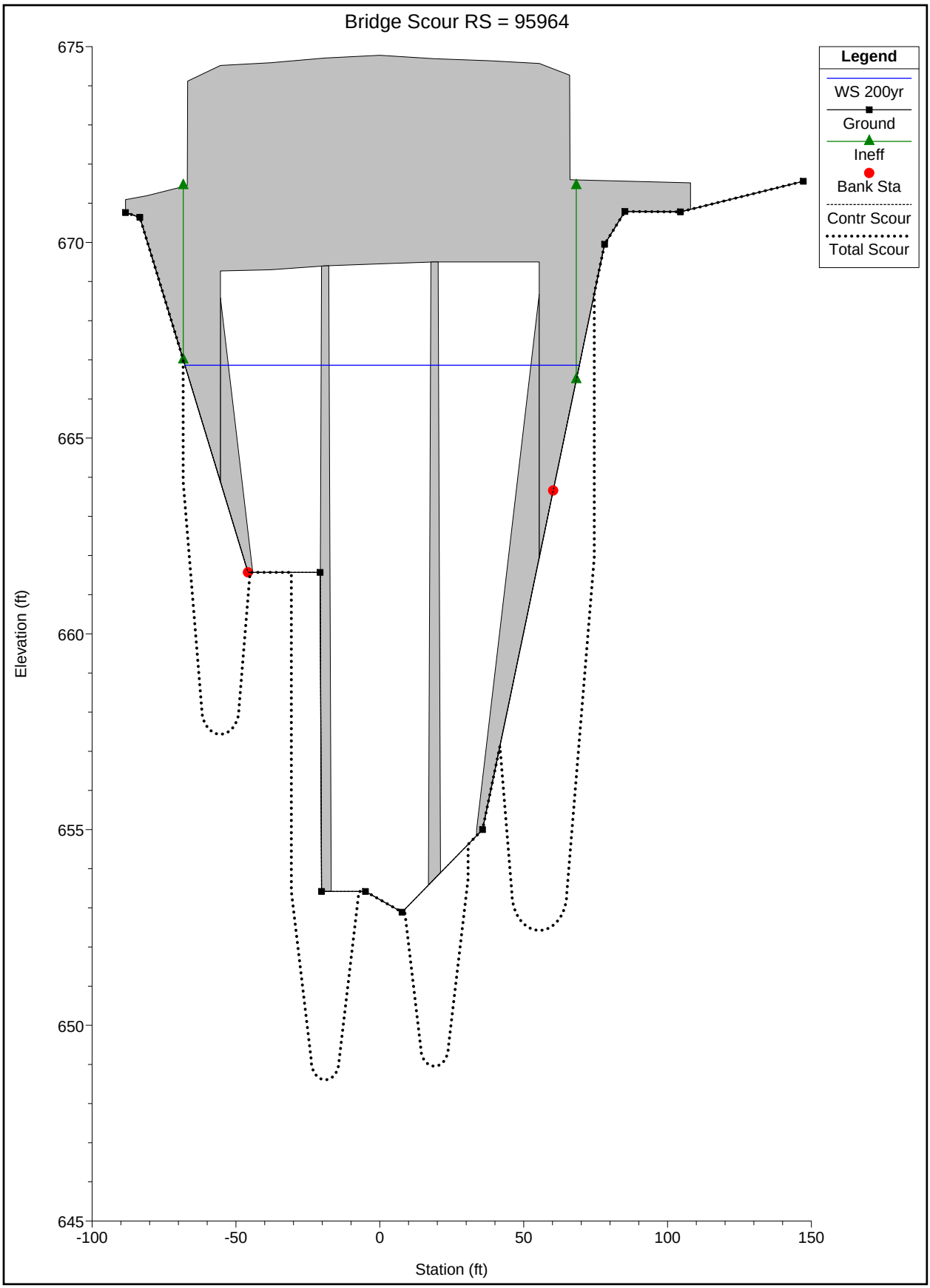
Input Data		
	Pier Shape:	Round nose
	Pier Width (ft):	4.22
	Grain Size D50 (mm):	1.10000
	Depth Upstream (ft):	9.90
	Velocity Upstream (ft/s):	1.86
	K1 Nose Shape:	1.00
	Pier Angle:	
	Pier Length (ft):	68.00
	K2 Angle Coef:	1.00
	K3 Bed Cond Coef:	1.10
	Grain Size D90 (mm):	17.00000
	K4 Armouring Coef:	1.00
	Set K1 value to 1.0 because angle > 5 degrees	
Results		
	Scour Depth Ys (ft):	4.74

	Froude #:	0.10	
	Equation:	CSU equation	

Abutment Scour

		Left	Right
Input Data			
	Station at Toe (ft):	-55.44	55.45
	Toe Sta at appr (ft):	-28.79	20.72
	Abutment Length (ft):	28.05	15.02
	Depth at Toe (ft):	2.84	4.77
	K1 Shape Coef:	0.55 - Spill-through abutment	
	Degree of Skew (degrees):	85.00	70.00
	K2 Skew Coef:	0.99	0.97
	Projected Length L' (ft):	24.64	13.94
	Avg Depth Obstructed Ya (ft):	3.64	5.40
	Flow Obstructed Qe (cfs):	116.37	236.73
	Area Obstructed Ae (sq ft):	102.14	81.06
Results			
	Scour Depth Ys (ft):	6.23	9.32
	Qe/Ae = Ve:	1.14	2.92
	Froude #:	0.11	0.22
	Equation:	Froehlich	Froehlich

200-YR SCOUR SECTION



200-YR HEC-RAS SCOUR REPORT

Contraction Scour

		Left	Channel	Right
Input Data				
	Average Depth (ft):	3.73	10.45	3.17
	Approach Velocity (ft/s):	1.17	3.85	1.63
	Br Average Depth (ft):	2.15	9.43	
	BR Opening Flow (cfs):	12.14	2058.86	
	BR Top WD (ft):	6.87	92.76	
	Grain Size D50 (mm):	1.10	1.10	1.10
	Approach Flow (cfs):	124.80	1798.11	54.09
	Approach Top WD (ft):	28.56	44.68	10.46
	K1 Coefficient:	0.640	0.640	0.640
Results				
	Scour Depth Ys (ft):	0.00	0.00	
	Critical Velocity (ft/s):	2.14	2.54	
	Equation:	Clear	Live	

Pier Scour

Pier: #1 (CL = -19)

Input Data		
	Pier Shape:	Round nose
	Pier Width (ft):	4.26
	Grain Size D50 (mm):	1.10000
	Depth Upstream (ft):	10.06
	Velocity Upstream (ft/s):	1.90
	K1 Nose Shape:	1.00
	Pier Angle:	
	Pier Length (ft):	68.00
	K2 Angle Coef:	1.00
	K3 Bed Cond Coef:	1.10
	Grain Size D90 (mm):	17.00000
	K4 Armouring Coef:	1.00
	Set K1 value to 1.0 because angle > 5 degrees	
Results		
	Scour Depth Ys (ft):	4.81
	Froude #:	0.11
	Equation:	CSU equation

Pier: #2 (CL = 19)

Input Data		
	Pier Shape:	Round nose
	Pier Width (ft):	4.22
	Grain Size D50 (mm):	1.10000
	Depth Upstream (ft):	10.06
	Velocity Upstream (ft/s):	1.90
	K1 Nose Shape:	1.00
	Pier Angle:	
	Pier Length (ft):	68.00
	K2 Angle Coef:	1.00
	K3 Bed Cond Coef:	1.10
	Grain Size D90 (mm):	17.00000
	K4 Armouring Coef:	1.00
	Set K1 value to 1.0 because angle > 5 degrees	
Results		
	Scour Depth Ys (ft):	4.79

	Froude #:	0.11	
	Equation:	CSU equation	

Abutment Scour

		Left	Right
Input Data			
	Station at Toe (ft):	-55.44	55.45
	Toe Sta at appr (ft):	-28.79	20.72
	Abutment Length (ft):	28.56	15.27
	Depth at Toe (ft):	3.01	4.94
	K1 Shape Coef:	0.55 - Spill-through abutment	
	Degree of Skew (degrees):	85.00	70.00
	K2 Skew Coef:	0.99	0.97
	Projected Length L' (ft):	26.35	14.85
	Avg Depth Obstructed Ya (ft):	3.73	5.46
	Flow Obstructed Qe (cfs):	124.80	247.75
	Area Obstructed Ae (sq ft):	106.58	83.44
Results			
	Scour Depth Ys (ft):	6.46	9.54
	Qe/Ae = Ve:	1.17	2.97
	Froude #:	0.11	0.22
	Equation:	Froehlich	Froehlich

EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

SOIL BORING LOG

Date 12/3/15

PROJECT BRM-4003 (508) **DESCRIPTION** St. Charles Road Bridge over Salt Creek **LOGGED BY** K. Krug

ROUTE FAU 1397 (St. Charles Road) **SECTION** 5-00094-00-BR **LOCATION** SE 1/4 **SEC.** 3 **TWP.** 39N **RNG.** 11E **PM.** 3rd

COUNTY DuPage **DRILLING METHOD** Mud Rotary below Creek Bed **HAMMER TYPE** Automatic

STRUCT. NO. 0226950
Station
BORING NO. B-2
Station
Offset
Northing 1,902,768.96
Easting 1,084,803.60
Ground Surface Elev. 671.9 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter Mud Rotary ft
Upon Completion Mud Rotary ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				CONCRETE PAVEMENT
				670.8
				Casing: Bridge deck/sidewalk to creekbed
-5				
-10				
				Dso = 1.1
				D95 = 17
-15				656.9
	2			Loose, Gray SAND and Gravel
	2		17	Grain Size 1.5'
	2			LL=28, PI=7, A-2-4(0)
	3			655.4
	2			Very Stiff, Gray LOAM
	3	2.00P	17	trace - shells Dso = 0.035
	4			little - gravel
	4			Grain Size D95 = 9 2.5
	1			LL=38, PI=17, A-6(7)
-20	1		25	652.9
				Very Loose to Loose, Gray SANDY LOAM
				651.9

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
	2			trace to little - organics
	2			Grain Size
	2			LL=31, PI=7, A-2-4(0)
	3		22	650.9
	4			Loose to Medium Dense, Gray SILTY LOAM
				trace - gravel
	2			Grain Size
	4		14	LL=22, PI=3, A-4(0)
-25	6			Dso = 0.03
				D95 = 2
				646.4
	11			Dense, Gray Medium SAND
	15		20	
	15			
				643.9
	20			Medium Dense to Extremely Dense, Gray SANDY LOAM
	15		10	some - gravel
-30	12			
	25			
				639.9
	50/5"		11	Dense, Gray Medium SAND
	14			
	18		23	
-35	20			
	18			
	22		24	
	10			
				633.4
	24			Medium Dense, Gray LOAM
	11		8	trace - gravel
-40	14			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge and S-Shear on Rimac/Shelby Tube (ST), P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Dso = 0.3
D95 = 8

EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

SOIL BORING LOG

Date 12/3/15

PROJECT BRM-4003 (508) **DESCRIPTION** St. Charles Road Bridge over Salt Creek **LOGGED BY** K. Krug

ROUTE FAU 1397 (St. Charles Road) **SECTION** 15-00094-00-BR **LOCATION** SE 1/4 **SEC.** 3 **TWP.** 39N **RNG.** 11E **PM.** 3rd

COUNTY DuPage **DRILLING METHOD** Mud Rotary below Creek Bed **HAMMER TYPE** Automatic

STRUCT. NO. 0226950
Station
BORING NO. B-2
Station
Offset
Northing 1,902,768.96
Easting 1,084,803.60
Ground Surface Elev. 671.9 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter Mud Rotary ft
Upon Completion Mud Rotary ft
After ____ **Hrs.** ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
				Medium Dense, Gray LOAM trace - gravel *(continued)*
	4			
	5		13	
	7			
628.9				
				Stiff, Gray CLAY LOAM trace - gravel
	5			
	6	1.24_B	14	
-45	7			
624.9				
				Dense, Gray SILTY LOAM some - gravel
	33			
	24		11	
-50	20			
619.9				
				Extremely Dense, Gray SANDY LOAM some - gravel
	50/5"			
			12	
616.9 -55				
				DOLOMITE: Light to dark gray, massive, fine grained, thin to thick bedded, moderately to intensly fractured, hard, slightly weathered trace - vugs, stylolites, chert
		810		
				Recovery = 100.0% RQD = 83.0% (Good)
611.9 -60				

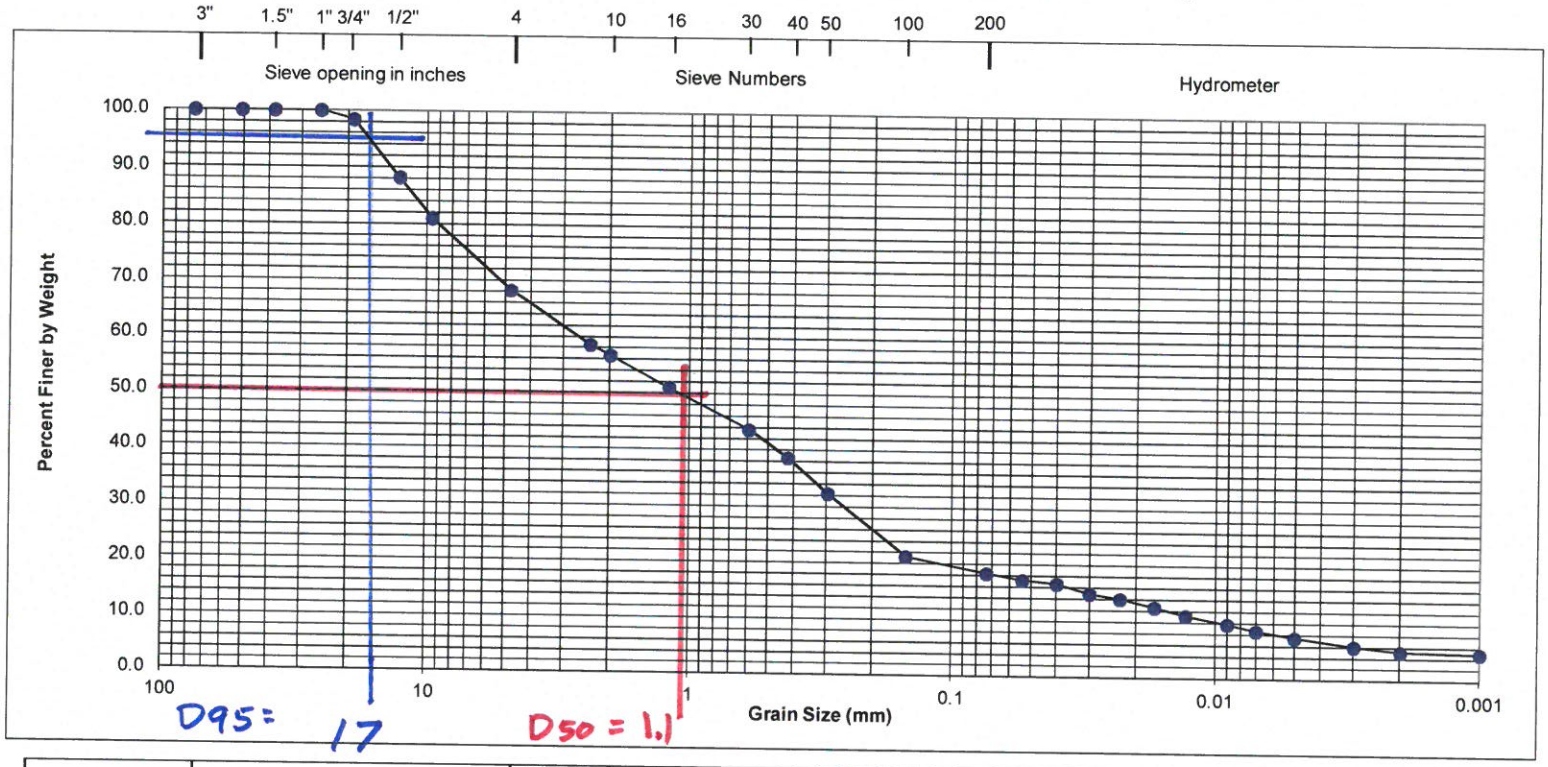
DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
606.9 -65				**END OF BORING**
-70				
-75				
-80				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge and S-Shear on Rimac/Shelby Tube (ST), P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Boring No.: B-2 Sample No.: SS-1 Depth (ft): 15-16.5

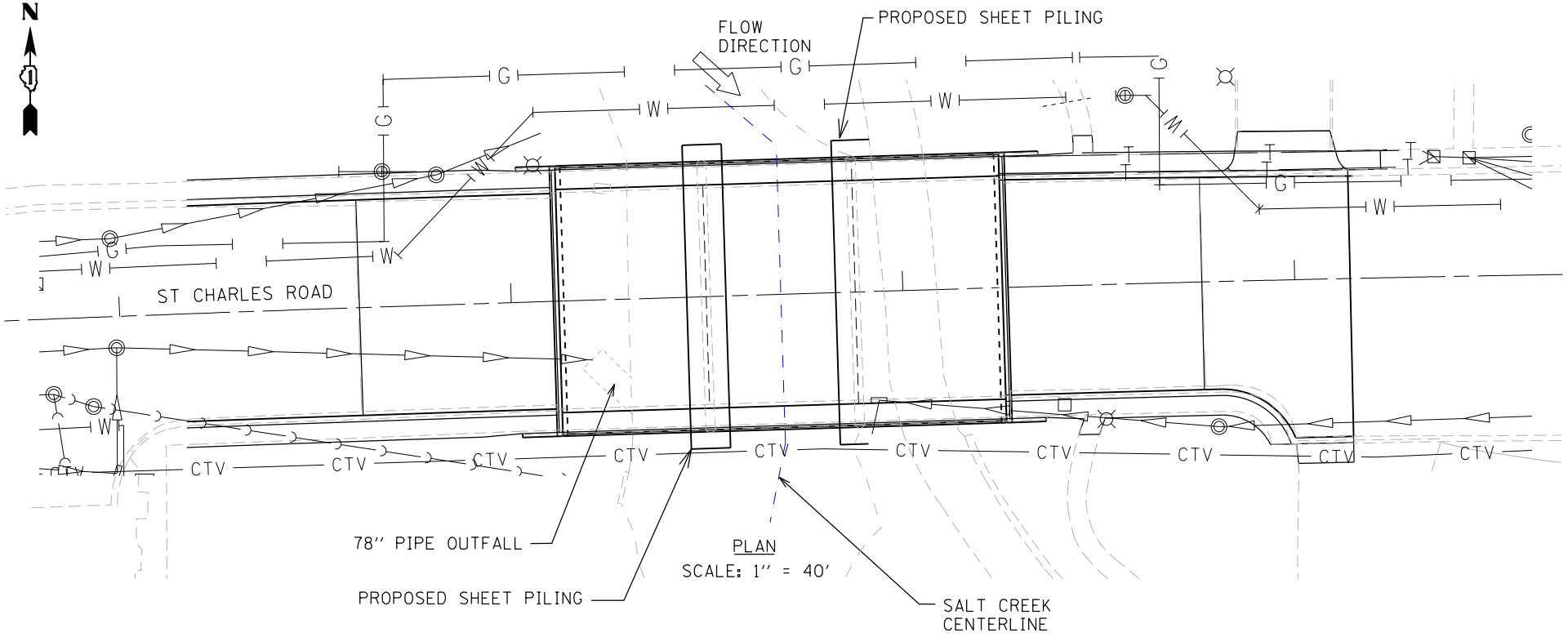
Soil Description: GRAY SAND / A-2-4(0)
(IDH/AASHTO Classification)

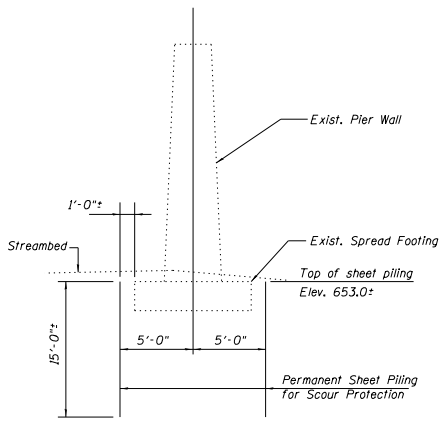
PARTICLE SIZE ANALYSIS OF SOIL (AASHTO T 88)



UNIFIED	GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	FINES	
AASHTO	GRAVEL		COARSE SAND	FINE SAND	SILT	CLAY
IDH	GRAVEL		SAND		SILT	CLAY

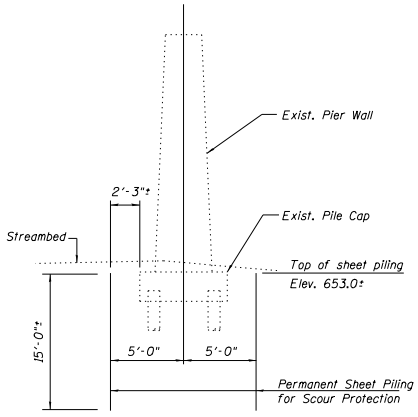
Gravel: 43.3% **Sand:** 38.3% **Silt:** 13.2% **Clay:** 5.2%





TYPICAL SECTION THRU PIER
NEAR EDGE OF DECK

ELEVATION
SCALE: NTS



TYPICAL SECTION THRU PIER
NEAR CENTERLINE OF BRIDGE

PRELIMINARY SCOUR DESIGN SKETCH
SALT CREEK / ST. CHARLES RD.

ROUTE: FAU 1397 (ST. CHARLES RD)
SECTION: 15-00094-00-BR
WATERCOURSE: SALT CREEK
EXISTING SN: 022-6950
SCALE: VARIES
PLOTTED BY: VAS DATE: 9-21-16
CHECKED BY: PM DATE: 9-22-16
SURVEY DATED: 11-20-2015

STRUCTURE GEOTECHNICAL REPORT
ST. CHARLES ROAD OVER SALT CREEK
VILLAGE OF VILLA PARK
DUPAGE COUNTY, ILLINOIS

PREPARED FOR

V3 COMPANIES OF ILLINOIS LTD.

WOODRIDGE, ILLINOIS

DECEMBER 21, 2015

PREPARED BY

EVEREST ENGINEERING COMPANY

915 WEST LIBERTY DRIVE
WHEATON, ILLINOIS 60187
PH: 630·462·9797

TABLE OF CONTENTS

STRUCTURE GEOTECHNICAL REPORT
ST. CHARLES ROAD OVER SALT CREEK
VILLAGE OF VILLA PARK,
DUPAGE COUNTY, ILLINOIS

1. INTRODUCTION

The Village of Villa Park and the Illinois Department of Transportation (IDOT) have proposed the rehabilitation of the St. Charles Road Bridge over Salt Creek. As part of the rehabilitation program, the design engineer, V3 Companies of Illinois Ltd. (V3), is considering one of the following options.

- Removal and replacement of the bridge superstructure utilizing the existing foundations.
- Complete (superstructure and substructure) removal and replacement of the existing bridge.

This report presents geotechnical engineering studies, analyses and recommendations for reconstruction of the proposed bridge. To investigate subsurface conditions, 4 borings B-1 thru B-4 were drilled. The structure location and boring locations are shown on *Sheet 1,* attached in the *Appendix*.

The broad objectives of this investigation were to determine the soil profile, the probable geologic origins of the soils, and the apparent variability of the underlying soils across the site. The objectives also included estimation of the probable behavior of the soils due to imposed loads and to provide soils-related recommendations; and to identify perceived geotechnical conditions that might affect anticipated construction operations. Reference is made to the *General Notices,* attached in the *Appendix,* for additional information that should be considered in the planning and preparation of the contract documents.

The scope of our services for this study did not include any environmental assessment for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater or air, on or below or around this site. Any statements in this report or on the Soil Boring Logs regarding odors, color, or unusual or suspicious items or conditions, if any encountered during the performance of this subsurface investigation, are noted as observations only, strictly for the client's information.

The boring numbers and locations were proposed and staked in the field by V3. The borings were relocated as necessary to accommodate drill rig accessibility. The as-drilled coordinates (northing and easting) and elevations were surveyed by V3.

The investigations were authorized by Mr. George J. Schober of V3 Companies of Illinois Ltd.

2. EXISTING STRUCTURE AND PROPOSED IMPROVEMENTS

The general bridge plan of the existing three span bridge is attached in the *Appendix.* The existing bridge:

- Originally constructed in early 1900 with face to face of abutments of 110'-9" in length and out to out width of 47'-6". It is our understating that original abutments and piers are supported on wooden pile foundations.
- The bridge was widened in 1978 with out to out width of 68'-0". The widened structure is supported on shallow spread footings.

The details of the proposed improvements are not known to Everest at the time of this report. However, it is our understating that the design engineer is considering one of the following options.

- Removal and replacement of the bridge superstructure utilizing the existing foundations.
- Complete (superstructure and substructure) removal and replacement of the existing bridge.

3. GEOLOGY

Proposed bridge structure over Salt Creek is located in the Southeast ¼ of Section 3, Township 39 North and Range 11 East. The surficial deposits in the project area are part of Wisconsinan glaciation system and belong to the Wadsworth and Hager Members of Wedron Formation. The deposits encountered primarily consist of clayey, silty and sandy till relatively low in content of pebbles, cobbles, and boulders.

Adapted from:

Summary of the Geology of Chicago Area by *H. B. Willman (Circular 460,Illinois State Geological Survey)* and *Handbook of Illinois Stratigraphy* by H.B. Willman, et. al., *(Bulletin 95, Illinois State Geological Survey).*

4. EXPLORATION AND TESTING

The drilling and investigation procedures used were in accordance with the guidelines contained in the *IDOT Geotechnical Manual*.

The investigation consisted of:

a) Literature search
b) Drilling the borings to aid in delineation of the variation and distribution of the soils both horizontally and in profile

4.1 Soil Borings

A total of 4 borings, B-1 thru B-4, were drilled by Everest for the proposed bridge in the months of November and December 2015. The depth of overburden varied from 40 feet in boring B-2 to 51.8 feet in boring B-4. The borings were drilled to the bedrock and then cored 10 feet into the bedrock. The boring locations are shown on *Sheet 1,* attached in the *Appendix.*

The borings were performed with a truck mounted rotary drill rig equipped with a hydraulic head. Borings B-1 and B-4 were drilled, behind the existing abutments, through the approach pavement, whereas boring B-3 was drilled, east of the existing east pier, adjacent to the existing bike path at the creek bank. The borings B-1, B-3 and B-4 were drilled using solid stem augers to depths varying from 11 feet to 15 feet and mud rotary drilling technique thereafter. In boring B-2 drilled east of the existing west pier, concrete sidewalk/bridge deck was cored and steel casing was installed through the core hole to the creekbed and mud rotary drilling technique was used.

The soil samples were obtained using standard penetration test (SPT) procedures in general accordance with *AASHTO T 206.* In general, soil samples were obtained at 2.5 foot intervals. To determine the scour reduction factor for various soil types, four continuous soil samples below the creekbed were obtained in borings B-2 and B-3. The subsurface exploration is summarized in *Table 4.1, Exploration Summary.* Subsurface conditions, visual soil descriptions and *IDH* soil classifications of various soil formations are presented on *Soil Boring Logs,* attached in *the Appendix.*

Table 4.1, Exploration Summary

Boring No.	Ground Surface Elevation (Feet)	Overburden / Top of Rock (Feet)	Rock Core Depth (Feet)	Total Depth (Feet)	Groundwater Depth / Elevation (Feet)		
					During Drilling	At Completion	After Completion
B-1	671.0	51 / 620.0	10	61	Dry	Mud Rotary	Grouted Immediately
B-2	671.9	40* / 616.9	10	50*	Stream	Mud Rotary	Grouted Immediately
B-3	661.4	46 / 615.4	10	56	7 / 654.4	Mud Rotary	Grouted Immediately
B-4	670.7	51.8 / 618.9	10	61.8	15 / 655.7	Mud Rotary	Grouted Immediately

* - Depth below creekbed

4.2 Field and Laboratory Testing

The field testing consisted of determination of unconfined compressive strength for the cohesive soil samples using a *Rimac* and/or *pocket penetrometer*. The laboratory testing consisted of determination of natural moisture content for all the soil samples. Nine (9) particle size analysis, 9 Atterberg limits, 2 unconfined compressive strength of soil, 4 unconfined compressive strength of rock, 1 moisture density relations, and 1 Illinois bearing ratio (IBR), tests were also performed for the selected samples. The test results are presented on the *Soil Boring Logs* and *Laboratory Test Data,* both attached in the *Appendix*.

