



**To:** El Paso County Engineering Division

**From:** Mike Bramlett, PE

**Date:** August 16, 2022

**Subject:** Sand Creek Center Tributary Channel Improvements

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The purpose of this letter is to provide design information for the existing conditions of the Sand Creek Center Tributary Drainageway, located east of the Solace Apartments site. This letter will also discuss the proposed improvements for the channel, design methodology, and the modeling results. For further information on the previous evaluation of the channel in its existing conditions and conceptual design, see the *Sand Creek – Center Tributary Channel Analyses Report for Solace Apartments* by JR Engineering. For further information concerning drainage for the Solace Apartments Site, see the *Final Drainage Report for Solace Apartments*, by JR Engineering.

### **Project General Discussion**

The Sand Creek Center Tributary Channel is located in Section 7, Township 14 South, Range 65 West of the 6<sup>th</sup> Principal Meridian in El Paso County, Colorado. The site is part of the Solace Apartments project and is located on the eastern edge of the project. As part of the proposed improvements for the Solace Apartments Project, this reach of the Sand Creek Center Tributary will also be improved. The sections upstream and downstream of the site have already undergone improvements, and the channel in its current state shows extensive flooding in a 100 year event. In addition to improvements to the Sand Creek Center Tributary Channel, the channels secondary drainageway located to the west of the channel in Paonia Street will also be improved with an overflow channel that will direct flow present in the secondary drainageway into the main channel and avoid further flooding of the Paonia Street extension into the Solace Apartments site.

### **Channel Flows**

Evaluation of the flows present in the Sand Creek Center Tributary and its secondary drainageway were discussed in detail in the *Sand Creek – Center Tributary Channel Analysis for Solace Apartments* by JR Engineering. Since the initial analysis of the channel took place, JR Engineering was able to acquire the modeling data used by FEMA for determination of flood plain modeling shown in FEMA FIRM 08041C0752G. JR Engineering assumes FEMA's flows to be accurate, and thus utilized these as the basis for our model. The main channel contains 820 cfs of flow and the secondary channel contains 217 cfs. The flow in the main channel then jumps up to 1,037 cfs at the convergence of the secondary drainageway. The convergence of these flows occurs just upstream of the Galley Road crossing, where existing topography directs the secondary drainageway into the main channel. Downstream an existing channel coming from nearby Valley Road (east)

converges with the main channel; we then utilized FEMA's 1,100 cfs to model the remaining portion of the channel.

### **Existing Channel Conditions**

In its existing conditions the Sand Creek Center Tributary Channel along the Solace site consists of a natural channel overgrown with trees and bushes along the sides of the channel with the bottom being relatively clean and free of obstacles. The 1,350 LF reach of the Sand Creek Center Tributary Channel located incorporated with the Solace site is undeveloped, as compared to the majority of channels in the basin which have had some improvement. Downstream and upstream sections of the Sand Creek Center Tributary Channel are concrete lined. The secondary Drainageway located in Paonia Street flows south from Omaha Blvd to the Solace Apartments site where flow splits between an existing concrete channel running east to the main Sand Creek Center Tributary Channel, and a swale flowing south where it eventually rejoins the main channel at the Galley Road crossing. It is anticipated that the concrete channel will divert 42 cfs from the 217cfs present in the secondary drainageway, with 175 cfs flowing south down the existing swale. There is also an existing channel coming from Valley Road to the east. This channel intersects the main channel approximate halfway between the north and south limits of the site, adding 63 cfs to the main channel, as discussed in the Channel Flows section above. In its existing conditions, the Sand Creek Center Tributary Channel FEMA firm panel 08041C0752G, depicts 100 year flooding extending into the adjacent properties to the east and onto Paonia Street improvements to the west. The existing channel currently overtops the Galley Road crossing; primarily due to the capacity of the culverts at the crossing rather than the channel's current conditions.

### **Proposed Channel Improvements**

As determined by the Sand Creek Drainage Basin Planning Study (DBPS) & and JR Engineering Sand Creek – Center Tributary Channel Analysis for Solace Apartments, this section of the Sand Creek Center Tributary will require improvements to ensure adequate capacity in the channel and protection against erosive velocities. In order to be consistent with improvements already made in the surrounding area and to align with the recommendations made by the DBPS, JR Engineering is proposing concrete lining of the channel along the Solace site, along with widening of the existing channel and modification to the channel alignment in this area. JR Engineering is also proposing the addition of a USBR Type III Stilling Basin and 10 foot sloped concrete drop in the channel, in order to force a hydraulic jump in the channel and reduce velocities present in the channel while still matching existing grades for the majority of channel alignment. The design methodology of the sloped drop and USBR Type III Stilling Basin are based on the design procedure for Stilling Basins presented in the Federal Highway Administrations Hydraulic Engineering Circular No. 14, Chapter 8. Calculation for stilling basin and accessories sizing can be found in the Appendix of this letter. The proposed channel section shall be a trapezoidal channel section with a 10' bottom width, with a minimum channel depth of 6.5' and side slopes varying from 3:1 to 2:1 along the channel's alignment. The channel shall be lined with concrete for a depth of 5' to protect the channel from the erosive velocities present in the channel, with an average depth of flow in a 100 year event for the proposed channel being approximately 4.5-5' this will provide a minimum freeboard of 2'-1.5' from the top of the channel to the 100 year water surface, adhering to the DCM Volume 1 for minimum freeboard of 1.4'. The concrete section shall typically be a 6" thick concrete apron for the channel, with sections of the section of channel located within the sloped drop and stilling basin being a 12"

thick concrete apron. In accordance with the DBPS the channel shall be designed with a stable slope of 1% for the majority of the channel. For further details please see the Channel Improvement Plans included in the Appendix of this letter. In order to reduce the velocities present in the channel and avoid excessively steep slopes for extended portions of the channel's alignment, a 100' long sloped drop structure, with a total vertical drop of 10', will be placed at the upstream end of the channel. At the base of the drop will be a USBR Type III Stilling Basin that will include chute blocks, baffle blocks and a sill wall to decrease the velocity of the water coming down the sloped drop and force a hydraulic jump. This basin will also include a low flow channel through the sill wall located at the end of the stilling basin to allow water movement through the structure at lower flows and prevent ponding of water in the structure. Further detail for the sloped drop and stilling basin can be found in the channel improvement plans shown in the Appendix.

### **Paonia Street Secondary Drainageway Improvements**

Part of the Sand Creek Center Tributary Improvements also includes the addition of a diversion channel that will direct flows present in the Paonia Street Secondary Drainageway into the main channel. This diversion will be known as the Overflow Channel for the remainder of this letter. Just north of the Overflow Channel, the existing Paonia Street is partially supered in existing conditions routing all flows present in the street to the east side. With major flows present in the existing Paonia Street present on the east side of the road, the Overflow channel will act as a large opening weir and divert flows to the main channel. The Overflow Channel shall be a concrete and riprapped lined channel with varying widths and depths that will convey the flows present in Paonia Street into the main channel. The diversion channel shall be concrete from the edge of Paonia to the right-of-way, after which it will become a riprap trapezoidal channel section with a typical bottom width of 20' and a depth of 2'-3'. The channel will run east from Paonia until it intersects with the proposed Sand Creek Center Tributary Channel alignment, where it will outfall just upstream of the proposed sloped drop in the channel. Just south of the diversion channel opening along Paonia Street will be two 15'type R inlets, that will be used to capture nuisance flows in the curb & gutter and also any flow that may bypass the diversion channel. These inlets are a redundant and not intended to capture any flows present in Paonia as the Overflow Channel is sized and designed to capture all flows present in Paonia; each inlet has a total intercept capacity of 17cfs for a total of 34cfs combined. These inlets will directly outfall into the main channel and will not be detained by any of the onsite detention ponds. For further detail on the diversion channel please see the channel improvement plans, and for detail on the type R inlets see the exert of the Solace Construction Drawings, both shown in the Appendix of this letter.

### **Modeling Results**

The proposed conditions of the channel and its second Drainageway were modeled using GeoHecRas to determine the extents of the 100 year floodplain for the site. Flow rates from the model were used based on those discussed in the Channel Flows section and Existing Conditions section of this letter. The model was run with downstream boundary conditions for each reach using critical depths, and the entirety of the model was ran using steady flow conditions. The model was contains four separate reaches, with the main reach modeling the proposed alignment and conditions for the Sand Creek Center Tributary Channel. The other reaches modeling the Paonia Street Overflow Channel, the existing concrete overflow channel at Paonia and an existing channel that runs east to west from Valley Street and intersects the Sand Creek Center Tributary Channel, each reach

intersection were modeled using the energy equation. The model used Manning's values (n) of 0.013 for the concrete lining, 0.033 for the riprap of the overflow channel, and 0.03 for the any location outside of the concrete or riprap extents as they were determined to be most similar to a grassed area with some weeds. The results of the GeoHecRas model show that the proposed improvements to the channel substantially reduce the extents of the flood plain in the channel and contain the 100 year flood plain within the concrete extents of the channel. The results also show a maximum velocity in the channel of 10.32 ft/s in a 100 year event, showing that the concrete lining of the channel will provide sufficient protection from erosive velocities present in the channel. The GeoHecRas model for the proposed conditions also shows overtopping of the channel crossing at Galley Road, which is consistent with the flood data presented by the FEMA FIRM 08041C0752G. Flooding of the roadway is due to the insufficient capacity of the culvert crossing in this area, with the current configuration of three 48" CMP culverts only providing 365 cfs of capacity of the 1,100 cfs flow at the crossing. Flooding of the Galley Road Crossing could be alleviated by upsizing of the culvert(s), these improvements will be necessary when the County deems the historic overtopping of Galley Road to be above acceptable tolerance. *The channel improvements did not results in any change to existing overtopping of Galley Road as this is due to insufficient capacity of the culverts at this crossing, which will ultimately be addressed at a later date.* Further details on the model results can be found in the Appendix.

## Summary

The analysis of the proposed improvements of the Sand Creek Center Tributary Drainageway and its secondary drainageway located in Paonia Street show significant reduction of the flood plain extents, with it now being contained within the channel extents and no longer extensively flooding properties adjacent the proposed Solace Apartment Site. The proposed diversion channel also redirects flow that would otherwise flood the proposed extension of Paonia Street back into the channel, thus alleviating the risk of the roadway flooding in a 100 year event.

## Letter Amendment

This section of the report give an overview of the revised channel design for the drop structure located within the channel. The proposed revisions to the model will only change the length and the slope of the proposed sloped drop at the start of the USBR Type III Stilling basin. The dimensions of the baffle blocks located within the stilling basin will slightly modify as well, but the length of the basin and overall design concept will remain the same and unchanged. The primary change will be the lengthening of the sloped dropped portion of the basin to add 40' more feet to the sloped drop, thus also lowering the slope of the drop from 10% to 7.43%. This change still results in no rise of the 100yr floodplain. Calculations, results and plans can be found in the attached **Amendment Appendix**.

As the 100 yr water surface elevation changed per your profile below is the minimum freeboard per DCM still met? Please address.

Per the profile below the 100 yr water surface elevation (WSE) increased, how does this new WSE compare with the FEMA floodplain elevations? The FEMA floodplain elevations may be provided on the profile on sheet 4 of 10.



Please contact me should you have any questions or concerns regarding this letter at 303-740-9393.

Sincerely,

**JR ENGINEERING, LLC**

A handwritten signature in blue ink that reads "Mike Bramlett". The signature is written in a cursive, flowing style.

Mike Bramlett, PE

JR Engineering



## USBR Type III Drop and Stilling Basin

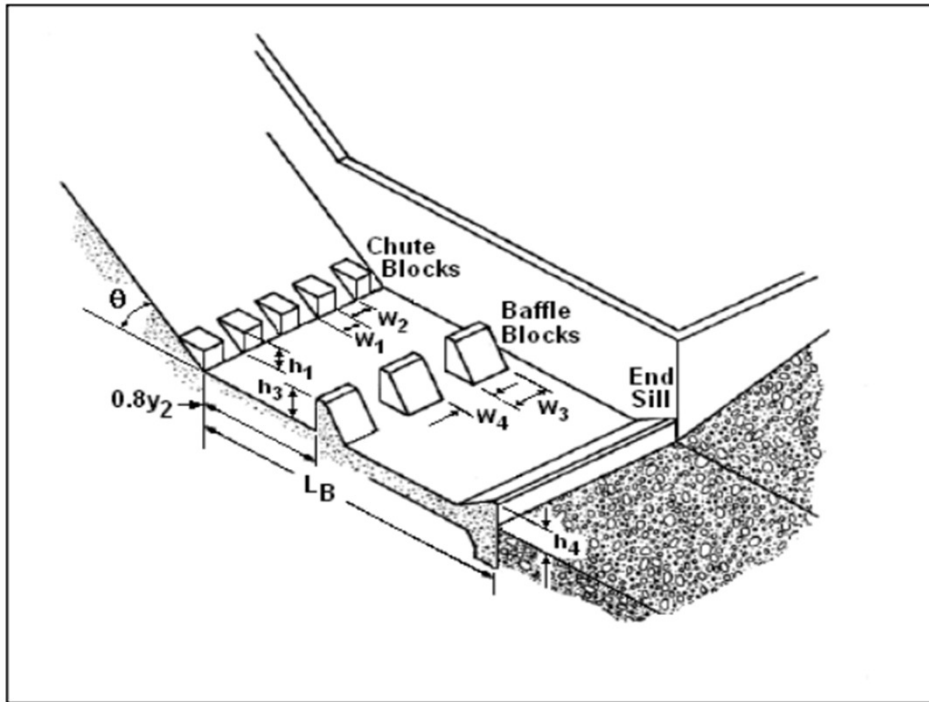
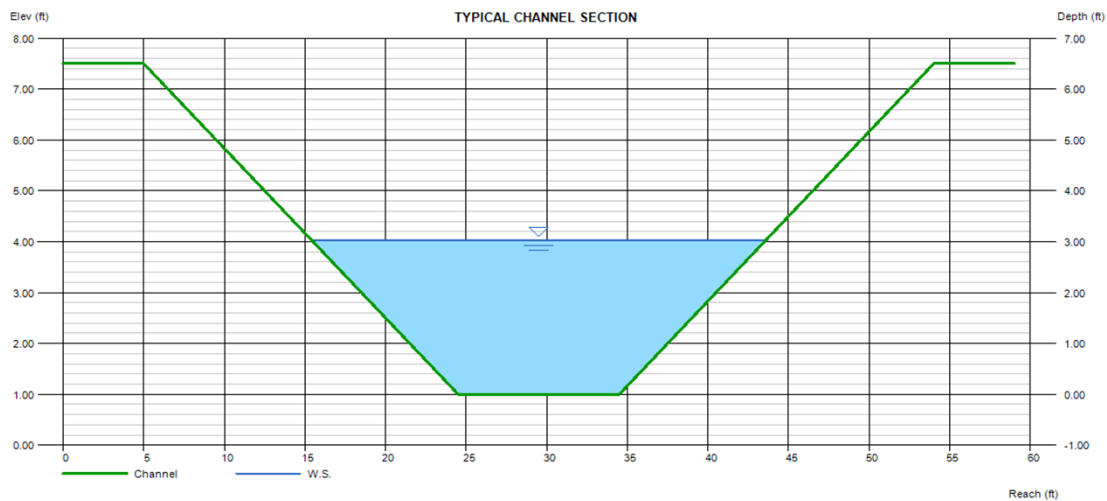


Figure 8.3. USBR Type III Stilling Basin

### Design of Energy Dissipators for Culverts and Channels

#### Upstream Channel Parameters

Channel Flow (Q)	1037 cfs
Channel Bottom Width	10 ft
Sill Slopes (Z:1)	1
Channel Total Depth	6.5 ft
Channel Depth (y1)	3.02 ft
Drop Crest Width	35 ft
Upstream Slope	1.00%



## USBR Type III Drop and Stilling Basin (cont...)

### FHWA Criteria Checks

Unit Discharge Over Crest	29.63	cfs/ft	Limit=200 cfs/ft
Transition Slope (St)	10.00%	> as $\Theta$	5.71 °
Velocity Entering Basin(V)	41.04	ft/s	Limit=60 ft/s
Channel Depth Entering Basin (d)	1.68	ft	
Transition Length (St)	120	ft	
Basin Width (Wb)	10	ft	

### Basin Parameter Calculations

$$\text{Froude Number entering Basin: } \frac{V}{(gd)^{1/2}} = 5.579879$$

Determine  $L_b/Y_2$  value from FHWA Table 8.2

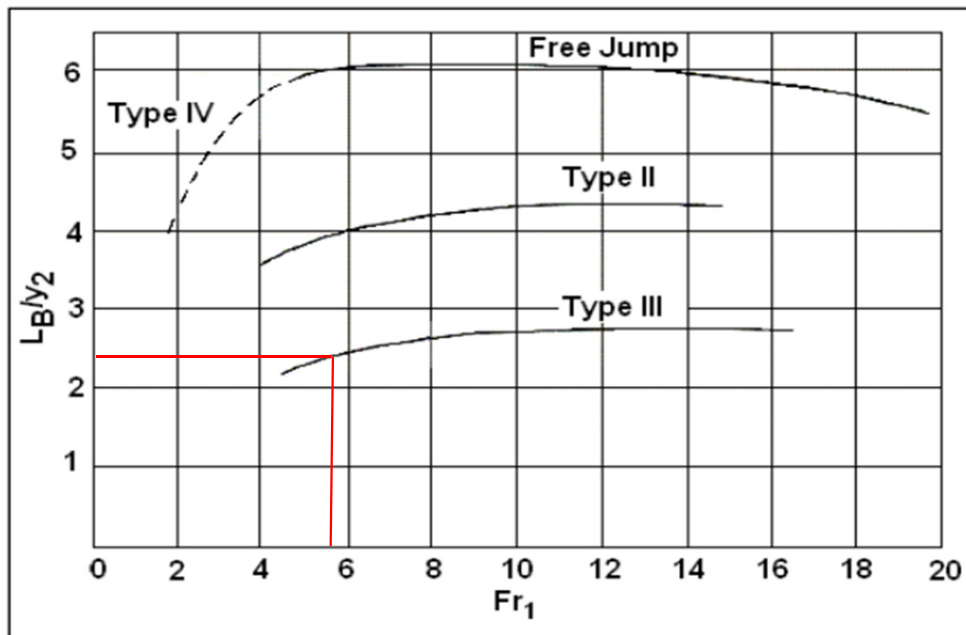


Figure 8.2. Length of Hydraulic Jump on a Horizontal Floor

$L_b/Y_2$ : 2.5      Conservative Approximation

Calculate  $Y_2$

$$Y_2: \frac{C * y_0}{2} (\sqrt{1 + 8Fr} - 1) = 12.4437 \text{ ft}$$

Length of Basin ( $L_b$ ): 31.1092536 ft

$$\text{Length of Basin Floor to Sill Top (Lt): } \frac{L_T(S_T - S_o) - L_b * S_o}{S_s + S_o} = 10.59486 \text{ ft}$$

### USBR Type III Drop and Stilling Basin (cont...)

Basin Element Sizing

Determine Number of Chute Blocks ( $N_c$ ):	$\frac{W_b}{2y_1}$	=	2.98 → 3
Chute Block Width and Spacing ( $W_1$ & $W_2$ ):	$\frac{W_b}{2N_c}$	=	1.666667
Baffle Block Height( $h_3$ ):	$y_1(0.168 * Fr + 0.58)$		2.549265 ft
Number of Baffle Blocks ( $N_b$ )	$\frac{W_b}{1.5h_3}$	=	2.615133 → 3
Baffle Width and Spacing ( $W_3$ & $W_4$ )	$\frac{W_b}{2N_b}$	=	1.666667
End Sill Height ( $h_4$ )	$y_1(0.0536 * Fr + 1.04)$		2.249657 ft
$0.8*Y_2$			9.95496114 ft

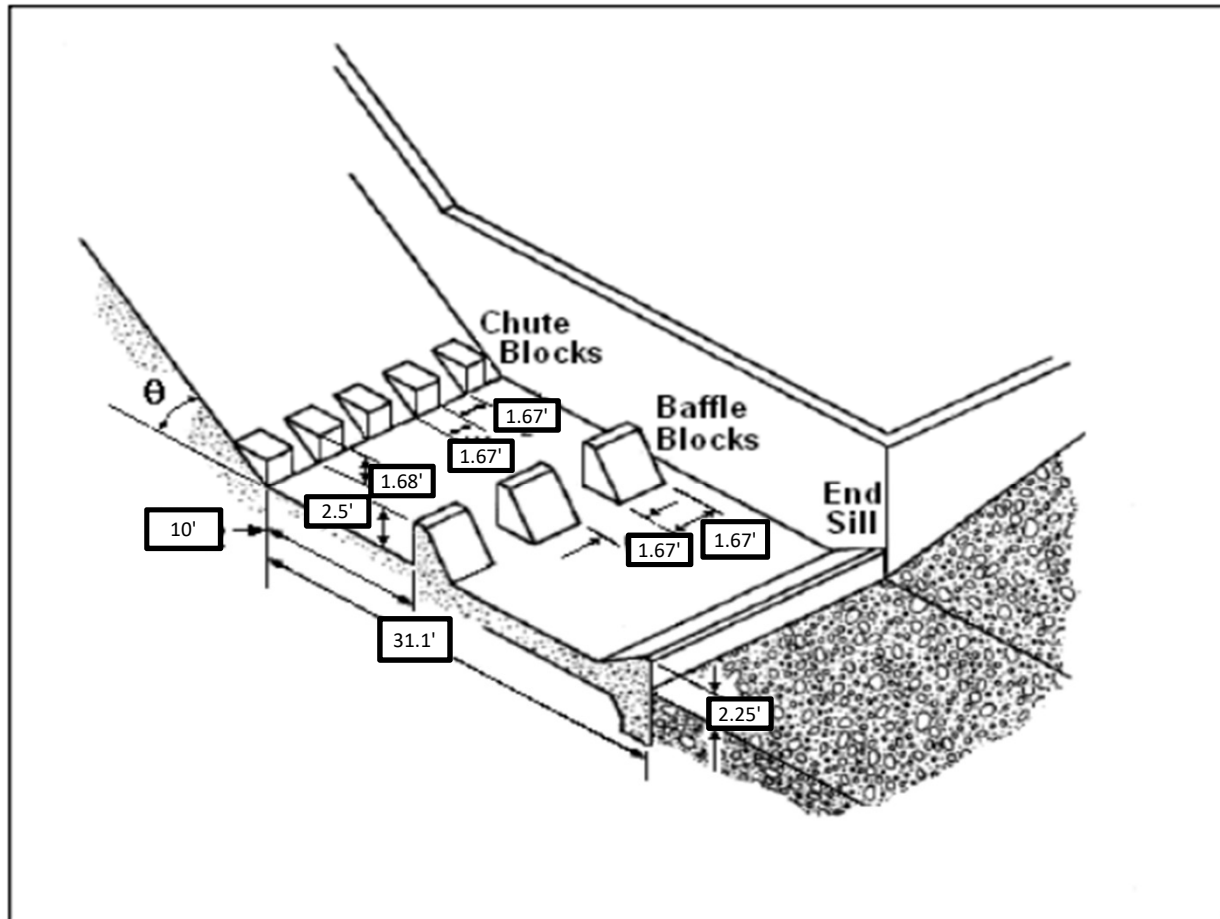
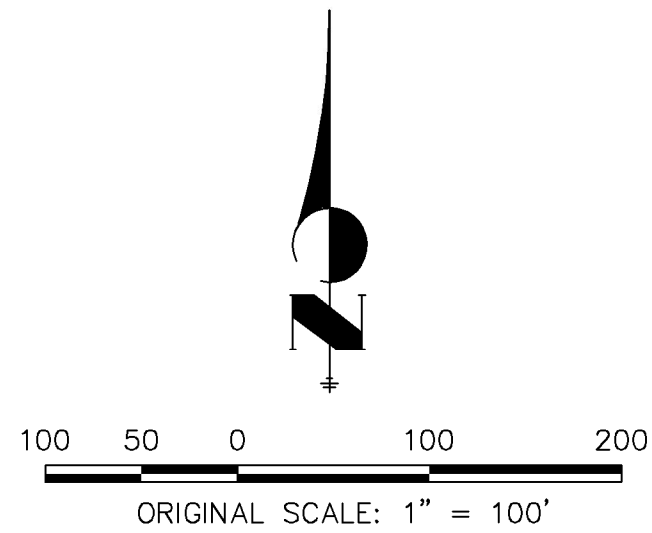
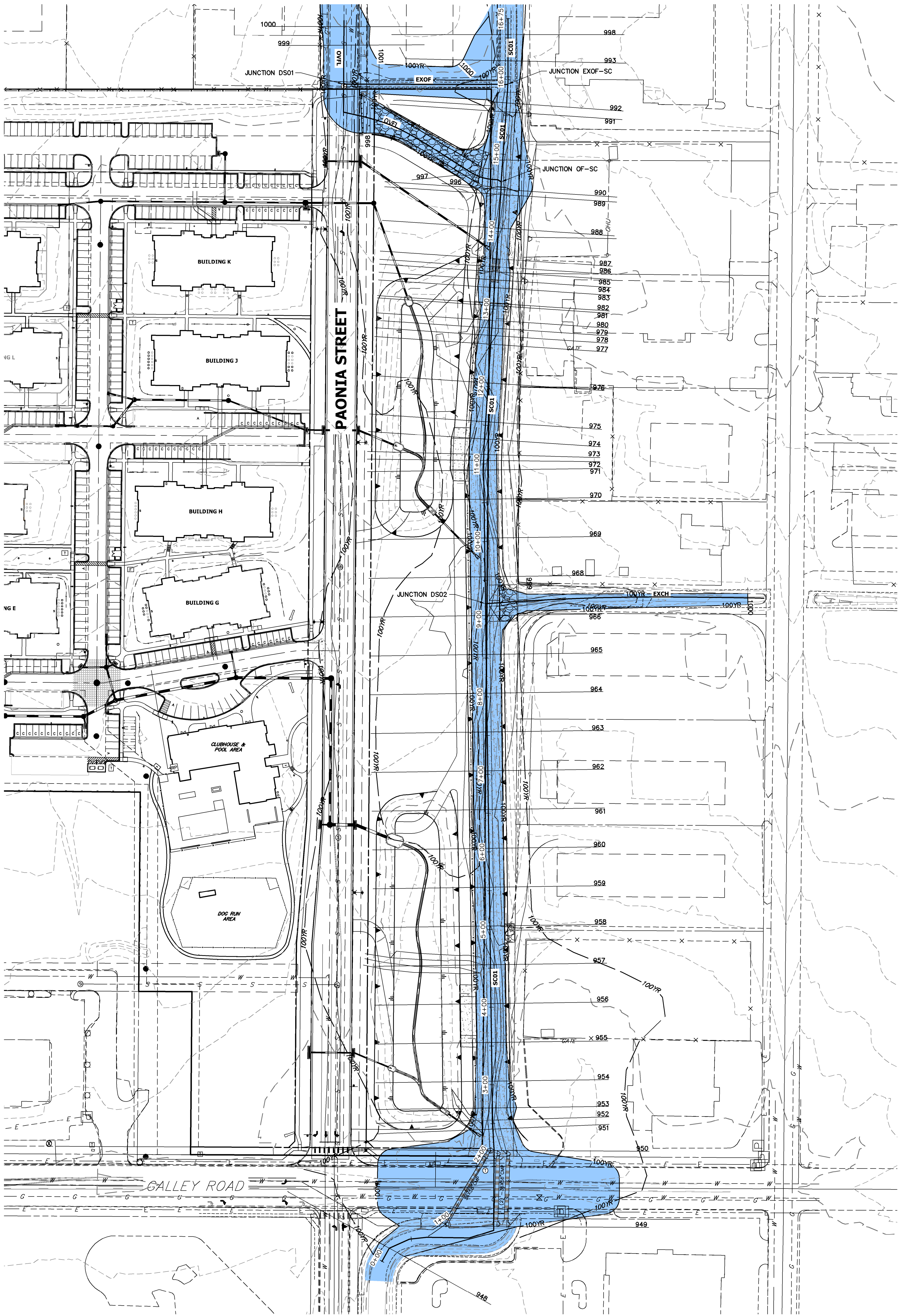


Figure 8.3. USBR Type III Stilling Basin



# SAND CREEK CHANNEL GEOHECRAS MODEL OVERLAY



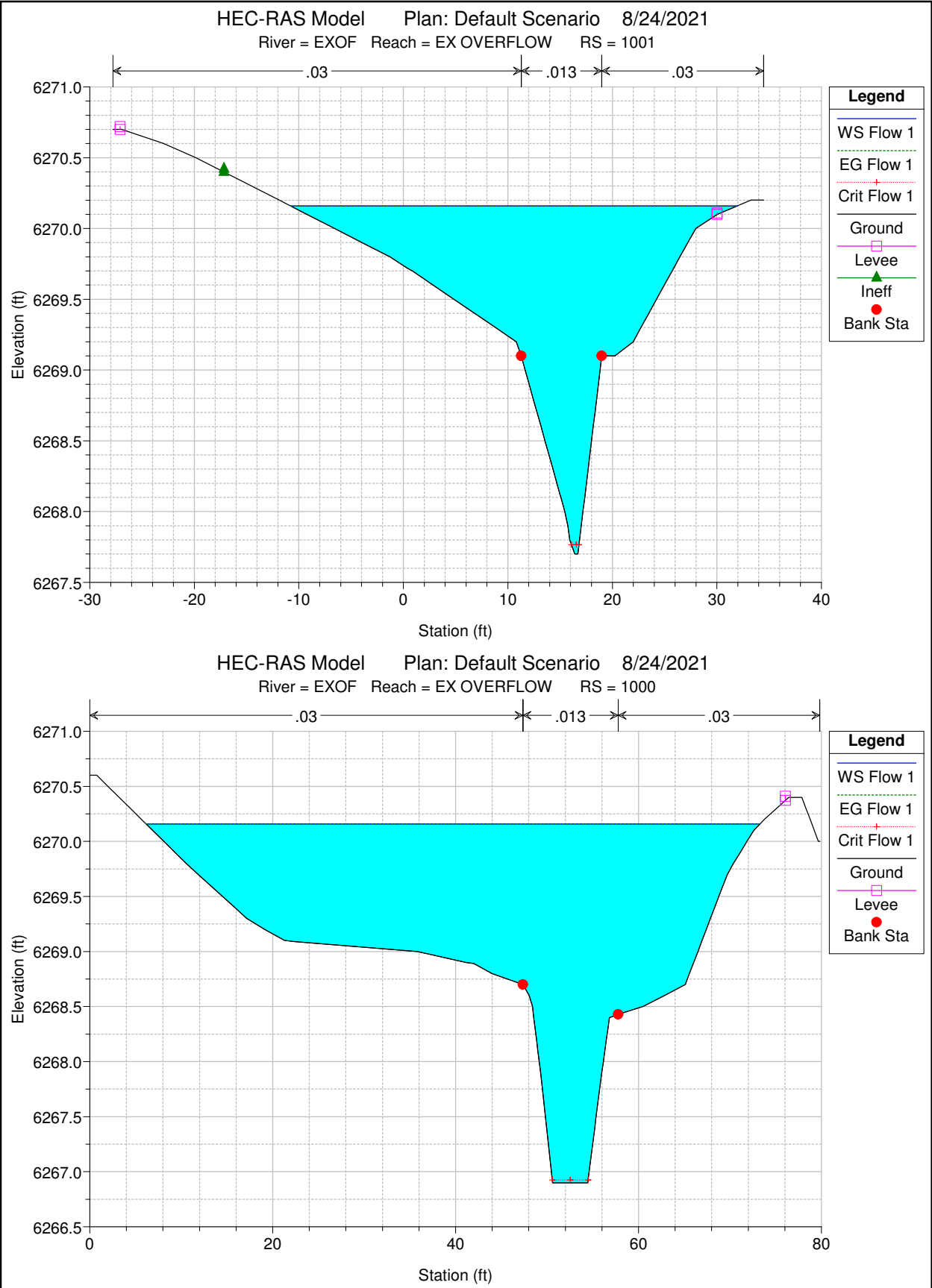
GEOHECRAS MODEL OVERLAY  
SAND CREEK CHANNEL  
JOB NO. 25174.00  
08/24/21  
SHEET 1 OF 1

 **J-R ENGINEERING**  
A Westrian Company

Centennial 303-740-9393 • Colorado Springs 719-593-2593  
Fort Collins 970-491-9888 • [www.jrengineering.com](http://www.jrengineering.com)







HEC-RAS Model    Plan: Default Scenario    8/24/2021

River = EXOF    Reach = EX OVERFLOW    RS = 1000

Elevation (ft)

6271.0

6270.5

6270.0

6269.5

6269.0

6268.5

6268.0

6267.5

6267.0

6266.5

Station (ft)

0

20

40

60

80

Legend

WS Flow 1

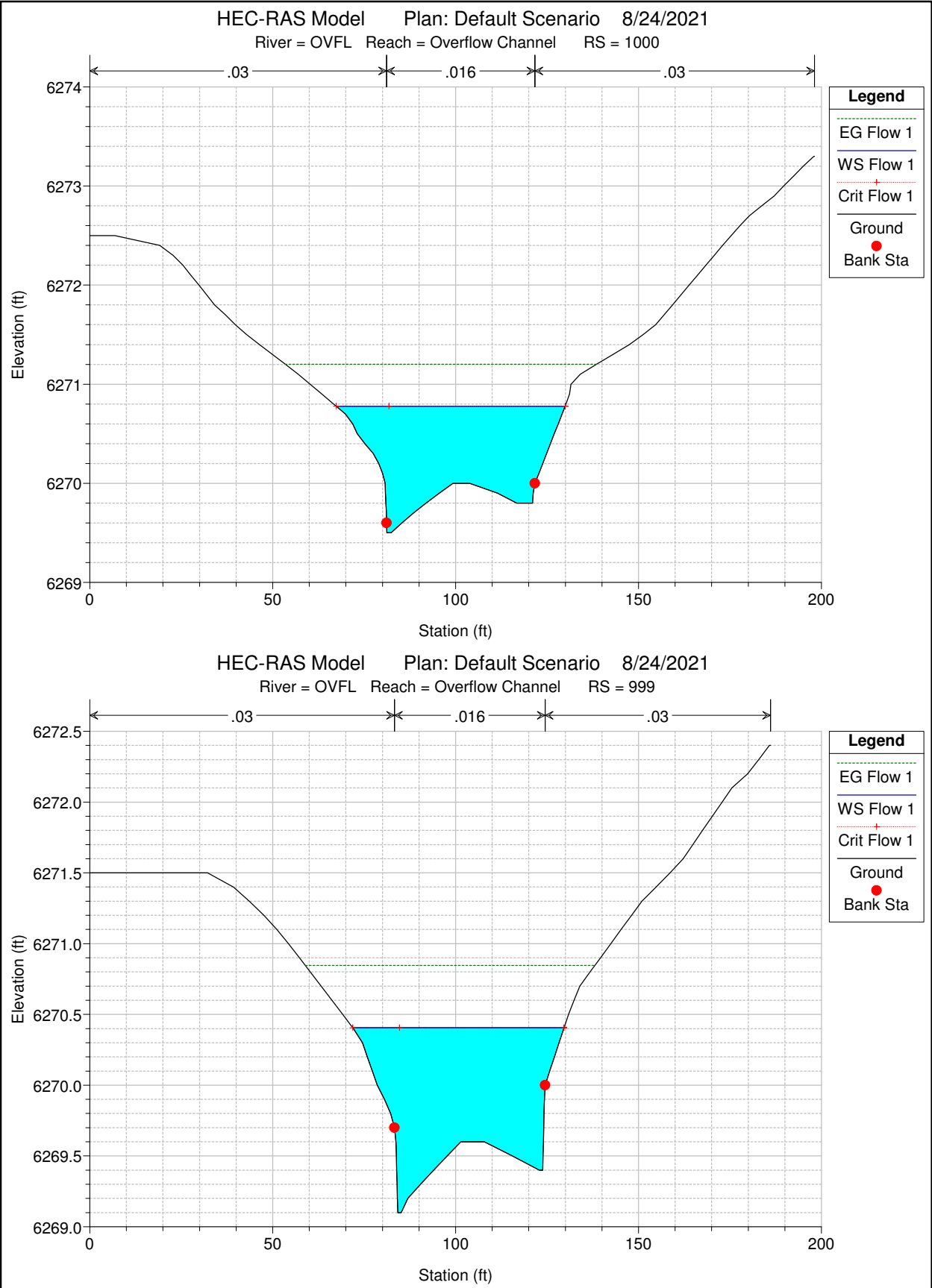
EG Flow 1

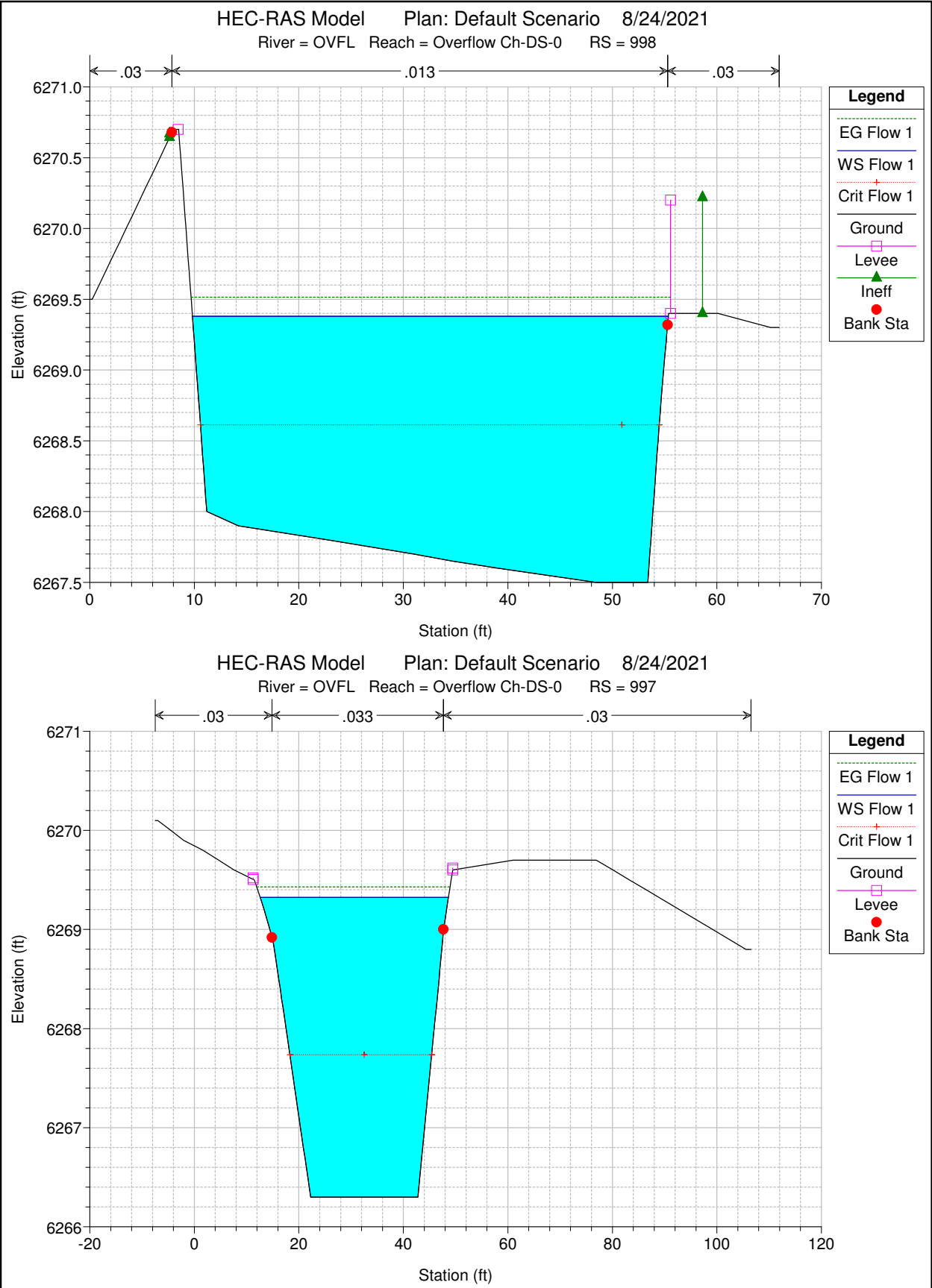
Crit Flow 1

Ground

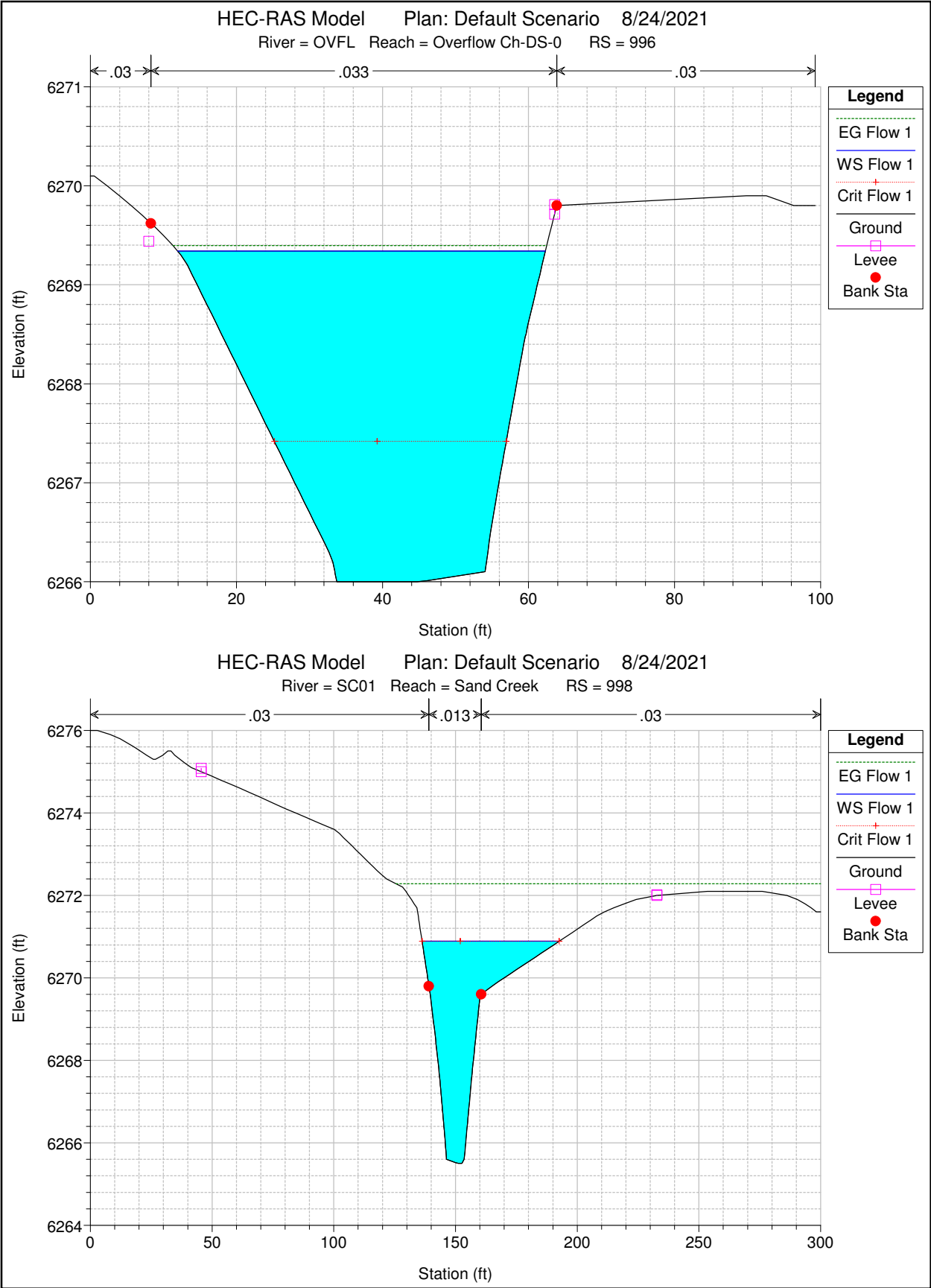
Levee

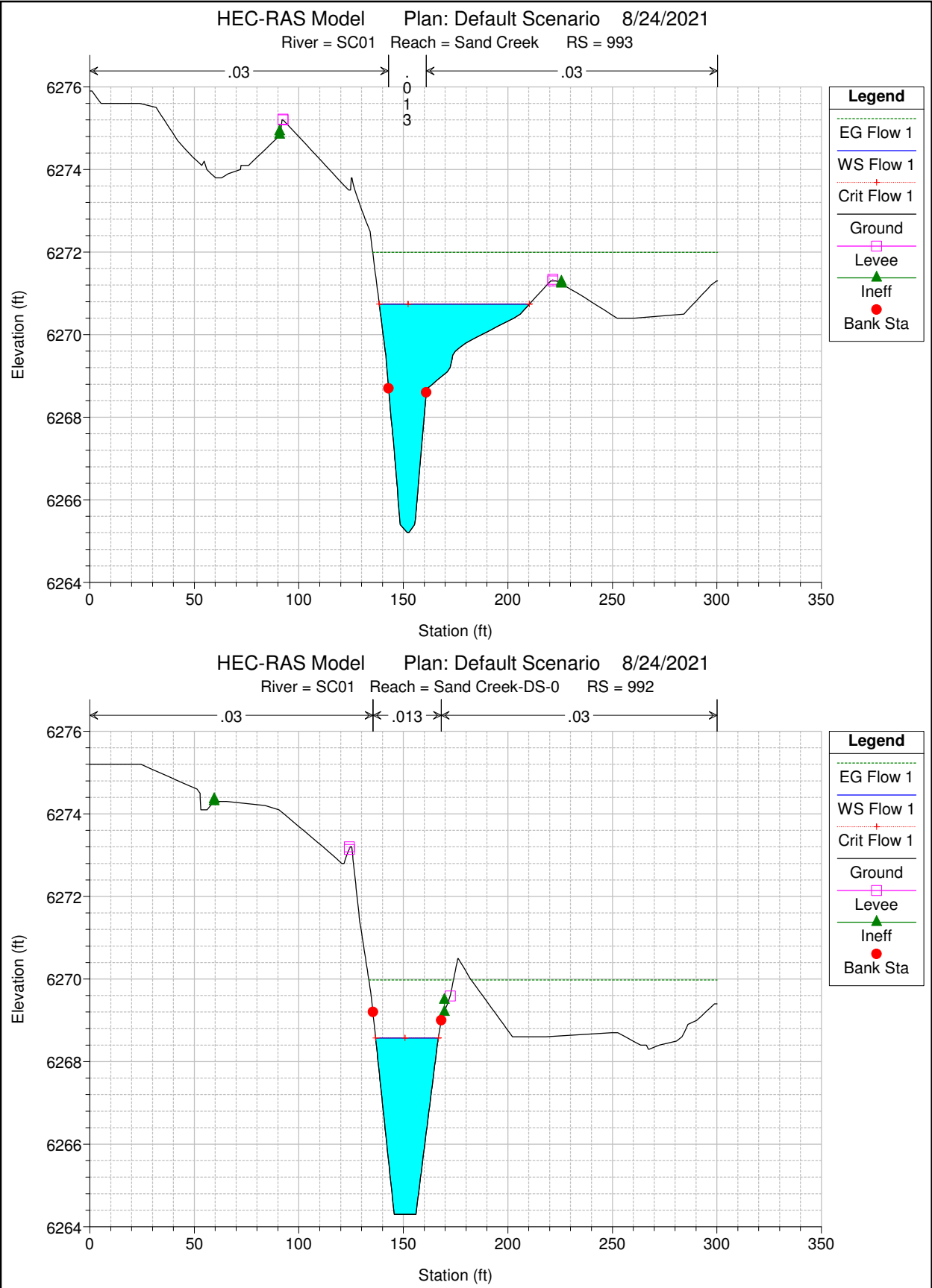
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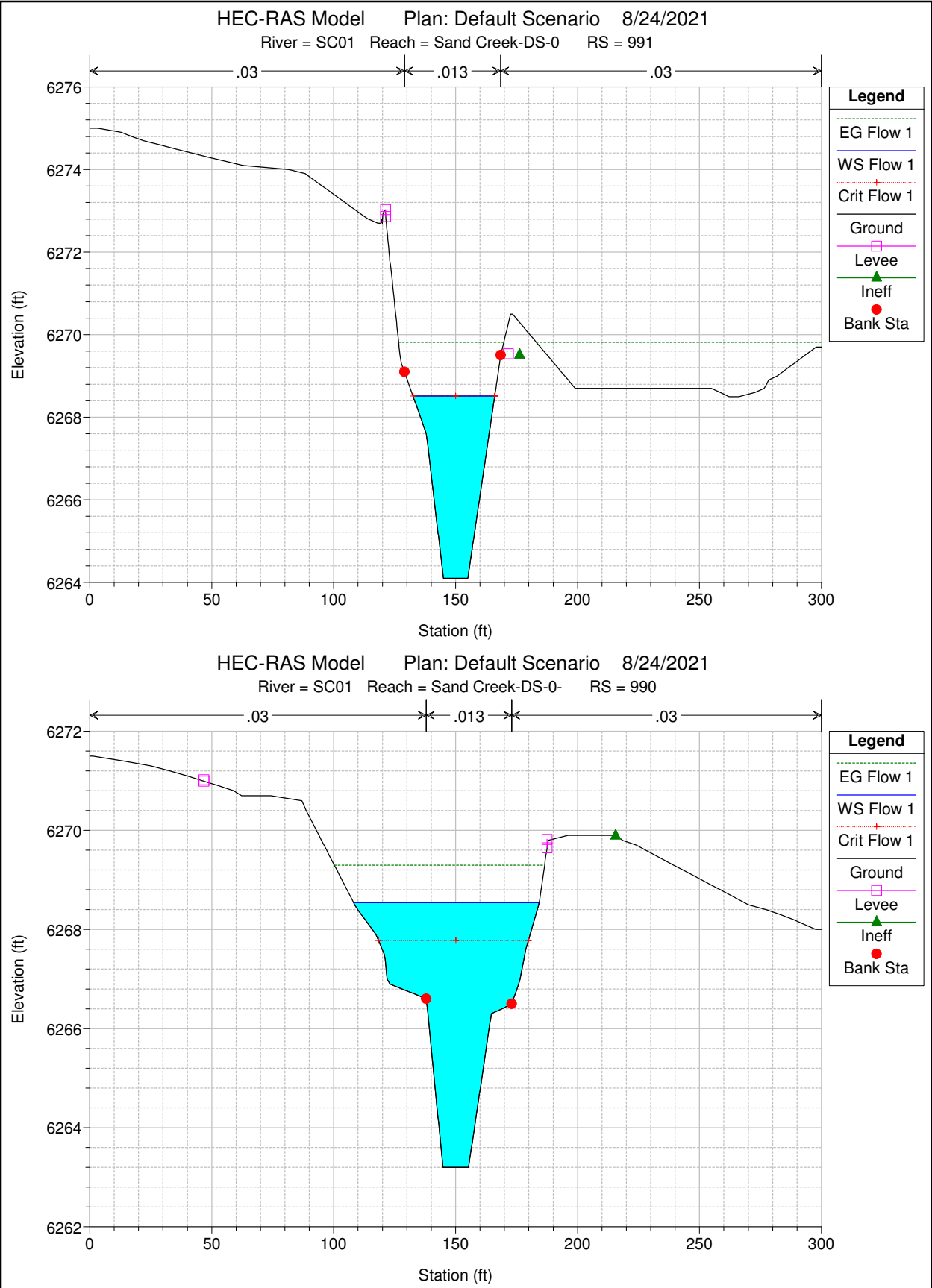


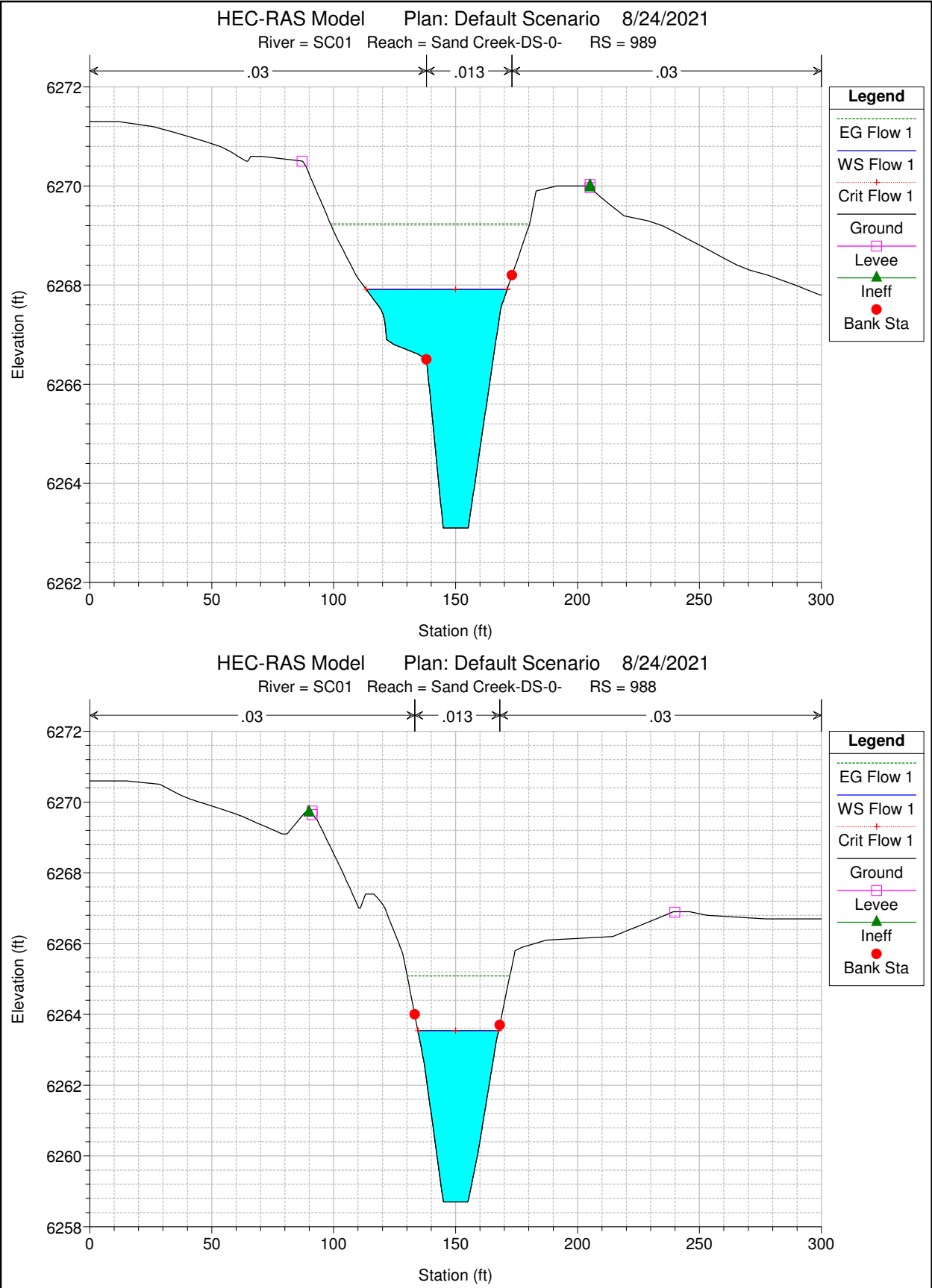


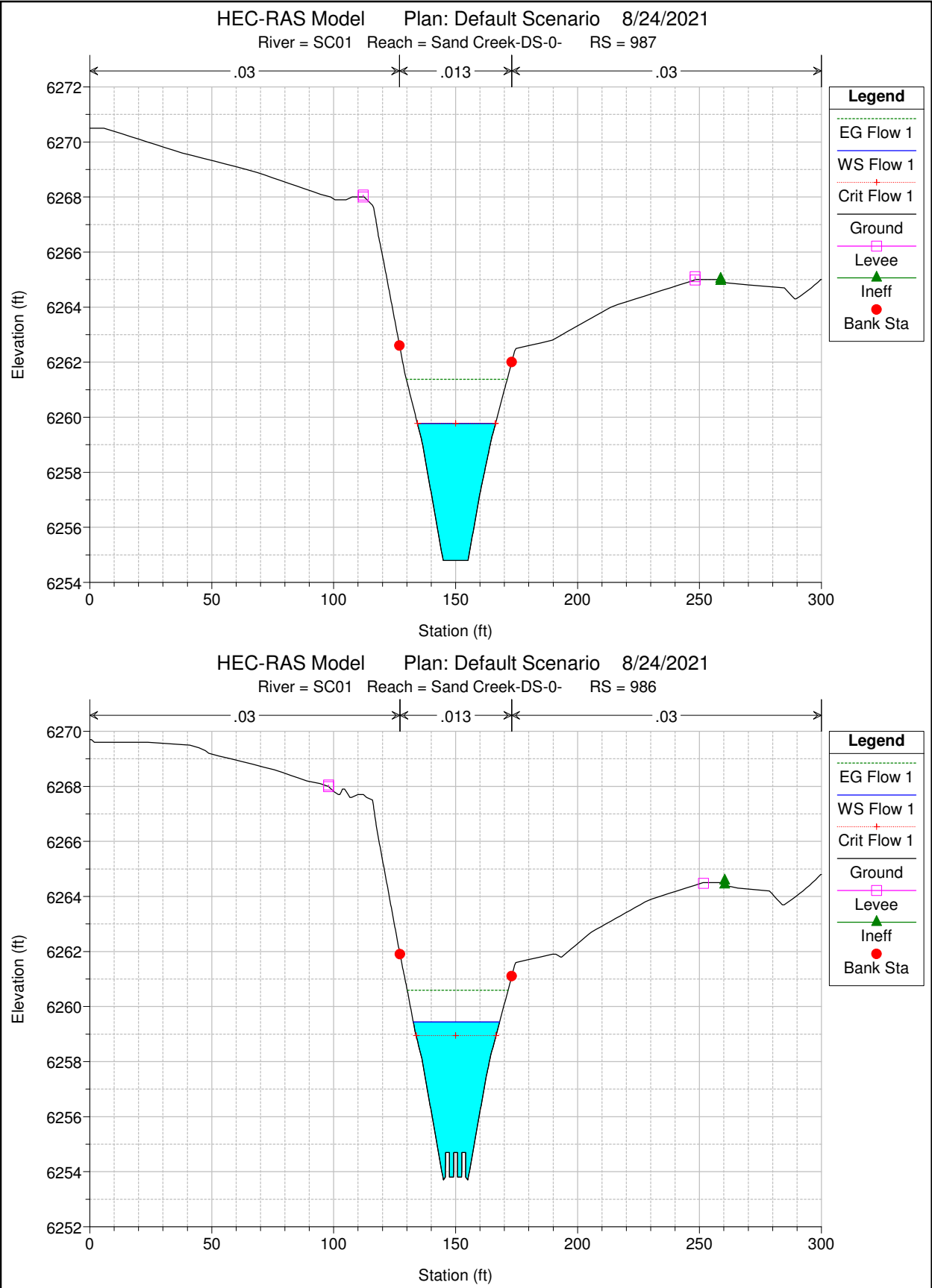




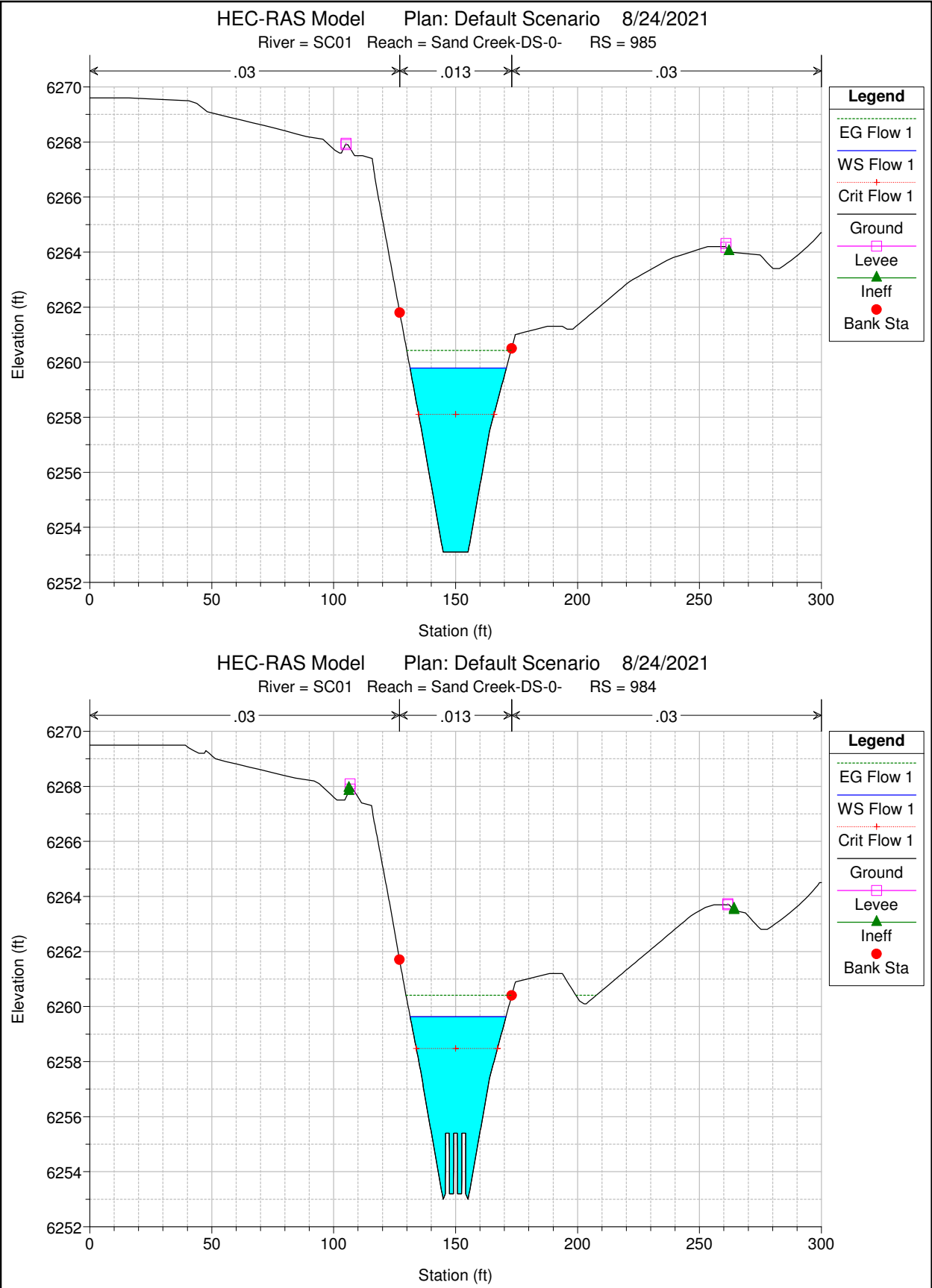


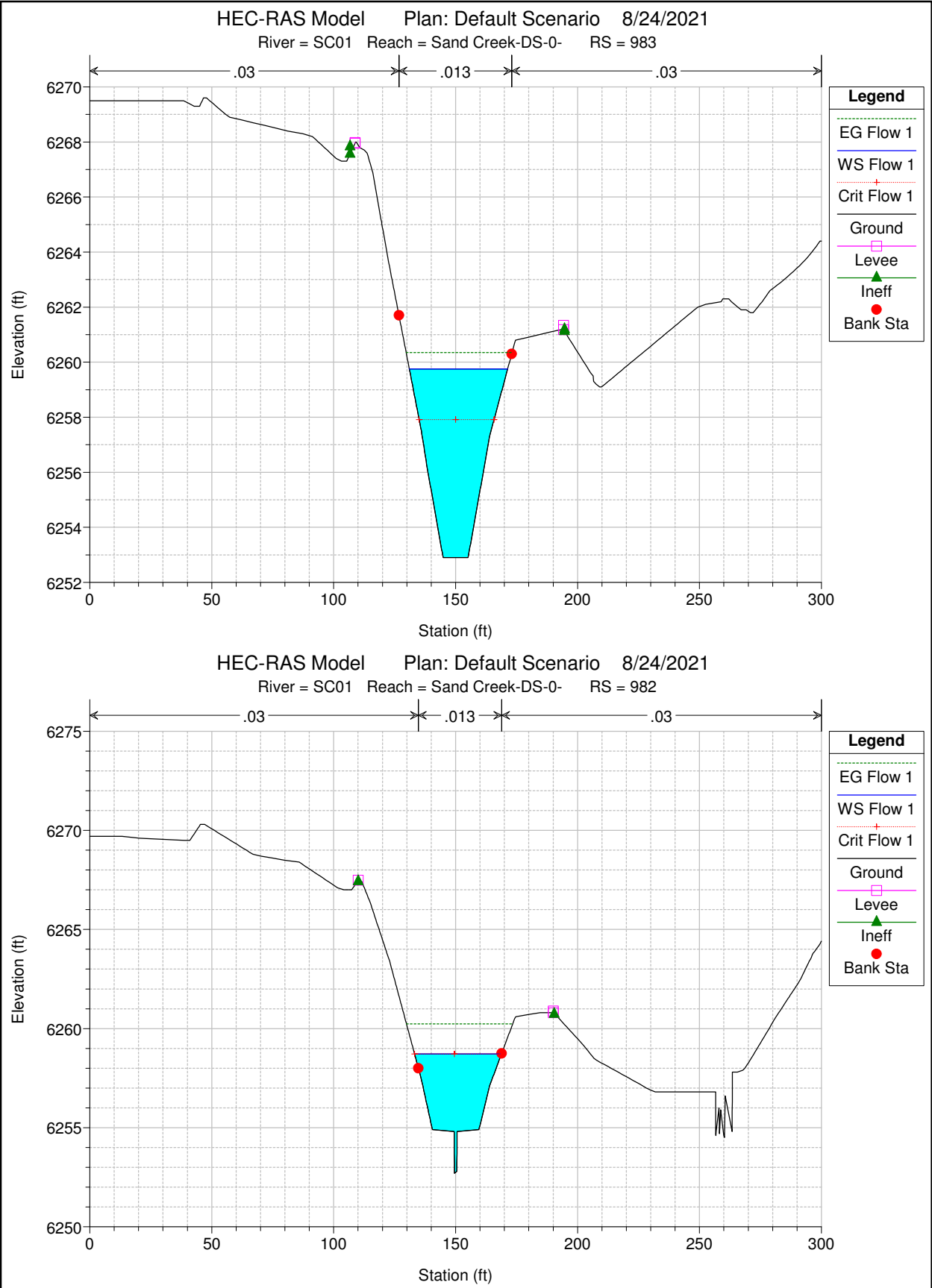


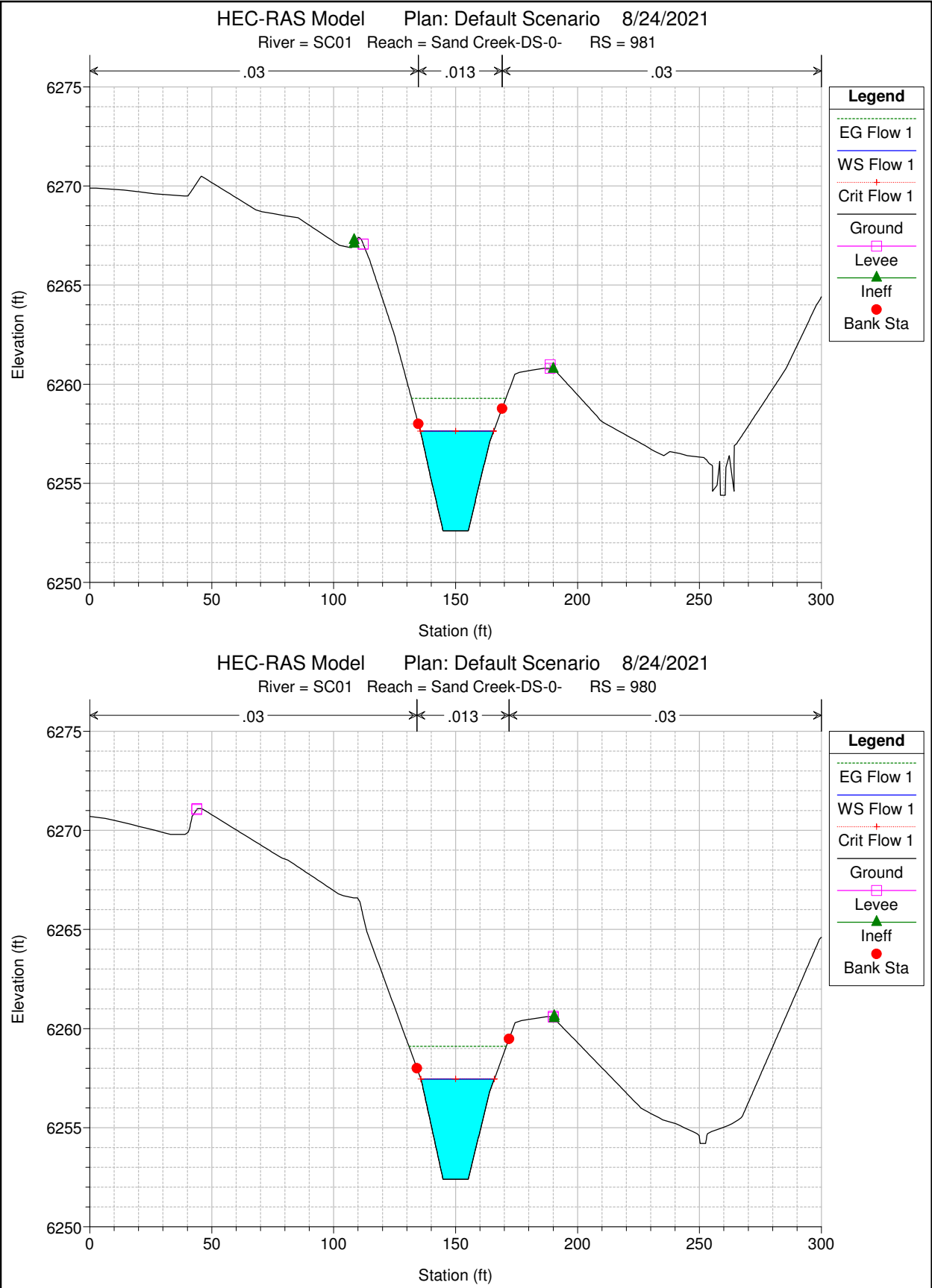


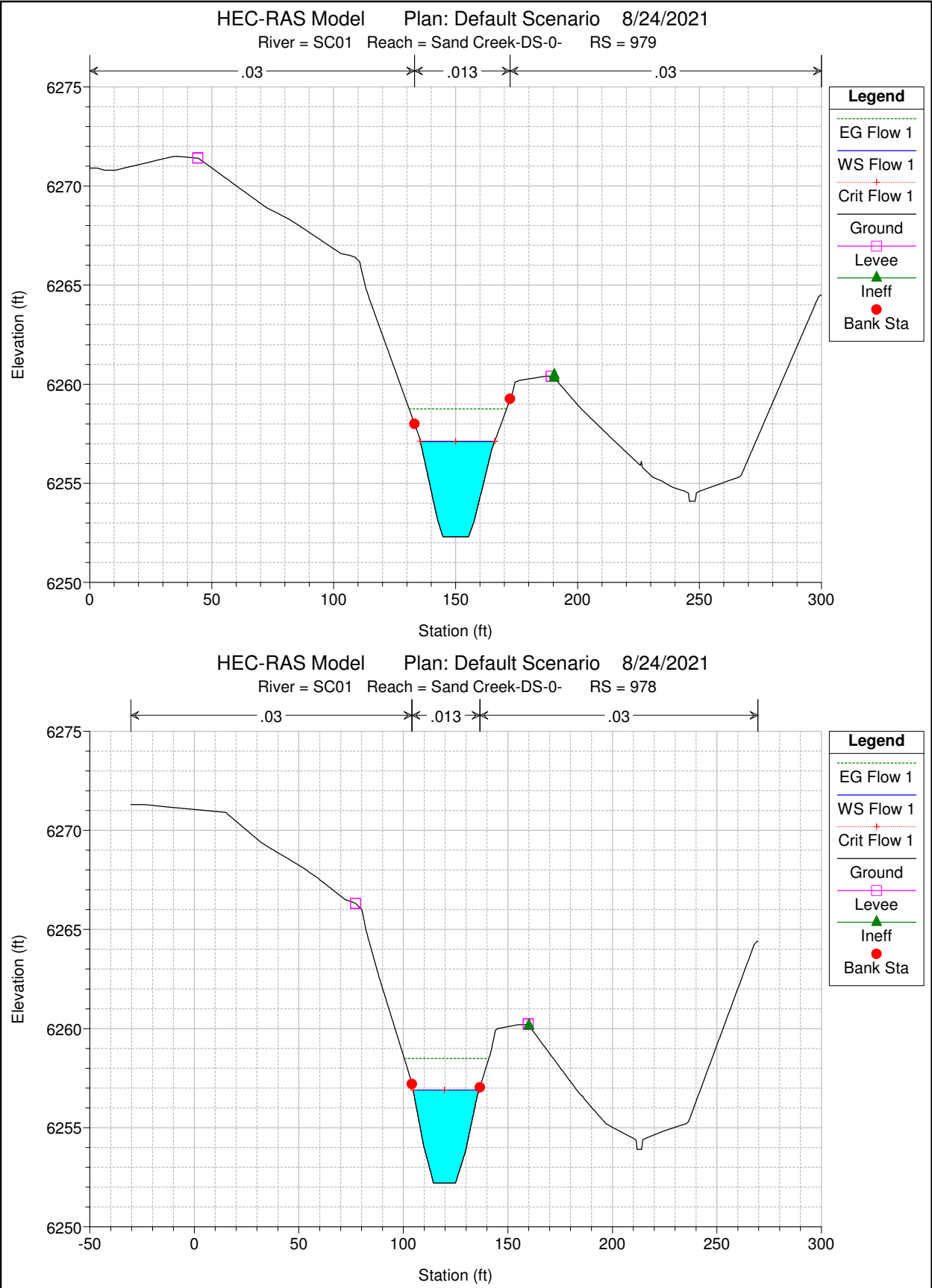


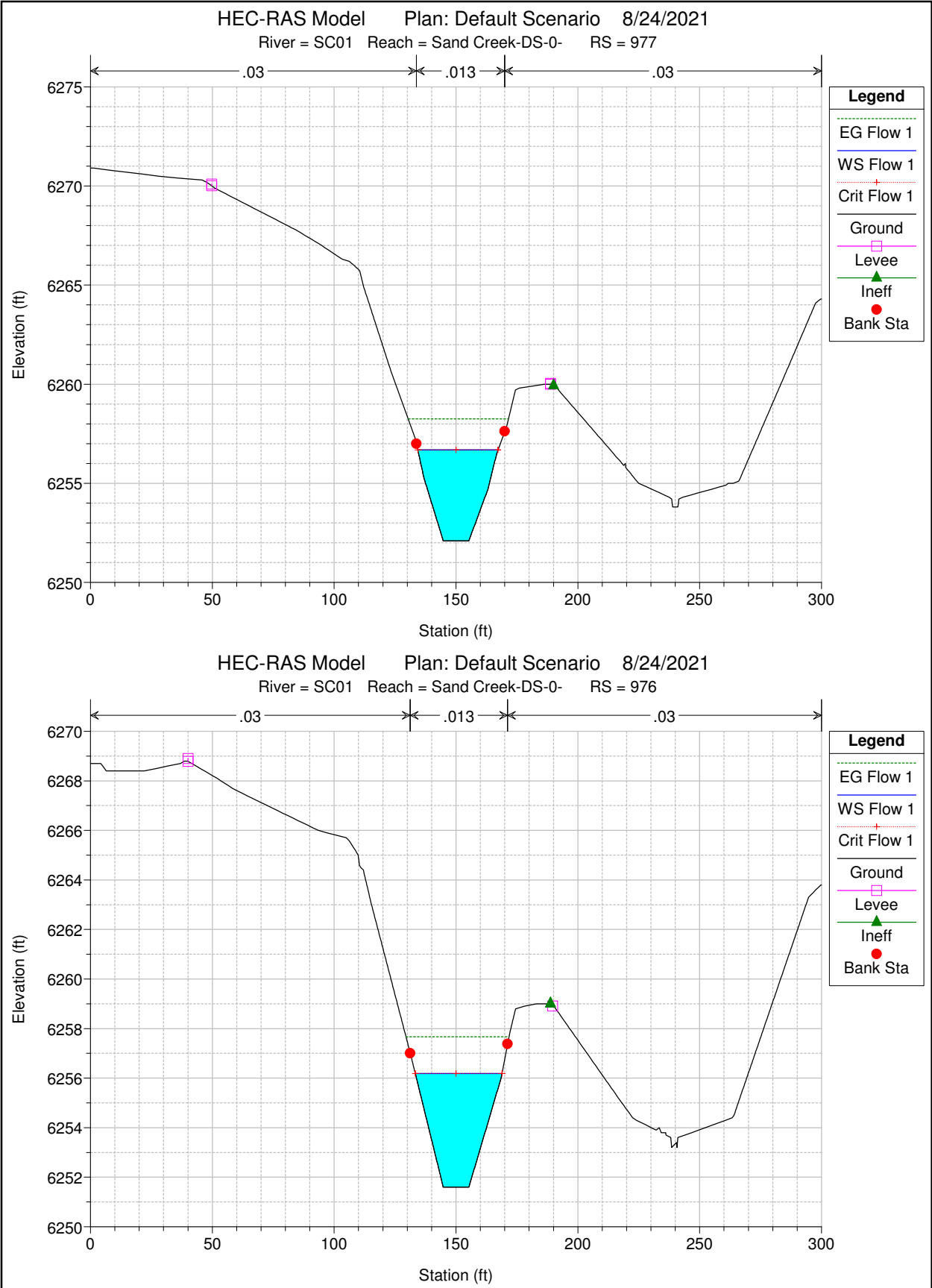




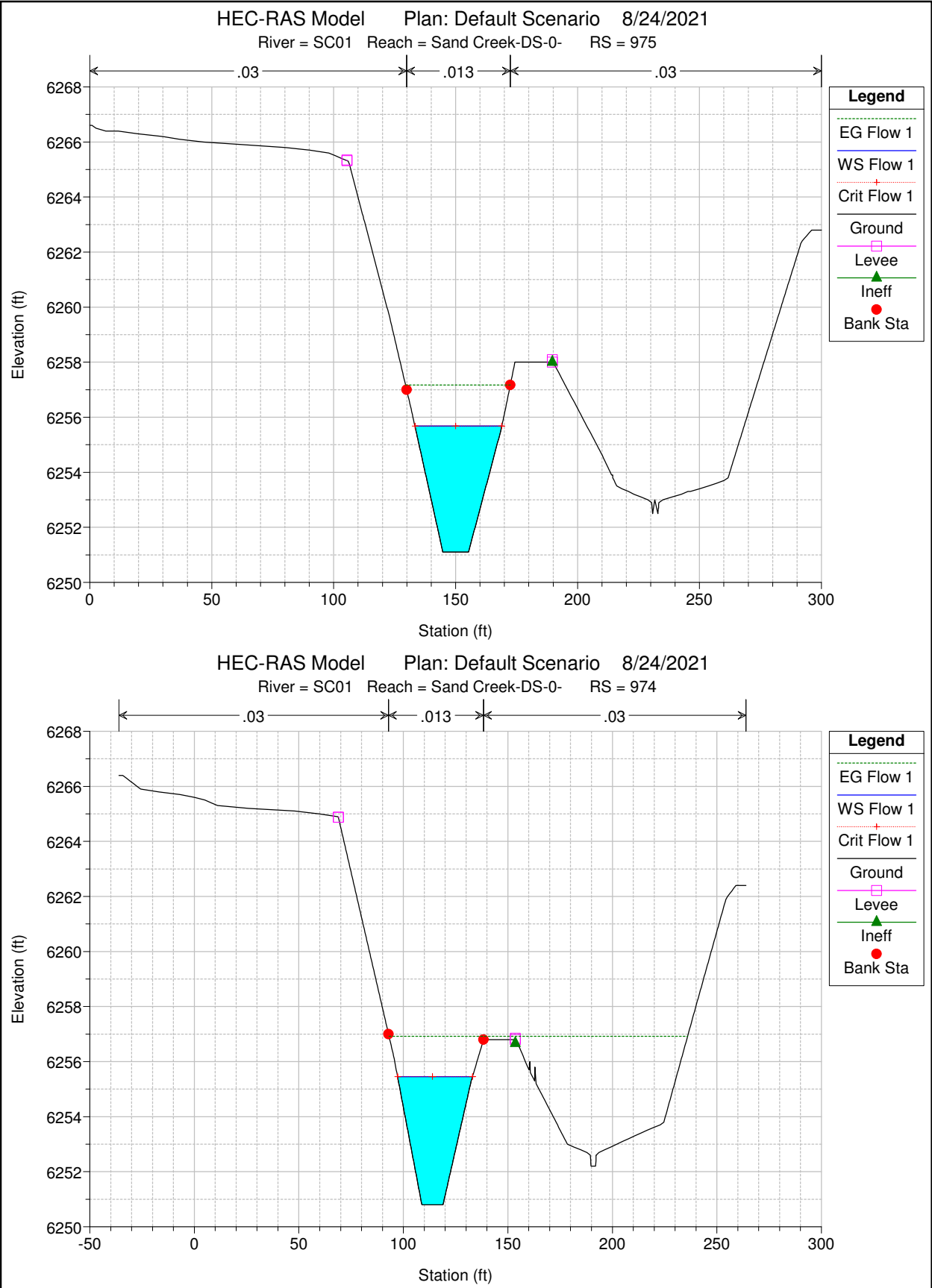


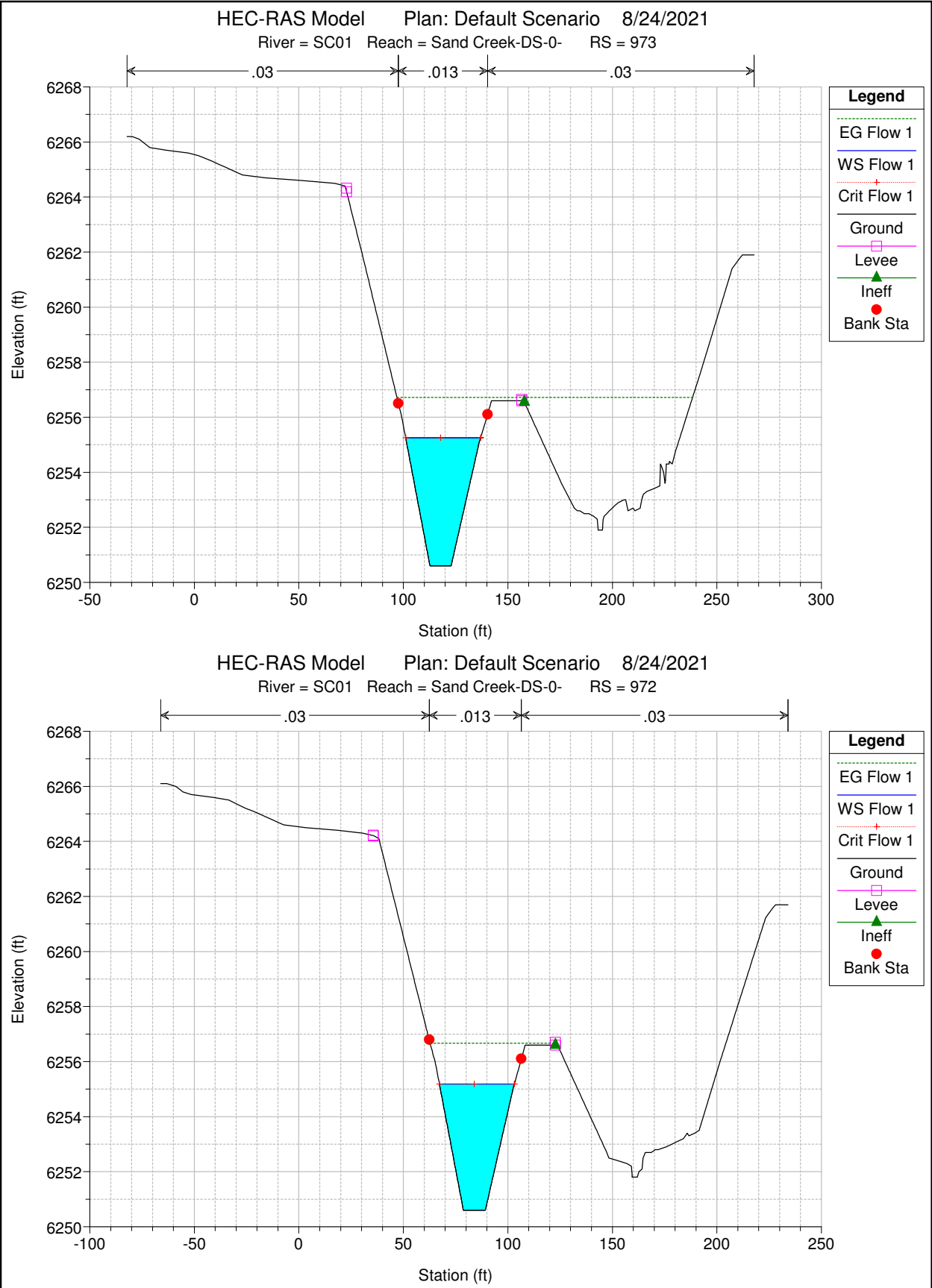


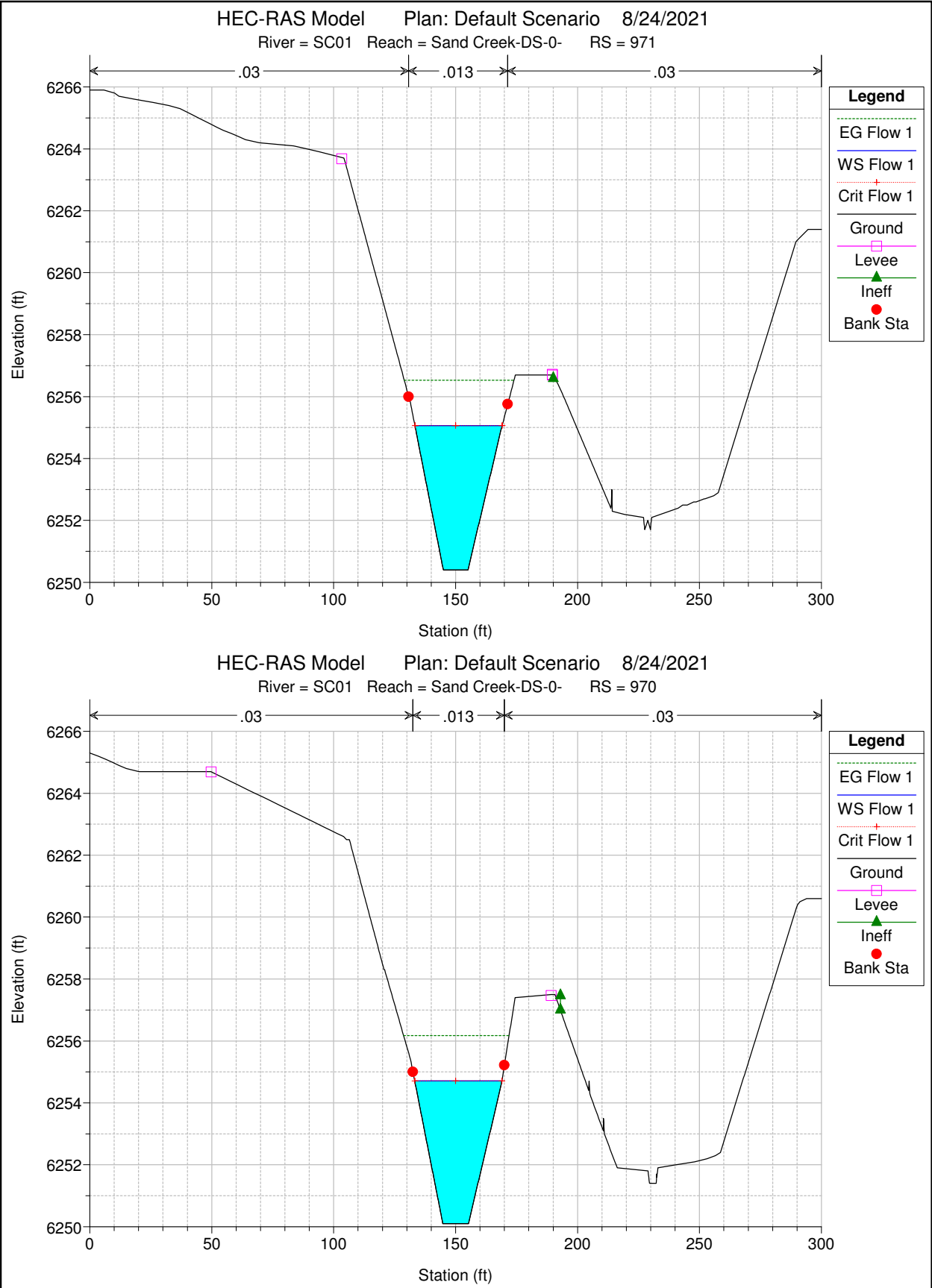


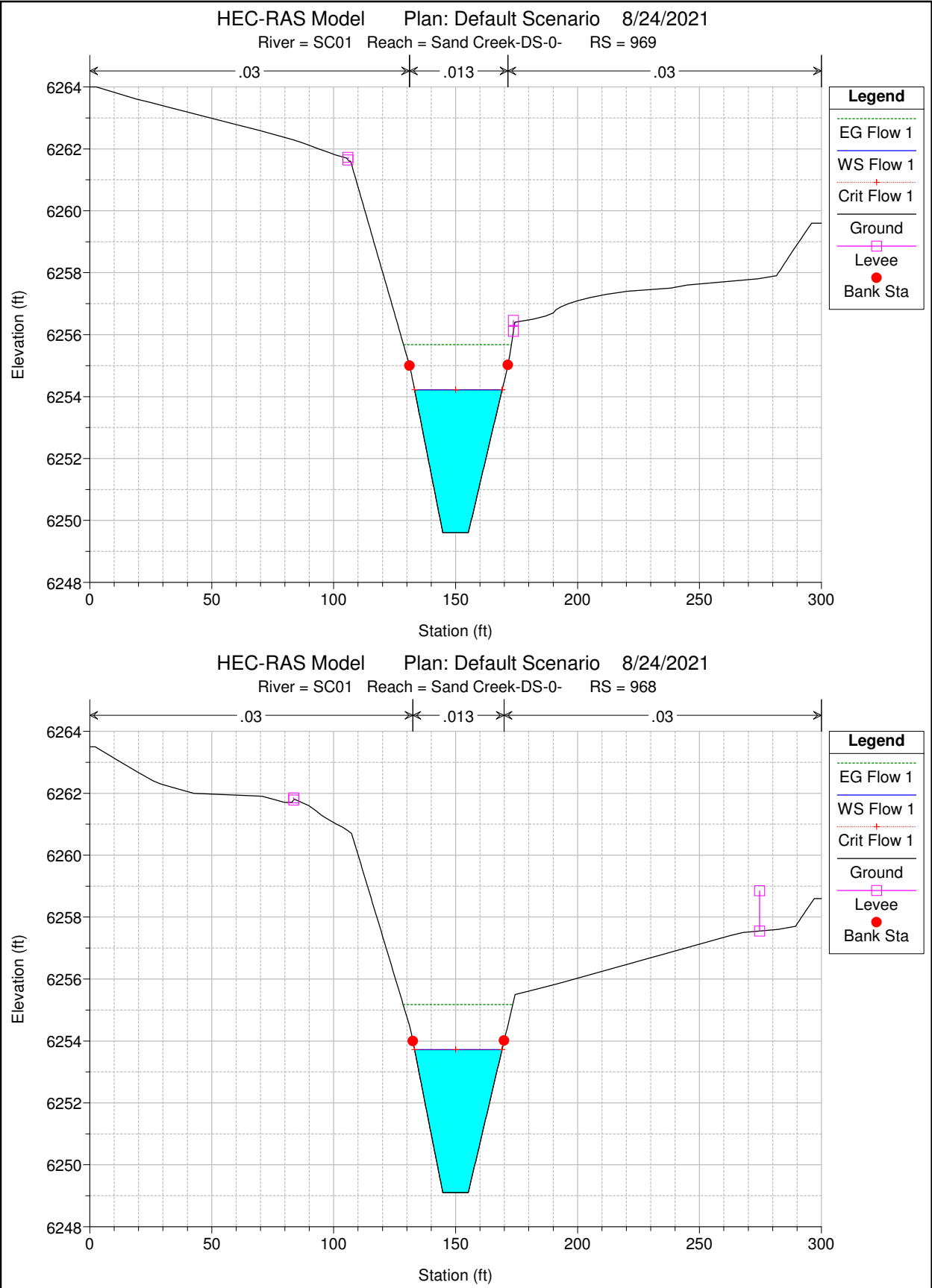


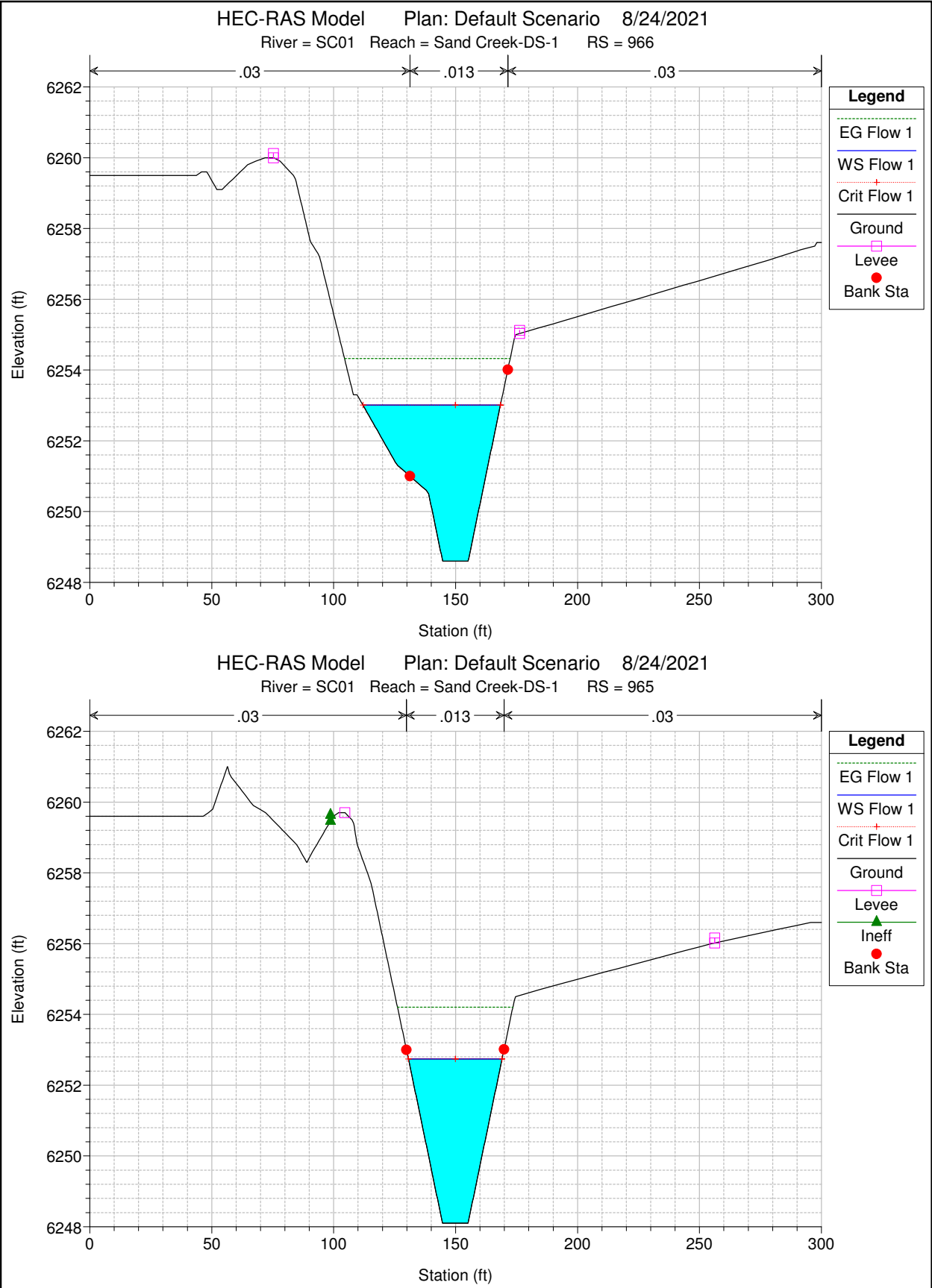


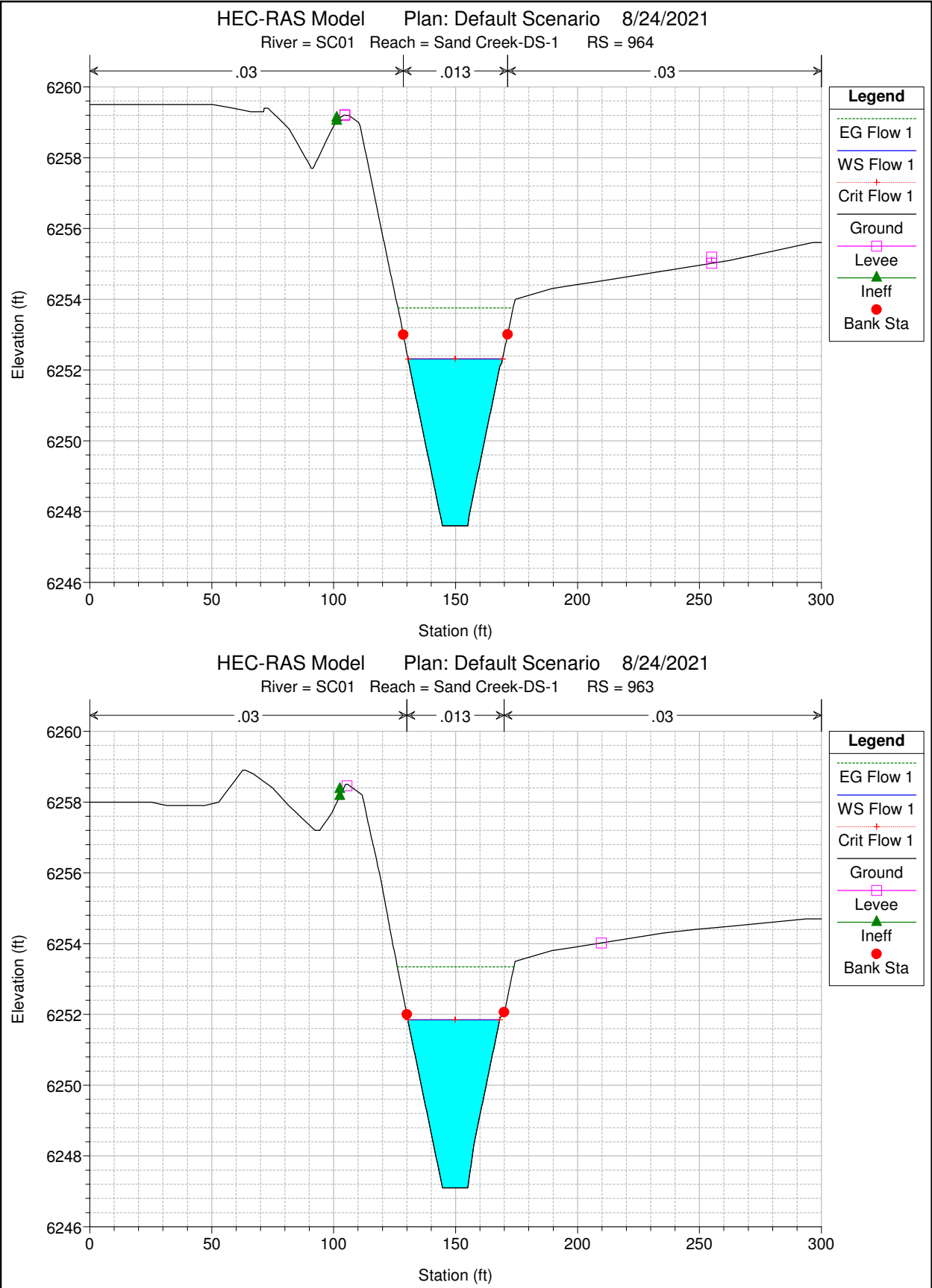


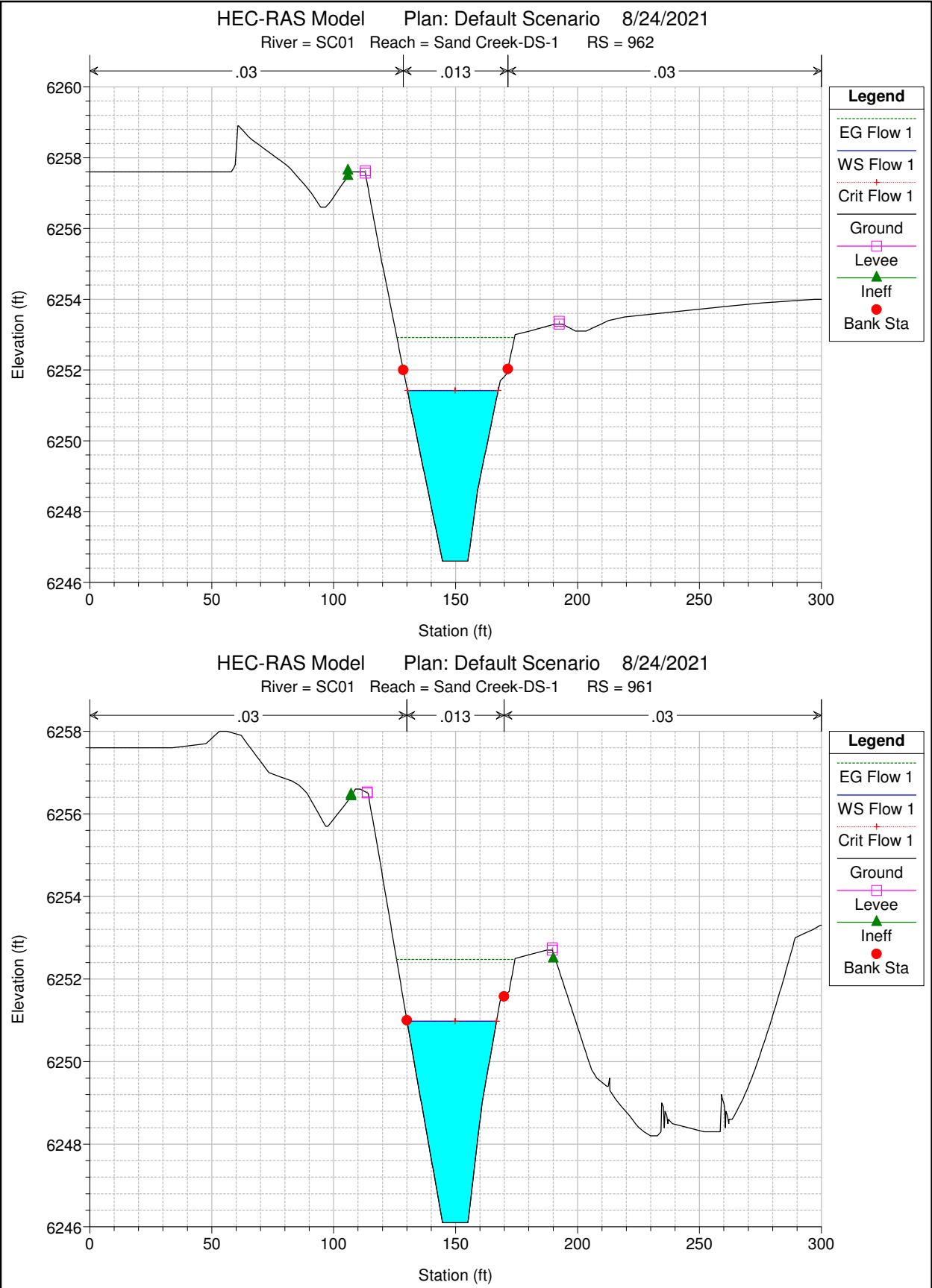


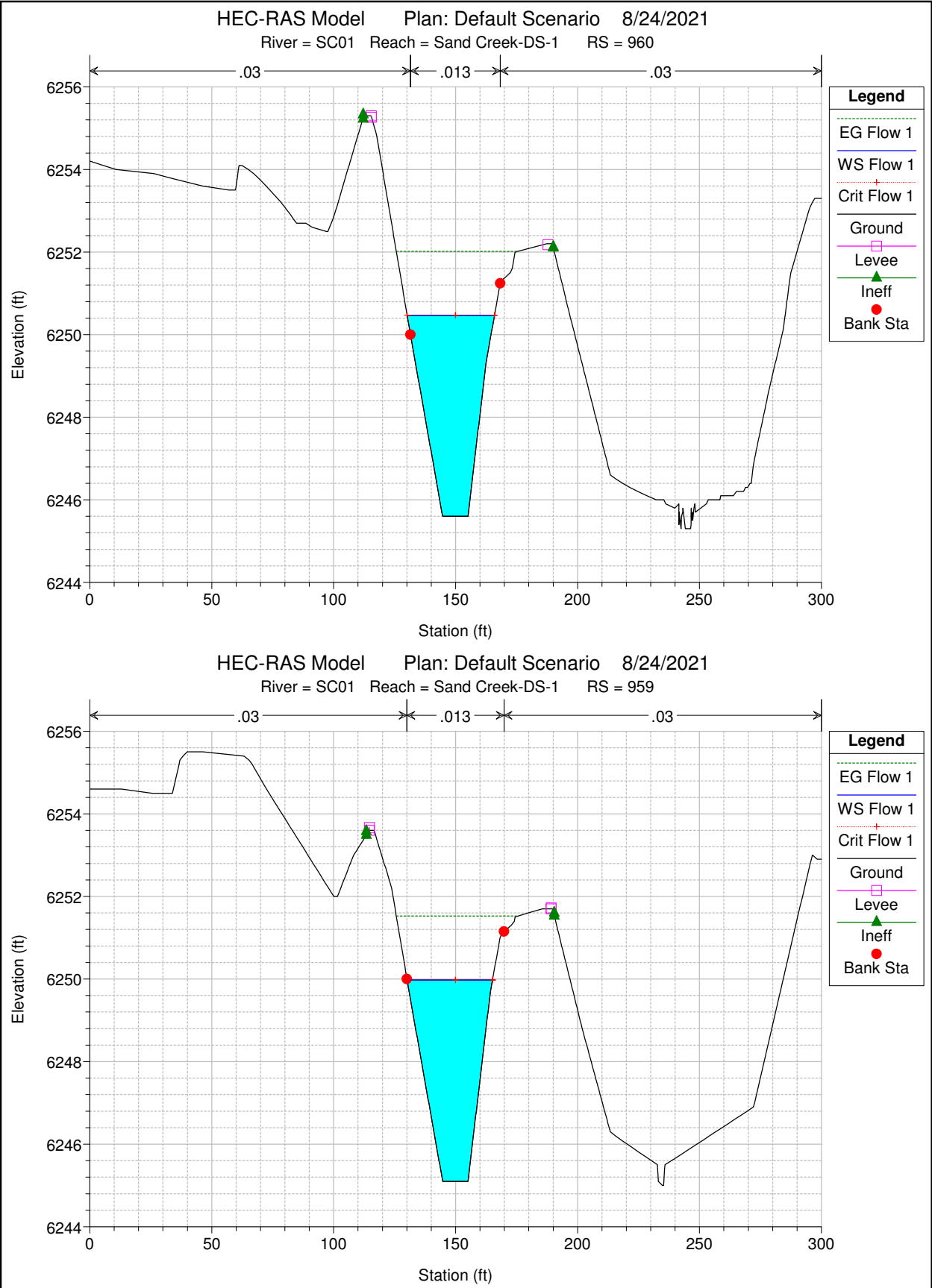




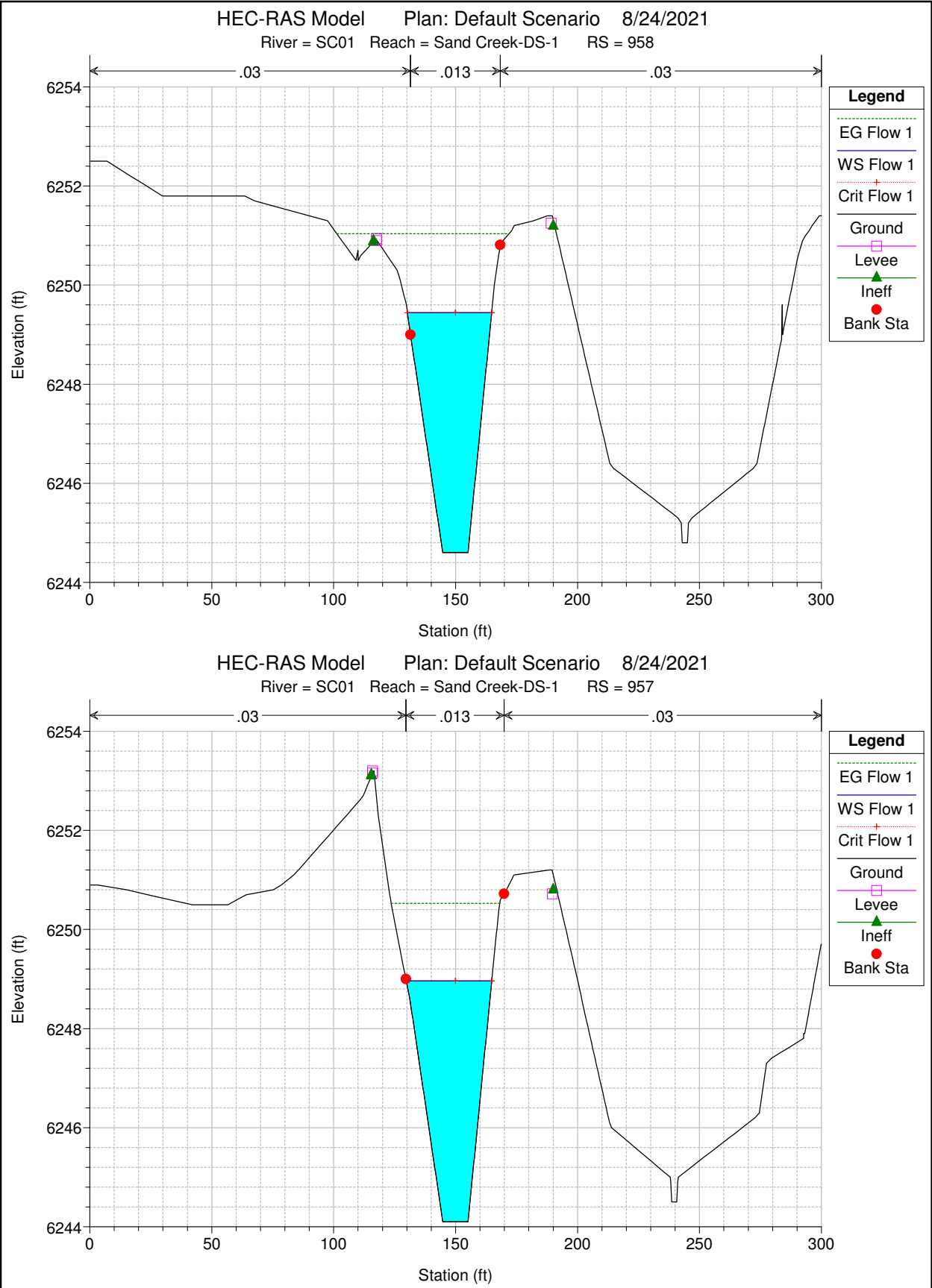


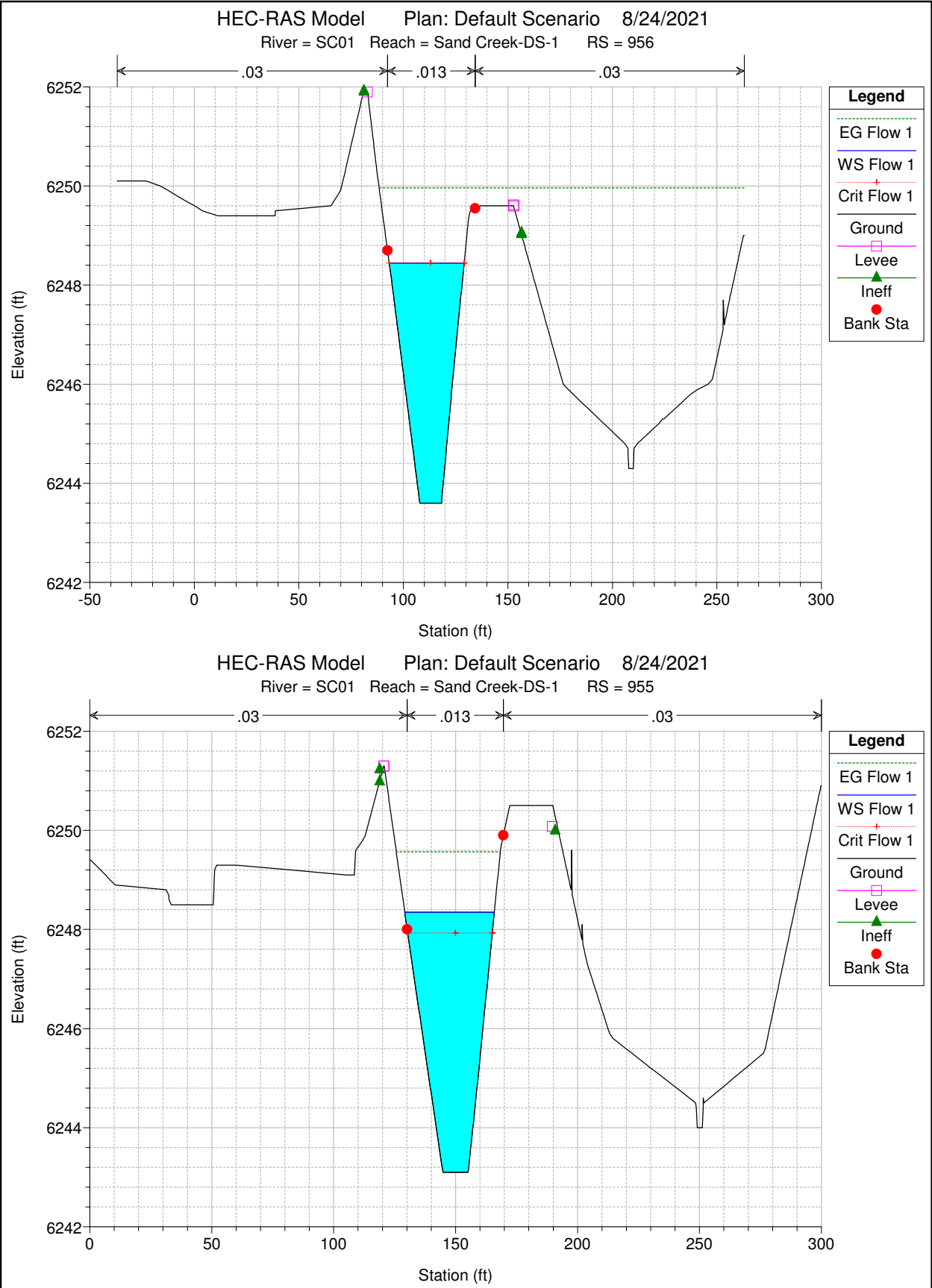






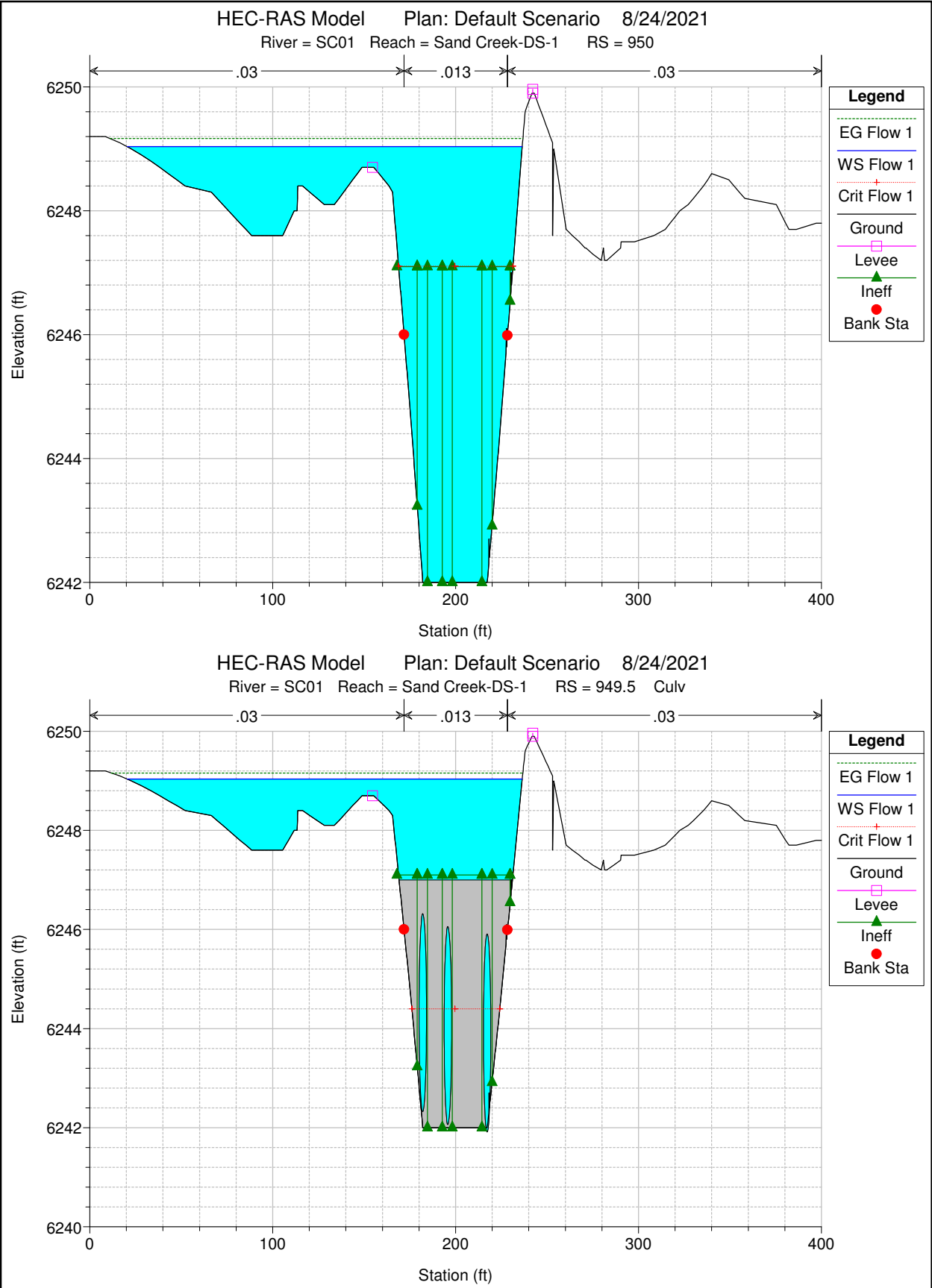


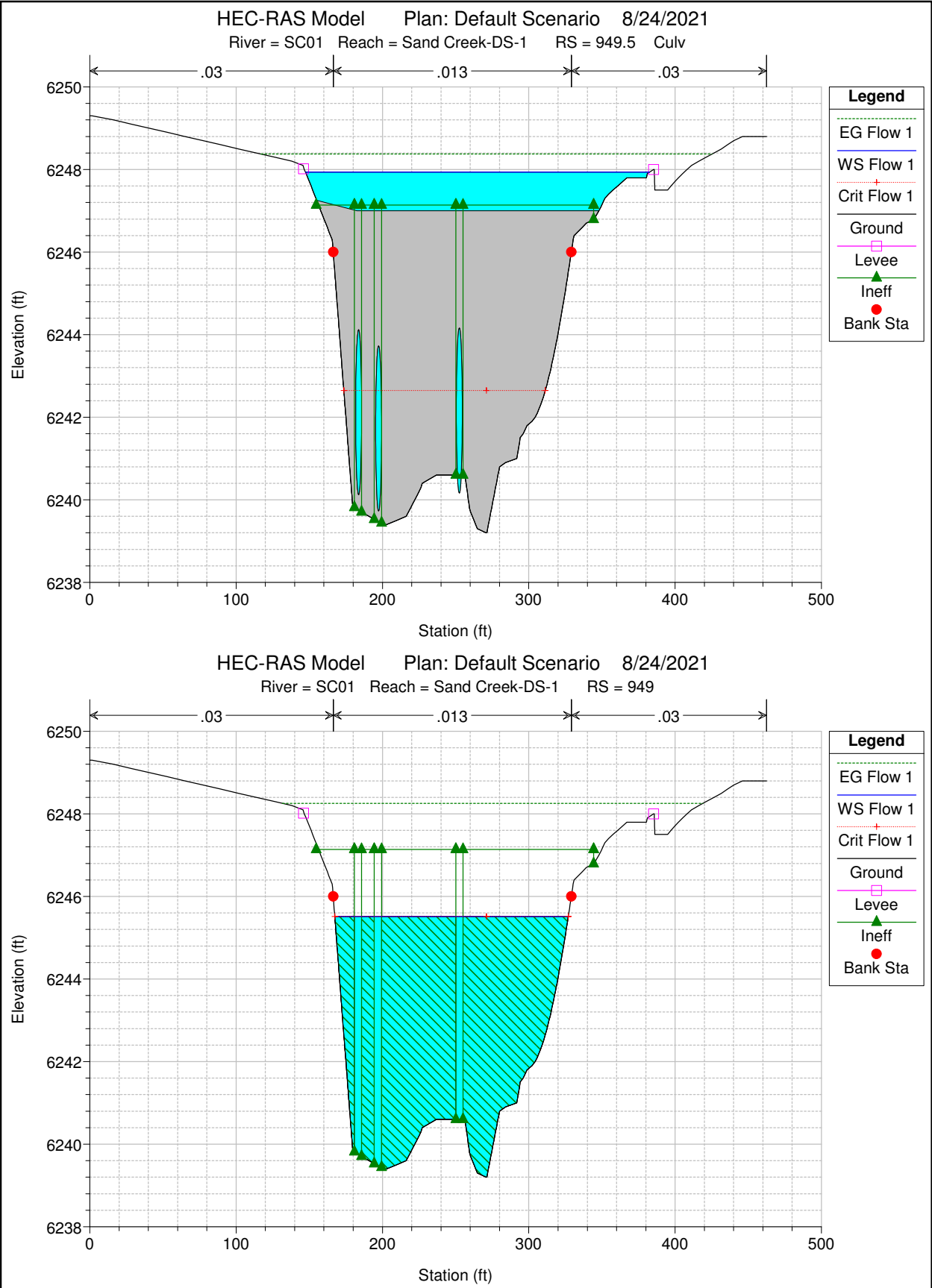












HEC-RAS Model    Plan: Default Scenario    8/24/2021

River = SC01    Reach = Sand Creek-DS-1    RS = 949

Elevation (ft)

6250

6248

6246

6244

6242

6240

6238

0

100

200

300

400

500

← .03 →

← .013 →

← .03 →

Legend

EG Flow 1

WS Flow 1

Crit Flow 1

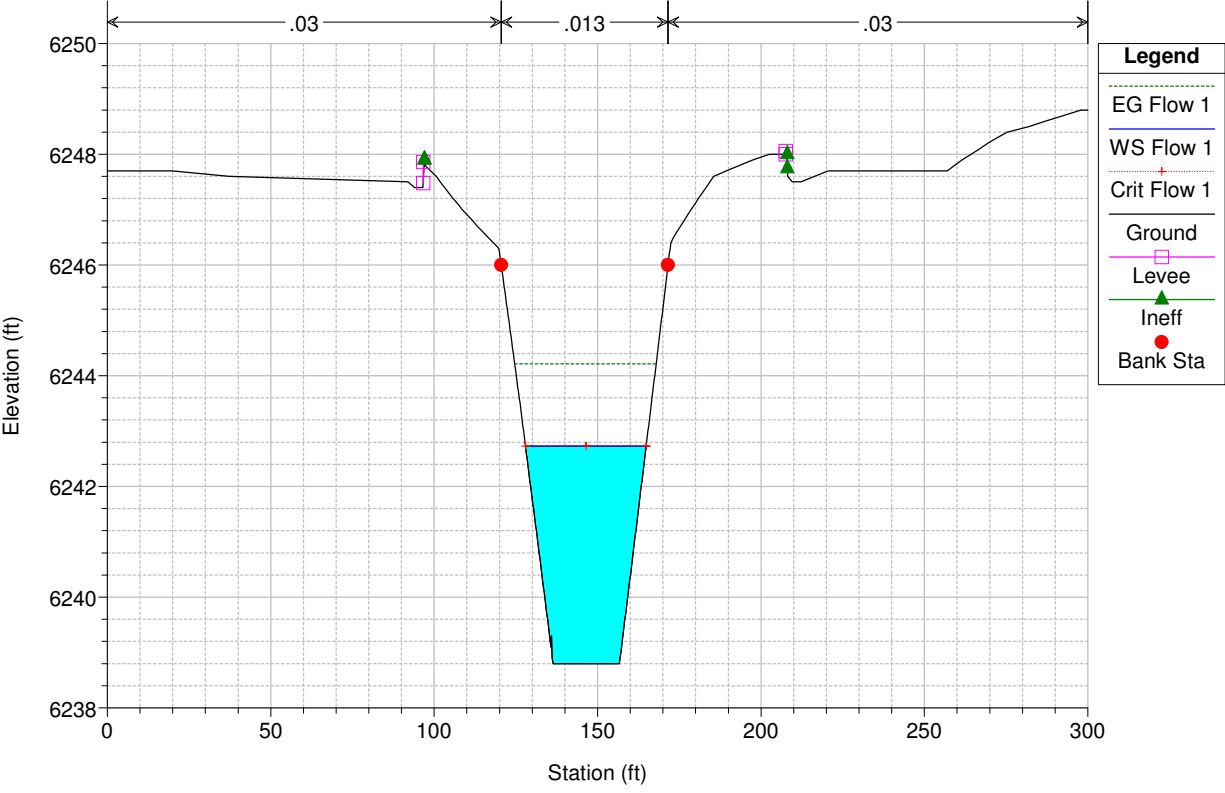
Ground

Levee

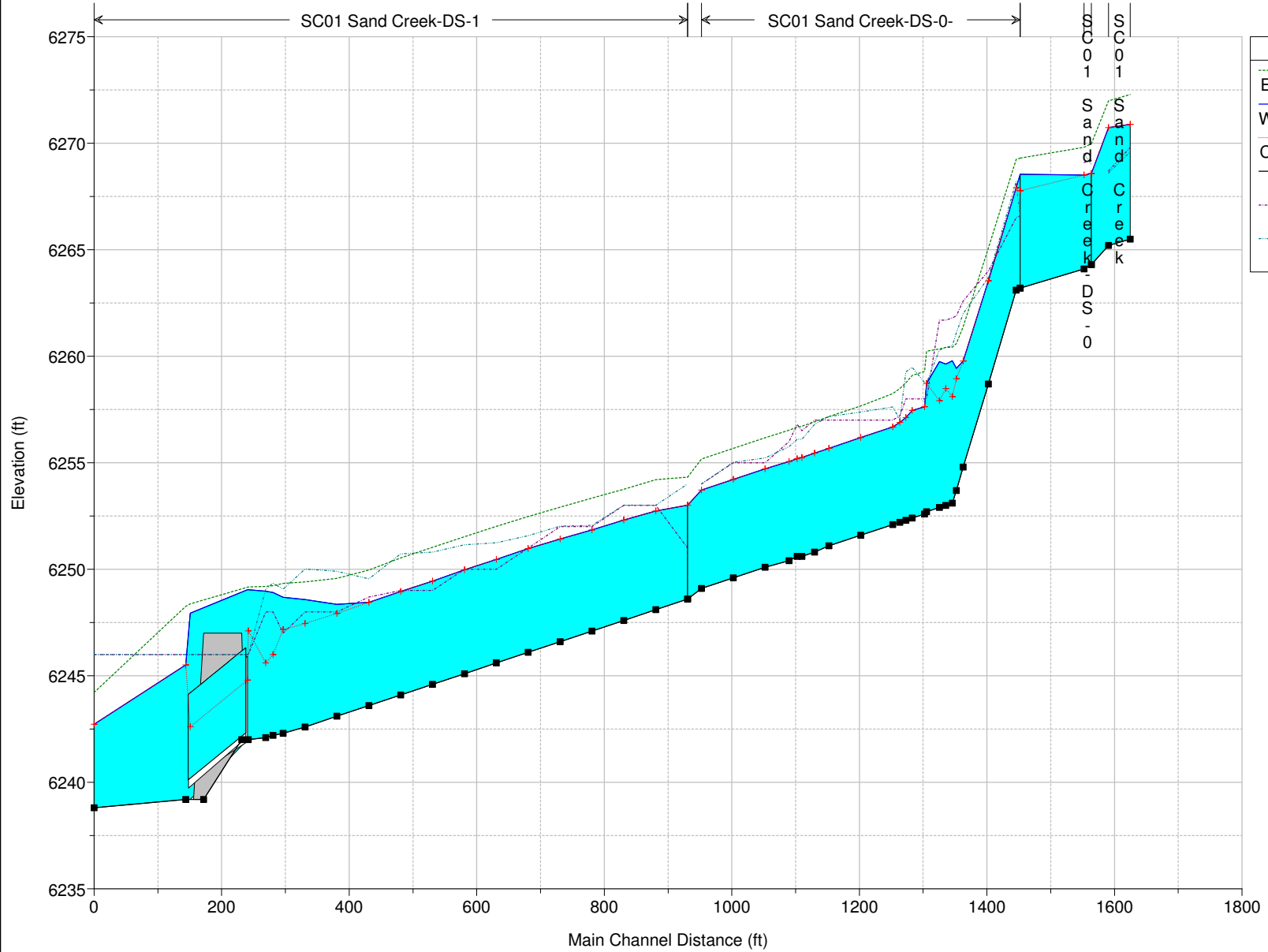
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HEC-RAS Model    Plan: Default Scenario    8/24/2021  
River = SC01    Reach = Sand Creek-DS-1    RS = 948