4.3 Groundwater

Solid stem augers were utilized from the ground surface to the depths of 12.5 feet in boring B-1, 11 feet in boring B-3 and 15 feet in boring B-4, from where mud rotary drilling technique was used to the top of the bedrock. Prior to the mud rotary drilling, boring B-1 was found to be dry and groundwater was encountered at a depth of 7 feet (elevation 654.4) in boring B-3 and at a depth of 15 feet (elevation 655.7) in boring B-4. Boring B-2 was drilled using mud rotary drilling technique from the creekbed.

Groundwater levels were not noted during and after the completion of the mud rotary drilling and also after rock coring where water was utilized. Borings were grouted and patched immediately after the completion of drilling/coring. Based on the subsurface investigation, the groundwater elevation of ±655 may be used for the design.

It is expected that the groundwater levels will vary from the observed in the future on a seasonal basis, depending upon the precipitation, runoff, infiltration, land use, and stream levels. Reference is also made to the *Section* on *Water Levels* in the *General Notices* attached in the *Appendix*.

5. GENERALIZED SUBSURFACE CONDITIONS

Borings B-1 and B-4 were drilled through the approach pavement consisting of 3 to 4 inches of asphalt pavement over 12 to 13 inches of concrete pavement. Below the approach pavement, crushed stone fill was encountered to a depth of 3 feet in boring B-1, whereas stiff sandy clay/clay and loose sand fill was encountered to a depth of 10.5 feet in boring B-4. In general, fills were underlain by loose to extremely dense granular soil layers with intermittent layers of medium stiff to hard clayey soils to the bedrock at elevations 620.0 in boring B-1 and 618.9 in boring B-4.

Boring B-2 was drilled through 13 inches thick concrete sidewalk/bridge deck. Upper 4 feet of creekbed soils consisted of 1.5 feet of loose sandy loam underlain by 2.5 feet of very stiff clay. In general, loose to extremely dense granular soil layers with intermittent layers of stiff to very stiff clayey soils were encountered to the bedrock at elevation of 616.9.

In boring B-3, about 1 foot thick topsoil was encountered at the surface, which was generally underlain by soft to very stiff clayey soils to a depth of 20.5 feet and subsequently underlain by loose to extremely dense granular soil layers to the bedrock at elevation of 615.4.

The generalized subsurface conditions are shown on *Sheet 2*, attached in the *Appendix.*

6. ANALYSES AND RECOMMENDATIONS

6.1 Seismic Data

The seismic data for the LRFD design are:

- Seismic Performance Zone(SPZ) = 1
- Design Spectral Acceleration at 1.0 sec. (S_{D1}) = 0.087g
- Design Spectral Acceleration at 0.2 sec. (S_{DS}) = 0.153g
- Soil Site Class = D

Based on the seismic data, liquefaction of the granular soils is not anticipated.

6.2 Abandoned Mines

No former mining activity is indicated in the ISGS records near the project location.

6.3 Overall Stability

Based on existing abutment end slopes of 1.5H:1V, no overall stability problems are anticipated for the end slope of 1.5H:1V or flatter.

6.4 Scour Protection

The hydraulic report is not available to Everest at the time of this report. Based on the soils encountered in boring B-2 drilled through the creekbed and using the guidelines provided in the *IDOT Bridge Manual, Section 2.3.6.3.2,* recommended reduction in the theoretical, predicted scour depth is presented in *Table 6.1*.

Table 6.1, Scour Depth Reduction

Depth Below Existing Creekbed in Boring B-2 (Feet)	Elevations (Feet)	Soil Type	Scour Depth Reduction (%)
0 to 1.5	±656.9 to ±655.4	Sand and Gravel	0
1.5 to 4.0	±655.4 to ±652.9	Loam (Qu > 1.5 tsf) with substantial Sand and Gravel	0
4.0 to 6.0	±652.9 to ±650.9	Sandy Loam	0
6.0 to 10.5	±650.9 to ±646.4	Silty Loam	0

Riprap or other revetments at piers and slopewalls at the bridge abutments may be considered for scour protection.

6.5 Foundations

It our understanding that the existing abutments and piers of the original construction are supported on deep foundations (wooden piles) and widened structure is supported on shallow foundations (spread footings). For reconstruction of the new bridge, Everest considered both shallow and deep foundation options.

6.5.1 Shallow Foundation

Everest encountered loose granular and clayey soils with Qu equal to or less than 1.5 tsf below the anticipated footing grades (elevation 651). It is our opinion that shallow foundation may not be an economically viable option due to anticipated removal and replacement of about 5 to 9 feet of weak soils.

6.5.2 Deep Foundation

Deep foundations such as metal shell cast-in-place concrete piles (MSP) or steel H-piles (HP) may be considered to support the new bridge. The pile design tables for various sizes of MSP and HP, using the *IDOT LRFD Geotechnical Pile Design Procedure,* are attached in the *Appendix.* The pile design tables summarize estimated ground surface against pile during driving, estimated bottom of the pile cap elevation, nominal required

bearing, factored resistance available below the pile cap and estimated pile length which includes length of pile from the bottom the pile cap and embedment. The estimated ground surface elevation against pile during driving, bottom of pile cap elevation, pile embedment and pile cutoff elevation are presented in *Table 6.2.* The pile lengths should be adjusted for the length of the embedment other than stated in *Table 6.2.*

Table 6.2, Pile Embedment and Elevations

Substructure	Ground Surface Elevation Against Pile During Driving (Feet)	Bottom of Pile Cap Elevation (Feet)	Pile Embedment (Feet)	Pile Cutoff Elevation (Feet)
West Abutment	±664.00	±664.00	1	±665.00
East Abutment	±664.00	±664.00	1	±665.00
West Pier	±651.00	±651.00	1	±652.00
East Pier	±651.00	±651.00	1	±652.00

Piles should be driven in accordance with *Section 512 - Piling,* as presented in the *Standard Specifications for Road and Bridge Construction,* by the *Illinois Department of Transportation.* Based on the subsurface conditions, Everest anticipates some hard driving conditions through dense soil layers and recommends using pile shoes for driving the MSP and HP. Everest recommends driving at least one test pile per substructure. The contractor should drive test piles to 110 percent of the Nominal Required Bearing specified in permanent locations at substructures specified or approved by the Engineer before ordering the remainder of piles.

6.6 Settlement

Everest does not anticipate any significant additional loads behind the abutments and hence, no settlement problems are anticipated.

6.7 Embankment and Backfill

The construction of embankment should be performed in accordance with the *Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction (IDOT SSRBC), Section 205*. In general, after the removal of vegetation, topsoil, and other unsuitable materials, excavated soils along the roadway should be suitable for embankment fill. Prior to the use of any on-site or borrow material in the construction of embankment, the materials should be tested and evaluated to verify that the materials meet the embankment material requirements.

The excavation and backfilling should be in accordance with the requirements of *IDOT SSRBC, Section 502.* The backfill should be placed in approximately continuous horizontal layers not more than ten (10) inches in thickness, loose measurement, and each layer should be compacted in-place in accordance with *Article 205.05* of the *IDOT SSRBC.* Over compaction of materials should be avoided.

6.8 Lateral Loads

In addition to vertical loads, the substructure units will also be subjected to lateral loads including lateral earth pressure due to backfill, live loads, and wind loads.

Lateral Resistance

The lateral loads acting on the bridge structure will be transferred to the deep foundations. Lateral loading of a deep foundation is a soil-structure interaction problem. The deflection of the deep foundation depends on lateral strength of soils and stiffness of the deep foundation. The detailed lateral capacity analysis includes factors such as magnitude, point of application and inclination of load, allowable deflection and structural design of the deep foundation. The nominal resistance of deep foundations to lateral loads should be evaluated based on both soils and foundation element properties. A soil resistance factor of 1.0 should be used to estimate lateral capacity as specified in *AASHTO LRFD Table 10.5.5.2.3-1*.

To determine the lateral capacity of the MSP and HP, analyses may be performed using available computer programs based on the P-Y analysis like *LPILE*. The estimated parameters of various soils for calculating the lateral loads are presented in *Table 6.3.*

Table 6.3, Estimated Soil Parameters

Soil Type	γ Unit weight (lb/ft^3)	γ' Effective Unit Weight (lb/ft^3)	Φ Angle of Internal Friction (deg)	ε_{50} Strain at 50% Stress Level	Soil Modulus		c[(a)] Undrained Shear Strength (tsf)
					k-static (lb/in^3)	k-cyclic (lb/in^3)	
Fill – Clay, Sandy Clay	125	63	---	0.007	500	200	0.5
Fill – Sand, Crushed Stone	125	63	30	---	20/25 [(b)]	20/25 [(b)]	---
Soft – Clay, Silty Clay, Clay Loam	115	53	---	0.02	30	---	0.1 - 0.25
Medium Stiff – Clay, Silty Clay, Clay Loam	120	58	---	0.01	100	---	0.25 - 0.50
Stiff – Clay, Silty Clay, Clay Loam	125	63	---	0.007	500	200	0.50 -1.00
Very Stiff – Clay, Silty Clay, Clay Loam	130	70	---	0.005	1,000	400	1.00 - 2.00
Hard – Clay, Silty Clay, Clay Loam	135	73	---	0.004	2,000	800	2.00 - 4.00
Loam, Silty Loam	115	53	26	---	20/25 [(b)]	20/25 [(b)]	---
Loose – Sand, Sandy Loam	115	53	30	---	20/25 [(b)]	20/25 [(b)]	---
Medium Dense – Sand, Sandy Loam	125	63	34	---	60/90 [(b)]	60/90 [(b)]	---
Dense to Extremely Dense – Sand, Sandy Loam	130	68	38	---	125/225 [(b)]	125/225 [(b)]	---

(a) - See Soil Boring Logs, $c = q_u/2$ where q_u= unconfined compressive strength
(b) - k for submerged sand/k for sand above water table

Lateral Earth Pressures

The lateral earth pressure exerted on the abutments and wingwalls will depend upon their stiffness, the type and density of the backfill placed behind and the drainage provisions. The backfill materials behind the abutments and wingwalls should be granular with a minimum drained friction angle of 30 degrees. The unit weight of 0.120

kcf, coefficient of active pressure of 0.33 and 2 feet of earth surcharge equivalent to 0.250 ksf should be used to calculate the lateral earth pressure.

6.9 Drainage

To reduce the buildup of hydrostatic pressure behind the abutments and wingwalls, it is preferred that a free draining granular material be used as backfill. The geocomposite drain may be used for cast-in-place (CIP) concrete walls as described in the *IDOT SSRBC*. In case weepholes are proposed to mitigate the hydrostatic pressure for the CIP concrete walls, the weepholes may be approximately 3 inch in diameter, spaced approximately 8 feet apart horizontally and 6 feet apart vertically. To avoid migration of fines resulting in blockage, the weepholes should be protected on the soil side by using a properly designed granular filter.

7. CONSTRUCTION CONSIDERATIONS

7.1 Seepage

No major excavation is expected for the proposed bridge. Some seepage and associated caving of materials should be expected during construction. For shallow excavations, normal sump and pump dewatering method should be adequate to keep excavations dry during construction. Any soil that has been softened by water should be removed prior to placing any fills and/or concrete. A cofferdam/diversion of the existing creek may be required for excavation and concrete placement to proceed in dry conditions.

7.2 Safety

The Health and Safety Act of the State of Illinois, together with the related Health and Safety Rules, all federal requirements, area specifications for excavation and slopes, and all other ordinances, statutes or building codes relating to construction operations and/or temporary sheeting and bracing of trenches and excavations must be observed.

7.3 Excavation Slopes

In general, the soils on this site should not be excavated with side slopes steeper than 1.5H:1V unless temporary sheeting and bracing are used. For temporary excavation slopes related *Occupational Safety and Health Administration (OSHA)* standards should be observed. Piles of excavated soils and heavy construction equipment should not be permitted closer to the top of any excavation than a distance equal to two (2) times the depth of the excavation, in order to reduce the possibilities of cave-ins.

7.4 Quality Control/Quality Assurance

For quality control/quality assurance purposes in general, and when the field conditions differ from the conditions described in the structure geotechnical report are encountered, the services of a qualified geotechnical engineer/inspector should be utilized for proper testing and evaluation of the soils and other construction materials and activities.

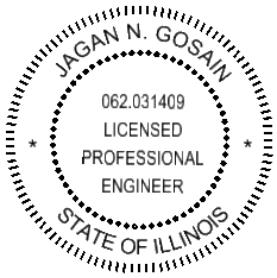
8. GENERAL

Soil conditions can change with the passage of time due to changes in the elevation of the groundwater table, changes in climatic conditions and other factors not evident at the time of this investigation. Also, variations can occur at locations between the borings, due to variations in the fill materials and the time of deposition. For these reasons, any soft areas or soil conditions believed to be different than those described herein, which are revealed during construction should be further investigated before construction proceeds.

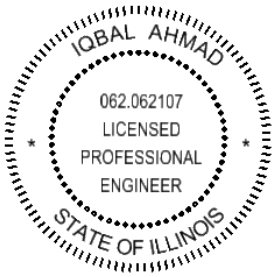
The information in *Section 7* has been provided for use by the designers and field inspection personnel. It is not intended to be a complete description of problems which may be encountered by the contractor during construction.

Respectfully submitted,
EVEREST ENGINEERING COMPANY

Jagan N. Gosain, P.E.
Principal Soils Engineer



Iqbal Ahmad, P.E.
Project Soils Engineer



APPENDICES

GENERAL NOTICES

GENERAL NOTICES

1. WARRANTY

The Geotechnical Engineer has prepared this report in accordance with generally accepted geotechnical engineering practices and makes no other warranties either expressed or implied. In no event does the Geotechnical Engineer accept any liability beyond the extent of fee collected for this work.

2. SOIL & ROCK DESCRIPTIONS

Unless otherwise noted, the soil and/or rock descriptions indicated on the boring logs are visual identifications and, generally, are not the result of laboratory identification testing. As such, they may not conclusively represent exact subsurface conditions. The soil and/or rock identifications indicated on the boring logs are based upon examination of samples in the field or delivered to the laboratory, and interpretation of field observations during drilling, and may not completely represent conditions in the ground.

Soil and/or rock samples are retained in our laboratory for ninety days and are then destroyed unless special disposition is requested by our client.

3. UNANTICIPATED SOIL & ROCK CONDITIONS

The analysis and recommendations submitted in this report are based upon the data obtained from soil borings and/or rock cores performed at the specific locations indicated, and subsequent laboratory testing of these samples. This yields a representative, but not necessarily exhaustive, picture of the subsurface conditions. The possibility of variations from expected conditions increases with spacing between borings and frequently requires that additional information be obtained to attain a properly constructed project. The Geotechnical Engineer should be contacted whenever unanticipated conditions are encountered, as these unanticipated conditions may alter conclusions and recommendations contained in the report.

4. CHANGED CONDITIONS

It is recommended that all construction contracts relating to foundations and earthwork include a *changed conditions* clause to establish procedures to be followed should unanticipated conditions be encountered.

No claim by the contractor for any conditions differing from those anticipated in the plans and specifications and indicated by the original geotechnical studies should be allowed unless the contractor has so notified the owner, verbally and in writing of such change in conditions. It is further recommended that all foundation work and site improvements be inspected by a Registered Professional Engineer with substantial experience in Geotechnical Engineering.

5. CHANGED STRUCTURE OR LOCATIONS

This report has been prepared to aid in the evaluation of this project and to assist the architect and/or engineer in the design of this project. In the event that any changes, however slight, in the design or location of the structure as outlined in this report are planned, or any structures are included or added that are not discussed in this report, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or approved in writing by the Geotechnical Engineer.

6. OBSERVATIONS DURING DRILLING

Attempts are made to detect and/or identify occurrences during drilling and sampling, such as: water, boulders, hazardous or toxic material, gas, relative ease or resistance to drilling progress, unusual sample recovery, variation of driving resistance, odors, obstructions, etc.; however, lack of mention does not preclude their presence.

7. BOULDERS, COBBLES AND GRAVEL

Boulders, cobbles and coarse gravel cannot be accurately observed or measured without special, large diameter borings and special samplers. Therefore, their absence from the boring logs does not preclude their existence.

8. LOCATION OF BURIED OBJECTS

All users of this report are cautioned that no attempt was made by the Geotechnical Engineer to locate any man-made buried objects during the course of this investigation. The Geotechnical Engineer can not be responsible for any buried man-made objects that are encountered during construction that are not discussed in the text of this report. The contractor is reminded to contact all utility companies to verify underground service locations, prior to any excavation work.

9. GROUNDWATER LEVELS

Groundwater level readings have been made in the bore holes at times and under conditions stated on the boring logs. Groundwater levels may not have stabilized at the last reading and show only the conditions observed at the time that the borings were drilled, unless otherwise noted. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, runoff, infiltration, land use, area lake/stream levels, temperature, and other factors not evident at the time measurements were made and reported herein. Since the probability of such variations is anticipated, design drawings and specifications should accommodate such possibilities and construction planning should be based upon such assumptions of variations.

10. USE OF REPORT BY BIDDERS

Bidders who are examining this report prior to submitting a bid are cautioned that this report was prepared as an aid to the designers of the project and it is not intended to reflect subsurface conditions as they may affect actual constructions operations.

11. STRATA CHANGES

Strata changes are indicated by a definite line on the boring logs and soil profiles which accompany this report. However, actual change in the ground may be gradual. Where changes occur between soil samples, the location of the changes are estimated using all available information and may not be shown at the exact actual depth.

12. CONSTRUCTION FOLLOW-UP

It is recommended that during construction of all foundation work and site improvements a qualified Geotechnical Engineer be retained to assure compliance with the recommendations contained in this report and with project specifications and to assist with making necessary field adjustments and to document changed conditions.

Everest Engineering Company would welcome the opportunity to provide continuous on-site geotechnical services during excavation, backfilling, compaction, foundation preparation, and paving operations, etc.

SOIL IDENTIFICATION TERMINOLOGY
AND
LEGEND

EVEREST ENGINEERING COMPANY

SOIL IDENTIFICATION TERMINOLOGY

Soils are identified and classified in this report according to the AASHTO/IDH Classification system with the following modifiers:

RELATIVE DENSITY OF GRANULAR SOILS

DESCRIPTION	BLOWS PER FOOT
Very Loose	0 to 4
Loose	4 to 10
Medium Dense	10 to 30
Dense	30 to 50
Very Dense	50 to 80
Extremely Dense	80+

CONSISTENCY OF COHESIVE SOILS

DESCRIPTION	Q_u (tsf)
Very Soft	0 to 0.25
Soft	0.25 to 0.50
Medium Stiff	0.50 to 1.0
Stiff	1.0 to 2.0
Very Stiff	2.0 to 4.0
Hard	4.0 to 8.0
Very Hard	8.0+

PARTICLE SIZE

COMPONENT	SIZE
Boulders	Over 8"
Cobbles	3" to 8"
Gravel - Coarse	3/4" to 3"
Gravel - Fine	* No. 4 to 3/4"
Sand - Coarse	* No. 10 to *No. 4
Sand - Medium	* No. 40 to *No. 10
Sand - Fine	* No. 200 to *No. 40
Fines - Silt and Clay	Below *No. 200

RELATIVE PROPORTIONS

DESCRIPTIVE TERM	PERCENT
Trace	0 to 10
Little	10 to 20
Some	20 to 35
And	35 to 50

STRATIFICATION

Parting	0 to 1/16"
Seam	1/16" to 1/2"
Layer	1/2" to 12"
Stratum	Greater than 12"
Varved Clay	Alternating seams or layers of sand, silt and clay
Pocket	Small, erratic deposits, usually less than 12"
Lens	Lenticular deposit
Occasional	One or less per 12"
Frequent	More than one per 12"

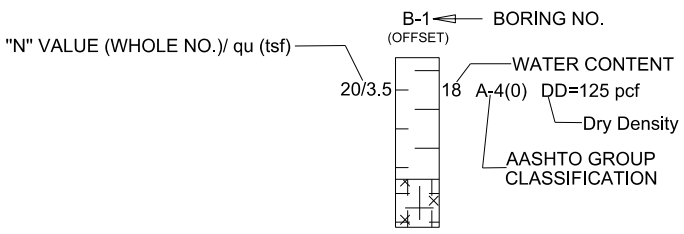
ABBREVIATIONS ON LOGS OF SUBSURFACE DATA

AS	Auger Sample
SS	Split spoon sampler, 2" OD, 1 3/8" ID
ST	Thinwall tube sampler, 3" OD, 2 7/8" ID
Q_u	Unconfined compressive strength (pocket penetrometer, Rimac, or load frame)
LL	Liquid Limit
PI	Plasticity Index
OC	Organic Content (%)
B	Bulge
S	Shear
P	Pocket Penetrometer

LEGEND

- TOPSOIL
- ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- CRUSHED STONE
- PEAT
- FILL
- CLAY
- SILTY CLAY
- SANDY CLAY
- CLAY LOAM
- SILTY CLAY LOAM
- SANDY CLAY LOAM
- LOAM
- SILTY LOAM
- SILT
- SANDY LOAM
- SAND
- DOLOMITE

- WATER LEVEL DURING DRILLING
- WATER LEVEL AT COMPLETION
- WATER LEVEL HRS. AFTER COMPLETION



Rev. 01/2013

SHEET 1,
PROJECT / BORING LOCATION MAP

LEGEND

DRILLED BORING

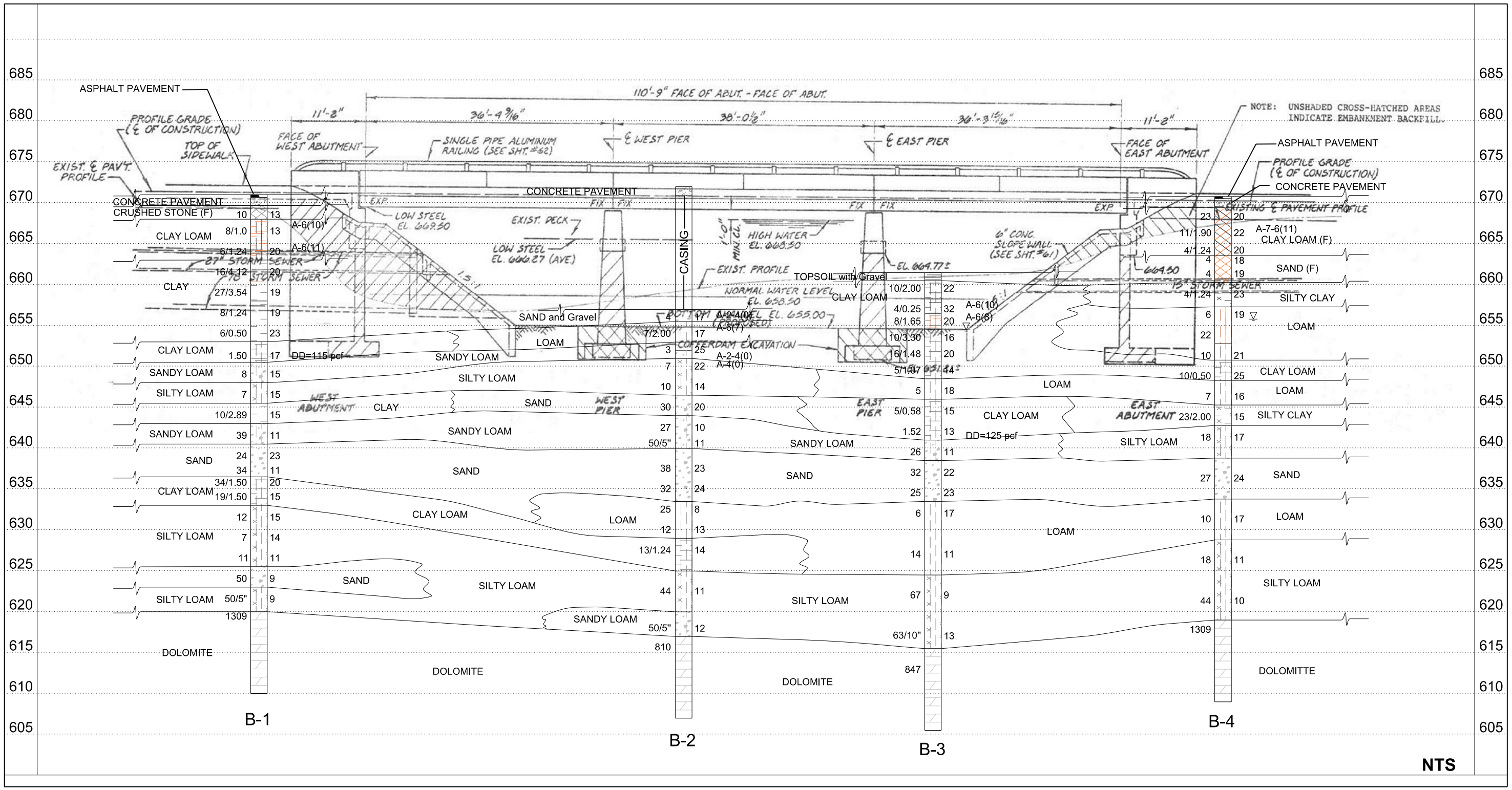
EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

PROJECT / BORING LOCATION MAP

ST. CHARLES ROAD BRIDGE OVER SALT CREEK
VILLA PARK, IL

CLIENT	V3 COMPANIES OF ILLINOIS LTD.
DATE	12/16/2015
JOB NO.	1264
SHEET NO.	1

SHEETS 2,
GENERALIZED SUBSURFACE PROFILE



EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

GENERALIZED SUBSURFCE PROFILE

ST. CHARLES ROAD BRIDGE OVER SALT CREEK
VILLA PARK, IL

CLIENT	V3 COMPANIES OF ILLINOIS LTD.
DATE	12/21/2015
JOB NO.	1264
SHEET NO.	2

SOIL BORING LOGS

EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

SOIL BORING LOG

Date 11/29/15

PROJECT BRM-4003 (508) **DESCRIPTION** St. Charles Road Bridge over Salt Creek **LOGGED BY** K. Krug

ROUTE FAU 1397 (St. Charles Road) **SECTION** 15-00094-00-BR **LOCATION** SE 1/4 **SEC.** 3 **TWP.** 39N **RNG.** 11E **PM.** 3rd

COUNTY DuPage **DRILLING METHOD** Solid Stem Auger / Mud Rotary below 12.5 feet **HAMMER TYPE** Automatic

STRUCT. NO. 0226950
Station
BORING NO. B-1
Station
Offset
Northing 1,902,818.84
Easting 1,084,759.95
Ground Surface Elev. 671.0 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter Dry ft
Upon Completion Mud Rotary ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
670.6				ASPHALT PAVEMENT
669.6				CONCRETE PAVEMENT
	5			CRUSHED STONE
	5		13	
	5			FILL
668.0				
	4			Stiff, Brown and Black CLAY LOAM trace - gravel BAG (3'-8') MDD=114 pcf, OMC=15.5%
	4	1.0P	13	
-5	4			
	3			Grain Size LL=38, PI=18, A-6(10)
	3	1.24B	20	Grain Size LL=38, PI=17, A-6(11)
	3			
663.0				
	5			Soft to Hard, Brown and Gray CLAY trace - gravel
	6	4.12B	20	
-10	10			
	10			
	12	3.54B	19	
	15			
658.0				
	4			Gray below 13 feet
	3	1.24B	19	
-15	5			
	3			
	3	0.50P	23	
	3			
653.0				
				Stiff, Gray CLAY LOAM
				Dry Density=115 pcf
651.0 -20		1.50ST B	17	

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
650.5				
	2			Loose, Gray SANDY LOAM trace - gravel
	3		15	
	5			
648.0				
	1			Loose, Gray SILTY LOAM trace - gravel
	2		15	
-25	5			
645.5				
	3			Very Stiff, Gray CLAY trace - gravel
	5	2.89B	15	
	5			
643.0				
	4			Dense, Gray SANDY LOAM some - gravel
	14		11	
-30	25			
640.5				
	10			Medium Dense to Dense, Gray SAND trace - gravel
	10		23	
	14			
	13			
636.5				
	17		11	
-35	17	1.50P	20	Stiff, Gray CLAY LOAM trace - gravel
	6			
	9	1.50P	15	
	10			
633.0				
	5			Loose to Medium Dense, Gray SILTY LOAM some - gravel
	8		15	
-40	4			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge and S-Shear on Rimac/Shelby Tube (ST), P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

SOIL BORING LOG

Date 11/29/15

PROJECT BRM-4003 (508) **DESCRIPTION** St. Charles Road Bridge over Salt Creek **LOGGED BY** K. Krug

ROUTE FAU 1397 (St. Charles Road) **SECTION** 15-00094-00-BR **LOCATION** SE 1/4 **SEC.** 3 **TWP.** 39N **RNG.** 11E **PM.** 3rd

COUNTY DuPage **DRILLING METHOD** Solid Stem Auger / Mud Rotary below 12.5 feet **HAMMER TYPE** Automatic

STRUCT. NO. 0226950
Station
BORING NO. B-1
Station
Offset
Northing 1,902,818.84
Easting 1,084,759.95
Ground Surface Elev. 671.0 ft

Surface Water Elev. ft
Stream Bed Elev. ft
Groundwater Elev.:
First Encounter Dry ft
Upon Completion Mud Rotary ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Loose to Medium Dense, Gray SILTY LOAM some - gravel *(continued)*		6		
		3 4		14
		4		
		5 6		11
	-45			
625.5 Very Dense, Gray SAND some - gravel		18		
		30 20		9
623.0 Extremely Dense, Gray SILTY LOAM some - gravel		15		
		50/5"		9
	-50			
620.0 DOLOMITE: Light to dark gray, slightly to moderately weathered, massive, fine grained, moderately to highly fractured, thin to thick bedded trace - vugs, stylolites, chert Recovery = 99% RQD = 62.5% (Fair)			1309	
	-55			
	-60			
	-65			
	-70			
	-75			
	-80			
610.0 **END OF BORING** MDD - Meximum Dry Density OMC - Optimum Moisture Content				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge and S-Shear on Rimac/Shelby Tube (ST), P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

SOIL BORING LOG

Date 12/3/15

PROJECT BRM-4003 (508) **DESCRIPTION** St. Charles Road Bridge over Salt Creek **LOGGED BY** K. Krug

ROUTE FAU 1397 (St. Charles Road) **SECTION** 15-00094-00-BR **LOCATION** SE 1/4 **SEC.** 3 **TWP.** 39N **RNG.** 11E **PM.** 3rd

COUNTY DuPage **DRILLING METHOD** Mud Rotary below Creek Bed **HAMMER TYPE** Automatic

STRUCT. NO. 0226950
Station
BORING NO. B-2
Station
Offset
Northing 1,902,768.96
Easting 1,084,803.60
Ground Surface Elev. 671.9 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter Mud Rotary ft
Upon Completion Mud Rotary ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				CONCRETE PAVEMENT
				670.8
				Casing: Bridge deck/sidewalk to creekbed
-5				
-10				
				656.9
-15	2			Loose, Gray SAND and Gravel
	2		17	Grain Size
	2			LL=28, PI=7, A-2-4(0)
				655.4
	3			Very Stiff, Gray LOAM
	2			trace - shells
	3	2.00P	17	little - gravel
	4			Grain Size
	4			LL=38, PI=17, A-6(7)
				652.9
	1			Very Loose to Loose, Gray
-20	1		25	SANDY LOAM
				651.9
	2			trace to little - organics
	2			Grain Size
	2			650.9
	3		22	LL=31, PI=7, A-2-4(0)
	4			Loose to Medium Dense, Gray
				SILTY LOAM
				trace - gravel
	2			Grain Size
	4		14	LL=22, PI=3, A-4(0)
-25	6			
				646.4
	11			Dense, Gray Medium SAND
	15		20	
	15			
				643.9
	20			Medium Dense to Extremely
	15		10	Dense, Gray SANDY LOAM
-30	12			some - gravel
	25			
	50/5"		11	639.9
	14			Dense, Gray Medium SAND
	18		23	
-35	20			
	18			
	22		24	
	10			
				633.4
	24			Medium Dense, Gray LOAM
	11		8	trace - gravel
-40	14			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge and S-Shear on Rimac/Shelby Tube (ST), P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

SOIL BORING LOG

Date 12/3/15

PROJECT BRM-4003 (508) **DESCRIPTION** St. Charles Road Bridge over Salt Creek **LOGGED BY** K. Krug

ROUTE FAU 1397 (St. Charles Road) **SECTION** 15-00094-00-BR **LOCATION** SE 1/4 **SEC.** 3 **TWP.** 39N **RNG.** 11E **PM.** 3rd

COUNTY DuPage **DRILLING METHOD** Mud Rotary below Creek Bed **HAMMER TYPE** Automatic

STRUCT. NO. 0226950
Station
BORING NO. B-2
Station
Offset
Northing 1,902,768.96
Easting 1,084,803.60
Ground Surface Elev. 671.9 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter Mud Rotary ft
Upon Completion Mud Rotary ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Medium Dense, Gray LOAM trace - gravel *(continued)*		4		
		5 7		13
	628.9			
Stiff, Gray CLAY LOAM trace - gravel		5		
		6 7	1.24_B	14
	-45			
	624.9			
Dense, Gray SILTY LOAM some - gravel		33		
		24 20		11
	-50			
	619.9			
Extremely Dense, Gray SANDY LOAM some - gravel		50/5"		
				12
	616.9 -55			
DOLOMITE: Light to dark gray, massive, fine grained, thin to thick bedded, moderately to intensly fractured, hard, slightly weathered trace - vugs, stylolites, chert Recovery = 100.0% RQD = 83.0% (Good)			810	
	611.9 -60			
	606.9 -65			
END OF BORING				
	-70			
	-75			
	-80			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge and S-Shear on Rimac/Shelby Tube (ST), P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

SOIL BORING LOG

Date 11/24/15

PROJECT BRM-4003 (508) **DESCRIPTION** St. Charles Road Bridge over Salt Creek **LOGGED BY** K. Krug

ROUTE FAU 1397 (St. Charles Road) **SECTION** 15-00094-00-BR **LOCATION** SE 1/4 **SEC.** 3 **TWP.** 39N **RNG.** 11E **PM.** 3rd

COUNTY DuPage **DRILLING METHOD** Solid Stem Auger / Mud Rotary below 12.5 feet **HAMMER TYPE** Automatic

STRUCT. NO. 0226950
Station
BORING NO. B-3
Station
Offset
Northing 1,902,759.65
Easting 1,084,859.85
Ground Surface Elev. 661.4 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 654.4 (7.0) ft ▽
Upon Completion Mud Rotary ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				TOPSOIL with Gravel
660.4				
	3			Very Soft to Very Stiff, Black CLAY LOAM
	5	2.00P	22	trace - organics, roots, gravel
	5			
	1			Grain Size
	2	0.25P	32	LL=41, PI=20, A-6(10)
656.4 -5	2			
	1			Brown and Gray from 5 to 7 feet
	3	1.65B	20	Grain Size
	5			LL=32, PI=13, A-6(8)
654.4 ▽	7			
	3			Gray below 7 feet
	5	3.30B	16	
	5			
	10			
	5			
-10	8	1.48B	20	
	8			
	9			
	0			
	1	1.07B	14	
	4			
648.4				
	2			Loose, Gray LOAM
	2		18	trace - gravel
-15	3			
645.9				
	2			Medium Stiff to Stiff, Gray CLAY LOAM
	2	0.58B	15	trace - gravel
	3			
		1.52ST	13	Dry Density=125 pcf
-20				
640.9				
	13			Medium Dense, Gray SANDY LOAM
	14		11	some - Gravel
	12			
638.4				
	10			Medium Dense to Dense, Gray SAND
	15		22	
-25	17			
	15			
	15		23	
	10			
633.4				
	2			Loose to Medium Dense, Gray LOAM
	3		17	trace - gravel
-30	3			
	6			
	6		11	
-35	8			
624.4				
	34			Very Dense to Extremely Dense, Gray SILTY LOAM
	28		9	some - gravel
-40	39			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge and S-Shear on Rimac/Shelby Tube (ST), P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

SOIL BORING LOG

Date 11/24/15

PROJECT BRM-4003 (508) **DESCRIPTION** St. Charles Road Bridge over Salt Creek **LOGGED BY** K. Krug

ROUTE FAU 1397 (St. Charles Road) **SECTION** 15-00094-00-BR **LOCATION** SE 1/4 **SEC.** 3 **TWP.** 39N **RNG.** 11E **PM.** 3rd

COUNTY DuPage **DRILLING METHOD** Solid Stem Auger / Mud Rotary below 12.5 feet **HAMMER TYPE** Automatic

STRUCT. NO. 0226950
Station
BORING NO. B-3
Station
Offset
Northing 1,902,759.65
Easting 1,084,859.85
Ground Surface Elev. 661.4 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 654.4 (7.0) ft ▽
Upon Completion Mud Rotary ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Dense to Extremely Dense, Gray SILTY LOAM some - gravel *(continued)*		15		
	-45	13 50/4"		13
615.4				
DOLOMITE: Light to dark gray, massive, fine grained, thin to medium bedded, moderately to intensly fractured, hard, slightly to moderately weathered trace - vugs, stylolites, chert Recovery = 97.5% RQD = 79.0% (Good)	-50		847	
	-55			
605.4				
END OF BORING	-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge and S-Shear on Rimac/Shelby Tube (ST), P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

SOIL BORING LOG

Date 12/1/15

PROJECT BRM-4003 (508) **DESCRIPTION** St. Charles Road Bridge over Salt Creek **LOGGED BY** K. Krug

ROUTE FAU 1397 (St. Charles Road) **SECTION** 15-00094-00-BR **LOCATION** SE 1/4 **SEC.** 3 **TWP.** 39N **RNG.** 11E **PM.** 3rd

COUNTY DuPage **DRILLING METHOD** Solid Stem Auger / Mud Rotary below 15 feet **HAMMER TYPE** Automatic

STRUCT. NO. 0226950
Station
BORING NO. B-4
Station
Offset
Northing 1,902,780.79
Easting 1,084,895.61
Ground Surface Elev. 670.7 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 655.7 (15.0) ft ▽
Upon Completion Mud Rotary ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
670.5				ASPHALT PAVEMENT
669.4				CONCRETE PAVEMENT
	12			Stiff, Brown and Black CLAY LOAM trace - gravel
	13		20	
	10			
	6			Grain Size LL=45, PI=23, A-7-6(11)
	4	1.90B	22	
-5	7			
	2			
	2			FILL
663.5	2	1.24B	20	
			18	Loose, Brown SAND some - gravel, miscellaneous fill
	2			
	2		19	
-10	2			FILL
660.2				Stiff, Black SILTY CLAY trace - organics
	2			
	2	1.24B	23	
657.2				Loose to Medium Dense, Brown and Gray LOAM trace - gravel
	4			
	3		19	
▽-15	3			
	9			
	11			
	11			
652.7				Gray below 18 feet
	3			
	4		21	
650.7 -20	6			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Medium Stiff, Gray CLAY LOAM trace - gravel
	2			
	3	0.50P	25	
648.2	7			
				Loose, Gray LOAM trace - gravel
	2			
	3		16	
-25	4			
645.2				Very Stiff, Gray SILTY CLAY trace - gravel
	8			
	9	2.00P	15	
	14			
642.7				Medium Dense, Gray SILTY LOAM trace - gravel
	8			
	9		17	
-30	9			
638.7				Medium Dense, Gray Medium SAND
	11			
	13		24	
-35	14			
633.7				Medium Dense, Gray LOAM trace - gravel
	3			
	3		17	
-40	7			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge and S-Shear on Rimac/Shelby Tube (ST), P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

SOIL BORING LOG

Date 12/1/15

PROJECT BRM-4003 (508) **DESCRIPTION** St. Charles Road Bridge over Salt Creek **LOGGED BY** K. Krug

ROUTE FAU 1397 (St. Charles Road) **SECTION** 15-00094-00-BR **LOCATION** SE 1/4 **SEC.** 3 **TWP.** 39N **RNG.** 11E **PM.** 3rd

COUNTY DuPage **DRILLING METHOD** Solid Stem Auger / Mud Rotary below 15 feet **HAMMER TYPE** Automatic

STRUCT. NO. 0226950
Station
BORING NO. B-4
Station
Offset
Northing 1,902,780.79
Easting 1,084,895.61
Ground Surface Elev. 670.7 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 655.7 (15.0) ft ▽
Upon Completion Mud Rotary ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Medium Dense, Gray LOAM trace - gravel *(continued)*
628.7				
				Medium Dense to Dense, Gray SILTY LOAM trace - gravel
	6			
	13		11	
-45	5			
	25			
	21		10	
-50	23			
618.9				
				DOLOMITE: Light to dark gray, fine grained, massive, thin to thick bedded, moderately to highly fractured, hard, slightly to moderately weathered trace - vugs, stylolites, chert
		1309		
				Recovery = 98.0% RQD = 62.0% (Fair)
-55				
-60				
-65				
-70				
-75				
-80				
608.9				**END OF BORING**

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge and S-Shear on Rimac/Shelby Tube (ST), P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

LABORATORY TEST DATA

PARTICLE SIZE ANALYSIS
&
ATTERBERG LIMITS

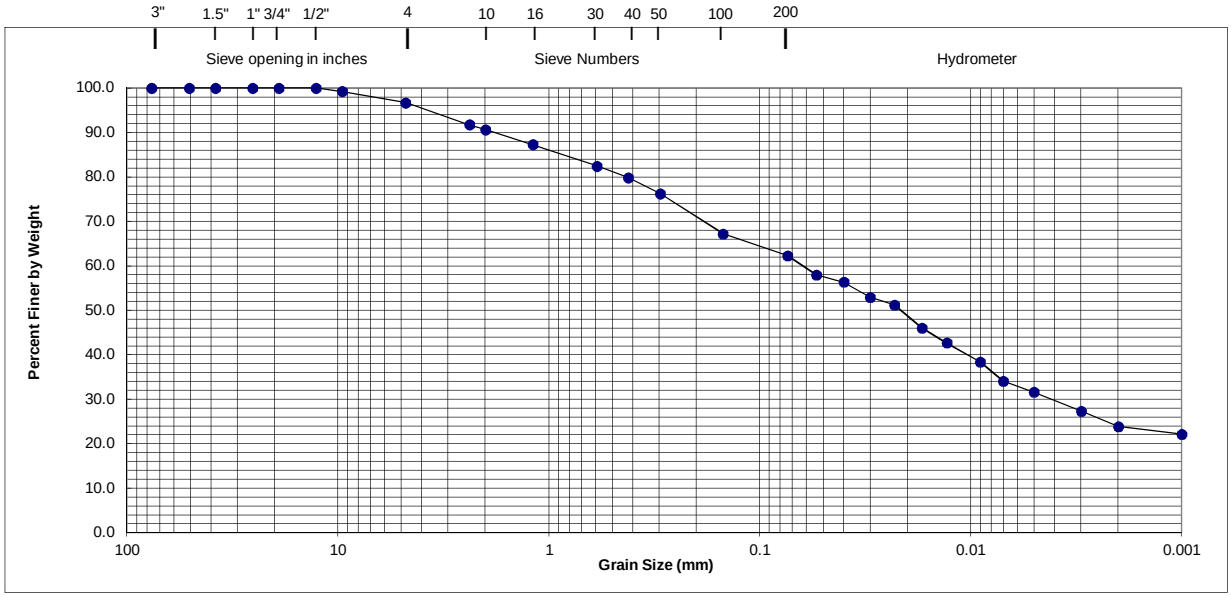
EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

Project: ST. CHARLES ROAD OVER SALT CREEK
Client: V3 COMPANIES OF ILLINOIS LTD.
Location: DEPAGE COUNTY, ILLINOIS
Job No: 1264 **Date:** 12/17/2015

Boring No: B-1 **Sample No:** Bag-1 **Depth (ft):** 3-8

Soil Description: BROWN AND BLACK CLAY LOAM / A-6(10)
(IDH/AASHTO Classification)

PARTICLE SIZE ANALYSIS OF SOIL (AASHTO T 88)



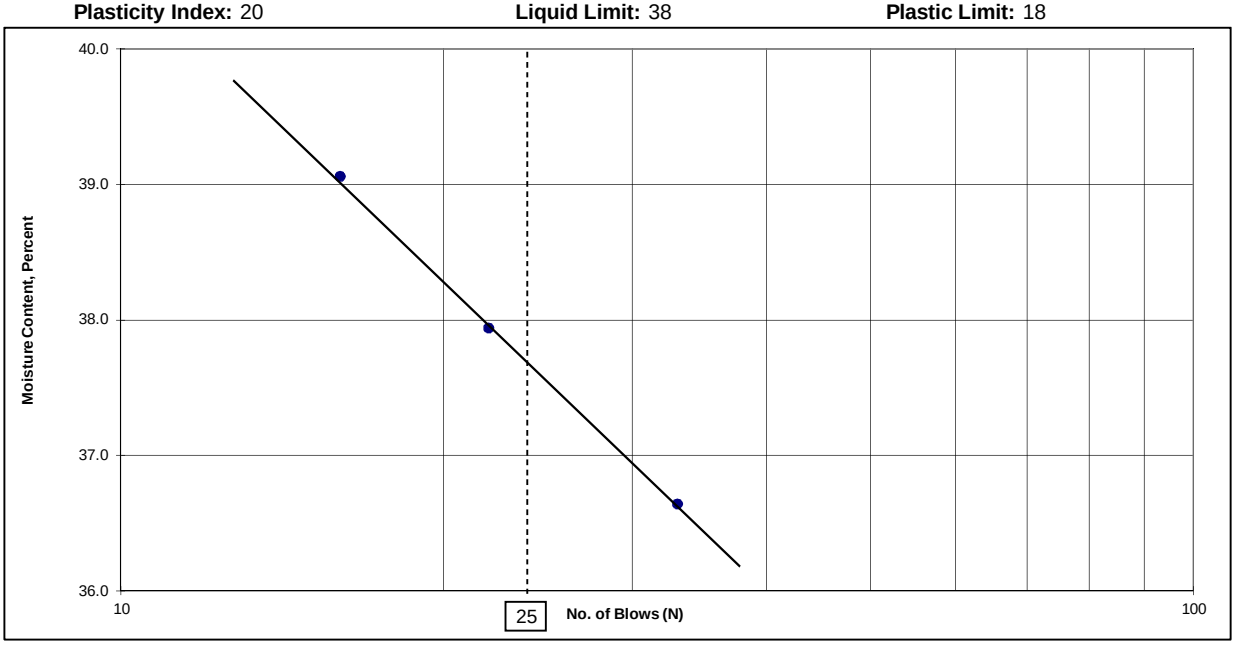
UNIFIED	GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	FINES	
AASHTO	GRAVEL		COARSE SAND	FINE SAND	SILT	CLAY
IDH	GRAVEL		SAND		SILT	CLAY

Gravel: 9.3% **Sand:** 28.4% **Silt:** 38.4% **Clay:** 23.9%

ATTERBERG LIMITS (AASHTO T 89 and T 90)

Preparation Method: AIR DRY **Estimated Retained on No. 40 Sieve (%):** 20.2

Plasticity Index: 20 **Liquid Limit:** 38 **Plastic Limit:** 18



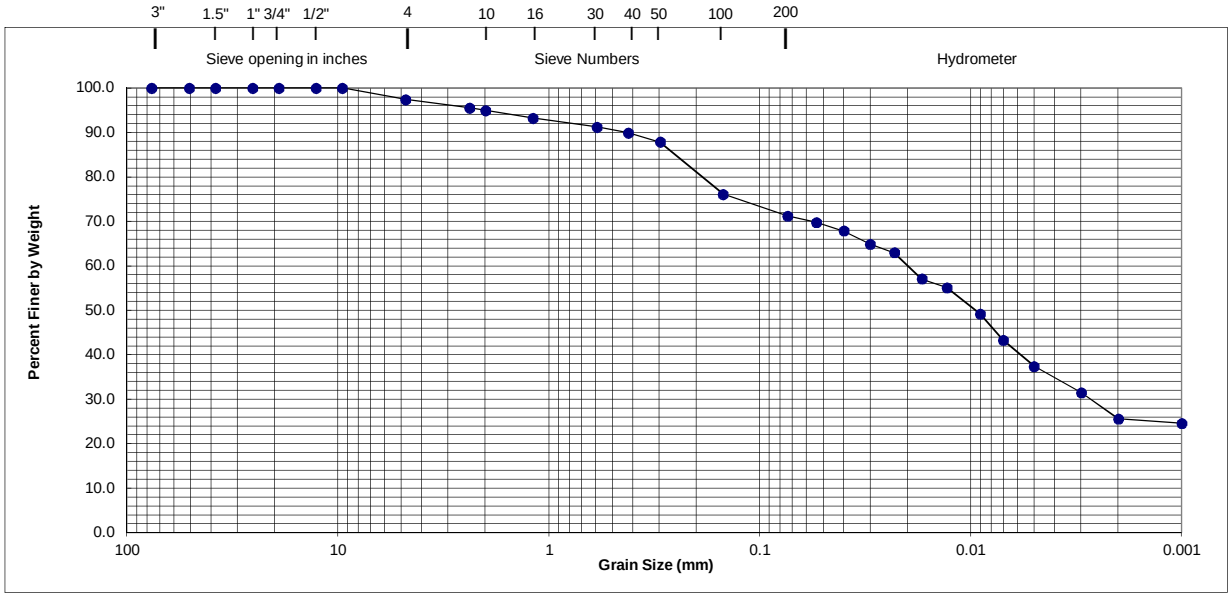
EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

Project: ST. CHARLES ROAD OVER SALT CREEK
Client: V3 COMPANIES OF ILLINOIS LTD.
Location: DEPAGE COUNTY, ILLINOIS
Job No: 1264 **Date:** 12/17/2015

Boring No: B-1 **Sample No:** SS-3 **Depth (ft):** 6-7.5

Soil Description: BROWN AND BLACK CLAY LOAM / A-6(11)
(IDH/AASHTO Classification)

PARTICLE SIZE ANALYSIS OF SOIL (AASHTO T 88)



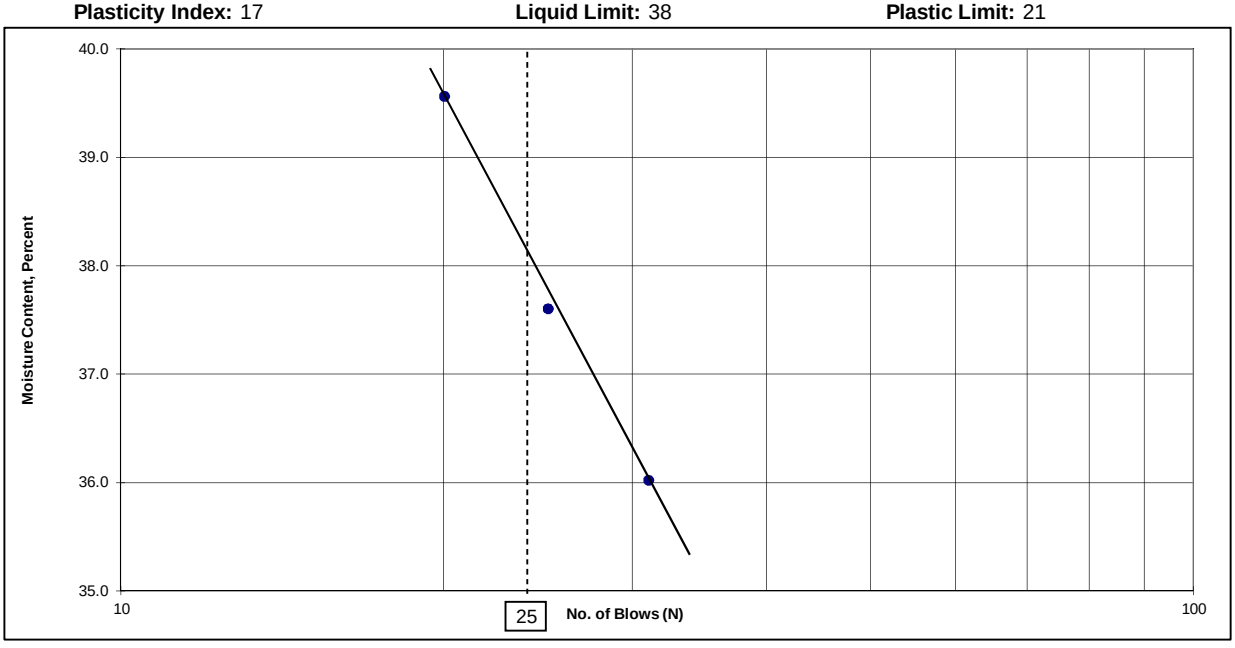
UNIFIED	GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	FINES	
AASHTO	GRAVEL		COARSE SAND	FINE SAND	SILT	CLAY
IDH	GRAVEL		SAND		SILT	CLAY

Gravel: 5.1% **Sand:** 23.7% **Silt:** 45.7% **Clay:** 25.6%

ATTERBERG LIMITS (AASHTO T 89 and T 90)

Preparation Method: AIR DRY **Estimated Retained on No. 40 Sieve (%):** 10.1

Plasticity Index: 17 **Liquid Limit:** 38 **Plastic Limit:** 21



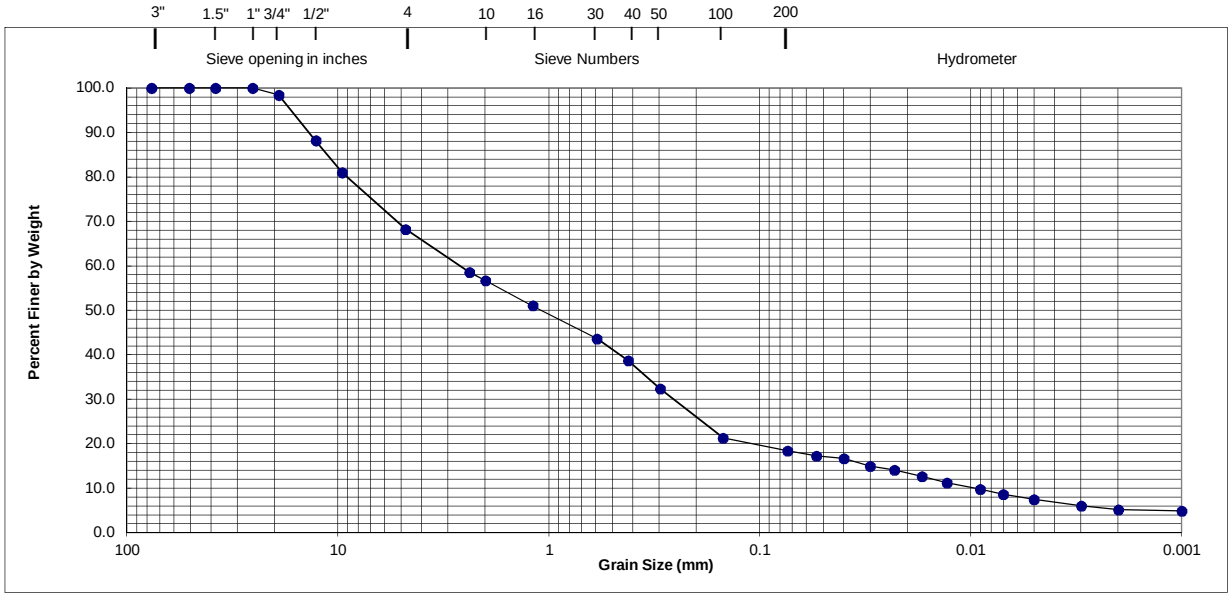
EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

Project: ST. CHARLES ROAD OVER SALT CREEK
Client: V3 COMPANIES OF ILLINOIS LTD.
Location: DEPAGE COUNTY, ILLINOIS
Job No: 1264 **Date:** 12/17/2015

Boring No: B-2 **Sample No:** SS-1 **Depth (ft):** 15-16.5

Soil Description: GRAY SAND / A-2-4(0)
(IDH/AASHTO Classification)

PARTICLE SIZE ANALYSIS OF SOIL (AASHTO T 88)