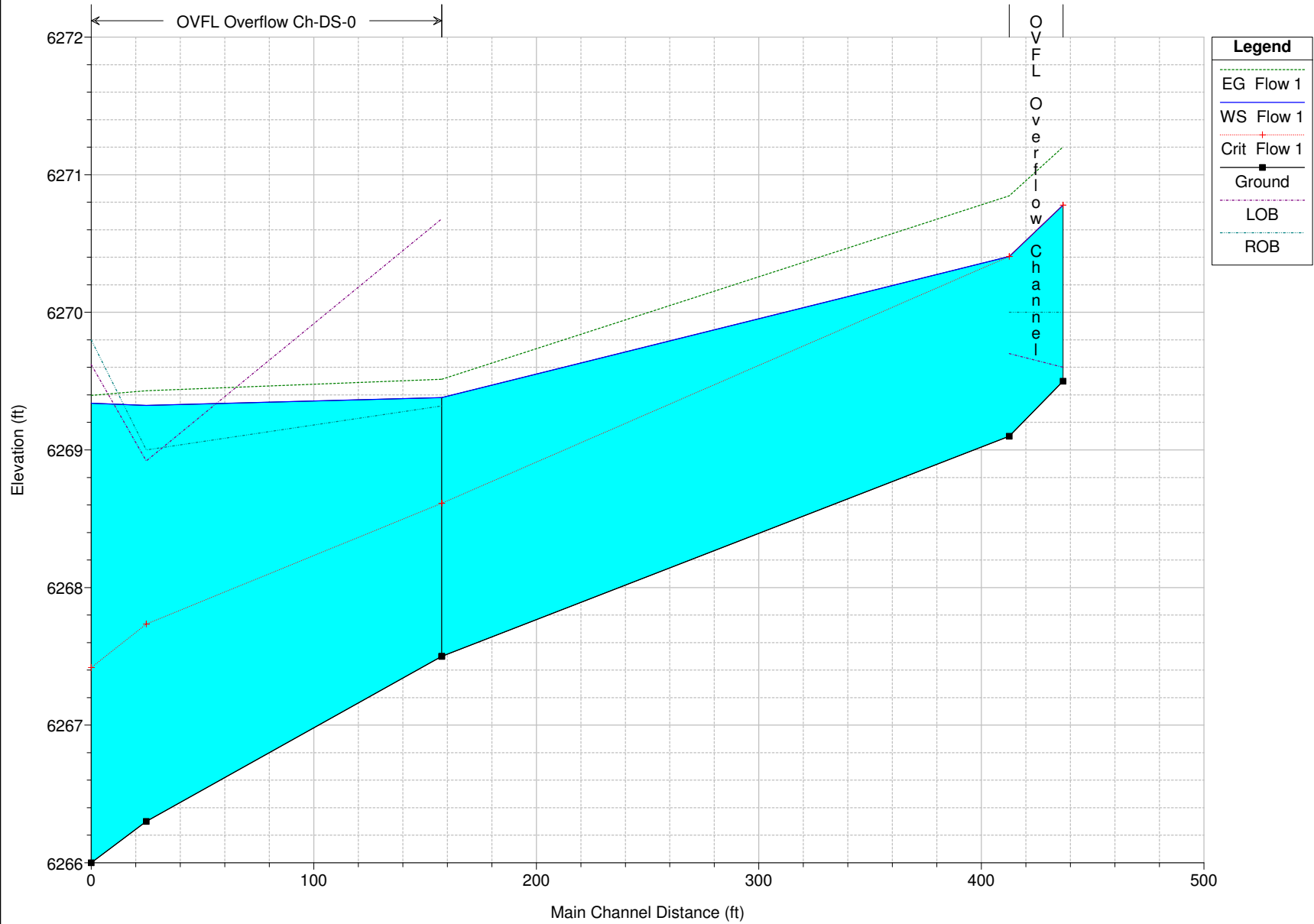


HEC-RAS Model Plan: Default Scenario 8/24/2021



Legend	
EG Flow 1	
WS Flow 1	
Crit Flow 1	
Ground	
LOB	
ROB	





HEC-RAS Plan: Default Scenario Profile: Flow 1

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
SC01	Sand Creek	998	Flow 1	820.00	6265.50	6270.89	6270.89	6272.28	0.001362	9.64	103.80	56.32	0.87
SC01	Sand Creek	993	Flow 1	820.00	6265.20	6270.74	6270.74	6272.00	0.001080	9.43	128.24	71.77	0.79
SC01	Sand Creek-DS-0	992	Flow 1	820.02	6264.30	6268.57	6268.57	6269.98	0.001829	9.51	86.27	30.02	0.99
SC01	Sand Creek-DS-0	991	Flow 1	820.02	6264.10	6268.51	6268.51	6269.81	0.001850	9.15	89.57	33.50	0.99
SC01	Sand Creek-DS-0	990	Flow 1	1037.00	6263.20	6268.54	6267.78	6269.30	0.000697	7.21	181.85	76.02	0.65
SC01	Sand Creek-DS-0	989	Flow 1	1037.00	6263.10	6267.92	6267.92	6269.24	0.001524	9.40	128.51	57.84	0.93
SC01	Sand Creek-DS-0	988	Flow 1	1037.00	6258.70	6263.54	6263.54	6265.09	0.001791	9.98	103.92	33.08	0.99
SC01	Sand Creek-DS-0	987	Flow 1	1037.00	6254.80	6259.78	6259.78	6261.38	0.001842	10.16	102.05	32.04	1.00
SC01	Sand Creek-DS-0	986	Flow 1	1037.00	6253.70	6259.44	6258.94	6260.59	0.001447	8.63	120.18	35.39	0.83
SC01	Sand Creek-DS-0	985	Flow 1	1037.00	6253.10	6259.79	6258.11	6260.43	0.000539	6.45	160.82	39.52	0.56
SC01	Sand Creek-DS-0	984	Flow 1	1037.00	6253.00	6259.63	6258.48	6260.41	0.001045	7.09	146.18	39.29	0.65
SC01	Sand Creek-DS-0	983	Flow 1	1037.00	6252.90	6259.75	6257.91	6260.35	0.000491	6.22	166.73	40.29	0.54
SC01	Sand Creek-DS-0	982	Flow 1	1037.00	6252.70	6258.72	6258.72	6260.24	0.002055	9.91	105.15	35.64	1.00
SC01	Sand Creek-DS-0	981	Flow 1	1037.00	6252.60	6257.64	6257.64	6259.29	0.001815	10.32	100.46	30.11	1.00
SC01	Sand Creek-DS-0	980	Flow 1	1037.00	6252.40	6257.46	6257.46	6259.10	0.001807	10.30	100.70	30.18	0.99
SC01	Sand Creek-DS-0	979	Flow 1	1037.00	6252.30	6257.12	6257.12	6258.76	0.001808	10.28	100.87	30.54	1.00
SC01	Sand Creek-DS-0	978	Flow 1	1037.00	6252.20	6256.90	6256.90	6258.49	0.001775	10.13	102.38	31.51	0.99
SC01	Sand Creek-DS-0	977	Flow 1	1037.00	6252.10	6256.69	6256.69	6258.25	0.001800	10.03	103.44	32.94	1.00
SC01	Sand Creek-DS-0	976	Flow 1	1037.00	6251.60	6256.19	6256.19	6257.67	0.001803	9.76	106.20	35.57	1.00
SC01	Sand Creek-DS-0	975	Flow 1	1037.00	6251.10	6255.68	6255.68	6257.17	0.001823	9.79	105.98	35.61	1.00
SC01	Sand Creek-DS-0	974	Flow 1	1037.00	6250.80	6255.45	6255.45	6256.92	0.001804	9.74	106.50	35.84	1.00
SC01	Sand Creek-DS-0	973	Flow 1	1037.00	6250.60	6255.25	6255.25	6256.72	0.001805	9.74	106.46	35.84	1.00
SC01	Sand Creek-DS-0	972	Flow 1	1037.00	6250.60	6255.19	6255.19	6256.67	0.001830	9.78	106.04	35.87	1.00
SC01	Sand Creek-DS-0	971	Flow 1	1037.00	6250.40	6255.06	6255.06	6256.53	0.001786	9.71	106.74	35.77	0.99
SC01	Sand Creek-DS-0	970	Flow 1	1037.00	6250.10	6254.71	6254.71	6256.17	0.001777	9.71	106.85	35.74	0.99
SC01	Sand Creek-DS-0	969	Flow 1	1037.00	6249.60	6254.22	6254.22	6255.68	0.001780	9.69	106.96	35.89	0.99
SC01	Sand Creek-DS-0	968	Flow 1	1037.00	6249.10	6253.72	6253.72	6255.18	0.001784	9.71	106.85	35.86	0.99
SC01	Sand Creek-DS-1	966	Flow 1	1100.00	6248.60	6253.01	6253.01	6254.32	0.001599	9.39	133.91	56.36	0.95
SC01	Sand Creek-DS-1	965	Flow 1	1100.00	6248.10	6252.74	6252.74	6254.20	0.001793	9.71	113.30	38.38	1.00
SC01	Sand Creek-DS-1	964	Flow 1	1100.00	6247.60	6252.31	6252.31	6253.75	0.001776	9.64	114.09	38.73	0.99
SC01	Sand Creek-DS-1	963	Flow 1	1100.00	6247.10	6251.84	6251.84	6253.34	0.001829	9.83	111.93	37.63	1.00
SC01	Sand Creek-DS-1	962	Flow 1	1100.00	6246.60	6251.43	6251.43	6252.92	0.001794	9.80	112.24	37.25	1.00
SC01	Sand Creek-DS-1	961	Flow 1	1100.00	6246.10	6250.98	6250.98	6252.47	0.001774	9.81	112.08	36.70	0.99
SC01	Sand Creek-DS-1	960	Flow 1	1100.00	6245.60	6250.47	6250.47	6252.02	0.001738	9.99	110.37	35.80	0.99
SC01	Sand Creek-DS-1	959	Flow 1	1100.00	6245.10	6249.98	6249.98	6251.53	0.001776	9.98	110.20	35.02	0.99
SC01	Sand Creek-DS-1	958	Flow 1	1100.00	6244.60	6249.44	6249.44	6251.04	0.001742	10.13	108.89	34.53	0.99
SC01	Sand Creek-DS-1	957	Flow 1	1100.00	6244.10	6248.96	6248.96	6250.53	0.001816	10.04	109.52	35.07	1.00
SC01	Sand Creek-DS-1	956	Flow 1	1100.00	6243.60	6248.44	6248.44	6249.96	0.001768	9.89	111.21	35.85	0.99
SC01	Sand Creek-DS-1	955	Flow 1	1100.00	6243.10	6248.35	6247.93	6249.57	0.001227	8.86	124.36	36.74	0.84
SC01	Sand Creek-DS-1	954	Flow 1	1100.00	6242.60	6248.58	6247.46	6249.40	0.000712	7.27	151.93	41.17	0.65
SC01	Sand Creek-DS-1	953	Flow 1	1100.00	6242.30	6248.68	6247.17	6249.33	0.000511	6.51	180.73	60.07	0.55
SC01	Sand Creek-DS-1	952	Flow 1	1100.00	6242.20	6248.91	6246.00	6249.23	0.000197	4.48	246.57	53.19	0.36
SC01	Sand Creek-DS-1	951	Flow 1	1100.00	6242.10	6248.97	6245.61	6249.20	0.000136	3.80	291.11	61.48	0.30
SC01	Sand Creek-DS-1	950	Flow 1	1100.00	6242.00	6249.04	6247.11	6249.17	0.000061	2.96	490.03	216.00	0.21
SC01	Sand Creek-DS-1	949.5		Culvert									
SC01	Sand Creek-DS-1	949	Flow 1	1100.00	6239.20	6245.51	6245.51	6248.25	0.001370	13.29	82.78	159.57	0.99
SC01	Sand Creek-DS-1	948	Flow 1	1100.00	6238.80	6242.73	6242.73	6244.22	0.001785	9.79	112.41	36.93	0.99
OVFL	Overflow Channel	1000	Flow 1	217.00	6269.50	6270.78	6270.78	6271.20	0.003604	5.36	46.17	62.59	0.97
OVFL	Overflow Channel	999	Flow 1	217.00	6269.10	6270.41	6270.41	6270.85	0.003698	5.40	43.73	57.72	0.98
OVFL	Overflow Ch-DS-0	998	Flow 1	216.98	6267.50	6269.38	6268.61	6269.51	0.000357	2.93	73.99	45.53	0.41
OVFL	Overflow Ch-DS-0	997	Flow 1	216.98	6266.30	6269.32	6267.74	6269.43	0.001027	2.62	83.44	36.02	0.29
OVFL	Overflow Ch-DS-0	996	Flow 1	216.98	6266.00	6269.34	6267.42	6269.40	0.000618	1.91	113.85	50.35	0.22
EXOF	EX OVERFLOW	1001	Flow 1	0.04	6267.70	6270.16	6267.77	6270.16	0.000000	0.00	30.50	42.71	0.00
EXOF	EX OVERFLOW	1000	Flow 1	0.04	6266.90	6270.16	6266.92	6270.16	0.000000	0.00	83.82	67.13	0.00
EXCH	EX CHANNEL	1000	Flow 1	63.00	6259.00	6260.04	6260.04	6260.46	0.002746	5.24	12.01	14.23	1.01
EXCH	EX CHANNEL	999	Flow 1	63.00	6249.20	6254.44		6254.45	0.000127	1.03	61.12	21.85	0.11

# SOLACE APARTMENTS - SAND CREEK CENTER TRIBUTARY

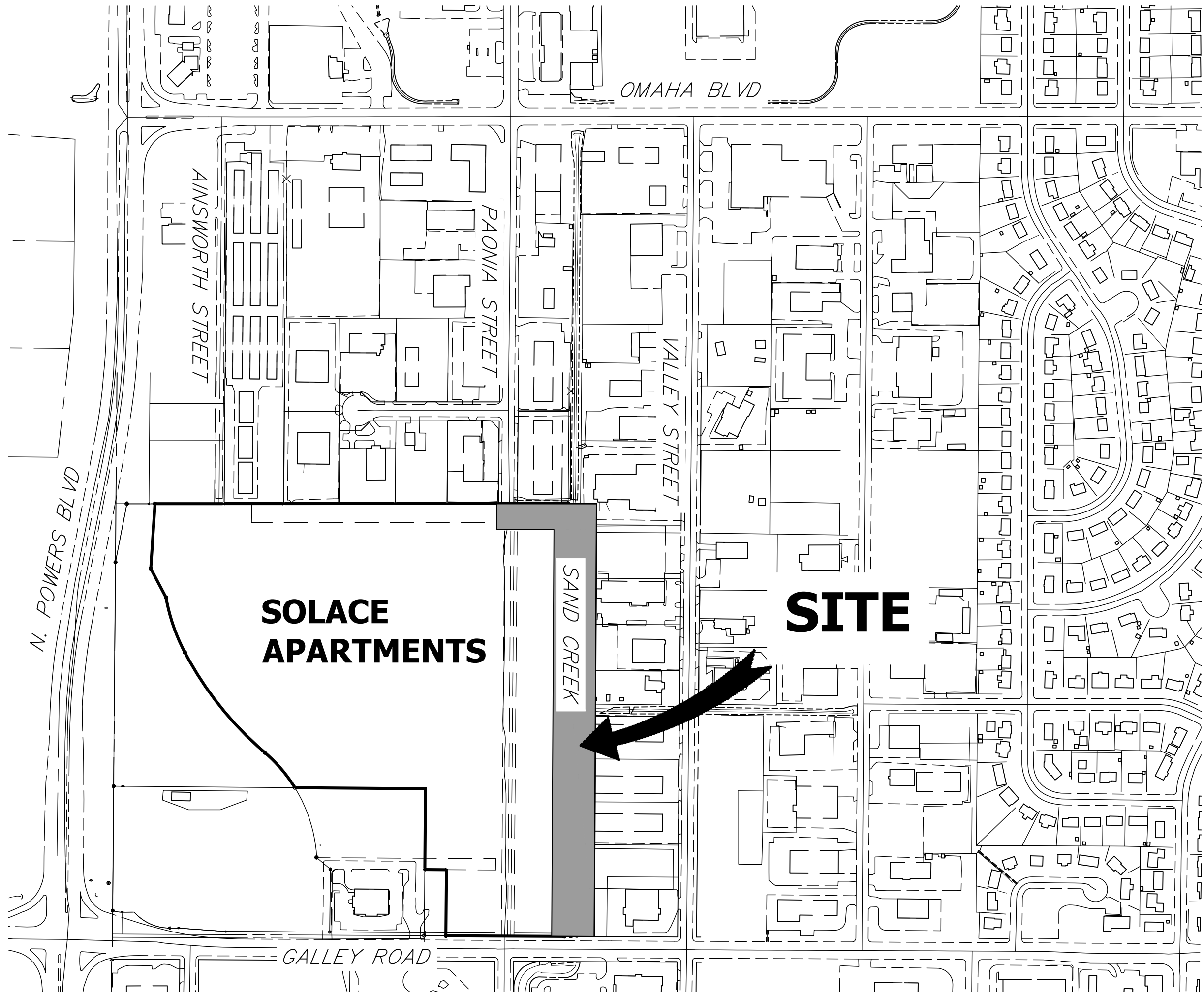
A PORTION OF SECTION 7, TOWNSHIP 14 SOUTH, RANGE 65 WEST OF THE 6TH P.M.

EL PASO COUNTY, COLORADO

## CHANNEL IMPROVEMENTS

### ABBREVIATIONS

AC	ACRE	FDP	FINAL DEVELOPMENT PLAN	PL	PROPERTY LINE
AD	ALGEBRAIC DIFFERENCE	FDR	FINAL DRAINAGE REPORT	PR	PROPOSED
AH	AHEAD	FES	FLARED END SECTION	PRC	POINT OF REVERSE CURVATURE
ARCH	ARCHITECT	FG	FINISHED GRADE	PT	POINT OF TANGENCY
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS	FH	FIRE HYDRANT	PV	PLUG VALVE
ASSY	ASSEMBLY	FL	FLOWLINE	PVC	POLYVINYL CHLORIDE
AVE	AVENUE	FIL	FILING	R	RADIUS
BB	BOX BASE	FO	FIBER OPTIC CABLE	RCP	REINFORCED CONCRETE PIPE
BK	BACK	GB	GRADE BREAK	RD	ROAD
BNDY	BOUNDARY	GE	GAS EASEMENT	ROW	RIGHT OF WAY
BOP	BOTTOM OF PIPE	GIS	GEOGRAPHIC INFORMATION SYSTEM	RT	RIGHT
BOV	BLOW OFF VALVE	GL	GAS LINE	S	SOUTH
BFV	BUTTERFLY VALVE	GPS	GLOBAL POSITIONING SYSTEM	STE	STEEL
BLVD	BOULEVARD	GV	GATE VALVE	SAN	SANITARY SEWER
BW	BOTTOM OF WALL	HC	HANDICAP	SF	SQUARE FEET
C&G	CURB & GUTTER	HDC	HIGH DEFLECTION COUPLING	ST	STREET
CATV	CABLE TELEVISION	HDPE	HIGH DENSITY POLYETHYLENE	STA	STATION
CB	CATCH BASIN	HGL	HYDRAULIC GRADE LINE	STM	STORM SEWER
CBG	CONCRETE BOX CULVERT	HOA	HOME OWNERS ASSOCIATION	SV	SQUARE YARD
CDOT	COLORADO DEPARTMENT OF TRANSPORTATION	HP	HIGH POINT	SY-IN	SQUARE YARD INCH
CDS	CUL-DE-SAC	I	INLET	TB	THRUST BLOCK
CFS	CUBIC FEET PER SECOND	IE	IRRIGATION EASEMENT	TBC	TOP BACK OF CURB
CL	CENTER LINE	INT	INTERSECTION	TBW	TOP BACK OF WALK
CLOMR	CONDITIONAL LETTER OF MAP REVISION	INV	INVERT	TEL	TELEPHONE
CLR	CLEAR	IRR	IRRIGATION	TOA	TOP OF ASPHALT
CMP	CORRUGATED METAL PIPE	KB	KICK (THRUST) BLOCK	TOB	TOP OF BOX
CO	CLEAN OUT	LE	LANDSCAPE EASEMENT	TOC	TOP OF CURB OR CONCRETE
CONC	CONCRETE	LF	LINEAR FEET	TOT	TOP OF FOUNDATION
CR	CIRCLE	LN	LANE	TOP	TOP OF PIPE
CSP	CORRUGATED STEEL PIPE	LOMR	LETTER OF MAP REVISION	TW	TOP OF WALL
CT	COURT	LP	LOW POINT	TYP	TYPICAL
CTRB	CONCRETE THRUST REDUCER BLOCK	LS	LUMP SUM	UDFCD	URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
CY	CUBIC YARD	LT	LEFT	UE	UTILITY EASEMENT
DBPS	DRAINAGE BASIN PLANNING STUDY	MAX	MAXIMUM	U&DE	UTILITY & DRAINAGE EASEMENT
DE	DRAINAGE EASEMENT	MDDP	MASTER DEVELOPMENT DRAINAGE PLAN	UGE	UNDERGROUND ELECTRIC
DIA	DIAMETER	MH	MANHOLE	VCP	VITRIFIED CLAY PIPE
DIP	DUCTILE IRON PIPE	MIN	MINIMUM	VPC	VERTICAL POINT OF CURVATURE
DR	DRIVE	N	NORTH	VPI	VERTICAL POINT OF INTERSECTION
DRC	DESIGN REVIEW COMMITTEE	NRCP	NON-REINFORCED CONCRETE PIPE	VPT	VERTICAL POINT OF TANGENCY
DU	DWELLING UNITS	ODP	OFFICIAL DEVELOPMENT PLAN	VTC	VEHICLE TRACKING CONTROL
E	EAST	OHE	OVERHEAD ELECTRIC	W	WEST
EA	EACH	OHU	OVERHEAD UTILITY	WL	WATER LINE
EGL	ENERGY GRADE LINE	PC	POINT OF CURVATURE	WM	WATER MAIN
EL	ELEVATION	PCC	POINT OF COMPOUND CURVATURE	WRD	WATER RESOURCES DEPARTMENT
ELEC	ELECTRIC	PCR	POINT OF CURB RETURN	WS	WATER SURFACE
EOA	EDGE OF ASPHALT	PDP	PRELIMINARY DEVELOPMENT PLAN	WSE	WATER SURFACE ELEVATION
ESMT	EASEMENT	PE	PROFESSIONAL ENGINEER	WTR	WATER
EST	ESTIMATE	PI	POINT OF INTERSECTION	YR	YEAR
EX	EXISTING	PKWY	PARKWAY		



VICINITY MAP

SCALE: 1" = 300'

### SHEET INDEX

1	COVER SHEET
2	GENERAL NOTES
3	SITE AND DEMO PLAN
4-6	CHANNEL PLAN AND PROFILES
7	CHANNEL DETAILS
8	DROP STRUCTURES PLAN AND PROFILE
9	DROP STRUCTURE DETAIL SHEETS
10	PAONIA STREET OVERFLOW PLAN
TOTAL	10

### BASIS OF BEARINGS

THE EASTERLY LINE OF LOT 2, POWERS & GALLEY PLAZA FILING NO. 1 RECORDED IN PLAT BOOK A-4 AT PAGE 30, SAID LINE BEING MONUMENTED BY A 1-1/4" YELLOW PLASTIC CAP STAMPED "LS 221061" AT THE SOUTH END AND A 1" O.D. PIPE AT THE NORTH END, SAID LINE BEARING N00°27'47"E AS SHOWN ON SAID PLAT.

### BENCHMARK

FIMS MONUMENT F81, BEING MONUMENTED BY A 3-1/4" ALUMINUM CAP IN RANGE BOX WITH NO TOP, LOCATED 900 FEET EAST OF THE INTERSECTION OF E. PLATTE AVENUE AND VALLEY STREET, APPROXIMATELY 80 FEET NORTH OF THE CENTERLINE OF E PLATTE AVENUE. SAID MONUMENT HAVING A PUBLISHED ELEVATION OF 6275.86 FEET, NAVD88.

THE LOCATIONS OF EXISTING ABOVE GROUND AND UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL ABOVE GROUND AND UNDERGROUND UTILITIES.



Know what's below.  
Call before you dig.

### OWNER/DEVELOPER STATEMENT

I, THE OWNER/DEVELOPER HAVE READ AND WILL COMPLY WITH ALL OF THE REQUIREMENTS SPECIFIED IN THESE DETAILED PLANS AND SPECIFICATIONS.

DANE OLMSTEAD

DATE

JACKSON DEARBORN PARTNERS  
404 S. WELLS STREET, SUITE 400  
CHICAGO, IL 60607

### EL PASO COUNTY STATEMENT

COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH COUNTY DESIGN CRITERIA. THE COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE COUNTY THROUGH THE APPROVAL OF THIS DOCUMENT ASSUMES NO RESPONSIBILITY FOR COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.

FILED IN ACCORDANCE WITH THE REQUIREMENTS OF THE EL PASO COUNTY LAND DEVELOPMENT CODE, DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2, AND ENGINEERING CRITERIA MANUAL AS AMENDED.

IN ACCORDANCE WITH ECM SECTION 1.12, THESE CONSTRUCTION DOCUMENTS WILL BE VALID FOR CONSTRUCTION FOR A PERIOD OF 2 YEARS FROM THE DATE SIGNED BY THE EL PASO COUNTY ENGINEER. IF CONSTRUCTION HAS NOT STARTED WITHIN THOSE 2 YEARS, THE PLANS WILL NEED TO BE RESUBMITTED FOR APPROVAL, INCLUDING PAYMENT OF REVIEW FEES AT THE PLANNING AND COMMUNITY DEVELOPMENT DIRECTOR'S DISCRETION.

### ENGINEER'S STATEMENT

STANDARD DETAILS SHOWN WERE REVIEWED ONLY AS TO THEIR APPLICATION ON THIS PROJECT

MIKE A. BRAMLETT, P.E.  
COLORADO P.E. 32314  
FOR AND ON BEHALF OF JR ENGINEERING

DATE

### APPLICANT/OWNER

JACKSON DEARBORN PARTNERS  
404 S. WELLS ST.  
SUITE 400  
CHICAGO, IL 60607  
P~734.216.2577

### CIVIL ENGINEER

JR ENGINEERING  
5475 TECH CENTER DR  
SUITE 235  
COLORADO SPRINGS, CO 80919  
CONTACT: MIKE BRAMLETT  
C~719.659.7679

### PLANNER

N.E.S. INC.  
619 N. CASCADE AVE  
SUITE 200  
COLORADO SPRINGS, CO 80903  
CONTACT: TAMARA BAXTER  
P~719.471.0073

### GEOTECHNICAL ENGINEER

CTL THOMPSON, INC  
5170 MARK DABLING BLVD  
COLORADO SPRINGS, CO 80918  
P~719.528.8300



JR ENGINEERING



CTL THOMPSON  
INCORPORATED

PREPARED FOR

JACKSON DEARBORN PARTNERS

404 S. WELLS ST.

SUITE 400

CHICAGO, ILL 60607

OFFICE PHONE

(734) 216-2577

JR ENGINEERING  
A Western Company



Central 303-740-9888 • Colorado Springs 719-583-2583  
Fort Collins 970-491-9888 • www.jrengineering.com

BY

DATE

No. REVISION

1"

300'

H-SCALE

V-SCALE

N/A

DATE

11/16/20

DESIGNED BY

JBIP

DRAWN BY

JBIP

CHECKED BY

SAND CREEK CENTER  
TRIBUTARY  
COVER SHEET

SHEET 1 OF 10

JOB NO. 25174.00

UNTIL SUCH TIME AS  
THESE DRAWINGS ARE  
APPROVED BY THE  
APPROPRIATE REVIEWING  
AGENCIES, OR ENGINEERING  
APPROVES THEIR USE  
DESIGNATED BY WRITTEN  
AUTHORIZATION.



LAYER LINETYPE LEGEND

	EXISTING	PROPOSED
MATCH LINE		
SECTION LINE		
BOUNDARY LINE		
PROPERTY LINE		
EASEMENT LINE		
RIGHT OF WAY		
CENTERLINE		
FENCE		
GUARDRAIL		
CABLE TV		
ELECTRIC		
FIBER OPTIC		
GAS MAIN		
IRRIGATION MAIN		
OVERHEAD UTILITY		
SANITARY SEWER		
STORM DRAIN		
TELEPHONE		
WATER MAIN		
SWALE/WATERWAY FLOWLINE		
DIVERSION DITCH		
TOP OF SLOPE		
TOE OF SLOPE		
100 YEAR FLOODPLAIN		
5 YEAR HGL		
100 YEAR HGL		

UTILITIES LEGEND

	EXISTING	PROPOSED
<b>STORM SEWER</b>		
MANHOLE		
STORM INLET		
AREA INLET - SQUARE		
FLARED END SECTION		
RIPRAP		
<b>SANITARY SEWER</b>		
LINE MARKER	<i>Mkr San</i>	
SERVICE MARKER		
CLEAN-OUT		
MANHOLE W/ DIRECTIONAL FLOW ARROW		
<b>WATER LINE</b>		
LINE MARKER	<i>Mkr W</i>	
SERVICE MARKER		
FIRE HYDRANT		
MANHOLE		
BEND		
BLOW-OFF VALVE		
WELL		
METER		
VALVE		
REDUCER		
CROSS		
PLUG W/ THRUST BLOCK		
TEE		
AIR & VACUUM VALVE ASSEMBLY		
<b>GAS LINE</b>		
MARKER	<i>Mkr G</i>	
SERVICE MARKER		
METER		
VALVE		
PLUG		
<b>DRY UTILITIES</b>		
CABLE TV MARKER	<i>Mkr TV</i>	
CABLE TELEVISION PEDESTAL		
ELECTRIC MARKER	<i>Mkr E</i>	
ELECTRIC SERVICE MARKER		
ELECTRICAL PEDESTAL		
ELECTRICAL METER		
ELECTRICAL MANHOLE		
FIBER-OPTIC MARKER	<i>Mkr FO</i>	
IRRIGATION PEDESTAL		
TELEPHONE MARKER	<i>Mkr T</i>	
TELEPHONE PEDESTAL		
TELEPHONE MANHOLE		
UTILITY POLE		
GUY ANCHOR		
GUY POLE		

MONUMENTATION LEGEND

ALUMINUM CAP - FOUND	
BRASS CAP - FOUND	
BENCHMARK - FOUND	
CROSS - FOUND	
MONUMENT - SET	
MONUMENT - FOUND (DEFAULT)	
MONUMENT - FOUND (ALTERNATE 1)	
MONUMENT - FOUND (ALTERNATE 2)	
MONUMENT - FOUND (ALTERNATE 3)	
MONUMENT - FOUND (ALTERNATE 4)	
MONUMENT - FOUND (ALTERNATE 5)	
MONUMENT - FOUND (ALTERNATE 6)	
MONUMENT - FOUND (ALTERNATE 7)	
NAIL & WASHER - FOUND	
PANEL - FOUND	
PK NAIL - FOUND	
ROW MONUMENT - FOUND	
ROW MARKER - FOUND	
SECTION CORNER - FOUND	
SECTION CORNER - SET	
QUARTER-SECTION CORNER - FOUND	
QUARTER-SECTION CORNER - SET	
SECTION CENTER - FOUND	
SECTION CENTER - FOUND	
CONTROL/TRVERSE POINT - SET	

DRAINAGE REPORT PLANS

	KEY
BASIN DESIGNATION (NO COEFFICIENT)	
BASIN DESIGNATION (1 COEFFICIENT)	
BASIN DESIGNATION (2 COEFFICIENTS)	
ANALYSIS POINT IDENTIFIER	
BASIN DESIGNATION (HISTORIC)	
BASIN DESIGNATION (DEVELOPED)	
SUB-BASIN DESIGNATION (DEVELOPED)	
DRAINAGE PIPE IDENTIFIER	
DRAINAGE POINT IDENTIFIER (HEXAGONAL)	
DRAINAGE POINT IDENTIFIER (TRIANGULAR)	
SWMM DESIGNATION 1	
SWMM DESIGNATION 2	
SWMM DESIGNATION 3	
SWMM DESIGNATION 4	

LANDSCAPE LEGEND

	EXISTING	PROPOSED
TREE - CONIFEROUS		
TREE - DECIDUOUS		
SHRUB/BUSH		
SHRUBS AND BUSHES		
IRRIGATION BOX		
IRRIGATION SPRINKLER		
IRRIGATION VALVE		
BOLLARD		
FLAGPOLE		

STANDARD NOTES FOR EL PASO COUNTY CONSTRUCTION PLANS

- ALL DRAINAGE AND ROADWAY CONSTRUCTION SHALL MEET THE STANDARDS AND SPECIFICATIONS OF THE CITY OF COLORADO SPRINGS/EL PASO COUNTY DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2, AND THE EL PASO COUNTY ENGINEERING CRITERIA MANUAL.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE NOTIFICATION AND FIELD NOTIFICATION OF ALL EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, BEFORE BEGINNING CONSTRUCTION. LOCATION OF EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CALL 811 TO CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC).
- CONTRACTOR SHALL KEEP A COPY OF THESE APPROVED PLANS, THE GRADING AND EROSION CONTROL PLAN, THE STORMWATER MANAGEMENT PLAN (SWMP), THE SOIL AND GEOTECHNICAL REPORT, AND THE APPROPRIATE DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS AT THE JOB SITE AT ALL TIMES, INCLUDING THE FOLLOWING:
  - EL PASO COUNTY ENGINEERING CRITERIA MANUAL (ECM)
  - CITY OF COLORADO SPRINGS/ EL PASO COUNTY DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2
  - COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) STANDARD SPECIFICATIONS AND BRIDGE CONSTRUCTION
  - CDOT M&S STANDARDS
- NOTWITHSTANDING ANYTHING DEPICTED IN THESE PLANS IN WORDS OR GRAPHIC REPRESENTATION, ALL DESIGN AND CONSTRUCTION RELATED TO ROADS, STORM DRAINAGE AND EROSION CONTROL SHALL CONFORM TO THE STANDARDS AND REQUIREMENTS OF THE MOST RECENT VERSIONS OF THE RELEVANT ADOPTED EL PASO COUNTY STANDARDS, INCLUDING THE LAND DEVELOPMENT CODE, THE ENGINEERING CRITERIA MANUAL, THE DRAINAGE CRITERIA MANUAL, AND THE DRAINAGE CRITERIA MANUAL VOLUME 2. ANY DEVIATIONS FROM REGULATIONS AND STANDARDS MUST BE REQUESTED, AND APPROVED, IN WRITING. ANY MODIFICATIONS NECESSARY TO MEET CRITERIA AFTER-THE-FACT WILL BE ENTIRELY THE DEVELOPER'S RESPONSIBILITY TO RECTIFY.
- IT IS THE DESIGN ENGINEER'S RESPONSIBILITY TO ACCURATELY SHOW EXISTING CONDITIONS, BOTH ONSITE AND OFFSITE, ON THE CONSTRUCTION PLANS. ANY MODIFICATIONS NECESSARY DUE TO CONFLICTS, OMISSIONS, OR CHANGED CONDITIONS WILL BE ENTIRELY THE DEVELOPER'S RESPONSIBILITY TO RECTIFY.
- CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH EL PASO COUNTY PLANNING AND COMMUNITY DEVELOPMENT INSPECTIONS, PRIOR TO STARTING CONSTRUCTION.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO UNDERSTAND THE REQUIREMENTS OF ALL JURISDICTIONAL AGENCIES TO OBTAIN ALL REQUIRED PERMITS, INCLUDING BUT NOT LIMITED TO EL PASO COUNTY EROSION AND STORMWATER QUALITY CONTROL PERMIT (ESQCP), REGIONAL BUILDING FLOODPLAIN DEVELOPMENT PERMIT, U.S. ARMY CORPS OF ENGINEERS-ISSUED 401 AND/OR 404 PERMITS, AND COUNTY AND STATE FUGITIVE DUST PERMITS.
- CONTRACTOR SHALL NOT DEVIATE FROM THE PLANS WITHOUT FIRST OBTAINING WRITTEN APPROVAL FROM THE DESIGN ENGINEER AND PCO. CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER IMMEDIATELY UPON DISCOVERY OF ANY ERRORS OR INCONSISTENCIES.
- ALL STORM DRAIN PIPE SHALL BE CLASS III RCP UNLESS OTHERWISE NOTED AND APPROVED BY PLANNING AND COMMUNITY DEVELOPMENT.
- CONTRACTOR SHALL COORDINATE GEOTECHNICAL TESTING PER ECM STANDARDS. PAVEMENT DESIGN SHALL BE APPROVED BY EL PASO COUNTY PCO PRIOR TO PLACEMENT OF CURB AND GUTTER AND PAVEMENT.
- ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE AT APPROVED CONSTRUCTION ACCESS POINTS.
- SIGHT VISIBILITY TRIANGLES ARE IDENTIFIED IN THE PLANS SHALL BE PROVIDED AT ALL INTERSECTIONS. OBSTRUCTIONS GREATER THAN 18 INCHES ABOVE FLOWLINE ARE NOT ALLOWED IN SIGHT TRIANGLES.
- SIGNING AND STRIPING SHALL COMPLY WITH EL PASO COUNTY DEPARTMENT OF PUBLIC WORKS AND MUTCD CRITERIA.
- CONTRACTOR SHALL OBTAIN ANY PERMITS REQUIRED BY EL PASO COUNTY DEPARTMENT OF PUBLIC WORKS, INCLUDING WORK WITHIN THE RIGHT-OF-WAY AND SPECIAL TRANSPORT PERMITS.
- THE LIMITS OF CONSTRUCTION SHALL REMAIN WITHIN THE PROPERTY LINE UNLESS OTHERWISE NOTED. THE OWENER/DEVELOPER SHALL OBTAIN WRITTEN PERMISSION AND EASEMENTS, WHERE REQUIRED, FROM ADJOINING PROPERTY OWNER(S) PRIOR TO ANY OFF-SITE DISTURBANCE, GRADING, OR CONSTRUCTION.

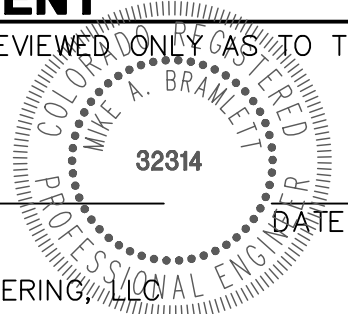


Know what's below.  
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ENGINEER'S STATEMENT

STANDARD DETAILS SHOWN WERE REVIEWED ONLY AS TO THEIR APPLICATION ON THIS PROJECT

MIKE A. BRAMLETT, P.E.  
COLORADO P.E. 32314  
FOR AND ON BEHALF OF JR ENGINEERING



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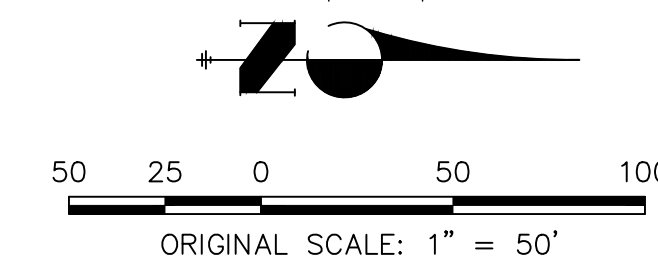
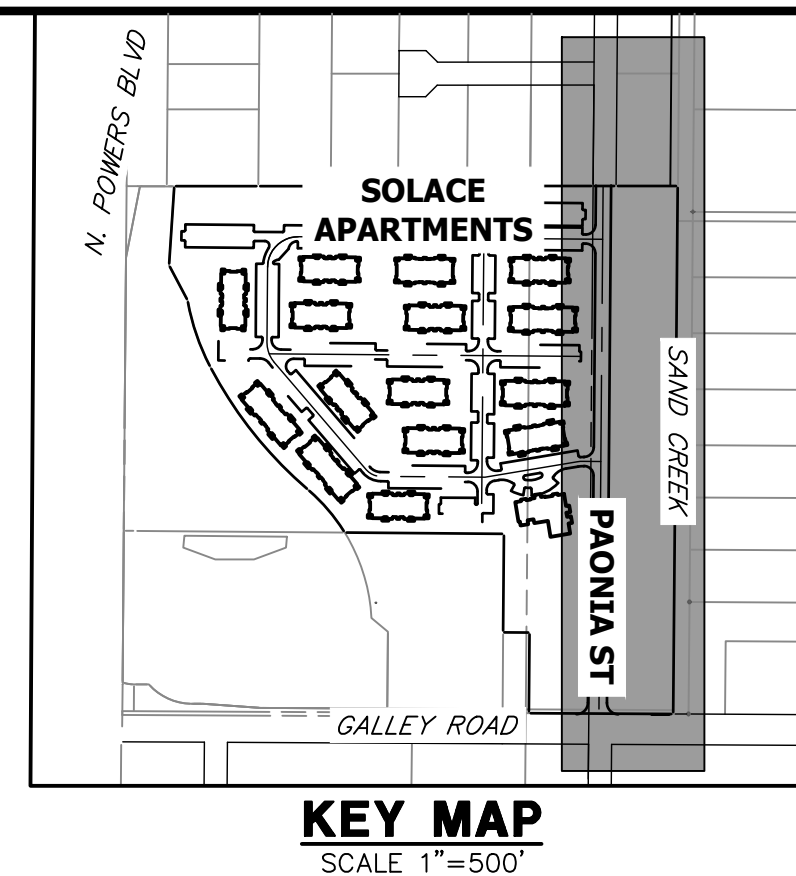
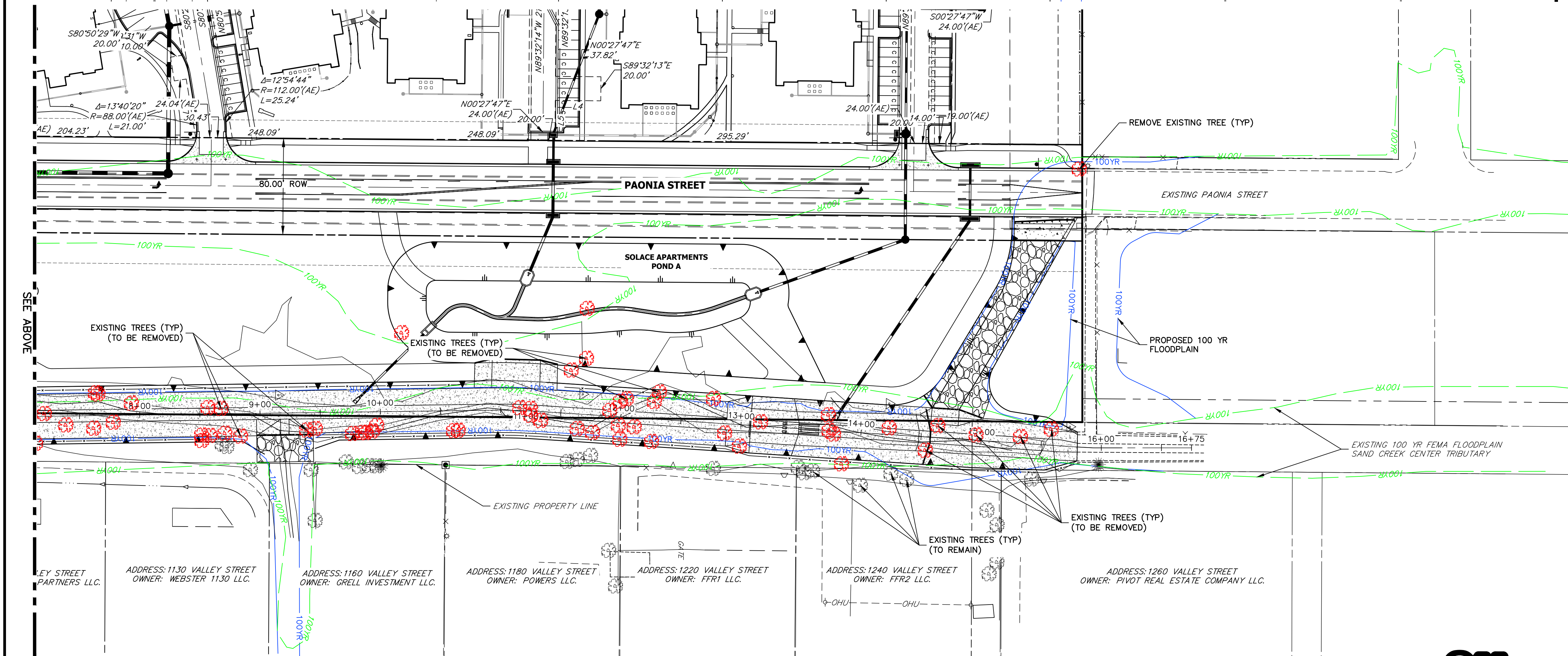
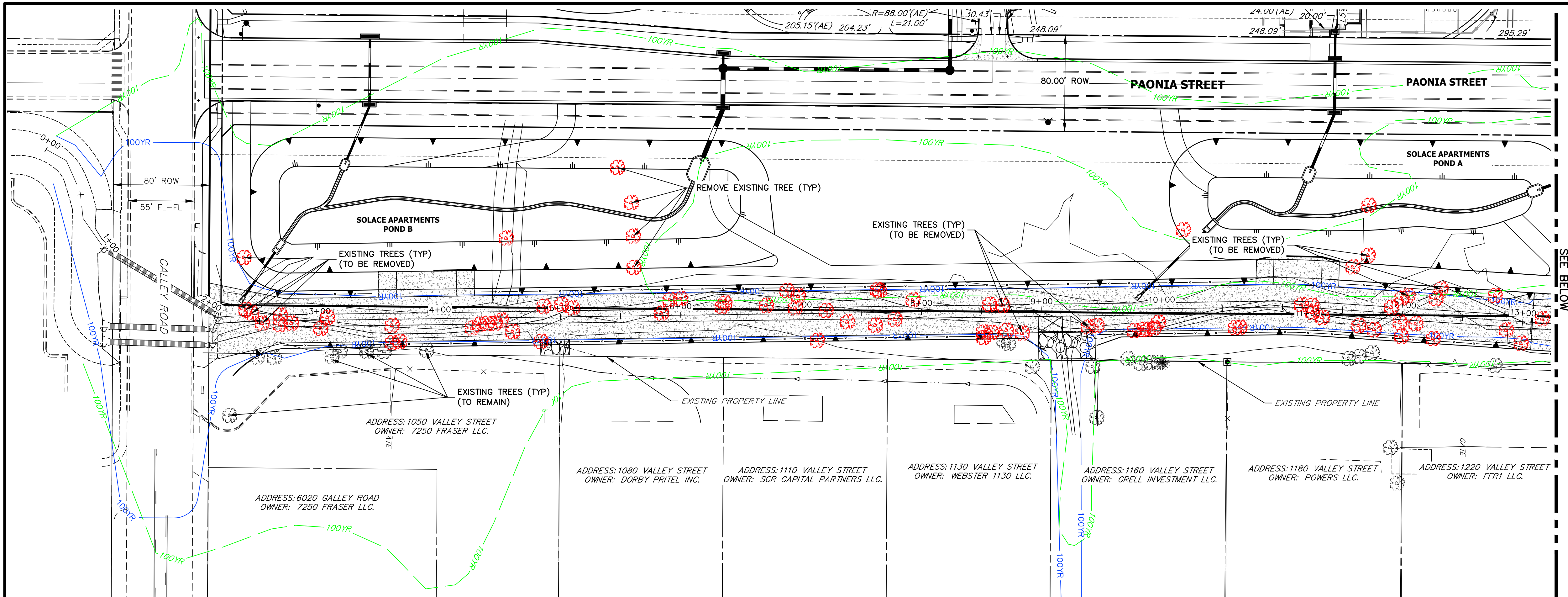
PREPARED FOR  
**JACKSON DEARBORN PARTNERS**  
404 S. WELLS ST.  
SUITE 400  
CHICAGO, ILL. 60607  
OFFICE PHONE (734) 216-2577

**J.R. ENGINEERING**  
A Western Company  
Central 303-740-9888 • Colorado Springs 719-583-2583  
Fort Collins 970-491-9888 • www.jrengineering.com

BY	DATE	REVISION	No.	N/A	H-SCALE	V-SCALE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY
							11/16/20	JRM	JRM	

SAND CREEK CENTER TRIBUTARY	GENERAL NOTES
SHEET 2 OF 10	JOB NO. 25174.00





**ENGINEER'S STATEMENT**  
STANDARD DETAILS SHOWN WERE REVIEWED ONLY AS TO THEIR APPLICATION ON THIS PROJECT

MIKE A. BRAMLETT, P.E.  
COLORADO P.E. 32314  
FOR AND ON BEHALF OF JR ENGINEERING, LLC

DATE

SHEET 3 OF 10		SAND CREEK CENTER TRIBUTARY		H-SCALE 1"=50'		No.	REVISION	BY	DATE
		SITE AND DEMO PLAN		V-SCALE N/A					
				DATE 11/16/20					
				DESIGNED BY JBP					
				DRAWN BY JBP					
				CHECKED BY					
JOB NO. 25174.00									

PREPARED FOR


**JACKSON DEARBORN PARTNERS**

404 S. WELLS ST.

SUITE 400

CHICAGO, ILL 60607

OFFICE PHONE (734) 216-2577



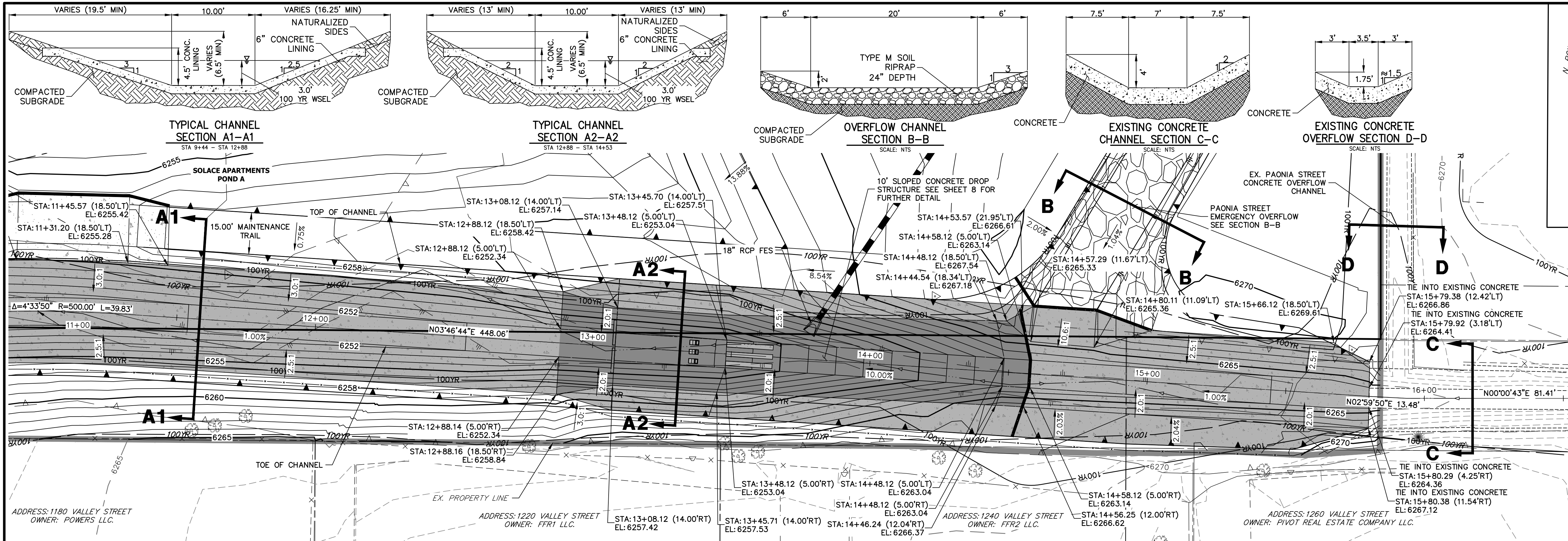
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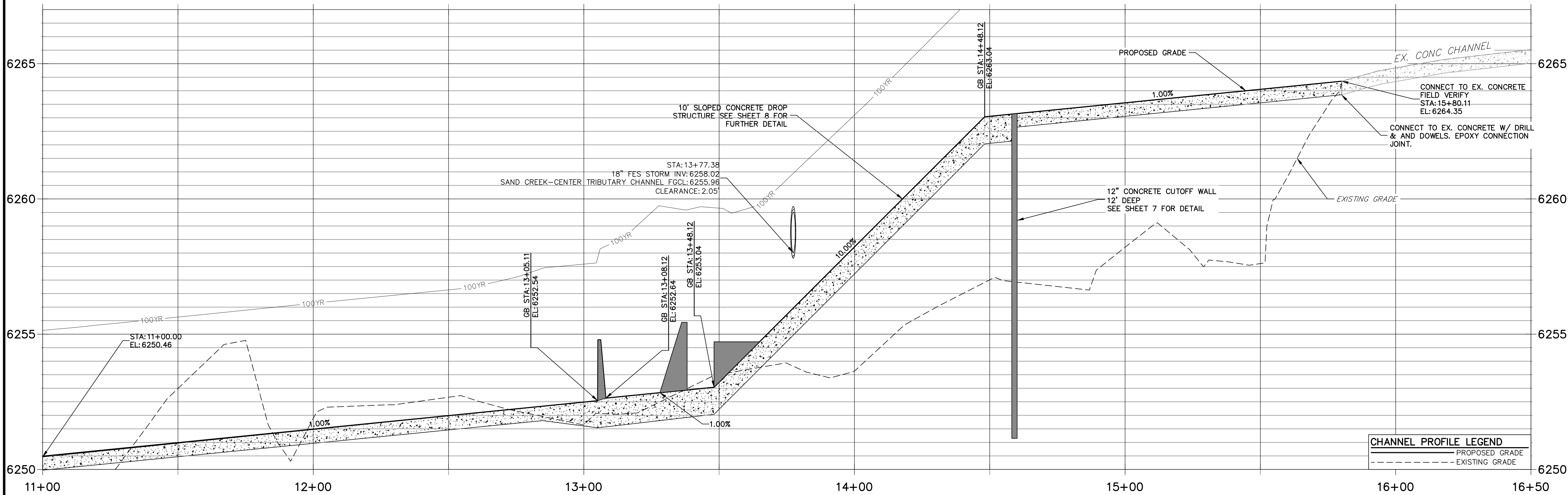
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AUTHORIZATION.



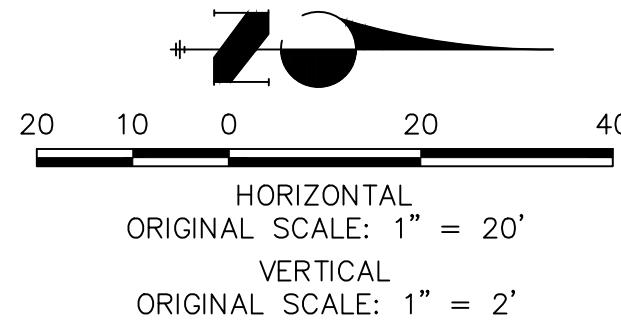


**SAND CREEK-CENTER TRIBUTARY CHANNEL PROFILE (4)**  
**STA 11+00.00 TO 16+50.00**

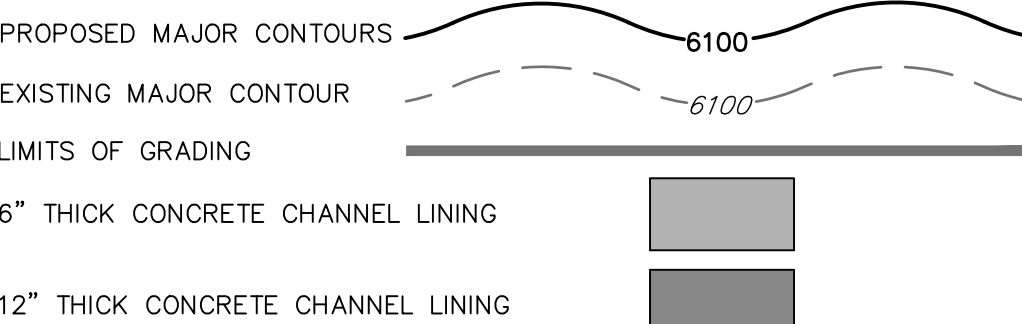


**FENCING NOTES**

1. FENCING SHALL BE PROVIDED ALONG THE EXTENTS OF THE CHANNEL, EXCEPT FOR AT LOCATIONS OF MAINTENANCE ACCESS.
2. FENCING SHALL CONFORM TO THE LANDSCAPING PLANS FOR SOLACE APARTMENTS.



**LEGEND**



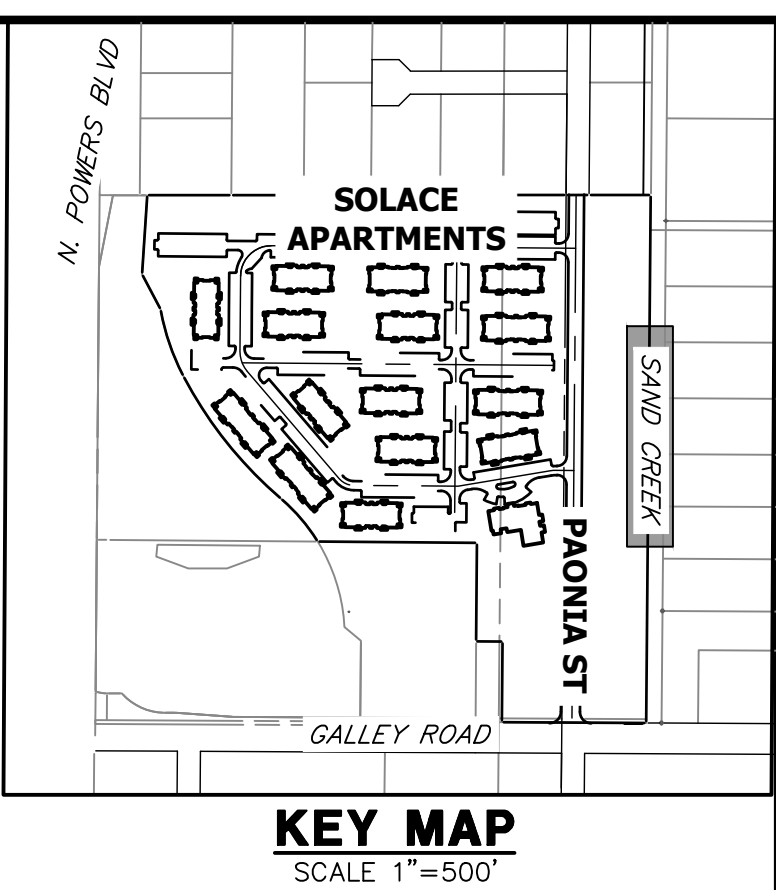
**ENGINEER'S STATEMENT**


STANDARD DETAILS SHOWN WERE REVIEWED ONLY AS TO THEIR APPLICATION ON THIS PROJECT

MIKE A. BRAMLETT, P.E.  
COLORADO P.E. 32314  
FOR AND ON BEHALF OF JR ENGINEERING

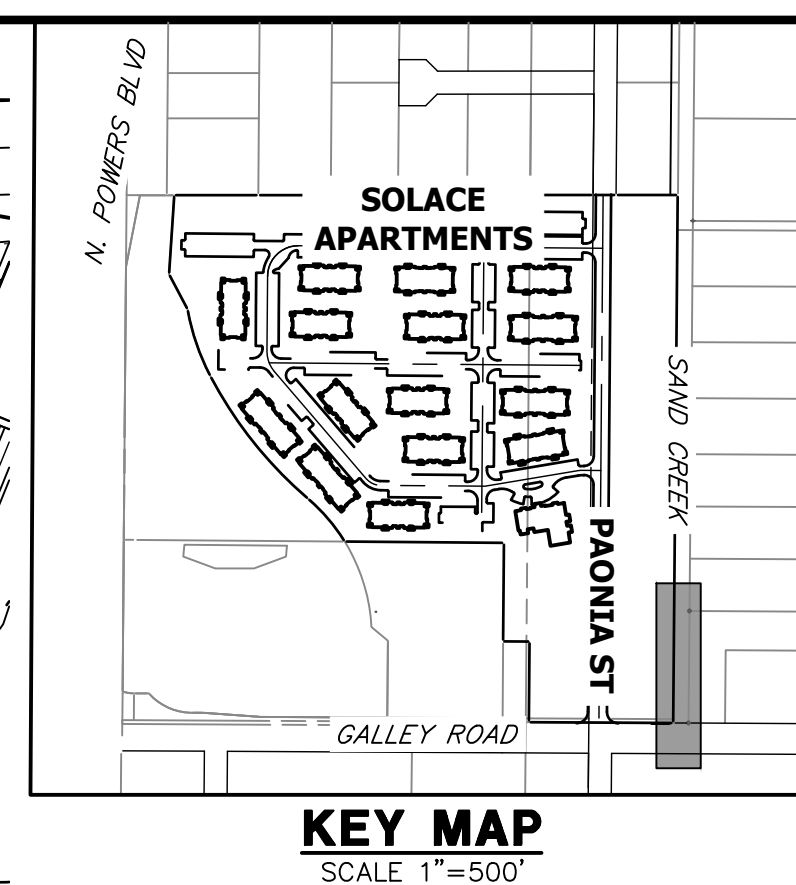


<b>JACKSON DEARBORN PARTNERS</b> 404 S. WELLS ST. SUITE 400 CHICAGO, ILL 60607 OFFICE PHONE (734) 216-2577	<b>J.R. ENGINEERING</b> A Westman Company  Central 303-740-9888 • Colorado Springs 719-583-2583 Fort Collins 970-491-9888 • www.jrengineering.com	BY	DATE
		No.	REVISION
		H-SCALE 1"=20'	V-SCALE 1"=2'
		DESIGNED BY JBP	DRAWN BY JBP
SAND CREEK CENTER TRIBUTARY CHANNEL PLAN AND PROFILES		SHEET 4 OF 10	
JOB NO. 25174.00			



SAND CREEK CENTER TRIBUTARY		H-SCALE	1"=20'	No.	REVISION	BY	DATE	<div><b>J.R. ENGINEERING</b> A Western Company Centennial 303-740-4333 • Colorado Springs 719-583-2533 Fort Collins 970-491-9888 • <a href="http://www.jrengineering.com">www.jrengineering.com</a></div>	JACKSON DEARBORN PARTNERS 404 S. WELLS ST. SUITE 400 CHICAGO, ILL 60607 OFFICE PHONE (734) 216-2577	UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING OFFICIALS, NO ENGINEERING APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.
CHANNEL PLAN AND PROFILES	V-SCALE	1"=2'	DATE							
SHEET	5	OF	10	JOB NO. 25174.00						





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**JACKSON DEARBORN PARTNERS**  
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CHICAGO, ILL 60607  
OFFICE PHONE  
(734) 216-2577

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MIKE A. BRAMLETT, P.E.  
COLORADO P.E. 32314  
FOR AND ON BEHALF OF: IR ENGINEERING

REVIEWED ONLY AS TO THE

32314

DATE

ENGINEERING, LLC

SHEET	6	OF	10
JOB NO.	25174.00		





\* USE ONLY IF T ≥ 8 IN.  
FORM ONLY FEMALE KEYWAY



\*\* USE ONLY IF  $T < 8$  IN.



A KEYWAY IS ALLOWED TO FACILITATE USE OF BENT TIE BARS OR APPROVED TWO PIECE CONNECTORS



\*\*\* USE T/4 WHEN T < 8 IN.



STANDARD DETAILS SHOWN WERE REVIEWED ONLY AS TO THEIR APPLICATION ON THIS PROJECT

MIKE A. BRAMLETT, P.E.  
COLORADO P.E. 32314  
FOR AND ON BEHALF OF

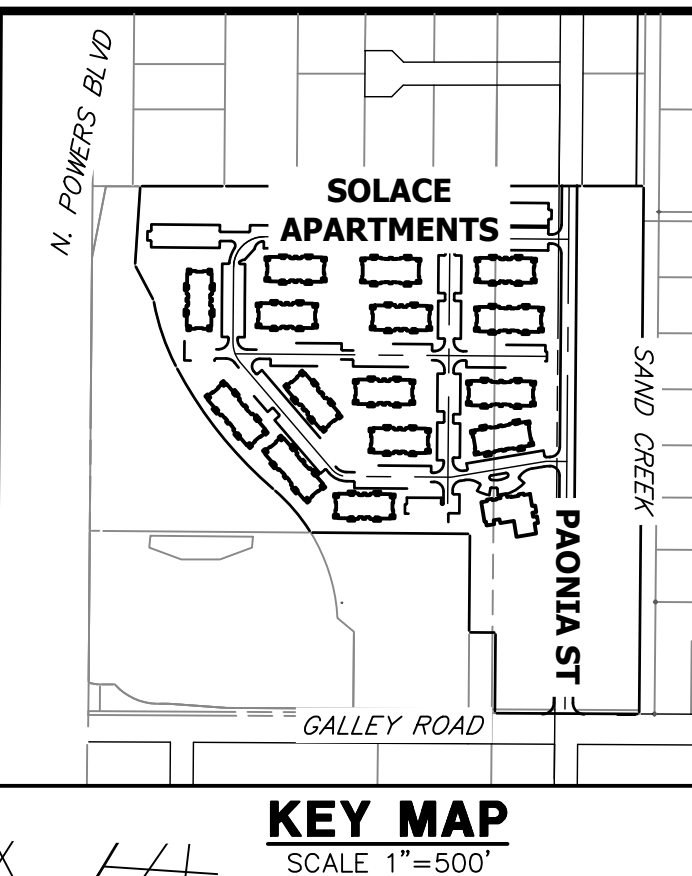
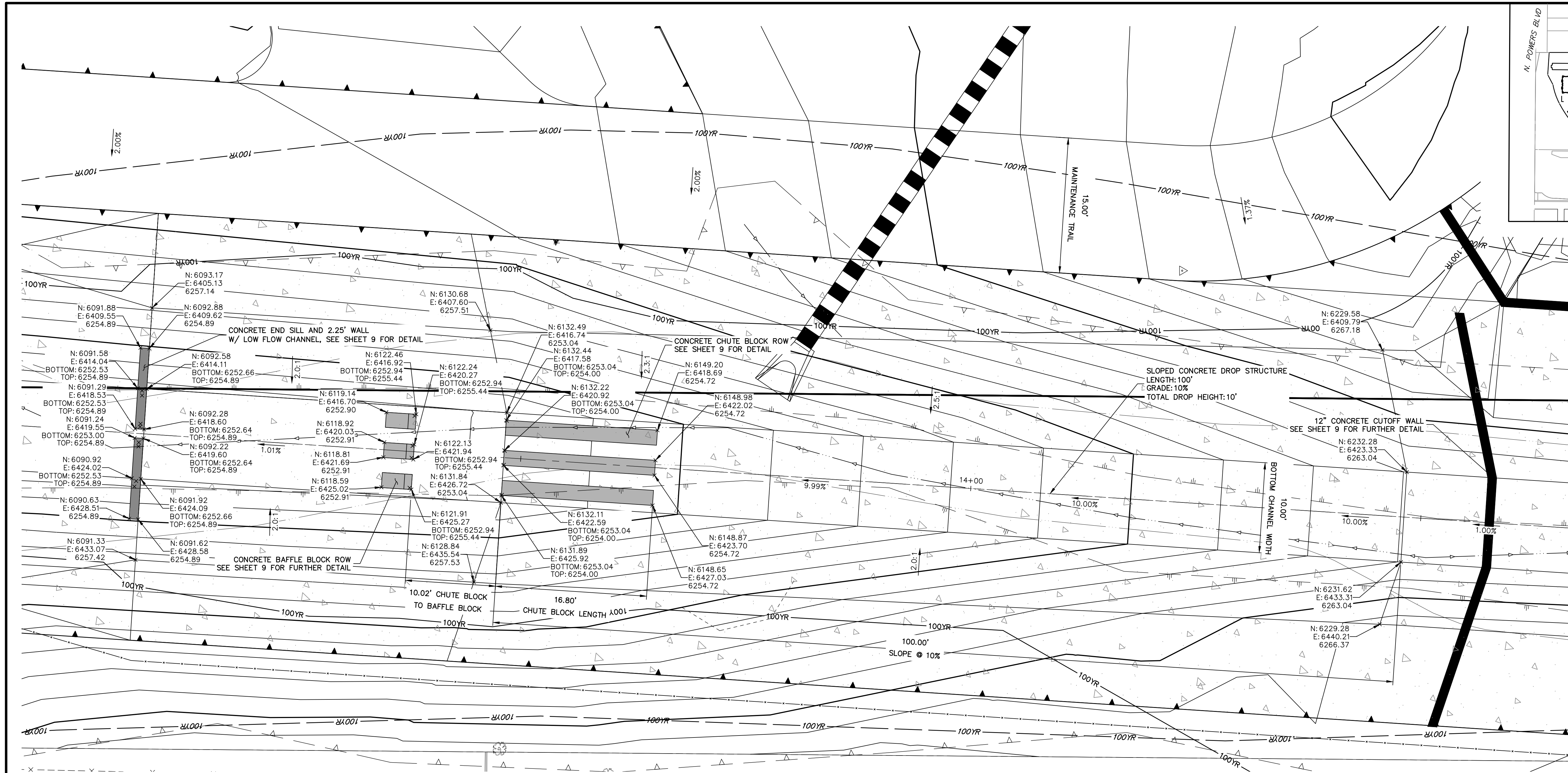
VIEWED ONLY AS TO

32314

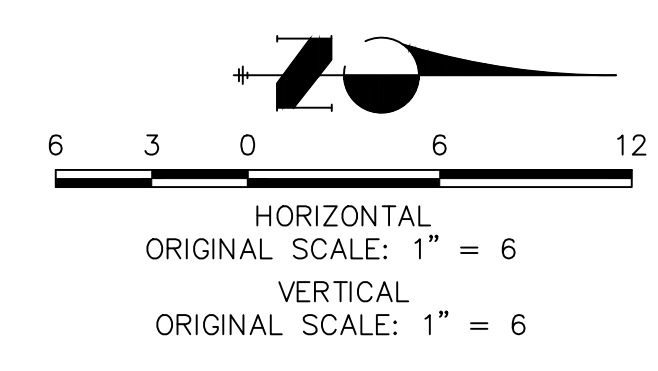
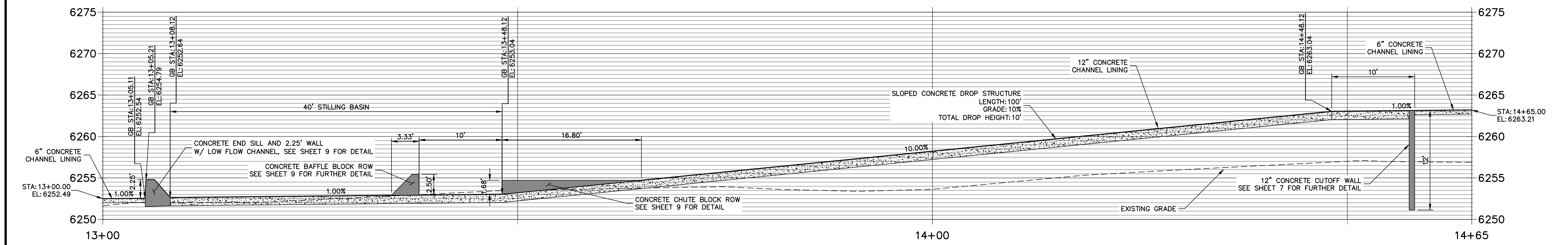
DATE

ENGINEERING, LLC

[illegible]



**DROP 1 PROFILE  
STA 13+00.00 TO 14+65.00**

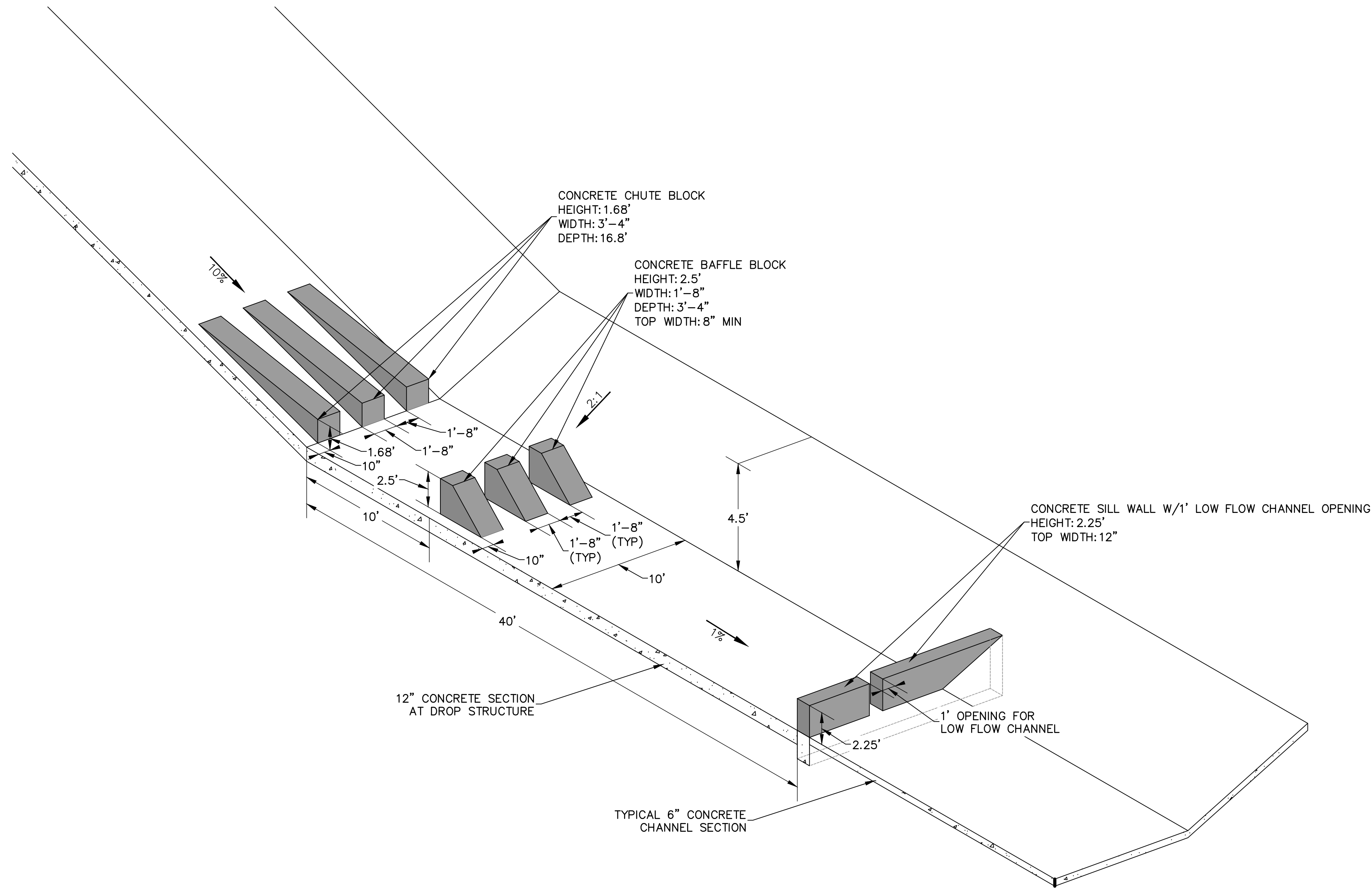


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STANDARD DETAILS SHOWN WERE REVIEWED ONLY AS TO THEIR APPLICATION ON THIS PROJECT

MIKE A. BRAMLETT, P.E.  
COLORADO P.E. 32314  
FOR AND ON BEHALF OF JR ENGINEERING, INC.