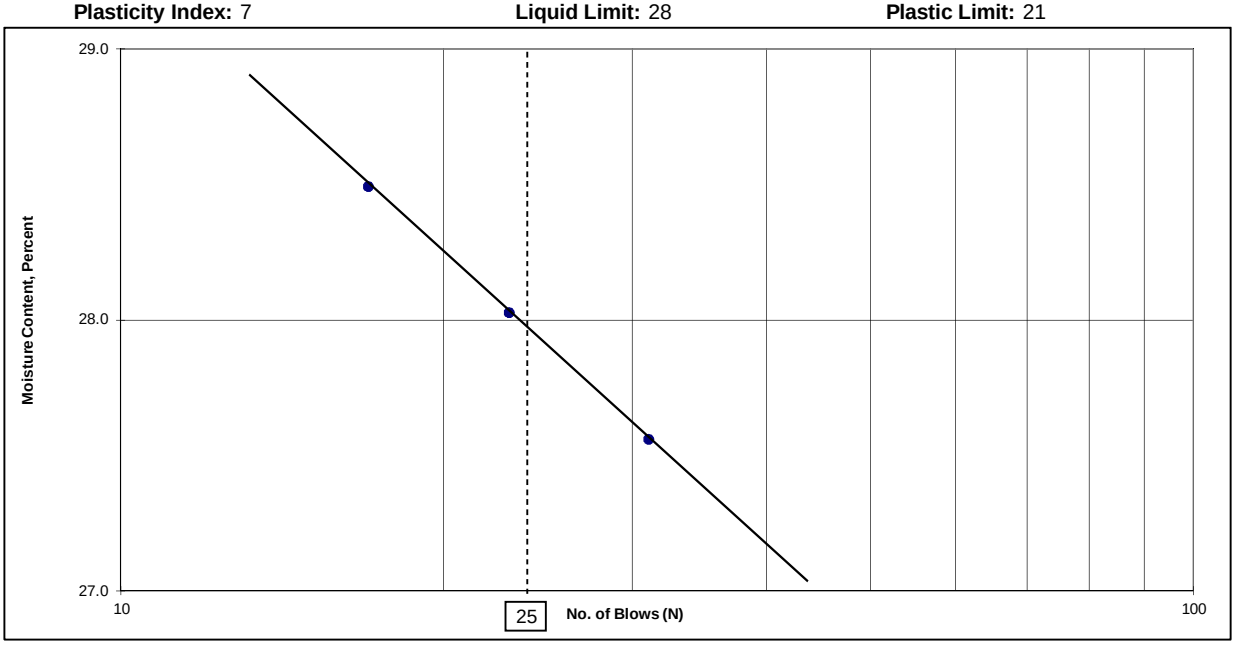
UNIFIED	GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	FINES	
AASHTO	GRAVEL		COARSE SAND	FINE SAND	SILT	CLAY
IDH	GRAVEL		SAND		SILT	CLAY

Gravel: 43.3% **Sand:** 38.3% **Silt:** 13.2% **Clay:** 5.2%

ATTERBERG LIMITS (AASHTO T 89 and T 90)

Preparation Method: AIR DRY **Estimated Retained on No. 40 Sieve (%):** 61.3

Plasticity Index: 7 **Liquid Limit:** 28 **Plastic Limit:** 21



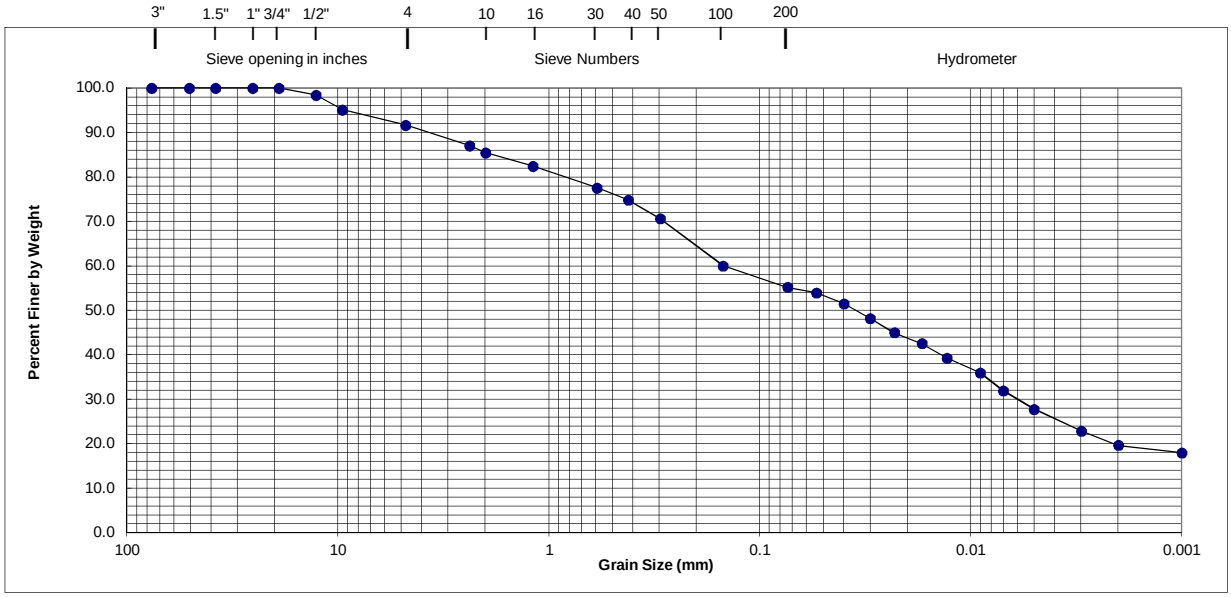
EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

Project: ST. CHARLES ROAD OVER SALT CREEK
Client: V3 COMPANIES OF ILLINOIS LTD.
Location: DEPAGE COUNTY, ILLINOIS
Job No: 1264 **Date:** 12/17/2015

Boring No: B-2 **Sample No:** SS-2 **Depth (ft):** 16.5-18

Soil Description: GRAY LOAM / A-6(7)
(IDH/AASHTO Classification)

PARTICLE SIZE ANALYSIS OF SOIL (AASHTO T 88)



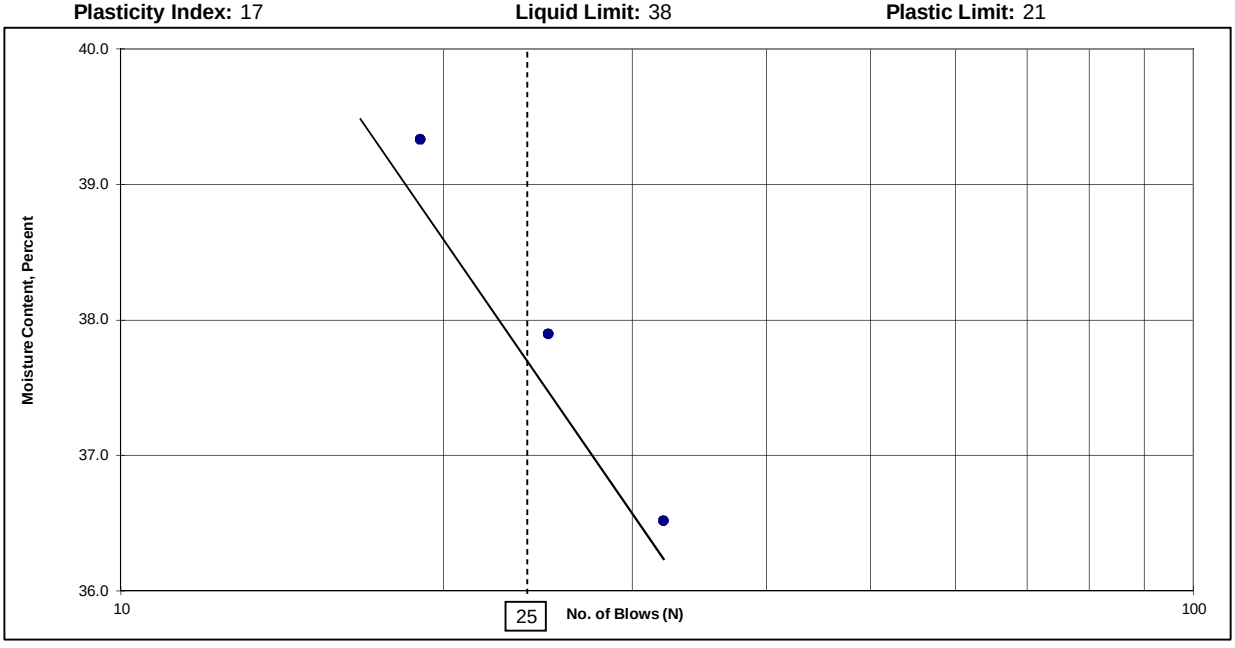
UNIFIED	GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	FINES	
AASHTO	GRAVEL		COARSE SAND	FINE SAND	SILT	CLAY
IDH	GRAVEL		SAND		SILT	CLAY

Gravel: 14.6% **Sand:** 30.3% **Silt:** 35.5% **Clay:** 19.6%

ATTERBERG LIMITS (AASHTO T 89 and T 90)

Preparation Method: AIR DRY **Estimated Retained on No. 40 Sieve (%):** 25.2

Plasticity Index: 17 **Liquid Limit:** 38 **Plastic Limit:** 21



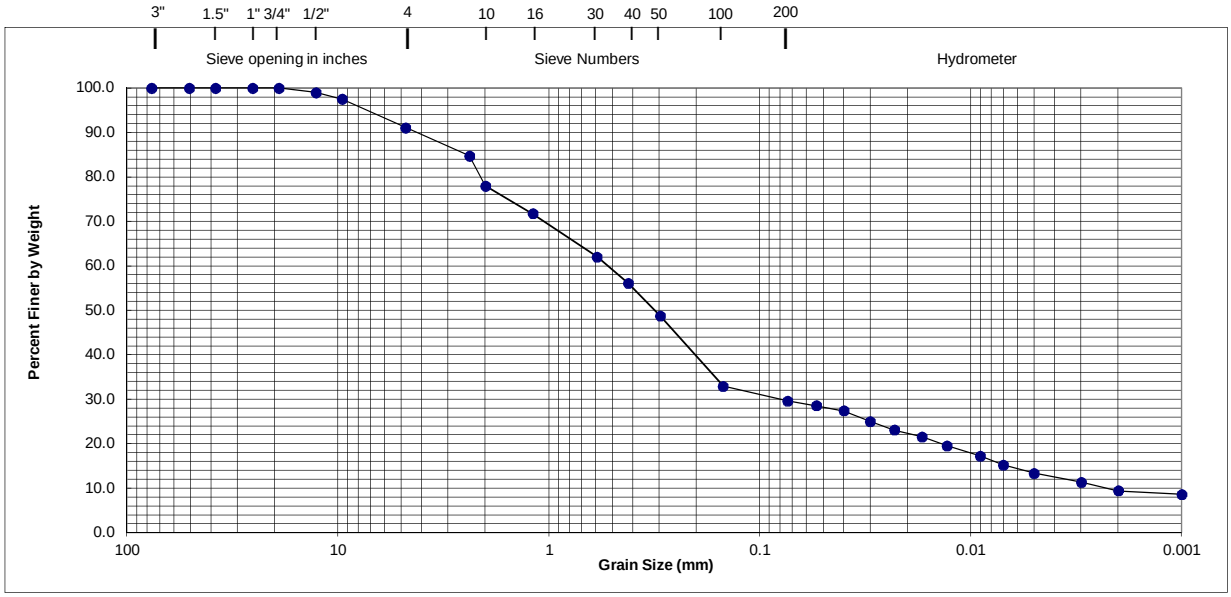
EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

Project: ST. CHARLES ROAD OVER SALT CREEK
Client: V3 COMPANIES OF ILLINOIS LTD.
Location: DEPAGE COUNTY, ILLINOIS
Job No: 1264 **Date:** 12/17/2015

Boring No: B-2 **Sample No:** SS-3 **Depth (ft):** 19-21

Soil Description: GRAY SANDY LOAM / A-2-4(0)
(IDH/AASHTO Classification)

PARTICLE SIZE ANALYSIS OF SOIL (AASHTO T 88)



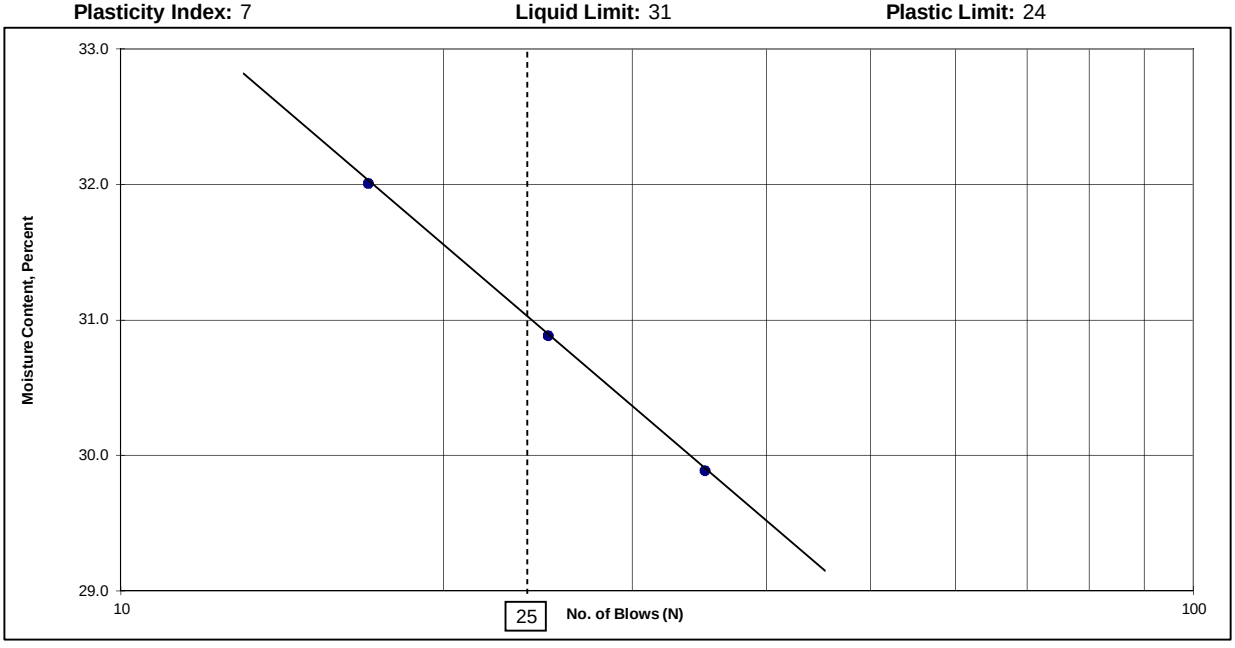
UNIFIED	GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	FINES	
AASHTO	GRAVEL		COARSE SAND	FINE SAND	SILT	CLAY
IDH	GRAVEL		SAND		SILT	CLAY

Gravel: 22.0% **Sand:** 48.4% **Silt:** 20.2% **Clay:** 9.4%

ATTERBERG LIMITS (AASHTO T 89 and T 90)

Preparation Method: AIR DRY **Estimated Retained on No. 40 Sieve (%):** 43.9

Plasticity Index: 7 **Liquid Limit:** 31 **Plastic Limit:** 24



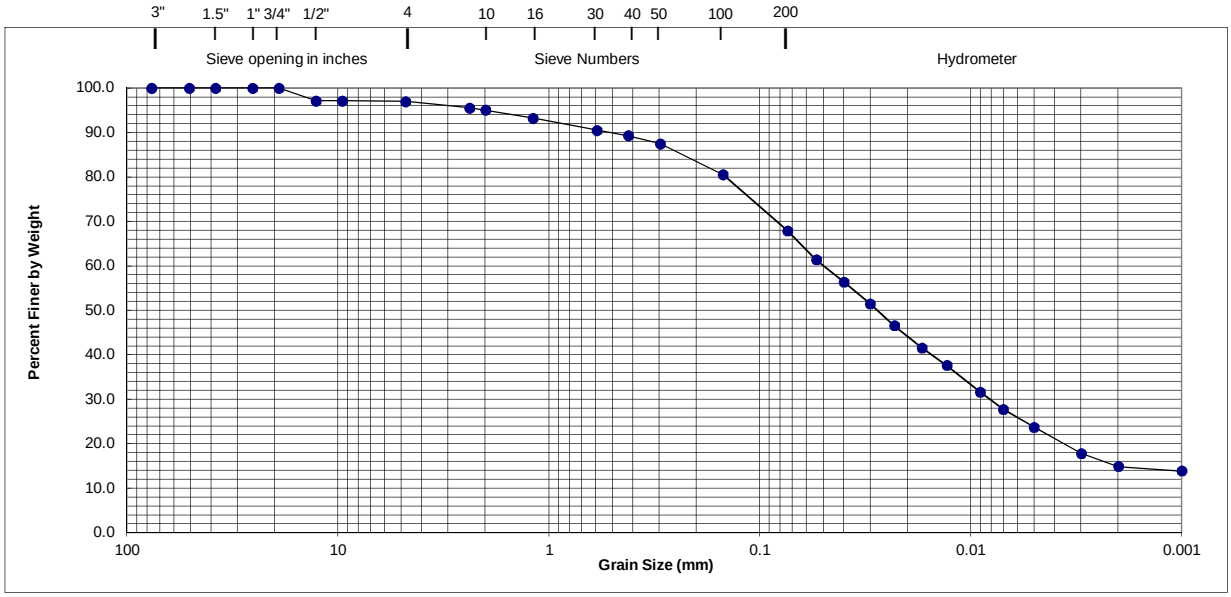
EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

Project: ST. CHARLES ROAD OVER SALT CREEK
Client: V3 COMPANIES OF ILLINOIS LTD.
Location: DEPAGE COUNTY, ILLINOIS
Job No: 1264 **Date:** 12/17/2015

Boring No: B-2 **Sample No:** SS-11 **Depth (ft):** 21-22.5

Soil Description: GRAY SILTY LOAM / A-4(0)
(IDH/AASHTO Classification)

PARTICLE SIZE ANALYSIS OF SOIL (AASHTO T 88)



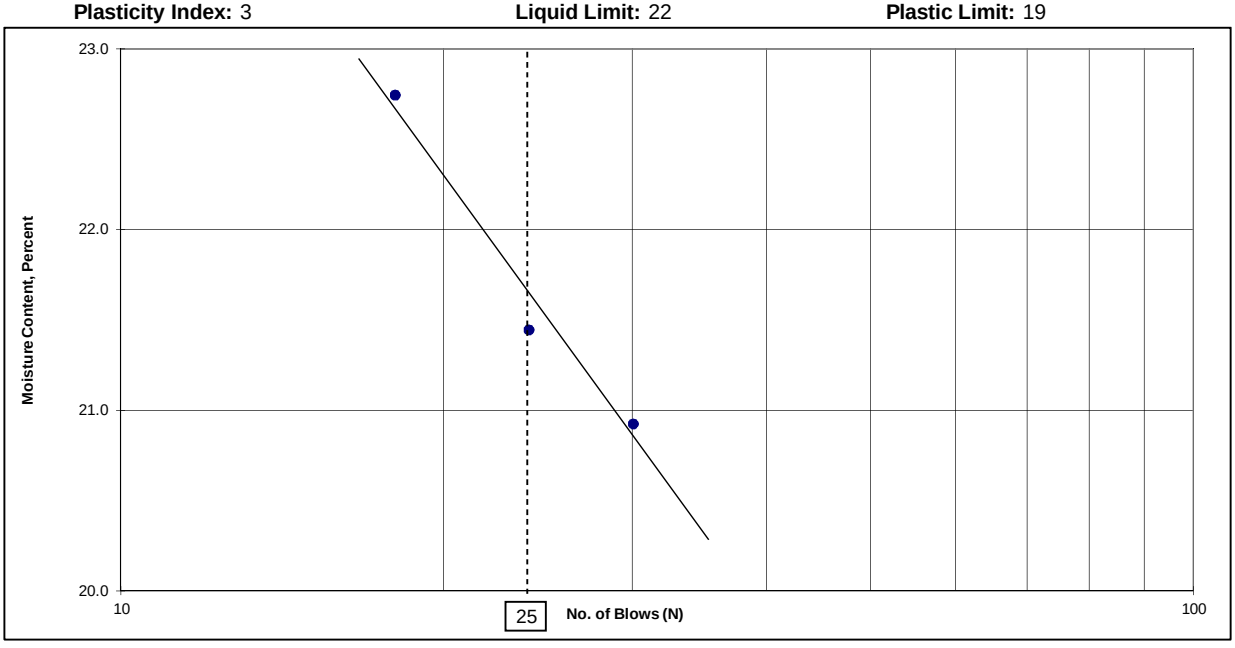
UNIFIED	GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	FINES	
AASHTO	GRAVEL		COARSE SAND	FINE SAND	SILT	CLAY
IDH	GRAVEL		SAND		SILT	CLAY

Gravel: 4.9% **Sand:** 27.1% **Silt:** 53.1% **Clay:** 14.8%

ATTERBERG LIMITS (AASHTO T 89 and T 90)

Preparation Method: AIR DRY **Estimated Retained on No. 40 Sieve (%):** 10.7

Plasticity Index: 3 **Liquid Limit:** 22 **Plastic Limit:** 19



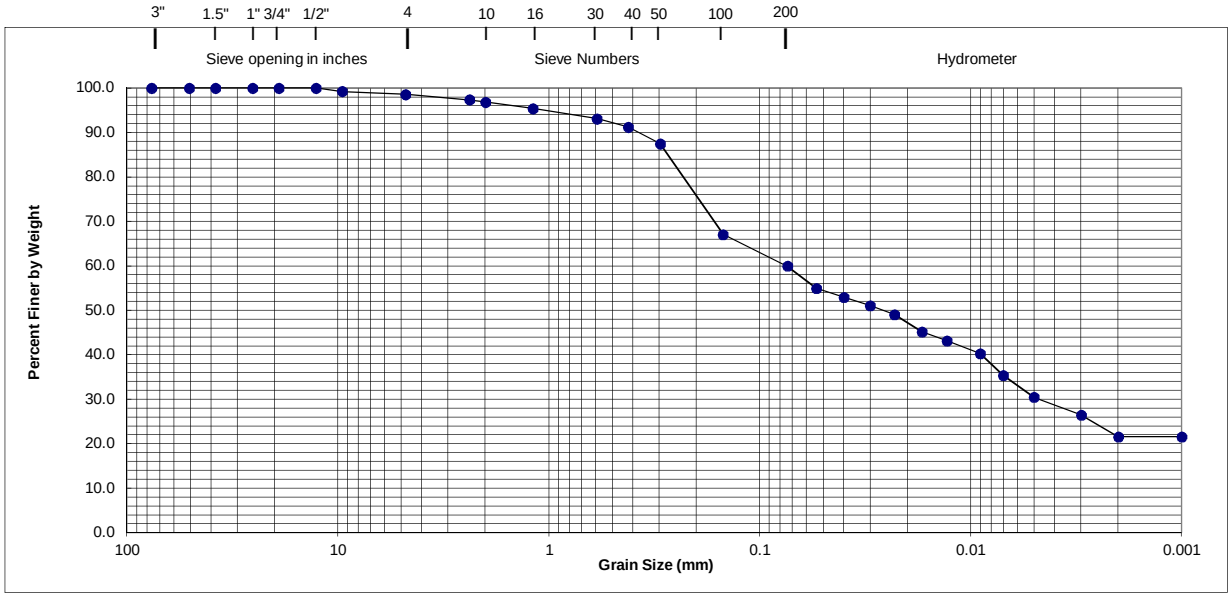
EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

Project: ST. CHARLES ROAD OVER SALT CREEK
Client: V3 COMPANIES
Location: DEPAGE COUNTY, ILLINOIS
Job No: 1264 **Date:** 12/17/2015

Boring No: B-3 **Sample No:** SS-2 **Depth (ft):** 3.5-5

Soil Description: BLACK CLAY LOAM / A-6(10)
(IDH/AASHTO Classification)

PARTICLE SIZE ANALYSIS OF SOIL (AASHTO T 88)



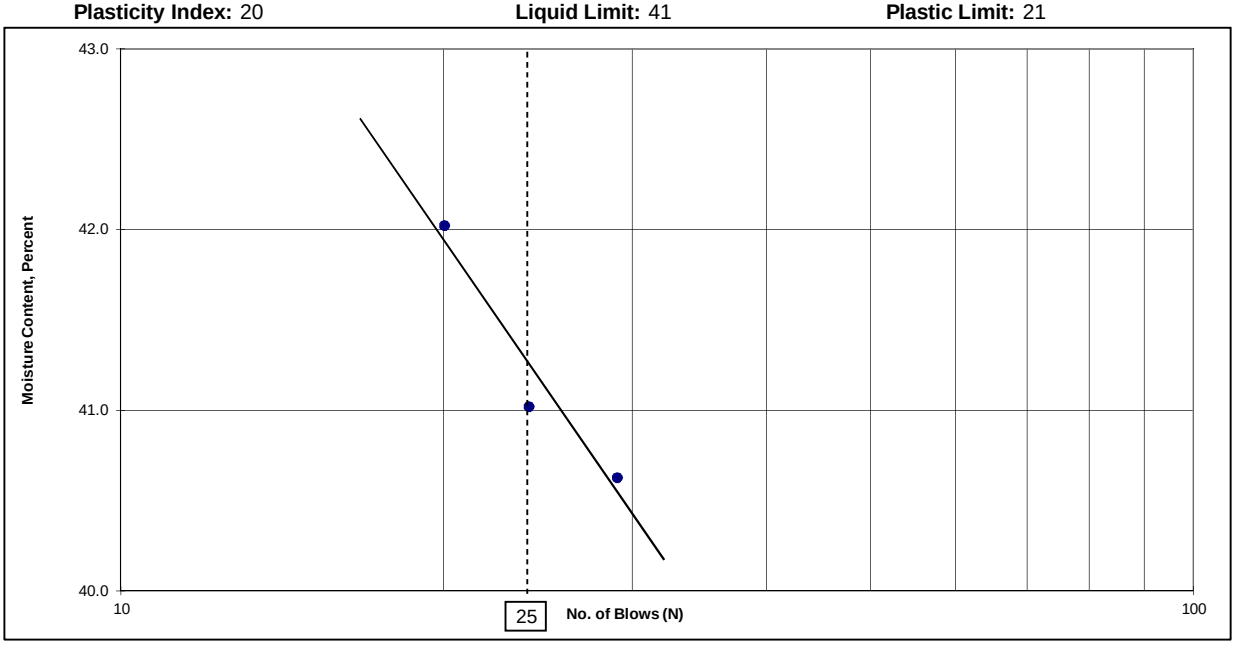
UNIFIED	GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	FINES	
AASHTO	GRAVEL		COARSE SAND	FINE SAND	SILT	CLAY
IDH	GRAVEL		SAND		SILT	CLAY

Gravel: 3.2% **Sand:** 36.9% **Silt:** 38.3% **Clay:** 21.6%

ATTERBERG LIMITS (AASHTO T 89 and T 90)

Preparation Method: AIR DRY **Estimated Retained on No. 40 Sieve (%):** 8.8

Plasticity Index: 20 **Liquid Limit:** 41 **Plastic Limit:** 21



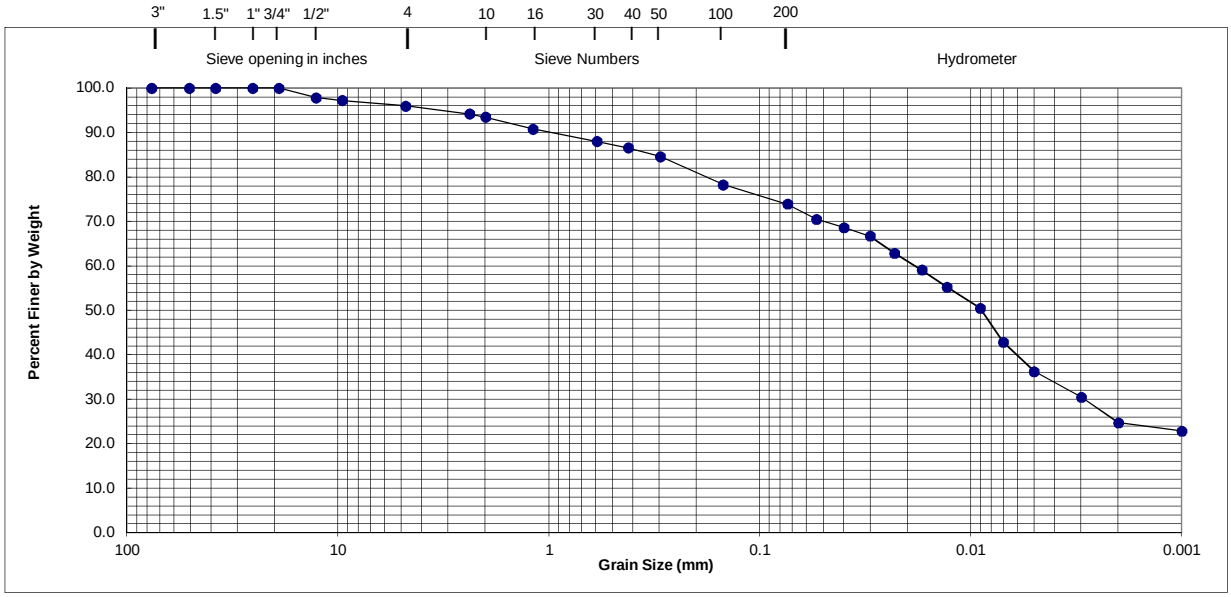
EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

Project: ST. CHARLES ROAD OVER SALT CREEK
Client: V3 COMPANIES OF ILLINOIS LTD.
Location: DEPAGE COUNTY, ILLINOIS
Job No: 1264 **Date:** 12/17/2015

Boring No: B-3 **Sample No:** SS-3 **Depth (ft):** 5-7

Soil Description: BROWN AND GRAY CLAY LOAM / A-6(8)
(IDH/AASHTO Classification)

PARTICLE SIZE ANALYSIS OF SOIL (AASHTO T 88)



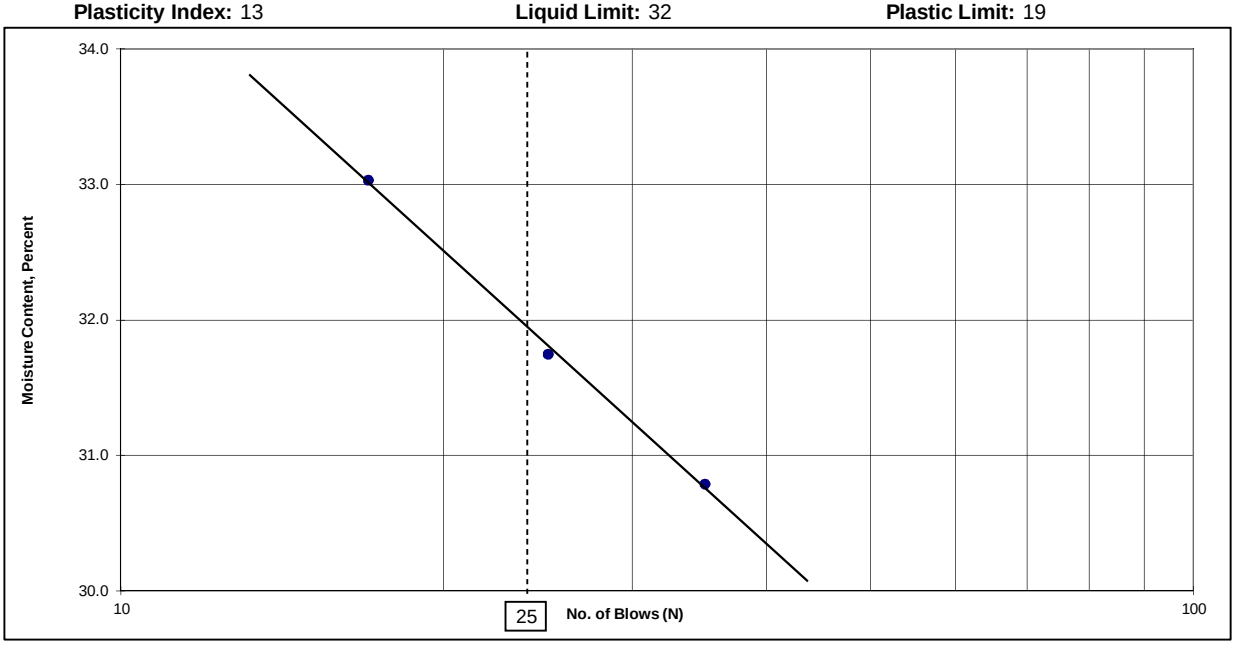
UNIFIED	GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	FINES	
AASHTO	GRAVEL		COARSE SAND	FINE SAND	SILT	CLAY
IDH	GRAVEL		SAND		SILT	CLAY

Gravel: 6.5% **Sand:** 19.6% **Silt:** 49.1% **Clay:** 24.8%

ATTERBERG LIMITS (AASHTO T 89 and T 90)

Preparation Method: AIR DRY **Estimated Retained on No. 40 Sieve (%):** 13.4

Plasticity Index: 13 **Liquid Limit:** 32 **Plastic Limit:** 19



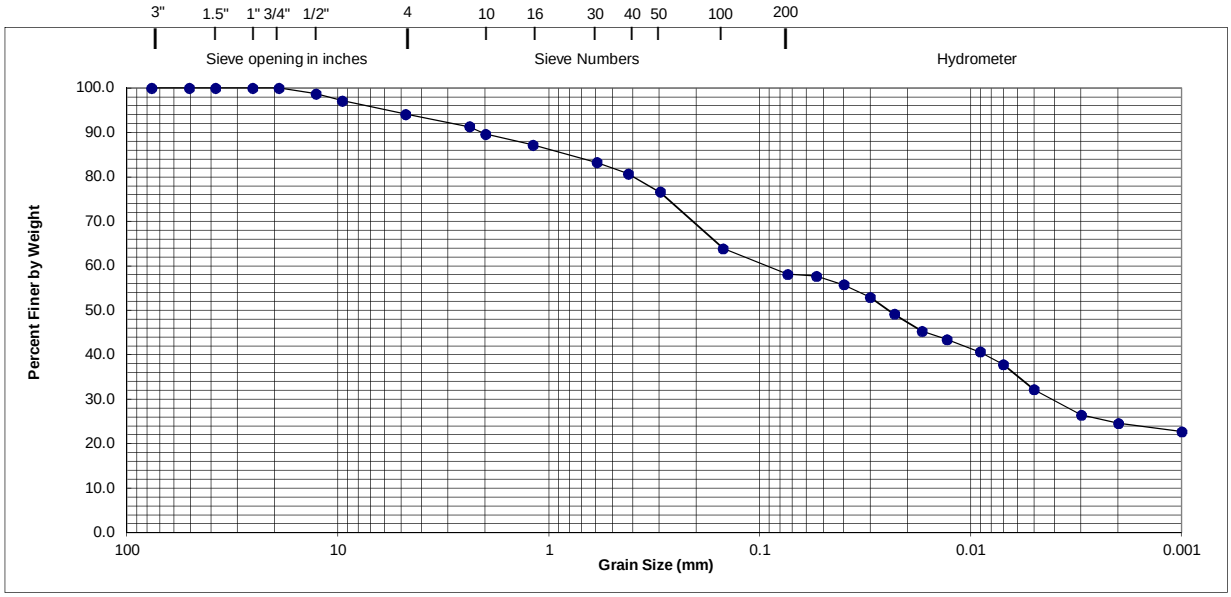
EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

Project: ST. CHARLES ROAD OVER SALT CREEK
Client: V3 COMPANIES OF ILLINOIS LTD.
Location: DEPAGE COUNTY, ILLINOIS
Job No: 1264 **Date:** 12/17/2015

Boring No: B-4 **Sample No:** SS-2 **Depth (ft):** 3.5-5

Soil Description: BLACK AND BROWN CLAY LOAM / A-7-6(11)
(IDH/AASHTO Classification)

PARTICLE SIZE ANALYSIS OF SOIL (AASHTO T 88)



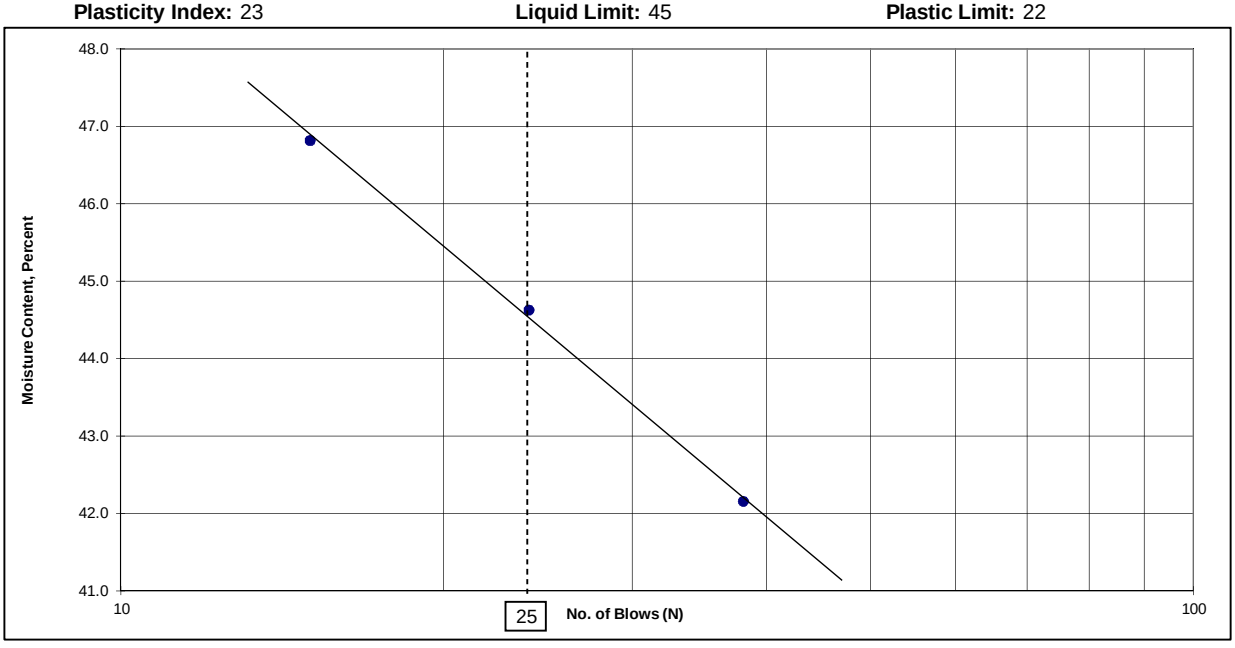
UNIFIED	GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	FINES	
AASHTO	GRAVEL		COARSE SAND	FINE SAND	SILT	CLAY
IDH	GRAVEL		SAND		SILT	CLAY

Gravel: 10.3% **Sand:** 31.6% **Silt:** 33.5% **Clay:** 24.6%

ATTERBERG LIMITS (AASHTO T 89 and T 90)

Preparation Method: AIR DRY **Estimated Retained on No. 40 Sieve (%):** 19.3

Plasticity Index: 23 **Liquid Limit:** 45 **Plastic Limit:** 22



UNCONFINED COMPRESSIVE STRENGTH (SOIL)

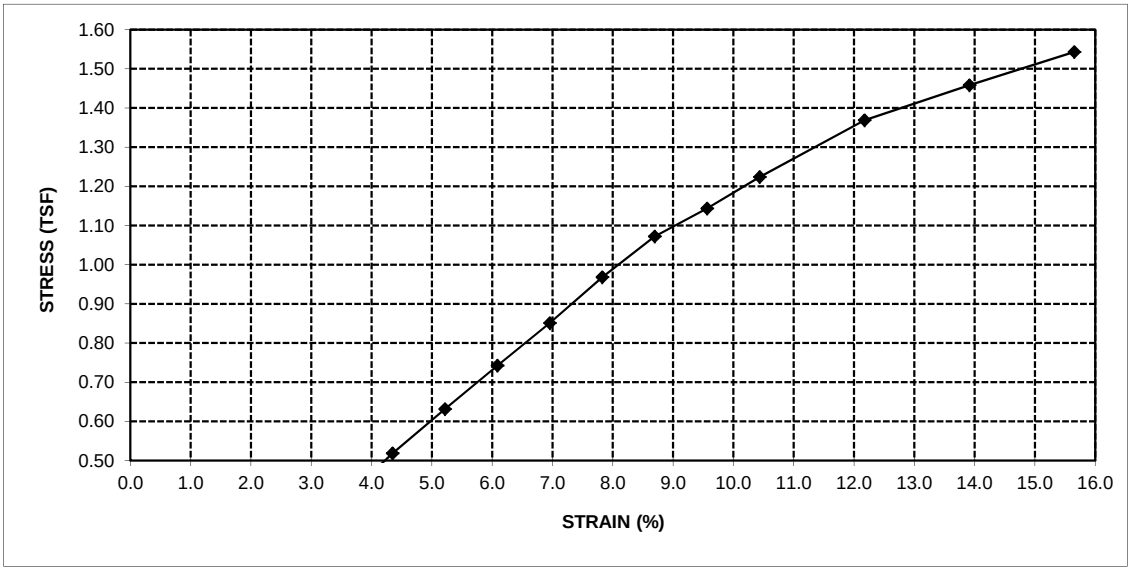
EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOIL (AASHTO T 208)

Project: St. Charles Road over Salt Creek
Location: DuPage County, Illinois
Client : V3 Companies of Illinois Ltd.
Boring No. : B-1
Soil Description : Gray Clay Loam
Moisture Content (%) : 17
Dry Density (pcf): 115
Unconfined Compressive Strength (tsf) : 1.50
Strain at Failure: 15.0%

Date: 12/1/2015
Job No.: 1264
Sample No. : ST-8
Sample Depth : 18.5'-20.5'
Test Depth : 19'-19.5'
Initial Diameter (in.): 2.85
Initial Height (in.): 5.75
Height -to-Diameter Ratio: 2.02
Strain Rate (in/min): 0.1

TIME (MINUTES)	LOAD (LB)	CORRECTED AREA (SQ. FT.)	STRAIN (%)	STRESS (TSF)
0.0	0	0.0443	0.0	0.00
1.0	17	0.0451	1.7	0.19
1.5	26	0.0455	2.6	0.29
2.0	36	0.0459	3.5	0.39
2.5	48	0.0463	4.3	0.52
3.0	59	0.0467	5.2	0.63
3.5	70	0.0471	6.1	0.74
4.0	81	0.0476	7.0	0.85
4.5	93	0.0480	7.8	0.97
5.0	104	0.0485	8.7	1.07
5.5	112	0.0490	9.6	1.14
6.0	121	0.0494	10.4	1.22
7.0	138	0.0504	12.2	1.37
8.0	150	0.0514	13.9	1.46
9.0	162	0.0525	15.7	1.54



SKETCH AT FAILURE

TYPE OF FAILURE

Diagonal: ☐
Bulge: ☑
Vertical: ☐

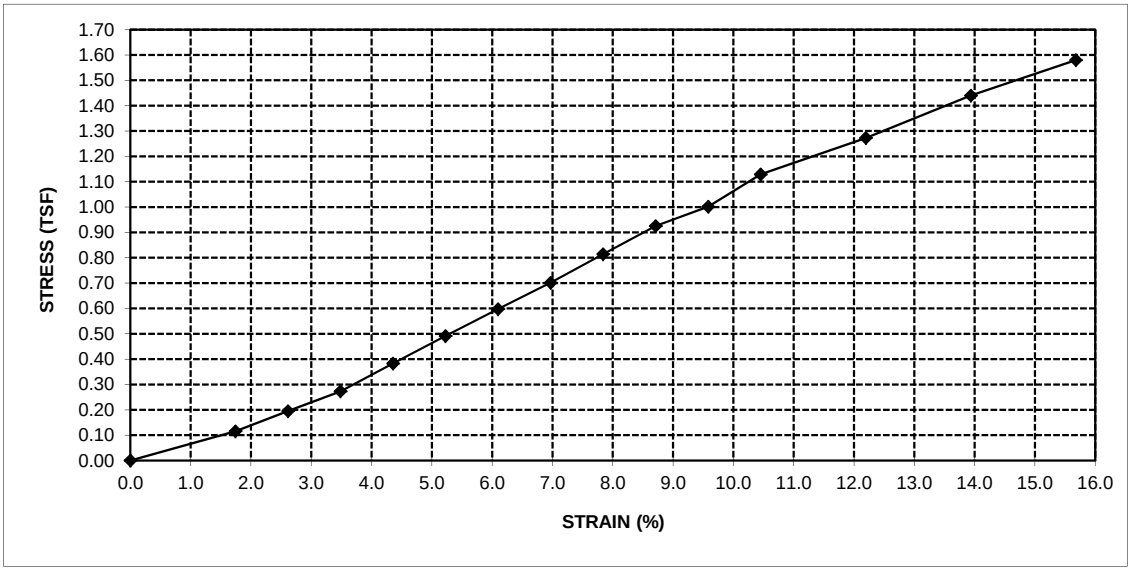
EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOIL (AASHTO T 208)

Project: St. Charles Road over Salt Creek
Location: DuPage County, Illinois
Client : V3 Companies of Illinois Ltd.
Boring No. : B-3
Soil Description : Gray Clay Loam
Moisture Content (%) : 13
Dry Density (pcf): 125
Unconfined Compressive Strength (tsf) : 1.52
Strain at Failure: 15.0%

Date: 12/1/2015
Job No.: 1264
Sample No. : ST-9
Sample Depth : 18.5'-20.5'
Test Depth : 19.5'-20'
Initial Diameter (in.): 2.79
Initial Height (in.): 5.74
Height -to-Diameter Ratio: 2.06
Strain Rate (in/min): 0.1

TIME (MINUTES)	LOAD (LB)	CORRECTED AREA (SQ. FT.)	STRAIN (%)	STRESS (TSF)
0.0	0	0.0424	0.0	0.00
1.0	10	0.0432	1.7	0.12
1.5	17	0.0436	2.6	0.20
2.0	24	0.0440	3.5	0.27
2.5	34	0.0444	4.4	0.38
3.0	44	0.0448	5.2	0.49
3.5	54	0.0452	6.1	0.60
4.0	64	0.0456	7.0	0.70
4.5	75	0.0460	7.8	0.81
5.0	86	0.0465	8.7	0.93
5.5	94	0.0469	9.6	1.00
6.0	107	0.0474	10.5	1.13
7.0	123	0.0483	12.2	1.27
8.0	142	0.0493	13.9	1.44
9.0	159	0.0503	15.7	1.58



SKETCH AT FAILURE

TYPE OF FAILURE

Diagonal: ☐
Bulge: ☑
Vertical: ☐

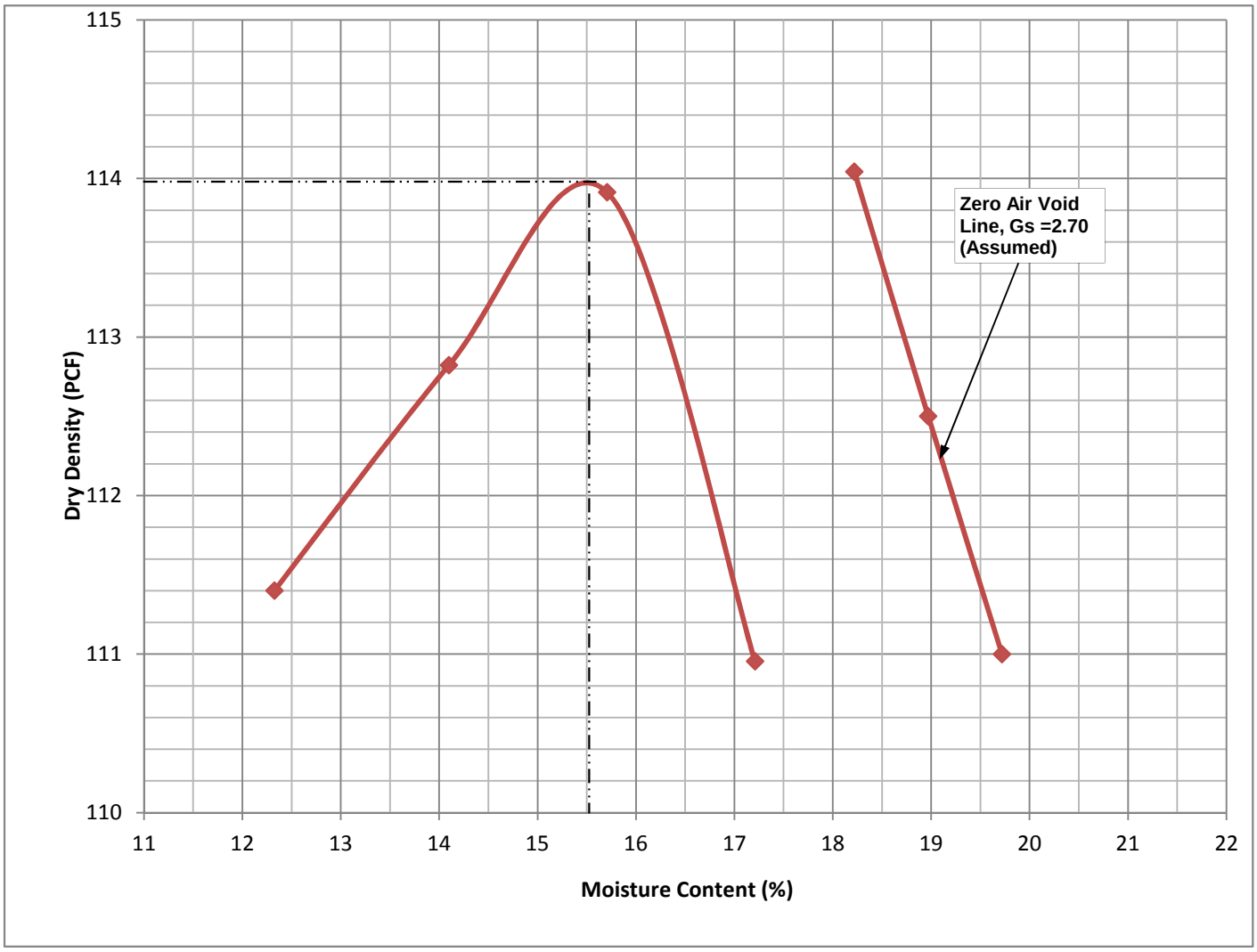
MOISTURE-DENSITY RELATIONS

EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

MOISTURE-DENSITY RELATIONS OF SOILS
Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in) Drop
AASHTO T 99 (Method C)

Project: St. Charles Road Bridge over Salt Creek
Location.: DuPage County, Illinois
Client: V3 Companies of Illinois Ltd.
Soil Identification: Brown and Black Clay Loam
Remarks: No material retained on No. 4 sieve
Preparation Method: Air Dry
Rammer Type: Mechanical
Maximum Dry Density (pcf): 114

Date: 12/02/2015
Report No.: NA
Job No.: 1264
Boring No.: B-1
Depth: 3'-8'
Sample No.: Bag-1
EEC Sample No.: NA
Optimum Moisture Content (%) : 15.5



The test results reported are indicative only of the material tested.
 Rev. 03/00

ILLINOIS BEARING RATIO (IBR)

EVEREST ENGINEERING COMPANY
915 WEST LIBERTY DRIVE, WHEATON, IL 60187

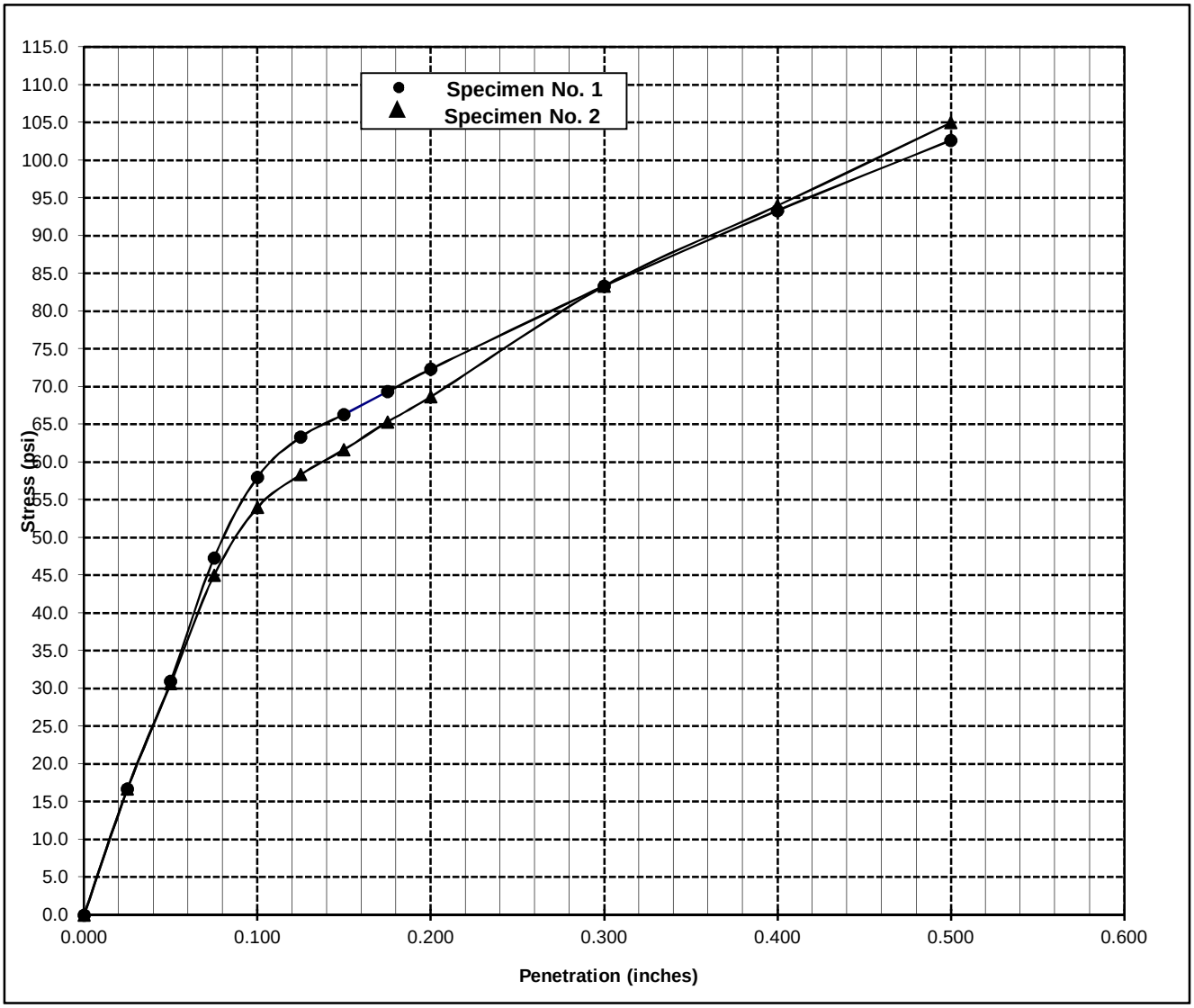
ILLINOIS BEARING RATIO (IBR)

Project: St. Charles Road Bridge over Salt Creek
Location.: DuPage County, Illinois
Client: V3 Companies of Illinois Ltd.
Job No.: 1264
Soil Identification: Brown and Black Clay Loam

Date: 12/2/2015
Boring No.: B-1
Depth: 3'-8'
Sample No.: Bag-1

		Spec. No. 1	Spec. No. 2
Maximum Dry Density	**(PCF)**	114.0	114.0
Optimum Moisture Content	**(%)**	15.5	15.5
Moisture before soaking	**(%)**	15.9	15.9
Moisture after soaking	**(%)**	17.4	17.5
Expansion	**(%)**	0.7	0.7

Test No.	IBR for 0.10 inch penetratior	IBR for 0.20 inch penetratior
1	5.8	4.8
2	5.4	4.6



PILE DESIGN TABLES

Pile Design Table for West Abutment utilizing Boring #B-1

GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = ±664.00 **BOTTOM OF PILE CAP ELEV. = 664.00**

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
Metal Shell 12"Φ w/.179" walls		
40	22	2
58	32	5
60	33	7
64	35	10
77	42	12
106	58	15
107	59	17
110	61	20
248	136	25
171	94	29
176	97	30
220	121	32
208	115	35
228	125	37
254	140	40
Metal Shell 12"Φ w/.25" walls		
40	22	2
58	32	5
60	33	7
64	35	10
77	42	12
106	58	15
107	59	17
110	61	20
171	94	29
176	97	30
208	115	35
228	125	37
353	194	40
Metal Shell 14"Φ w/.25" walls		
53	29	2
72	40	7
75	41	10
93	51	12
129	71	15
130	71	17
134	73	20
203	111	29
208	114	30
248	137	35
274	150	37
413	227	40
Metal Shell 14"Φ w/.312" walls		
53	29	2
72	40	7
75	41	10
93	51	12
129	71	15
130	71	17
134	73	20
203	111	29
208	114	30
248	137	35
274	150	37
513	282	40

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 8 X 36		
8	4	2
26	14	5
35	19	7
36	20	10
45	25	12
49	27	17
62	34	20
72	40	29
75	41	30
79	43	35
83	46	37
117	65	40
126	70	42
151	83	45
286	157	47
Steel HP 10 X 42		
9	5	2
32	18	5
45	25	10
57	32	12
61	34	17
81	44	20
91	50	29
94	52	30
98	54	35
104	57	37
146	80	40
160	88	42
186	103	45
335	184	47
Steel HP 10 X 57		
11	6	2
34	18	5
46	25	10
59	32	12
62	34	17
83	46	20
93	51	29
96	53	30
100	55	35
107	59	37
150	83	40
163	90	42
195	107	45
454	250	48