DATE

<b>SAND CREEK CENTER TRIBUTARY</b>	<b>DROP STRUCTURES PLAN AND PROFILE</b>	PREPARED FOR		JACKSON DEARBORN PARTNERS 404 S. WELLS ST. SUITE 400 CHICAGO, ILL. 60607 OFFICE PHONE (734) 216-2577	
		UNLESS SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, OR ENGINEERING APPROVES THEIR USE DESIGNATED BY WRITTEN AUTHORIZATION.			
		DESIGNED BY		JBP	
		DRAWN BY		JBP	
CHECKED BY					
DATE		11/16/20			
H-SCALE 1"=6'		V-SCALE 1"=6'			
No.		REVISION			
BY		DATE			

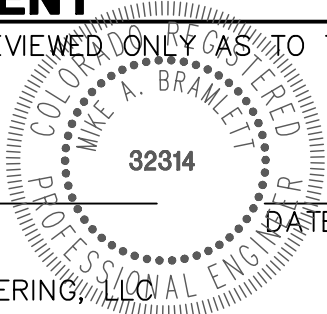


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STANDARD DETAILS SHOWN WERE REVIEWED ONLY AS TO THEIR APPLICATION ON THIS PROJECT

MIKE A. BRAMLETT, P.E.  
COLORADO P.E. 32314  
FOR AND ON BEHALF OF JR ENGINEERING



SAND CREEK CENTER  
TRIBUTARY  
DROP STRUCTURE DETAIL  
SHEETS

SHEET 9 OF 10

JOB NO. 25174.00

No. REVISION

H-SCALE  
V-SCALE  
DATE  
DESIGNED BY  
DRAWN BY  
CHECKED BY

N/A  
N/A  
11/16/20  
JBP  
JBP

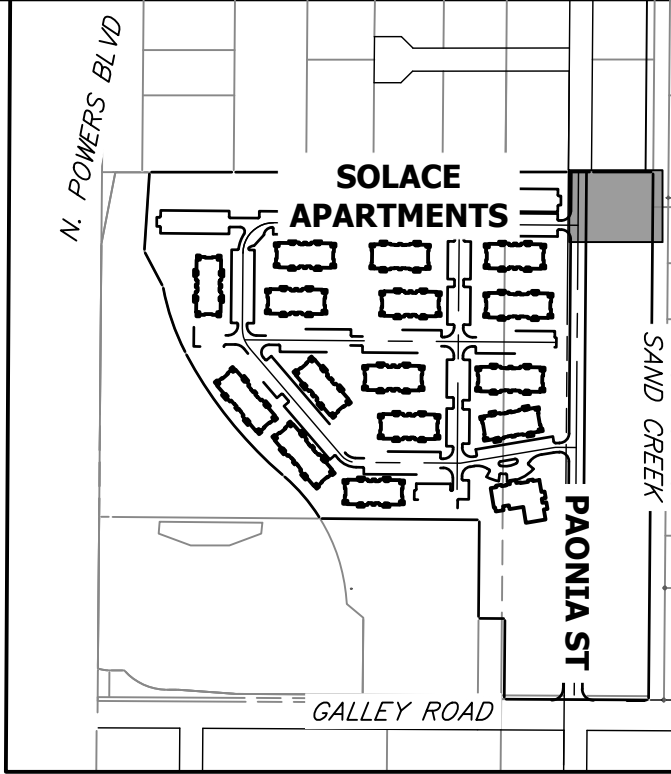
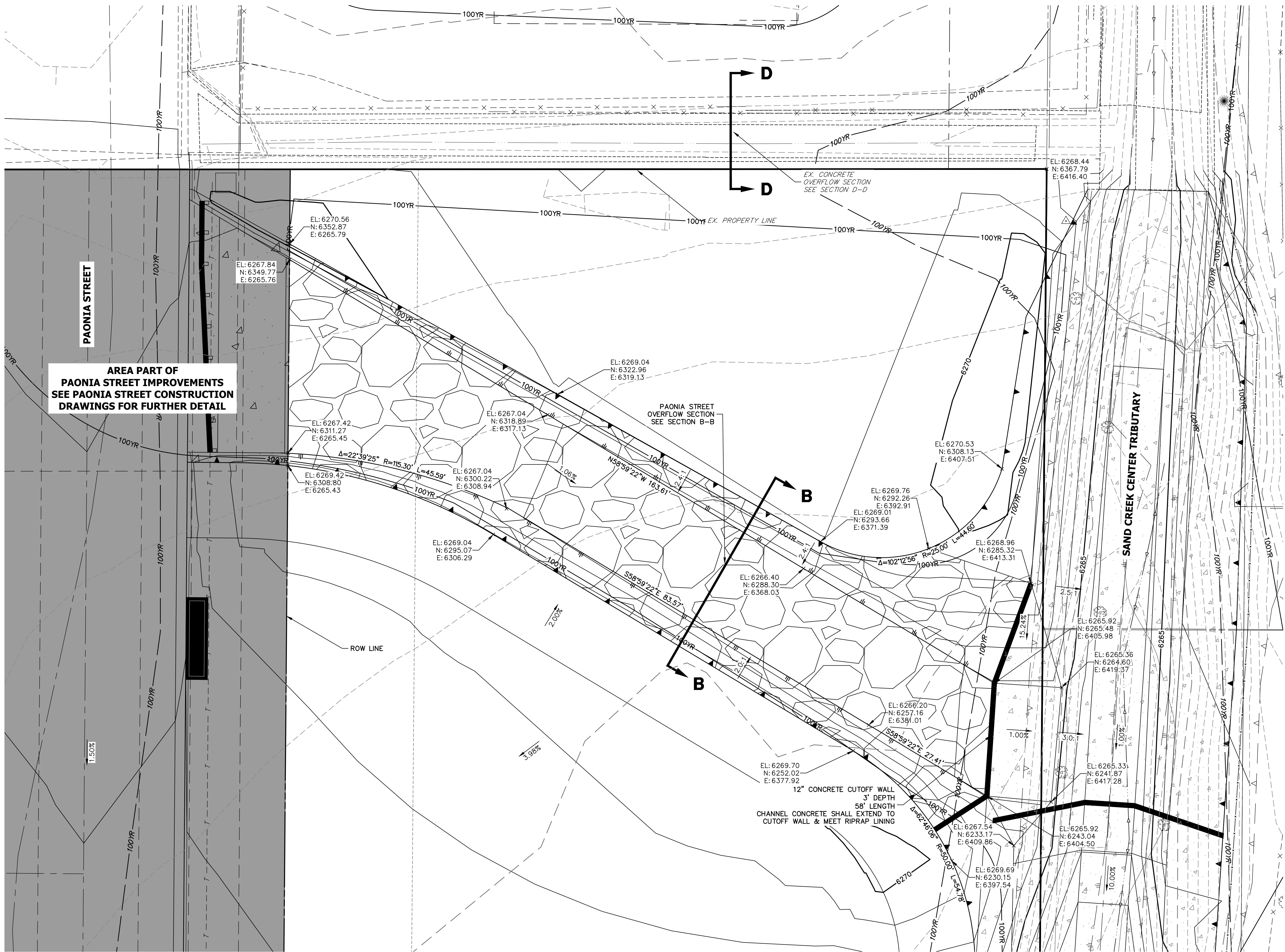
BY DATE

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A Western Company  
Central 303-740-9888 • Colorado Springs 719-583-2583  
Fort Collins 970-491-9888 • www.jrengineering.com

PREPARED FOR  
**JACKSON DEARBORN PARTNERS**  
404 S. WELLS ST.  
SUITE 400  
CHICAGO, ILL. 60607  
OFFICE PHONE  
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AUTHORIZATION.

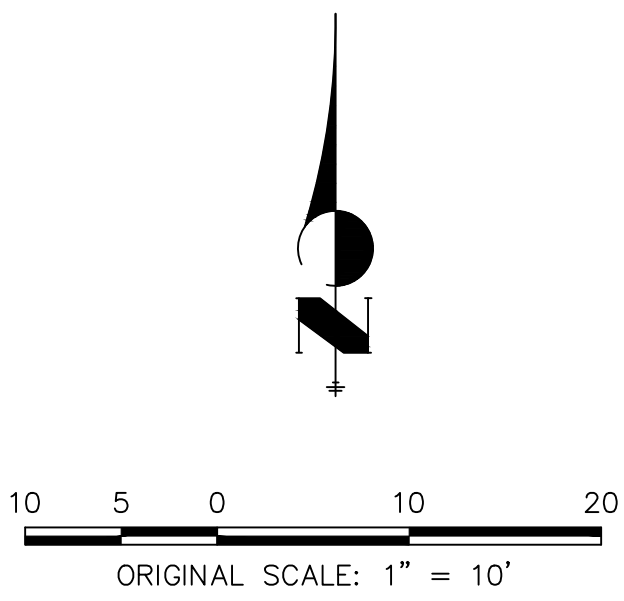
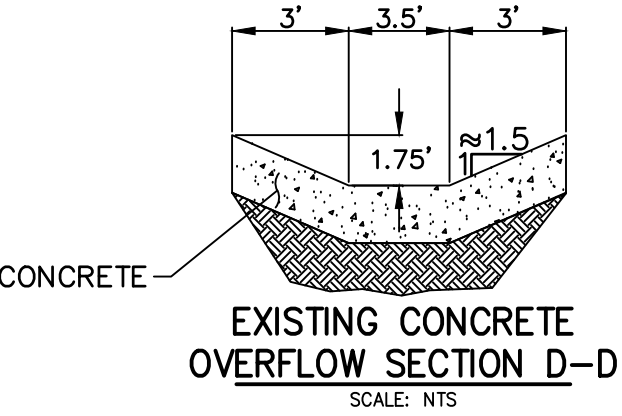
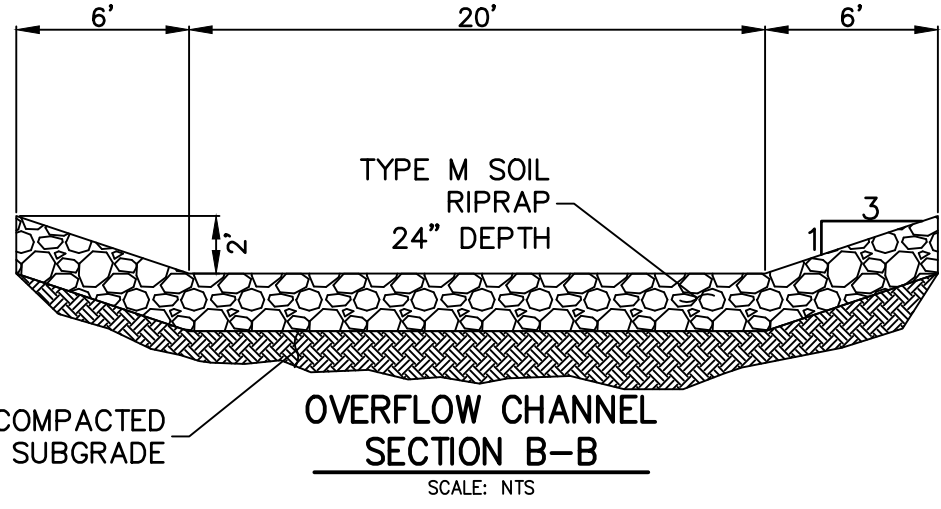




AREA PART OF  
PAONIA STREET IMPROVEMENTS  
SEE PAONIA STREET CONSTRUCTION  
DRAWINGS FOR FURTHER DETAIL

PAONIA STREET  
OVERFLOW SECTION  
SEE SECTION B-B

12" CONCRETE CUTOFF WALL  
3' DEPTH  
58' LENGTH  
CHANNEL CONCRETE SHALL EXTEND TO  
CUTOFF WALL & MEET RIPRAP LINING



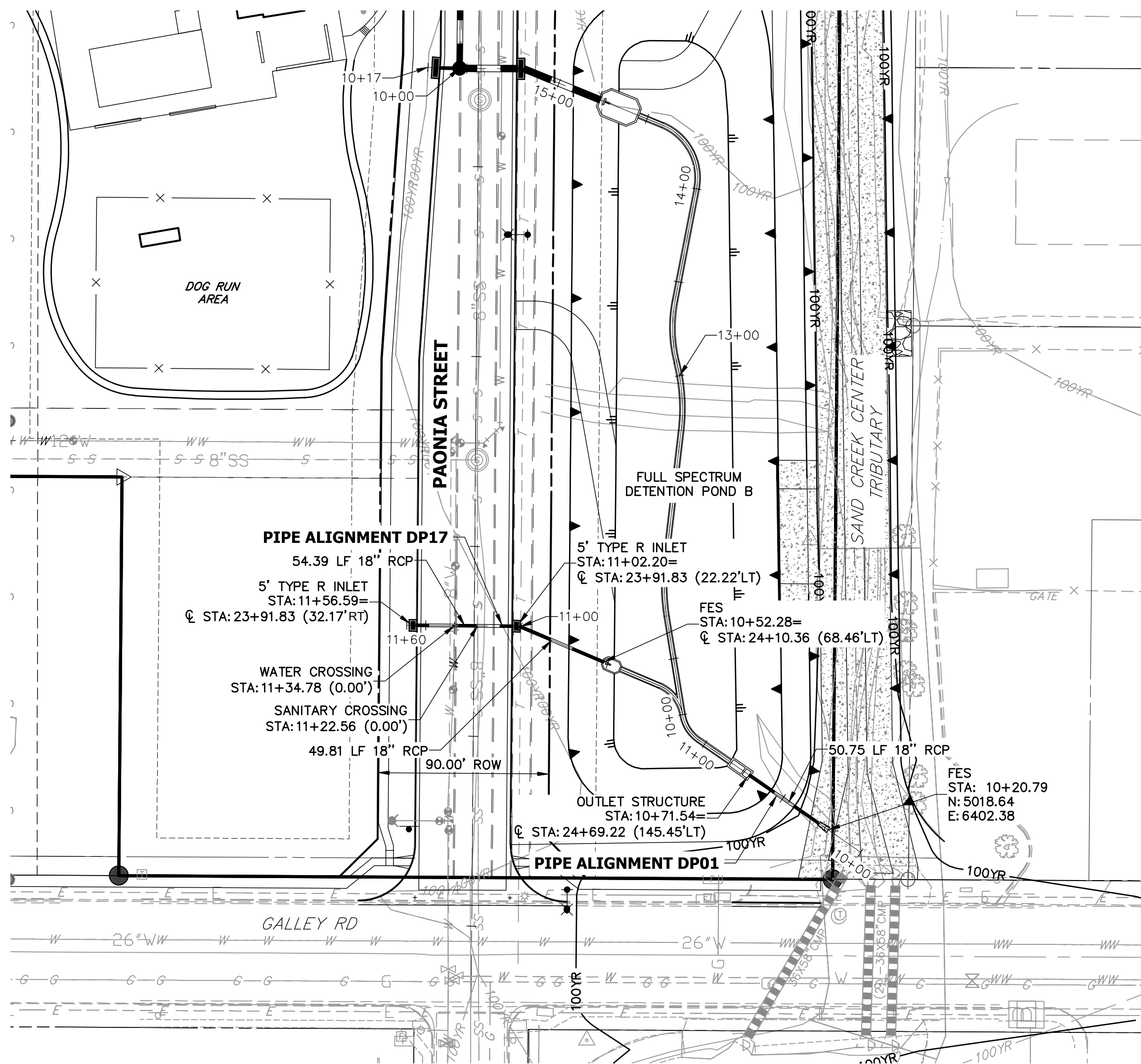
**811**  
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**ENGINEER'S STATEMENT**  
PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR  
ENGINEERING  
*Mike Bramlett*  
MIKE A. BRAMLETT, P.E.  
COLORADO P.E. 32314  
FOR AND ON BEHALF OF JR ENGINEERING, LLC  
DATE 7/14/21

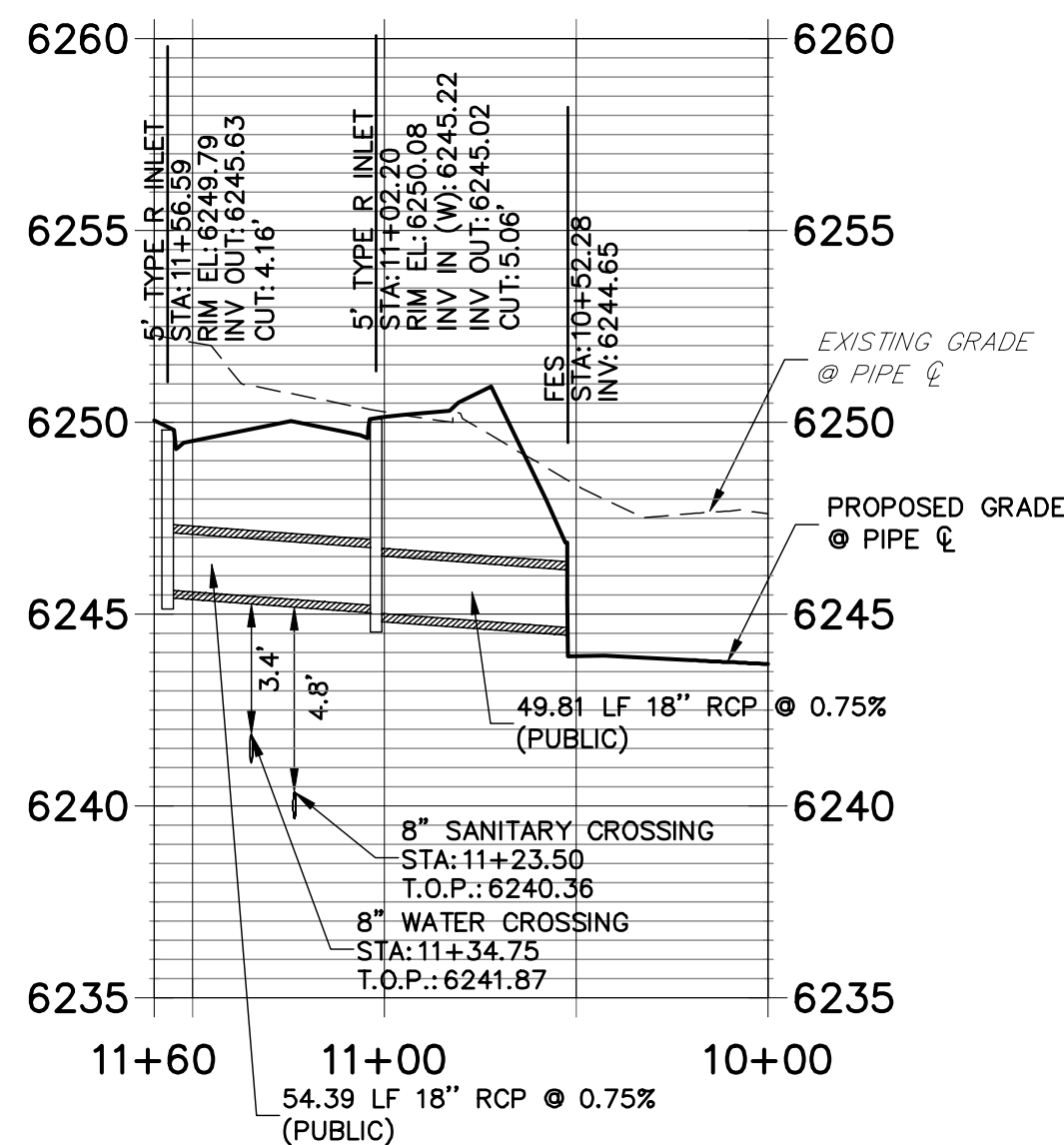
SAND CREEK CENTER TRIBUTARY PAONIA STREET OVERFLOW PLAN	SHEET 10 OF 10 JOB NO. 25174.00	DESIGNED BY JBP		DRAWN BY JBP		CHECKED BY		No. REVISION	BY	DATE	PREPARED FOR JACKSON DEARBORN PARTNERS 404 S. WELLS ST. SUITE 400 CHICAGO, ILL. 60607 OFFICE PHONE (734) 216-2577	UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, JR ENGINEERING APPROVES THEIR USE FOR THE PROJECTS DESIGNATED BY WRITTEN AUTHORIZATION.

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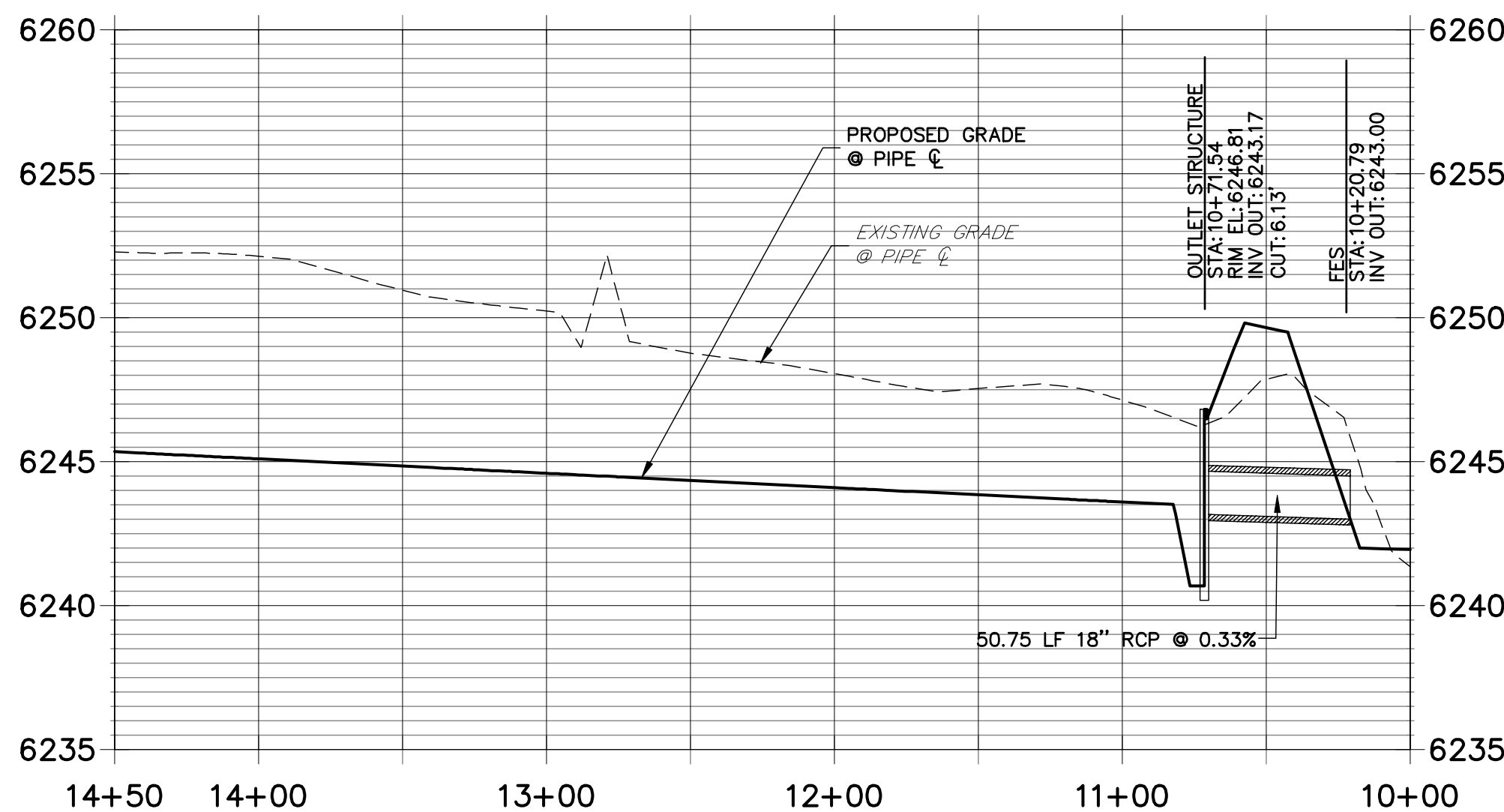




**DP17 PROFILE**  
**STA 10+00.00 TO 11+60.00**

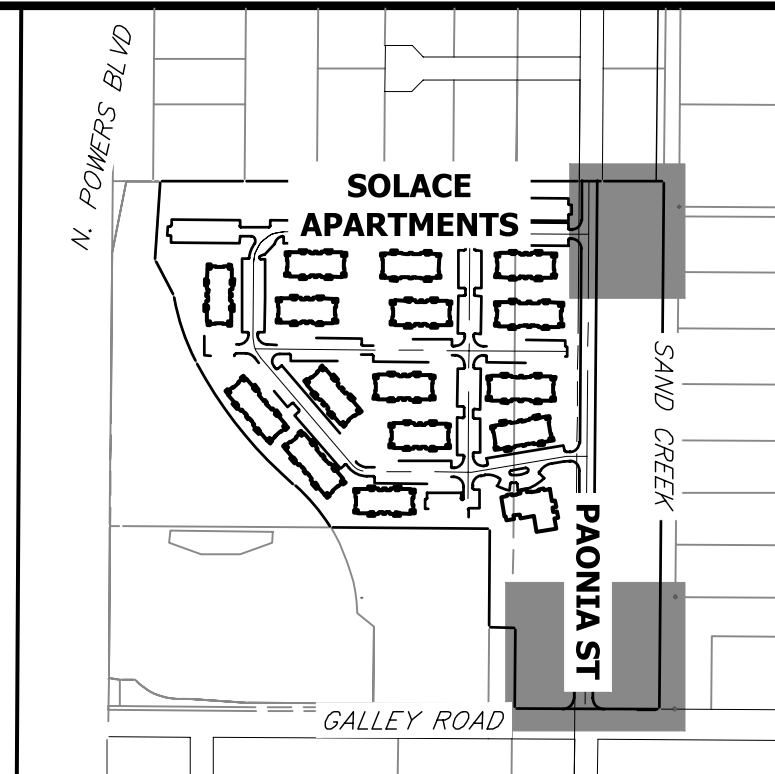


**DP01 PROFILE (1)**  
**STA 10+00.00 TO 14+50.00**

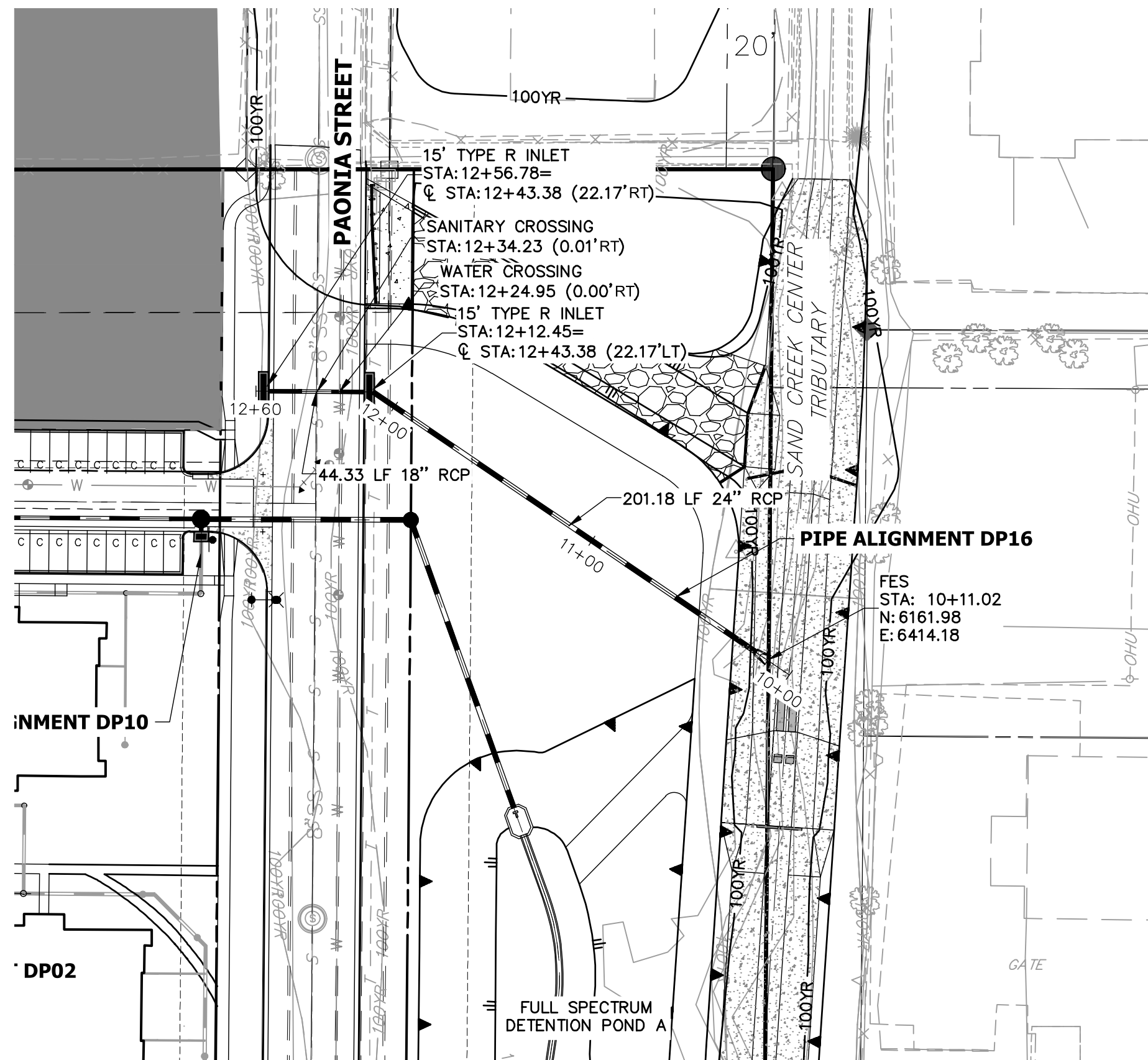


**STORM SEWER NOTES**

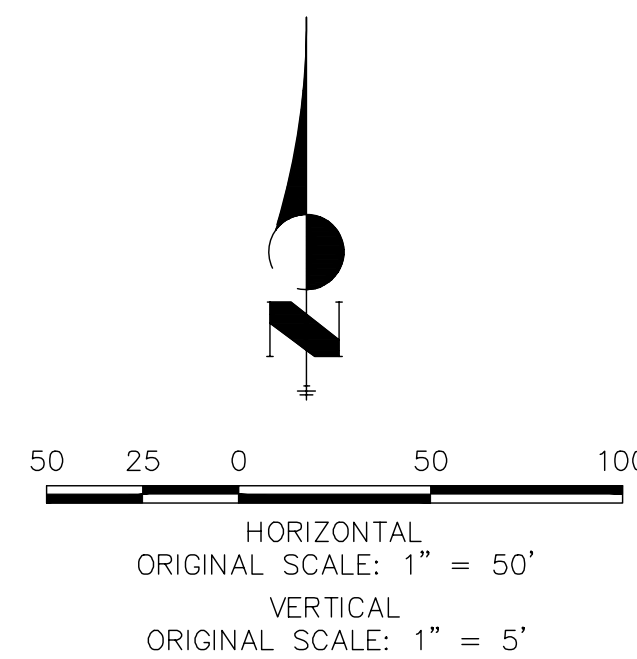
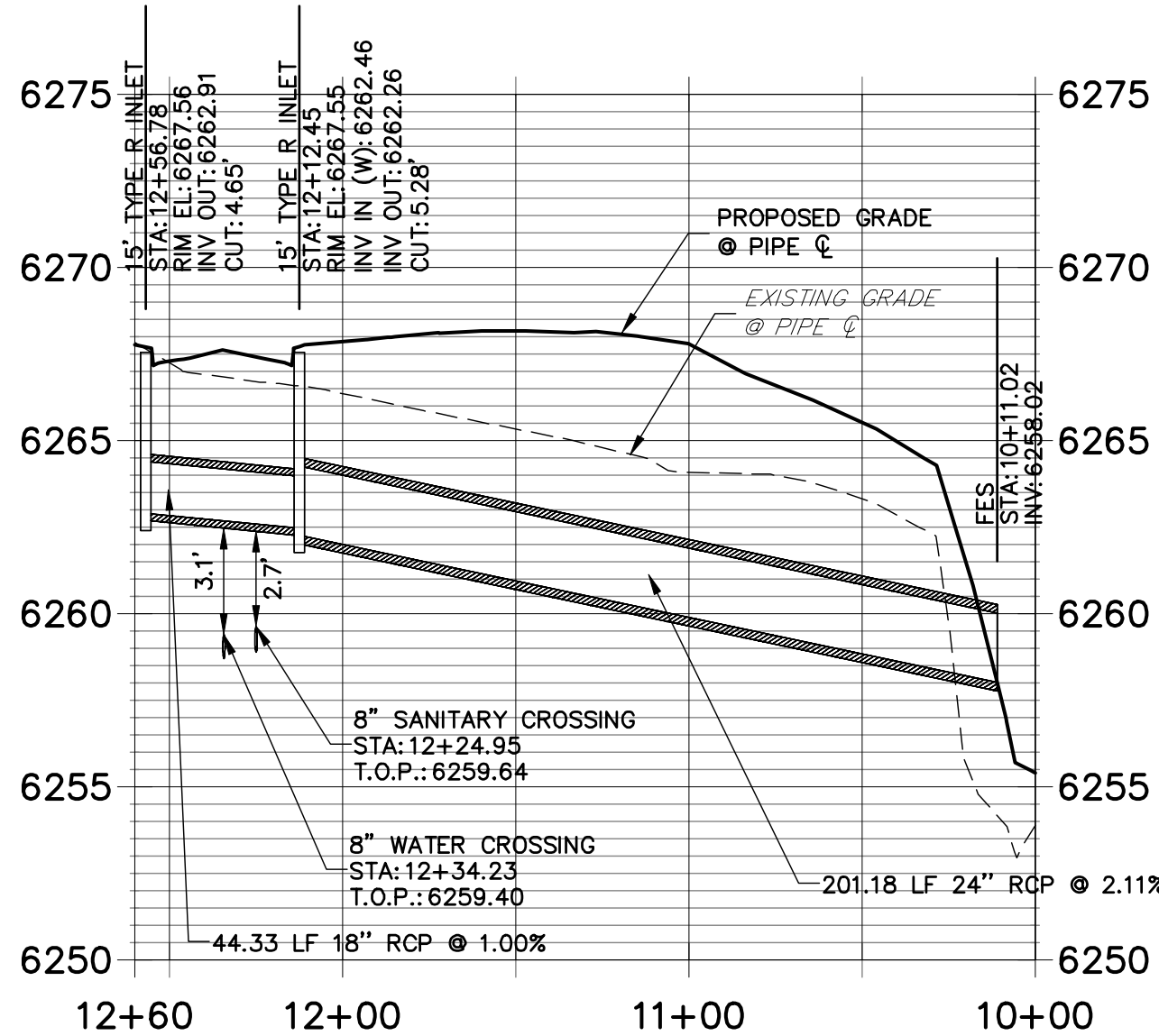
1. SEE DETAIL SHEET 29 FOR APPLICABLE STORM SEWER DETAILS.
2. PIPE LENGTHS MEASURED FROM CENTER OF MANHOLES TO CENTER OF MANHOLES, INSIDE FACE OF INLETS, OUTLET END OF FLARED END SECTIONS AND FACE OF WALLS WHERE APPLICABLE.
3. E STATIONS & OFFSETS ARE LABELED AT CENTER OF STRUCTURE.
4. CONTRACTOR TO FIELD VERIFY EXISTING UTILITY LOCATIONS, PRIOR TO EXTENSION OF MAINS AND SERVICE CONNECTIONS. CONTRACTOR TO COORDINATE CONNECTIONS WITH UTILITY PROVIDER.
5. ALL PUBLIC WATER LINES ARE OWNED BY CHEROKEE METROPOLITAN DISTRICT.



**KEY MAP**  
SCALE 1"=500'



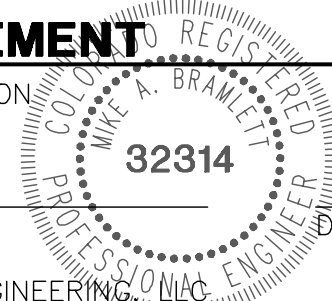
**DP16 PROFILE**  
**STA 10+00.00 TO 12+60.00**



**ENGINEER'S STATEMENT**

PREPARED UNDER MY SUPERVISION

MIKE A. BRAMLETT, P.E.  
COLORADO P.E. 32314  
FOR AND ON BEHALF OF JR ENGINEERING



SOLACE APARTMENTS -  
FILING NO. 1  
STORM SEWER PLAN AND  
PROFILE

SHEET 15 OF 32

JOB NO. 25174.00

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SUITE 400  
CHICAGO, ILL. 60607  
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AUTHORIZATION.

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

X	X	XXXXX	XXXX	XXXX	XX	XXXX
X	X	X	X	X	X	X
X	X	X	X	X	X	X
XXXXXX	XXXX	X	XXX	XXXX	XXXXXX	XXXX
X	X	X	X	X	X	X
X	X	X	X	X	X	X
X	X	XXXXX	XXXX	X	X	XXXXX

PROJECT DATA

Project Title: HEC-RAS Model  
Project File : Updated 08-24-2021 Proposed Model.prj  
Run Date and Time: 8/24/2021 9:48:33 AM

Project in English units

Project Description:

CRS Info=<SpatialReference> <CoordinateSystem WKT="PROJCS[&quot;WGS 84 / World Mercator&quot;;GEOGCS[&quot;WGS 84&quot;;DATUM[&quot;WGS\_1984&quot;;SPHEROID[&quot;WGS 84&quot;;6378137,298.257223563,AUTHORITY[&quot;EPSG&quot;;&quot;7030&quot;];],AUTHORITY[&quot;EPSG&quot;;&quot;6326&quot;];],PRIMEM[&quot;Greenwich&quot;;0,AUTHORITY[&quot;EPSG&quot;;&quot;8901&quot;];],UNIT[&quot;degree&quot;;0.0174532925199433,AUTHORITY[&quot;EPSG&quot;;&quot;9122&quot;];],AUTHORITY[&quot;EPSG&quot;;&quot;4326&quot;];],PROJECTION[&quot;Mercator\_1SP&quot;];,PARAMETER[&quot;central\_meridian&quot;;0],PARAMETER[&quot;scale\_factor&quot;;1],PARAMETER[&quot;false\_easting&quot;;0],PARAMETER[&quot;false\_northing&quot;;0],UNIT[&quot;International Foot&quot;;0.3048],AXIS[&quot;Easting&quot;;EAST],AXIS[&quot;Northing&quot;;NORTH]]" AcadCode="" /> <Registration OffsetX="0" OffsetY="0" OffsetZ="0" ScaleX="1" ScaleY="1" ScaleZ="1" /></SpatialReference>

PLAN DATA

Plan Title: Default Scenario  
Plan File : X:\2510000.all\2517400\GeoHecRas\Updated 08-24-2021 Proposed Model.p01

Geometry Title: Default Geometry  
Geometry File : X:\2510000.all\2517400\GeoHecRas\Updated 08-24-2021 Proposed Model.g01

Flow Title : Default Steady Flow  
Flow File : X:\2510000.all\2517400\GeoHecRas\Updated 08-24-2021 Proposed Model.f01

Plan Description:  
Default Scenario

Plan Summary Information:

Number of:	Cross Sections =	55	Multiple Openings =	0
	Culverts =	1	Inline Structures =	0
	Bridges =	0	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 =	0.33
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: Default Steady Flow  
Flow File : X:\2510000.all\2517400\GeoHecRas\Updated 08-24-2021 Proposed Model.f01

Flow Data (cfs)

River	Reach	RS	Flow 1
EXCH	EX CHANNEL	1000	63
EXOF	EX OVERFLOW	1001	42
OVFL	Overflow Channel	1000	217

OVFL	Overflow Ch-DS-0998	175
SC01	Sand Creek 998	820
SC01	Sand Creek-DS-0 992	862
SC01	Sand Creek-DS-0-990	1037
SC01	Sand Creek-DS-1 966	1100

Boundary Conditions

River	Reach	Profile	Upstream
	Downstream		
SC01	Sand Creek-DS-1 Flow 1 Critical		

GEOMETRY DATA

Geometry Title: Default Geometry  
Geometry File : X:\2510000.all\2517400\GeoHecRas\Updated 08-24-2021 Proposed Model.g01

Reach Connection Table

River Boundary	Reach	Upstream Boundary	Downstream
EXCH	EX CHANNEL		Junc-DS02
EXOF	EX OVERFLOW	Junc-DS01	EXOF-SC
OVFL	Overflow Channel		Junc-DS01
OVFL	Overflow Ch-DS-0	Junc-DS01	OF-SC
SC01	Sand Creek		EXOF-SC
SC01	Sand Creek-DS-0	EXOF-SC	OF-SC
SC01	Sand Creek-DS-0-	OF-SC	Junc-DS02
SC01	Sand Creek-DS-1	Junc-DS02	

JUNCTION INFORMATION

Name: Junc-DS01  
Description:  
Energy computation Method

Length across River	Junction Reach	Tributary River	Reach	Length
Angle				
OVFL	Overflow Channel to OVFL		Overflow Ch-DS-0	255.09
0				
OVFL	Overflow Channel to EXOF		EX OVERFLOW	209.74
0				

Name: EXOF-SC  
Description:  
Energy computation Method

Length across River	Junction Reach	Tributary River	Reach	Length
Angle				
SC01	Sand Creek to SC01		Sand Creek-DS-0	26.69
0				
EXOF	EX OVERFLOW to SC01		Sand Creek-DS-0	47.45
0				

Name: OF-SC  
Description:  
Energy computation Method

Length across River	Junction Reach	Tributary River	Reach	Length
Angle				
SC01	Sand Creek-DS-0 to SC01		Sand Creek-DS-0-	100.01
0				
OVFL	Overflow Ch-DS-0 to SC01		Sand Creek-DS-0-	41.97
0				

Name: Junc-DS02  
Description:  
Energy computation Method

Length across River	Junction Reach	Tributary River	Reach	Length
Angle				
SC01	Sand Creek-DS-0- to SC01		Sand Creek-DS-1	21.51
0				
EXCH	EX CHANNEL to SC01		Sand Creek-DS-1	0
0				

CROSS SECTION



RIVER: EXCH  
REACH: EX CHANNEL RS: 1000

INPUT  
Description:

Station	Elevation	Data	num=	78					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6261.8	1.46	6261.8	3.02	6261.7	4.57	6261.6	5	
6261.5									
5.14	6261.4	5.29	6261.3	5.43	6261.2	5.58	6261.1	5.72	
6261									
5.87	6260.9	6.01	6260.8	6.16	6260.7	6.3	6260.6	6.45	
6260.5									
6.59	6260.4	6.75	6260.3	6.93	6260.2	7.11	6260.1	7.29	
6260									
7.47	6259.9	7.64	6259.8	7.82	6259.7	8	6259.6	8.53	
6259.5									
9.15	6259.4	9.77	6259.3	10.4	6259.2	11.2	6259.1	12.62	
6259									
19.64	6259	19.81	6259.1	19.98	6259.2	20.15	6259.3	20.32	
6259.4									
20.49	6259.5	20.66	6259.6	20.85	6259.7	21.03	6259.8	21.21	
6259.9									
21.39	6260	21.57	6260.1	21.76	6260.2	21.94	6260.3	22.12	
6260.4									
22.3	6260.5	22.49	6260.6	22.67	6260.7	22.85	6260.8	23.03	
6260.9									
23.22	6261	23.41	6261.1	23.6	6261.2	23.8	6261.3	23.99	
6261.4									
24.19	6261.5	24.38	6261.6	24.54	6261.7	24.7	6261.8	24.86	
6261.9									
25.02	6262	25.18	6262.1	25.34	6262.2	25.5	6262.3	25.66	
6262.4									
25.83	6262.5	25.99	6262.6	26.15	6262.7	26.31	6262.8	26.47	
6262.9									
26.63	6263	26.79	6263.1	26.95	6263.2	27.11	6263.3	27.27	
6263.4									
27.44	6263.5	27.95	6263.6	28.88	6263.6				

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 5 .013 23.99 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 5 23.99 284.89 284.89 284.89 .1  
.3

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6260.46	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.43	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6260.04	Reach Len. (ft)	284.89
284.89 284.89			
Crit W.S. (ft)	6260.04	Flow Area (sq ft)	
12.01			
E.G. Slope (ft/ft)	0.002746	Area (sq ft)	
12.01			
Q Total (cfs)	63.00	Flow (cfs)	
63.00			
Top Width (ft)	14.23	Top Width (ft)	
14.23			
Vel Total (ft/s)	5.24	Avg. Vel. (ft/s)	
5.24			
Max Chl Dpth (ft)	1.04	Hydr. Depth (ft)	
0.84			
Conv. Total (cfs)	1202.3	Conv. (cfs)	
1202.3			
Length Wtd. (ft)	284.89	Wetted Per. (ft)	
14.66			
Min Ch El (ft)	6259.00	Shear (lb/sq ft)	
0.14			
Alpha	1.00	Stream Power (lb/ft s)	28.88
0.00 0.00			
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	
0.24			
C & E Loss (ft)	0.12	Cum SA (acres)	
0.12			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
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.  
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: EXCH  
REACH: EX CHANNEL RS: 999

[illegible]

E.G. Slope (ft/ft)	0.000127	Area (sq ft)	
61.12			
Q Total (cfs)	63.00	Flow (cfs)	
63.00			
Top Width (ft)	21.85	Top Width (ft)	
21.85			
Vel Total (ft/s)	1.03	Avg. Vel. (ft/s)	
1.03			
Max Chl Dpth (ft)	5.24	Hydr. Depth (ft)	
2.80			
Conv. Total (cfs)	5597.5	Conv. (cfs)	
5597.5			
Length Wtd. (ft)	0.00	Wetted Per. (ft)	
24.31			
Min Ch El (ft)	6249.20	Shear (lb/sq ft)	
0.02			
Alpha	1.00	Stream Power (lb/ft s)	46.94
0.00	0.00		
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	
C & E Loss (ft)	0.13	Cum SA (acres)	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: EXOF  
REACH: EX OVERFLOW RS: 1001

INPUT									
Description:									
Station	Elevation	Data	num=	62					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev									
-27.78	6270.7	-26.94	6270.7	-22.94	6270.6	-19.83	6270.5	-17.18	
6270.4									
-14.53	6270.3	-11.88	6270.2	-9.23	6270.1	-6.58	6270	-3.93	
6269.9									
-1.28	6269.8	.37	6269.72	.87	6269.7	2.83	6269.6	4.83	
6269.5									
6.82	6269.4	8.81	6269.3	10.8	6269.2	11.28	6269.1	11.65	
6269									
12.03	6268.9	12.41	6268.8	12.79	6268.7	13.17	6268.6	13.55	
6268.5									
13.93	6268.4	14.31	6268.3	14.69	6268.2	14.98	6268.12	15.07	
6268.1									
15.45	6268	15.74	6267.9	15.93	6267.8	16.4	6267.7	16.69	
6267.7									

16.85	6267.8	17.02	6267.9	17.18	6268	17.35	6268.1	17.51	
6268.2									
17.68	6268.3	17.84	6268.4	18.01	6268.5	18.17	6268.6	18.34	
6268.7									
18.5	6268.8	18.67	6268.9	18.82	6269	18.98	6269.1	20.23	
6269.1									
21.99	6269.2	22.73	6269.3	23.48	6269.4	24.22	6269.5	24.97	
6269.6									
25.71	6269.7	26.46	6269.8	27.2	6269.9	27.98	6270	30.04	
6270.1									
33.26	6270.2	34.47	6270.2						
Manning's n	Values		num=	3					
Sta	n Val	Sta	n Val	Sta	n Val				
-27.78	.03	11.28	.013	18.98	.03				
Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	
Expan.									
	11.28	18.98		138.8	138.8	138.8		.1	
.3									
Ineffective Flow		num=	1						
Sta L	Sta R	Elev	Permanent						
-27.78	-17.16	6270.42	F						
Left Levee	Station=	-27.1	Elevation=	6270.72					
Right Levee	Station=	30.02	Elevation=	6270.11					

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6270.16	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.00	Wt. n-Val.	0.030
0.013	0.030		
W.S. Elev (ft)	6270.16	Reach Len. (ft)	138.80
138.80	138.80		
Crit W.S. (ft)	6267.77	Flow Area (sq ft)	10.11
13.67	6.71		
E.G. Slope (ft/ft)	0.000000	Area (sq ft)	10.11
13.67	6.71		
Q Total (cfs)	0.04	Flow (cfs)	0.00
0.03	0.00		
Top Width (ft)	42.71	Top Width (ft)	22.06
7.70	12.94		
Vel Total (ft/s)	0.00	Avg. Vel. (ft/s)	0.00
0.00	0.00		
Max Chl Dpth (ft)	2.46	Hydr. Depth (ft)	0.46
1.78	0.52		
Conv. Total (cfs)	2693.3	Conv. (cfs)	297.5
2182.1	213.7		
Length Wtd. (ft)	138.80	Wetted Per. (ft)	22.09
8.29	13.03		
Min Ch El (ft)	6267.70	Shear (lb/sq ft)	0.00
0.00	0.00		

Alpha	2.67	Stream Power (lb/ft s)	34.47
-27.10 30.02			
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.10
0.13 0.05			
C & E Loss (ft)	0.00	Cum SA (acres)	0.10
0.03 0.05			

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.

Warning: The split flow optimization for the junction failed to converge within the maximum number of iterations. The results from the final iteration were used.

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

#### CROSS SECTION

RIVER: EXOF

REACH: EX OVERFLOW RS: 1000

#### INPUT

Description:

Station	Elevation	Data	num=	84					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6270.6	.76	6270.6	1.98	6270.5	3.2	6270.4	4.43	
6270.3									
5.65	6270.2	6.87	6270.1	8.1	6270	9.32	6269.9	10.55	
6269.8									
11.86	6269.7	13.18	6269.6	14.51	6269.5	15.84	6269.4	17.16	
6269.3									
19.12	6269.2	21.27	6269.1	22.31	6269.09	35.85	6269	41.17	
6268.9									
41.99	6268.89	43.96	6268.8	47.37	6268.7	48.05	6268.6	48.4	
6268.5									
48.55	6268.4	48.69	6268.3	48.84	6268.2	48.99	6268.1	49.14	
6268									
49.29	6267.9	49.43	6267.8	49.56	6267.7	49.69	6267.6	49.82	
6267.5									
49.96	6267.4	50.09	6267.3	50.22	6267.2	50.35	6267.1	50.48	
6267									
50.61	6266.9	54.45	6266.9	54.6	6267	54.75	6267.1	54.9	
6267.2									
55.06	6267.3	55.21	6267.4	55.36	6267.5	55.51	6267.6	55.67	
6267.7									
55.82	6267.8	55.98	6267.9	56.15	6268	56.31	6268.1	56.48	
6268.2									
56.65	6268.3	56.81	6268.4	57.77	6268.43	60.49	6268.5	62.85	
6268.6									

65.12	6268.7	65.57	6268.8	66.03	6268.9	66.49	6269	66.95
6269.1								
67.41	6269.2	67.87	6269.3	68.32	6269.4	68.78	6269.5	69.24
6269.6								
69.7	6269.7	70.36	6269.8	71.11	6269.9	71.85	6270	72.6
6270.1								
73.77	6270.2	75.1	6270.3	76.43	6270.4	77.87	6270.4	78.31
6270.3								
78.76	6270.2	79.21	6270.1	79.65	6270	79.81	6270	

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
0 .03	47.37 .013	57.77 .03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.
Expan.				
	47.37	57.77	0 0 0	.1

.3			
Right Levee	Station=	76.07	Elevation= 6270.41

#### CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6270.16	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.00	Wt. n-Val.	0.030
0.013 0.030			
W.S. Elev (ft)	6270.16	Reach Len. (ft)	47.45
47.45 47.45			
Crit W.S. (ft)	6266.92	Flow Area (sq ft)	39.81
27.04 16.97			
E.G. Slope (ft/ft)	0.000000	Area (sq ft)	39.81
27.04 16.97			
Q Total (cfs)	0.04	Flow (cfs)	0.01
0.03 0.00			
Top Width (ft)	67.13	Top Width (ft)	41.21
10.40 15.51			
Vel Total (ft/s)	0.00	Avg. Vel. (ft/s)	0.00
0.00 0.00			
Max Chl Dpth (ft)	3.26	Hydr. Depth (ft)	0.97
2.60 1.09			
Conv. Total (cfs)	8316.8	Conv. (cfs)	1925.4
5504.3 887.1			
Length Wtd. (ft)	47.45	Wetted Per. (ft)	41.26
11.38 15.66			
Min Ch El (ft)	6266.90	Shear (lb/sq ft)	0.00
0.00 0.00			
Alpha	2.87	Stream Power (lb/ft s)	79.81
0.00 76.07			
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.02
0.06 0.01			
C & E Loss (ft)	0.14	Cum SA (acres)	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). 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, energy was used.

CROSS SECTION

RIVER: OVFL  
REACH: Overflow Channel RS: 1000

INPUT

Description:

Station	Elevation	Data	num=	78					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6272.5	6.84	6272.5	19.1	6272.4	22.75	6272.3	25.46	
6272.2									
27.63	6272.1	29.8	6272	31.97	6271.9	34.14	6271.8	37.09	
6271.7									
39.72	6271.6	42.88	6271.5	46.38	6271.4	49.92	6271.3	53.46	
6271.2									
56.99	6271.1	60.28	6271	63.46	6270.9	66.65	6270.8	69.84	
6270.7									
71.87	6270.6	73.1	6270.5	75.2	6270.4	77.48	6270.3	78.97	
6270.2									
80.03	6270.1	80.74	6270	80.84	6269.9	80.94	6269.8	81.04	
6269.7									
81.14	6269.6	81.23	6269.5	82.37	6269.5	85.34	6269.6	88.52	
6269.7									
91.88	6269.8	95.58	6269.9	99.28	6270	103.82	6270	111.4	
6269.9									
116.73	6269.8	121.02	6269.8	121.23	6269.9	121.7	6270	122.76	
6270.1									
123.82	6270.2	124.88	6270.3	125.93	6270.4	126.99	6270.5	128.05	
6270.6									
129.1	6270.7	130.16	6270.8	131.15	6270.9	131.5	6271	134.06	
6271.1									
138.53	6271.2	142.99	6271.3	147.45	6271.4	151.27	6271.5	154.7	
6271.6									
156.98	6271.7	159.26	6271.8	161.54	6271.9	163.82	6272	166.1	
6272.1									
168.39	6272.2	170.67	6272.3	172.95	6272.4	175.35	6272.5	177.75	
6272.6									
180.28	6272.7	183.71	6272.8	187.06	6272.9	189.71	6273	192.36	
6273.1									
195.02	6273.2	197.9	6273.3	198.12	6273.3				

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val

0 .03 81.14 .016 121.7 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 81.14 121.7 24.16 24.16 24.16 .1  
.3

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6271.20	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.42	Wt. n-Val.	0.030
0.016 0.030			
W.S. Elev (ft)	6270.78	Reach Len. (ft)	24.16
24.16 24.16			
Crit W.S. (ft)	6270.78	Flow Area (sq ft)	4.67
38.30 3.20			
E.G. Slope (ft/ft)	0.003604	Area (sq ft)	4.67
38.30 3.20			
Q Total (cfs)	217.00	Flow (cfs)	6.67
205.26 5.07			
Top Width (ft)	62.59	Top Width (ft)	13.80
40.56 8.23			
Vel Total (ft/s)	4.70	Avg. Vel. (ft/s)	1.43
5.36 1.58			
Max Chl Dpth (ft)	1.28	Hydr. Depth (ft)	0.34
0.94 0.39			
Conv. Total (cfs)	3614.5	Conv. (cfs)	111.1
3419.0 84.4			
Length Wtd. (ft)	24.16	Wetted Per. (ft)	13.99
40.65 8.27			
Min Ch El (ft)	6269.50	Shear (lb/sq ft)	0.08
0.21 0.09			
Alpha	1.24	Stream Power (lb/ft s)	198.12
0.00 0.00			
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.02
0.25 0.01			
C & E Loss (ft)	0.00	Cum SA (acres)	0.01
0.02 0.00			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: OVFL  
REACH: Overflow Channel RS: 999

INPUT									
Description:									
Station	Elevation	Data	num=	67					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6271.2	0	6271.5	32.18	6271.5	39.29	6271.4	43.62	6271.3	47.59
6270.7	51.08	6271.1	54.32	6271	57.34	6270.9	60.28	6270.8	63.22
6270.2	66.16	6270.6	69.11	6270.5	72.05	6270.4	74.52	6270.3	75.88
6269.7	77.24	6270.1	78.61	6270	80.54	6269.9	82.25	6269.8	83.31
6269.2	83.7	6269.6	83.8	6269.5	83.9	6269.4	84	6269.3	84.1
6269.4	84.2	6269.1	85.11	6269.1	86.96	6269.2	90.43	6269.3	94.01
6269.4	97.72	6269.5	101.43	6269.6	107.82	6269.6	115.44	6269.5	122.9
6269.4	123.81	6269.4	123.91	6269.5	124	6269.6	124.1	6269.7	124.18
6269.8	124.25	6269.9	124.47	6270	125.74	6270.1	127.01	6270.2	128.28
6270.3	129.54	6270.4	130.9	6270.5	132.39	6270.6	133.95	6270.7	136.77
6270.8	139.6	6270.9	142.43	6271	145.25	6271.1	148.08	6271.2	150.93
6271.3	154.76	6271.4	158.6	6271.5	162.19	6271.6	164.85	6271.7	167.51
6271.8	170.17	6271.9	172.83	6272	175.49	6272.1	179.83	6272.2	182.81
6272.3	185.79	6272.4	186.08	6272.4					

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
0	.03	83.31	.016	124.47	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.	83.31	124.47		0	0		.1
.3							

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6270.85	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.44	Wt. n-Val.	0.030

0.016	0.030		
W.S. Elev (ft)	6270.41	Reach Len. (ft)	
Crit W.S. (ft)	6270.41	Flow Area (sq ft)	3.71
38.98	1.04	E.G. Slope (ft/ft)	0.003698
38.98	1.04	Area (sq ft)	3.71
Q Total (cfs)	217.00	Flow (cfs)	5.26
210.66	1.08	Top Width (ft)	11.42
41.16	5.14	Avg. Vel. (ft/s)	1.42
Vel Total (ft/s)	4.96	Hydr. Depth (ft)	0.32
5.40	1.04	Conv. (cfs)	86.5
Max Chl Dpth (ft)	1.31	Wetted Per. (ft)	11.44
0.95	0.20	Shear (lb/sq ft)	0.07
Conv. Total (cfs)	3568.5	Stream Power (lb/ft s)	186.08
3464.2	17.8	Cum Volume (acre-ft)	0.02
Length Wtd. (ft)		Cum SA (acres)	
41.64	5.16		
Min Ch El (ft)	6269.10		
0.22	0.05		
Alpha	1.15		
0.00	0.00		
Frctn Loss (ft)	0.21		
0.23	0.01		
C & E Loss (ft)	0.09		

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: A flow split was encountered. The program first calculated the momentum of both channels below the junction. An energy balance was performed across the junction from the stream with the highest momentum downstream to the section upstream.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: OVFL  
REACH: Overflow Ch-DS-0 RS: 998





-7.48	6270.1	-6.96	6270.1	-4.51	6270	-2.05	6269.9	1.62
6269.8								
4.68	6269.7	7.62	6269.6	11.47	6269.5	12.12	6269.4	12.77
6269.3								
13.37	6269.2	13.91	6269.1	14.45	6269	14.88	6268.92	14.99
6268.9								
15.33	6268.8	15.61	6268.7	15.88	6268.6	16.16	6268.5	16.44
6268.4								
16.71	6268.3	16.99	6268.2	17.27	6268.1	17.55	6268	17.82
6267.9								
18.1	6267.8	18.38	6267.7	18.65	6267.6	18.93	6267.5	19.21
6267.4								
19.48	6267.3	19.76	6267.2	20.04	6267.1	20.31	6267	20.59
6266.9								
20.87	6266.8	21.15	6266.7	21.42	6266.6	21.7	6266.5	21.98
6266.4								
22.25	6266.3	42.77	6266.3	42.95	6266.4	43.14	6266.5	43.32
6266.6								
43.5	6266.7	43.69	6266.8	43.87	6266.9	44.06	6267	44.24
6267.1								
44.43	6267.2	44.61	6267.3	44.8	6267.4	44.98	6267.5	45.17
6267.6								
45.35	6267.7	45.54	6267.8	45.72	6267.9	45.91	6268	46.09
6268.1								
46.28	6268.2	46.46	6268.3	46.65	6268.4	46.83	6268.5	47
6268.6								
47.17	6268.7	47.35	6268.8	47.52	6268.9	47.69	6269	47.98
6269.1								
48.27	6269.2	48.56	6269.3	48.85	6269.4	49.14	6269.5	49.43
6269.6								
60.99	6269.7	76.9	6269.7	80.09	6269.6	83.27	6269.5	86.45
6269.4								
89.64	6269.3	92.82	6269.2	96	6269.1	99.18	6269	102.37
6268.9								
105.55	6268.8	106.52	6268.8					

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
-7.48	.03	14.88	.033
		47.69	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.
Expan.						
	14.88	47.69	24.72	24.72	24.72	.1
.3						
Left Levee	Station=	11.26	Elevation=	6269.52		
Right Levee	Station=	49.45	Elevation=	6269.62		

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6269.43	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.11	Wt. n-Val.	0.030

0.033	0.030		
W.S. Elev (ft)	6269.32	Reach Len. (ft)	24.72
24.72	24.72		
Crit W.S. (ft)	6267.74	Flow Area (sq ft)	0.45
82.84	0.15		
E.G. Slope (ft/ft)	0.001027	Area (sq ft)	0.45
82.84	0.15		
Q Total (cfs)	216.98	Flow (cfs)	0.24
216.67	0.07		
Top Width (ft)	36.02	Top Width (ft)	2.27
32.81	0.94		
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)	0.53
2.62	0.45		
Max Chl Dpth (ft)	3.02	Hydr. Depth (ft)	0.20
2.52	0.16		
Conv. Total (cfs)	6769.7	Conv. (cfs)	7.4
6760.2	2.2		
Length Wtd. (ft)	24.72	Wetted Per. (ft)	2.30
33.96	1.00		
Min Ch El (ft)	6266.30	Shear (lb/sq ft)	0.01
0.16	0.01		
Alpha	1.01	Stream Power (lb/ft s)	106.52
11.26	49.45		
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.02
0.18	0.01		
C & E Loss (ft)	0.01	Cum SA (acres)	0.00
0.02	0.00		

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

CROSS SECTION

RIVER: OVFL  
REACH: Overflow Ch-DS-0 RS: 996

INPUT									
Description:									
Station	Elevation	Data	num=	92					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6270.1	.51	6270.1	2.27	6270	3.98	6269.9	5.59	
6269.8									
7.14	6269.7	8.3	6269.62	8.61	6269.6	9.99	6269.5	11.27	
6269.4									
12.41	6269.3	13.29	6269.2	13.95	6269.1	14.62	6269	15.29	
6268.9									
15.96	6268.8	16.63	6268.7	17.29	6268.6	17.96	6268.5	18.63	
6268.4									
19.3	6268.3	19.96	6268.2	20.63	6268.1	21.3	6268	21.97	



107.47	6273.2	109.19	6273.1	110.91	6273	112.64	6272.9	114.36
6272.8								
116.09	6272.7	117.81	6272.6	119.77	6272.5	121.72	6272.4	124.95
6272.3								
128.22	6272.2	129.6	6272.1	130.73	6272	131.86	6271.9	133
6271.8								
134.13	6271.7	134.45	6271.6	134.69	6271.5	134.93	6271.4	135.19
6271.3								
135.45	6271.2	135.7	6271.1	135.96	6271	136.22	6270.9	136.48
6270.8								
136.74	6270.7	137	6270.6	137.26	6270.5	137.52	6270.4	137.78
6270.3								
138.04	6270.2	138.3	6270.1	138.56	6270	138.81	6269.9	139.07
6269.8								
139.33	6269.7	139.59	6269.6	139.81	6269.5	140.01	6269.4	140.22
6269.3								
140.42	6269.2	140.62	6269.1	140.83	6269	141.03	6268.9	141.24
6268.8								
141.44	6268.7	141.65	6268.6	141.83	6268.5	142.01	6268.4	142.19
6268.3								
142.38	6268.2	142.56	6268.1	142.74	6268	142.92	6267.9	143.1
6267.8								
143.29	6267.7	143.47	6267.6	143.62	6267.5	143.77	6267.4	143.92
6267.3								
144.06	6267.2	144.21	6267.1	144.36	6267	144.51	6266.9	144.65
6266.8								
144.8	6266.7	144.95	6266.6	145.09	6266.5	145.24	6266.4	145.39
6266.3								
145.52	6266.2	145.65	6266.1	145.79	6266	145.92	6265.9	146.05
6265.8								
146.19	6265.7	146.32	6265.6	150.01	6265.52	151.21	6265.5	152.65
6265.5								
153.56	6265.6	153.71	6265.7	153.87	6265.8	154.03	6265.9	154.18
6266								
154.34	6266.1	154.5	6266.2	154.65	6266.3	154.81	6266.4	154.97
6266.5								
155.12	6266.6	155.27	6266.7	155.42	6266.8	155.57	6266.9	155.73
6267								
155.88	6267.1	156.03	6267.2	156.18	6267.3	156.33	6267.4	156.48
6267.5								
156.63	6267.6	156.81	6267.7	156.98	6267.8	157.16	6267.9	157.34
6268								
157.51	6268.1	157.69	6268.2	157.86	6268.3	158.04	6268.4	158.21
6268.5								
158.39	6268.6	158.56	6268.7	158.74	6268.8	158.92	6268.9	159.09
6269								
159.27	6269.1	159.44	6269.2	159.62	6269.3	159.79	6269.4	159.97
6269.5								
160.54	6269.6	162.69	6269.7	165.02	6269.8	167.45	6269.9	169.96
6270								
172.48	6270.1	175.02	6270.2	177.57	6270.3	180.12	6270.4	182.67
6270.5								
185.22	6270.6	187.77	6270.7	190.31	6270.8	192.86	6270.9	195.41