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 12 X 53		
11	6	2
38	21	5
55	30	10
73	40	12
76	42	17
98	54	20
113	62	29
117	64	30
120	66	35
129	71	37
175	96	40
191	105	42
224	123	45
418	230	47
Steel HP 12 X 63		
12	7	2
40	22	5
55	30	10
73	40	12
76	42	17
100	55	20
114	63	29
118	65	30
121	67	35
130	71	37
179	99	40
195	107	42
232	127	45
497	273	47
Steel HP 12 X 74		
14	8	2
41	23	5
56	31	10
75	41	12
77	43	17
101	56	20
116	64	29
120	66	30
123	68	35
132	73	37
183	101	40
198	109	42
238	131	45
589	324	48
Steel HP 12 X 84		
15	8	2
42	23	5
57	31	10
76	42	12
79	43	17
102	56	20
117	65	29
121	67	30
125	69	35
134	74	37
186	102	40
201	111	42
244	134	45
664	365	48

Pile Design Table for West Abutment utilizing Boring #B-1

GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = ±664.00

BOTTOM OF PILE CAP ELEV. = 664.00

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 14 X 73		
14	8	2
47	26	5
67	37	10
90	50	12
92	51	17
118	65	20
138	76	29
143	79	30
145	80	35
157	86	37
212	117	40
231	127	42
274	151	45
578	318	47
Steel HP 14 X 89		
16	9	2
49	27	5
67	37	10
92	50	12
93	51	17
120	66	20
140	77	29
145	80	30
147	81	35
159	87	37
218	120	40
236	130	42
284	156	45
705	388	48

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 14 X 102		
18	10	2
50	28	5
68	38	10
93	51	12
95	52	17
122	67	20
142	78	29
146	81	30
149	82	35
161	88	37
222	122	40
240	132	42
292	160	45
810	445	48
Steel HP 14 X 117		
20	11	2
52	29	5
69	38	10
94	52	12
96	53	17
124	68	20
144	79	29
148	82	30
151	83	35
163	90	37
227	125	40
244	134	42
301	166	45
929	511	49

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)

Pile Design Table for East Abutment utilizing Boring #B-4

GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = ±664.00 **BOTTOM OF PILE CAP ELEV. = 664.00**

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
Metal Shell 12"Φ w/.179" walls		
10	5	2
16	9	5
40	22	8
45	25	15
67	37	20
131	72	22
158	87	31
200	110	36
254	140	41
Metal Shell 12"Φ w/.25" walls		
10	5	2
16	9	5
40	22	8
45	25	15
67	37	20
131	72	22
158	87	31
200	110	36
319	175	41
353	194	46
Metal Shell 14"Φ w/.25" walls		
11	6	2
21	11	5
51	28	8
53	29	15
81	45	20
165	91	22
192	105	31
247	136	36
404	222	41
413	227	46
Metal Shell 14"Φ w/.312" walls		
11	6	2
21	11	5
51	28	8
53	29	15
81	45	20
165	91	22
192	105	31
247	136	36
404	222	41
513	282	46

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 8 X 36		
2	1	2
4	2	5
13	7	8
16	9	15
20	11	17
24	13	20
36	20	22
41	23	31
50	28	36
62	34	41
89	49	46
286	157	49
Steel HP 10 X 42		
2	1	2
5	2	5
16	9	8
20	11	10
20	11	15
27	15	17
30	17	20
45	25	22
53	29	31
66	36	36
77	42	41
109	60	46
335	184	48
Steel HP 10 X 57		
3	1	2
5	3	5
17	9	8
20	11	15
27	15	17
31	17	20
46	25	22
54	30	31
67	37	36
80	44	41
117	64	46
454	250	49
Steel HP 12 X 53		
3	2	2
5	3	5
19	11	8
24	13	10
25	14	15
32	18	17
36	20	20
53	29	22
64	35	26
67	37	31
79	43	36
92	51	41
131	72	46
418	230	48

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 12 X 63		
3	2	2
6	3	5
20	11	8
25	14	10
25	14	15
33	18	17
37	20	20
55	30	22
66	36	26
67	37	31
81	44	36
95	52	41
138	76	46
497	273	49
Steel HP 12 X 74		
3	2	2
6	3	5
20	11	8
26	14	15
34	18	17
38	21	20
56	31	22
68	37	26
69	38	31
82	45	36
97	54	41
144	79	46
589	324	50
Steel HP 12 X 84		
3	2	2
7	4	5
21	11	8
26	14	15
34	19	17
39	21	20
57	31	22
69	38	26
70	38	31
83	46	36
99	55	41
150	82	46
664	365	50

Pile Design Table for East Abutment utilizing Boring #B-4

GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = ±664.00

BOTTOM OF PILE CAP ELEV. = 664.00

Steel HP 14 X 73

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
3	2	2
7	4	5
24	13	8
29	16	10
31	17	15
39	22	17
44	24	20
65	36	22
78	43	26
83	46	31
96	53	36
113	62	41
163	90	46
578	318	49

Steel HP 14 X 89

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
4	2	2
8	4	5
24	13	8
31	17	10
32	17	15
40	22	17
45	25	20
67	37	22
81	44	26
84	46	31
97	54	36
116	64	41
172	95	46
705	388	50

Steel HP 14 X 102

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
4	2	2
8	4	5
25	13	8
32	18	15
41	22	17
46	25	20
68	37	22
83	45	26
85	47	31
99	54	36
119	65	41
179	99	46
810	445	50

Steel HP 14 X 117

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
4	2	2
9	5	5
25	14	8
32	18	15
41	23	17
47	26	20
69	38	22
85	47	26
87	48	31
100	55	36
122	67	41
188	103	46
929	511	50

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)

Pile Design Table for West Pier utilizing Boring #B-2

GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = ±651.00 **BOTTOM OF PILE CAP ELEV. = 651.00**

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
Metal Shell 12"Φ w/.179" walls		
25	14	3
114	63	6
132	72	8
177	97	21
254	140	27
Metal Shell 12"Φ w/.25" walls		
25	14	3
114	63	6
132	72	8
177	97	23
346	190	27
353	194	32
Metal Shell 14"Φ w/.25" walls		
30	16	3
133	73	6
173	95	8
208	114	23
413	227	27
Metal Shell 14"Φ w/.312" walls		
30	16	3
133	73	6
173	95	8
208	114	23
435	239	27
513	282	32
Steel HP 8 X 36		
2	1	3
8	4	6
11	6	8
19	10	11
24	13	12
34	19	16
36	20	23
60	33	27
75	42	32
98	54	35
286	157	37
Steel HP 10 X 42		
2	1	3
8	4	6
14	8	8
23	13	11
30	16	12
42	23	16
46	25	23
74	41	27
94	52	32
121	66	35
335	184	37

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 10 X 57		
2	1	3
10	6	6
16	9	8
26	14	11
33	18	12
45	25	16
47	26	23
77	42	27
97	53	32
129	71	35
454	250	38
Steel HP 12 X 53		
2	1	3
9	5	6
17	9	8
28	15	11
36	20	12
51	28	16
58	32	19
59	32	23
89	49	27
112	62	32
145	80	35
418	230	37
Steel HP 12 X 63		
2	1	3
10	6	6
18	10	8
30	16	11
38	21	12
53	29	16
59	33	23
92	50	27
116	64	32
152	84	35
497	273	38
Steel HP 12 X 74		
3	1	3
11	6	6
19	11	8
32	18	11
40	22	12
55	30	16
60	33	23
94	52	27
118	65	32
158	87	35
589	324	38
Steel HP 12 X 84		
3	2	3
12	7	6
20	11	8
34	19	11
42	23	12
57	31	16
61	34	23
96	53	27
121	66	32
164	90	35
664	365	39

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 14 X 73		
3	1	3
11	6	6
21	12	8
35	19	11
45	25	12
63	35	16
71	39	19
73	40	21
73	40	23
109	60	27
137	75	32
179	99	35
578	318	38
Steel HP 14 X 89		
3	2	3
12	7	6
23	13	8
38	21	11
48	27	12
66	36	16
73	40	19
74	41	23
112	62	27
141	78	32
189	104	35
705	388	38
Steel HP 14 X 102		
3	2	3
13	7	6
25	13	8
41	22	11
51	28	12
68	38	16
75	41	19
75	41	21
75	41	23
115	63	27
144	79	32
196	108	35
810	445	39
Steel HP 14 X 117		
4	2	3
15	8	6
26	14	8
44	24	11
54	30	12
71	39	16
76	42	23
118	65	27
148	81	32
205	113	35
929	511	39

Pile Design Table for East Pier utilizing Boring #B-3

GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = ±651.00 **BOTTOM OF PILE CAP ELEV. = 651.00**

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
Metal Shell 12"Φ w/.179" walls		
18	10	6
31	17	9
104	57	19
143	79	24
254	140	28
Metal Shell 12"Φ w/.25" walls		
18	10	6
31	17	9
104	57	19
143	79	24
353	194	28
Metal Shell 14"Φ w/.25" walls		
22	12	6
39	21	9
125	69	19
177	98	24
413	227	28
Metal Shell 14"Φ w/.312" walls		
22	12	6
39	21	9
125	69	19
177	98	24
461	254	28
513	282	33
Steel HP 8 X 36		
8	5	4
9	5	6
14	8	9
26	14	11
29	16	19
38	21	24
50	27	28
77	42	33
103	57	37
286	157	39
Steel HP 10 X 42		
10	6	4
11	6	6
18	10	9
32	17	11
37	20	19
49	27	24
61	34	28
96	53	33
127	70	37
335	184	39

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 10 X 57		
10	6	4
11	6	6
18	10	9
33	18	11
37	21	19
50	27	24
66	36	28
99	54	33
135	74	37
454	250	40
Steel HP 12 X 53		
12	7	4
13	7	6
21	12	9
38	21	11
46	25	19
58	32	24
74	41	28
115	63	33
153	84	37
418	230	39
Steel HP 12 X 63		
12	7	4
14	8	6
22	12	9
40	22	11
46	25	19
60	33	24
77	43	28
118	65	33
160	88	37
497	273	40
Steel HP 12 X 74		
12	7	4
14	8	6
22	12	9
41	23	11
47	26	19
60	33	24
81	44	28
121	66	33
166	91	37
589	324	40
Steel HP 12 X 84		
13	7	4
14	8	6
23	13	9
42	23	11
47	26	19
61	34	24
83	46	28
123	68	33
172	95	37
664	365	41

Nominal Required Bearing (Kips)	Bearing Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 14 X 73		
14	8	4
16	9	6
26	14	9
47	26	11
56	31	19
71	39	24
91	50	28
140	77	33
189	104	37
578	318	40
Steel HP 14 X 89		
15	8	4
17	9	6
27	15	9
49	27	11
57	31	19
72	40	24
96	53	28
144	79	33
198	109	37
705	388	40
Steel HP 14 X 102		
15	8	4
17	9	6
27	15	9
50	28	11
57	32	19
73	40	24
100	55	28
147	81	33
205	113	37
810	445	41
Steel HP 14 X 117		
15	8	4
17	9	6
28	16	9
52	29	11
58	32	19
74	41	24
104	57	28
151	83	33
214	118	37
929	511	41

Underwater Inspection
Bridge No. 022-6950

December 11, 2014

Prepared for:

Village of Villa Park

THE GARDEN VILLAGE

Prepared by:

COLLINS ENGINEERS INC.

123 North Wacker Drive, Suite 900
Chicago, Illinois 60606
312.704.9300 • www.collinsengr.com

TABLE OF CONTENTS

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EXECUTIVE SUMMARY

Project:	Underwater Inspection of St. Charles Road Bridge over Salt Creek in Villa Park
Purpose of Project:	To perform a visual and tactile inspection of the below water surfaces of the submerged substructure units.
Inspection Team:	Team Leader – Piotr Sawulski, P.E. – Collins Engineers, Inc. Team Member – Michael Spencer, E.I.T. – Collins Engineers, Inc. Team Member – Jacob Green – Collins Engineers, Inc.
Inspection Date(s):	December 11, 2014

Summary of Findings:

- Partial footing exposure at the West Pier with up to 0.8 foot of vertical exposure.
- Partial footing exposure at the East Pier with up to 2.6 feet of vertical exposure.
- Random cracking with efflorescence, scaling and areas of rust staining on the West and East Pier walls.
- Timber debris accumulation at the upstream end of the West Pier.
- Scour depression downstream of the West Pier.

Summary of Recommendations:

- Remove timber drift accumulation.
- Monitor footing exposure at the West and East Piers and consider implementing scour countermeasures if extent of exposure is found to be increasing.
- Monitor scour depression downstream of the West Pier.
- Monitor cracking and scaling at the West and East Piers.
- Re-inspect underwater within 60 months.

1.0 INTRODUCTION

1.1 Purpose and Scope

This report presents the findings of the underwater investigation performed for the submerged substructure units of Bridge No. 022-6950 in the Village of Villa Park, Illinois. The investigation was conducted by Collins Engineers, Inc. (Collins) on December 11, 2014. The primary purpose of the investigation was to determine the condition of the substructure components located in the water at the time of the inspection from the waterline to the channel bottom. In addition, a brief inspection was made of adjacent substructure areas that could be submerged during periods of high water.

The following report includes a description of the structure, the method of investigation, a description of existing conditions, and an evaluation and recommendations based on the conditions.

1.2 General Description of the Structure

The bridge is a three span, precast, prestressed concrete deck beam structure supported by two abutments and two intermediate piers. The piers are comprised of reinforced concrete walls founded on concrete footings supported on timber piles. Design plans dated 1977 and field observations indicate that as part of the bridge widening, approximately 20-foot-long and 12-foot-long walls section were added to north and south ends of both piers, respectively. The pier extensions are supported on concrete spread footings founded on natural streambed material (silty clay and sand according to available boring logs). Additionally, both piers were increased in height by approximately 5 feet. The substructure units are labeled as West Abutment, West and East Piers, and East Abutment, from west to east.

1.3 Method of Investigation

Prior to the inspection, Collins obtained and reviewed the available bridge plans and previous inspection reports. A three-person team consisting of one professional engineer-diver and two engineer-divers conducted the underwater inspection. The inspection was conducted using commercial scuba diving equipment. During the inspection, the diver entered the water from the shore while an engineer on the shore recorded the inspection notes.

The underwater inspection consisted of a visual and tactile examination of the accessible surfaces of the submerged substructure units from the waterline to the channel bottom with particular attention given to any areas of deterioration or apparent distress. The type of channel bottom material, presence and extent of scour, presence and extent of riprap, presence and extent of debris, and the location of any structural defects were noted. In addition, the conditions of the shorelines in the vicinity of the structure were noted. Photographs were taken to document general conditions and observed deficiencies.

The channel bottom depths were obtained using an incremental sounding pole. The channel bottom depths were recorded along the bridge fascias, 100 feet upstream and downstream of the bridge and at eighth points along the faces of each pier. The waterline was referenced to a known elevation on the structure.

2.0 EXISTING CONDITIONS

2.1 Substructure Conditions

The West Pier was generally in satisfactory condition below the waterline with no defects of immediate structural significance observed. The footing of the pier was partially exposed around the upstream end (spread footing supported newer portion of pier wall) and along the west side (pile supported original construction). The maximum vertical face exposure of the spread footing was 0.5 foot, while the maximum exposure along the pile supported portion of the pier footing was 0.8 foot. The accessible portions of the top of the footing were mostly rough, irregular and often covered with construction debris (concrete rubble). Left in place formwork, consisting of vertical timber boards, was present along the majority of original pier construction and extended up to 12 inches above the top of the footing. The concrete of the pier wall was generally smooth and sound, with no significant deterioration. However, a 5-foot-high section of pier wall extension typically exhibited widespread vertical hairline cracking with efflorescence and areas of rust staining. The cold construction joint at the interface of original and newer pier construction typically had cracking extending along the full height of the pier wall, with occasional areas of minor concrete section losses. Additionally, a 1-foot-high band of concrete scaling was noted around the waterline, on the original portion of pier wall. Outside of the abovementioned typical pier deterioration, three cracks measuring 1/16 inch to 1/8 inch wide were noted on the east face of the pier wall. A moderate accumulation of timber drift, extending up to 2 feet above the waterline, was noted at the upstream nose of the pier. Refer to Photographs 9 through 15 for views of the typical West Pier conditions and specific defects identified during the inspection.

The East Pier was generally in satisfactory condition below the waterline with no defects of immediate structural significance observed. The footing of the pier was partially exposed along the west side of the pile supported original footing construction, with the maximum vertical exposure of up to 2.6 feet near the pier's centerline. No undermining of the footing was evident due to left in place original timber formwork, typically extending from the channel bottom up to 12 inches above the top of the footing. The accessible portions of the footing were mostly rough, irregular and often covered with construction debris (concrete rubble). The concrete of the pier wall was generally smooth and sound, with no significant deterioration. However, a 5-foot-high section of pier wall extension typically exhibited widespread vertical hairline cracking with efflorescence and areas of rust staining. The cold construction joint at the interface of original and newer pier construction typically had cracking extending along full height of the pier wall, with occasional areas of minor concrete section losses. Additionally, a 1-foot-high band of concrete scaling was noted around the waterline on the original portion of pier wall. Refer to Photographs 16 through 18 for views of the typical East Pier conditions and a specific defect identified during the inspection.

The West Slope Wall was generally in good condition and appeared stable with no evidence of significant differential settlement. The toe of the slope wall was typically exposed along majority of the wall, with the maximum vertical exposure of 1 foot at the downstream end.

2.2 Waterway Conditions

At the time of inspection, the waterline was approximately 11.2 feet below the top of the pier cap at the downstream nose of the West Pier. This corresponds to a waterline elevation of 658.4 based on available bridge plans dated 1977. At the time of inspection, the West Pier and East Pier were located in the waterway and the Salt Creek was flowing north to south at approximately 1 foot per second. The channel bottom in the vicinity of both piers consisted of sand and gravel allowing up to 6 inches of probe rod penetration. Soft silty infill material, allowing up to 12 inches of probe rod penetration, was noted downstream of the south end of the West Pier and around the upstream end of the East Pier. Localized channel bottom degradation was evident along the west face of the West Pier, as well as around the upstream end of the East Pier, with up to approximately 3 foot drop in channel bottom elevation. A 10-foot-diameter, up to 4-foot-deep, scour depression was also noted downstream of the south bridge fascia, between the slope wall and the West Pier. Refer to Figure 2 in Appendix A for the waterway configuration and sounding plan, and Figure 3 for channel cross sections and general elevation of the bridge.

2.3 Shoreline Conditions

The west shoreline, from the bridge fascia to approximately 20 feet upstream, was armored with riprap, measuring up to 1 foot in diameter, and lightly vegetated. Beyond, the shoreline consisted of up to 10 feet high, cut banks with exposed tree roots. The west shoreline, downstream of the bridge, consisted of riprap and what appeared to be roughly poured sections of concrete embankment. The east shoreline, upstream and downstream of the bridge, consisted of moderately vegetated embankments with up to 5 feet high steep cut banks and exposed tree roots. Riprap, measuring 10 inches in diameter and smaller, was armoring the east shoreline around the downstream end of the East Pier. Refer to Photographs 3 through 8 and 19 and 20 in Appendix B for views of the east and west shorelines and slope walls at the abutments.

3.0 EVALUATION AND RECOMMENDATIONS

Based on the underwater inspection findings, Bridge No. 022-6950 can be considered to be in generally satisfactory condition and overall structurally sound. The footing exposure noted at the West Pier, as well as the footing exposure and possible undermining of the pile supported portion of the East Pier, which are likely related to the current angle of attack of the river's flow at the bridge, which is to the southeast at a 30 to 45 degree angle to the longitudinal axis of the bridge piers, are not a significant concern at this time given the current extent of the exposures. However, further localized channel bottom degradation, especially around the spread footing supported portions of the substructure units, could eventually pose a threat to the substructure stability of those units. As a result, it is recommended that the extent of exposure at both piers be closely monitored during future inspections and if found to be increasing, consideration be given to implementing scour countermeasures in the form of placement of properly sized and graded riprap at both substructure units to prevent further localized channel bottom scouring. In regard to the scour depression just south of the structure, which is believed to be caused by water from a storm sewer located near the south end of the concrete slope wall, given its location relative to the structure, no remedial actions are recommended at this time.

The timber debris accumulation at the West Pier is not believed to be significantly affecting the channel flow; however, it should be removed at this time to reduce the likelihood of channel bottom degradation resulting from obstructed flow and to limit further debris accumulation.

The cracking and scaling at the East and West Piers are not structural concerns at this time given their magnitude compared to the overall pier size, and as a result, no repairs are recommended. These defects should be monitored during future inspections to ensure that they are not enlarging and that no reinforcing steel becomes exposed. If the areas are observed to be enlarging or reinforcing steel becomes exposed, it may be necessary to repair the areas at that time. Repairs would include removal of concrete to a minimum of 1 inch behind the reinforcing steel, cleaning and replacing reinforcing steel as required, and placing concrete designed to provide high durability with low permeability.

In accordance with the National Bridge Inspection Standards, it is recommended that the subsequent underwater inspection of Bridge No. 022-6950 be performed within 60 months.

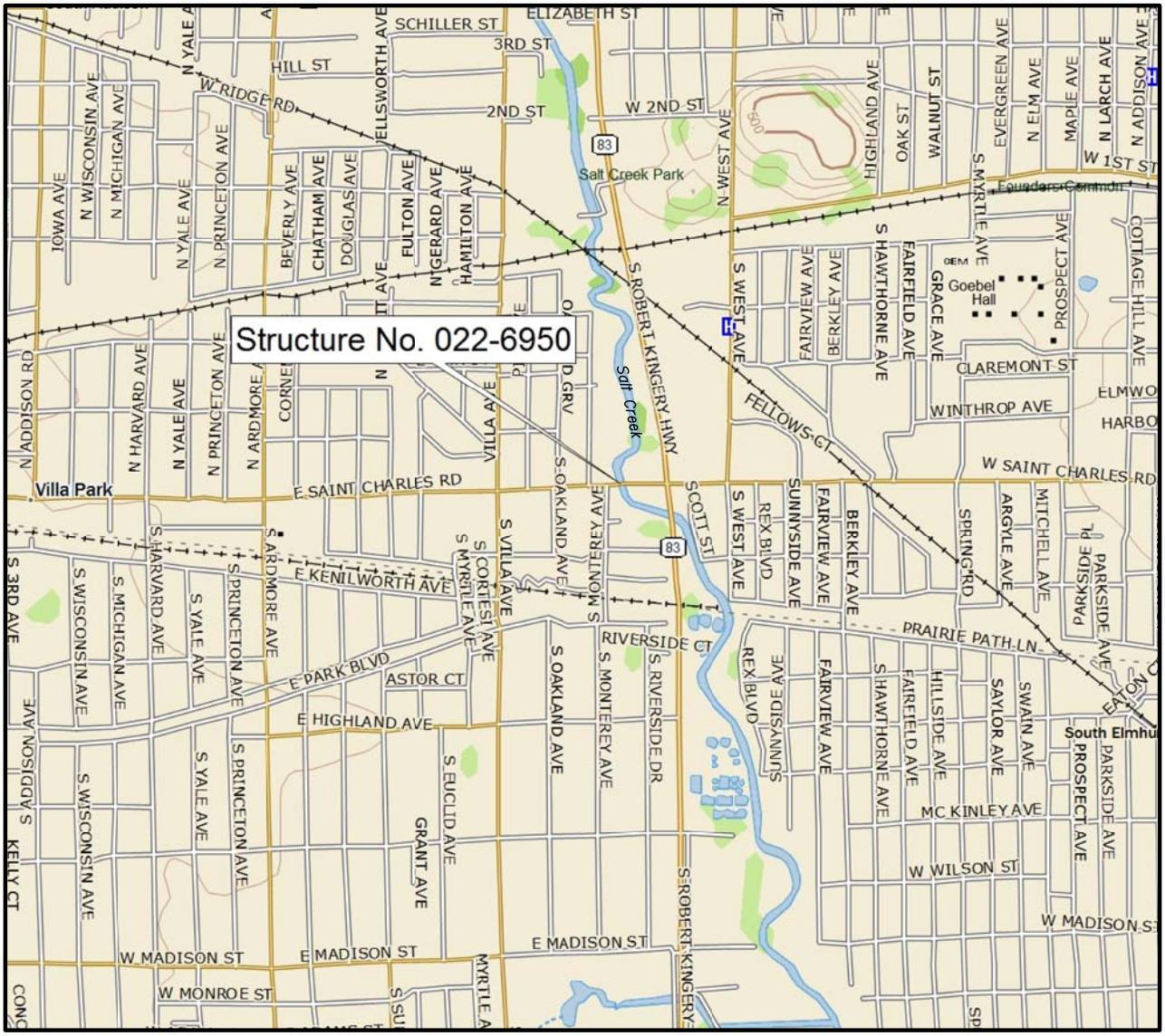
Respectfully submitted,
COLLINS ENGINEERS, INC.

Piotr Sawulski, P.E.
Project Manager

Originated by:
Jacob P. Green

Engineer-Diver:
Piotr Sawulski, P.E.

APPENDIX A – FIGURES

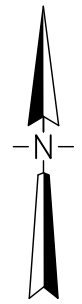


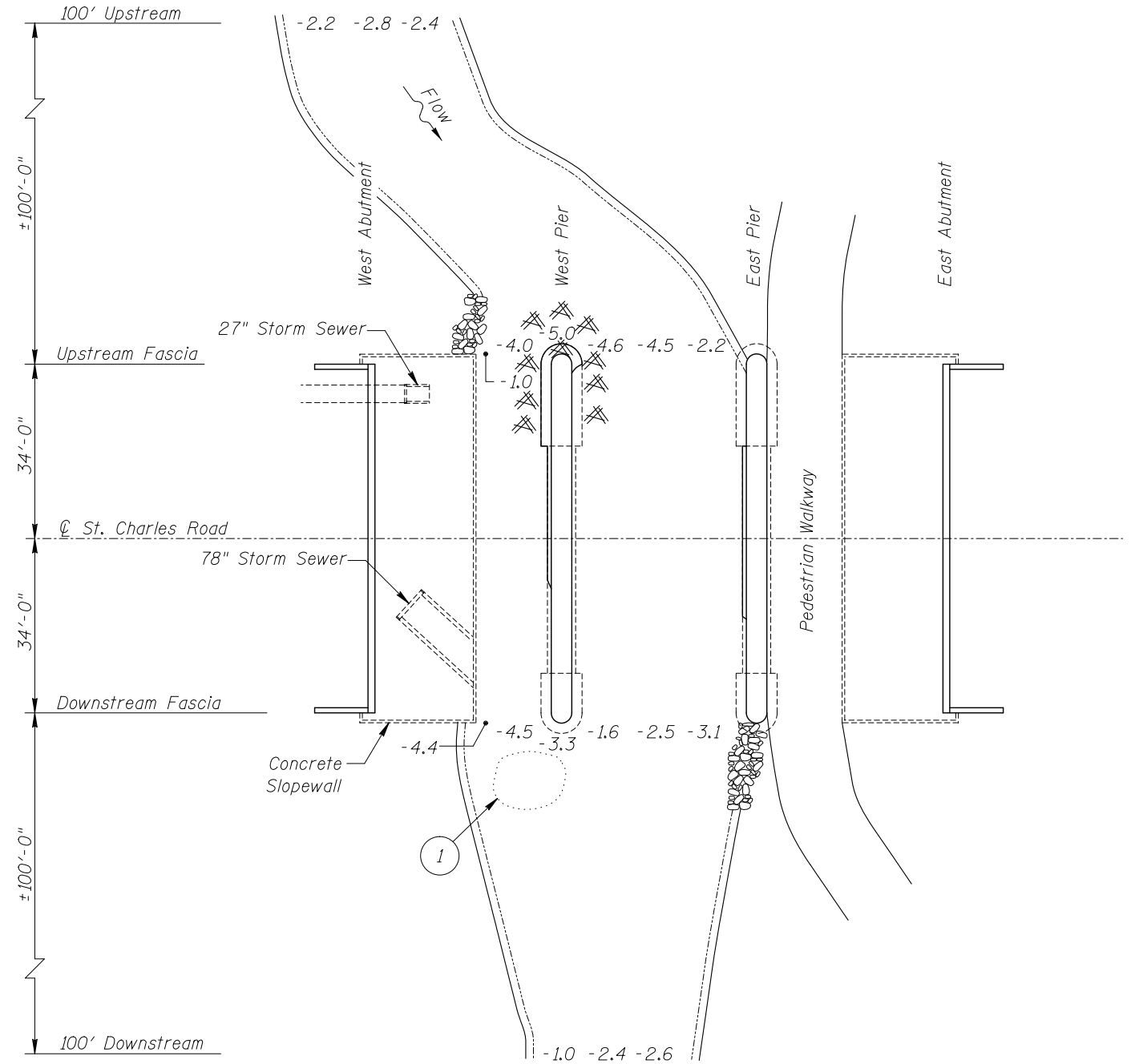
VILLAGE OF VILLA PARK

ST. CHARLES ROAD OVER
SALT CREEK
STRUCTURE NUMBER: 022-6950

LOCATION MAP

Drawn By: PRH	COLLINS ENGINEERS INC	Date: DEC., 2014
Checked By: PS	123 North Wacker Drive Suite 900 Chicago, Il. 60606 (312) 704-9300 www.collinsengr.com	Scale: 1"=1/2 Mile
Code:87776950	ILLINOIS PROFESSIONAL DESIGN FIRM LICENSE NO. 184-000993	Figure No.: 1





PLAN

INSPECTION NOTES:

1. Four foot deep scour depression measuring approximately 10 feet in diameter.

GENERAL NOTES:

1. West Pier and East Pier were inspected underwater.
2. At the time of inspection on December 11, 2014, the waterline was located approximately 11.2 feet below the top of the pier cap at the downstream nose of the West Pier. This corresponds to a waterline elevation of 658.4 feet based on the bridge plans dated 1977.
3. Soundings indicate the channel bottom elevation at the time of inspection and are measured in feet.
4. These figures were developed from field observations and the bridge plans.

LEGEND:

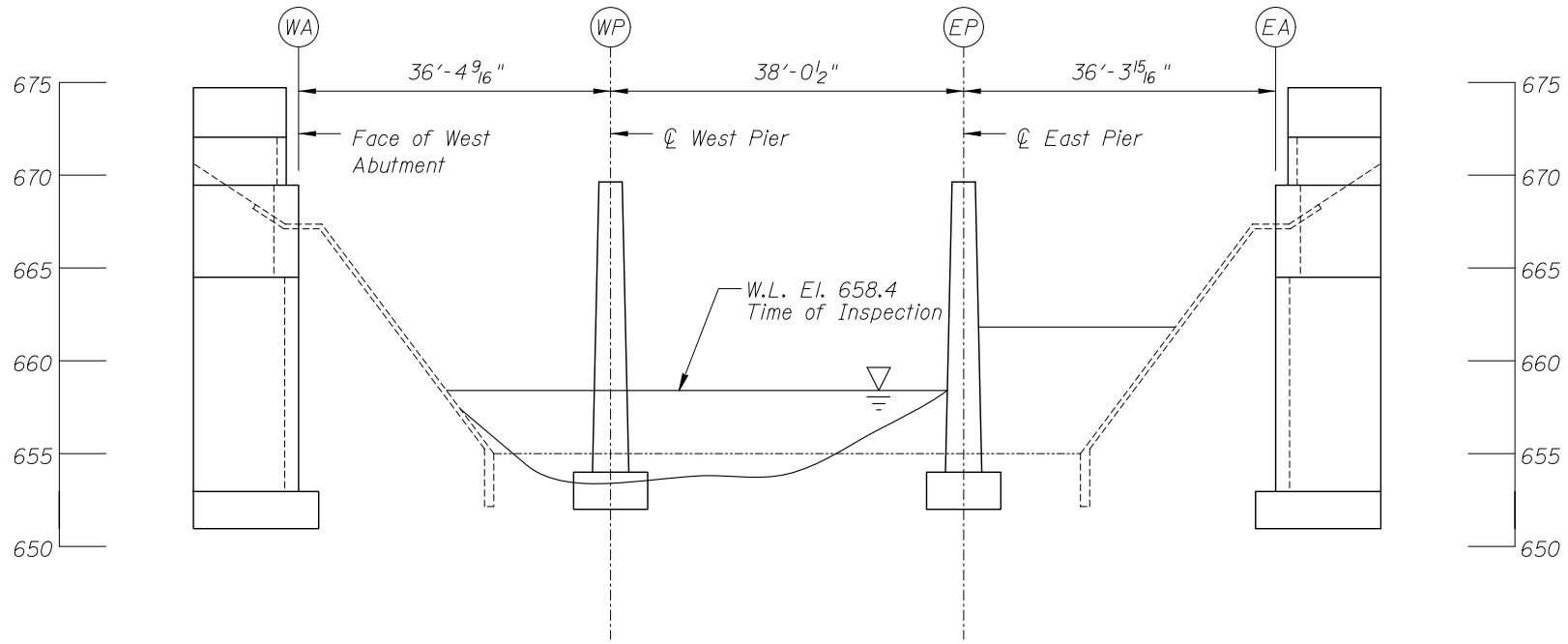
-1.0	Channel Cross Section Depth from Waterline
	Shoreline on 12/11/14 (W/L El. 658.4)
	Timber Debris
	Riprap

VILLAGE OF VILLA PARK

ST. CHARLES ROAD OVER
SALT CREEK
STRUCTURE NUMBER: 022-6950

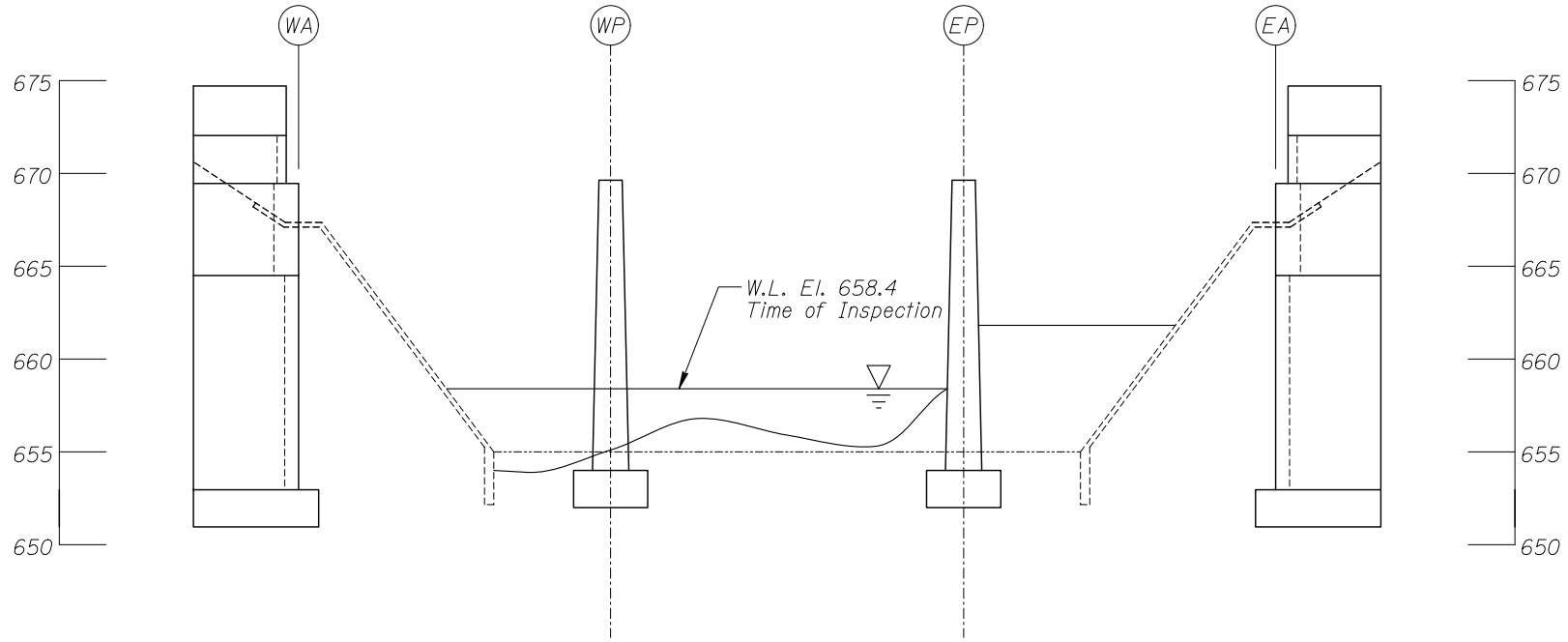
SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS 123 North Wacker Drive Suite 900 Chicago, Il. 60606 (312) 704-9300 www.collinsengr.com ILLINOIS PROFESSIONAL DESIGN FIRM LICENSE NO. 184.000993	Date: DEC., 2014
Checked By: PS		Scale: 1"=30'
Code: 87776950		Figure No.: 2



UPSTREAM FASCIA CHANNEL CROSS SECTION

Scale: H:1"=20" V:1′=10′



DOWNSTREAM FASCIA CHANNEL CROSS SECTION

Scale: H:1"=20" V:1′=10′

LEGEND:

---------- Channel Bottom, 1977 Design Plans.

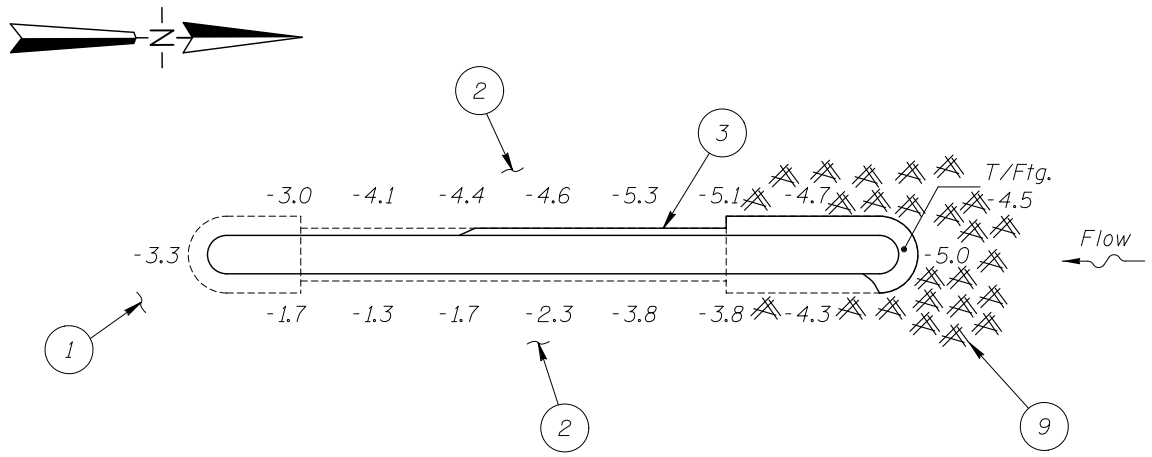
———— Channel Bottom, December, 2014.

VILLAGE OF VILLA PARK

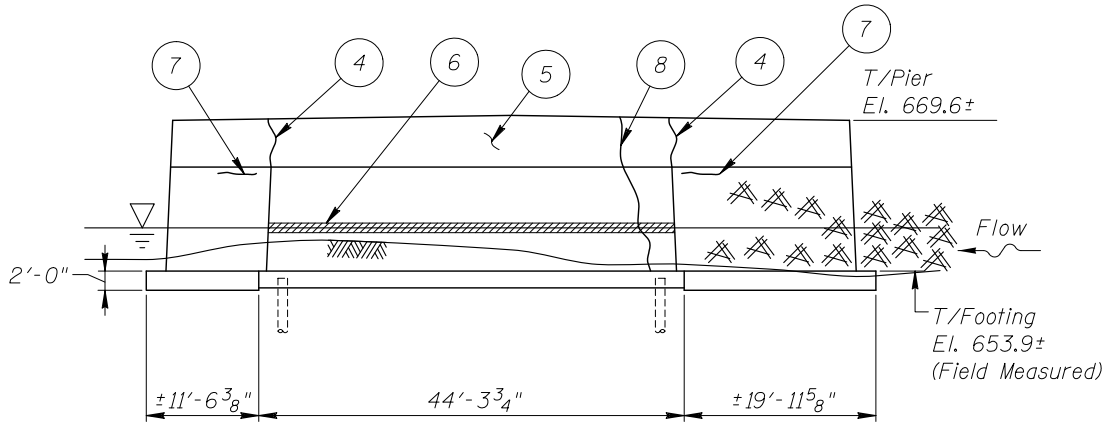
ST. CHARLES ROAD OVER
SALT CREEK
STRUCTURE NUMBER: 022-6950

CHANNEL CROSS SECTIONS

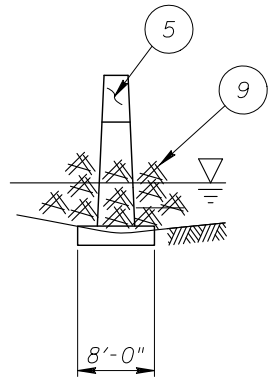
Drawn By: PRH	COLLINS ENGINEERS 123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: DEC., 2014
Checked By: PS	ILLINOIS PROFESSIONAL DESIGN FIRM LICENSE NO. 184-000993	Scale: As Noted
Code: 87776950		Figure No.: 3



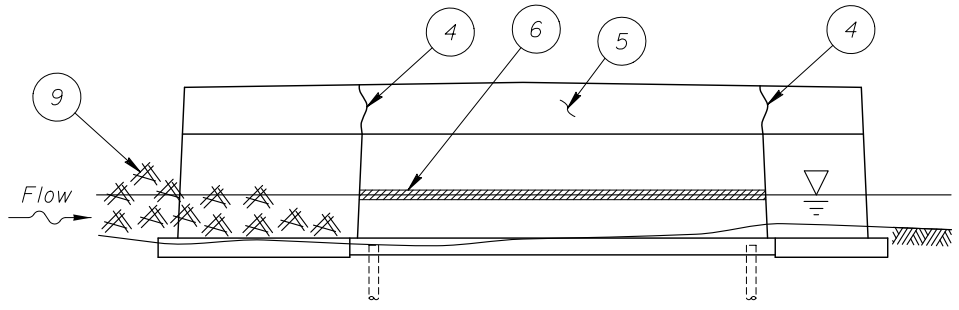
PLAN



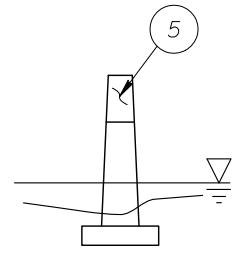
EAST ELEVATION



NORTH ELEVATION



WEST ELEVATION



SOUTH ELEVATION

INSPECTION NOTES:

1. *The channel bottom material consisted of sand and silt infill allowing up to 12 inches of probe rod penetration.*
2. *The channel bottom material around the perimeter of the pier consisted of sand and gravel allowing up to 6 inches of probe rod penetration.*
3. *The footing was partially exposed around the upstream end and west side of the pier. The exposure ranged from only top of the footing exposure at the downstream end to 0.8 of a foot of vertical exposure near mid-point of the pier. Left in-place formwork, consisting of vertical timber boards, was noted along the footing of the original pier construction.*
4. *Cracks with occasional minor concrete section losses in the cold construction joints between the original and newer portions of the pier. The cracks measured up to 1/8 inch wide and extended from top of the pier to the channel bottom.*
5. *The concrete of the pier extension exhibited random vertical hairline cracks with efflorescence and areas of rust staining, typically located near the horizontal cold construction joint.*
6. *A band of concrete scaling, with up to 1/2 inch of penetration, on the original pier construction, extended from 6 inches above to 6 inches below the waterline.*
7. *Two horizontal cracks, measuring up to 1/8 inch wide, with rust staining, located 6 inches below the horizontal construction joint near the upstream and downstream quarter points on the east face of the pier.*
8. *A vertical hairline to 1/16 inch wide crack with associated map cracking extended along the full height of the pier wall.*
9. *A moderate accumulation of timber debris, consisting of up to two foot diameter and smaller tree branches, was noted at the upsream nose and both faces of the pier. The debris extended 5 feet off the faces, 8 feet off the nose and up to 2 feet above the waterline.*

LEGEND:

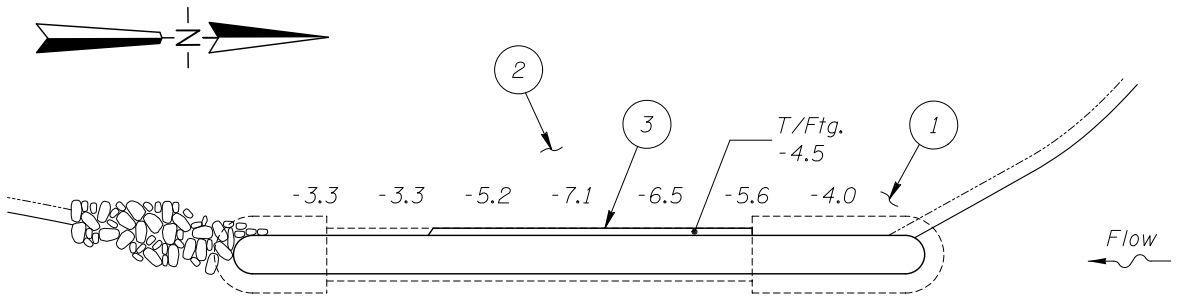
- (4) *Indicates Inspection Note Number*
- *Channel Bottom*
- *Timber Debris*

VILLAGE OF VILLA PARK

ST. CHARLES ROAD OVER
SALT CREEK
STRUCTURE NUMBER: 022-6950

WEST PIER

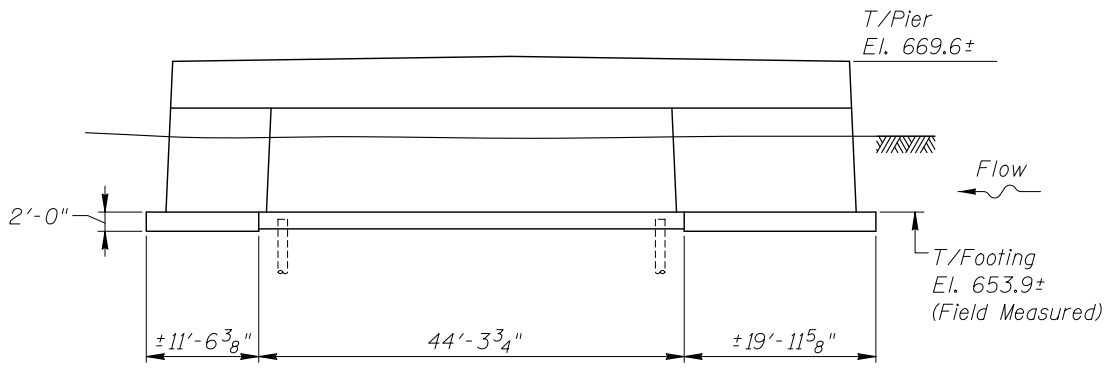
Drawn By: PRH	COLLINS ENGINEERS 123 North Wacker Drive Suite 900 Chicago, Il. 60606 (312) 704-9300 www.collinsengr.com ILLINOIS PROFESSIONAL DESIGN FIRM LICENSE NO. 184-000993	Date: DEC., 2014
Checked By: PS		Scale: 1"=20'
Code: 87776950		Figure No.: 4



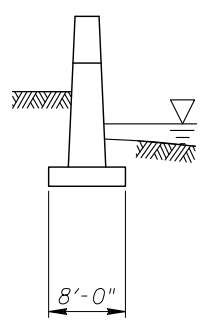
PLAN

INSPECTION NOTES:

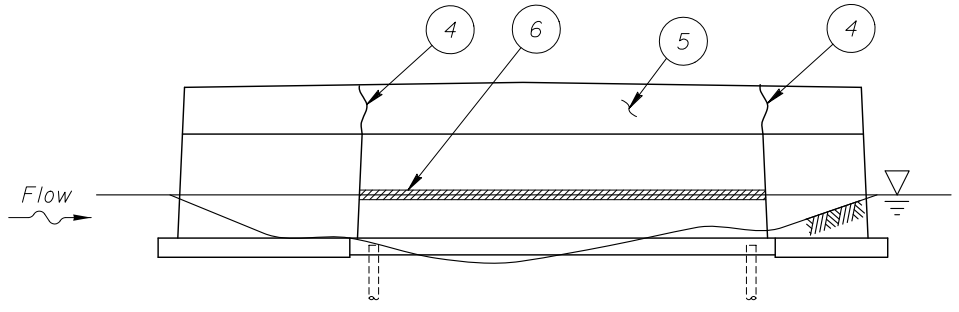
1. *The channel bottom material consisted of sand and silt infill allowing up to 12 inches of probe rod penetration.*
2. *The channel bottom material around the perimeter of the pier consisted of sand and gravel allowing up to 6 inches of probe rod penetration.*
3. *The footing was partially exposed along the west side of the pier, with the exposure ranging from only top of the footing exposure near the downstream end to 2.6 feet of vertical exposure near mid-point of the pier. Due to left in-place formwork along the footing of the original pier construction, no possible footing undermining was noted.*
4. *Cracks with occasional minor concrete section losses in the cold construction joints between the original and newer portions of the pier. The cracks measured up to 1/8 inch wide and extended from top of the pier to the channel bottom.*
5. *The concrete of the pier extension exhibited random vertical hairline cracks with efflorescence and areas of rust staining, typically located near the horizontal cold construction joint.*
6. *A band of concrete scaling, with up to 1/2 inch of penetration, on the original pier construction, extended from 6 inches above to 6 inches below the waterline.*



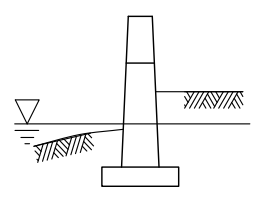
EAST ELEVATION



NORTH ELEVATION



WEST ELEVATION



SOUTH ELEVATION

LEGEND:

- (4) *Indicates Inspection Note Number*
- *Channel Bottom*
- *Timber Debris*

VILLAGE OF VILLA PARK

ST. CHARLES ROAD OVER
SALT CREEK
STRUCTURE NUMBER: 022-6950

EAST PIER

Drawn By: PRH	COLLINS ENGINEERS 123 North Wacker Drive Suite 900 Chicago, Il. 60606 (312) 704-9300 www.collinsengr.com	Date: DEC., 2014
Checked By: PS	ILLINOIS PROFESSIONAL DESIGN FIRM LICENSE NO. 184.000993	Scale: 1"=20'
Code: 87776950		Figure No.: 5

APPENDIX B – PHOTOGRAPHS

Photograph 1: Overall View of Bridge No. 022-6950, Looking North.

Photograph 2: Overall View of Bridge No. 022-6950, Looking Southeast.

Photograph 3: View of the West Shoreline Upstream of the Bridge, Looking West.

Photograph 4: View of the West Shoreline Downstream of the Bridge, Looking West.

Photograph 5: View of the East Shoreline Upstream of the Bridge, Looking East.

Photograph 6: View of the East Shoreline Downstream of the Bridge, Looking East.

Photograph 7: View of the West Slope Wall and the Abutment, Looking Northwest.

Photograph 8: View of the West Slope Wall and the Abutment, Looking Southwest.

Photograph 9: View of the West Pier, Looking Northwest.

Photograph 10: View of the West Pier, Looking Southeast.

Photograph 11: View of the Typical Concrete Condition at the Waterline at the Downstream Nose of the West Pier, Looking North.

Photograph 12: View of Concrete Scaling at the Waterline at the Downstream Quarter-Point on the East Face of the West Pier, Looking West.

Photograph 13: View of Cracking at the Upstream Quarter-Point on the East Face of the West Pier, Looking West.

Photograph 14: View of Typical Concrete Condition of West Pier Extension on the West Face, Looking East.

Photograph 15: View of Timber Debris Accumulation at the Upstream Nose of the West Pier, Looking South.

Photograph 16: View of the East Pier, Looking Northwest.

Photograph 17: View of the East Pier, Looking Southeast.

Photograph 18: View of a Typical Crack in Construction Joint on the West Face of the East Pier, Looking East.

Photograph 19: View of the East Slope Wall and the Abutment, Looking Northeast.

Photograph 20: View of the East Slope Wall and the Abutment, Looking Southeast.

SECTION IV

CORRESPONDENCE

List of Correspondence:

Item 1: Conference Memorandum between V3, IDOT and Villa Park to discuss project status and schedule dated November 6, 2015.

Item 2: FHWA Meeting Agenda discussing scour and project details dated March 15, 2016.

Item 3: Email exchange between V3 and IDNR-OWR verifying that hydraulic modeling used in the Hydraulic Report has been reviewed and approved by IDNR-OWR dated September 23, 2016.

Item 4: Letter from the Village of Villa Park stating that the St. Charles Rd. Bridge is not a source of flood damage dated September 29, 2016.

Item 5: Letter from the City of Elmhurst stating that the St. Charles Rd. Bridge is not a source of flood damage dated September 29, 2016.

Item 1

CONFERENCE MEMORANDUM

DATE OF MEMO: 11/6/15

DATE OF MEETING: 11/4/15

LOCATION OF MEETING: IDOT District 1, Bureau of Local Roads

ATTENDEES: Alex Househ, (Illinois Department of Transportation)
Suleyman Tulgar, IDOT
Vydas Juskelis, Village of Villa Park (VP)
Jeremie Lukowicz, VP
George Schober, V3 Companies (V3)
Elora Hsu, V3

TO: Attendees

FROM: Elora Hsu

CC: Marilin Solomon, IDOT, Greg Wolterstorff (V3), Scott Brejcha (V3), Lynn Smith (V3), Bill Vegrzyn (V3), Kent Johnson (City of Elmhurst), Jim Rodgers (Elmhurst Park District), File 15228

RE: St. Charles Road Bridge (FAU 1397) over Salt Creek

The kick-off meeting for the subject project was held on 11/4/15 at 1:30 PM to discuss the project status and anticipated schedule. The following is a summary of the key issues discussed at the meeting:

Item	Action
The project scope consists of preliminary engineering to determine the rehabilitation of the St. Charles Rd. bridge V3 anticipates that the super structure will need to be replaced, but it has not yet been determined if the substructure will need to be replaced.	INFO
Introductions and project contacts were stated. V3 will issue a list of contact information to the team.	INFO/V3
It is anticipated that this project will be classified as a Categorical Exclusion (CE) II.	INFO
V3 noted that the wetlands adjacent to the bridge are not DuPage County jurisdiction, but are Army Corp (ACOE) jurisdiction so impacts less than 0.1 acres will not have to be mitigated. IDOT stated that they will require that all impacts be mitigated regardless of jurisdiction.	INFO
IDOT suggested that the Bridge Condition Report (BCR) to be completed prior to first FHWA meeting.	INFO
IDOT noted that only an abbreviated BCR is necessary for a full bridge replacement. A full BCR is required for replacement of the superstructure. V3 will coordinate with the Bridge office to determine if an abbreviated BCR will be appropriate.	INFO
V3 summarized the following project status: a) Topo Survey – currently underway; IDOT requested Bat Survey to include under the bridge as well as in the tress as part of the tree survey. b) Environmental Survey Request – currently working on the form c) PESA (local) – should be completed by middle of November d) Wetland Delineation – delineation is complete. V3 anticipates less than 0.1 acre to be impacted, but IDOT still requires mitigation for wetland	a) INFO/V3 b) INFO c) INFO d) INFO/V3

e) Hydraulic Report – Starts once survey is completed f) Bridge Condition Report – Concurrent to hydraulic report findings	e) INFO f) INFO
V3 will target a February 2016 FHWA meeting.	INFO
V3 anticipates design approval by the end of 2016.	INFO
ESR form and submittal questions were answered – a) Contract # – Label "TBD" b) Local Contact person – Villa Park (Jeremie Lukowicz) c) Special Waste – V3 is conducting the PESA within the St. Charles Road project limits with the exception of the area located within the IL 83 right-of-way. d) IDOT will provide V3 with the Local Roads ESR submittal checklist.	 a) V3 b) V3 c) INFO/V3 d) IDOT
Local PESA: For area outside of the IL 83 right-of-way, V3 is conducting the PESA.	INFO
Special Waste Request (continued) State PESA: A portion of the ESR limits is within a state route (IL 83). To be conservative, IDOT suggests maintaining the limits shown in the exhibit in case re-profiling of St. Charles Road is necessary. Since the ESR limits contains portion of a state route, V3 will need to fill out the "Special Waste Screening Request" (pg 2) of the ESR so that IDOT can perform the PESA. If it is determined that re-profiling is not necessary, V3 can cancel the request without affecting the project schedule.	INFO/V3
V3 will verify if any properties within the ESR limits are classified as Section 4(f).	V3
V3 will need to coordinate the Traffic Maintenance Plan with Bureau of Traffic for their review and approval since the construction staging will impact IL 83. This could impact the schedule as their review will take up to 8 weeks.	INFO/V3
Since the bridge is anticipated to be constructed in stages and traffic will be maintained during construction, IDOT suggested that V3 coordinate the TMP with the Bridge Office for their review and approval prior to completion of BCR.	INFO/V3
V3 should research the property ownership and maintenance agreements related to the property around the Salt Creek and the adjacent bike path and sidewalk. Impacts may require a 4(f) report be prepared. V3 will coordinate with the Elmhurst Park District, the DuPage County Forest Preserve and the City of Elmhurst. The need for a 4(f) or 6(f) report should be discussed with the FHWA at the initial meeting planned for February 2016.	V3

This constitutes the writer's understanding of the items discussed and agreements reached at the aforementioned meeting. Any corrections and/or additions, to this memorandum should be sent to the writer within ten (10) business days of receipt of this memorandum.