6271								
197.96	6271.1	200.49	6271.2	203.01	6271.3	205.54	6271.4	208.06
6271.5								
211.16	6271.6	215.04	6271.7	219.38	6271.8	224.24	6271.9	232.83
6272								
253.5	6272.1	276.06	6272.1	286.06	6272	290.37	6271.9	293.51
6271.8								
296.08	6271.7	298.25	6271.6	300	6271.6			
Manning's n Values			num=	3				
Sta n Val	Sta n Val	Sta n Val	Sta n Val	Sta n Val				
0 .03	139.07	.013	160.54	.03				
Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.		
Expan.								
	139.07	160.54	33.99	33.99	33.99	.1		
.3								
Left Levee	Station=	45.54	Elevation=	6275.08				
Right Levee	Station=	232.75	Elevation=	6272.02				
CROSS SECTION OUTPUT	Profile #Flow 1							
E.G. Elev (ft)	6272.28	Element	Left OB					
Channel Right OB								
Vel Head (ft)	1.39	Wt. n-Val.	0.030					
0.013 0.030								
W.S. Elev (ft)	6270.89	Reach Len. (ft)	33.99					
33.99 33.99								
Crit W.S. (ft)	6270.89	Flow Area (sq ft)	1.53					
82.03 20.23								
E.G. Slope (ft/ft)	0.001362	Area (sq ft)	1.53					
82.03 20.23								
Q Total (cfs)	820.00	Flow (cfs)	1.78					
791.01 27.21								
Top Width (ft)	56.32	Top Width (ft)	2.82					
21.47 32.03								
Vel Total (ft/s)	7.90	Avg. Vel. (ft/s)	1.16					
9.64 1.34								
Max Chl Dpth (ft)	5.39	Hydr. Depth (ft)	0.54					
3.82 0.63								
Conv. Total (cfs)	22217.5	Conv. (cfs)	48.2					
21432.0 737.2								
Length Wtd. (ft)	33.99	Wetted Per. (ft)	3.02					
23.74 32.06								
Min Ch El (ft)	6265.50	Shear (lb/sq ft)	0.04					
0.29 0.05								
Alpha	1.44	Stream Power (lb/ft s)	300.00					
45.54 232.75								
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.00					
0.11 0.04								
C & E Loss (ft)	0.04	Cum SA (acres)	0.00					
0.02 0.03								

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek RS: 993

INPUT  
Description:

Station		Elevation		Data		num=		235	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6275.9	1.05	6275.9	2.47	6275.8	3.9	6275.7	5.33	
6275.6									
23.88	6275.6	31.7	6275.5	33	6275.4	34.29	6275.3	35.59	
6275.2									
36.89	6275.1	38.18	6275	39.48	6274.9	40.78	6274.8	42.08	
6274.7									
43.77	6274.6	45.56	6274.5	47.35	6274.4	49.19	6274.3	51.35	
6274.2									
53.57	6274.1	54.72	6274.2	56.01	6274	57.87	6273.9	60.22	
6273.8									
63.01	6273.8	66.37	6273.9	66.49	6273.9	72.12	6274	72.36	
6274.1									
75.96	6274.1	78.03	6274.2	80.09	6274.3	82.15	6274.4	84.22	
6274.5									
86.28	6274.6	88.34	6274.7	90.4	6274.8	91.31	6274.9	91.53	
6275									
91.76	6275.1	91.98	6275.2	92.44	6275.2	94.3	6275.1	96.17	
6275									
98.04	6274.9	99.9	6274.8	101.77	6274.7	103.63	6274.6	105.48	
6274.5									
107.29	6274.4	109.11	6274.3	110.92	6274.2	112.74	6274.1	114.55	
6274									
116.37	6273.9	118.18	6273.8	120	6273.7	121.85	6273.6	123.79	
6273.5									
124.77	6273.5	124.89	6273.6	125	6273.7	125.11	6273.8	125.42	
6273.8									
125.81	6273.7	126.19	6273.6	126.74	6273.5	127.44	6273.4	128.15	
6273.3									

128.85	6273.2	129.56	6273.1	130.27	6273	130.97	6272.9	131.73	
6272.8									
132.53	6272.7	133.34	6272.6	134.05	6272.5	134.3	6272.4	134.55	
6272.3									
134.8	6272.2	135.05	6272.1	135.31	6272	135.56	6271.9	135.81	
6271.8									
136.06	6271.7	136.31	6271.6	136.56	6271.5	136.81	6271.4	137.06	
6271.3									
137.32	6271.2	137.57	6271.1	137.82	6271	138.07	6270.9	138.32	
6270.8									
138.57	6270.7	138.82	6270.6	139.07	6270.5	139.33	6270.4	139.58	
6270.3									
139.83	6270.2	140.08	6270.1	140.33	6270	140.58	6269.9	140.84	
6269.8									
141.09	6269.7	141.34	6269.6	141.59	6269.5	141.76	6269.4	141.92	
6269.3									
142.09	6269.2	142.25	6269.1	142.42	6269	142.59	6268.9	142.75	
6268.8									
142.92	6268.7	143.09	6268.6	143.25	6268.5	143.42	6268.4	143.58	
6268.3									
143.75	6268.2	143.92	6268.1	144.08	6268	144.28	6267.9	144.48	
6267.8									
144.69	6267.7	144.89	6267.6	145.09	6267.5	145.26	6267.4	145.42	
6267.3									
145.59	6267.2	145.76	6267.1	145.92	6267	146.09	6266.9	146.26	
6266.8									
146.42	6266.7	146.59	6266.6	146.76	6266.5	146.92	6266.4	147.09	
6266.3									
147.25	6266.2	147.38	6266.1	147.51	6266	147.64	6265.9	147.81	
6265.8									
147.97	6265.7	148.14	6265.6	148.31	6265.5	148.47	6265.4	150.16	
6265.3									
151.95	6265.2	152.65	6265.2	153.99	6265.3	155.38	6265.4	155.71	
6265.5									
155.88	6265.6	156.05	6265.7	156.22	6265.8	156.39	6265.9	156.57	
6266									
156.74	6266.1	156.9	6266.2	157.06	6266.3	157.21	6266.4	157.37	
6266.5									
157.54	6266.6	157.71	6266.7	157.88	6266.8	158.05	6266.9	158.22	
6267									
158.39	6267.1	158.56	6267.2	158.74	6267.3	158.91	6267.4	159.08	
6267.5									
159.25	6267.6	159.42	6267.7	159.59	6267.8	159.76	6267.9	159.93	
6268									
160.1	6268.1	160.27	6268.2	160.44	6268.3	160.61	6268.4	160.79	
6268.5									
160.96	6268.6	161.13	6268.7	161.55	6268.7	163.9	6268.8	166.25	
6268.9									
168.6	6269	170.95	6269.1	172.4	6269.2	172.82	6269.3	173.25	
6269.4									
173.67	6269.5	174.83	6269.6	177.34	6269.7	179.87	6269.8	183.68	
6269.9									
187.5	6270	191.32	6270.1	195.14	6270.2	198.98	6270.3	202.82	



125.93 6272.9 126.14 6272.8 126.36 6272.7 126.57 6272.6 126.78  
6272.5  
126.99 6272.4 127.2 6272.3 127.42 6272.2 127.63 6272.1 127.84  
6272  
128.05 6271.9 128.26 6271.8 128.48 6271.7 128.69 6271.6 128.9  
6271.5  
129.11 6271.4 129.43 6271.3 129.77 6271.2 130.07 6271.1 130.38  
6271  
130.68 6270.9 130.99 6270.8 131.29 6270.7 131.6 6270.6 131.9  
6270.5  
132.21 6270.4 132.52 6270.3 132.82 6270.2 133.13 6270.1 133.43  
6270  
133.74 6269.9 134.04 6269.8 134.31 6269.7 134.59 6269.6 134.8  
6269.5  
135.01 6269.4 135.21 6269.3 135.42 6269.2 135.63 6269.1 135.83  
6269  
136.04 6268.9 136.25 6268.8 136.45 6268.7 136.66 6268.6 136.87  
6268.5  
137.07 6268.4 137.28 6268.3 137.49 6268.2 137.69 6268.1 137.9  
6268  
138.11 6267.9 138.31 6267.8 138.52 6267.7 138.73 6267.6 138.93  
6267.5  
139.14 6267.4 139.35 6267.3 139.56 6267.2 139.77 6267.1 139.98  
6267  
140.19 6266.9 140.39 6266.8 140.6 6266.7 140.81 6266.6 141.02  
6266.5  
141.23 6266.4 141.44 6266.3 141.65 6266.2 141.85 6266.1 142.06  
6266  
142.27 6265.9 142.48 6265.8 142.69 6265.7 142.9 6265.6 143.11  
6265.5  
143.31 6265.4 143.52 6265.3 143.73 6265.2 143.94 6265.1 144.15  
6265  
144.36 6264.9 144.57 6264.8 144.77 6264.7 144.98 6264.6 145.19  
6264.5  
145.4 6264.4 145.61 6264.3 156 6264.3 156.25 6264.4 156.5  
6264.5  
156.75 6264.6 157 6264.7 157.25 6264.8 157.5 6264.9 157.75  
6265  
158 6265.1 158.25 6265.2 158.5 6265.3 158.75 6265.4 159  
6265.5  
159.25 6265.6 159.5 6265.7 159.75 6265.8 160 6265.9 160.25  
6266  
160.5 6266.1 160.75 6266.2 161 6266.3 161.25 6266.4 161.5  
6266.5  
161.75 6266.6 162 6266.7 162.25 6266.8 162.5 6266.9 162.75  
6267  
163 6267.1 163.25 6267.2 163.5 6267.3 163.75 6267.4 164  
6267.5  
164.25 6267.6 164.5 6267.7 164.75 6267.8 165 6267.9 165.25  
6268  
165.5 6268.1 165.75 6268.2 166 6268.3 166.25 6268.4 166.5  
6268.5  
166.82 6268.6 167.14 6268.7 167.46 6268.8 167.78 6268.9 168.04

6268.97  
168.18 6269 168.9 6269.1 169.62 6269.2 170.35 6269.3 171.07  
6269.4  
171.79 6269.5 172.38 6269.59 172.48 6269.6 172.88 6269.7 173.28  
6269.8  
173.68 6269.9 174.08 6270 174.48 6270.1 174.88 6270.2 175.28  
6270.3  
175.68 6270.4 176.08 6270.5 176.29 6270.5 177.45 6270.4 178.6  
6270.3  
179.76 6270.2 180.91 6270.1 182.06 6270 183.61 6269.9 185.04  
6269.8  
186.47 6269.7 187.9 6269.6 189.33 6269.5 190.76 6269.4 192.19  
6269.3  
193.63 6269.2 195.06 6269.1 196.49 6269 197.92 6268.9 199.35  
6268.8  
200.78 6268.7 202.21 6268.6 218.17 6268.6 249.61 6268.7 252.54  
6268.7  
256.2 6268.6 259.87 6268.5 263.53 6268.4 266.25 6268.4 267.2  
6268.3  
267.59 6268.3 272.49 6268.4 280.68 6268.5 283.34 6268.6 284.27  
6268.7  
285.21 6268.8 286.14 6268.9 290.42 6269 290.56 6269.01 292.54  
6269.1  
294.65 6269.2 296.76 6269.3 298.88 6269.4 300.03 6269.4  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 135.42 .013 168.18 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 135.42 168.18 11.58 11.58 11.58 .1  
.3  
Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 59.57 6274.35 F  
169.59 300.03 6269.49 F  
Left Levee Station= 124.12 Elevation= 6273.2  
Right Levee Station= 172.46 Elevation= 6269.59  
  
CROSS SECTION OUTPUT Profile #Flow 1  
  
E.G. Elev (ft) 6269.98 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.40 Wt. n-Val.  
0.013  
W.S. Elev (ft) 6268.57 Reach Len. (ft) 11.58  
11.58 11.58  
Crit W.S. (ft) 6268.57 Flow Area (sq ft)  
86.27  
E.G. Slope (ft/ft) 0.001829 Area (sq ft)  
86.27





161 6266.5 161.25 6266.6 161.5 6266.7 161.75 6266.8 162  
6266.9  
162.25 6267 162.5 6267.1 162.75 6267.2 163 6267.3 163.25  
6267.4  
163.5 6267.5 163.75 6267.6 164 6267.7 164.25 6267.8 164.5  
6267.9  
164.75 6268 165 6268.1 165.25 6268.2 165.5 6268.3 165.75  
6268.4  
166 6268.5 166.25 6268.6 166.5 6268.7 166.75 6268.8 167  
6268.9  
167.25 6269 167.5 6269.1 167.75 6269.2 168 6269.3 168.25  
6269.4  
168.5 6269.5 168.52 6269.5 168.9 6269.6 169.3 6269.7 169.7  
6269.8  
170.1 6269.9 170.5 6270 170.91 6270.1 171.31 6270.2 171.71  
6270.3  
172.11 6270.4 172.51 6270.5 173.41 6270.5 174.74 6270.4 176.17  
6270.3  
177.6 6270.2 179.03 6270.1 180.45 6270 181.88 6269.9 183.31  
6269.8  
184.74 6269.7 186.17 6269.6 187.6 6269.5 189.02 6269.4 190.45  
6269.3  
191.88 6269.2 193.31 6269.1 194.74 6269 196.17 6268.9 197.59  
6268.8  
199.02 6268.7 254.84 6268.7 258.49 6268.6 262.14 6268.5 266.11  
6268.5  
272.78 6268.6 276.5 6268.7 277.44 6268.8 278.38 6268.9 281.85  
6269  
284.14 6269.1 286.42 6269.2 288.71 6269.3 290.99 6269.4 293.28  
6269.5  
295.56 6269.6 297.85 6269.7 300 6269.7  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 129.01 .013 168.52 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 129.01 168.52 100 100 100 .1  
.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
176.21 300 6269.51 F  
Left Levee Station= 121.34 Elevation= 6273.03  
Right Levee Station= 171.6 Elevation= 6269.54  
  
CROSS SECTION OUTPUT Profile #Flow 1  
  
E.G. Elev (ft) 6269.81 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.30 Wt. n-Val.  
0.013

W.S. Elev (ft) 6268.51 Reach Len. (ft) 100.01  
100.01 100.01  
Crit W.S. (ft) 6268.51 Flow Area (sq ft)  
89.57  
E.G. Slope (ft/ft) 0.001850 Area (sq ft)  
89.57  
Q Total (cfs) 820.02 Flow (cfs)  
820.02  
Top Width (ft) 33.50 Top Width (ft)  
33.50  
Vel Total (ft/s) 9.15 Avg. Vel. (ft/s)  
9.15  
Max Chl Dpth (ft) 4.41 Hydr. Depth (ft)  
2.67  
Conv. Total (cfs) 19064.6 Conv. (cfs)  
19064.6  
Length Wtd. (ft) 100.01 Wetted Per. (ft)  
35.25  
Min Ch El (ft) 6264.10 Shear (lb/sq ft)  
0.29  
Alpha 1.00 Stream Power (lb/ft s) 300.00  
121.34 171.60  
Frctn Loss (ft) 0.10 Cum Volume (acre-ft) 0.04  
0.26 0.01  
C & E Loss (ft) 0.16 Cum SA (acres)

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 990

INPUT  
Description:  
Station Elevation Data num= 175  
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
Elev

0	6271.5	1.25	6271.5	14.06	6271.4	25.09	6271.3	32.78
6271.2								
39.93	6271.1	46.38	6271	52.82	6270.9	58.95	6270.8	62.24
6270.7								
74.21	6270.7	86.91	6270.6	87.78	6270.5	88.74	6270.4	89.79
6270.3								
90.83	6270.2	91.88	6270.1	92.92	6270	93.97	6269.9	95.02
6269.8								
96.06	6269.7	97.11	6269.6	98.15	6269.5	99.2	6269.4	100.25
6269.3								
101.29	6269.2	102.34	6269.1	103.39	6269	104.43	6268.9	105.48
6268.8								
106.52	6268.7	107.57	6268.6	108.62	6268.5	109.85	6268.4	111.35
6268.3								
112.85	6268.2	114.35	6268.1	115.86	6268	117.29	6267.9	118.15
6267.8								
119.02	6267.7	119.88	6267.6	120.74	6267.5	121.1	6267.4	121.3
6267.3								
121.51	6267.2	121.71	6267.1	121.89	6267	123.09	6266.9	128.09
6266.8								
133.09	6266.7	138	6266.6	138.2	6266.5	138.4	6266.4	138.6
6266.3								
138.8	6266.2	139	6266.1	139.2	6266	139.4	6265.9	139.6
6265.8								
139.8	6265.7	140	6265.6	140.2	6265.5	140.4	6265.4	140.6
6265.3								
140.8	6265.2	141	6265.1	141.2	6265	141.4	6264.9	141.6
6264.8								
141.8	6264.7	142	6264.6	142.2	6264.5	142.4	6264.4	142.6
6264.3								
142.8	6264.2	143	6264.1	143.2	6264	143.4	6263.9	143.6
6263.8								
143.8	6263.7	144	6263.6	144.2	6263.5	144.4	6263.4	144.6
6263.3								
144.8	6263.2	155.3	6263.2	155.6	6263.3	155.9	6263.4	156.21
6263.5								
156.51	6263.6	156.81	6263.7	157.12	6263.8	157.42	6263.9	157.72
6264								
158.03	6264.1	158.33	6264.2	158.63	6264.3	158.94	6264.4	159.24
6264.5								
159.54	6264.6	159.84	6264.7	160.15	6264.8	160.45	6264.9	160.75
6265								
161.05	6265.1	161.35	6265.2	161.65	6265.3	161.95	6265.4	162.25
6265.5								
162.55	6265.6	162.85	6265.7	163.15	6265.8	163.45	6265.9	163.75
6266								
164.05	6266.1	164.35	6266.2	164.65	6266.3	169	6266.4	173.05
6266.5								
173.74	6266.6	174.44	6266.7	175.14	6266.8	175.84	6266.9	176.48
6267								
176.86	6267.1	177.25	6267.2	177.63	6267.3	178.02	6267.4	178.4
6267.5								
178.79	6267.6	179.37	6267.7	179.96	6267.8	180.54	6267.9	181.12

6268													
181.71	6268.1	182.29	6268.2	182.87	6268.3	183.45	6268.4	184.04					
6268.5													
184.46	6268.6	184.74	6268.7	185.03	6268.8	185.32	6268.9	185.61					
6269													
185.9	6269.1	186.19	6269.2	186.48	6269.3	186.76	6269.4	187.05					
6269.5													
187.36	6269.6	187.69	6269.7	188.01	6269.8	195.99	6269.9	215.85					
6269.9													
218.42	6269.8	224.13	6269.7	227.95	6269.6	231.78	6269.5	235.6					
6269.4													
239.43	6269.3	243.25	6269.2	247.08	6269.1	250.9	6269	254.72					
6268.9													
258.55	6268.8	262.37	6268.7	266.2	6268.6	270.02	6268.5	277.32					
6268.4													
283.18	6268.3	288.58	6268.2	293.13	6268.1	297.68	6268	300					
6268													
Manning's n Values													
Sta	n Val	Sta	n Val	3	Sta	n Val							
0	.03	138	.013	173.05		.03							
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.													
Expan.													
	138	173.05		6.48	6.48	6.48		.1					
.3													
Ineffective Flow num= 1													
Sta L	Sta R	Elev	Permanent										
215.58	300	6269.89	F										
Left Levee		Station=	46.79	Elevation=		6271.02							
Right Levee		Station=	187.52	Elevation=		6269.82							
CROSS SECTION OUTPUT Profile #Flow 1													
E.G. Elev (ft)													
Channel Right OB			6269.30	Element		Left OB							
Vel Head (ft)			0.76	Wt. n-Val.		0.030							
0.013	0.030												
W.S. Elev (ft)			6268.54	Reach Len. (ft)		6.48							
6.48	6.48												
Crit W.S. (ft)			6267.78	Flow Area (sq ft)		35.96							
134.30	11.59												
E.G. Slope (ft/ft)			0.000697	Area (sq ft)		35.96							
134.30	11.59												
Q Total (cfs)			1037.00	Flow (cfs)		53.09							
968.53	15.37												
Top Width (ft)			76.02	Top Width (ft)		29.81							
35.05	11.16												
Vel Total (ft/s)			5.70	Avg. Vel. (ft/s)		1.48							
7.21	1.33												
Max Chl Dpth (ft)			5.34	Hydr. Depth (ft)		1.21							
3.83	1.04												

Conv. Total (cfs)	39276.7	Conv. (cfs)	2010.9
36683.5	582.3		
Length Wtd. (ft)	6.48	Wetted Per. (ft)	29.97
36.36	11.35		
Min Ch El (ft)	6263.20	Shear (lb/sq ft)	0.05
0.16	0.04		
Alpha	1.50	Stream Power (lb/ft s)	300.00
46.79	187.52		
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.02
1.31	0.00		
C & E Loss (ft)	0.06	Cum SA (acres)	0.02
0.40	0.00		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

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.

Warning: The split flow optimization for the junction failed to converge within the maximum number of iterations. The results from the final iteration were used.

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

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 989

INPUT  
Description:  
Station Elevation Data num= 182  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6271.3 11.68 6271.3 25.78 6271.2 33.47 6271.1 40.5  
6271  
46.95 6270.9 53.39 6270.8 57.56 6270.7 60.85 6270.6 64.15  
6270.5  
64.77 6270.5 65.97 6270.6 70.63 6270.6 87.28 6270.5 88.57  
6270.4  
89.45 6270.3 90.32 6270.2 91.19 6270.1 92.06 6270 92.93  
6269.9  
93.8 6269.8 94.67 6269.7 95.54 6269.6 96.41 6269.5 97.28  
6269.4  
98.15 6269.3 99.03 6269.2 99.9 6269.1 100.8 6269 101.85  
6268.9  
102.89 6268.8 103.94 6268.7 104.99 6268.6 106.03 6268.5 107.08  
6268.4  
108.12 6268.3 109.17 6268.2 110.55 6268.1 112.05 6268 113.55  
6267.9

115.05	6267.8	116.55	6267.7	118.06	6267.6	119.45	6267.5	120.31
6267.4								
120.87	6267.3	121.08	6267.2	121.28	6267.1	121.49	6267	121.69
6266.9								
124.85	6266.8	129.85	6266.7	134.85	6266.6	138.08	6266.5	138.28
6266.4								
138.48	6266.3	138.68	6266.2	138.88	6266.1	139.08	6266	139.28
6265.9								
139.48	6265.8	139.68	6265.7	139.88	6265.6	140.08	6265.5	140.28
6265.4								
140.48	6265.3	140.68	6265.2	140.88	6265.1	141.08	6265	141.28
6264.9								
141.48	6264.8	141.68	6264.7	141.88	6264.6	142.08	6264.5	142.28
6264.4								
142.48	6264.3	142.68	6264.2	142.88	6264.1	143.08	6264	143.28
6263.9								
143.48	6263.8	143.68	6263.7	143.88	6263.6	144.08	6263.5	144.28
6263.4								
144.48	6263.3	144.68	6263.2	144.88	6263.1	155.19	6263.1	155.49
6263.2								
155.79	6263.3	156.09	6263.4	156.39	6263.5	156.69	6263.6	156.99
6263.7								
157.29	6263.8	157.59	6263.9	157.89	6264	158.19	6264.1	158.49
6264.2								
158.79	6264.3	159.09	6264.4	159.39	6264.5	159.69	6264.6	159.99
6264.7								
160.29	6264.8	160.59	6264.9	160.89	6265	161.19	6265.1	161.49
6265.2								
161.79	6265.3	162.09	6265.4	162.39	6265.5	162.69	6265.6	162.99
6265.7								
163.29	6265.8	163.59	6265.9	163.89	6266	164.19	6266.1	164.49
6266.2								
164.79	6266.3	165.09	6266.4	165.39	6266.5	165.69	6266.6	165.99
6266.7								
166.29	6266.8	166.59	6266.9	166.89	6267	167.19	6267.1	167.49
6267.2								
167.79	6267.3	168.09	6267.4	168.39	6267.5	168.94	6267.6	169.64
6267.7								
170.34	6267.8	171.04	6267.9	171.74	6268	172.43	6268.1	173.13
6268.2								
173.83	6268.3	174.53	6268.4	175.23	6268.5	175.93	6268.6	176.63
6268.7								
177.33	6268.8	178.03	6268.9	178.73	6269	179.42	6269.1	180.12
6269.2								
180.69	6269.3	181.05	6269.4	181.43	6269.5	181.82	6269.6	182.2
6269.7								
182.59	6269.8	182.98	6269.9	191.39	6270	204.28	6270	206.71
6269.9								
208.92	6269.8	211.3	6269.7	213.88	6269.6	216.45	6269.5	219.02
6269.4								
228.83	6269.3	234.72	6269.2	238.8	6269.1	242.62	6269	246.44
6268.9								
250.27	6268.8	254.09	6268.7	257.92	6268.6	261.74	6268.5	265.57

6268.4  
270.75 6268.3 278.05 6268.2 283.72 6268.1 289.19 6268 294.28  
6267.9  
299.54 6267.8 300 6267.8  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 138.08 .013 173.13 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 138.08 173.13 43.52 43.52 43.52 .1  
.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
205.11 300 6270.01 F  
Left Levee Station= 87 Elevation= 6270.5  
Right Levee Station= 205.11 Elevation= 6270.03

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6269.24	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.32	Wt. n-Val.	0.030
0.013			
W.S. Elev (ft)	6267.92	Reach Len. (ft)	43.52
43.52 43.52			
Crit W.S. (ft)	6267.92	Flow Area (sq ft)	22.59
105.92			
E.G. Slope (ft/ft)	0.001524	Area (sq ft)	22.59
105.92			
Q Total (cfs)	1037.00	Flow (cfs)	40.93
996.07			
Top Width (ft)	57.84	Top Width (ft)	24.77
33.07			
Vel Total (ft/s)	8.07	Avg. Vel. (ft/s)	1.81
9.40			
Max Chl Dpth (ft)	4.82	Hydr. Depth (ft)	0.91
3.20			
Conv. Total (cfs)	26564.5	Conv. (cfs)	1048.4
25516.1			
Length Wtd. (ft)	43.52	Wetted Per. (ft)	24.90
34.62			
Min Ch El (ft)	6263.10	Shear (lb/sq ft)	0.09
0.29			
Alpha	1.31	Stream Power (lb/ft s)	300.00
87.00 205.11			
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.02
1.29			
C & E Loss (ft)	0.02	Cum SA (acres)	0.01
0.39			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 988

INPUT  
Description:  
Station Elevation Data num= 232  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6270.6 15.16 6270.6 28.64 6270.5 31.48 6270.4 34.31  
6270.3  
37.14 6270.2 40.61 6270.1 45.04 6270 49.48 6269.9 53.91  
6269.8  
58.35 6269.7 62.37 6269.6 65.67 6269.5 68.96 6269.4 72.26  
6269.3  
75.56 6269.2 78.85 6269.1 80.91 6269.1 82.11 6269.2 83.3  
6269.3  
84.5 6269.4 85.7 6269.5 86.9 6269.6 88.1 6269.7 90.42  
6269.7  
91.84 6269.6 93.22 6269.5 93.92 6269.4 94.63 6269.3 95.34  
6269.2  
96.05 6269.1 96.76 6269 97.47 6268.9 98.18 6268.8 98.89  
6268.7  
99.6 6268.6 100.31 6268.5 101.02 6268.4 101.73 6268.3 102.44  
6268.2  
103.13 6268.1 103.79 6268 104.44 6267.9 105.1 6267.8 105.76  
6267.7  
106.41 6267.6 107.07 6267.5 107.73 6267.4 108.39 6267.3 109.04  
6267.2  
109.7 6267.1 110.36 6267 110.94 6267 111.47 6267.1 112  
6267.2  
112.53 6267.3 113.06 6267.4 116.37 6267.4 117.85 6267.3 119.08  
6267.2  
120.24 6267.1 120.97 6267 121.56 6266.9 122.14 6266.8 122.72  
6266.7

123.3 6266.6 123.89 6266.5 124.47 6266.4 125.05 6266.3 125.63  
6266.2  
126.22 6266.1 126.79 6266 127.32 6265.9 127.91 6265.8 128.41  
6265.7  
128.69 6265.6 128.98 6265.5 129.26 6265.4 129.54 6265.3 129.83  
6265.2  
130.11 6265.1 130.39 6265 130.68 6264.9 130.96 6264.8 131.24  
6264.7  
131.52 6264.6 131.81 6264.5 132.09 6264.4 132.37 6264.3 132.66  
6264.2  
132.94 6264.1 133.22 6264 133.51 6263.9 133.79 6263.8 134.07  
6263.7  
134.36 6263.6 134.64 6263.5 134.92 6263.4 135.21 6263.3 135.49  
6263.2  
135.77 6263.1 136.06 6263 136.34 6262.9 136.62 6262.8 136.91  
6262.7  
137.17 6262.6 137.37 6262.5 137.57 6262.4 137.77 6262.3 137.97  
6262.2  
138.17 6262.1 138.37 6262 138.57 6261.9 138.77 6261.8 138.97  
6261.7  
139.17 6261.6 139.37 6261.5 139.57 6261.4 139.77 6261.3 139.97  
6261.2  
140.17 6261.1 140.37 6261 140.57 6260.9 140.77 6260.8 140.97  
6260.7  
141.17 6260.6 141.37 6260.5 141.57 6260.4 141.77 6260.3 141.97  
6260.2  
142.17 6260.1 142.37 6260 142.57 6259.9 142.77 6259.8 142.97  
6259.7  
143.17 6259.6 143.37 6259.5 143.57 6259.4 143.77 6259.3 143.97  
6259.2  
144.17 6259.1 144.37 6259 144.57 6258.9 144.77 6258.8 144.97  
6258.7  
155.04 6258.7 155.34 6258.8 155.64 6258.9 155.94 6259 156.24  
6259.1  
156.54 6259.2 156.84 6259.3 157.14 6259.4 157.44 6259.5 157.74  
6259.6  
158.04 6259.7 158.34 6259.8 158.64 6259.9 158.94 6260 159.21  
6260.1  
159.44 6260.2 159.68 6260.3 159.92 6260.4 160.16 6260.5 160.4  
6260.6  
160.63 6260.7 160.87 6260.8 161.11 6260.9 161.35 6261 161.58  
6261.1  
161.82 6261.2 162.06 6261.3 162.3 6261.4 162.54 6261.5 162.77  
6261.6  
163.01 6261.7 163.25 6261.8 163.49 6261.9 163.72 6262 163.96  
6262.1  
164.2 6262.2 164.44 6262.3 164.67 6262.4 164.91 6262.5 165.15  
6262.6  
165.39 6262.7 165.63 6262.8 165.86 6262.9 166.1 6263 166.34  
6263.1  
166.59 6263.2 166.88 6263.3 167.18 6263.4 167.48 6263.5 167.78  
6263.6  
168.08 6263.7 168.38 6263.8 168.68 6263.9 168.98 6264 169.28

6264.1  
169.58 6264.2 169.88 6264.3 170.18 6264.4 170.48 6264.5 170.78  
6264.6  
171.07 6264.7 171.37 6264.8 171.67 6264.9 171.97 6265 172.27  
6265.1  
172.57 6265.2 172.87 6265.3 173.17 6265.4 173.47 6265.5 173.77  
6265.6  
174.07 6265.7 174.37 6265.8 177.25 6265.9 182.25 6266 187.25  
6266.1  
214.46 6266.2 218.01 6266.3 221.57 6266.4 225.12 6266.5 228.67  
6266.6  
232.22 6266.7 235.77 6266.8 239.33 6266.9 245.92 6266.9 253.13  
6266.8  
277.3 6266.7 300 6266.7  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 133.22 .013 168.08 .03  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 133.22 168.08 39.44 39.44 39.44 .1  
.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
0 89.93 6269.72 F  
Left Levee Station= 91.19 Elevation= 6269.75  
Right Levee Station= 239.87 Elevation= 6266.89  
CROSS SECTION OUTPUT Profile #Flow 1  
E.G. Elev (ft) 6265.09 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.55 Wt. n-Val.  
0.013  
W.S. Elev (ft) 6263.54 Reach Len. (ft) 39.44  
39.44 39.44  
Crit W.S. (ft) 6263.54 Flow Area (sq ft)  
103.92  
E.G. Slope (ft/ft) 0.001791 Area (sq ft)  
103.92  
Q Total (cfs) 1037.00 Flow (cfs)  
1037.00  
Top Width (ft) 33.08 Top Width (ft)  
33.08  
Vel Total (ft/s) 9.98 Avg. Vel. (ft/s)  
9.98  
Max Chl Dpth (ft) 4.84 Hydr. Depth (ft)  
3.14  
Conv. Total (cfs) 24506.5 Conv. (cfs)  
24506.5  
Length Wtd. (ft) 39.44 Wetted Per. (ft)

35.07  
Min Ch El (ft) 6258.70 Shear (lb/sq ft)  
0.33  
Alpha 1.00 Stream Power (lb/ft s) 300.00  
91.19 239.87  
Frctn Loss (ft) 0.07 Cum Volume (acre-ft) 0.01  
1.19  
C & E Loss (ft) 0.01 Cum SA (acres) 0.00  
0.36

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 987

INPUT  
Description:  
Station Elevation Data num= 283  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6270.5 5.82 6270.5 9.64 6270.4 13.16 6270.3 16.68  
6270.2  
20.19 6270.1 23.71 6270 27.23 6269.9 30.74 6269.8 34.26  
6269.7  
37.85 6269.6 42.3 6269.5 46.76 6269.4 51.22 6269.3 55.61  
6269.2  
59.93 6269.1 64.25 6269 68.45 6268.9 71.72 6268.8 74.99  
6268.7  
78.26 6268.6 81.53 6268.5 84.8 6268.4 88.08 6268.3 91.35  
6268.2  
94.62 6268.1 98.74 6268 100.58 6267.9 105.05 6267.9 107.62  
6268  
112.49 6268 113.63 6267.9 114.77 6267.8 115.91 6267.7 116.45  
6267.6  
116.65 6267.5 116.85 6267.4 117.05 6267.3 117.25 6267.2 117.43  
6267.1

117.61 6267 117.78 6266.9 117.95 6266.8 118.13 6266.7 118.31  
6266.6  
118.55 6266.5 118.78 6266.4 119.02 6266.3 119.25 6266.2 119.48  
6266.1  
119.72 6266 119.95 6265.9 120.17 6265.8 120.39 6265.7 120.6  
6265.6  
120.81 6265.5 121.03 6265.4 121.24 6265.3 121.46 6265.2 121.67  
6265.1  
121.88 6265 122.1 6264.9 122.31 6264.8 122.53 6264.7 122.74  
6264.6  
122.96 6264.5 123.17 6264.4 123.38 6264.3 123.6 6264.2 123.81  
6264.1  
124.03 6264 124.24 6263.9 124.45 6263.8 124.67 6263.7 124.88  
6263.6  
125.1 6263.5 125.31 6263.4 125.52 6263.3 125.74 6263.2 125.95  
6263.1  
126.17 6263 126.38 6262.9 126.6 6262.8 126.81 6262.7 127.02  
6262.6  
127.24 6262.5 127.45 6262.4 127.67 6262.3 127.88 6262.2 128.09  
6262.1  
128.31 6262 128.52 6261.9 128.74 6261.8 128.95 6261.7 129.17  
6261.6  
129.44 6261.5 129.73 6261.4 130.01 6261.3 130.29 6261.2 130.58  
6261.1  
130.86 6261 131.14 6260.9 131.43 6260.8 131.71 6260.7 131.99  
6260.6  
132.28 6260.5 132.56 6260.4 132.84 6260.3 133.13 6260.2 133.41  
6260.1  
133.69 6260 133.98 6259.9 134.26 6259.8 134.54 6259.7 134.83  
6259.6  
135.11 6259.5 135.39 6259.4 135.68 6259.3 135.96 6259.2 136.24  
6259.1  
136.47 6259 136.67 6258.9 136.87 6258.8 137.07 6258.7 137.27  
6258.6  
137.47 6258.5 137.67 6258.4 137.87 6258.3 138.07 6258.2 138.27  
6258.1  
138.47 6258 138.67 6257.9 138.87 6257.8 139.07 6257.7 139.27  
6257.6  
139.47 6257.5 139.67 6257.4 139.87 6257.3 140.07 6257.2 140.27  
6257.1  
140.47 6257 140.67 6256.9 140.87 6256.8 141.07 6256.7 141.27  
6256.6  
141.47 6256.5 141.67 6256.4 141.87 6256.3 142.07 6256.2 142.27  
6256.1  
142.47 6256 142.67 6255.9 142.87 6255.8 143.07 6255.7 143.27  
6255.6  
143.47 6255.5 143.67 6255.4 143.87 6255.3 144.07 6255.2 144.27  
6255.1  
144.47 6255 144.67 6254.9 144.87 6254.8 155.1 6254.8 155.3  
6254.9  
155.5 6255 155.7 6255.1 155.9 6255.2 156.1 6255.3 156.3  
6255.4  
156.5 6255.5 156.7 6255.6 156.9 6255.7 157.1 6255.8 157.3

6255.9								
157.5	6256	157.7	6256.1	157.9	6256.2	158.1	6256.3	158.3
6256.4								
158.5	6256.5	158.7	6256.6	158.9	6256.7	159.1	6256.8	159.3
6256.9								
159.5	6257	159.7	6257.1	159.9	6257.2	160.14	6257.3	160.37
6257.4								
160.61	6257.5	160.85	6257.6	161.09	6257.7	161.33	6257.8	161.56
6257.9								
161.8	6258	162.04	6258.1	162.28	6258.2	162.51	6258.3	162.75
6258.4								
162.99	6258.5	163.23	6258.6	163.47	6258.7	163.7	6258.8	163.94
6258.9								
164.18	6259	164.42	6259.1	164.65	6259.2	164.93	6259.3	165.23
6259.4								
165.53	6259.5	165.83	6259.6	166.13	6259.7	166.42	6259.8	166.72
6259.9								
167.02	6260	167.32	6260.1	167.62	6260.2	167.92	6260.3	168.22
6260.4								
168.52	6260.5	168.82	6260.6	169.12	6260.7	169.42	6260.8	169.72
6260.9								
170.02	6261	170.32	6261.1	170.61	6261.2	170.91	6261.3	171.21
6261.4								
171.51	6261.5	171.81	6261.6	172.11	6261.7	172.41	6261.8	172.71
6261.9								
173.01	6262	173.31	6262.1	173.61	6262.2	173.91	6262.3	174.21
6262.4								
174.82	6262.5	179.82	6262.6	184.82	6262.7	189.62	6262.8	191.62
6262.9								
193.63	6263	195.63	6263.1	197.63	6263.2	199.64	6263.3	201.64
6263.4								
203.65	6263.5	205.65	6263.6	207.65	6263.7	209.66	6263.8	211.66
6263.9								
213.67	6264	216.68	6264.1	220.23	6264.2	223.78	6264.3	227.33
6264.4								
230.89	6264.5	234.44	6264.6	237.99	6264.7	241.54	6264.8	245.1
6264.9								
248.65	6265	258.2	6265	259.08	6264.9	270.41	6264.8	284.82
6264.7								
285.84	6264.6	286.86	6264.5	287.96	6264.4	289.05	6264.3	289.66
6264.3								
291.32	6264.4	292.9	6264.5	294.42	6264.6	295.85	6264.7	297.2
6264.8								
298.5	6264.9	299.7	6265	300	6265			
Manning's n Values num= 3								
Sta	n Val	Sta	n Val	Sta	n Val			
0	.03	127.02	.013	173.01	.03			
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.								
Expan.	127.02	173.01		10.56	10.56	10.56		.1
.3								

Ineffective Flow	num=	1		
Sta L	Sta R	Elev	Permanent	
258.72	300	6265.02	F	
Left Levee	Station=	112.13	Elevation=	6268.07
Right Levee	Station=	248.25	Elevation=	6265.11
CROSS SECTION OUTPUT Profile #Flow 1				
E.G. Elev (ft)		6261.38	Element	Left OB
Channel Right OB				
Vel Head (ft)		1.60	Wt. n-Val.	
0.013				
W.S. Elev (ft)		6259.78	Reach Len. (ft)	10.56
10.56	10.56			
Crit W.S. (ft)		6259.78	Flow Area (sq ft)	
102.05				
E.G. Slope (ft/ft)		0.001842	Area (sq ft)	
102.05				
Q Total (cfs)		1037.00	Flow (cfs)	
1037.00				
Top Width (ft)		32.04	Top Width (ft)	
32.04				
Vel Total (ft/s)		10.16	Avg. Vel. (ft/s)	
10.16				
Max Chl Dpth (ft)		4.98	Hydr. Depth (ft)	
3.19				
Conv. Total (cfs)		24162.3	Conv. (cfs)	
24162.3				
Length Wtd. (ft)		10.56	Wetted Per. (ft)	
34.23				
Min Ch El (ft)		6254.80	Shear (lb/sq ft)	
0.34				
Alpha		1.00	Stream Power (lb/ft s)	300.00
112.13	248.25			
Frctn Loss (ft)		0.02	Cum Volume (acre-ft)	0.01
1.09				
C & E Loss (ft)		0.13	Cum SA (acres)	0.00
0.33				
Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.				
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.				
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.				

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 986

INPUT

Description:

Station	Elevation	Data	num=	338					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6269.7	.65	6269.7	1.86	6269.6	23.84	6269.6	41.05	
6269.5									
44.74	6269.4	47.36	6269.3	48.78	6269.2	53.11	6269.1	57.81	
6269									
62.51	6268.9	66.9	6268.8	71.23	6268.7	75.55	6268.6	79.18	
6268.5									
82.45	6268.4	85.72	6268.3	88.99	6268.2	94.38	6268.1	97.79	
6268									
99	6267.9	100.22	6267.8	101.92	6267.7	102.53	6267.7	103.06	
6267.8									
103.58	6267.9	104.51	6267.9	105.21	6267.8	105.91	6267.7	106.61	
6267.6									
107.35	6267.6	109.92	6267.7	112.2	6267.7	113.52	6267.6	115.96	
6267.5									
116.12	6267.4	116.28	6267.3	116.45	6267.2	116.61	6267.1	116.77	
6267									
116.93	6266.9	117.1	6266.8	117.26	6266.7	117.42	6266.6	117.58	
6266.5									
117.77	6266.4	117.98	6266.3	118.19	6266.2	118.4	6266.1	118.61	
6266									
118.81	6265.9	119.02	6265.8	119.23	6265.7	119.44	6265.6	119.65	
6265.5									
119.86	6265.4	120.07	6265.3	120.28	6265.2	120.49	6265.1	120.7	
6265									
120.9	6264.9	121.11	6264.8	121.32	6264.7	121.53	6264.6	121.74	
6264.5									
121.95	6264.4	122.16	6264.3	122.37	6264.2	122.58	6264.1	122.79	
6264									
122.99	6263.9	123.2	6263.8	123.41	6263.7	123.62	6263.6	123.83	
6263.5									
124.04	6263.4	124.25	6263.3	124.46	6263.2	124.67	6263.1	124.87	
6263									
125.08	6262.9	125.29	6262.8	125.5	6262.7	125.71	6262.6	125.92	
6262.5									
126.13	6262.4	126.34	6262.3	126.55	6262.2	126.76	6262.1	126.96	
6262									
127.17	6261.9	127.4	6261.8	127.63	6261.7	127.85	6261.6	128.08	
6261.5									
128.31	6261.4	128.54	6261.3	128.78	6261.2	129.01	6261.1	129.24	
6261									
129.48	6260.9	129.71	6260.8	129.94	6260.7	130.16	6260.6	130.37	
6260.5									

130.59	6260.4	130.8	6260.3	131.01	6260.2	131.23	6260.1	131.44	
6260									
131.66	6259.9	131.87	6259.8	132.08	6259.7	132.3	6259.6	132.51	
6259.5									
132.73	6259.4	132.94	6259.3	133.16	6259.2	133.37	6259.1	133.64	
6259									
133.92	6258.9	134.21	6258.8	134.49	6258.7	134.77	6258.6	135.06	
6258.5									
135.34	6258.4	135.62	6258.3	135.91	6258.2	136.17	6258.1	136.37	
6258									
136.57	6257.9	136.77	6257.8	136.97	6257.7	137.17	6257.6	137.37	
6257.5									
137.57	6257.4	137.77	6257.3	137.97	6257.2	138.17	6257.1	138.37	
6257									
138.57	6256.9	138.77	6256.8	138.97	6256.7	139.17	6256.6	139.37	
6256.5									
139.57	6256.4	139.77	6256.3	139.97	6256.2	140.17	6256.1	140.37	
6256									
140.57	6255.9	140.77	6255.8	140.97	6255.7	141.17	6255.6	141.37	
6255.5									
141.57	6255.4	141.77	6255.3	141.97	6255.2	142.17	6255.1	142.37	
6255									
142.57	6254.9	142.77	6254.8	142.97	6254.7	143.17	6254.6	143.37	
6254.5									
143.57	6254.4	143.77	6254.3	143.97	6254.2	144.17	6254.1	144.37	
6254									
144.57	6253.9	144.77	6253.8	144.97	6253.7	145.17	6253.6	145.37	
6254.1									
145.84	6254.3	145.86	6254.6	145.87	6254.7	147.42	6254.7	147.43	
6254.6									
147.45	6254.3	147.46	6254.1	147.48	6253.8	149.15	6253.8	149.17	
6254.1									
149.18	6254.3	149.2	6254.6	149.21	6254.7	150.76	6254.7	150.77	
6254.6									
150.79	6254.3	150.8	6254.1	150.82	6253.8	152.49	6253.8	152.51	
6254.1									
152.52	6254.3	152.54	6254.6	152.55	6254.7	154.1	6254.7	154.11	
6254.6									
154.13	6254.3	154.14	6254.1	154.16	6253.8	155.03	6253.7	155.23	
6253.8									
155.43	6253.9	155.63	6254	155.83	6254.1	156.03	6254.2	156.23	
6254.3									
156.43	6254.4	156.63	6254.5	156.83	6254.6	157.03	6254.7	157.23	
6254.8									
157.43	6254.9	157.63	6255	157.83	6255.1	158.03	6255.2	158.23	
6255.3									
158.43	6255.4	158.63	6255.5	158.83	6255.6	159.03	6255.7	159.23	
6255.8									
159.43	6255.9	159.63	6256	159.83	6256.1	160.03	6256.2	160.23	
6256.3									
160.43	6256.4	160.63	6256.5	160.83	6256.6	161.03	6256.7	161.23	
6256.8									
161.43	6256.9	161.63	6257	161.83	6257.1	162.03	6257.2	162.23	



257.3												
162.43	6257.4	162.66	6257.5	162.9	6257.6	163.14	6257.7	163.38				
6257.8												
163.61	6257.9	163.85	6258	164.09	6258.1	164.34	6258.2	164.63				
6258.3												
164.93	6258.4	165.23	6258.5	165.53	6258.6	165.83	6258.7	166.13				
6258.8												
166.43	6258.9	166.73	6259	167.03	6259.1	167.33	6259.2	167.63				
6259.3												
167.93	6259.4	168.23	6259.5	168.53	6259.6	168.82	6259.7	169.12				
6259.8												
169.42	6259.9	169.72	6260	170.02	6260.1	170.32	6260.2	170.62				
6260.3												
170.92	6260.4	171.22	6260.5	171.52	6260.6	171.82	6260.7	172.12				
6260.8												
172.42	6260.9	172.71	6261	173.01	6261.1	173.31	6261.2	173.61				
6261.3												
173.91	6261.4	174.21	6261.5	174.65	6261.6	179.62	6261.7	184.62				
6261.8												
189.66	6261.9	191.12	6261.9	193.08	6261.8	193.46	6261.8	194.8				
6261.9												
196.15	6262	197.49	6262.1	198.84	6262.2	200.18	6262.3	201.53				
6262.4												
202.87	6262.5	204.22	6262.6	205.6	6262.7	207.6	6262.8	209.61				
6262.9												
211.61	6263	213.61	6263.1	215.62	6263.2	217.62	6263.3	219.63				
6263.4												
221.63	6263.5	223.63	6263.6	225.64	6263.7	227.64	6263.8	230.14				
6263.9												
233.69	6264	237.25	6264.1	240.8	6264.2	244.35	6264.3	247.9				
6264.4												
251.46	6264.5	259.74	6264.5	260.62	6264.4	265.71	6264.3	278.7				
6264.2												
279.71	6264.1	280.73	6264	281.79	6263.9	282.89	6263.8	283.98				
6263.7												
284.71	6263.7	286.37	6263.8	287.98	6263.9	289.53	6264	291				
6264.1												
292.43	6264.2	293.78	6264.3	295.1	6264.4	296.32	6264.5	297.52				
6264.6												
298.61	6264.7	299.69	6264.8	300	6264.8							
Manning's n Values												
			num=	3								
Sta	n Val	Sta	n Val	Sta	n Val							
0	.03	127.17	.013	173.01	.03							
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.												
Expan.	127.17	173.01		6.48	6.48	6.48		.1				
.3												
Ineffective Flow			num=	1								
Sta L	Sta R	Elev	Permanent									
260.39	300	6264.57	F									
Left Levee			Station=	97.89	Elevation= 6268.05							

Right Levee	Station=	251.6	Elevation=	6264.48
CROSS SECTION OUTPUT Profile #Flow 1				
E.G. Elev (ft)	6260.59	Element	Left OB	
Channel Right OB				
Vel Head (ft)	1.16	Wt. n-Val.		
0.013				
W.S. Elev (ft)	6259.44	Reach Len. (ft)	6.48	
6.48	6.48			
Crit W.S. (ft)	6258.94	Flow Area (sq ft)		
120.18				
E.G. Slope (ft/ft)	0.001447	Area (sq ft)		
120.18				
Q Total (cfs)	1037.00	Flow (cfs)		
1037.00				
Top Width (ft)	35.39	Top Width (ft)		
35.39				
Vel Total (ft/s)	8.63	Avg. Vel. (ft/s)		
8.63				
Max Chl Dpth (ft)	5.74	Hydr. Depth (ft)		
3.40				
Conv. Total (cfs)	27263.1	Conv. (cfs)		
27263.1				
Length Wtd. (ft)	6.48	Wetted Per. (ft)		
42.98				
Min Ch El (ft)	6253.70	Shear (lb/sq ft)		
0.25				
Alpha	1.00	Stream Power (lb/ft s)	300.00	
97.89	251.60			
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	
1.07				
C & E Loss (ft)	0.15	Cum SA (acres)	0.00	
0.32				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

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, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 985

INPUT



Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.03	127.09	.013	172.98	.03
Bank Sta:	Left	Right	Lengths: Left Channel		Right
Expan.					Coeff Contr.
	127.09	172.98	10.39	10.39	10.39
.3					.1
Ineffective Flow		num= 1			
Sta L	Sta R	Elev	Permanent		
262.07	300	6264.03	F		
Left Levee	Station=	105.01	Elevation= 6267.95		
Right Levee	Station=	260.81	Elevation= 6264.31		

E.G. Elev (ft)	6260.43	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.65	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6259.79	Reach Len. (ft)	10.39
10.39 10.39			
Crit W.S. (ft)	6258.11	Flow Area (sq ft)	
160.82			
E.G. Slope (ft/ft)	0.000539	Area (sq ft)	
160.82			

[illegible]

115.69 6267.2 115.88 6267.1 116.07 6267 116.26 6266.9 116.45  
6266.8  
116.63 6266.7 116.86 6266.6 117.11 6266.5 117.32 6266.4 117.53  
6266.3  
117.75 6266.2 117.96 6266.1 118.17 6266 118.38 6265.9 118.6  
6265.8  
118.81 6265.7 119.02 6265.6 119.23 6265.5 119.45 6265.4 119.66  
6265.3  
119.87 6265.2 120.08 6265.1 120.3 6265 120.51 6264.9 120.72  
6264.8  
120.93 6264.7 121.15 6264.6 121.36 6264.5 121.57 6264.4 121.78  
6264.3  
122 6264.2 122.21 6264.1 122.42 6264 122.63 6263.9 122.85  
6263.8  
123.06 6263.7 123.27 6263.6 123.48 6263.5 123.67 6263.4 123.87  
6263.3  
124.07 6263.2 124.27 6263.1 124.46 6263 124.66 6262.9 124.86  
6262.8  
125.06 6262.7 125.25 6262.6 125.45 6262.5 125.65 6262.4 125.85  
6262.3  
126.04 6262.2 126.24 6262.1 126.44 6262 126.64 6261.9 126.83  
6261.8  
127.03 6261.7 127.23 6261.6 127.43 6261.5 127.62 6261.4 127.82  
6261.3  
128.02 6261.2 128.22 6261.1 128.41 6261 128.61 6260.9 128.81  
6260.8  
129.02 6260.7 129.24 6260.6 129.46 6260.5 129.68 6260.4 129.9  
6260.3  
130.11 6260.2 130.33 6260.1 130.55 6260 130.77 6259.9 130.99  
6259.8  
131.21 6259.7 131.43 6259.6 131.64 6259.5 131.86 6259.4 132.08  
6259.3  
132.3 6259.2 132.52 6259.1 132.74 6259 132.96 6258.9 133.17  
6258.8  
133.39 6258.7 133.61 6258.6 133.83 6258.5 134.05 6258.4 134.27  
6258.3  
134.49 6258.2 134.7 6258.1 134.92 6258 135.14 6257.9 135.36  
6257.8  
135.58 6257.7 135.8 6257.6 136.01 6257.5 136.19 6257.4 136.37  
6257.3  
136.55 6257.2 136.72 6257.1 136.9 6257 137.08 6256.9 137.27  
6256.8  
137.47 6256.7 137.67 6256.6 137.87 6256.5 138.07 6256.4 138.27  
6256.3  
138.47 6256.2 138.67 6256.1 138.87 6256 139.07 6255.9 139.27  
6255.8  
139.47 6255.7 139.67 6255.6 139.87 6255.5 140.07 6255.4 140.27  
6255.3  
140.47 6255.2 140.67 6255.1 140.87 6255 141.07 6254.9 141.27  
6254.8  
141.47 6254.7 141.67 6254.6 141.87 6254.5 142.07 6254.4 142.27  
6254.3  
142.47 6254.2 142.67 6254.1 142.87 6254 143.07 6253.9 143.27

6253.8  
143.47 6253.7 143.67 6253.6 143.87 6253.5 144.07 6253.4 144.27  
6253.3  
144.47 6253.2 144.67 6253.1 144.87 6253 145.8 6253.2 145.82  
6253.7  
145.84 6254.2 145.86 6254.7 145.88 6255.2 145.89 6255.4 147.37  
6255.4  
147.39 6255.2 147.41 6254.7 147.43 6254.2 147.45 6253.7 147.47  
6253.2  
149.14 6253.2 149.16 6253.7 149.18 6254.2 149.2 6254.7 149.22  
6255.2  
149.23 6255.4 150.71 6255.4 150.73 6255.2 150.75 6254.7 150.77  
6254.2  
150.79 6253.7 150.81 6253.2 152.49 6253.2 152.51 6253.7 152.53  
6254.2  
152.55 6254.7 152.57 6255.2 152.58 6255.4 154.07 6255.4 154.08  
6255.2  
154.1 6254.7 154.12 6254.2 154.14 6253.7 154.16 6253.2 155.12  
6253  
155.33 6253.1 155.53 6253.2 155.73 6253.3 155.93 6253.4 156.13  
6253.5  
156.33 6253.6 156.53 6253.7 156.73 6253.8 156.93 6253.9 157.13  
6254  
157.33 6254.1 157.53 6254.2 157.73 6254.3 157.93 6254.4 158.13  
6254.5  
158.33 6254.6 158.53 6254.7 158.73 6254.8 158.93 6254.9 159.13  
6255  
159.33 6255.1 159.53 6255.2 159.73 6255.3 159.93 6255.4 160.13  
6255.5  
160.33 6255.6 160.53 6255.7 160.73 6255.8 160.93 6255.9 161.13  
6256  
161.33 6256.1 161.53 6256.2 161.73 6256.3 161.93 6256.4 162.13  
6256.5  
162.33 6256.6 162.53 6256.7 162.73 6256.8 162.93 6256.9 163.13  
6257  
163.33 6257.1 163.53 6257.2 163.73 6257.3 163.93 6257.4 164.2  
6257.5  
164.51 6257.6 164.81 6257.7 165.11 6257.8 165.42 6257.9 165.72  
6258  
166.02 6258.1 166.32 6258.2 166.63 6258.3 166.93 6258.4 167.23  
6258.5  
167.54 6258.6 167.84 6258.7 168.14 6258.8 168.45 6258.9 168.75  
6259  
169.05 6259.1 169.35 6259.2 169.66 6259.3 169.96 6259.4 170.26  
6259.5  
170.57 6259.6 170.87 6259.7 171.17 6259.8 171.48 6259.9 171.78  
6260  
172.08 6260.1 172.38 6260.2 172.69 6260.3 172.99 6260.4 173.29  
6260.5  
173.6 6260.6 173.9 6260.7 174.2 6260.8 174.59 6260.9 179.41  
6261  
184.08 6261.1 188.49 6261.2 193.72 6261.2 194.42 6261.1 195.13  
6261

195.84	6260.9	196.55	6260.8	197.26	6260.7	197.97	6260.6	198.68
6260.5								
199.39	6260.4	200.1	6260.3	200.81	6260.2	202.65	6260.1	203.51
6260.1								
204.86	6260.2	206.2	6260.3	207.55	6260.4	208.89	6260.5	210.24
6260.6								
211.58	6260.7	212.93	6260.8	214.27	6260.9	215.62	6261	216.96
6261.1								
218.31	6261.2	219.65	6261.3	221	6261.4	222.34	6261.5	223.69
6261.6								
225.03	6261.7	226.38	6261.8	227.72	6261.9	229.07	6262	230.42
6262.1								
231.76	6262.2	233.11	6262.3	234.45	6262.4	235.8	6262.5	237.14
6262.6								
238.49	6262.7	239.83	6262.8	241.18	6262.9	242.52	6263	243.87
6263.1								
245.21	6263.2	246.56	6263.3	248.36	6263.4	250.36	6263.5	252.37
6263.6								
255.91	6263.7	262.18	6263.7	263.06	6263.6	263.94	6263.5	268.88
6263.4								
269.9	6263.3	270.92	6263.2	271.93	6263.1	273.01	6263	274.1
6262.9								
275.2	6262.8	277.76	6262.8	279.42	6262.9	281.01	6263	282.56
6263.1								
284.09	6263.2	285.51	6263.3	286.94	6263.4	288.29	6263.5	289.6
6263.6								
290.89	6263.7	292.09	6263.8	293.28	6263.9	294.39	6264	295.47
6264.1								
296.5	6264.2	297.46	6264.3	298.41	6264.4	299.25	6264.5	300
6264.5								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.03	127.03	.013	172.99	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.
Expan.						
127.03	172.99	10	10	10		.1

.3	Ineffective Flow		num=		2	
Sta L	Sta R	Elev	Permanent			
0	106.27	6267.94	F			
264.16	300	6263.55	F			
Left Levee	Station=	106.69	Elevation=	6268.09		
Right Levee	Station=	261.65	Elevation=	6263.74		

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6260.41	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.78	Wt. n-Val.	
0.013			

W.S. Elev (ft)	6259.63	Reach Len. (ft)	10.00
10.00	10.00		
Crit W.S. (ft)	6258.48	Flow Area (sq ft)	
146.18			
E.G. Slope (ft/ft)	0.001045	Area (sq ft)	
146.18			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	39.29	Top Width (ft)	
39.29			
Vel Total (ft/s)	7.09	Avg. Vel. (ft/s)	
7.09			
Max Chl Dpth (ft)	6.63	Hydr. Depth (ft)	
3.72			
Conv. Total (cfs)	32086.6	Conv. (cfs)	
32086.6			
Length Wtd. (ft)	10.00	Wetted Per. (ft)	
54.93			
Min Ch El (ft)	6253.00	Shear (lb/sq ft)	
0.17			
Alpha	1.00	Stream Power (lb/ft s)	300.00
106.69	261.65		
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01
1.01			
C & E Loss (ft)	0.05	Cum SA (acres)	0.00
0.31			

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, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 983

INPUT									
Description:									
Station	Elevation	Data	num=	366					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev									
0	6269.5	38.52	6269.5	40.63	6269.4	42.74	6269.3	45.02	
6269.3									
45.56	6269.4	46.11	6269.5	46.65	6269.6	47.85	6269.6	49.17	
6269.5									
50.48	6269.4	51.8	6269.3	53.11	6269.2	54.43	6269.1	55.74	
6269									
57.42	6268.9	62.17	6268.8	66.92	6268.7	71.67	6268.6	76.42	

6268.5  
81.17 6268.4 87.35 6268.3 91.3 6268.2 92.52 6268.1 93.73  
6268  
94.95 6267.9 96.17 6267.8 97.38 6267.7 98.6 6267.6 99.81  
6267.5  
101.03 6267.4 103.23 6267.3 105.32 6267.3 105.84 6267.4 106.37  
6267.5  
106.9 6267.6 107.42 6267.7 107.95 6267.8 108.48 6267.9 109.01  
6268  
109.24 6268 109.94 6267.9 110.64 6267.8 112.57 6267.7 113.72  
6267.6  
114.05 6267.5 114.37 6267.4 114.69 6267.3 115.02 6267.2 115.34  
6267.1  
115.66 6267 115.99 6266.9 116.24 6266.8 116.44 6266.7 116.63  
6266.6  
116.83 6266.5 117.03 6266.4 117.23 6266.3 117.42 6266.2 117.62  
6266.1  
117.82 6266 118.02 6265.9 118.21 6265.8 118.41 6265.7 118.61  
6265.6  
118.81 6265.5 119 6265.4 119.2 6265.3 119.4 6265.2 119.6  
6265.1  
119.79 6265 119.99 6264.9 120.19 6264.8 120.39 6264.7 120.58  
6264.6  
120.78 6264.5 120.98 6264.4 121.18 6264.3 121.37 6264.2 121.57  
6264.1  
121.77 6264 121.97 6263.9 122.18 6263.8 122.4 6263.7 122.62  
6263.6  
122.84 6263.5 123.06 6263.4 123.28 6263.3 123.49 6263.2 123.71  
6263.1  
123.93 6263 124.15 6262.9 124.37 6262.8 124.59 6262.7 124.81  
6262.6  
125.02 6262.5 125.24 6262.4 125.46 6262.3 125.68 6262.2 125.9  
6262.1  
126.12 6262 126.34 6261.9 126.55 6261.8 126.77 6261.7 126.99  
6261.6  
127.21 6261.5 127.43 6261.4 127.65 6261.3 127.87 6261.2 128.08  
6261.1  
128.3 6261 128.52 6260.9 128.74 6260.8 128.96 6260.7 129.18  
6260.6  
129.4 6260.5 129.61 6260.4 129.83 6260.3 130.05 6260.2 130.27  
6260.1  
130.49 6260 130.71 6259.9 130.92 6259.8 131.14 6259.7 131.36  
6259.6  
131.58 6259.5 131.8 6259.4 132.02 6259.3 132.24 6259.2 132.45  
6259.1  
132.67 6259 132.89 6258.9 133.11 6258.8 133.33 6258.7 133.55  
6258.6  
133.77 6258.5 133.98 6258.4 134.2 6258.3 134.42 6258.2 134.64  
6258.1  
134.86 6258 135.08 6257.9 135.3 6257.8 135.51 6257.7 135.73  
6257.6  
135.95 6257.5 136.14 6257.4 136.32 6257.3 136.49 6257.2 136.67  
6257.1

136.85 6257 137.03 6256.9 137.2 6256.8 137.38 6256.7 137.56  
6256.6  
137.74 6256.5 137.91 6256.4 138.09 6256.3 138.27 6256.2 138.47  
6256.1  
138.67 6256 138.87 6255.9 139.07 6255.8 139.27 6255.7 139.47  
6255.6  
139.67 6255.5 139.87 6255.4 140.07 6255.3 140.27 6255.2 140.47  
6255.1  
140.67 6255 140.87 6254.9 141.07 6254.8 141.27 6254.7 141.47  
6254.6  
141.67 6254.5 141.87 6254.4 142.07 6254.3 142.27 6254.2 142.47  
6254.1  
142.67 6254 142.87 6253.9 143.07 6253.8 143.27 6253.7 143.47  
6253.6  
143.67 6253.5 143.87 6253.4 144.07 6253.3 144.27 6253.2 144.47  
6253.1  
144.68 6253 144.88 6252.9 155.11 6252.9 155.31 6253 155.52  
6253.1  
155.72 6253.2 155.92 6253.3 156.12 6253.4 156.32 6253.5 156.53  
6253.6  
156.73 6253.7 156.93 6253.8 157.13 6253.9 157.33 6254 157.53  
6254.1  
157.73 6254.2 157.93 6254.3 158.13 6254.4 158.33 6254.5 158.53  
6254.6  
158.73 6254.7 158.93 6254.8 159.13 6254.9 159.33 6255 159.53  
6255.1  
159.73 6255.2 159.93 6255.3 160.13 6255.4 160.33 6255.5 160.53  
6255.6  
160.73 6255.7 160.93 6255.8 161.13 6255.9 161.33 6256 161.53  
6256.1  
161.73 6256.2 161.93 6256.3 162.13 6256.4 162.33 6256.5 162.53  
6256.6  
162.73 6256.7 162.93 6256.8 163.13 6256.9 163.33 6257 163.53  
6257.1  
163.73 6257.2 163.93 6257.3 164.2 6257.4 164.51 6257.5 164.81  
6257.6  
165.11 6257.7 165.42 6257.8 165.72 6257.9 166.02 6258 166.32  
6258.1  
166.63 6258.2 166.93 6258.3 167.23 6258.4 167.54 6258.5 167.84  
6258.6  
168.14 6258.7 168.45 6258.8 168.75 6258.9 169.05 6259 169.35  
6259.1  
169.66 6259.2 169.96 6259.3 170.26 6259.4 170.57 6259.5 170.87  
6259.6  
171.17 6259.7 171.48 6259.8 171.78 6259.9 172.08 6260 172.38  
6260.1  
172.69 6260.2 172.99 6260.3 173.29 6260.4 173.6 6260.5 173.9  
6260.6  
174.2 6260.7 174.59 6260.8 179.41 6260.9 184.24 6261 189.15  
6261.1  
194.09 6261.2 194.1 6261.2 194.81 6261.1 195.52 6261 196.23  
6260.9  
196.94 6260.8 197.65 6260.7 198.35 6260.6 199.06 6260.5 199.77

6260.4  
200.48 6260.3 201.19 6260.2 201.9 6260.1 202.61 6260 203.32  
6259.9  
204.03 6259.8 204.74 6259.7 205.45 6259.6 206.41 6259.5 206.5  
6259.4  
206.6 6259.3 207.64 6259.2 209.05 6259.1 209.86 6259.1 211.22  
6259.2  
212.57 6259.3 213.93 6259.4 215.29 6259.5 216.65 6259.6 218.01  
6259.7  
219.37 6259.8 220.73 6259.9 222.09 6260 223.45 6260.1 224.81  
6260.2  
226.17 6260.3 227.52 6260.4 228.88 6260.5 230.24 6260.6 231.6  
6260.7  
232.96 6260.8 234.32 6260.9 235.68 6261 237.04 6261.1 238.4  
6261.2  
239.76 6261.3 241.11 6261.4 242.47 6261.5 243.83 6261.6 245.19  
6261.7  
246.55 6261.8 247.91 6261.9 249.27 6262 252.5 6262.1 258.88  
6262.2  
259.6 6262.3 262.03 6262.3 263.12 6262.2 264.32 6262.1 265.73  
6262  
267.14 6261.9 269.14 6261.9 270.89 6261.8 272.04 6261.8 272.96  
6261.9  
273.87 6262 274.78 6262.1 275.68 6262.2 276.48 6262.3 277.27  
6262.4  
278.07 6262.5 278.95 6262.6 280.46 6262.7 281.89 6262.8 283.32  
6262.9  
284.7 6263 286.01 6263.1 287.32 6263.2 288.56 6263.3 289.76  
6263.4  
290.95 6263.5 292.05 6263.6 293.13 6263.7 294.19 6263.8 295.15  
6263.9  
296.11 6264 297 6264.1 297.83 6264.2 298.66 6264.3 299.37  
6264.4  
300 6264.4  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 126.77 .013 172.99 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 126.77 172.99 20.18 20.18 20.18 .1  
.3  
Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 106.69 6267.83 F  
194.64 300 6261.19 F  
Left Levee Station= 108.78 Elevation= 6267.98  
Right Levee Station= 194.22 Elevation= 6261.34  
  
CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft) 6260.35 Element Left OB  
Channel Right OB  
Vel Head (ft) 0.60 Wt. n-Val.  
0.013  
W.S. Elev (ft) 6259.75 Reach Len. (ft) 20.18  
20.18 20.18  
Crit W.S. (ft) 6257.91 Flow Area (sq ft)  
166.73  
E.G. Slope (ft/ft) 0.000491 Area (sq ft)  
166.73  
Q Total (cfs) 1037.00 Flow (cfs)  
1037.00  
Top Width (ft) 40.29 Top Width (ft)  
40.29  
Vel Total (ft/s) 6.22 Avg. Vel. (ft/s)  
6.22  
Max Chl Dpth (ft) 6.85 Hydr. Depth (ft)  
4.14  
Conv. Total (cfs) 46798.2 Conv. (cfs)  
46798.2  
Length Wtd. (ft) 20.18 Wetted Per. (ft)  
43.33  
Min Ch El (ft) 6252.90 Shear (lb/sq ft)  
0.12  
Alpha 1.00 Stream Power (lb/ft s) 300.00  
108.78 194.22  
Frctn Loss (ft) 0.02 Cum Volume (acre-ft) 0.01  
0.97  
C & E Loss (ft) 0.09 Cum SA (acres) 0.00  
0.30  
  
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.  
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, energy was used.  
  
CROSS SECTION  
  
RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 982  
  
INPUT  
Description:  
Station Elevation Data num= 384  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6269.7 13.22 6269.7 20.5 6269.6 38.81 6269.5 41.02

6269.5  
41.57 6269.6 42.11 6269.7 42.65 6269.8 43.2 6269.9 43.74  
6270  
44.28 6270.1 44.83 6270.2 45.37 6270.3 47.13 6270.3 48.44  
6270.2  
49.75 6270.1 51.07 6270 52.38 6269.9 53.7 6269.8 55.01  
6269.7  
56.33 6269.6 57.64 6269.5 58.96 6269.4 60.27 6269.3 61.59  
6269.2  
62.9 6269.1 64.22 6269 65.53 6268.9 66.84 6268.8 70.15  
6268.7  
74.91 6268.6 79.66 6268.5 85.83 6268.4 87.04 6268.3 88.26  
6268.2  
89.48 6268.1 90.69 6268 91.91 6267.9 93.12 6267.8 94.34  
6267.7  
95.55 6267.6 96.77 6267.5 97.99 6267.4 99.2 6267.3 100.42  
6267.2  
101.63 6267.1 104.2 6267 107.41 6267 107.94 6267.1 108.46  
6267.2  
108.99 6267.3 109.52 6267.4 110.05 6267.5 110.78 6267.5 111.59  
6267.4  
111.92 6267.3 112.24 6267.2 112.56 6267.1 112.89 6267 113.21  
6266.9  
113.53 6266.8 113.86 6266.7 114.18 6266.6 114.51 6266.5 114.83  
6266.4  
115.12 6266.3 115.39 6266.2 115.66 6266.1 115.93 6266 116.2  
6265.9  
116.47 6265.8 116.74 6265.7 117.01 6265.6 117.28 6265.5 117.54  
6265.4  
117.81 6265.3 118.08 6265.2 118.35 6265.1 118.62 6265 118.89  
6264.9  
119.16 6264.8 119.43 6264.7 119.7 6264.6 119.97 6264.5 120.24  
6264.4  
120.51 6264.3 120.78 6264.2 121.05 6264.1 121.31 6264 121.58  
6263.9  
121.85 6263.8 122.12 6263.7 122.39 6263.6 122.66 6263.5 122.93  
6263.4  
123.15 6263.3 123.37 6263.2 123.58 6263.1 123.8 6263 124.02  
6262.9  
124.24 6262.8 124.46 6262.7 124.68 6262.6 124.9 6262.5 125.11  
6262.4  
125.33 6262.3 125.55 6262.2 125.77 6262.1 125.99 6262 126.21  
6261.9  
126.43 6261.8 126.64 6261.7 126.86 6261.6 127.08 6261.5 127.3  
6261.4  
127.52 6261.3 127.74 6261.2 127.95 6261.1 128.17 6261 128.39  
6260.9  
128.61 6260.8 128.83 6260.7 129.05 6260.6 129.27 6260.5 129.48  
6260.4  
129.7 6260.3 129.92 6260.2 130.14 6260.1 130.36 6260 130.58  
6259.9  
130.8 6259.8 131.01 6259.7 131.23 6259.6 131.45 6259.5 131.67  
6259.4

131.89 6259.3 132.11 6259.2 132.33 6259.1 132.54 6259 132.76  
6258.9  
132.98 6258.8 133.2 6258.7 133.42 6258.6 133.64 6258.5 133.86  
6258.4  
134.07 6258.3 134.29 6258.2 134.51 6258.1 134.73 6258 134.95  
6257.9  
135.17 6257.8 135.39 6257.7 135.6 6257.6 135.82 6257.5 136.03  
6257.4  
136.21 6257.3 136.39 6257.2 136.57 6257.1 136.74 6257 136.92  
6256.9  
137.1 6256.8 137.28 6256.7 137.45 6256.6 137.63 6256.5 137.81  
6256.4  
137.99 6256.3 138.17 6256.2 138.34 6256.1 138.52 6256 138.7  
6255.9  
138.88 6255.8 139.05 6255.7 139.23 6255.6 139.41 6255.5 139.59  
6255.4  
139.76 6255.3 139.94 6255.2 140.12 6255.1 140.3 6255 140.48  
6254.9  
149.4 6254.8 149.42 6254.7 149.44 6254.2 149.46 6253.7 149.48  
6253.2  
149.5 6252.7 150 6252.75 150.5 6252.8 150.52 6253.2 150.54  
6253.7  
150.56 6254.2 150.58 6254.7 150.6 6254.8 159.53 6254.9 159.74  
6255  
159.94 6255.1 160.14 6255.2 160.34 6255.3 160.54 6255.4 160.74  
6255.5  
160.94 6255.6 161.14 6255.7 161.34 6255.8 161.54 6255.9 161.74  
6256  
161.94 6256.1 162.14 6256.2 162.34 6256.3 162.54 6256.4 162.74  
6256.5  
162.94 6256.6 163.14 6256.7 163.34 6256.8 163.54 6256.9 163.74  
6257  
163.94 6257.1 164.21 6257.2 164.51 6257.3 164.81 6257.4 165.12  
6257.5  
165.42 6257.6 165.72 6257.7 166.03 6257.8 166.33 6257.9 166.63  
6258  
166.94 6258.1 167.24 6258.2 167.54 6258.3 167.84 6258.4 168.15  
6258.5  
168.45 6258.6 168.75 6258.7 168.88 6258.74 169.06 6258.8 169.36  
6258.9  
169.66 6259 169.97 6259.1 170.27 6259.2 170.57 6259.3 170.88  
6259.4  
171.18 6259.5 171.48 6259.6 171.78 6259.7 172.09 6259.8 172.39  
6259.9  
172.69 6260 173 6260.1 173.3 6260.2 173.6 6260.3 173.91  
6260.4  
174.21 6260.5 174.68 6260.6 179.68 6260.7 184.68 6260.8 190.22  
6260.8  
190.96 6260.7 191.71 6260.6 192.45 6260.5 193.19 6260.4 193.94  
6260.3  
194.68 6260.2 195.43 6260.1 196.17 6260 196.91 6259.9 197.66  
6259.8  
198.4 6259.7 199.15 6259.6 199.89 6259.5 200.63 6259.4 201.38



6259.3											
202.12	6259.2	202.8	6259.1	203.46	6259	204.11	6258.9	204.76			
6258.8											
205.41	6258.7	206.06	6258.6	206.71	6258.5	207.8	6258.4	209.28			
6258.3											
210.76	6258.2	212.24	6258.1	213.71	6258	215.19	6257.9	216.66			
6257.8											
218.13	6257.7	219.59	6257.6	221.06	6257.5	222.52	6257.4	223.99			
6257.3											
225.45	6257.2	226.79	6257.1	228.19	6257	229.86	6256.9	231.89			
6256.8											
256.58	6256.8	256.59	6256.7	256.61	6256.2	256.63	6255.7	256.65			
6255.2											
256.67	6254.7	256.68	6254.6	256.87	6254.8	257.95	6256	258.18			
6254.7											
258.69	6255.9	259.93	6254.6	260.22	6254.5	260.59	6256.6	263.4			
6254.8											
263.41	6255.3	263.43	6255.8	263.45	6256.3	263.46	6256.8	263.48			
6257.3											
263.49	6257.8	265.58	6257.8	267.81	6257.9	268.6	6258	269.15			
6258.1											
269.67	6258.2	270.19	6258.3	270.71	6258.4	271.21	6258.5	271.71			
6258.6											
272.2	6258.7	272.7	6258.8	273.2	6258.9	273.69	6259	274.18			
6259.1											
274.66	6259.2	275.14	6259.3	275.62	6259.4	276.1	6259.5	276.59			
6259.6											
277.07	6259.7	277.55	6259.8	278.03	6259.9	278.52	6260	279			
6260.1											
279.48	6260.2	279.96	6260.3	280.44	6260.4	280.93	6260.5	281.42			
6260.6											
281.95	6260.7	282.49	6260.8	283.02	6260.9	283.56	6261	284.09			
6261.1											
284.62	6261.2	285.16	6261.3	285.69	6261.4	286.23	6261.5	286.76			
6261.6											
287.3	6261.7	287.83	6261.8	288.36	6261.9	288.9	6262	289.43			
6262.1											
289.97	6262.2	290.5	6262.3	291.04	6262.4	291.52	6262.5	291.91			
6262.6											
292.3	6262.7	292.7	6262.8	293.09	6262.9	293.48	6263	293.88			
6263.1											
294.27	6263.2	294.66	6263.3	295.05	6263.4	295.45	6263.5	295.84			
6263.6											
296.23	6263.7	296.62	6263.8	297.22	6263.9	297.86	6264	298.44			
6264.1											
299.01	6264.2	299.49	6264.3	299.92	6264.4	300	6264.4				
Manning's n Values num= 3											
Sta	n Val	Sta	n Val	Sta	n Val						
0	.03	134.73	.013	168.88	.03						
Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.						
Expan.											

	134.73	168.88		2.95	2.95	2.95		.1				
.3												
Ineffective Flow			num=	2								
Sta L	Sta R	Elev	Permanent									
0	110.04	6267.43	F									
190.45	300	6260.73	F									
Left Levee	Station=	110.04	Elevation=	6267.48								
Right Levee	Station=	190.03	Elevation=	6260.89								

CROSS SECTION OUTPUT Profile #Flow 1			
E.G. Elev (ft)	6260.24	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.52	Wt. n-Val.	0.030
0.013			
W.S. Elev (ft)	6258.72	Reach Len. (ft)	2.95
2.95 2.95			
Crit W.S. (ft)	6258.72	Flow Area (sq ft)	0.56
104.59			
E.G. Slope (ft/ft)	0.002055	Area (sq ft)	0.56
104.59			
Q Total (cfs)	1037.00	Flow (cfs)	0.60
1036.40			
Top Width (ft)	35.64	Top Width (ft)	1.57
34.07			
Vel Total (ft/s)	9.86	Avg. Vel. (ft/s)	1.06
9.91			
Max Chl Dpth (ft)	6.02	Hydr. Depth (ft)	0.36
3.07			
Conv. Total (cfs)	22874.2	Conv. (cfs)	13.2
22861.1			
Length Wtd. (ft)	2.95	Wetted Per. (ft)	1.72
39.55			
Min Ch El (ft)	6252.70	Shear (lb/sq ft)	0.04
0.34			
Alpha	1.01	Stream Power (lb/ft s)	300.00
110.04 190.03			
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01
0.91			
C & E Loss (ft)	0.01	Cum SA (acres)	0.00
0.28			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

INPUT	Description:								
Station	Elevation	Data	num=	442					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev	0	6269.9	2.58	6269.9	13.86	6269.8	20.62	6269.7	26.7
6269.6	38.85	6269.5	40.28	6269.5	40.82	6269.6	41.37	6269.7	41.91
6269.8	42.45	6269.9	43	6270	43.54	6270.1	44.08	6270.2	44.63
6270.3	45.17	6270.4	45.71	6270.5	45.73	6270.5	47.05	6270.4	48.36
6270.3	49.68	6270.2	50.99	6270.1	52.31	6270	53.62	6269.9	54.94
6269.8	56.25	6269.7	57.56	6269.6	58.88	6269.5	60.19	6269.4	61.51
6269.3	62.82	6269.2	64.14	6269.1	65.45	6269	66.77	6268.9	68.08
6268.8	70.63	6268.7	75.38	6268.6	80.13	6268.5	85.38	6268.4	86.6
6268.3	87.82	6268.2	89.03	6268.1	90.25	6268	91.46	6267.9	92.68
6267.8	93.89	6267.7	95.11	6267.6	96.33	6267.5	97.54	6267.4	98.76
6267.3	99.97	6267.2	101.19	6267.1	102.53	6267	106.68	6266.9	107.42
6266.9	107.95	6267	108.47	6267.1	109	6267.2	109.53	6267.3	110.06
6267.4	110.56	6267.4	111.35	6267.3	111.69	6267.2	112.02	6267.1	112.34
6267	112.66	6266.9	112.99	6266.8	113.31	6266.7	113.64	6266.6	113.96
6266.5	114.28	6266.4	114.61	6266.3	114.91	6266.2	115.18	6266.1	115.45
6266	115.72	6265.9	115.98	6265.8	116.25	6265.7	116.52	6265.6	116.79
6265.5	117.06	6265.4	117.33	6265.3	117.6	6265.2	117.87	6265.1	118.14
6265	118.41	6264.9	118.68	6264.8	118.95	6264.7	119.22	6264.6	119.48
6264.5	119.75	6264.4	120.02	6264.3	120.29	6264.2	120.56	6264.1	120.83
6264	121.1	6263.9	121.37	6263.8	121.64	6263.7	121.91	6263.6	122.18

6263.5								
122.45	6263.4	122.72	6263.3	122.99	6263.2	123.25	6263.1	123.52
6263								
123.79	6262.9	124.06	6262.8	124.33	6262.7	124.6	6262.6	124.87
6262.5								
125.09	6262.4	125.31	6262.3	125.53	6262.2	125.75	6262.1	125.97
6262								
126.19	6261.9	126.41	6261.8	126.62	6261.7	126.84	6261.6	127.06
6261.5								
127.28	6261.4	127.5	6261.3	127.72	6261.2	127.94	6261.1	128.15
6261								
128.37	6260.9	128.59	6260.8	128.81	6260.7	129.03	6260.6	129.25
6260.5								
129.47	6260.4	129.68	6260.3	129.9	6260.2	130.12	6260.1	130.34
6260								
130.56	6259.9	130.78	6259.8	131	6259.7	131.21	6259.6	131.43
6259.5								
131.65	6259.4	131.87	6259.3	132.09	6259.2	132.31	6259.1	132.53
6259								
132.74	6258.9	132.96	6258.8	133.18	6258.7	133.4	6258.6	133.62
6258.5								
133.84	6258.4	134.06	6258.3	134.27	6258.2	134.49	6258.1	134.71
6258								
134.93	6257.9	135.15	6257.8	135.37	6257.7	135.58	6257.6	135.8
6257.5								
136.02	6257.4	136.2	6257.3	136.37	6257.2	136.55	6257.1	136.73
6257								
136.91	6256.9	137.08	6256.8	137.26	6256.7	137.44	6256.6	137.62
6256.5								
137.79	6256.4	137.97	6256.3	138.15	6256.2	138.33	6256.1	138.51
6256								
138.68	6255.9	138.86	6255.8	139.04	6255.7	139.22	6255.6	139.39
6255.5								
139.57	6255.4	139.75	6255.3	139.93	6255.2	140.12	6255.1	140.31
6255								
140.5	6254.9	140.7	6254.8	140.89	6254.7	141.08	6254.6	141.27
6254.5								
141.46	6254.4	141.65	6254.3	141.84	6254.2	142.03	6254.1	142.22
6254								
142.41	6253.9	142.6	6253.8	142.79	6253.7	142.98	6253.6	143.17
6253.5								
143.36	6253.4	143.56	6253.3	143.75	6253.2	143.93	6253.1	144.11
6253								
144.29	6252.9	144.47	6252.8	144.65	6252.7	144.82	6252.6	155.19
6252.6								
155.39	6252.7	155.58	6252.8	155.78	6252.9	155.98	6253	156.17
6253.1								
156.36	6253.2	156.55	6253.3	156.74	6253.4	156.93	6253.5	157.12
6253.6								
157.32	6253.7	157.51	6253.8	157.7	6253.9	157.89	6254	158.08
6254.1								
158.27	6254.2	158.46	6254.3	158.65	6254.4	158.84	6254.5	159.03
6254.6								

159.22	6254.7	159.41	6254.8	159.6	6254.9	159.79	6255	159.98
6255.1								
160.19	6255.2	160.4	6255.3	160.6	6255.4	160.8	6255.5	161
6255.6								
161.2	6255.7	161.4	6255.8	161.6	6255.9	161.8	6256	162
6256.1								
162.2	6256.2	162.4	6256.3	162.6	6256.4	162.8	6256.5	163
6256.6								
163.2	6256.7	163.4	6256.8	163.6	6256.9	163.8	6257	164
6257.1								
164.3	6257.2	164.6	6257.3	164.9	6257.4	165.21	6257.5	165.51
6257.6								
165.81	6257.7	166.12	6257.8	166.42	6257.9	166.72	6258	167.02
6258.1								
167.33	6258.2	167.63	6258.3	167.93	6258.4	168.24	6258.5	168.54
6258.6								
168.84	6258.7	169.05	6258.77	169.15	6258.8	169.45	6258.9	169.75
6259								
170.06	6259.1	170.36	6259.2	170.66	6259.3	170.96	6259.4	171.27
6259.5								
171.57	6259.6	171.87	6259.7	172.18	6259.8	172.48	6259.9	172.78
6260								
173.09	6260.1	173.39	6260.2	173.69	6260.3	173.99	6260.4	174.3
6260.5								
176.15	6260.6	181.15	6260.7	186.15	6260.8	190	6260.8	190.74
6260.7								
191.49	6260.6	192.23	6260.5	192.97	6260.4	193.72	6260.3	194.46
6260.2								
195.21	6260.1	195.95	6260	196.69	6259.9	197.44	6259.8	198.18
6259.7								
198.93	6259.6	199.67	6259.5	200.42	6259.4	201.16	6259.3	201.9
6259.2								
202.65	6259.1	203.39	6259	204.14	6258.9	204.88	6258.8	205.62
6258.7								
206.37	6258.6	207.11	6258.5	207.86	6258.4	208.51	6258.3	209.16
6258.2								
210.14	6258.1	211.62	6258	213.09	6257.9	214.56	6257.8	216.02
6257.7								
217.49	6257.6	218.95	6257.5	220.42	6257.4	221.88	6257.3	223.35
6257.2								
224.81	6257.1	226.27	6257	227.74	6256.9	229.06	6256.8	230.37
6256.7								
231.85	6256.6	233.51	6256.5	235.37	6256.4	237.83	6256.6	241.9
6256.5								
245.02	6256.4	251.83	6256.3	252.65	6256.2	252.76	6256.2	253.34
6256.1								
254.03	6256	255.3	6255.9	255.32	6255.8	255.33	6255.6	255.35
6255.3								
255.36	6255.1	255.39	6254.8	255.4	6254.6	257.21	6254.9	258.32
6256.1								
258.58	6254.4	260.53	6254.4	260.82	6255.8	262.19	6256.4	264.14
6254.6								
264.15	6254.9	264.16	6255.2	264.18	6255.7	264.2	6256.2	264.22

6256.7								
264.23	6256.9	265.25	6257	265.77	6257.1	266.31	6257.2	266.84
6257.3								
267.38	6257.4	267.91	6257.5	268.45	6257.6	268.98	6257.7	269.51
6257.8								
270.05	6257.9	270.58	6258	271.12	6258.1	271.65	6258.2	272.19
6258.3								
272.72	6258.4	273.26	6258.5	273.79	6258.6	274.32	6258.7	274.86
6258.8								
275.39	6258.9	275.93	6259	276.46	6259.1	277	6259.2	277.53
6259.3								
278.07	6259.4	278.6	6259.5	279.13	6259.6	279.67	6259.7	280.2
6259.8								
280.74	6259.9	281.27	6260	281.81	6260.1	282.34	6260.2	282.88
6260.3								
283.41	6260.4	283.94	6260.5	284.48	6260.6	285.01	6260.7	285.5
6260.8								
285.89	6260.9	286.28	6261	286.68	6261.1	287.07	6261.2	287.46
6261.3								
287.85	6261.4	288.25	6261.5	288.64	6261.6	289.03	6261.7	289.42
6261.8								
289.82	6261.9	290.21	6262	290.6	6262.1	291	6262.2	291.39
6262.3								
291.78	6262.4	292.17	6262.5	292.57	6262.6	292.96	6262.7	293.35
6262.8								
293.73	6262.9	294.11	6263	294.49	6263.1	294.87	6263.2	295.25
6263.3								
295.63	6263.4	296.01	6263.5	296.39	6263.6	296.77	6263.7	297.15
6263.8								
297.53	6263.9	297.95	6264	298.53	6264.1	299.03	6264.2	299.47
6264.3								
299.9	6264.4	300	6264.4					
Manning's n Values								
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	
0	.03	134.71	.013	169.05	.03			
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.								
Expan.	134.71	169.05		19.23	19.23	19.23		.1
.3								
Ineffective Flow num= 2								
Sta L	Sta R	Elev	Permanent					
0	108.36	6267.27	F					
190.03	300	6260.77	F					
Left Levee	Station=	112.13	Elevation=	6267.08				
Right Levee	Station=	188.77	Elevation=	6260.98				
CROSS SECTION OUTPUT Profile #Flow 1								
E.G. Elev (ft)								
Channel	Right OB	6259.29	Element					Left OB

Vel Head (ft)	1.65	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6257.64	Reach Len. (ft)	19.23
19.23	19.23		
Crit W.S. (ft)	6257.64	Flow Area (sq ft)	
100.46			
E.G. Slope (ft/ft)	0.001815	Area (sq ft)	
100.46			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	30.11	Top Width (ft)	
30.11			
Vel Total (ft/s)	10.32	Avg. Vel. (ft/s)	
10.32			
Max Chl Dpth (ft)	5.03	Hydr. Depth (ft)	
3.34			
Conv. Total (cfs)	24340.3	Conv. (cfs)	
24340.3			
Length Wtd. (ft)	19.23	Wetted Per. (ft)	
32.55			
Min Ch El (ft)	6252.60	Shear (lb/sq ft)	
0.35			
Alpha	1.00	Stream Power (lb/ft s)	300.00
112.13	188.77		
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.01
0.90			
C & E Loss (ft)	0.00	Cum SA (acres)	
0.28			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

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

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 980

INPUT  
 Description:  
 Station Elevation Data num= 469  

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev								

0	6270.7	.15	6270.7	6.35	6270.6	10.35	6270.5	13.74
6270.4								
17.03	6270.3	20.31	6270.2	23.59	6270.1	26.79	6270	29.94
6269.9								
33.08	6269.8	39.05	6269.8	40.29	6269.9	40.63	6270	40.91
6270.1								
41.08	6270.2	41.26	6270.3	41.43	6270.4	41.6	6270.5	41.78
6270.6								
41.95	6270.7	42.5	6270.8	43.04	6270.9	43.58	6271	44.13
6271.1								
45.92	6271.1	47.24	6271	48.55	6270.9	49.87	6270.8	51.18
6270.7								
52.5	6270.6	53.81	6270.5	55.13	6270.4	56.44	6270.3	57.76
6270.2								
59.07	6270.1	60.38	6270	61.7	6269.9	63.01	6269.8	64.33
6269.7								
65.64	6269.6	66.96	6269.5	68.27	6269.4	69.59	6269.3	70.9
6269.2								
72.22	6269.1	73.53	6269	74.85	6268.9	76.16	6268.8	77.48
6268.7								
78.79	6268.6	81.27	6268.5	82.48	6268.4	83.7	6268.3	84.92
6268.2								
86.13	6268.1	87.35	6268	88.56	6267.9	89.78	6267.8	90.99
6267.7								
92.21	6267.6	93.43	6267.5	94.64	6267.4	95.86	6267.3	97.07
6267.2								
98.29	6267.1	99.5	6267	100.72	6266.9	101.94	6266.8	104.03
6266.7								
108.19	6266.6	109.78	6266.6	110.25	6266.5	110.7	6266.4	110.89
6266.3								
111.09	6266.2	111.28	6266.1	111.47	6266	111.67	6265.9	111.86
6265.8								
112.05	6265.7	112.25	6265.6	112.44	6265.5	112.63	6265.4	112.83
6265.3								
113.02	6265.2	113.22	6265.1	113.41	6265	113.6	6264.9	113.85
6264.8								
114.15	6264.7	114.45	6264.6	114.75	6264.5	115.05	6264.4	115.35
6264.3								
115.64	6264.2	115.94	6264.1	116.24	6264	116.54	6263.9	116.84
6263.8								
117.14	6263.7	117.44	6263.6	117.73	6263.5	118.03	6263.4	118.33
6263.3								
118.63	6263.2	118.93	6263.1	119.23	6263	119.53	6262.9	119.82
6262.8								
120.12	6262.7	120.42	6262.6	120.72	6262.5	121.02	6262.4	121.32
6262.3								
121.62	6262.2	121.91	6262.1	122.21	6262	122.51	6261.9	122.81
6261.8								
123.11	6261.7	123.41	6261.6	123.71	6261.5	124	6261.4	124.3
6261.3								
124.6	6261.2	124.9	6261.1	125.2	6261	125.5	6260.9	125.8
6260.8								
126.09	6260.7	126.39	6260.6	126.69	6260.5	126.99	6260.4	127.29

6260.3								
127.59	6260.2	127.89	6260.1	128.18	6260	128.48	6259.9	128.78
6259.8								
129.08	6259.7	129.38	6259.6	129.68	6259.5	129.98	6259.4	130.27
6259.3								
130.57	6259.2	130.87	6259.1	131.16	6259	131.46	6258.9	131.75
6258.8								
132.04	6258.7	132.34	6258.6	132.63	6258.5	132.93	6258.4	133.22
6258.3								
133.51	6258.2	133.81	6258.1	134.1	6258	134.39	6257.9	134.69
6257.8								
134.98	6257.7	135.28	6257.6	135.57	6257.5	135.86	6257.4	136.1
6257.3								
136.27	6257.2	136.45	6257.1	136.63	6257	136.81	6256.9	136.99
6256.8								
137.17	6256.7	137.34	6256.6	137.52	6256.5	137.7	6256.4	137.88
6256.3								
138.06	6256.2	138.24	6256.1	138.41	6256	138.59	6255.9	138.77
6255.8								
138.95	6255.7	139.13	6255.6	139.3	6255.5	139.48	6255.4	139.66
6255.3								
139.84	6255.2	140.02	6255.1	140.2	6255	140.37	6254.9	140.55
6254.8								
140.73	6254.7	140.91	6254.6	141.09	6254.5	141.27	6254.4	141.44
6254.3								
141.62	6254.2	141.8	6254.1	141.98	6254	142.16	6253.9	142.34
6253.8								
142.51	6253.7	142.69	6253.6	142.87	6253.5	143.05	6253.4	143.23
6253.3								
143.41	6253.2	143.58	6253.1	143.76	6253	143.94	6252.9	144.12
6252.8								
144.3	6252.7	144.48	6252.6	144.66	6252.5	144.84	6252.4	155.18
6252.4								
155.37	6252.5	155.57	6252.6	155.76	6252.7	155.96	6252.8	156.16
6252.9								
156.35	6253	156.55	6253.1	156.75	6253.2	156.95	6253.3	157.15
6253.4								
157.35	6253.5	157.55	6253.6	157.75	6253.7	157.95	6253.8	158.15
6253.9								
158.35	6254	158.55	6254.1	158.75	6254.2	158.95	6254.3	159.15
6254.4								
159.35	6254.5	159.55	6254.6	159.75	6254.7	159.95	6254.8	160.15
6254.9								
160.35	6255	160.55	6255.1	160.75	6255.2	160.95	6255.3	161.15
6255.4								
161.35	6255.5	161.55	6255.6	161.75	6255.7	161.95	6255.8	162.15
6255.9								
162.35	6256	162.55	6256.1	162.75	6256.2	162.95	6256.3	163.15
6256.4								
163.35	6256.5	163.55	6256.6	163.75	6256.7	163.95	6256.8	164.22
6256.9								
164.52	6257	164.82	6257.1	165.11	6257.2	165.41	6257.3	165.71
6257.4								

166.01	6257.5	166.31	6257.6	166.61	6257.7	166.91	6257.8	167.21
6257.9								
167.51	6258	167.81	6258.1	168.1	6258.2	168.4	6258.3	168.7
6258.4								
169	6258.5	169.3	6258.6	169.6	6258.7	169.89	6258.8	170.19
6258.9								
170.49	6259	170.79	6259.1	171.08	6259.2	171.38	6259.3	171.68
6259.4								
171.91	6259.48	171.97	6259.5	172.27	6259.6	172.57	6259.7	172.87
6259.8								
173.16	6259.9	173.46	6260	173.76	6260.1	174.05	6260.2	174.35
6260.3								
177.03	6260.4	182.12	6260.5	187.24	6260.6	189.81	6260.6	190.51
6260.5								
191.22	6260.4	192.01	6260.3	192.8	6260.2	193.58	6260.1	194.37
6260								
195.16	6259.9	195.95	6259.8	196.74	6259.7	197.53	6259.6	198.32
6259.5								
199.11	6259.4	199.9	6259.3	200.69	6259.2	201.48	6259.1	202.27
6259								
203.06	6258.9	203.85	6258.8	204.64	6258.7	205.43	6258.6	206.22
6258.5								
207	6258.4	207.79	6258.3	208.58	6258.2	209.37	6258.1	210.16
6258								
210.95	6257.9	211.74	6257.8	212.53	6257.7	213.32	6257.6	214.11
6257.5								
214.9	6257.4	215.69	6257.3	216.48	6257.2	217.27	6257.1	218.06
6257								
218.85	6256.9	219.64	6256.8	220.43	6256.7	221.21	6256.6	222
6256.5								
222.79	6256.4	223.58	6256.3	224.42	6256.2	225.15	6256.1	225.88
6256								
227.21	6255.9	228.75	6255.8	230.3	6255.7	231.84	6255.6	233.39
6255.5								
234.93	6255.4	237.54	6255.3	240.24	6255.2	241.99	6255.1	243.73
6255								
245.48	6254.9	247.23	6254.8	248.98	6254.7	249.84	6254.6	249.95
6254.5								
250.06	6254.4	250.17	6254.3	250.28	6254.2	252.54	6254.2	252.65
6254.3								
252.76	6254.4	252.87	6254.5	252.98	6254.6	253.27	6254.7	254.92
6254.8								
257.2	6254.9	259.47	6255	261.75	6255.1	263.39	6255.2	264.64
6255.3								
265.88	6255.4	267.12	6255.5	267.66	6255.6	268.02	6255.7	268.37
6255.8								
268.73	6255.9	269.08	6256	269.44	6256.1	269.79	6256.2	270.15
6256.3								
270.5	6256.4	270.86	6256.5	271.21	6256.6	271.57	6256.7	271.92
6256.8								
272.28	6256.9	272.63	6257	272.99	6257.1	273.34	6257.2	273.69
6257.3								
274.05	6257.4	274.4	6257.5	274.76	6257.6	275.11	6257.7	275.47

6257.8  
275.82 6257.9 276.18 6258 276.53 6258.1 276.89 6258.2 277.24  
6258.3  
277.6 6258.4 277.95 6258.5 278.31 6258.6 278.66 6258.7 279.02  
6258.8  
279.37 6258.9 279.72 6259 280.08 6259.1 280.43 6259.2 280.79  
6259.3  
281.14 6259.4 281.5 6259.5 281.85 6259.6 282.21 6259.7 282.56  
6259.8  
282.92 6259.9 283.27 6260 283.63 6260.1 283.98 6260.2 284.34  
6260.3  
284.69 6260.4 285.05 6260.5 285.4 6260.6 285.76 6260.7 286.11  
6260.8  
286.46 6260.9 286.82 6261 287.17 6261.1 287.53 6261.2 287.88  
6261.3  
288.24 6261.4 288.59 6261.5 288.95 6261.6 289.3 6261.7 289.66  
6261.8  
290.01 6261.9 290.36 6262 290.71 6262.1 291.06 6262.2 291.41  
6262.3  
291.77 6262.4 292.12 6262.5 292.47 6262.6 292.82 6262.7 293.17  
6262.8  
293.52 6262.9 293.88 6263 294.23 6263.1 294.58 6263.2 294.93  
6263.3  
295.28 6263.4 295.63 6263.5 295.99 6263.6 296.34 6263.7 296.69  
6263.8  
297.04 6263.9 297.39 6264 297.74 6264.1 298.1 6264.2 298.45  
6264.3  
298.8 6264.4 299.15 6264.5 299.79 6264.6 300 6264.6  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 134.1 .013 171.91 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 134.1 171.91 10 10 10 .1  
  
.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
190.45 300 6260.62 F  
Left Levee Station= 43.86 Elevation= 6271.1  
Right Levee Station= 190.03 Elevation= 6260.62  
  
CROSS SECTION OUTPUT Profile #Flow 1  
  
E.G. Elev (ft) 6259.10 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.65 Wt. n-Val.  
0.013  
W.S. Elev (ft) 6257.46 Reach Len. (ft) 10.00  
10.00 10.00  
Crit W.S. (ft) 6257.46 Flow Area (sq ft)

100.70  
E.G. Slope (ft/ft) 0.001807 Area (sq ft)  
100.70  
Q Total (cfs) 1037.00 Flow (cfs)  
1037.00  
Top Width (ft) 30.18 Top Width (ft)  
30.18  
Vel Total (ft/s) 10.30 Avg. Vel. (ft/s)  
10.30  
Max Chl Dpth (ft) 5.06 Hydr. Depth (ft)  
3.34  
Conv. Total (cfs) 24396.1 Conv. (cfs)  
24396.1  
Length Wtd. (ft) 10.00 Wetted Per. (ft)  
32.64  
Min Ch El (ft) 6252.40 Shear (lb/sq ft)  
0.35  
Alpha 1.00 Stream Power (lb/ft s) 300.00  
43.86 190.03  
Frctn Loss (ft) 0.02 Cum Volume (acre-ft) 0.01  
0.86  
C & E Loss (ft) 0.00 Cum SA (acres)  
0.27

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 979

INPUT  
Description:  
Station Elevation Data num= 458  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6270.9 2.94 6270.9 6.1 6270.8 10.63 6270.8 14.03  
6270.9  
17.42 6271 20.82 6271.1 24.22 6271.2 27.61 6271.3 31.01  
6271.4  
34.4 6271.5 36.29 6271.5 44.55 6271.4 45.67 6271.3 46.79

6271.2  
47.9 6271.1 49.02 6271 50.14 6270.9 51.26 6270.8 52.38  
6270.7  
53.49 6270.6 54.61 6270.5 55.73 6270.4 56.85 6270.3 57.96  
6270.2  
59.08 6270.1 60.2 6270 61.32 6269.9 62.44 6269.8 63.55  
6269.7  
64.67 6269.6 65.79 6269.5 66.91 6269.4 68.03 6269.3 69.14  
6269.2  
70.26 6269.1 71.38 6269 72.64 6268.9 74.22 6268.8 75.8  
6268.7  
77.38 6268.6 78.96 6268.5 80.55 6268.4 81.99 6268.3 83.34  
6268.2  
84.62 6268.1 85.84 6268 87.06 6267.9 88.27 6267.8 89.49  
6267.7  
90.7 6267.6 91.92 6267.5 93.13 6267.4 94.35 6267.3 95.57  
6267.2  
96.78 6267.1 98 6267 99.21 6266.9 100.43 6266.8 101.64  
6266.7  
102.86 6266.6 106.65 6266.5 108.91 6266.4 109.6 6266.3 110.55  
6266.2  
110.79 6266.1 110.98 6266 111.17 6265.9 111.36 6265.8 111.55  
6265.7  
111.75 6265.6 111.94 6265.5 112.13 6265.4 112.32 6265.3 112.51  
6265.2  
112.7 6265.1 112.89 6265 113.08 6264.9 113.33 6264.8 113.59  
6264.7  
113.85 6264.6 114.12 6264.5 114.38 6264.4 114.66 6264.3 114.96  
6264.2  
115.25 6264.1 115.55 6264 115.84 6263.9 116.13 6263.8 116.43  
6263.7  
116.72 6263.6 117.01 6263.5 117.31 6263.4 117.6 6263.3 117.9  
6263.2  
118.19 6263.1 118.48 6263 118.78 6262.9 119.07 6262.8 119.36  
6262.7  
119.66 6262.6 119.95 6262.5 120.24 6262.4 120.54 6262.3 120.83  
6262.2  
121.13 6262.1 121.42 6262 121.71 6261.9 122.01 6261.8 122.3  
6261.7  
122.59 6261.6 122.89 6261.5 123.18 6261.4 123.48 6261.3 123.77  
6261.2  
124.06 6261.1 124.36 6261 124.65 6260.9 124.94 6260.8 125.24  
6260.7  
125.53 6260.6 125.83 6260.5 126.12 6260.4 126.41 6260.3 126.71  
6260.2  
127 6260.1 127.29 6260 127.59 6259.9 127.88 6259.8 128.18  
6259.7  
128.47 6259.6 128.76 6259.5 129.06 6259.4 129.35 6259.3 129.64  
6259.2  
129.94 6259.1 130.23 6259 130.53 6258.9 130.82 6258.8 131.11  
6258.7  
131.41 6258.6 131.7 6258.5 131.99 6258.4 132.29 6258.3 132.58  
6258.2

132.88 6258.1 133.17 6258 133.46 6257.9 133.76 6257.8 134.05  
6257.7  
134.34 6257.6 134.64 6257.5 134.93 6257.4 135.2 6257.3 135.38  
6257.2  
135.55 6257.1 135.73 6257 135.91 6256.9 136.09 6256.8 136.27  
6256.7  
136.45 6256.6 136.62 6256.5 136.8 6256.4 136.98 6256.3 137.16  
6256.2  
137.34 6256.1 137.52 6256 137.69 6255.9 137.87 6255.8 138.05  
6255.7  
138.23 6255.6 138.41 6255.5 138.58 6255.4 138.76 6255.3 138.94  
6255.2  
139.12 6255.1 139.3 6255 139.48 6254.9 139.65 6254.8 139.83  
6254.7  
140.01 6254.6 140.19 6254.5 140.37 6254.4 140.55 6254.3 140.72  
6254.2  
140.9 6254.1 141.08 6254 141.26 6253.9 141.44 6253.8 141.62  
6253.7  
141.79 6253.6 141.97 6253.5 142.15 6253.4 142.33 6253.3 142.52  
6253.2  
142.77 6253.1 143.02 6253 143.27 6252.9 143.52 6252.8 143.77  
6252.7  
144.02 6252.6 144.27 6252.5 144.52 6252.4 144.77 6252.3 155.27  
6252.3  
155.57 6252.4 155.87 6252.5 156.17 6252.6 156.47 6252.7 156.77  
6252.8  
157.07 6252.9 157.37 6253 157.63 6253.1 157.83 6253.2 158.03  
6253.3  
158.23 6253.4 158.43 6253.5 158.63 6253.6 158.83 6253.7 159.03  
6253.8  
159.23 6253.9 159.43 6254 159.63 6254.1 159.83 6254.2 160.03  
6254.3  
160.23 6254.4 160.43 6254.5 160.63 6254.6 160.83 6254.7 161.03  
6254.8  
161.23 6254.9 161.43 6255 161.63 6255.1 161.83 6255.2 162.03  
6255.3  
162.23 6255.4 162.43 6255.5 162.63 6255.6 162.83 6255.7 163.03  
6255.8  
163.23 6255.9 163.43 6256 163.63 6256.1 163.83 6256.2 164.03  
6256.3  
164.23 6256.4 164.43 6256.5 164.63 6256.6 164.83 6256.7 165.11  
6256.8  
165.41 6256.9 165.7 6257 166 6257.1 166.29 6257.2 166.59  
6257.3  
166.89 6257.4 167.18 6257.5 167.48 6257.6 167.77 6257.7 168.07  
6257.8  
168.36 6257.9 168.66 6258 168.95 6258.1 169.25 6258.2 169.54  
6258.3  
169.84 6258.4 170.13 6258.5 170.43 6258.6 170.72 6258.7 171.02  
6258.8  
171.32 6258.9 171.61 6259 171.91 6259.1 172.2 6259.2 172.37  
6259.26  
172.5 6259.3 172.79 6259.4 173.09 6259.5 173.38 6259.6 173.6

6259.7  
173.8 6259.8 173.99 6259.9 174.19 6260 174.38 6260.1 176.46  
6260.2  
181.64 6260.3 186.82 6260.4 189.88 6260.4 190.58 6260.3 191.29  
6260.2  
191.99 6260.1 192.7 6260 193.4 6259.9 194.11 6259.8 194.81  
6259.7  
195.51 6259.6 196.22 6259.5 196.92 6259.4 197.63 6259.3 198.33  
6259.2  
199.04 6259.1 199.74 6259 200.45 6258.9 201.21 6258.8 202.03  
6258.7  
202.84 6258.6 203.66 6258.5 204.47 6258.4 205.3 6258.3 206.14  
6258.2  
206.98 6258.1 207.82 6258 208.66 6257.9 209.5 6257.8 210.35  
6257.7  
211.19 6257.6 212.03 6257.5 212.87 6257.4 213.71 6257.3 214.57  
6257.2  
215.43 6257.1 216.29 6257 217.15 6256.9 218.01 6256.8 218.87  
6256.7  
219.73 6256.6 220.59 6256.5 221.45 6256.4 222.31 6256.3 223.17  
6256.2  
224.03 6256.1 224.88 6256 225.74 6255.9 226.16 6256.1 226.6  
6255.8  
227.46 6255.7 228.32 6255.6 229.18 6255.5 230.04 6255.4 231.02  
6255.3  
232.84 6255.2 234.66 6255.1 236.07 6255 237.48 6254.9 238.88  
6254.8  
241.44 6254.7 243.96 6254.6 245.46 6254.5 245.57 6254.4 245.68  
6254.3  
245.79 6254.2 245.9 6254.1 248.24 6254.1 248.35 6254.2 248.46  
6254.3  
248.57 6254.4 248.68 6254.5 249.98 6254.6 252.26 6254.7 254.53  
6254.8  
256.8 6254.9 259.08 6255 261.35 6255.1 263.63 6255.2 265.9  
6255.3  
267.08 6255.4 267.44 6255.5 267.79 6255.6 268.14 6255.7 268.5  
6255.8  
268.85 6255.9 269.2 6256 269.56 6256.1 269.91 6256.2 270.26  
6256.3  
270.61 6256.4 270.96 6256.5 271.31 6256.6 271.67 6256.7 272.02  
6256.8  
272.37 6256.9 272.72 6257 273.07 6257.1 273.43 6257.2 273.78  
6257.3  
274.13 6257.4 274.48 6257.5 274.83 6257.6 275.18 6257.7 275.54  
6257.8  
275.89 6257.9 276.24 6258 276.59 6258.1 276.94 6258.2 277.29  
6258.3  
277.65 6258.4 278 6258.5 278.35 6258.6 278.7 6258.7 279.05  
6258.8  
279.4 6258.9 279.76 6259 280.11 6259.1 280.46 6259.2 280.81  
6259.3  
281.16 6259.4 281.51 6259.5 281.87 6259.6 282.22 6259.7 282.57  
6259.8

282.92 6259.9 283.27 6260 283.63 6260.1 283.98 6260.2 284.33  
6260.3  
284.68 6260.4 285.03 6260.5 285.38 6260.6 285.74 6260.7 286.09  
6260.8  
286.44 6260.9 286.79 6261 287.14 6261.1 287.49 6261.2 287.85  
6261.3  
288.2 6261.4 288.55 6261.5 288.9 6261.6 289.25 6261.7 289.6  
6261.8  
289.96 6261.9 290.31 6262 290.66 6262.1 291.01 6262.2 291.36  
6262.3  
291.71 6262.4 292.07 6262.5 292.42 6262.6 292.77 6262.7 293.12  
6262.8  
293.47 6262.9 293.83 6263 294.18 6263.1 294.53 6263.2 294.88  
6263.3  
295.23 6263.4 295.58 6263.5 295.94 6263.6 296.29 6263.7 296.64  
6263.8  
296.99 6263.9 297.34 6264 297.69 6264.1 298.05 6264.2 298.4  
6264.3  
298.75 6264.4 299.71 6264.5 300 6264.5  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 133.17 .013 172.37 .03  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 133.17 172.37 9.51 9.51 9.51 .1  
.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
190.45 300 6260.46 F  
Left Levee Station= 44.28 Elevation= 6271.44  
Right Levee Station= 189.19 Elevation= 6260.41  
CROSS SECTION OUTPUT Profile #Flow 1  
E.G. Elev (ft) 6258.76 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.64 Wt. n-Val.  
0.013  
W.S. Elev (ft) 6257.12 Reach Len. (ft) 9.51  
9.51 9.51  
Crit W.S. (ft) 6257.12 Flow Area (sq ft)  
100.87  
E.G. Slope (ft/ft) 0.001808 Area (sq ft)  
100.87  
Q Total (cfs) 1037.00 Flow (cfs)  
1037.00  
Top Width (ft) 30.54 Top Width (ft)  
30.54  
Vel Total (ft/s) 10.28 Avg. Vel. (ft/s)  
10.28



Max Chl Dpth (ft) 4.82 Hydr. Depth (ft)  
3.30  
Conv. Total (cfs) 24386.7 Conv. (cfs)  
24386.7  
Length Wtd. (ft) 9.51 Wetted Per. (ft)  
32.79  
Min Ch El (ft) 6252.30 Shear (lb/sq ft)  
0.35  
Alpha 1.00 Stream Power (lb/ft s) 300.00  
44.28 189.19  
Frctn Loss (ft) 0.02 Cum Volume (acre-ft) 0.01  
0.83  
C & E Loss (ft) 0.01 Cum SA (acres)  
0.26

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 978

INPUT  
Description:  
Station Elevation Data num= 447  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
-30.34 6271.3 -23.86 6271.3 -14.08 6271.2 -4.29 6271.1 5.49  
6271  
15.07 6270.9 16.19 6270.8 17.3 6270.7 18.42 6270.6 19.54  
6270.5  
20.66 6270.4 21.77 6270.3 22.89 6270.2 24.01 6270.1 25.13  
6270  
26.25 6269.9 27.36 6269.8 28.48 6269.7 29.6 6269.6 30.72  
6269.5  
31.84 6269.4 33.25 6269.3 34.83 6269.2 36.41 6269.1 37.99  
6269  
39.57 6268.9 41.15 6268.8 42.73 6268.7 44.32 6268.6 45.9  
6268.5  
47.48 6268.4 49.06 6268.3 50.64 6268.2 52.22 6268.1 53.57  
6268

54.92 6267.9 56.28 6267.8 57.63 6267.7 58.93 6267.6 60.14  
6267.5  
61.36 6267.4 62.58 6267.3 63.79 6267.2 65.01 6267.1 66.22  
6267  
67.44 6266.9 68.65 6266.8 69.87 6266.7 71.09 6266.6 72.3  
6266.5  
75.05 6266.4 77.42 6266.3 78.21 6266.2 79.15 6266.1 80.09  
6266  
80.38 6265.9 80.57 6265.8 80.76 6265.7 80.95 6265.6 81.14  
6265.5  
81.33 6265.4 81.52 6265.3 81.71 6265.2 81.9 6265.1 82.09  
6265  
82.31 6264.9 82.57 6264.8 82.83 6264.7 83.1 6264.6 83.36  
6264.5  
83.62 6264.4 83.88 6264.3 84.15 6264.2 84.41 6264.1 84.67  
6264  
84.94 6263.9 85.2 6263.8 85.46 6263.7 85.72 6263.6 85.99  
6263.5  
86.25 6263.4 86.51 6263.3 86.77 6263.2 87.04 6263.1 87.3  
6263  
87.56 6262.9 87.83 6262.8 88.09 6262.7 88.38 6262.6 88.67  
6262.5  
88.97 6262.4 89.26 6262.3 89.56 6262.2 89.85 6262.1 90.14  
6262  
90.44 6261.9 90.73 6261.8 91.02 6261.7 91.32 6261.6 91.61  
6261.5  
91.9 6261.4 92.2 6261.3 92.49 6261.2 92.79 6261.1 93.08  
6261  
93.37 6260.9 93.67 6260.8 93.96 6260.7 94.25 6260.6 94.55  
6260.5  
94.84 6260.4 95.14 6260.3 95.43 6260.2 95.72 6260.1 96.02  
6260  
96.31 6259.9 96.6 6259.8 96.9 6259.7 97.19 6259.6 97.49  
6259.5  
97.78 6259.4 98.07 6259.3 98.37 6259.2 98.66 6259.1 98.95  
6259  
99.25 6258.9 99.54 6258.8 99.84 6258.7 100.13 6258.6 100.42  
6258.5  
100.72 6258.4 101.01 6258.3 101.3 6258.2 101.6 6258.1 101.89  
6258  
102.19 6257.9 102.48 6257.8 102.77 6257.7 103.07 6257.6 103.36  
6257.5  
103.65 6257.4 103.95 6257.3 104.13 6257.2 104.31 6257.1 104.49  
6257  
104.67 6256.9 104.84 6256.8 105.02 6256.7 105.2 6256.6 105.38  
6256.5  
105.56 6256.4 105.74 6256.3 105.91 6256.2 106.09 6256.1 106.27  
6256  
106.45 6255.9 106.63 6255.8 106.8 6255.7 106.98 6255.6 107.16  
6255.5  
107.34 6255.4 107.52 6255.3 107.7 6255.2 107.87 6255.1 108.05  
6255  
108.23 6254.9 108.41 6254.8 108.59 6254.7 108.77 6254.6 108.94

6254.5  
109.12 6254.4 109.3 6254.3 109.48 6254.2 109.7 6254.1 109.95  
6254  
110.2 6253.9 110.45 6253.8 110.7 6253.7 110.95 6253.6 111.2  
6253.5  
111.45 6253.4 111.7 6253.3 111.95 6253.2 112.2 6253.1 112.45  
6253  
112.7 6252.9 112.95 6252.8 113.2 6252.7 113.45 6252.6 113.7  
6252.5  
113.95 6252.4 114.2 6252.3 114.45 6252.2 124.92 6252.2 125.22  
6252.3  
125.52 6252.4 125.82 6252.5 126.12 6252.6 126.42 6252.7 126.72  
6252.8  
127.02 6252.9 127.32 6253 127.62 6253.1 127.92 6253.2 128.22  
6253.3  
128.52 6253.4 128.82 6253.5 129.12 6253.6 129.42 6253.7 129.72  
6253.8  
129.93 6253.9 130.13 6254 130.33 6254.1 130.53 6254.2 130.73  
6254.3  
130.93 6254.4 131.13 6254.5 131.33 6254.6 131.53 6254.7 131.73  
6254.8  
131.93 6254.9 132.13 6255 132.33 6255.1 132.53 6255.2 132.73  
6255.3  
132.93 6255.4 133.13 6255.5 133.33 6255.6 133.53 6255.7 133.73  
6255.8  
133.93 6255.9 134.13 6256 134.33 6256.1 134.53 6256.2 134.73  
6256.3  
134.93 6256.4 135.13 6256.5 135.33 6256.6 135.61 6256.7 135.91  
6256.8  
136.2 6256.9 136.5 6257 136.6 6257.03 136.79 6257.1 137.09  
6257.2  
137.38 6257.3 137.68 6257.4 137.98 6257.5 138.27 6257.6 138.57  
6257.7  
138.86 6257.8 139.16 6257.9 139.45 6258 139.75 6258.1 140.04  
6258.2  
140.34 6258.3 140.63 6258.4 140.93 6258.5 141.22 6258.6 141.52  
6258.7  
141.81 6258.8 142.06 6258.9 142.25 6259 142.45 6259.1 142.64  
6259.2  
142.83 6259.3 143.03 6259.4 143.22 6259.5 143.42 6259.6 143.61  
6259.7  
143.8 6259.8 144 6259.9 145.02 6260 150.2 6260.1 155.32  
6260.2  
159.7 6260.2 160.41 6260.1 161.11 6260 161.82 6259.9 162.52  
6259.8  
163.22 6259.7 163.93 6259.6 164.63 6259.5 165.34 6259.4 166.04  
6259.3  
166.75 6259.2 167.45 6259.1 168.16 6259 168.86 6258.9 169.57  
6258.8  
170.27 6258.7 170.97 6258.6 171.68 6258.5 172.38 6258.4 173.09  
6258.3  
173.79 6258.2 174.5 6258.1 175.2 6258 175.91 6257.9 176.61  
6257.8

177.32 6257.7 178.02 6257.6 178.72 6257.5 179.43 6257.4 180.13  
6257.3  
180.84 6257.2 181.54 6257.1 182.25 6257 182.95 6256.9 183.75  
6256.8  
184.57 6256.7 185.38 6256.6 185.81 6256.6 186.2 6256.5 187.01  
6256.4  
187.83 6256.3 188.65 6256.2 189.46 6256.1 190.28 6256 191.1  
6255.9  
191.91 6255.8 192.74 6255.7 193.58 6255.6 194.43 6255.5 195.27  
6255.4  
196.11 6255.3 196.95 6255.2 198.52 6255.1 200.31 6255 202.11  
6254.9  
203.9 6254.8 205.7 6254.7 207.5 6254.6 209.3 6254.5 211.1  
6254.4  
211.43 6254.3 211.53 6254.2 211.64 6254.1 211.75 6254 211.85  
6253.9  
213.98 6253.9 214.09 6254 214.19 6254.1 214.3 6254.2 214.41  
6254.3  
214.51 6254.4 216.82 6254.5 219.13 6254.6 221.46 6254.7 223.87  
6254.8  
226.5 6254.9 229.43 6255 232.36 6255.1 235.29 6255.2 236.42  
6255.3  
236.77 6255.4 237.12 6255.5 237.47 6255.6 237.82 6255.7 238.17  
6255.8  
238.52 6255.9 238.88 6256 239.23 6256.1 239.58 6256.2 239.93  
6256.3  
240.28 6256.4 240.63 6256.5 240.98 6256.6 241.33 6256.7 241.69  
6256.8  
242.04 6256.9 242.39 6257 242.74 6257.1 243.09 6257.2 243.44  
6257.3  
243.79 6257.4 244.15 6257.5 244.5 6257.6 244.85 6257.7 245.2  
6257.8  
245.55 6257.9 245.9 6258 246.25 6258.1 246.61 6258.2 246.96  
6258.3  
247.31 6258.4 247.66 6258.5 248.01 6258.6 248.36 6258.7 248.71  
6258.8  
249.07 6258.9 249.42 6259 249.77 6259.1 250.12 6259.2 250.47  
6259.3  
250.82 6259.4 251.17 6259.5 251.52 6259.6 251.88 6259.7 252.23  
6259.8  
252.58 6259.9 252.93 6260 253.28 6260.1 253.63 6260.2 253.98  
6260.3  
254.34 6260.4 254.69 6260.5 255.04 6260.6 255.39 6260.7 255.74  
6260.8  
256.09 6260.9 256.44 6261 256.8 6261.1 257.15 6261.2 257.5  
6261.3  
257.85 6261.4 258.2 6261.5 258.55 6261.6 258.9 6261.7 259.26  
6261.8  
259.61 6261.9 259.96 6262 260.31 6262.1 260.66 6262.2 261.01  
6262.3  
261.36 6262.4 261.71 6262.5 262.07 6262.6 262.42 6262.7 262.77  
6262.8  
263.12 6262.9 263.47 6263 263.82 6263.1 264.17 6263.2 264.53

6263.3  
264.88 6263.4 265.22 6263.5 265.57 6263.6 265.92 6263.7 266.27  
6263.8  
266.62 6263.9 266.96 6264 267.31 6264.1 267.66 6264.2 268.25  
6264.3  
269.24 6264.4 269.66 6264.4

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
-30.34 .03 104.13 .013 136.6 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 104.13 136.6 11.26 11.26 11.26 .1

.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
160.11 269.66 6260.15 F  
Left Levee Station= 77.18 Elevation= 6266.33  
Right Levee Station= 159.69 Elevation= 6260.26

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6258.49	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.59	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6256.90	Reach Len. (ft)	11.26
11.26 11.26			
Crit W.S. (ft)	6256.90	Flow Area (sq ft)	
102.38			
E.G. Slope (ft/ft)	0.001775	Area (sq ft)	
102.38			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	31.51	Top Width (ft)	
31.51			
Vel Total (ft/s)	10.13	Avg. Vel. (ft/s)	
10.13			
Max Chl Dpth (ft)	4.70	Hydr. Depth (ft)	
3.25			
Conv. Total (cfs)	24611.0	Conv. (cfs)	
24611.0			
Length Wtd. (ft)	11.26	Wetted Per. (ft)	
33.57			
Min Ch El (ft)	6252.20	Shear (lb/sq ft)	
0.34			
Alpha	1.00	Stream Power (lb/ft s)	269.66
77.18 159.69			
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.01
0.81			
C & E Loss (ft)	0.01	Cum SA (acres)	

0.25

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 977

INPUT  
Description:  
Station Elevation Data num= 443  
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
Elev  
0 6270.9 1.28 6270.9 7.94 6270.8 14.61 6270.7 21.27  
6270.6  
27.94 6270.5 36.02 6270.4 45.8 6270.3 47.63 6270.2 48.74  
6270.1  
49.86 6270 50.98 6269.9 52.45 6269.8 54.03 6269.7 55.61  
6269.6  
57.19 6269.5 58.78 6269.4 60.36 6269.3 61.94 6269.2 63.52  
6269.1  
65.1 6269 66.68 6268.9 68.26 6268.8 69.84 6268.7 71.42  
6268.6  
73.01 6268.5 74.59 6268.4 76.17 6268.3 77.75 6268.2 79.33  
6268.1  
80.91 6268 82.49 6267.9 84.07 6267.8 85.44 6267.7 86.79  
6267.6  
88.14 6267.5 89.5 6267.4 90.85 6267.3 92.2 6267.2 93.56  
6267.1  
94.87 6267 96.08 6266.9 97.3 6266.8 98.51 6266.7 99.73  
6266.6  
100.94 6266.5 102.16 6266.4 103.38 6266.3 106.28 6266.2 107.12  
6266.1  
108.06 6266 109 6265.9 109.94 6265.8 110.56 6265.7 110.75  
6265.6  
110.94 6265.5 111.13 6265.4 111.33 6265.3 111.52 6265.2 111.71  
6265.1  
111.9 6265 112.15 6264.9 112.41 6264.8 112.68 6264.7 112.94  
6264.6  
113.2 6264.5 113.46 6264.4 113.73 6264.3 113.99 6264.2 114.25

6264.1  
114.52 6264 114.78 6263.9 115.04 6263.8 115.3 6263.7 115.57  
6263.6  
115.83 6263.5 116.09 6263.4 116.36 6263.3 116.62 6263.2 116.88  
6263.1  
117.14 6263 117.41 6262.9 117.67 6262.8 117.93 6262.7 118.2  
6262.6  
118.46 6262.5 118.72 6262.4 118.98 6262.3 119.25 6262.2 119.51  
6262.1  
119.77 6262 120.04 6261.9 120.3 6261.8 120.56 6261.7 120.82  
6261.6  
121.09 6261.5 121.35 6261.4 121.61 6261.3 121.87 6261.2 122.14  
6261.1  
122.4 6261 122.66 6260.9 122.93 6260.8 123.19 6260.7 123.48  
6260.6  
123.78 6260.5 124.07 6260.4 124.37 6260.3 124.66 6260.2 124.95  
6260.1  
125.25 6260 125.54 6259.9 125.83 6259.8 126.13 6259.7 126.42  
6259.6  
126.72 6259.5 127.01 6259.4 127.3 6259.3 127.6 6259.2 127.89  
6259.1  
128.18 6259 128.48 6258.9 128.77 6258.8 129.07 6258.7 129.36  
6258.6  
129.65 6258.5 129.95 6258.4 130.24 6258.3 130.53 6258.2 130.83  
6258.1  
131.12 6258 131.42 6257.9 131.71 6257.8 132 6257.7 132.3  
6257.6  
132.59 6257.5 132.88 6257.4 133.18 6257.3 133.4 6257.2 133.58  
6257.1  
133.75 6257 133.93 6256.9 134.11 6256.8 134.29 6256.7 134.47  
6256.6  
134.65 6256.5 134.82 6256.4 135 6256.3 135.18 6256.2 135.36  
6256.1  
135.54 6256 135.72 6255.9 135.89 6255.8 136.07 6255.7 136.25  
6255.6  
136.43 6255.5 136.61 6255.4 136.79 6255.3 137.01 6255.2 137.26  
6255.1  
137.51 6255 137.76 6254.9 138.01 6254.8 138.26 6254.7 138.51  
6254.6  
138.76 6254.5 139.01 6254.4 139.26 6254.3 139.51 6254.2 139.76  
6254.1  
140.01 6254 140.26 6253.9 140.51 6253.8 140.76 6253.7 141.01  
6253.6  
141.26 6253.5 141.51 6253.4 141.76 6253.3 142.01 6253.2 142.26  
6253.1  
142.51 6253 142.76 6252.9 143.01 6252.8 143.26 6252.7 143.51  
6252.6  
143.76 6252.5 144.01 6252.4 144.26 6252.3 144.51 6252.2 144.76  
6252.1  
155.29 6252.1 155.59 6252.2 155.89 6252.3 156.19 6252.4 156.49  
6252.5  
156.79 6252.6 157.09 6252.7 157.39 6252.8 157.69 6252.9 157.99  
6253

158.29 6253.1 158.59 6253.2 158.89 6253.3 159.19 6253.4 159.49  
6253.5  
159.79 6253.6 160.09 6253.7 160.39 6253.8 160.69 6253.9 160.99  
6254  
161.29 6254.1 161.59 6254.2 161.89 6254.3 162.19 6254.4 162.49  
6254.5  
162.79 6254.6 163.09 6254.7 163.31 6254.8 163.51 6254.9 163.71  
6255  
163.91 6255.1 164.11 6255.2 164.31 6255.3 164.51 6255.4 164.71  
6255.5  
164.91 6255.6 165.11 6255.7 165.31 6255.8 165.51 6255.9 165.71  
6256  
165.91 6256.1 166.11 6256.2 166.31 6256.3 166.51 6256.4 166.71  
6256.5  
167 6256.6 167.3 6256.7 167.59 6256.8 167.89 6256.9 168.18  
6257  
168.48 6257.1 168.77 6257.2 169.07 6257.3 169.37 6257.4 169.66  
6257.5  
169.96 6257.6 170.01 6257.62 170.25 6257.7 170.55 6257.8 170.84  
6257.9  
171.06 6258 171.26 6258.1 171.45 6258.2 171.65 6258.3 171.84  
6258.4  
172.03 6258.5 172.23 6258.6 172.42 6258.7 172.62 6258.8 172.81  
6258.9  
173 6259 173.2 6259.1 173.39 6259.2 173.59 6259.3 173.78  
6259.4  
173.97 6259.5 174.17 6259.6 174.36 6259.7 175.98 6259.8 181.14  
6259.9  
186.14 6260 189.97 6260 190.68 6259.9 191.38 6259.8 192.09  
6259.7  
192.79 6259.6 193.5 6259.5 194.2 6259.4 194.91 6259.3 195.61  
6259.2  
196.32 6259.1 197.02 6259 197.72 6258.9 198.43 6258.8 199.13  
6258.7  
199.84 6258.6 200.54 6258.5 201.25 6258.4 201.95 6258.3 202.66  
6258.2  
203.36 6258.1 204.07 6258 204.77 6257.9 205.47 6257.8 206.18  
6257.7  
206.88 6257.6 207.59 6257.5 208.29 6257.4 209 6257.3 209.7  
6257.2  
210.41 6257.1 211.11 6257 211.82 6256.9 212.52 6256.8 213.22  
6256.7  
213.93 6256.6 214.63 6256.5 215.34 6256.4 216.04 6256.3 216.75  
6256.2  
217.45 6256.1 218.16 6256 218.86 6255.9 219.54 6256 219.57  
6255.8  
220.27 6255.7 220.97 6255.6 221.64 6255.5 222.28 6255.4 222.91  
6255.3  
223.55 6255.2 224.18 6255.1 225.03 6255 226.8 6254.9 228.57  
6254.8  
230.34 6254.7 232.1 6254.6 233.87 6254.5 235.63 6254.4 237.4  
6254.3  
238.51 6254.2 238.61 6254.1 238.71 6254 238.81 6253.9 238.92

6253.8								
241.08	6253.8	241.18	6253.9	241.28	6254	241.39	6254.1	241.49
6254.2								
243.15	6254.3	246.08	6254.4	249.01	6254.5	251.94	6254.6	254.87
6254.7								
257.8	6254.8	260.73	6254.9	261.72	6255	263.66	6255	266.07
6255.1								
266.43	6255.2	266.78	6255.3	267.13	6255.4	267.48	6255.5	267.83
6255.6								
268.18	6255.7	268.53	6255.8	268.89	6255.9	269.24	6256	269.59
6256.1								
269.94	6256.2	270.29	6256.3	270.64	6256.4	270.99	6256.5	271.35
6256.6								
271.7	6256.7	272.05	6256.8	272.4	6256.9	272.75	6257	273.1
6257.1								
273.45	6257.2	273.81	6257.3	274.16	6257.4	274.51	6257.5	274.86
6257.6								
275.21	6257.7	275.56	6257.8	275.91	6257.9	276.26	6258	276.62
6258.1								
276.97	6258.2	277.32	6258.3	277.67	6258.4	278.02	6258.5	278.37
6258.6								
278.72	6258.7	279.08	6258.8	279.43	6258.9	279.78	6259	280.13
6259.1								
280.48	6259.2	280.83	6259.3	281.18	6259.4	281.54	6259.5	281.89
6259.6								
282.24	6259.7	282.59	6259.8	282.94	6259.9	283.29	6260	283.64
6260.1								
284	6260.2	284.35	6260.3	284.7	6260.4	285.05	6260.5	285.4
6260.6								
285.75	6260.7	286.1	6260.8	286.45	6260.9	286.8	6261	287.15
6261.1								
287.5	6261.2	287.85	6261.3	288.19	6261.4	288.54	6261.5	288.89
6261.6								
289.24	6261.7	289.59	6261.8	289.93	6261.9	290.28	6262	290.63
6262.1								
290.98	6262.2	291.33	6262.3	291.67	6262.4	292.02	6262.5	292.37
6262.6								
292.72	6262.7	293.06	6262.8	293.41	6262.9	293.76	6263	294.11
6263.1								
294.46	6263.2	294.8	6263.3	295.15	6263.4	295.5	6263.5	295.85
6263.6								
296.2	6263.7	296.54	6263.8	296.89	6263.9	297.24	6264	297.63
6264.1								
298.62	6264.2	299.62	6264.3	300	6264.3			
Manning's n Values num= 3								
Sta	n Val	Sta	n Val	Sta	n Val			
0	.03	133.75	.013	170.01	.03			
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.								
Expan.	133.75	170.01		50	50	50		.1
.3								

Ineffective Flow	num=	1		
Sta L	Sta R	Elev	Permanent	
190.03	300	6259.93	F	
Left Levee	Station=	49.73	Elevation=	6270.1
Right Levee	Station=	188.77	Elevation=	6260.04
CROSS SECTION OUTPUT Profile #Flow 1				
E.G. Elev (ft)		6258.25	Element	Left OB
Channel Right OB				
Vel Head (ft)		1.56	Wt. n-Val.	
0.013				
W.S. Elev (ft)		6256.69	Reach Len. (ft)	50.00
50.00	50.00			
Crit W.S. (ft)		6256.69	Flow Area (sq ft)	
103.44				
E.G. Slope (ft/ft)		0.001800	Area (sq ft)	
103.44				
Q Total (cfs)		1037.00	Flow (cfs)	
1037.00				
Top Width (ft)		32.94	Top Width (ft)	
32.94				
Vel Total (ft/s)		10.03	Avg. Vel. (ft/s)	
10.03				
Max Chl Dpth (ft)		4.58	Hydr. Depth (ft)	
3.14				
Conv. Total (cfs)		24445.1	Conv. (cfs)	
24445.1				
Length Wtd. (ft)		50.00	Wetted Per. (ft)	
34.79				
Min Ch El (ft)		6252.10	Shear (lb/sq ft)	
0.33				
Alpha		1.00	Stream Power (lb/ft s)	300.00
49.73	188.77			
Frctn Loss (ft)		0.09	Cum Volume (acre-ft)	0.01
0.79				
C & E Loss (ft)		0.02	Cum SA (acres)	
0.24				
Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.				
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.				
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.				