ATTENDANCE ROSTER
BUREAU OF LOCAL ROADS AND STREETS

PROJECT: Project Kickoff meeting - St. Charles Rd Bridge Phase I
DATE: 11/04/15 TIME: 01:30 PM
LOCATION: Schaumburg / District One ROOM: Conference Room A

	NAME (Please Print)	REPRESENTING	PHONE NUMBER
1	Marilin Solomon	IDOT – D1 – BLRS	(847) 705-4407 Marilin.Solomon@illinois.gov
2	Alex Househ	IDOT – D1 – BLRS	(847) 705-4410 Alex.Househ@illinois.gov
3	Suleyman Tulgar	IDOT – D1 – BLRS (HDR, Inc.)	(847) 705-4205 Suleyman.tulgar@illinois.gov
4	ELORA Hsu	V3	(630) 729-6323
5	George Schober	V 3	(630) 291-0064
6	Jeremie Lukowicz	Villa Park	(630) 834-8505
7	VYDAS JUSKELIS	VILLA PARK	(630) 834-8505
8			( )
9			( )
10			( )
11			( )
12			( )
13			( )
14			( )

STP PROJECT MILESTONE SCHEDULE

Municipality:	Villa Park
Project:	St Charles Road Bridge of Salt Creek - Phase I
Scope of Work:	Preliminary Engineering for Bridge Replacement
TIP #:	08-14-0034
TIP Years (Ph II / Const):	TBD/TBD
Section #:	15-00094-00-BR
Current Constr & E3 Cost (date: 2/13/15):	$4,340,000
Fund Type(s):	STP-BR

Contact Information

Municipality	Jeremy Lukowicz: jlukowicz@invillapark.com; (630) 834-8505
Council/Liaison	Mike Albin: MAlbin@dmmc-cog.org; (630) 571-0480 ; 226
Consultant	George Schober: gschober@v3co.com; 630-291-0064
IDOT	Marilin Solomon: marilin.solomon@illinois.gov; (847) 705-440

Date Prepared: _____ Date Revised: _____

	Projected Dates			
	Initial Est.	Kick-Off	Revised/Actual	Notes
1. Project Scoping				
2. IDOT Phase I Kick-off Meeting		11/4/2015	11/4/2015	
3. 1st State/Federal Coordination Meeting		2/10/2016		
4. Categorical Exclusion Concurrence		2/10/2016		
5. Design Variance Concurrence		6/8/2016		
6. Submit Draft Phase I Report (PDR) to IDOT (a)		7/15/2016		
7. Public Hearing/Meeting (or N/A)		10/15/2016		No public meeting is anticiapted ot be required, but will present the project at Village Board meeting
8. Right-of-Way Kick-off Meeting (or N/A)		N/A		No right of way acquisition is anticipated
9. Submit Final Phase I Report (PDR) to IDOT (b)		9/15/2016		
10. Submit Phase II Engr. Agreem't to IDOT (or N/A)		10/15/2016		
11. Phase I Design Approval		11/15/2016		
12. ROW Aquistion Initiation (or N/A) (c)		N/A		No right of way acquisition is anticipated
13. Phase II Engr. Agreement Approval (or N/A)		1/15/2017		
14. Submit Pre-Final Plans and Estimates (d)		6/15/2017		
15. Submit Phase III Engr. Agreement to IDOT		6/15/2017		
16. Submit Final Plans, Specs & Estimates (PS&E) (e)		9/15/2017		
17. ROW Acquisition Complete		N/A		
18. Construction Letting		12/15/2017		

Notes:

(a) 3 to 6 month review required per complexity and submittal quality
(b) 1 to 3 month review
(c) Minimum 9 to 18 months required from plats to acquisition
(d) 85% minimum; 1 to 4 month review
(e) 7 to 10 days before Springfield BLR due date

See IDOT Local Roads' **Mechanics of Project Management** "Federal Aid Project Initiation to Completion" Flow Chart for sequence of events and estimated review times.

AGENDA ITEM #3
March 15, 2016

Item 2

St. Charles Road Bridge (FAU 1397)
Over Salt Creek
Section No.: 15-00094-00-BR
Job No. : P-91-313-15
Project Number: BRM-4003(508)
Structure No: 022-6950
County: DuPage

This is the first presentation of this project. The purpose of this meeting is to present the general scope of the project and the current status of the design.

A. Location

The project is located within the Village of Villa Park and City of Elmhurst in DuPage County.

B. Traffic Volume

St. Charles Road is a Minor Arterial under Villa Park's jurisdiction.

The existing traffic volumes within the project limits are 23,200 vpd for St. Charles Road. St. Charles Road is a non-designated truck route.

C. Crash Experience

The project limits are from Monterey Avenue to 100' East of the Salt Creek bridge on St. Charles Road. A crash analysis was performed for the years 2013 through 2015 within the project limits and a total number of 6 crashes occurred. All of the crashes occurred at the intersections of Monterey Avenue and St. Charles Road. No crashes occurred on the bridge.

The most common crash type was Sideswipe (Same Direction) with 3 crashes (50%), followed by 2 Rear End crashes (33%), and 1 Sideswiped (Opposite Direction) (16%). Most of the crashes occurred west of the bridge during the daytime (66%) and under dry pavement conditions. The high percentage of sideswipe crashes may be attributed to the narrow lane widths.

D. Existing Conditions

St. Charles Road has two lanes in each direction with sidewalks on both sides of the road.

The pavement approaches widen to 53 feet and consist of 10.5" outside lanes, 11' inside lanes and a 10 foot wide left turn lane.

The bridge width is 55 feet. The structure is a simple three span, 17" deep PPC deck beam bridge with asphalt overlay and poured concrete sidewalks and parapets.

The asphalt wearing surface varies from 2" to 4 ¼" over a waterproofing membrane system.

There is a 2' utility gap between the two outer deck beams on the north and south side of the bridge. There are 9 ducts running through the 2' gap on the north side of the bridge.

The substructure is rated a 7. The abutments are cantilevered walls and the piers are solid walls both in good condition with minor spalls and cracks.

There is an existing 78" storm sewer that passes through the west abutment and outlets at the southwest end of the west slopewall.

There is some evidence of scour at the bridge. Some of the more significant scour issues appear to be due to the 78" diameter storm sewer outfall. Unless the bridge is realigned or storm sewer outfall is relocated, these scour issues will continue regardless if substructure is replaced. While evidence of some scour was found, the bridge is in generally good condition. The NBIS scour rating for the bridge is an 8.

E. Design Criteria

Design criteria will be based on 3R Policy. Posted speed limit on St. Charles Road is 30 mph, with a design speed of 35 mph.

F. Proposed Improvements

The proposed scope of the project is to replace the superstructure of the Salt Creek Bridge, including approach and substructure rehabilitation. The Superstructure will be replaced with 17" deep PPC Deck beams and a 5" concrete wearing surface and results in raising the profile by approximately 3 inches.

The new Superstructure will be widened 6" to the North and the South to provide five 11 foot lanes. The sidewalk and the parapet will cantilever 6" off of the deck beams.

The 2' gaps between the outside beams for utilities will be removed. Any utilities to be maintained will be verified and relocated in conduits placed along the parapet wall.

The abutments and piers will be repaired with Structural Repair of Concrete ($\leq$ 5") and Epoxy Crack Sealing.

The top 5.5' of the 10' long wingwalls will be removed and replaced at all 4 corners to accommodate the 6" superstructure widening.

The approaches will be widened 1' to the North and South and resurfaced with asphalt.

Scour countermeasures will be implemented at the piers and all of the debris will be removed from the west pier.

This work will be completed using stage construction.

G. Status of Environmental Coordination

We have received cultural clearances. We are awaiting biological, wetland, and special waste clearances.

Wetland Delineation is complete; we anticipate less than 0.1 acres to be impacted.

Local PESA report has been completed and submitted to Local Roads for review.

H. Status of Agency Coordination

We anticipate meeting with the local agencies shortly after this meeting to receive their feedback on the proposed improvements.

Regarding Stage Construction: We anticipate the Salt Creek Greenway bikepath to be temporarily closed during construction and will coordinate with the appropriate agencies accordingly.

The trail was funded by IDOT Congestion Mitigation Air Quality Program (CMAQ), IDNR's bike path program, and the DuPage Mayors and Managers Transportation Control Measures Program. Will this require 4(f) or 6(f) reports to be prepared?

It is our understanding that the Forest Preserve District of DuPage County entered an Intergovernmental Agreement with the EPD to lease certain properties along Salt Creek to the Park District.

I. Anticipated Design Exceptions

None anticipated

Project Schedule Design Approval is scheduled for November 2016

Item 3

Vicki Sykes

From: Winsauer, Liana <Liana.Winsauer@Illinois.gov>
Sent: Friday, September 23, 2016 11:18 AM
To: Vicki Sykes
Cc: Shauna Urlacher
Subject: RE: Lower Salt Creek Floodplain Mapping

Yes, we have reviewed the Lower Salt Creek watershed study, and concurred with the proposed mapping and certified the associated discharges. Please note that the proposed mapping will not become regulatory until finalized by FEMA.

Liana M. Winsauer
liana.winsauer@illinois.gov
Floodplain Studies Engineer
IDNR, Office of Water Resources
2050 W. Stearns Rd.
Bartlett, IL 60103
847-608-3166

From: Vicki Sykes [mailto:vsykes@v3co.com]
Sent: Friday, September 23, 2016 8:47 AM
To: Winsauer, Liana
Cc: Shauna Urlacher
Subject: [External] Lower Salt Creek Floodplain Mapping

Hello Liana,

DuPage County recently provided V3 with FEQ modeling for the Lower Salt Creek (cover page and 1st few pages of report attached). We are preparing an IDOT Hydraulic Report for the St. Charles Road Bridge over Salt Creek in Villa Park and have used this modeling to analyze the bridge capacity. It's our understanding that this modeling is going through the FEMA review process and is expected to become the regulatory model sometime in 2017.

Can you please confirm that IDNR-OWR has reviewed and approved this model?

Thanks so much.

Vicki Sykes, CFM, LEED AP BD+C
Senior Project Engineer

V3 Companies
7325 Janes Ave. Woodridge, IL 60517
Direct: 630.729.6288 | Fax: 630.724.9202 | Cell: 630.699.1019
vsykes@v3co.com | www.v3co.com

Village of Villa Park

20 South Ardmore Avenue, Villa Park, Illinois 60181-2696

DEPARTMENT OF PUBLIC WORKS

Phone (630) 834-8505
Fax (630) 834-8509

VYDAS JUSKELIS, P.E. • Public Works Director

September 29, 2016

Illinois Department of Transportation
Bureau of Local Roads & Streets Region 1 / District 1
201 W. Center Court
Schaumburg, IL 60196

Re: St. Charles Road Bridge Over Salt Creek
Section No. 15-00094-00-BR

I, Vydas Juskelis, hereby certify that to the best of my knowledge the St. Charles Road Bridge over Salt Creek has not been the cause of demonstrable flood damage and that: no building or structures have been impacted by the backwater induced by the existing bridge; and there is no record of complaints of flood damage associated with the St. Charles Road Bridge over Salt Creek.

Sincerely yours,

Vydas Juskelis 9/29/2016

Vydas Juskelis, P.E.
Public Works Director

VYDAS JUSKELIS
062-045747
REGISTERED
PROFESSIONAL
ENGINEER
STATE OF ILLINOIS

Expi 11/30/2017

cc: file - St. Charles Rd. Bridge

CITY OF ELMHURST
209 NORTH YORK STREET
ELMHURST, ILLINOIS 60126-2759
(630) 530-3000
www.elmhurst.org

September 29, 2016

Illinois Department of Transportation
Bureau of Local Roads and Streets Region 1 / District 1
201 W. Center Court
Schaumburg, IL 60196

Re: St. Charles Road Bridge Over Salt Creek
Section No. 15-00094-00-BR

I, Kent Johnson, hereby certify that to the best of my knowledge the St. Charles Road Bridge over Salt Creek has not been the cause of demonstrable flood damage. Furthermore there is no known record of building or structures that have been impacted by the backwater induced by the existing bridge; and there is no record of complaints of flood damage associated with the St. Charles Road Bridge over Salt Creek.

Sincerely,

Kent Johnson, P. E., CFM
City Engineer

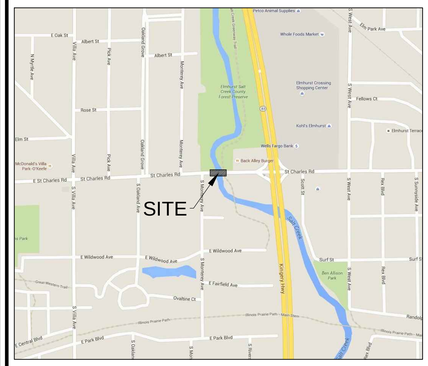
LICENSED PROFESSIONAL ENGINEER
KENT M. JOHNSON
062.064097
STATE OF ILLINOIS
EXP. 11/30/2017

SECTION V

SURVEY NOTES

TOPOGRAPHIC EXHIBIT
OF
ST. CHARLES ROAD BRIDGE OVER SALT CREEK
VILLA PARK, IL

PART OF THE SOUTHEAST QUARTER OF SECTION 3, AND THE NORTHEAST QUARTER OF SECTION 10, ALL IN TOWNSHIP 39 NORTH, RANGE 11 EAST OF THE THIRD PRINCIPAL MERIDIAN, IN DUPAGE COUNTY, ILLINOIS



VICINITY MAP
NOT TO SCALE

BENCHMARK

SOURCE:

STATION DESIGNATION: DUPAGE COUNTY 0100
ESTABLISHED BY: DUPAGE COUNTY
DATE: MARCH 2006

ELEVATION: 689.72 (PUBLISHED AND HELD)
DATUM: NAVD88
DESCRIPTION: BRASS DISK SET IN CONCRETE LOCATED AT THE NORTHEAST CORNER OF A BRIDGE FOR THE ILLINOIS PRAIRIE PATH OVER ILLINOIS ROUTE 83. STATION IS 63.0 FEET EAST OF THE EAST EDGE OF PAVEMENT OF ILLINOIS ROUTE 83 AND 8.0 FT SOUTH OF THE CENTERLINE OF THE ILLINOIS PRAIRIE PATH. MONUMENT IS A 3.5 INCH BRASS DISK ON THE TOP OF THE CONCRETE BASE OF THE NORTH HANDRAIL. MONUMENT IS 3.0 FT ABOVE GRADE.

STATION DESIGNATION: DUPAGE COUNTY YK03003
ESTABLISHED BY: DUPAGE COUNTY
DATE: UNKNOWN

ELEVATION: 671.22 (PUBLISHED AND MEASURED)
DATUM: NAVD88
DESCRIPTION: BRASS DISK IN CONCRETE LOCATED ALONG WEST AVENUE AT THE ENTRANCE TO COURTS PLUS (ELMHURST PARK DISTRICT) AND UTLEY AVENUE. STATION IS 31.0 FT NORTHWEST OF A FIRE HYDRANT, 22.0 FT WEST OF A WOODEN POWER POLE, AND 48 FT SOUTHWEST OF A CONCRETE LIGHT STANDARD. MONUMENT IS 1 FOOT BELOW GRADE.

SITE:
STATION DESIGNATION: SBM#1
ESTABLISHED BY: V3 COMPANIES
DATE: 06/08/16

ELEVATION: 664.56 (MEASURED)
DATUM: NAVD88
DESCRIPTION: CUT SQUARE ON NORTHEAST CORNER RETAINING WALL ALONG EAST SIDE OF MIXED USE PATH SOUTH OF AND BELOW ST. CHARLES ROAD BRIDGE

STATION DESIGNATION: SBM#2
ESTABLISHED BY: V3 COMPANIES
DATE: 06/08/16

ELEVATION: 664.47 (MEASURED)
DATUM: NAVD88
DESCRIPTION: CUT SQUARE ON SOUTHWEST CORNER RETAINING WALL ALONG EAST SIDE OF MIXED USE PATH NORTH OF AND BELOW ST. CHARLES ROAD BRIDGE

STATION DESIGNATION: SBM#3
ESTABLISHED BY: V3 COMPANIES
DATE: 06/08/16

ELEVATION: 671.66 (MEASURED)
DATUM: NAVD88
DESCRIPTION: BRASS DISK LOCATED ALONG 4.0 FT. NORTH OF NORTH BACK OF CURB OF ST. CHARLES ROAD AND 0.75 FT SOUTHWEST OF WEST END OF CONCRETE WALL ON BRIDGE OVER THE SALT CREEK.

THE ELEVATIONS ABOVE WERE KNOWN TO BE ACCURATE AT THE TIME THEY WERE ESTABLISHED. V3 DOES NOT CERTIFY TO THE ACCURACY THEREAFTER, NOR ASSUMES RESPONSIBILITY FOR THE MIS-USE OR MIS-INTERPRETATION OF THE INFORMATION SHOWN HEREON.

IT IS ADVISED THAT ALL OF THE ABOVE ELEVATIONS BE CHECKED BETWEEN EACH OTHER AND VERIFY A MINIMUM OF 3 SURROUNDING UTILITY RIM ELEVATIONS AND ANY ADJACENT BUILDING FINISHED FLOOR OR TOP OF FOUNDATION ELEVATIONS SHOWN HEREON PRIOR TO USE OR COMMENCEMENT OF ANY CONSTRUCTION OR OTHER WORK.

PERSONS USING THIS INFORMATION ARE TO CONTACT V3 IMMEDIATELY WITH ANY DISCREPANCIES FOUND PRIOR TO THE START OF ANY WORK.

GENERAL NOTES

1. COMPARE ALL POINTS IN FIELD PRIOR TO ANY CONSTRUCTION AND REPORT ANY DISCREPANCIES TO SURVEYOR AT ONCE.
2. FOR BUILDING RESTRICTIONS AS ESTABLISHED BY LOCAL ORDINANCES NOT SHOWN HEREON, CONSULT YOUR LOCAL MUNICIPAL AUTHORITIES.
3. DO NOT SCALE DIMENSIONS FROM THIS MAP.
4. CALL J.U.L.I.E. AT 1-800-892-0123 FOR FIELD LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO ANY DIGGING OR CONSTRUCTION.
5. UTILITIES AND IMPROVEMENTS SHOWN HEREON BASED ON VISIBLE FIELD VERIFIED STRUCTURES.
6. BOUNDARY INFORMATION SHOWN HEREON, IF ANY EXISTS, IS FOR GRAPHICAL DEPICTION ONLY.
7. THE OWNER SHOULD COMPARE THE DESCRIPTION ON THIS MAP, IF ANY EXISTS, WITH HIS, OR HER DEED ABSTRACT, OR TITLE POLICY AND NOTIFY SURVEYOR OF ANY DIFFERENCES.
8. THIS MAP DOES NOT CONSTITUTE A PLAT OF SURVEY.
9. UNDERGROUND UTILITY LINES SHOWN HEREON ARE BASED ON FIELD LOCATED STRUCTURES IN COORDINATION WITH ATLAS INFORMATION PROVIDED BY UTILITY COMPANIES THROUGH J.U.L.I.E.'S DESIGN STAGE PROCESS. SEE "UTILITY ATLAS NOTES" HEREON FOR SPECIFICS.

BASIS OF BEARINGS

THE BASIS OF BEARINGS IS THE STATE PLANE COORDINATE SYSTEM (SPCS) NAD 83 (2007) ZONE 1201 (ILLINOIS EAST) WITH PROJECT ORIGIN AT:
LATITUDE: 41-53-24.1292 N
LONGITUDE: 87-57-48.8352 W
ELLIPSOID HEIGHT: 560.376
GROUND SCALE FACTOR: 1.0000401564
ALL MEASUREMENTS ARE ON THE GROUND.

STATE PLANE MERIDIAN

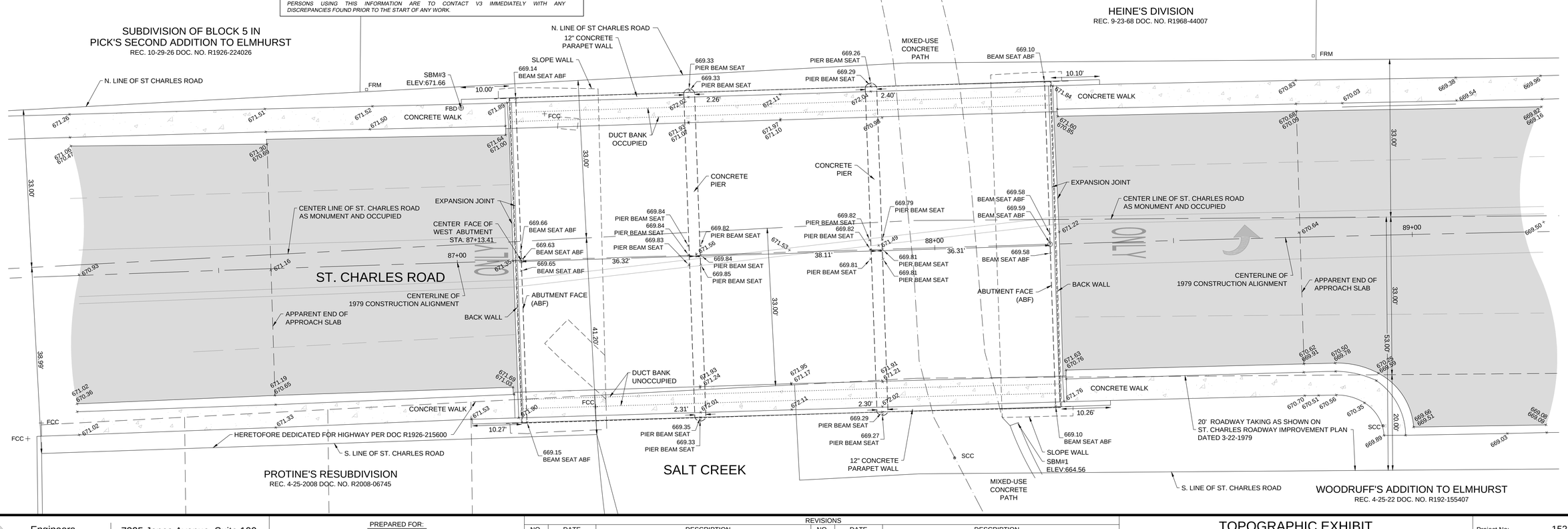
GRAPHIC SCALE

10 0 5 10 20 40

1" = 10'

LEGEND

782.62 / 782.12	EXISTING TOP OF CURB ELEVATION / EXISTING EDGE OF PAVEMENT ELEVATION
+782.83	EXISTING SPOT ELEVATION
⊕ FBD	FOUND BRASS DISC
⊠	FOUND ROW MARKER
○ FIR	FOUND IRON ROD
○ FPK	FOUND PK NAIL
○ FMG	FOUND MAG NAIL
+ FCC	FOUND CUT CROSS
○ FIP	FOUND IRON PIPE
	ASPHALT PAVING OR WATER (LABELED)
	CONCRETE



Engineers
Scientists
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PREPARED FOR:

VILLAGE OF VILLA PARK
20 S. ARDMORE AVE.
VILLA PARK, IL 60181-2696
630-592-6072

REVISIONS

NO.	DATE	DESCRIPTION	NO.	DATE	DESCRIPTION
1	06/17/16	UPDATED TO INCLUDE R.O.W. & CENTERLINE DATA			

TOPOGRAPHIC EXHIBIT

ST. CHARLES ROAD BRIDGE OVER SALT CREEK, VILLA PARK, IL

DRAFTING COMPLETED:	06/09/16	DRAWN BY:	EJM	PROJECT MANAGER:	GVB
FIELD WORK COMPLETED:	06/08/16	CHECKED BY:	GVB	SCALE:	1" = 10'

Project No: 15228
Group No: VP03.1
SHEET NO. 1 of 1

E:\2015\15228\Drawings\ACAD\SYS\TOP\15228_BRIDGE_20160608.dwg, 6/17/2016 4:01:51 PM, emurray

S ARNOW

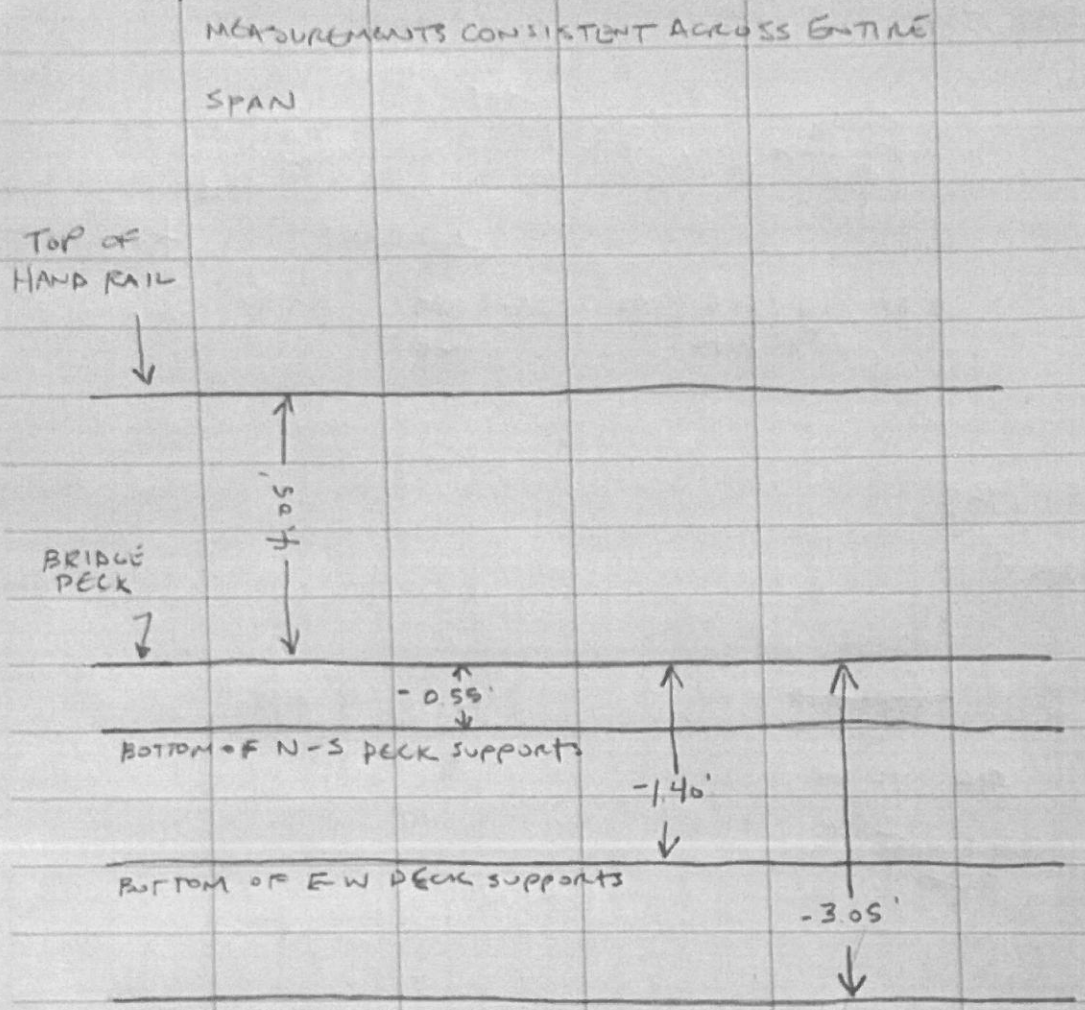
11/20/15

15228

PED BRIDGE DETAILS

WO 21755

* MEASUREMENTS CONSISTENT ACROSS ENTIRE SPAN



FROM NORTH END OF BRIDGE, 72.5' SOUTH, -7.4' FROM BRIDGE DECK IS TBK

FROM NORTH END OF BRIDGE, 35' SOUTH, -7.0' FROM BRIDGE DECK IS BBK

SECTION VI

DATA CD