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 976

INPUT  
Description:

Station	Elevation	Data	num=	429					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6268.7	4.23	6268.7	4.99	6268.6	5.75	6268.5	6.5	
6268.4									
22	6268.4	26.98	6268.5	31.96	6268.6	36.94	6268.7	38.49	
6268.8									
39.86	6268.8	41.59	6268.7	43.32	6268.6	45.05	6268.5	46.78	
6268.4									
48.51	6268.3	50.24	6268.2	51.97	6268.1	53.6	6268	55.16	
6267.9									
56.71	6267.8	58.27	6267.7	60.15	6267.6	62.16	6267.5	64.22	
6267.4									
66.31	6267.3	68.4	6267.2	70.49	6267.1	72.58	6267	74.66	
6266.9									
76.75	6266.8	78.84	6266.7	80.93	6266.6	83.02	6266.5	85.1	
6266.4									
87.19	6266.3	89.28	6266.2	91.37	6266.1	93.46	6266	97.27	
6265.9									
101.1	6265.8	104.94	6265.7	106.06	6265.6	106.71	6265.5	107.35	
6265.4									
108	6265.3	108.64	6265.2	109.27	6265.1	109.86	6265	109.99	
6264.9									
110.11	6264.8	110.24	6264.7	110.37	6264.6	110.98	6264.5	111.97	
6264.4									
112.2	6264.3	112.44	6264.2	112.68	6264.1	112.92	6264	113.16	
6263.9									
113.4	6263.8	113.64	6263.7	113.88	6263.6	114.12	6263.5	114.36	
6263.4									
114.59	6263.3	114.83	6263.2	115.07	6263.1	115.34	6263	115.6	
6262.9									
115.87	6262.8	116.13	6262.7	116.4	6262.6	116.66	6262.5	116.93	
6262.4									
117.19	6262.3	117.46	6262.2	117.72	6262.1	117.99	6262	118.26	
6261.9									
118.52	6261.8	118.79	6261.7	119.05	6261.6	119.32	6261.5	119.58	
6261.4									
119.85	6261.3	120.11	6261.2	120.38	6261.1	120.64	6261	120.91	
6260.9									
121.17	6260.8	121.44	6260.7	121.7	6260.6	121.97	6260.5	122.23	
6260.4									
122.5	6260.3	122.76	6260.2	123.03	6260.1	123.29	6260	123.56	
6259.9									
123.82	6259.8	124.09	6259.7	124.35	6259.6	124.62	6259.5	124.88	
6259.4									

125.15	6259.3	125.41	6259.2	125.68	6259.1	125.94	6259	126.21	
6258.9									
126.47	6258.8	126.74	6258.7	127	6258.6	127.27	6258.5	127.53	
6258.4									
127.8	6258.3	128.06	6258.2	128.33	6258.1	128.6	6258	128.86	
6257.9									
129.13	6257.8	129.39	6257.7	129.66	6257.6	129.92	6257.5	130.19	
6257.4									
130.45	6257.3	130.72	6257.2	130.98	6257.1	131.25	6257	131.51	
6256.9									
131.76	6256.8	132.01	6256.7	132.26	6256.6	132.51	6256.5	132.76	
6256.4									
133.01	6256.3	133.26	6256.2	133.51	6256.1	133.76	6256	134.01	
6255.9									
134.26	6255.8	134.51	6255.7	134.76	6255.6	135.01	6255.5	135.26	
6255.4									
135.51	6255.3	135.76	6255.2	136.01	6255.1	136.26	6255	136.51	
6254.9									
136.76	6254.8	137.01	6254.7	137.26	6254.6	137.51	6254.5	137.76	
6254.4									
138.01	6254.3	138.26	6254.2	138.51	6254.1	138.76	6254	139.01	
6253.9									
139.26	6253.8	139.51	6253.7	139.76	6253.6	140.01	6253.5	140.26	
6253.4									
140.51	6253.3	140.76	6253.2	141.01	6253.1	141.26	6253	141.51	
6252.9									
141.76	6252.8	142.01	6252.7	142.26	6252.6	142.51	6252.5	142.76	
6252.4									
143.01	6252.3	143.26	6252.2	143.51	6252.1	143.76	6252	144.01	
6251.9									
144.26	6251.8	144.51	6251.7	144.76	6251.6	155.29	6251.6	155.59	
6251.7									
155.89	6251.8	156.19	6251.9	156.49	6252	156.79	6252.1	157.09	
6252.2									
157.39	6252.3	157.69	6252.4	157.99	6252.5	158.29	6252.6	158.59	
6252.7									
158.89	6252.8	159.19	6252.9	159.49	6253	159.79	6253.1	160.09	
6253.2									
160.39	6253.3	160.69	6253.4	160.99	6253.5	161.29	6253.6	161.59	
6253.7									
161.89	6253.8	162.19	6253.9	162.49	6254	162.79	6254.1	163.09	
6254.2									
163.39	6254.3	163.69	6254.4	163.99	6254.5	164.29	6254.6	164.59	
6254.7									
164.89	6254.8	165.19	6254.9	165.49	6255	165.79	6255.1	166.09	
6255.2									
166.39	6255.3	166.69	6255.4	166.99	6255.5	167.29	6255.6	167.59	
6255.7									
167.89	6255.8	168.19	6255.9	168.49	6256	168.69	6256.1	168.88	
6256.2									
169.07	6256.3	169.27	6256.4	169.46	6256.5	169.66	6256.6	169.85	
6256.7									
170.04	6256.8	170.24	6256.9	170.43	6257	170.63	6257.1	170.82	

6257.2  
171.01 6257.3 171.18 6257.38 171.21 6257.4 171.4 6257.5 171.6  
6257.6  
171.79 6257.7 172 6257.8 172.24 6257.9 172.49 6258 172.73  
6258.1  
172.97 6258.2 173.21 6258.3 173.46 6258.4 173.7 6258.5 173.94  
6258.6  
174.18 6258.7 174.43 6258.8 177.98 6258.9 182.98 6259 189.51  
6259  
190.22 6258.9 190.94 6258.8 191.65 6258.7 192.36 6258.6 193.08  
6258.5  
193.79 6258.4 194.5 6258.3 195.22 6258.2 195.93 6258.1 196.64  
6258  
197.36 6257.9 198.07 6257.8 198.78 6257.7 199.5 6257.6 200.21  
6257.5  
200.92 6257.4 201.64 6257.3 202.35 6257.2 203.06 6257.1 203.78  
6257  
204.49 6256.9 205.2 6256.8 205.92 6256.7 206.63 6256.6 207.34  
6256.5  
208.06 6256.4 208.77 6256.3 209.48 6256.2 210.2 6256.1 210.91  
6256  
211.62 6255.9 212.34 6255.8 213.05 6255.7 213.76 6255.6 214.48  
6255.5  
215.19 6255.4 215.9 6255.3 216.62 6255.2 217.33 6255.1 218.05  
6255  
218.8 6254.9 219.55 6254.8 220.29 6254.7 221.04 6254.6 221.77  
6254.5  
222.44 6254.4 224.05 6254.3 226.08 6254.2 228.12 6254.1 230.14  
6254  
232.15 6253.9 233.41 6254 234.16 6253.8 236.06 6253.8 236.17  
6253.7  
238.08 6253.6 238.18 6253.5 238.28 6253.4 238.38 6253.3 238.48  
6253.2  
240.5 6253.4 240.67 6253.2 240.77 6253.3 240.87 6253.4 240.97  
6253.5  
241.07 6253.6 243.85 6253.7 246.69 6253.8 249.53 6253.9 252.33  
6254  
255.13 6254.1 257.89 6254.2 260.62 6254.3 263.37 6254.4 264.06  
6254.5  
264.41 6254.6 264.76 6254.7 265.11 6254.8 265.46 6254.9 265.8  
6255  
266.15 6255.1 266.5 6255.2 266.85 6255.3 267.2 6255.4 267.54  
6255.5  
267.89 6255.6 268.24 6255.7 268.59 6255.8 268.94 6255.9 269.28  
6256  
269.63 6256.1 269.98 6256.2 270.33 6256.3 270.68 6256.4 271.02  
6256.5  
271.37 6256.6 271.72 6256.7 272.07 6256.8 272.42 6256.9 272.76  
6257  
273.11 6257.1 273.46 6257.2 273.81 6257.3 274.16 6257.4 274.51  
6257.5  
274.85 6257.6 275.2 6257.7 275.55 6257.8 275.9 6257.9 276.25  
6258

276.59 6258.1 276.94 6258.2 277.29 6258.3 277.64 6258.4 277.98  
6258.5  
278.33 6258.6 278.68 6258.7 279.03 6258.8 279.38 6258.9 279.72  
6259  
280.07 6259.1 280.42 6259.2 280.77 6259.3 281.12 6259.4 281.46  
6259.5  
281.81 6259.6 282.16 6259.7 282.51 6259.8 282.86 6259.9 283.2  
6260  
283.55 6260.1 283.9 6260.2 284.25 6260.3 284.59 6260.4 284.94  
6260.5  
285.29 6260.6 285.64 6260.7 285.99 6260.8 286.33 6260.9 286.68  
6261  
287.03 6261.1 287.38 6261.2 287.73 6261.3 288.07 6261.4 288.42  
6261.5  
288.77 6261.6 289.12 6261.7 289.46 6261.8 289.81 6261.9 290.16  
6262  
290.51 6262.1 290.86 6262.2 291.2 6262.3 291.55 6262.4 291.9  
6262.5  
292.25 6262.6 292.6 6262.7 292.94 6262.8 293.29 6262.9 293.64  
6263  
293.99 6263.1 294.34 6263.2 294.71 6263.3 295.7 6263.4 296.69  
6263.5  
297.69 6263.6 298.68 6263.7 299.67 6263.8 300 6263.8

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 131.25 .013 171.18 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 131.25 171.18 50 50 50 .1

.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
188.77 300 6259.01 F  
Left Levee Station= 40.09 Elevation= 6268.9  
Right Levee Station= 189.61 Elevation= 6258.91

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft) 6257.67 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.48 Wt. n-Val.  
0.013  
W.S. Elev (ft) 6256.19 Reach Len. (ft) 50.00  
50.00 50.00  
Crit W.S. (ft) 6256.19 Flow Area (sq ft)  
106.20  
E.G. Slope (ft/ft) 0.001803 Area (sq ft)  
106.20  
Q Total (cfs) 1037.00 Flow (cfs)  
1037.00

Top Width (ft)	35.57	Top Width (ft)	
Vel Total (ft/s)	9.76	Avg. Vel. (ft/s)	
Max Chl Dpth (ft)	4.59	Hydr. Depth (ft)	
Conv. Total (cfs)	24422.0	Conv. (cfs)	
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
Min Ch El (ft)	6251.60	Shear (lb/sq ft)	
Alpha	1.00	Stream Power (lb/ft s)	300.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

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

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 975

INPUT									
Description:									
Station	Elevation	Data	num=	394					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6266.6	.89	6266.6	2.59	6266.5	6.55	6266.4	11.67	
19.4	6266.3	30.05	6266.2	36.51	6266.1	46.74	6266	63.04	
80.29	6265.8	90.31	6265.7	98	6265.6	100.65	6265.5	103.3	
105.96	6265.3	106.45	6265.2	106.74	6265.1	107.04	6265	107.33	
107.63	6264.8	107.92	6264.7	108.22	6264.6	108.51	6264.5	108.81	

109.11	6264.3	109.4	6264.2	109.7	6264.1	109.99	6264	110.29
6263.9								
110.58	6263.8	110.88	6263.7	111.17	6263.6	111.47	6263.5	111.76
6263.4								
112.06	6263.3	112.35	6263.2	112.65	6263.1	112.95	6263	113.24
6262.9								
113.54	6262.8	113.83	6262.7	114.13	6262.6	114.42	6262.5	114.72
6262.4								
115.01	6262.3	115.31	6262.2	115.6	6262.1	115.9	6262	116.2
6261.9								
116.49	6261.8	116.79	6261.7	117.08	6261.6	117.38	6261.5	117.67
6261.4								
117.97	6261.3	118.26	6261.2	118.56	6261.1	118.85	6261	119.15
6260.9								
119.44	6260.8	119.74	6260.7	120.04	6260.6	120.34	6260.5	120.64
6260.4								
120.94	6260.3	121.24	6260.2	121.55	6260.1	121.85	6260	122.15
6259.9								
122.46	6259.8	122.76	6259.7	123.03	6259.6	123.3	6259.5	123.56
6259.4								
123.83	6259.3	124.09	6259.2	124.36	6259.1	124.62	6259	124.89
6258.9								
125.15	6258.8	125.42	6258.7	125.68	6258.6	125.95	6258.5	126.21
6258.4								
126.48	6258.3	126.74	6258.2	127.01	6258.1	127.27	6258	127.54
6257.9								
127.8	6257.8	128.07	6257.7	128.33	6257.6	128.6	6257.5	128.86
6257.4								
129.13	6257.3	129.39	6257.2	129.66	6257.1	129.92	6257	130.19
6256.9								
130.46	6256.8	130.72	6256.7	130.99	6256.6	131.25	6256.5	131.51
6256.4								
131.76	6256.3	132.01	6256.2	132.26	6256.1	132.51	6256	132.76
6255.9								
133.01	6255.8	133.26	6255.7	133.51	6255.6	133.76	6255.5	134.01
6255.4								
134.26	6255.3	134.51	6255.2	134.76	6255.1	135.01	6255	135.26
6254.9								
135.51	6254.8	135.76	6254.7	136.01	6254.6	136.26	6254.5	136.51
6254.4								
136.76	6254.3	137.01	6254.2	137.26	6254.1	137.51	6254	137.76
6253.9								
138.01	6253.8	138.26	6253.7	138.51	6253.6	138.76	6253.5	139.01
6253.4								
139.26	6253.3	139.51	6253.2	139.76	6253.1	140.01	6253	140.26
6252.9								
140.51	6252.8	140.76	6252.7	141.01	6252.6	141.26	6252.5	141.51
6252.4								
141.76	6252.3	142.01	6252.2	142.26	6252.1	142.51	6252	142.76
6251.9								
143.01	6251.8	143.26	6251.7	143.51	6251.6	143.76	6251.5	144.01
6251.4								
144.26	6251.3	144.51	6251.2	144.76	6251.1	155.28	6251.1	155.58



6251.2  
155.88 6251.3 156.18 6251.4 156.48 6251.5 156.78 6251.6 157.08  
6251.7  
157.38 6251.8 157.68 6251.9 157.98 6252 158.28 6252.1 158.58  
6252.2  
158.88 6252.3 159.18 6252.4 159.48 6252.5 159.78 6252.6 160.08  
6252.7  
160.38 6252.8 160.68 6252.9 160.98 6253 161.28 6253.1 161.58  
6253.2  
161.88 6253.3 162.18 6253.4 162.48 6253.5 162.78 6253.6 163.08  
6253.7  
163.38 6253.8 163.68 6253.9 163.98 6254 164.28 6254.1 164.58  
6254.2  
164.88 6254.3 165.18 6254.4 165.48 6254.5 165.78 6254.6 166.08  
6254.7  
166.38 6254.8 166.68 6254.9 166.98 6255 167.28 6255.1 167.58  
6255.2  
167.88 6255.3 168.18 6255.4 168.48 6255.5 168.73 6255.6 168.97  
6255.7  
169.21 6255.8 169.46 6255.9 169.7 6256 169.94 6256.1 170.18  
6256.2  
170.42 6256.3 170.65 6256.4 170.88 6256.5 171.11 6256.6 171.34  
6256.7  
171.57 6256.8 171.8 6256.9 172.03 6257 172.26 6257.1 172.42  
6257.17  
172.49 6257.2 172.71 6257.3 172.94 6257.4 173.17 6257.5 173.4  
6257.6  
173.63 6257.7 173.86 6257.8 174.09 6257.9 174.32 6258 189.98  
6258  
190.57 6257.9 191.17 6257.8 191.76 6257.7 192.36 6257.6 192.96  
6257.5  
193.55 6257.4 194.15 6257.3 194.75 6257.2 195.34 6257.1 195.94  
6257  
196.53 6256.9 197.13 6256.8 197.73 6256.7 198.32 6256.6 198.92  
6256.5  
199.51 6256.4 200.11 6256.3 200.71 6256.2 201.3 6256.1 201.9  
6256  
202.49 6255.9 203.09 6255.8 203.69 6255.7 204.28 6255.6 204.88  
6255.5  
205.47 6255.4 206.07 6255.3 206.67 6255.2 207.26 6255.1 207.86  
6255  
208.45 6254.9 209.05 6254.8 209.65 6254.7 210.21 6254.6 210.74  
6254.5  
211.27 6254.4 211.81 6254.3 212.34 6254.2 212.87 6254.1 213.4  
6254  
213.94 6253.9 214.45 6253.9 214.47 6253.8 215 6253.7 215.53  
6253.6  
216.07 6253.5 218.27 6253.4 220.85 6253.3 223.17 6253.2 226  
6253.1  
228.82 6253 230.37 6252.9 230.48 6252.8 230.58 6252.7 230.68  
6252.6  
230.79 6252.5 231.66 6253 232.96 6252.5 233.06 6252.6 233.17  
6252.7

233.2 6252.7 233.27 6252.8 233.37 6252.9 235.03 6253 238.76  
6253.1  
242.49 6253.2 245.31 6253.3 246.22 6253.3 249.96 6253.4 253.69  
6253.5  
256.95 6253.6 260.02 6253.7 261.71 6253.8 262.06 6253.9 262.41  
6254  
262.76 6254.1 263.11 6254.2 263.46 6254.3 263.81 6254.4 264.16  
6254.5  
264.51 6254.6 264.86 6254.7 265.21 6254.8 265.56 6254.9 265.91  
6255  
266.26 6255.1 266.61 6255.2 266.96 6255.3 267.31 6255.4 267.66  
6255.5  
268.01 6255.6 268.36 6255.7 268.71 6255.8 269.06 6255.9 269.41  
6256  
269.76 6256.1 270.11 6256.2 270.46 6256.3 270.81 6256.4 271.16  
6256.5  
271.51 6256.6 271.86 6256.7 272.21 6256.8 272.56 6256.9 272.91  
6257  
273.26 6257.1 273.61 6257.2 273.96 6257.3 274.31 6257.4 274.66  
6257.5  
275.01 6257.6 275.36 6257.7 275.71 6257.8 276.06 6257.9 276.41  
6258  
276.77 6258.1 277.12 6258.2 277.47 6258.3 277.82 6258.4 278.17  
6258.5  
278.52 6258.6 278.87 6258.7 279.22 6258.8 279.57 6258.9 279.92  
6259  
280.27 6259.1 280.62 6259.2 280.97 6259.3 281.32 6259.4 281.67  
6259.5  
282.02 6259.6 282.38 6259.7 282.73 6259.8 283.08 6259.9 283.43  
6260  
283.78 6260.1 284.13 6260.2 284.48 6260.3 284.84 6260.4 285.19  
6260.5  
285.54 6260.6 285.89 6260.7 286.24 6260.8 286.59 6260.9 286.94  
6261  
287.3 6261.1 287.65 6261.2 288 6261.3 288.35 6261.4 288.7  
6261.5  
289.05 6261.6 289.4 6261.7 289.76 6261.8 290.11 6261.9 290.46  
6262  
290.81 6262.1 291.16 6262.2 291.51 6262.3 292.03 6262.4 293.02  
6262.5  
294.01 6262.6 295 6262.7 295.99 6262.8 300 6262.8  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 129.92 .013 172.42 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 129.92 172.42 22.55 22.55 22.55 .1  
  
.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
189.61 300 6258 F

Left Levee Station= 105.43 Elevation= 6265.35  
Right Levee Station= 189.61 Elevation= 6258.09

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6257.17	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.49	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6255.68	Reach Len. (ft)	22.55
22.55 22.55			
Crit W.S. (ft)	6255.68	Flow Area (sq ft)	
105.88			
E.G. Slope (ft/ft)	0.001823	Area (sq ft)	
105.88			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.61	Top Width (ft)	
35.61			
Vel Total (ft/s)	9.79	Avg. Vel. (ft/s)	
9.79			
Max Chl Dpth (ft)	4.58	Hydr. Depth (ft)	
2.97			
Conv. Total (cfs)	24286.3	Conv. (cfs)	
24286.3			
Length Wtd. (ft)	22.55	Wetted Per. (ft)	
37.25			
Min Ch El (ft)	6251.10	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
105.43 189.61			
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01
0.54			
C & E Loss (ft)	0.01	Cum SA (acres)	
0.16			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 974

INPUT  
Description:  
Station Elevation Data num= 373

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev								
-36.1	6266.4	-34.2	6266.4	-32.49	6266.3	-30.79	6266.2	-29.08
6266.1								
-27.38	6266	-25.67	6265.9	-16.94	6265.8	-6.87	6265.7	.13
6265.6								
5.11	6265.5	8.1	6265.4	11.09	6265.3	25.97	6265.2	47.98
6265.1								
59.67	6265	68.84	6264.9	69.15	6264.8	69.45	6264.7	69.76
6264.6								
70.06	6264.5	70.37	6264.4	70.67	6264.3	70.98	6264.2	71.28
6264.1								
71.59	6264	71.89	6263.9	72.19	6263.8	72.5	6263.7	72.8
6263.6								
73.11	6263.5	73.41	6263.4	73.72	6263.3	74.02	6263.2	74.33
6263.1								
74.63	6263	74.94	6262.9	75.24	6262.8	75.55	6262.7	75.85
6262.6								
76.15	6262.5	76.46	6262.4	76.76	6262.3	77.07	6262.2	77.37
6262.1								
77.68	6262	77.98	6261.9	78.29	6261.8	78.59	6261.7	78.9
6261.6								
79.2	6261.5	79.5	6261.4	79.81	6261.3	80.11	6261.2	80.42
6261.1								
80.72	6261	81.03	6260.9	81.33	6260.8	81.64	6260.7	81.94
6260.6								
82.25	6260.5	82.55	6260.4	82.86	6260.3	83.16	6260.2	83.46
6260.1								
83.77	6260	84.07	6259.9	84.38	6259.8	84.68	6259.7	84.99
6259.6								
85.29	6259.5	85.6	6259.4	85.9	6259.3	86.21	6259.2	86.51
6259.1								
86.81	6259	87.12	6258.9	87.42	6258.8	87.73	6258.7	88.03
6258.6								
88.34	6258.5	88.64	6258.4	88.95	6258.3	89.25	6258.2	89.56
6258.1								
89.86	6258	90.17	6257.9	90.47	6257.8	90.77	6257.7	91.08
6257.6								
91.38	6257.5	91.69	6257.4	91.99	6257.3	92.3	6257.2	92.6
6257.1								
92.91	6257	93.21	6256.9	93.52	6256.8	93.82	6256.7	94.12
6256.6								
94.43	6256.5	94.73	6256.4	95.04	6256.3	95.34	6256.2	95.6
6256.1								
95.85	6256	96.1	6255.9	96.35	6255.8	96.6	6255.7	96.85
6255.6								
97.1	6255.5	97.35	6255.4	97.6	6255.3	97.85	6255.2	98.1

6255.1  
98.35 6255 98.6 6254.9 98.85 6254.8 99.1 6254.7 99.35  
6254.6  
99.6 6254.5 99.85 6254.4 100.1 6254.3 100.35 6254.2 100.6  
6254.1  
100.85 6254 101.1 6253.9 101.35 6253.8 101.6 6253.7 101.85  
6253.6  
102.1 6253.5 102.35 6253.4 102.6 6253.3 102.85 6253.2 103.1  
6253.1  
103.35 6253 103.6 6252.9 103.85 6252.8 104.1 6252.7 104.35  
6252.6  
104.6 6252.5 104.85 6252.4 105.1 6252.3 105.35 6252.2 105.6  
6252.1  
105.85 6252 106.1 6251.9 106.35 6251.8 106.6 6251.7 106.85  
6251.6  
107.1 6251.5 107.35 6251.4 107.6 6251.3 107.85 6251.2 108.1  
6251.1  
108.35 6251 108.6 6250.9 108.85 6250.8 118.96 6250.8 119.26  
6250.9  
119.56 6251 119.86 6251.1 120.16 6251.2 120.46 6251.3 120.76  
6251.4  
121.06 6251.5 121.36 6251.6 121.66 6251.7 121.96 6251.8 122.26  
6251.9  
122.56 6252 122.86 6252.1 123.16 6252.2 123.46 6252.3 123.76  
6252.4  
124.06 6252.5 124.36 6252.6 124.66 6252.7 124.96 6252.8 125.26  
6252.9  
125.56 6253 125.86 6253.1 126.16 6253.2 126.46 6253.3 126.76  
6253.4  
127.06 6253.5 127.36 6253.6 127.66 6253.7 127.96 6253.8 128.26  
6253.9  
128.56 6254 128.86 6254.1 129.16 6254.2 129.46 6254.3 129.76  
6254.4  
130.06 6254.5 130.36 6254.6 130.66 6254.7 130.96 6254.8 131.26  
6254.9  
131.56 6255 131.86 6255.1 132.16 6255.2 132.47 6255.3 132.87  
6255.4  
133.26 6255.5 133.65 6255.6 134.05 6255.7 134.44 6255.8 134.83  
6255.9  
135.22 6256 135.62 6256.1 136.01 6256.2 136.4 6256.3 136.8  
6256.4  
137.19 6256.5 137.58 6256.6 137.97 6256.7 138.37 6256.8 153.49  
6256.8  
154.19 6256.7 154.88 6256.6 155.58 6256.5 156.24 6256.4 156.77  
6256.3  
157.3 6256.2 157.83 6256.1 158.36 6256 158.89 6255.9 159.45  
6255.8  
160.13 6255.7 160.48 6256 160.81 6255.6 161.49 6255.5 162.17  
6255.4  
162.85 6255.3 162.91 6255.8 163.53 6255.2 164.21 6255.1 164.89  
6255  
165.57 6254.9 166.24 6254.8 166.92 6254.7 167.6 6254.6 168.28  
6254.5

168.96 6254.4 169.64 6254.3 170.32 6254.2 171 6254.1 171.68  
6254  
172.36 6253.9 173.04 6253.8 173.72 6253.7 174.39 6253.6 175.07  
6253.5  
175.75 6253.4 176.43 6253.3 177.11 6253.2 177.79 6253.1 178.47  
6253  
181.55 6252.9 184.72 6252.8 187.88 6252.7 189.4 6252.6 189.5  
6252.5  
189.6 6252.4 189.7 6252.3 189.8 6252.2 191.91 6252.2 192.01  
6252.3  
192.11 6252.4 192.21 6252.5 192.22 6252.6 192.31 6252.6 193.56  
6252.7  
196.41 6252.8 199.27 6252.9 202.13 6253 204.99 6253.1 207.84  
6253.2  
210.7 6253.3 213.58 6253.4 216.46 6253.5 219.49 6253.6 222.87  
6253.7  
224.61 6253.8 224.98 6253.9 225.34 6254 225.71 6254.1 226.07  
6254.2  
226.44 6254.3 226.8 6254.4 227.16 6254.5 227.53 6254.6 227.89  
6254.7  
228.26 6254.8 228.62 6254.9 228.99 6255 229.35 6255.1 229.71  
6255.2  
230.08 6255.3 230.44 6255.4 230.81 6255.5 231.17 6255.6 231.54  
6255.7  
231.9 6255.8 232.27 6255.9 232.63 6256 232.99 6256.1 233.36  
6256.2  
233.72 6256.3 234.09 6256.4 234.45 6256.5 234.82 6256.6 235.18  
6256.7  
235.54 6256.8 235.91 6256.9 236.27 6257 236.64 6257.1 237  
6257.2  
237.37 6257.3 237.73 6257.4 238.09 6257.5 238.46 6257.6 238.82  
6257.7  
239.19 6257.8 239.55 6257.9 239.92 6258 240.28 6258.1 240.65  
6258.2  
241.02 6258.3 241.39 6258.4 241.75 6258.5 242.12 6258.6 242.49  
6258.7  
242.86 6258.8 243.23 6258.9 243.6 6259 243.97 6259.1 244.33  
6259.2  
244.7 6259.3 245.07 6259.4 245.44 6259.5 245.81 6259.6 246.18  
6259.7  
246.54 6259.8 246.91 6259.9 247.28 6260 247.65 6260.1 248.02  
6260.2  
248.39 6260.3 248.75 6260.4 249.12 6260.5 249.49 6260.6 249.86  
6260.7  
250.23 6260.8 250.6 6260.9 250.96 6261 251.33 6261.1 251.7  
6261.2  
252.07 6261.3 252.44 6261.4 252.81 6261.5 253.17 6261.6 253.54  
6261.7  
253.91 6261.8 254.28 6261.9 255.13 6262 256.12 6262.1 257.11  
6262.2  
258.1 6262.3 259.09 6262.4 263.9 6262.4  
Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-36.1	.03	92.91	.013	138.37	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
 Expan. 92.91 138.37 19.92 19.92 19.92 .1

.3  
 Ineffective Flow num= 1  
 Sta L Sta R Elev Permanent  
 153.51 263.9 6256.67 F  
 Left Levee Station= 68.91 Elevation= 6264.88  
 Right Levee Station= 153.51 Elevation= 6256.85

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6256.92	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.47	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6255.45	Reach Len. (ft)	19.92
19.92 19.92			
Crit W.S. (ft)	6255.45	Flow Area (sq ft)	
106.50			
E.G. Slope (ft/ft)	0.001804	Area (sq ft)	
106.50			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.84	Top Width (ft)	
35.84			
Vel Total (ft/s)	9.74	Avg. Vel. (ft/s)	
9.74			
Max Chl Dpth (ft)	4.65	Hydr. Depth (ft)	
2.97			
Conv. Total (cfs)	24417.2	Conv. (cfs)	
24417.2			
Length Wtd. (ft)	19.92	Wetted Per. (ft)	
37.49			
Min Ch El (ft)	6250.80	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	263.90
68.91 153.51			
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01
0.49			
C & E Loss (ft)	0.00	Cum SA (acres)	
0.15			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
 Warning: During the standard step iterations, when the assumed water surface

was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 973

INPUT  
 Description:  
 Station Elevation Data num= 390

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev								
-32.18	6266.2	-29.67	6266.2	-26.39	6266.1	-24.69	6266	-22.99
6265.9								
-21.29	6265.8	-13.57	6265.7	-2.85	6265.6	1.97	6265.5	5.36
6265.4								
8.45	6265.3	11.39	6265.2	14.33	6265.1	17.27	6265	20.21
6264.9								
23.16	6264.8	34.13	6264.7	51.24	6264.6	67.2	6264.5	72.15
6264.4								
72.48	6264.3	72.81	6264.2	73.14	6264.1	73.47	6264	73.8
6263.9								
74.13	6263.8	74.46	6263.7	74.79	6263.6	75.12	6263.5	75.45
6263.4								
75.78	6263.3	76.11	6263.2	76.44	6263.1	76.77	6263	77.1
6262.9								
77.43	6262.8	77.76	6262.7	78.09	6262.6	78.42	6262.5	78.75
6262.4								
79.08	6262.3	79.41	6262.2	79.74	6262.1	80.07	6262	80.4
6261.9								
80.73	6261.8	81.05	6261.7	81.37	6261.6	81.69	6261.5	82.01
6261.4								
82.32	6261.3	82.64	6261.2	82.96	6261.1	83.28	6261	83.6
6260.9								
83.92	6260.8	84.24	6260.7	84.56	6260.6	84.87	6260.5	85.19
6260.4								
85.51	6260.3	85.83	6260.2	86.15	6260.1	86.47	6260	86.79
6259.9								
87.11	6259.8	87.42	6259.7	87.74	6259.6	88.06	6259.5	88.38
6259.4								
88.7	6259.3	89.02	6259.2	89.34	6259.1	89.66	6259	89.97
6258.9								
90.29	6258.8	90.61	6258.7	90.93	6258.6	91.25	6258.5	91.57
6258.4								
91.89	6258.3	92.21	6258.2	92.52	6258.1	92.84	6258	93.16
6257.9								
93.48	6257.8	93.8	6257.7	94.12	6257.6	94.44	6257.5	94.76

6257.4								
95.07	6257.3	95.39	6257.2	95.71	6257.1	96.03	6257	96.35
6256.9								
96.67	6256.8	96.99	6256.7	97.31	6256.6	97.62	6256.5	97.94
6256.4								
98.26	6256.3	98.58	6256.2	98.9	6256.1	99.22	6256	99.48
6255.9								
99.73	6255.8	99.98	6255.7	100.23	6255.6	100.48	6255.5	100.73
6255.4								
100.98	6255.3	101.23	6255.2	101.48	6255.1	101.73	6255	101.98
6254.9								
102.23	6254.8	102.48	6254.7	102.73	6254.6	102.98	6254.5	103.23
6254.4								
103.48	6254.3	103.73	6254.2	103.98	6254.1	104.23	6254	104.48
6253.9								
104.73	6253.8	104.98	6253.7	105.23	6253.6	105.48	6253.5	105.73
6253.4								
105.98	6253.3	106.23	6253.2	106.48	6253.1	106.73	6253	106.98
6252.9								
107.23	6252.8	107.48	6252.7	107.73	6252.6	107.98	6252.5	108.23
6252.4								
108.48	6252.3	108.73	6252.2	108.98	6252.1	109.23	6252	109.48
6251.9								
109.73	6251.8	109.98	6251.7	110.23	6251.6	110.48	6251.5	110.73
6251.4								
110.98	6251.3	111.23	6251.2	111.48	6251.1	111.73	6251	111.98
6250.9								
112.23	6250.8	112.48	6250.7	112.73	6250.6	122.82	6250.6	123.12
6250.7								
123.42	6250.8	123.73	6250.9	124.03	6251	124.33	6251.1	124.63
6251.2								
124.93	6251.3	125.23	6251.4	125.53	6251.5	125.83	6251.6	126.13
6251.7								
126.43	6251.8	126.73	6251.9	127.03	6252	127.33	6252.1	127.63
6252.2								
127.94	6252.3	128.24	6252.4	128.54	6252.5	128.84	6252.6	129.14
6252.7								
129.44	6252.8	129.74	6252.9	130.04	6253	130.34	6253.1	130.64
6253.2								
130.93	6253.3	131.23	6253.4	131.53	6253.5	131.83	6253.6	132.13
6253.7								
132.43	6253.8	132.73	6253.9	133.03	6254	133.33	6254.1	133.63
6254.2								
133.93	6254.3	134.23	6254.4	134.53	6254.5	134.83	6254.6	135.13
6254.7								
135.42	6254.8	135.72	6254.9	136.02	6255	136.34	6255.1	136.74
6255.2								
137.14	6255.3	137.53	6255.4	137.93	6255.5	138.33	6255.6	138.73
6255.7								
139.13	6255.8	139.52	6255.9	139.92	6256	140.3	6256.1	140.67
6256.2								
141.03	6256.3	141.4	6256.4	141.76	6256.5	142.13	6256.6	157.52
6256.6								

158.14	6256.5	158.74	6256.4	159.35	6256.3	159.95	6256.2	160.56
6256.1								
161.16	6256	161.77	6255.9	162.37	6255.8	162.97	6255.7	163.58
6255.6								
164.18	6255.5	164.79	6255.4	165.39	6255.3	165.99	6255.2	166.6
6255.1								
167.2	6255	167.81	6254.9	168.41	6254.8	169.01	6254.7	169.62
6254.6								
170.22	6254.5	170.83	6254.4	171.43	6254.3	172.04	6254.2	172.64
6254.1								
173.24	6254	173.85	6253.9	174.45	6253.8	175.06	6253.7	175.66
6253.6								
176.28	6253.5	176.97	6253.4	177.66	6253.3	178.35	6253.2	179.04
6253.1								
179.73	6253	180.42	6252.9	181.11	6252.8	181.8	6252.7	183.25
6252.6								
184.35	6252.6	186.62	6252.5	188.78	6252.5	191.04	6252.4	192.75
6252.3								
192.85	6252.2	192.95	6252.1	193.05	6252	193.15	6251.9	195.22
6251.9								
195.32	6252	195.42	6252.1	195.52	6252.2	195.62	6252.3	196.1
6252.4								
197.26	6252.5	198.54	6252.6	199.91	6252.7	201.33	6252.8	202.79
6252.9								
205.51	6253	206.35	6253	206.64	6252.9	206.93	6252.8	207.22
6252.7								
207.51	6252.6	209.91	6252.7	210.76	6252.6	213.29	6252.7	213.55
6252.8								
213.81	6252.9	214.07	6253	214.33	6253.1	214.42	6253.1	214.82
6253.2								
216.45	6253.3	219.57	6253.4	222.69	6253.5	223.03	6254.3	223.53
6254.2								
224.03	6254.1	224.51	6254	225.19	6253.6	225.38	6253.7	225.44
6253.8								
225.51	6253.9	225.58	6254	225.65	6254.1	225.72	6254.2	225.79
6254.3								
227.13	6254.3	227.25	6254.4	228.62	6254.3	228.97	6254.4	229.32
6254.5								
229.67	6254.6	230.02	6254.7	230.37	6254.8	230.78	6254.9	231.19
6255								
231.61	6255.1	232.03	6255.2	232.44	6255.3	232.86	6255.4	233.28
6255.5								
233.69	6255.6	234.11	6255.7	234.53	6255.8	234.94	6255.9	235.36
6256								
235.78	6256.1	236.19	6256.2	236.61	6256.3	237.03	6256.4	237.44
6256.5								
237.86	6256.6	238.28	6256.7	238.69	6256.8	239.11	6256.9	239.53
6257								
239.94	6257.1	240.36	6257.2	240.78	6257.3	241.19	6257.4	241.61
6257.5								
242.03	6257.6	242.44	6257.7	242.86	6257.8	243.27	6257.9	243.67
6258								
244.07	6258.1	244.47	6258.2	244.87	6258.3	245.27	6258.4	245.67

E.G. Elev (ft)	6256.72	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.47	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6255.25	Reach Len. (ft)	7.53
7.53 7.53			
Crit W.S. (ft)	6255.25	Flow Area (sq ft)	
106.46			
E.G. Slope (ft/ft)	0.001805	Area (sq ft)	
106.46			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.84	Top Width (ft)	
35.84			
Vel Total (ft/s)	9.74	Avg. Vel. (ft/s)	
9.74			
Max Chl Dpth (ft)	4.65	Hydr. Depth (ft)	
2.97			
Conv. Total (cfs)	24405.7	Conv. (cfs)	
24405.7			

Length Wtd. (ft)	7.53	Wetted Per. (ft)	
37.48			
Min Ch El (ft)	6250.60	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	267.82
72.83	156.59		
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01
0.44			
C & E Loss (ft)	0.00	Cum SA (acres)	
0.13			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

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

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 972

INPUT

Description:

Station	Elevation	Data	num=	372					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-66.04	6266.1	-63.22	6266.1	-58.86	6266	-57.17	6265.9	-55.47	6265.8
-51.5	6265.7	-40.89	6265.6	-33.49	6265.5	-30.79	6265.4	-28.26	6265.3
-25.41	6265.2	-22.05	6265.1	-18.91	6265	-15.98	6264.9	-13.06	6264.8
-10.13	6264.7	-7.21	6264.6	3.48	6264.5	18.96	6264.4	30.72	6264.3
35.96	6264.2	38.29	6264.1	38.62	6264	38.95	6263.9	39.28	6263.8
39.6	6263.7	39.93	6263.6	40.26	6263.5	40.59	6263.4	40.92	6263.3
41.25	6263.2	41.58	6263.1	41.91	6263	42.24	6262.9	42.57	6262.8
42.9	6262.7	43.23	6262.6	43.55	6262.5	43.88	6262.4	44.21	6262.3
44.54	6262.2	44.87	6262.1	45.2	6262	45.53	6261.9	45.86	6261.8

46.19	6261.7	46.52	6261.6	46.85	6261.5	47.17	6261.4	47.5
6261.3								
47.83	6261.2	48.16	6261.1	48.49	6261	48.82	6260.9	49.15
6260.8								
49.48	6260.7	49.81	6260.6	50.14	6260.5	50.47	6260.4	50.8
6260.3								
51.12	6260.2	51.45	6260.1	51.78	6260	52.11	6259.9	52.44
6259.8								
52.77	6259.7	53.1	6259.6	53.43	6259.5	53.76	6259.4	54.09
6259.3								
54.42	6259.2	54.75	6259.1	55.07	6259	55.4	6258.9	55.73
6258.8								
56.06	6258.7	56.39	6258.6	56.72	6258.5	57.05	6258.4	57.38
6258.3								
57.71	6258.2	58.04	6258.1	58.37	6258	58.7	6257.9	59.02
6257.8								
59.35	6257.7	59.68	6257.6	60.01	6257.5	60.34	6257.4	60.67
6257.3								
61	6257.2	61.35	6257.1	61.69	6257	62.03	6256.9	62.38
6256.8								
62.72	6256.7	63.06	6256.6	63.4	6256.5	63.75	6256.4	64.09
6256.3								
64.43	6256.2	64.78	6256.1	65.12	6256	65.45	6255.9	65.7
6255.8								
65.95	6255.7	66.2	6255.6	66.45	6255.5	66.7	6255.4	66.95
6255.3								
67.2	6255.2	67.45	6255.1	67.7	6255	67.95	6254.9	68.2
6254.8								
68.45	6254.7	68.7	6254.6	68.95	6254.5	69.2	6254.4	69.45
6254.3								
69.7	6254.2	69.96	6254.1	70.21	6254	70.46	6253.9	70.71
6253.8								
70.96	6253.7	71.21	6253.6	71.46	6253.5	71.71	6253.4	71.96
6253.3								
72.21	6253.2	72.46	6253.1	72.71	6253	72.96	6252.9	73.21
6252.8								
73.46	6252.7	73.71	6252.6	73.96	6252.5	74.21	6252.4	74.46
6252.3								
74.71	6252.2	74.96	6252.1	75.21	6252	75.46	6251.9	75.71
6251.8								
75.96	6251.7	76.21	6251.6	76.46	6251.5	76.71	6251.4	76.96
6251.3								
77.21	6251.2	77.46	6251.1	77.71	6251	77.96	6250.9	78.21
6250.8								
78.46	6250.7	78.71	6250.6	89.22	6250.6	89.52	6250.7	89.82
6250.8								
90.12	6250.9	90.42	6251	90.72	6251.1	91.02	6251.2	91.32
6251.3								
91.62	6251.4	91.92	6251.5	92.22	6251.6	92.52	6251.7	92.82
6251.8								
93.12	6251.9	93.42	6252	93.72	6252.1	94.03	6252.2	94.33
6252.3								
94.63	6252.4	94.93	6252.5	95.23	6252.6	95.53	6252.7	95.83

6252.8								
96.13	6252.9	96.43	6253	96.73	6253.1	97.03	6253.2	97.33
6253.3								
97.63	6253.4	97.93	6253.5	98.23	6253.6	98.53	6253.7	98.83
6253.8								
99.13	6253.9	99.44	6254	99.74	6254.1	100.04	6254.2	100.34
6254.3								
100.64	6254.4	100.94	6254.5	101.23	6254.6	101.53	6254.7	101.83
6254.8								
102.13	6254.9	102.43	6255	102.81	6255.1	103.17	6255.2	103.54
6255.3								
103.9	6255.4	104.27	6255.5	104.63	6255.6	105	6255.7	105.37
6255.8								
105.73	6255.9	106.1	6256	106.46	6256.1	106.83	6256.2	107.19
6256.3								
107.56	6256.4	107.93	6256.5	108.29	6256.6	123.7	6256.6	124.34
6256.5								
124.94	6256.4	125.55	6256.3	126.15	6256.2	126.76	6256.1	127.36
6256								
127.96	6255.9	128.57	6255.8	129.17	6255.7	129.78	6255.6	130.38
6255.5								
130.98	6255.4	131.59	6255.3	132.19	6255.2	132.8	6255.1	133.4
6255								
134.01	6254.9	134.61	6254.8	135.21	6254.7	135.82	6254.6	136.42
6254.5								
137.03	6254.4	137.63	6254.3	138.23	6254.2	138.84	6254.1	139.44
6254								
140.05	6253.9	140.65	6253.8	141.26	6253.7	141.86	6253.6	142.46
6253.5								
143.07	6253.4	143.67	6253.3	144.28	6253.2	144.88	6253.1	145.48
6253								
146.09	6252.9	146.69	6252.8	147.26	6252.7	147.82	6252.6	148.38
6252.5								
152.55	6252.4	156.94	6252.3	159.06	6252.2	159.16	6252.1	159.26
6252								
159.36	6251.9	159.46	6251.8	161.88	6251.8	162.3	6251.9	162.73
6252								
164.17	6252.1	164.29	6252.2	164.4	6252.3	164.52	6252.4	164.64
6252.5								
165.26	6252.6	165.75	6252.7	168.53	6252.7	170.45	6252.8	171.9
6252.8								
175.53	6252.9	178.46	6253	181.19	6253.1	183.92	6253.2	185.85
6253.4								
186.65	6253.3	189.38	6253.4	191.46	6253.5	191.86	6253.6	192.26
6253.7								
192.66	6253.8	193.06	6253.9	193.46	6254	193.86	6254.1	194.26
6254.2								
194.66	6254.3	195.06	6254.4	195.46	6254.5	195.86	6254.6	196.26
6254.7								
196.66	6254.8	197.06	6254.9	197.46	6255	197.87	6255.1	198.27
6255.2								
198.67	6255.3	199.07	6255.4	199.38	6255.5	199.47	6255.5	199.87
6255.6								





89.24	6264	94.22	6263.9	99.19	6263.8	104.17	6263.7	104.58
6263.6								
104.93	6263.5	105.27	6263.4	105.62	6263.3	105.96	6263.2	106.31
6263.1								
106.65	6263	106.99	6262.9	107.34	6262.8	107.68	6262.7	108.03
6262.6								
108.37	6262.5	108.72	6262.4	109.06	6262.3	109.41	6262.2	109.75
6262.1								
110.1	6262	110.44	6261.9	110.79	6261.8	111.13	6261.7	111.48
6261.6								
111.82	6261.5	112.17	6261.4	112.51	6261.3	112.86	6261.2	113.2
6261.1								
113.54	6261	113.89	6260.9	114.23	6260.8	114.58	6260.7	114.92
6260.6								
115.27	6260.5	115.61	6260.4	115.96	6260.3	116.3	6260.2	116.65
6260.1								
116.99	6260	117.34	6259.9	117.68	6259.8	118.03	6259.7	118.37
6259.6								
118.72	6259.5	119.06	6259.4	119.41	6259.3	119.75	6259.2	120.09
6259.1								
120.44	6259	120.78	6258.9	121.13	6258.8	121.47	6258.7	121.82
6258.6								
122.16	6258.5	122.51	6258.4	122.85	6258.3	123.2	6258.2	123.54
6258.1								
123.89	6258	124.23	6257.9	124.58	6257.8	124.92	6257.7	125.27
6257.6								
125.61	6257.5	125.96	6257.4	126.3	6257.3	126.65	6257.2	126.99
6257.1								
127.33	6257	127.67	6256.9	128.02	6256.8	128.36	6256.7	128.7
6256.6								
129.05	6256.5	129.39	6256.4	129.73	6256.3	130.07	6256.2	130.42
6256.1								
130.76	6256	131.1	6255.9	131.45	6255.8	131.71	6255.7	131.96
6255.6								
132.21	6255.5	132.46	6255.4	132.71	6255.3	132.96	6255.2	133.21
6255.1								
133.46	6255	133.71	6254.9	133.96	6254.8	134.21	6254.7	134.46
6254.6								
134.71	6254.5	134.96	6254.4	135.21	6254.3	135.46	6254.2	135.71
6254.1								
135.96	6254	136.21	6253.9	136.46	6253.8	136.71	6253.7	136.96
6253.6								
137.21	6253.5	137.46	6253.4	137.71	6253.3	137.96	6253.2	138.21
6253.1								
138.46	6253	138.71	6252.9	138.96	6252.8	139.21	6252.7	139.46
6252.6								
139.71	6252.5	139.96	6252.4	140.21	6252.3	140.46	6252.2	140.71
6252.1								
140.96	6252	141.21	6251.9	141.46	6251.8	141.71	6251.7	141.96
6251.6								
142.21	6251.5	142.46	6251.4	142.71	6251.3	142.96	6251.2	143.21
6251.1								
143.46	6251	143.71	6250.9	143.96	6250.8	144.21	6250.7	144.46

6250.6								
144.71	6250.5	144.96	6250.4	155.05	6250.4	155.35	6250.5	155.65
6250.6								
155.95	6250.7	156.25	6250.8	156.55	6250.9	156.85	6251	157.15
6251.1								
157.45	6251.2	157.75	6251.3	158.05	6251.4	158.35	6251.5	158.65
6251.6								
158.95	6251.7	159.25	6251.8	159.55	6251.9	159.85	6252	160.15
6252.1								
160.45	6252.2	160.75	6252.3	161.05	6252.4	161.35	6252.5	161.65
6252.6								
161.95	6252.7	162.25	6252.8	162.55	6252.9	162.85	6253	163.15
6253.1								
163.45	6253.2	163.75	6253.3	164.05	6253.4	164.35	6253.5	164.65
6253.6								
164.95	6253.7	165.25	6253.8	165.55	6253.9	165.85	6254	166.15
6254.1								
166.45	6254.2	166.75	6254.3	167.05	6254.4	167.35	6254.5	167.65
6254.6								
167.95	6254.7	168.25	6254.8	168.55	6254.9	168.88	6255	169.21
6255.1								
169.54	6255.2	169.87	6255.3	170.2	6255.4	170.53	6255.5	170.86
6255.6								
171.19	6255.7	171.39	6255.76	171.52	6255.8	171.85	6255.9	172.18
6256								
172.51	6256.1	172.84	6256.2	173.17	6256.3	173.5	6256.4	173.83
6256.5								
174.16	6256.6	174.49	6256.7	189.94	6256.7	190.64	6256.6	191.34
6256.5								
192.03	6256.4	192.64	6256.3	193.18	6256.2	193.72	6256.1	194.26
6256								
194.8	6255.9	195.34	6255.8	195.88	6255.7	196.42	6255.6	196.96
6255.5								
197.5	6255.4	198.04	6255.3	198.58	6255.2	199.12	6255.1	199.66
6255								
200.19	6254.9	200.73	6254.8	201.27	6254.7	201.81	6254.6	202.35
6254.5								
202.89	6254.4	203.43	6254.3	203.97	6254.2	204.51	6254.1	205.05
6254								
205.59	6253.9	206.13	6253.8	206.67	6253.7	207.21	6253.6	207.75
6253.5								
208.29	6253.4	208.82	6253.3	209.36	6253.2	209.9	6253.1	210.44
6253								
210.98	6252.9	211.52	6252.8	212.06	6252.7	212.6	6252.6	213.14
6252.5								
213.69	6252.4	213.81	6252.5	214.05	6253	214.25	6252.3	219.14
6252.2								
227.09	6252.1	227.2	6252	227.3	6251.9	227.41	6251.8	227.52
6251.7								
228.81	6252	229.91	6251.7	230.02	6251.8	230.14	6251.9	230.25
6252								
230.36	6252.1	233.98	6252.2	237.64	6252.3	241.29	6252.4	243.1
6252.5								

244.95	6252.5	247.6	6252.6	248.61	6252.6	251.9	6252.7	252.26
6252.7								
255.81	6252.8	257.71	6252.9	258.11	6253	258.5	6253.1	258.89
6253.2								
259.28	6253.3	259.68	6253.4	260.07	6253.5	260.46	6253.6	260.85
6253.7								
261.25	6253.8	261.64	6253.9	262.03	6254	262.42	6254.1	262.82
6254.2								
263.21	6254.3	263.6	6254.4	264	6254.5	264.39	6254.6	264.78
6254.7								
265.17	6254.8	265.57	6254.9	265.96	6255	266.35	6255.1	266.74
6255.2								
267.14	6255.3	267.53	6255.4	267.92	6255.5	268.31	6255.6	268.71
6255.7								
269.1	6255.8	269.49	6255.9	269.88	6256	270.28	6256.1	270.67
6256.2								
271.06	6256.3	271.45	6256.4	271.85	6256.5	272.24	6256.6	272.63
6256.7								
273.03	6256.8	273.42	6256.9	273.81	6257	274.2	6257.1	274.6
6257.2								
274.99	6257.3	275.38	6257.4	275.77	6257.5	276.17	6257.6	276.56
6257.7								
276.95	6257.8	277.34	6257.9	277.74	6258	278.13	6258.1	278.52
6258.2								
278.91	6258.3	279.31	6258.4	279.7	6258.5	280.09	6258.6	280.48
6258.7								
280.88	6258.8	281.27	6258.9	281.66	6259	282.05	6259.1	282.45
6259.2								
282.84	6259.3	283.23	6259.4	283.62	6259.5	284.02	6259.6	284.41
6259.7								
284.8	6259.8	285.19	6259.9	285.59	6260	285.98	6260.1	286.37
6260.2								
286.76	6260.3	287.16	6260.4	287.55	6260.5	287.94	6260.6	288.33
6260.7								
288.73	6260.8	289.12	6260.9	289.51	6261	290.7	6261.1	291.97
6261.2								
293.24	6261.3	294.5	6261.4	300	6261.4			

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.03	130.76	.013	171.39	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.	130.76	171.39		37.63	37.63		.1

.3	Ineffective Flow	num=	1
Sta L	Sta R	Elev	Permanent
190.03	300	6256.59	F
Left Levee	Station=	103.33	Elevation= 6263.68
Right Levee	Station=	189.61	Elevation= 6256.72

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6256.53	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.47	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6255.06	Reach Len. (ft)	37.63
37.63 37.63			
Crit W.S. (ft)	6255.06	Flow Area (sq ft)	
106.74			
E.G. Slope (ft/ft)	0.001786	Area (sq ft)	
106.74			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.77	Top Width (ft)	
35.77			
Vel Total (ft/s)	9.71	Avg. Vel. (ft/s)	
9.71			
Max Chl Dpth (ft)	4.66	Hydr. Depth (ft)	
2.98			
Conv. Total (cfs)	24541.1	Conv. (cfs)	
24541.1			
Length Wtd. (ft)	37.63	Wetted Per. (ft)	
37.42			
Min Ch El (ft)	6250.40	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
103.33 189.61			
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.01
0.39			
C & E Loss (ft)	0.02	Cum SA (acres)	
0.11			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 970

INPUT



200.99	6255.2	201.44	6255.1	201.89	6255	202.33	6254.9	202.78
6254.8								
203.23	6254.7	203.68	6254.6	204.12	6254.5	204.57	6254.4	204.7
6254.7								
205.02	6254.3	205.46	6254.2	205.91	6254.1	206.36	6254	206.81
6253.9								
207.28	6253.8	207.75	6253.7	208.22	6253.6	208.69	6253.5	209.16
6253.4								
209.63	6253.3	210.1	6253.2	210.57	6253.1	210.65	6253.5	211.04
6253								
211.51	6252.9	211.98	6252.8	212.45	6252.7	212.92	6252.6	213.39
6252.5								
213.86	6252.4	214.33	6252.3	214.79	6252.2	215.26	6252.1	215.76
6252								
216.26	6251.9	228.9	6251.8	229.04	6251.7	229.18	6251.6	229.32
6251.5								
229.46	6251.4	232.25	6251.4	232.39	6251.5	232.49	6251.7	232.52
6251.6								
232.66	6251.7	232.8	6251.8	232.94	6251.9	240.6	6252	247.97
6252.1								
253.08	6252.2	256.52	6252.3	258.54	6252.4	258.94	6252.5	259.33
6252.6								
259.73	6252.7	260.12	6252.8	260.52	6252.9	260.91	6253	261.31
6253.1								
261.7	6253.2	262.1	6253.3	262.49	6253.4	262.89	6253.5	263.29
6253.6								
263.68	6253.7	264.08	6253.8	264.47	6253.9	264.87	6254	265.26
6254.1								
265.66	6254.2	266.05	6254.3	266.45	6254.4	266.84	6254.5	267.24
6254.6								
267.63	6254.7	268.03	6254.8	268.43	6254.9	268.82	6255	269.22
6255.1								
269.61	6255.2	270.01	6255.3	270.4	6255.4	270.8	6255.5	271.19
6255.6								
271.59	6255.7	271.98	6255.8	272.38	6255.9	272.77	6256	273.17
6256.1								
273.57	6256.2	273.96	6256.3	274.36	6256.4	274.75	6256.5	275.15
6256.6								
275.54	6256.7	275.94	6256.8	276.33	6256.9	276.73	6257	277.12
6257.1								
277.52	6257.2	277.91	6257.3	278.31	6257.4	278.7	6257.5	279.1
6257.6								
279.5	6257.7	279.89	6257.8	280.29	6257.9	280.68	6258	281.08
6258.1								
281.47	6258.2	281.87	6258.3	282.26	6258.4	282.66	6258.5	283.05
6258.6								
283.45	6258.7	283.84	6258.8	284.24	6258.9	284.64	6259	285.03
6259.1								
285.43	6259.2	285.82	6259.3	286.22	6259.4	286.61	6259.5	287.01
6259.6								
287.4	6259.7	287.79	6259.8	288.19	6259.9	288.58	6260	288.97
6260.1								
289.37	6260.2	289.76	6260.3	290.16	6260.4	291.22	6260.5	293.93

6260.6								
300	6260.6							
Manning's	n	Values	num=	3				
Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.03	132.5	.013	169.98	.03			
Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.
Expan.								
	132.5	169.98		50	50	50		.1
.3								
Ineffective Flow	num=	1						
Sta L	Sta R	Elev	Permanent					
192.96	300	6257.47	F					
Left Levee	Station=	49.73	Elevation=	6264.69				
Right Levee	Station=	189.19	Elevation=	6257.47				
CROSS SECTION OUTPUT	Profile #Flow 1							
E.G. Elev (ft)		6256.17	Element				Left OB	
Channel Right OB								
Vel Head (ft)		1.46	Wt. n-Val.					
0.013								
W.S. Elev (ft)		6254.71	Reach Len. (ft)				50.00	
50.00	50.00							
Crit W.S. (ft)		6254.71	Flow Area (sq ft)					
106.85								
E.G. Slope (ft/ft)		0.001777	Area (sq ft)					
106.85								
Q Total (cfs)		1037.00	Flow (cfs)					
1037.00								
Top Width (ft)		35.74	Top Width (ft)					
35.74								
Vel Total (ft/s)		9.71	Avg. Vel. (ft/s)					
9.71								
Max Chl Dpth (ft)		4.61	Hydr. Depth (ft)					
2.99								
Conv. Total (cfs)		24598.0	Conv. (cfs)					
24598.0								
Length Wtd. (ft)		50.00	Wetted Per. (ft)					
37.38								
Min Ch El (ft)		6250.10	Shear (lb/sq ft)					
0.32								
Alpha		1.00	Stream Power (lb/ft s)				300.00	
49.73	189.19							
Frctn Loss (ft)		0.09	Cum Volume (acre-ft)				0.01	
0.30								
C & E Loss (ft)		0.00	Cum SA (acres)					
0.08								

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

## CROSS SECTION

RIVER: SC01

REACH: Sand Creek-DS-0- RS: 969

## INPUT

Description:

Station	Elevation	Data	num=	251					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6264	2.64	6264	6.84	6263.9	11.04	6263.8	15.24	6263.7
19.44	6263.6	24.89	6263.5	29.66	6263.4	34.61	6263.3	39.56	6263.2
44.5	6263.1	49.45	6263	54.4	6262.9	59.35	6262.8	64.47	6262.7
69.43	6262.6	74.02	6262.5	78.62	6262.4	83.21	6262.3	87.14	6262.2
90.53	6262.1	93.93	6262	97.32	6261.9	100.71	6261.8	105.22	6261.7
106.35	6261.6	106.94	6261.6	107.3	6261.5	107.67	6261.4	108.04	6261.3
108.4	6261.2	108.77	6261.1	109.14	6261	109.5	6260.9	109.87	6260.8
110.24	6260.7	110.6	6260.6	110.97	6260.5	111.33	6260.4	111.7	6260.3
112.07	6260.2	112.43	6260.1	112.8	6260	113.17	6259.9	113.53	6259.8
113.9	6259.7	114.27	6259.6	114.63	6259.5	115	6259.4	115.36	6259.3
115.73	6259.2	116.1	6259.1	116.46	6259	116.83	6258.9	117.2	6258.8
117.56	6258.7	117.93	6258.6	118.3	6258.5	118.66	6258.4	119.03	6258.3
119.39	6258.2	119.76	6258.1	120.13	6258	120.49	6257.9	120.86	6257.8
121.23	6257.7	121.59	6257.6	121.96	6257.5	122.33	6257.4	122.69	6257.3
123.06	6257.2	123.42	6257.1	123.79	6257	124.16	6256.9	124.52	6256.8
124.89	6256.7	125.26	6256.6	125.62	6256.5	125.99	6256.4	126.33	6256.3

6256.3								
126.72	6256.2	127.09	6256.1	127.45	6256	127.82	6255.9	128.19
6255.8								
128.55	6255.7	128.92	6255.6	129.29	6255.5	129.65	6255.4	130.02
6255.3								
130.39	6255.2	130.75	6255.1	131.11	6255	131.12	6255	131.47
6254.9								
131.72	6254.8	131.97	6254.7	132.22	6254.6	132.47	6254.5	132.72
6254.4								
132.97	6254.3	133.22	6254.2	133.47	6254.1	133.72	6254	133.97
6253.9								
134.22	6253.8	134.47	6253.7	134.72	6253.6	134.97	6253.5	135.22
6253.4								
135.47	6253.3	135.72	6253.2	135.97	6253.1	136.22	6253	136.47
6252.9								
136.72	6252.8	136.97	6252.7	137.22	6252.6	137.48	6252.5	137.73
6252.4								
137.98	6252.3	138.23	6252.2	138.48	6252.1	138.73	6252	138.98
6251.9								
139.23	6251.8	139.48	6251.7	139.73	6251.6	139.98	6251.5	140.23
6251.4								
140.48	6251.3	140.73	6251.2	140.99	6251.1	141.24	6251	141.49
6250.9								
141.74	6250.8	141.99	6250.7	142.24	6250.6	142.49	6250.5	142.74
6250.4								
142.99	6250.3	143.24	6250.2	143.49	6250.1	143.74	6250	143.99
6249.9								
144.25	6249.8	144.5	6249.7	144.75	6249.6	155.21	6249.6	155.51
6249.7								
155.81	6249.8	156.11	6249.9	156.41	6250	156.71	6250.1	157.01
6250.2								
157.31	6250.3	157.61	6250.4	157.91	6250.5	158.21	6250.6	158.51
6250.7								
158.81	6250.8	159.11	6250.9	159.41	6251	159.71	6251.1	160.01
6251.2								
160.31	6251.3	160.61	6251.4	160.91	6251.5	161.21	6251.6	161.51
6251.7								
161.81	6251.8	162.11	6251.9	162.41	6252	162.71	6252.1	163.01
6252.2								
163.31	6252.3	163.61	6252.4	163.91	6252.5	164.21	6252.6	164.51
6252.7								
164.81	6252.8	165.11	6252.9	165.41	6253	165.71	6253.1	166.01
6253.2								
166.31	6253.3	166.61	6253.4	166.91	6253.5	167.21	6253.6	167.51
6253.7								
167.81	6253.8	168.11	6253.9	168.41	6254	168.71	6254.1	169.02
6254.2								
169.32	6254.3	169.62	6254.4	169.93	6254.5	170.23	6254.6	170.53
6254.7								
170.84	6254.8	171.14	6254.9	171.44	6255	171.48	6255.02	171.68
6255.1								
171.88	6255.2	172.08	6255.3	172.28	6255.4	172.48	6255.5	172.68
6255.6								

172.89	6255.7	173.09	6255.8	173.29	6255.9	173.49	6256	173.69
6256.1								
173.89	6256.2	174.09	6256.3	174.29	6256.4	181.87	6256.5	186.87
6256.6								
190	6256.7	191.15	6256.8	193.28	6256.9	196.33	6257	200.35
6257.1								
205.4	6257.2	211.85	6257.3	220.64	6257.4	238.15	6257.5	245.04
6257.6								
259.5	6257.7	273.95	6257.8	281.58	6257.9	282.39	6258	283.21
6258.1								
284.02	6258.2	284.84	6258.3	285.66	6258.4	286.5	6258.5	287.35
6258.6								
288.2	6258.7	289.06	6258.8	289.94	6258.9	290.75	6259	291.63
6259.1								
292.5	6259.2	293.38	6259.3	294.26	6259.4	295.13	6259.5	295.99
6259.6								
300	6259.6							

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
0 .03 131.11 .013 171.48 .03		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.
Expan.						
131.11	171.48	50	50	50	.1	
.3						
Left Levee	Station=	105.85	Elevation=	6261.73		
Right Levee	Station=	173.7	Elevation=	6256.46		

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6255.68	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.46	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6254.22	Reach Len. (ft)	50.00
50.00 50.00			
Crit W.S. (ft)	6254.22	Flow Area (sq ft)	
106.96			
E.G. Slope (ft/ft)	0.001780	Area (sq ft)	
106.96			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.89	Top Width (ft)	
35.89			
Vel Total (ft/s)	9.69	Avg. Vel. (ft/s)	
9.69			
Max Chl Dpth (ft)	4.62	Hydr. Depth (ft)	
2.98			
Conv. Total (cfs)	24580.2	Conv. (cfs)	
24580.2			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	

37.52			
Min Ch El (ft)	6249.60	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
105.85 173.70			
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.01
0.18			
C & E Loss (ft)	0.00	Cum SA (acres)	
0.04			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 968

INPUT  
Description:

Station	Elevation	Data	num=	248					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev									
0	6263.5	2.29	6263.5	4.34	6263.4	6.47	6263.3	8.6	
6263.2									
10.72	6263.1	12.85	6263	14.98	6262.9	17.11	6262.8	19.26	
6262.7									
21.53	6262.6	23.81	6262.5	26.08	6262.4	29.13	6262.3	33.63	
6262.2									
38.13	6262.1	42.73	6262	70.63	6261.9	75.25	6261.8	79.86	
6261.7									
82.85	6261.7	83.83	6261.8	83.98	6261.8	86.85	6261.7	89.72	
6261.6									
91.59	6261.5	93.21	6261.4	94.82	6261.3	96.75	6261.2	98.92	
6261.1									
101.1	6261	103.69	6260.9	105.68	6260.8	107.35	6260.7	107.74	
6260.6									
108.12	6260.5	108.5	6260.4	108.88	6260.3	109.27	6260.2	109.65	
6260.1									
110.03	6260	110.42	6259.9	110.8	6259.8	111.18	6259.7	111.56	
6259.6									
111.95	6259.5	112.33	6259.4	112.71	6259.3	113.09	6259.2	113.48	
6259.1									
113.86	6259	114.24	6258.9	114.62	6258.8	115.01	6258.7	115.39	

6258.6  
115.77 6258.5 116.15 6258.4 116.54 6258.3 116.92 6258.2 117.3  
6258.1  
117.69 6258 118.07 6257.9 118.45 6257.8 118.83 6257.7 119.22  
6257.6  
119.6 6257.5 119.98 6257.4 120.36 6257.3 120.75 6257.2 121.13  
6257.1  
121.51 6257 121.89 6256.9 122.28 6256.8 122.66 6256.7 123.04  
6256.6  
123.42 6256.5 123.81 6256.4 124.19 6256.3 124.57 6256.2 124.96  
6256.1  
125.34 6256 125.72 6255.9 126.1 6255.8 126.49 6255.7 126.87  
6255.6  
127.25 6255.5 127.63 6255.4 128.02 6255.3 128.4 6255.2 128.78  
6255.1  
129.16 6255 129.55 6254.9 129.93 6254.8 130.31 6254.7 130.69  
6254.6  
131.08 6254.5 131.44 6254.4 131.69 6254.3 131.95 6254.2 132.2  
6254.1  
132.45 6254 132.7 6253.9 132.95 6253.8 133.2 6253.7 133.45  
6253.6  
133.7 6253.5 133.95 6253.4 134.2 6253.3 134.45 6253.2 134.7  
6253.1  
134.95 6253 135.21 6252.9 135.46 6252.8 135.71 6252.7 135.96  
6252.6  
136.21 6252.5 136.46 6252.4 136.71 6252.3 136.96 6252.2 137.21  
6252.1  
137.46 6252 137.71 6251.9 137.96 6251.8 138.21 6251.7 138.47  
6251.6  
138.72 6251.5 138.97 6251.4 139.22 6251.3 139.47 6251.2 139.72  
6251.1  
139.97 6251 140.22 6250.9 140.47 6250.8 140.72 6250.7 140.97  
6250.6  
141.22 6250.5 141.47 6250.4 141.73 6250.3 141.98 6250.2 142.23  
6250.1  
142.48 6250 142.73 6249.9 142.98 6249.8 143.23 6249.7 143.48  
6249.6  
143.73 6249.5 143.98 6249.4 144.23 6249.3 144.48 6249.2 144.73  
6249.1  
155.18 6249.1 155.48 6249.2 155.78 6249.3 156.08 6249.4 156.38  
6249.5  
156.68 6249.6 156.98 6249.7 157.28 6249.8 157.58 6249.9 157.88  
6250  
158.18 6250.1 158.48 6250.2 158.78 6250.3 159.08 6250.4 159.38  
6250.5  
159.68 6250.6 159.98 6250.7 160.28 6250.8 160.58 6250.9 160.88  
6251  
161.18 6251.1 161.48 6251.2 161.78 6251.3 162.08 6251.4 162.38  
6251.5  
162.68 6251.6 162.98 6251.7 163.28 6251.8 163.58 6251.9 163.88  
6252  
164.18 6252.1 164.48 6252.2 164.78 6252.3 165.08 6252.4 165.38  
6252.5

165.68 6252.6 165.98 6252.7 166.28 6252.8 166.58 6252.9 166.88  
6253  
167.18 6253.1 167.48 6253.2 167.78 6253.3 168.08 6253.4 168.38  
6253.5  
168.68 6253.6 168.98 6253.7 169.28 6253.8 169.59 6253.9 169.89  
6254  
169.91 6254.01 170.19 6254.1 170.5 6254.2 170.8 6254.3 171.1  
6254.4  
171.41 6254.5 171.71 6254.6 172.01 6254.7 172.31 6254.8 172.62  
6254.9  
172.92 6255 173.22 6255.1 173.53 6255.2 173.83 6255.3 174.13  
6255.4  
174.41 6255.5 179.49 6255.6 184.48 6255.7 189.48 6255.8 194.21  
6255.9  
198.77 6256 203.33 6256.1 207.89 6256.2 212.44 6256.3 217  
6256.4  
221.56 6256.5 226.12 6256.6 230.68 6256.7 235.24 6256.8 239.8  
6256.9  
244.36 6257 248.92 6257.1 253.48 6257.2 258.04 6257.3 262.6  
6257.4  
267.85 6257.5 282.3 6257.6 289.42 6257.7 290.24 6257.8 291.05  
6257.9  
291.88 6258 292.73 6258.1 293.58 6258.2 294.44 6258.3 295.31  
6258.4  
296.19 6258.5 297.06 6258.6 300 6258.6  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 132.45 .013 169.91 .03  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 132.45 169.91 50 50 50 .1  
.3  
Left Levee Station= 83.65 Elevation= 6261.85  
Right Levee Station= 274.63 Elevation= 6258.85  
CROSS SECTION OUTPUT Profile #Flow 1  
E.G. Elev (ft) 6255.18 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.46 Wt. n-Val.  
0.013  
W.S. Elev (ft) 6253.72 Reach Len. (ft) 21.51  
21.51 21.51  
Crit W.S. (ft) 6253.72 Flow Area (sq ft)  
106.85  
E.G. Slope (ft/ft) 0.001784 Area (sq ft)  
106.85  
Q Total (cfs) 1037.00 Flow (cfs)  
1037.00  
Top Width (ft) 35.86 Top Width (ft)





162.64	6251.1	162.94	6251.2	163.24	6251.3	163.54	6251.4	163.84
6251.5								
164.14	6251.6	164.44	6251.7	164.74	6251.8	165.04	6251.9	165.34
6252								
165.64	6252.1	165.94	6252.2	166.24	6252.3	166.54	6252.4	166.84
6252.5								
167.14	6252.6	167.44	6252.7	167.74	6252.8	168.04	6252.9	168.34
6253								
168.64	6253.1	168.94	6253.2	169.25	6253.3	169.55	6253.4	169.85
6253.5								
170.16	6253.6	170.46	6253.7	170.76	6253.8	171.07	6253.9	171.37
6254								
171.41	6254.01	171.67	6254.1	171.97	6254.2	172.28	6254.3	172.58
6254.4								
172.88	6254.5	173.19	6254.6	173.49	6254.7	173.79	6254.8	174.1
6254.9								
174.67	6255	179.67	6255.1	184.67	6255.2	189.66	6255.3	194.58
6255.4								
199.5	6255.5	204.41	6255.6	209.33	6255.7	214.24	6255.8	219.16
6255.9								
224.07	6256	228.99	6256.1	233.91	6256.2	238.82	6256.3	243.74
6256.4								
248.65	6256.5	253.57	6256.6	258.48	6256.7	263.4	6256.8	268.32
6256.9								
273.23	6257	277.93	6257.1	282.49	6257.2	287.05	6257.3	291.61
6257.4								
297.27	6257.5	298.12	6257.6	300	6257.6			

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.03	131.31	.013
		171.41	.03

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff	Contr.
Expan.						
	131.31	171.41		50	50	50
.3						.1
Left Levee	Station=	75.27	Elevation=	6260.12		
Right Levee	Station=	176.21	Elevation=	6255.12		

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6254.32	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.31	Wt. n-Val.	0.030
0.013			
W.S. Elev (ft)	6253.01	Reach Len. (ft)	50.00
50.00			
Crit W.S. (ft)	6253.01	Flow Area (sq ft)	21.71
112.20			
E.G. Slope (ft/ft)	0.001599	Area (sq ft)	21.71
112.20			
Q Total (cfs)	1100.00	Flow (cfs)	46.33

1053.67			
Top Width (ft)	56.36	Top Width (ft)	19.30
37.06			
Vel Total (ft/s)	8.21	Avg. Vel. (ft/s)	2.13
9.39			
Max Chl Dpth (ft)	4.41	Hydr. Depth (ft)	1.12
3.03			
Conv. Total (cfs)	27510.0	Conv. (cfs)	1158.8
26351.2			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	19.41
38.10			
Min Ch El (ft)	6248.60	Shear (lb/sq ft)	0.11
0.29			
Alpha	1.25	Stream Power (lb/ft s)	300.00
75.27	176.21		
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.06
4.13	0.00		
C & E Loss (ft)	0.01	Cum SA (acres)	0.25
1.16	0.01		

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

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

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-1 RS: 965

INPUT									
Description:									
Station	Elevation	Data	num=	264					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6259.6	46.46	6259.6	48.64	6259.7	50.38	6259.8	50.88	
6259.9									
51.38	6260	51.89	6260.1	52.39	6260.2	52.89	6260.3	53.39	
6260.4									
53.89	6260.5	54.4	6260.6	54.9	6260.7	55.4	6260.8	55.9	
6260.9									
56.4	6261	56.5	6261	56.88	6260.9	57.26	6260.8	58.11	
6260.7									
59.23	6260.6	60.35	6260.5	61.46	6260.4	62.58	6260.3	63.7	

6260.2								
64.82	6260.1	65.93	6260	67.05	6259.9	69.63	6259.8	72.09
6259.7								
73.5	6259.6	74.92	6259.5	76.33	6259.4	77.75	6259.3	79.16
6259.2								
80.58	6259.1	81.99	6259	83.41	6258.9	84.81	6258.8	85.63
6258.7								
86.46	6258.6	87.28	6258.5	88.1	6258.4	88.93	6258.3	89.08
6258.3								
89.77	6258.4	90.53	6258.5	91.38	6258.6	92.23	6258.7	93.08
6258.8								
93.93	6258.9	94.77	6259	95.62	6259.1	96.47	6259.2	97.32
6259.3								
98.16	6259.4	99.01	6259.5	99.86	6259.6	102.05	6259.7	104.64
6259.7								
106.06	6259.6	107.49	6259.5	108.22	6259.4	108.45	6259.3	108.68
6259.2								
108.91	6259.1	109.14	6259	109.36	6258.9	109.67	6258.8	110.19
6258.7								
110.71	6258.6	111.23	6258.5	111.75	6258.4	112.27	6258.3	112.8
6258.2								
113.32	6258.1	113.84	6258	114.36	6257.9	114.88	6257.8	115.37
6257.7								
115.68	6257.6	115.99	6257.5	116.3	6257.4	116.61	6257.3	116.91
6257.2								
117.22	6257.1	117.53	6257	117.84	6256.9	118.15	6256.8	118.46
6256.7								
118.76	6256.6	119.07	6256.5	119.38	6256.4	119.69	6256.3	120
6256.2								
120.3	6256.1	120.61	6256	120.92	6255.9	121.23	6255.8	121.54
6255.7								
121.84	6255.6	122.15	6255.5	122.46	6255.4	122.77	6255.3	123.08
6255.2								
123.39	6255.1	123.69	6255	124	6254.9	124.31	6254.8	124.62
6254.7								
124.93	6254.6	125.23	6254.5	125.54	6254.4	125.85	6254.3	126.16
6254.2								
126.47	6254.1	126.78	6254	127.08	6253.9	127.39	6253.8	127.7
6253.7								
128.01	6253.6	128.32	6253.5	128.62	6253.4	128.93	6253.3	129.24
6253.2								
129.55	6253.1	129.86	6253	130.17	6252.9	130.47	6252.8	130.78
6252.7								
131.09	6252.6	131.4	6252.5	131.7	6252.4	132	6252.3	132.3
6252.2								
132.6	6252.1	132.9	6252	133.2	6251.9	133.5	6251.8	133.81
6251.7								
134.11	6251.6	134.41	6251.5	134.71	6251.4	135.01	6251.3	135.31
6251.2								
135.61	6251.1	135.91	6251	136.21	6250.9	136.51	6250.8	136.81
6250.7								
137.11	6250.6	137.41	6250.5	137.71	6250.4	138.01	6250.3	138.31
6250.2								

138.61	6250.1	138.91	6250	139.21	6249.9	139.51	6249.8	139.81
6249.7								
140.11	6249.6	140.41	6249.5	140.71	6249.4	141.01	6249.3	141.31
6249.2								
141.61	6249.1	141.91	6249	142.21	6248.9	142.51	6248.8	142.81
6248.7								
143.11	6248.6	143.41	6248.5	143.71	6248.4	144.01	6248.3	144.31
6248.2								
144.61	6248.1	155.1	6248.1	155.4	6248.2	155.7	6248.3	156
6248.4								
156.3	6248.5	156.6	6248.6	156.9	6248.7	157.2	6248.8	157.5
6248.9								
157.8	6249	158.1	6249.1	158.4	6249.2	158.7	6249.3	159
6249.4								
159.3	6249.5	159.6	6249.6	159.9	6249.7	160.2	6249.8	160.5
6249.9								
160.8	6250	161.1	6250.1	161.4	6250.2	161.7	6250.3	162
6250.4								
162.3	6250.5	162.6	6250.6	162.9	6250.7	163.2	6250.8	163.5
6250.9								
163.8	6251	164.1	6251.1	164.4	6251.2	164.7	6251.3	165
6251.4								
165.3	6251.5	165.6	6251.6	165.9	6251.7	166.2	6251.8	166.5
6251.9								
166.8	6252	167.1	6252.1	167.4	6252.2	167.7	6252.3	168
6252.4								
168.3	6252.5	168.6	6252.6	168.91	6252.7	169.21	6252.8	169.51
6252.9								
169.82	6253	169.84	6253.01	170.12	6253.1	170.42	6253.2	170.73
6253.3								
171.03	6253.4	171.33	6253.5	171.63	6253.6	171.94	6253.7	172.24
6253.8								
172.54	6253.9	172.85	6254	173.15	6254.1	173.45	6254.2	173.76
6254.3								
174.06	6254.4	174.55	6254.5	179.55	6254.6	184.55	6254.7	189.55
6254.8								
194.99	6254.9	200.43	6255	205.87	6255.1	211.31	6255.2	216.75
6255.3								
222.2	6255.4	227.64	6255.5	233.08	6255.6	238.52	6255.7	243.96
6255.8								
249.4	6255.9	254.84	6256	261.61	6256.1	268.4	6256.2	275.19
6256.3								
281.98	6256.4	288.77	6256.5	295.56	6256.6	300	6256.6	
Manning's	n Values		num=	3				
Sta	n Val	Sta	n Val	Sta	n Val			
0	.03	129.86	.013	169.84	.03			
Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.
Expan.								
	129.86	169.84		50	50	50		.1
.3								
Ineffective Flow		num=	1					

Sta L Sta R Elev Permanent  
0 98.73 6259.63 F  
Left Levee Station= 104.59 Elevation= 6259.7  
Right Levee Station= 256.2 Elevation= 6256.16

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6254.20	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.46	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6252.74	Reach Len. (ft)	50.00
50.00 50.00			
Crit W.S. (ft)	6252.74	Flow Area (sq ft)	
113.30			
E.G. Slope (ft/ft)	0.001793	Area (sq ft)	
113.30			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	38.38	Top Width (ft)	
38.38			
Vel Total (ft/s)	9.71	Avg. Vel. (ft/s)	
9.71			
Max Chl Dpth (ft)	4.64	Hydr. Depth (ft)	
2.95			
Conv. Total (cfs)	25977.7	Conv. (cfs)	
25977.7			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
39.88			
Min Ch El (ft)	6248.10	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
104.59 256.20			
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.05
4.00 0.00			
C & E Loss (ft)	0.01	Cum SA (acres)	0.24
1.12 0.01			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 964

INPUT  
Description:  
Station Elevation Data num= 240  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6259.5 50.51 6259.5 58.79 6259.4 66.02 6259.3 71.28  
6259.3  
71.51 6259.4 73.06 6259.4 74.55 6259.3 76.04 6259.2 77.53  
6259.1  
79.02 6259 80.51 6258.9 81.85 6258.8 82.67 6258.7 83.49  
6258.6  
84.32 6258.5 85.14 6258.4 85.96 6258.3 86.79 6258.2 87.61  
6258.1  
88.43 6258 89.26 6257.9 90.08 6257.8 90.91 6257.7 91.57  
6257.7  
92.27 6257.8 92.96 6257.9 93.66 6258 94.36 6258.1 95.05  
6258.2  
95.75 6258.3 96.45 6258.4 97.15 6258.5 97.84 6258.6 98.54  
6258.7  
99.26 6258.8 100.11 6258.9 100.95 6259 101.8 6259.1 104.15  
6259.2  
106.12 6259.2 108.12 6259.1 110.11 6259 110.86 6258.9 111.16  
6258.8  
111.46 6258.7 111.75 6258.6 112.05 6258.5 112.35 6258.4 112.64  
6258.3  
112.94 6258.2 113.24 6258.1 113.53 6258 113.83 6257.9 114.13  
6257.8  
114.42 6257.7 114.72 6257.6 115.02 6257.5 115.31 6257.4 115.61  
6257.3  
115.91 6257.2 116.2 6257.1 116.5 6257 116.8 6256.9 117.09  
6256.8  
117.39 6256.7 117.69 6256.6 117.98 6256.5 118.28 6256.4 118.58  
6256.3  
118.87 6256.2 119.17 6256.1 119.47 6256 119.77 6255.9 120.07  
6255.8  
120.38 6255.7 120.68 6255.6 120.98 6255.5 121.29 6255.4 121.59  
6255.3  
121.89 6255.2 122.2 6255.1 122.5 6255 122.8 6254.9 123.11  
6254.8  
123.41 6254.7 123.72 6254.6 124.03 6254.5 124.33 6254.4 124.64  
6254.3  
124.95 6254.2 125.26 6254.1 125.57 6254 125.87 6253.9 126.22  
6253.8  
126.57 6253.7 126.82 6253.6 127.19 6253.5 127.46 6253.4 127.73  
6253.3  
128 6253.2 128.26 6253.1 128.53 6253 128.8 6252.9 129.1  
6252.8  
129.39 6252.7 129.67 6252.6 129.96 6252.5 130.25 6252.4 130.53

6252.3  
130.82 6252.2 131.11 6252.1 131.39 6252 131.69 6251.9 131.99  
6251.8  
132.29 6251.7 132.59 6251.6 132.89 6251.5 133.19 6251.4 133.49  
6251.3  
133.79 6251.2 134.09 6251.1 134.39 6251 134.69 6250.9 134.99  
6250.8  
135.29 6250.7 135.59 6250.6 135.89 6250.5 136.19 6250.4 136.49  
6250.3  
136.79 6250.2 137.09 6250.1 137.39 6250 137.69 6249.9 137.99  
6249.8  
138.29 6249.7 138.59 6249.6 138.89 6249.5 139.19 6249.4 139.49  
6249.3  
139.79 6249.2 140.09 6249.1 140.39 6249 140.69 6248.9 140.99  
6248.8  
141.29 6248.7 141.59 6248.6 141.89 6248.5 142.19 6248.4 142.49  
6248.3  
142.79 6248.2 143.09 6248.1 143.39 6248 143.69 6247.9 143.99  
6247.8  
144.29 6247.7 144.59 6247.6 155.01 6247.6 155.21 6247.7 155.41  
6247.8  
155.61 6247.9 155.85 6248 156.15 6248.1 156.45 6248.2 156.75  
6248.3  
157.05 6248.4 157.35 6248.5 157.65 6248.6 157.95 6248.7 158.25  
6248.8  
158.55 6248.9 158.85 6249 159.15 6249.1 159.45 6249.2 159.75  
6249.3  
160.05 6249.4 160.35 6249.5 160.65 6249.6 160.95 6249.7 161.25  
6249.8  
161.55 6249.9 161.85 6250 162.15 6250.1 162.45 6250.2 162.75  
6250.3  
163.05 6250.4 163.35 6250.5 163.65 6250.6 163.95 6250.7 164.25  
6250.8  
164.55 6250.9 164.85 6251 165.15 6251.1 165.45 6251.2 165.75  
6251.3  
166.05 6251.4 166.35 6251.5 166.65 6251.6 166.95 6251.7 167.25  
6251.8  
167.55 6251.9 167.85 6252 168.15 6252.1 168.9 6252.2 169.2  
6252.3  
169.5 6252.4 169.81 6252.5 170.11 6252.6 170.41 6252.7 170.71  
6252.8  
171.02 6252.9 171.32 6253 171.36 6253.01 171.62 6253.1 171.93  
6253.2  
172.23 6253.3 172.53 6253.4 172.84 6253.5 173.14 6253.6 173.44  
6253.7  
173.74 6253.8 174.05 6253.9 174.47 6254 179.47 6254.1 184.47  
6254.2  
189.47 6254.3 198.65 6254.4 207.85 6254.5 217.05 6254.6 226.25  
6254.7  
235.45 6254.8 244.65 6254.9 253.85 6255 262.34 6255.1 269.17  
6255.2  
275.99 6255.3 282.82 6255.4 289.65 6255.5 296.48 6255.6 300  
6255.6

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 128.53 .013 171.36 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 128.53 171.36 50 50 50 .1  
.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
0 101.24 6259.12 F  
Left Levee Station= 104.59 Elevation= 6259.22  
Right Levee Station= 254.95 Elevation= 6255.19

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft) 6253.75 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.44 Wt. n-Val.  
0.013  
W.S. Elev (ft) 6252.31 Reach Len. (ft) 50.00  
50.00 50.00  
Crit W.S. (ft) 6252.31 Flow Area (sq ft)  
114.09  
E.G. Slope (ft/ft) 0.001776 Area (sq ft)  
114.09  
Q Total (cfs) 1100.00 Flow (cfs)  
1100.00  
Top Width (ft) 38.73 Top Width (ft)  
38.73  
Vel Total (ft/s) 9.64 Avg. Vel. (ft/s)  
9.64  
Max Chl Dpth (ft) 4.71 Hydr. Depth (ft)  
2.95  
Conv. Total (cfs) 26104.4 Conv. (cfs)  
26104.4  
Length Wtd. (ft) 50.00 Wetted Per. (ft)  
40.28  
Min Ch El (ft) 6247.60 Shear (lb/sq ft)  
0.31  
Alpha 1.00 Stream Power (lb/ft s) 300.00  
104.59 254.95  
Frctn Loss (ft) 0.09 Cum Volume (acre-ft) 0.05  
3.87 0.00  
C & E Loss (ft) 0.01 Cum SA (acres) 0.24  
1.08 0.01

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

6254.7								
122.58	6254.6	122.85	6254.5	123.12	6254.4	123.39	6254.3	123.65
6254.2								
123.92	6254.1	124.19	6254	124.47	6253.9	124.81	6253.8	125.1
6253.7								
125.39	6253.6	125.68	6253.5	125.96	6253.4	126.25	6253.3	126.54
6253.2								
126.82	6253.1	127.11	6253	127.4	6252.9	127.68	6252.8	127.97
6252.7								
128.26	6252.6	128.54	6252.5	128.83	6252.4	129.12	6252.3	129.41
6252.2								
129.69	6252.1	129.98	6252	130.27	6251.9	130.55	6251.8	130.84
6251.7								
131.13	6251.6	131.41	6251.5	131.71	6251.4	132.01	6251.3	132.31
6251.2								
132.61	6251.1	132.91	6251	133.21	6250.9	133.51	6250.8	133.81
6250.7								
134.11	6250.6	134.41	6250.5	134.71	6250.4	135.01	6250.3	135.31
6250.2								
135.61	6250.1	135.91	6250	136.21	6249.9	136.51	6249.8	136.81
6249.7								
137.11	6249.6	137.41	6249.5	137.71	6249.4	138.01	6249.3	138.31
6249.2								
138.61	6249.1	138.91	6249	139.21	6248.9	139.51	6248.8	139.81
6248.7								
140.11	6248.6	140.41	6248.5	140.71	6248.4	141.01	6248.3	141.31
6248.2								
141.61	6248.1	141.91	6248	142.21	6247.9	142.51	6247.8	142.81
6247.7								
143.11	6247.6	143.41	6247.5	143.71	6247.4	144.01	6247.3	144.31
6247.2								
144.61	6247.1	155.02	6247.1	155.22	6247.2	155.42	6247.3	155.62
6247.4								
155.82	6247.5	156.02	6247.6	156.22	6247.7	156.42	6247.8	156.62
6247.9								
156.82	6248	157.02	6248.1	157.22	6248.2	157.42	6248.3	157.72
6248.4								
158.02	6248.5	158.32	6248.6	158.62	6248.7	158.92	6248.8	159.22
6248.9								
159.52	6249	159.82	6249.1	160.12	6249.2	160.42	6249.3	160.72
6249.4								
161.02	6249.5	161.32	6249.6	161.62	6249.7	161.92	6249.8	162.22
6249.9								
162.52	6250	162.82	6250.1	163.12	6250.2	163.42	6250.3	163.72
6250.4								
164.02	6250.5	164.32	6250.6	164.62	6250.7	164.92	6250.8	165.22
6250.9								
165.52	6251	165.82	6251.1	166.12	6251.2	166.42	6251.3	166.72
6251.4								
167.02	6251.5	167.32	6251.6	167.62	6251.7	167.92	6251.8	168.22
6251.9								
169.43	6252	169.84	6252.06	170.12	6252.1	170.42	6252.2	170.72
6252.3								

171.03	6252.4	171.33	6252.5	171.63	6252.6	171.94	6252.7	172.24
6252.8								
172.54	6252.9	172.85	6253	173.15	6253.1	173.45	6253.2	173.75
6253.3								
174.06	6253.4	174.41	6253.5	179.41	6253.6	184.41	6253.7	189.41
6253.8								
198.53	6253.9	207.73	6254	216.93	6254.1	226.13	6254.2	235.33
6254.3								
248.64	6254.4	263.69	6254.5	278.74	6254.6	293.79	6254.7	300
6254.7								

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.03	129.98	.013
		169.84	.03

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.
Expan.								
	129.98	169.84		50	50	50		.1

.3								
Ineffective Flow	num=	1						
Sta L	Sta R	Elev	Permanent					
0	102.5	6258.36	F					
Left Levee	Station=	105.43	Elevation=	6258.46				
Right Levee	Station=	209.72	Elevation=	6254.02				

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6253.34	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.50	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6251.84	Reach Len. (ft)	50.00
50.00	50.00		
Crit W.S. (ft)	6251.84	Flow Area (sq ft)	
111.93			
E.G. Slope (ft/ft)	0.001829	Area (sq ft)	
111.93			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	37.63	Top Width (ft)	
37.63			
Vel Total (ft/s)	9.83	Avg. Vel. (ft/s)	
9.83			
Max Chl Dpth (ft)	4.74	Hydr. Depth (ft)	
2.97			
Conv. Total (cfs)	25723.4	Conv. (cfs)	
25723.4			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
39.26			
Min Ch El (ft)	6247.10	Shear (lb/sq ft)	
0.33			
Alpha	1.00	Stream Power (lb/ft s)	300.00

105.43	209.72				
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.05		
3.74	0.00				
C & E Loss (ft)	0.00	Cum SA (acres)	0.24		
1.03	0.01				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 962

INPUT										
Description:										
Station	Elevation	Data	num=	244						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev										
0	6257.6	58.01	6257.6	58.97	6257.7	59.61	6257.8	59.71		
6257.9										
59.8	6258	59.9	6258.1	59.99	6258.2	60.09	6258.3	60.19		
6258.4										
60.28	6258.5	60.38	6258.6	60.47	6258.7	60.57	6258.8	60.67		
6258.9										
61.02	6258.9	62.36	6258.8	63.7	6258.7	65.05	6258.6	66.62		
6258.5										
68.61	6258.4	70.59	6258.3	72.58	6258.2	74.56	6258.1	76.55		
6258										
78.53	6257.9	80.52	6257.8	82.17	6257.7	83.43	6257.6	84.69		
6257.5										
85.95	6257.4	87.21	6257.3	88.47	6257.2	89.73	6257.1	90.87		
6257										
91.82	6256.9	92.78	6256.8	93.73	6256.7	94.69	6256.6	96.65		
6256.6										
97.99	6256.7	99.04	6256.8	100.05	6256.9	101.05	6257	102.05		
6257.1										
103.05	6257.2	104.06	6257.3	105.06	6257.4	106.06	6257.5	107.06		
6257.6										
112.88	6257.6	113.15	6257.5	113.41	6257.4	113.68	6257.3	113.95		
6257.2										
114.22	6257.1	114.49	6257	114.75	6256.9	115.02	6256.8	115.29		

6256.7								
115.56	6256.6	115.83	6256.5	116.09	6256.4	116.36	6256.3	116.63
6256.2								
116.9	6256.1	117.17	6256	117.44	6255.9	117.7	6255.8	117.97
6255.7								
118.24	6255.6	118.51	6255.5	118.78	6255.4	119.04	6255.3	119.31
6255.2								
119.58	6255.1	119.85	6255	120.2	6254.9	120.53	6254.8	120.82
6254.7								
121.11	6254.6	121.4	6254.5	121.68	6254.4	121.97	6254.3	122.26
6254.2								
122.54	6254.1	122.83	6254	123.12	6253.9	123.4	6253.8	123.69
6253.7								
123.98	6253.6	124.26	6253.5	124.55	6253.4	124.84	6253.3	125.12
6253.2								
125.41	6253.1	125.7	6253	125.98	6252.9	126.27	6252.8	126.56
6252.7								
126.84	6252.6	127.13	6252.5	127.42	6252.4	127.7	6252.3	127.99
6252.2								
128.28	6252.1	128.56	6252	128.85	6251.9	129.14	6251.8	129.42
6251.7								
129.71	6251.6	130	6251.5	130.28	6251.4	130.57	6251.3	130.86
6251.2								
131.14	6251.1	131.43	6251	131.73	6250.9	132.03	6250.8	132.33
6250.7								
132.63	6250.6	132.93	6250.5	133.23	6250.4	133.53	6250.3	133.83
6250.2								
134.13	6250.1	134.43	6250	134.73	6249.9	135.03	6249.8	135.33
6249.7								
135.63	6249.6	135.93	6249.5	136.23	6249.4	136.53	6249.3	136.83
6249.2								
137.13	6249.1	137.43	6249	137.73	6248.9	138.03	6248.8	138.33
6248.7								
138.63	6248.6	138.93	6248.5	139.23	6248.4	139.53	6248.3	139.83
6248.2								
140.13	6248.1	140.43	6248	140.73	6247.9	141.03	6247.8	141.33
6247.7								
141.63	6247.6	141.93	6247.5	142.23	6247.4	142.53	6247.3	142.83
6247.2								
143.13	6247.1	143.43	6247	143.73	6246.9	144.03	6246.8	144.33
6246.7								
144.63	6246.6	155.03	6246.6	155.23	6246.7	155.43	6246.8	155.63
6246.9								
155.83	6247	156.03	6247.1	156.23	6247.2	156.43	6247.3	156.63
6247.4								
156.83	6247.5	157.03	6247.6	157.23	6247.7	157.43	6247.8	157.63
6247.9								
157.83	6248	158.03	6248.1	158.23	6248.2	158.43	6248.3	158.63
6248.4								
158.83	6248.5	159.03	6248.6	159.29	6248.7	159.59	6248.8	159.89
6248.9								
160.19	6249	160.49	6249.1	160.79	6249.2	161.09	6249.3	161.39
6249.4								

161.69	6249.5	161.99	6249.6	162.29	6249.7	162.59	6249.8	162.89
6249.9								
163.19	6250	163.49	6250.1	163.79	6250.2	164.09	6250.3	164.39
6250.4								
164.69	6250.5	164.99	6250.6	165.29	6250.7	165.59	6250.8	165.89
6250.9								
166.19	6251	166.49	6251.1	166.79	6251.2	167.09	6251.3	167.39
6251.4								
167.69	6251.5	167.99	6251.6	168.29	6251.7	169.79	6251.8	171.04
6251.9								
171.34	6252	171.44	6252.03	171.64	6252.1	171.95	6252.2	172.25
6252.3								
172.55	6252.4	172.85	6252.5	173.16	6252.6	173.46	6252.7	173.76
6252.8								
174.07	6252.9	174.37	6253	180.35	6253.1	185.65	6253.2	190.65
6253.3								
193.73	6253.3	196.42	6253.2	199.11	6253.1	203.57	6253.1	206.61
6253.2								
209.66	6253.3	212.7	6253.4	219.21	6253.5	233.34	6253.6	247.47
6253.7								
261.61	6253.8	275.76	6253.9	297.15	6254	300	6254	

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.03	128.56	.013
171.44	.03		
Bank Sta: Left		Right	Lengths: Left Channel
Expan.		Right	Coeff Contr.
128.56		171.44	50 50 50 .1
.3			
Ineffective Flow		num= 1	
Sta L	Sta R	Elev	Permanent
0	105.85	6257.63	F
Left Levee		Station=	112.97
Right Levee		Station=	192.54
		Elevation=	6257.63
		Elevation=	6253.38

CROSS SECTION OUTPUT				Profile #Flow 1			
E.G. Elev (ft)		6252.92	Element		Left OB		
Channel Right OB							
Vel Head (ft)		1.49	Wt. n-Val.				
0.013							
W.S. Elev (ft)		6251.43	Reach Len. (ft)		50.00		
50.00		50.00					
Crit W.S. (ft)		6251.43	Flow Area (sq ft)				
112.24							
E.G. Slope (ft/ft)		0.001794	Area (sq ft)				
112.24							
Q Total (cfs)		1100.00	Flow (cfs)				
1100.00							
Top Width (ft)		37.25	Top Width (ft)				
37.25							

Vel Total (ft/s) 9.80 Avg. Vel. (ft/s)  
9.80  
Max Chl Dpth (ft) 4.82 Hydr. Depth (ft)  
3.01  
Conv. Total (cfs) 25969.3 Conv. (cfs)  
25969.3  
Length Wtd. (ft) 50.00 Wetted Per. (ft)  
38.97  
Min Ch El (ft) 6246.60 Shear (lb/sq ft)  
0.32  
Alpha 1.00 Stream Power (lb/ft s) 300.00  
112.97 192.54  
Frctn Loss (ft) 0.09 Cum Volume (acre-ft) 0.05  
3.61 0.00  
C & E Loss (ft) 0.00 Cum SA (acres) 0.24  
0.99 0.01

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 961

INPUT  
Description:  
Station Elevation Data num= 334  
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
Elev  
0 6257.6 33.9 6257.6 47.55 6257.7 49.43 6257.8 51.3  
6257.9  
53.17 6258 56.2 6258 62.04 6257.9 63.31 6257.8 64.57  
6257.7  
65.83 6257.6 67.09 6257.5 68.36 6257.4 69.62 6257.3 70.88  
6257.2  
72.14 6257.1 73.41 6257 77.85 6256.9 82.81 6256.8 85.67  
6256.7  
87.46 6256.6 89.08 6256.5 90.04 6256.4 90.99 6256.3 91.95  
6256.2  
92.91 6256.1 93.86 6256 94.82 6255.9 95.77 6255.8 96.73  
6255.7

97.63 6255.7 98.98 6255.8 100.32 6255.9 101.66 6256 103  
6256.1  
104.34 6256.2 105.68 6256.3 106.87 6256.4 107.88 6256.5 108.88  
6256.6  
110.85 6256.6 114.17 6256.5 114.43 6256.4 114.7 6256.3 114.97  
6256.2  
115.24 6256.1 115.57 6256 115.94 6255.9 116.25 6255.8 116.54  
6255.7  
116.83 6255.6 117.11 6255.5 117.4 6255.4 117.69 6255.3 117.97  
6255.2  
118.26 6255.1 118.55 6255 118.83 6254.9 119.12 6254.8 119.41  
6254.7  
119.7 6254.6 119.98 6254.5 120.27 6254.4 120.56 6254.3 120.84  
6254.2  
121.13 6254.1 121.42 6254 121.7 6253.9 121.99 6253.8 122.28  
6253.7  
122.56 6253.6 122.85 6253.5 123.14 6253.4 123.42 6253.3 123.71  
6253.2  
124 6253.1 124.28 6253 124.57 6252.9 124.86 6252.8 125.14  
6252.7  
125.43 6252.6 125.72 6252.5 126 6252.4 126.29 6252.3 126.58  
6252.2  
126.86 6252.1 127.15 6252 127.44 6251.9 127.72 6251.8 128.01  
6251.7  
128.3 6251.6 128.58 6251.5 128.87 6251.4 129.16 6251.3 129.44  
6251.2  
129.73 6251.1 130.02 6251 130.3 6250.9 130.59 6250.8 130.88  
6250.7  
131.16 6250.6 131.45 6250.5 131.75 6250.4 132.05 6250.3 132.35  
6250.2  
132.65 6250.1 132.95 6250 133.25 6249.9 133.55 6249.8 133.85  
6249.7  
134.15 6249.6 134.45 6249.5 134.75 6249.4 135.05 6249.3 135.35  
6249.2  
135.65 6249.1 135.95 6249 136.25 6248.9 136.55 6248.8 136.85  
6248.7  
137.15 6248.6 137.45 6248.5 137.75 6248.4 138.05 6248.3 138.35  
6248.2  
138.65 6248.1 138.95 6248 139.25 6247.9 139.55 6247.8 139.85  
6247.7  
140.15 6247.6 140.45 6247.5 140.75 6247.4 141.05 6247.3 141.35  
6247.2  
141.65 6247.1 141.95 6247 142.25 6246.9 142.55 6246.8 142.85  
6246.7  
143.15 6246.6 143.45 6246.5 143.75 6246.4 144.05 6246.3 144.35  
6246.2  
144.65 6246.1 155.04 6246.1 155.24 6246.2 155.44 6246.3 155.64  
6246.4  
155.84 6246.5 156.04 6246.6 156.24 6246.7 156.44 6246.8 156.64  
6246.9  
156.84 6247 157.04 6247.1 157.24 6247.2 157.44 6247.3 157.64  
6247.4  
157.84 6247.5 158.04 6247.6 158.24 6247.7 158.44 6247.8 158.64



6247.9  
158.84 6248 159.04 6248.1 159.24 6248.2 159.44 6248.3 159.64  
6248.4  
159.84 6248.5 160.04 6248.6 160.24 6248.7 160.44 6248.8 160.64  
6248.9  
160.86 6249 161.16 6249.1 161.46 6249.2 161.76 6249.3 162.06  
6249.4  
162.36 6249.5 162.66 6249.6 162.96 6249.7 163.26 6249.8 163.56  
6249.9  
163.86 6250 164.16 6250.1 164.46 6250.2 164.76 6250.3 165.06  
6250.4  
165.36 6250.5 165.66 6250.6 165.96 6250.7 166.26 6250.8 166.56  
6250.9  
166.86 6251 167.16 6251.1 167.46 6251.2 167.76 6251.3 168.06  
6251.4  
168.36 6251.5 169.86 6251.58 170.16 6251.6 171.96 6251.7 172.26  
6251.8  
172.56 6251.9 172.86 6252 173.17 6252.1 173.47 6252.2 173.77  
6252.3  
174.08 6252.4 174.38 6252.5 180.91 6252.6 187.33 6252.7 189.69  
6252.7  
190.24 6252.6 190.8 6252.5 191.35 6252.4 191.9 6252.3 192.46  
6252.2  
193.01 6252.1 193.57 6252 194.12 6251.9 194.67 6251.8 195.23  
6251.7  
195.78 6251.6 196.34 6251.5 196.89 6251.4 197.44 6251.3 198  
6251.2  
198.55 6251.1 199.11 6251 199.66 6250.9 200.21 6250.8 200.77  
6250.7  
201.32 6250.6 201.87 6250.5 202.43 6250.4 202.98 6250.3 203.54  
6250.2  
204.09 6250.1 204.64 6250 205.2 6249.9 205.8 6249.8 206.84  
6249.7  
207.89 6249.6 209.9 6249.5 212.1 6249.4 212.57 6249.4 212.86  
6249.5  
213.15 6249.6 213.25 6249.3 214.35 6249.2 215.53 6249.1 216.81  
6249  
218.15 6248.9 219.67 6248.8 221.17 6248.7 222.43 6248.6 223.69  
6248.5  
225.17 6248.4 227.25 6248.3 229.88 6248.2 232.7 6248.2 234.16  
6248.3  
234.48 6249 235.16 6248.9 235.62 6248.4 235.84 6248.8 236.51  
6248.7  
237.08 6248.5 237.19 6248.6 238.94 6248.5 245.36 6248.4 251.78  
6248.3  
258.45 6248.3 259.03 6249.2 259.35 6249.1 259.91 6249 260.25  
6248.9  
260.66 6248.4 260.86 6248.8 261.47 6248.7 262.05 6248.5 262.08  
6248.6  
263.39 6248.6 264.39 6248.7 265.23 6248.8 266.13 6248.9 267.04  
6249  
267.89 6249.1 268.6 6249.2 269.31 6249.3 270.02 6249.4 270.72  
6249.5

271.41 6249.6 272.03 6249.7 272.66 6249.8 273.28 6249.9 273.87  
6250  
274.43 6250.1 275 6250.2 275.56 6250.3 276.12 6250.4 276.68  
6250.5  
277.25 6250.6 277.82 6250.7 278.4 6250.8 278.92 6250.9 279.44  
6251  
279.95 6251.1 280.46 6251.2 280.97 6251.3 281.48 6251.4 281.99  
6251.5  
282.5 6251.6 283.01 6251.7 283.52 6251.8 284.02 6251.9 284.5  
6252  
284.98 6252.1 285.46 6252.2 285.93 6252.3 286.41 6252.4 286.88  
6252.5  
287.36 6252.6 287.83 6252.7 288.31 6252.8 288.78 6252.9 289.26  
6253  
292.78 6253.1 296.67 6253.2 299.51 6253.3 300 6253.3

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 130.02 .013 169.86 .03  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 130.02 169.86 50 50 50 .1  
.3  
Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 107.1 6256.46 F  
190.03 300 6252.49 F  
Left Levee Station= 113.81 Elevation= 6256.53  
Right Levee Station= 189.61 Elevation= 6252.76

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft) 6252.47 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.50 Wt. n-Val.  
0.013  
W.S. Elev (ft) 6250.98 Reach Len. (ft) 50.00  
50.00 50.00  
Crit W.S. (ft) 6250.98 Flow Area (sq ft)  
112.08  
E.G. Slope (ft/ft) 0.001774 Area (sq ft)  
112.08  
Q Total (cfs) 1100.00 Flow (cfs)  
1100.00  
Top Width (ft) 36.70 Top Width (ft)  
36.70  
Vel Total (ft/s) 9.81 Avg. Vel. (ft/s)  
9.81  
Max Chl Dpth (ft) 4.88 Hydr. Depth (ft)  
3.05  
Conv. Total (cfs) 26119.3 Conv. (cfs)

26119.3  
Length Wtd. (ft) 50.00 Wetted Per. (ft)  
38.50  
Min Ch El (ft) 6246.10 Shear (lb/sq ft)  
0.32  
Alpha 1.00 Stream Power (lb/ft s) 300.00  
113.81 189.61  
Frctn Loss (ft) 0.09 Cum Volume (acre-ft) 0.05  
3.48 0.00  
C & E Loss (ft) 0.01 Cum SA (acres) 0.24  
0.95 0.01

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 960

INPUT  
Description:  
Station Elevation Data num= 399  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6254.2 .12 6254.2 5.46 6254.1 10.8 6254 26.21  
6253.9  
32.83 6253.8 39.45 6253.7 46.07 6253.6 56.98 6253.5 59.77  
6253.5  
60.01 6253.6 60.24 6253.7 60.47 6253.8 60.71 6253.9 60.94  
6254  
61.17 6254.1 62.37 6254.1 65.04 6254 67.16 6253.9 69.02  
6253.8  
70.72 6253.7 72.26 6253.6 73.8 6253.5 75.39 6253.4 76.95  
6253.3  
78.4 6253.2 79.77 6253.1 81.08 6253 82.34 6252.9 83.56  
6252.8  
84.75 6252.7 88.6 6252.7 91.19 6252.6 97.11 6252.5 97.66  
6252.5  
98.33 6252.6 99 6252.7 99.67 6252.8 100.29 6252.9 100.79  
6253  
101.29 6253.1 101.79 6253.2 102.29 6253.3 102.79 6253.4 103.29

6253.5  
103.79 6253.6 104.29 6253.7 104.79 6253.8 105.29 6253.9 105.79  
6254  
106.29 6254.1 106.79 6254.2 107.29 6254.3 107.79 6254.4 108.3  
6254.5  
108.8 6254.6 109.3 6254.7 109.8 6254.8 110.3 6254.9 110.8  
6255  
111.3 6255.1 111.8 6255.2 113.03 6255.3 115.32 6255.3 115.8  
6255.2  
116.29 6255.1 116.78 6255 117.26 6254.9 117.71 6254.8 117.99  
6254.7  
118.28 6254.6 118.57 6254.5 118.85 6254.4 119.14 6254.3 119.43  
6254.2  
119.71 6254.1 120 6254 120.29 6253.9 120.57 6253.8 120.86  
6253.7  
121.15 6253.6 121.43 6253.5 121.72 6253.4 122.01 6253.3 122.3  
6253.2  
122.58 6253.1 122.87 6253 123.16 6252.9 123.44 6252.8 123.73  
6252.7  
124.02 6252.6 124.3 6252.5 124.59 6252.4 124.88 6252.3 125.16  
6252.2  
125.45 6252.1 125.74 6252 126.02 6251.9 126.31 6251.8 126.6  
6251.7  
126.88 6251.6 127.17 6251.5 127.46 6251.4 127.74 6251.3 128.03  
6251.2  
128.32 6251.1 128.6 6251 128.89 6250.9 129.18 6250.8 129.46  
6250.7  
129.75 6250.6 130.04 6250.5 130.32 6250.4 130.61 6250.3 130.9  
6250.2  
131.18 6250.1 131.47 6250 131.77 6249.9 132.07 6249.8 132.37  
6249.7  
132.67 6249.6 132.97 6249.5 133.27 6249.4 133.57 6249.3 133.87  
6249.2  
134.17 6249.1 134.47 6249 134.77 6248.9 135.07 6248.8 135.37  
6248.7  
135.67 6248.6 135.97 6248.5 136.27 6248.4 136.57 6248.3 136.87  
6248.2  
137.17 6248.1 137.47 6248 137.77 6247.9 138.07 6247.8 138.37  
6247.7  
138.67 6247.6 138.97 6247.5 139.27 6247.4 139.57 6247.3 139.87  
6247.2  
140.17 6247.1 140.47 6247 140.77 6246.9 141.07 6246.8 141.37  
6246.7  
141.67 6246.6 141.97 6246.5 142.27 6246.4 142.57 6246.3 142.87  
6246.2  
143.17 6246.1 143.47 6246 143.77 6245.9 144.07 6245.8 144.37  
6245.7  
144.67 6245.6 155.05 6245.6 155.25 6245.7 155.45 6245.8 155.65  
6245.9  
155.85 6246 156.05 6246.1 156.25 6246.2 156.45 6246.3 156.65  
6246.4  
156.85 6246.5 157.05 6246.6 157.25 6246.7 157.45 6246.8 157.65  
6246.9

157.85 6247.4	6247	158.05	6247.1	158.25	6247.2	158.45	6247.3	158.65
158.85 6247.9	6247.5	159.05	6247.6	159.25	6247.7	159.45	6247.8	159.65
159.85 6248.4	6248	160.05	6248.1	160.25	6248.2	160.45	6248.3	160.65
160.85 6248.9	6248.5	161.05	6248.6	161.25	6248.7	161.45	6248.8	161.65
161.85 6249.4	6249	162.05	6249.1	162.25	6249.2	162.45	6249.3	162.73
163.03 6249.9	6249.5	163.33	6249.6	163.63	6249.7	163.93	6249.8	164.23
164.53 6250.4	6250	164.83	6250.1	165.13	6250.2	165.43	6250.3	165.73
166.03 6250.9	6250.5	166.33	6250.6	166.63	6250.7	166.93	6250.8	167.23
167.53 6251.3	6251	167.83	6251.1	168.13	6251.2	168.33	6251.24	168.61
170.52 6251.8	6251.4	172.44	6251.5	173.18	6251.6	173.48	6251.7	173.78
174.09 6252.2	6251.9	174.39	6252	180.65	6252.1	187.4	6252.2	189.63
190.05 6251.7	6252.1	190.47	6252	190.89	6251.9	191.31	6251.8	191.72
192.14 6251.2	6251.6	192.56	6251.5	192.98	6251.4	193.4	6251.3	193.82
194.22 6250.7	6251.1	194.62	6251	195.03	6250.9	195.45	6250.8	195.87
196.28 6250.2	6250.6	196.7	6250.5	197.13	6250.4	197.56	6250.3	197.99
198.42 6249.7	6250.1	198.85	6250	199.28	6249.9	199.71	6249.8	200.14
200.57 6249.2	6249.6	201	6249.5	201.43	6249.4	201.86	6249.3	202.29
202.72 6248.7	6249.1	203.15	6249	203.58	6248.9	204.01	6248.8	204.44
204.87 6248.2	6248.6	205.3	6248.5	205.73	6248.4	206.16	6248.3	206.59
207.02 6247.7	6248.1	207.45	6248	207.88	6247.9	208.31	6247.8	208.74
209.17 6247.2	6247.6	209.59	6247.5	210.02	6247.4	210.45	6247.3	210.88
211.31 6246.7	6247.1	211.74	6247	212.17	6246.9	212.6	6246.8	213.03
213.46 6246.2	6246.6	215.88	6246.5	218.49	6246.4	221.39	6246.3	224.75
228.4 6245.8	6246.1	232.21	6246	235.39	6246	236.12	6245.9	239.88
241.55 6245.5	6245.9	241.59	6245.4	241.64	6245.7	241.82	6245.6	242.01
242.09 6245.7	6245.5	242.2	6245.4	242.39	6245.3	242.59	6245.6	243.09
243.19	6245.8	244.19	6245.3	246.36	6245.3	246.56	6245.4	246.61

6245.8								
246.67	6245.6	246.77	6245.5	246.98	6245.6	247.19	6245.7	247.24
6245.5								
247.72	6245.8	248.14	6245.9	248.3	6245.7	252.79	6245.9	253.57
6246								
258.34	6246	258.67	6246.1	263.89	6246.1	265.17	6246.2	268.08
6246.2								
268.82	6246.3	269.79	6246.3	270.74	6246.4	271.17	6246.4	271.38
6246.5								
271.6	6246.6	271.82	6246.7	272.04	6246.8	272.25	6246.9	272.58
6247								
272.93	6247.1	273.29	6247.2	273.65	6247.3	274	6247.4	274.36
6247.5								
274.72	6247.6	275.07	6247.7	275.43	6247.8	275.78	6247.9	276.14
6248								
276.5	6248.1	276.85	6248.2	277.21	6248.3	277.57	6248.4	277.92
6248.5								
278.28	6248.6	278.66	6248.7	279.05	6248.8	279.45	6248.9	279.85
6249								
280.25	6249.1	280.65	6249.2	281.05	6249.3	281.45	6249.4	281.85
6249.5								
282.25	6249.6	282.65	6249.7	283.05	6249.8	283.45	6249.9	283.85
6250								
284.25	6250.1	284.5	6250.2	284.73	6250.3	284.95	6250.4	285.17
6250.5								
285.39	6250.6	285.61	6250.7	285.84	6250.8	286.06	6250.9	286.28
6251								
286.5	6251.1	286.72	6251.2	286.95	6251.3	287.17	6251.4	287.47
6251.5								
287.95	6251.6	288.44	6251.7	288.93	6251.8	289.42	6251.9	289.9
6252								
290.39	6252.1	290.88	6252.2	291.37	6252.3	291.85	6252.4	292.34
6252.5								
292.83	6252.6	293.32	6252.7	293.81	6252.8	294.29	6252.9	294.78
6253								
295.36	6253.1	296.3	6253.2	297.25	6253.3	300	6253.3	
Manning's n	Values		num=	3				
Sta	n Val	Sta	n Val	Sta	n Val			
0	.03	131.47	.013	168.33	.03			
Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	
Expan.								
	131.47	168.33		50	50	50	.1	
.3								
Ineffective Flow		num=	2					
Sta L	Sta R	Elev	Permanent					
0	112.13	6255.33	F					
190.03	300	6252.12	F					
Left Levee	Station=	115.48	Elevation=	6255.3				
Right Levee	Station=	187.94	Elevation=	6252.18				
CROSS SECTION OUTPUT	Profile #Flow 1							

E.G. Elev (ft)	6252.02	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.55	Wt. n-Val.	0.030
0.013			
W.S. Elev (ft)	6250.47	Reach Len. (ft)	50.00
50.00 50.00			
Crit W.S. (ft)	6250.47	Flow Area (sq ft)	0.31
110.06			
E.G. Slope (ft/ft)	0.001738	Area (sq ft)	0.31
110.06			
Q Total (cfs)	1100.00	Flow (cfs)	0.24
1099.76			
Top Width (ft)	35.80	Top Width (ft)	1.34
34.46			
Vel Total (ft/s)	9.97	Avg. Vel. (ft/s)	0.75
9.99			
Max Chl Dpth (ft)	5.17	Hydr. Depth (ft)	0.23
3.19			
Conv. Total (cfs)	26389.4	Conv. (cfs)	5.7
26383.8			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	1.42
36.24			
Min Ch El (ft)	6245.60	Shear (lb/sq ft)	0.02
0.33			
Alpha	1.01	Stream Power (lb/ft s)	300.00
115.48 187.94			
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.05
3.35 0.00			
C & E Loss (ft)	0.02	Cum SA (acres)	0.24
0.91 0.01			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

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

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-1 RS: 959

INPUT

Description:									
Station	Elevation	Data	num=	373					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6254.6	13.02	6254.6	25.77	6254.5	33.92	6254.5	34.3	
6254.6									
34.68	6254.7	35.06	6254.8	35.44	6254.9	35.82	6255	36.2	
6255.1									
36.58	6255.2	36.96	6255.3	38.2	6255.4	39.93	6255.5	46.4	
6255.5									
63.21	6255.4	65.32	6255.3	66.61	6255.2	67.58	6255.1	68.55	
6255									
69.52	6254.9	70.49	6254.8	71.46	6254.7	72.44	6254.6	73.5	
6254.5									
74.56	6254.4	75.62	6254.3	76.69	6254.2	77.75	6254.1	78.81	
6254									
79.87	6253.9	80.93	6253.8	82	6253.7	83.06	6253.6	84.12	
6253.5									
85.18	6253.4	86.24	6253.3	87.31	6253.2	88.37	6253.1	89.43	
6253									
90.49	6252.9	91.56	6252.8	92.62	6252.7	93.68	6252.6	94.74	
6252.5									
95.8	6252.4	96.87	6252.3	97.93	6252.2	98.99	6252.1	100.05	
6252									
101.55	6252	102.21	6252.1	102.87	6252.2	103.53	6252.3	104.19	
6252.4									
104.85	6252.5	105.51	6252.6	106.17	6252.7	106.83	6252.8	107.48	
6252.9									
108.17	6253	109.25	6253.1	110.32	6253.2	111.4	6253.3	112.47	
6253.4									
113.55	6253.5	114.62	6253.6	116.58	6253.6	117.09	6253.5	117.59	
6253.4									
118.1	6253.3	118.61	6253.2	119.12	6253.1	119.63	6253	120.14	
6252.9									
120.64	6252.8	121.34	6252.7	121.83	6252.6	122.31	6252.5	122.8	
6252.4									
123.29	6252.3	123.75	6252.2	124.03	6252.1	124.32	6252	124.61	
6251.9									
124.9	6251.8	125.18	6251.7	125.47	6251.6	125.76	6251.5	126.04	
6251.4									
126.33	6251.3	126.62	6251.2	126.9	6251.1	127.19	6251	127.48	
6250.9									
127.76	6250.8	128.05	6250.7	128.34	6250.6	128.62	6250.5	128.91	
6250.4									
129.2	6250.3	129.48	6250.2	129.77	6250.1	130.06	6250	130.34	
6249.9									
130.63	6249.8	130.92	6249.7	131.2	6249.6	131.49	6249.5	131.79	
6249.4									
132.09	6249.3	132.39	6249.2	132.69	6249.1	132.99	6249	133.29	
6248.9									
133.59	6248.8	133.89	6248.7	134.19	6248.6	134.49	6248.5	134.79	
6248.4									
135.09	6248.3	135.39	6248.2	135.69	6248.1	135.99	6248	136.29	

6247.9  
136.59 6247.8 136.89 6247.7 137.19 6247.6 137.49 6247.5 137.79  
6247.4  
138.09 6247.3 138.39 6247.2 138.69 6247.1 138.99 6247 139.29  
6246.9  
139.59 6246.8 139.89 6246.7 140.19 6246.6 140.49 6246.5 140.79  
6246.4  
141.09 6246.3 141.39 6246.2 141.69 6246.1 141.99 6246 142.29  
6245.9  
142.59 6245.8 142.89 6245.7 143.19 6245.6 143.49 6245.5 143.79  
6245.4  
144.09 6245.3 144.39 6245.2 144.69 6245.1 155.06 6245.1 155.26  
6245.2  
155.47 6245.3 155.67 6245.4 155.87 6245.5 156.07 6245.6 156.27  
6245.7  
156.47 6245.8 156.67 6245.9 156.87 6246 157.07 6246.1 157.27  
6246.2  
157.47 6246.3 157.67 6246.4 157.87 6246.5 158.07 6246.6 158.27  
6246.7  
158.47 6246.8 158.67 6246.9 158.87 6247 159.07 6247.1 159.27  
6247.2  
159.47 6247.3 159.67 6247.4 159.87 6247.5 160.07 6247.6 160.27  
6247.7  
160.47 6247.8 160.67 6247.9 160.87 6248 161.07 6248.1 161.27  
6248.2  
161.47 6248.3 161.67 6248.4 161.87 6248.5 162.07 6248.6 162.27  
6248.7  
162.47 6248.8 162.67 6248.9 162.87 6249 163.07 6249.1 163.27  
6249.2  
163.47 6249.3 163.67 6249.4 163.87 6249.5 164.07 6249.6 164.3  
6249.7  
164.6 6249.8 164.9 6249.9 165.2 6250 165.5 6250.1 165.8  
6250.2  
166.1 6250.3 166.4 6250.4 166.7 6250.5 167 6250.6 167.3  
6250.7  
167.6 6250.8 167.9 6250.9 168.2 6251 168.97 6251.1 169.88  
6251.15  
170.89 6251.2 172.81 6251.3 174.1 6251.4 174.4 6251.5 179.79  
6251.6  
185.5 6251.7 189.75 6251.7 190.17 6251.6 190.59 6251.5 191  
6251.4  
191.42 6251.3 191.84 6251.2 192.26 6251.1 192.68 6251 193.1  
6250.9  
193.52 6250.8 193.94 6250.7 194.36 6250.6 194.77 6250.5 195.19  
6250.4  
195.61 6250.3 196.03 6250.2 196.45 6250.1 196.87 6250 197.29  
6249.9  
197.71 6249.8 198.13 6249.7 198.54 6249.6 198.96 6249.5 199.38  
6249.4  
199.8 6249.3 200.22 6249.2 200.64 6249.1 201.06 6249 201.48  
6248.9  
201.9 6248.8 202.35 6248.7 202.81 6248.6 203.27 6248.5 203.73  
6248.4

204.2 6248.3 204.66 6248.2 205.12 6248.1 205.58 6248 206.04  
6247.9  
206.5 6247.8 206.96 6247.7 207.42 6247.6 207.88 6247.5 208.34  
6247.4  
208.81 6247.3 209.27 6247.2 209.73 6247.1 210.19 6247 210.65  
6246.9  
211.11 6246.8 211.57 6246.7 212.03 6246.6 212.49 6246.5 212.95  
6246.4  
213.42 6246.3 215.5 6246.2 217.96 6246.1 220.41 6246 222.86  
6245.9  
225.33 6245.8 227.82 6245.7 230.31 6245.6 232.76 6245.5 232.86  
6245.4  
232.97 6245.3 233.07 6245.2 233.17 6245.1 234.82 6245 235.32  
6245  
235.42 6245.1 235.52 6245.2 235.62 6245.3 235.72 6245.4 235.87  
6245.5  
238.49 6245.6 241.11 6245.7 243.73 6245.8 246.35 6245.9 248.93  
6246  
251.51 6246.1 254.08 6246.2 256.66 6246.3 259.24 6246.4 261.81  
6246.5  
264.39 6246.6 266.97 6246.7 269.54 6246.8 272.12 6246.9 272.62  
6247  
273.01 6247.1 273.4 6247.2 273.79 6247.3 274.18 6247.4 274.57  
6247.5  
274.96 6247.6 275.35 6247.7 275.74 6247.8 276.13 6247.9 276.52  
6248  
276.91 6248.1 277.3 6248.2 277.68 6248.3 278.07 6248.4 278.46  
6248.5  
278.85 6248.6 279.24 6248.7 279.63 6248.8 280.02 6248.9 280.41  
6249  
280.8 6249.1 281.19 6249.2 281.58 6249.3 281.97 6249.4 282.36  
6249.5  
282.75 6249.6 283.14 6249.7 283.53 6249.8 283.92 6249.9 284.31  
6250  
284.7 6250.1 285.09 6250.2 285.48 6250.3 285.87 6250.4 286.26  
6250.5  
286.65 6250.6 287.03 6250.7 287.43 6250.8 287.83 6250.9 288.23  
6251  
288.63 6251.1 289.03 6251.2 289.43 6251.3 289.83 6251.4 290.23  
6251.5  
290.63 6251.6 291.03 6251.7 291.43 6251.8 291.83 6251.9 292.23  
6252  
292.63 6252.1 293.03 6252.2 293.44 6252.3 293.84 6252.4 294.24  
6252.5  
294.64 6252.6 295.04 6252.7 295.44 6252.8 295.84 6252.9 296.24  
6253  
296.34 6253 298.21 6252.9 300 6252.9  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 130.06 .013 169.88 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.

Expan. 130.06 169.88 50 50 50 .1

.3  
Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 113.39 6253.58 F  
190.45 300 6251.6 F  
Left Levee Station= 114.64 Elevation= 6253.67  
Right Levee Station= 189.19 Elevation= 6251.72

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6251.53	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.55	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6249.98	Reach Len. (ft)	50.00
50.00 50.00			
Crit W.S. (ft)	6249.98	Flow Area (sq ft)	
110.20			
E.G. Slope (ft/ft)	0.001776	Area (sq ft)	
110.20			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	35.02	Top Width (ft)	
35.02			
Vel Total (ft/s)	9.98	Avg. Vel. (ft/s)	
9.98			
Max Chl Dpth (ft)	4.98	Hydr. Depth (ft)	
3.15			
Conv. Total (cfs)	26102.7	Conv. (cfs)	
26102.7			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
36.94			
Min Ch El (ft)	6245.10	Shear (lb/sq ft)	
0.33			
Alpha	1.00	Stream Power (lb/ft s)	300.00
114.64 189.19			
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.05
3.22 0.00			
C & E Loss (ft)	0.03	Cum SA (acres)	0.24
0.87 0.01			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program

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

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 958

INPUT  
Description:  
Station Elevation Data num= 299  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6252.5 7.05 6252.5 10.29 6252.4 13.53 6252.3 16.77  
6252.2  
20.02 6252.1 23.26 6252 26.5 6251.9 29.74 6251.8 63.58  
6251.8  
67.44 6251.7 74.95 6251.6 82.46 6251.5 89.97 6251.4 97.48  
6251.3  
98.92 6251.2 100.36 6251.1 101.83 6251 103.29 6250.9 104.76  
6250.8  
106.23 6250.7 107.69 6250.6 109.16 6250.5 109.98 6250.7 110.08  
6250.5  
111.17 6250.6 113.06 6250.7 114.9 6250.8 116.75 6250.9 117.76  
6250.9  
119.13 6250.8 120.5 6250.7 121.88 6250.6 123.25 6250.5 124.62  
6250.4  
126 6250.3 126.73 6250.2 127.24 6250.1 127.75 6250 128.26  
6249.9  
128.76 6249.8 129.31 6249.7 129.79 6249.6 130.08 6249.5 130.36  
6249.4  
130.65 6249.3 130.94 6249.2 131.22 6249.1 131.51 6249 131.81  
6248.9  
132.11 6248.8 132.41 6248.7 132.71 6248.6 133.01 6248.5 133.31  
6248.4  
133.61 6248.3 133.91 6248.2 134.21 6248.1 134.51 6248 134.81  
6247.9  
135.11 6247.8 135.41 6247.7 135.71 6247.6 136.01 6247.5 136.31  
6247.4  
136.61 6247.3 136.91 6247.2 137.21 6247.1 137.51 6247 137.81  
6246.9  
138.11 6246.8 138.41 6246.7 138.71 6246.6 139.01 6246.5 139.31  
6246.4  
139.61 6246.3 139.91 6246.2 140.21 6246.1 140.51 6246 140.81  
6245.9  
141.11 6245.8 141.41 6245.7 141.71 6245.6 142.01 6245.5 142.31  
6245.4  
142.61 6245.3 142.91 6245.2 143.21 6245.1 143.51 6245 143.81  
6244.9  
144.11 6244.8 144.41 6244.7 144.71 6244.6 155.08 6244.6 155.28  
6244.7

155.48 6244.8 155.68 6244.9 155.88 6245 156.08 6245.1 156.28  
6245.2 156.48 6245.3 156.68 6245.4 156.88 6245.5 157.08 6245.6 157.28  
6245.7 157.48 6245.8 157.68 6245.9 157.88 6246 158.08 6246.1 158.28  
6246.2 158.48 6246.3 158.68 6246.4 158.88 6246.5 159.08 6246.6 159.28  
6246.7 159.48 6246.8 159.68 6246.9 159.88 6247 160.08 6247.1 160.28  
6247.2 160.48 6247.3 160.68 6247.4 160.88 6247.5 161.08 6247.6 161.28  
6247.7 161.48 6247.8 161.68 6247.9 161.88 6248 162.08 6248.1 162.28  
6248.2 162.48 6248.3 162.68 6248.4 162.88 6248.5 163.08 6248.6 163.28  
6248.7 163.48 6248.8 163.68 6248.9 163.88 6249 164.08 6249.1 164.28  
6249.2 164.48 6249.3 164.68 6249.4 164.88 6249.5 165.08 6249.6 165.28  
6249.7 165.48 6249.8 165.68 6249.9 165.88 6250 166.17 6250.1 166.47  
6250.2 166.77 6250.3 167.07 6250.4 167.37 6250.5 167.67 6250.6 167.97  
6250.7 168.27 6250.8 168.35 6250.81 169.34 6250.9 171.25 6251 173  
6251.1 174.02 6251.2 181.94 6251.3 187.63 6251.4 189.65 6251.4 190.12  
6251.3 190.59 6251.2 191.06 6251.1 191.53 6251 192 6250.9 192.47  
6250.8 192.94 6250.7 193.41 6250.6 193.88 6250.5 194.35 6250.4 194.82  
6250.3 195.29 6250.2 195.76 6250.1 196.23 6250 196.7 6249.9 197.17  
6249.8 197.64 6249.7 198.11 6249.6 198.58 6249.5 199.05 6249.4 199.52  
6249.3 199.99 6249.2 200.46 6249.1 200.93 6249 201.4 6248.9 201.87  
6248.8 202.34 6248.7 202.81 6248.6 203.29 6248.5 203.76 6248.4 204.23  
6248.3 204.71 6248.2 205.18 6248.1 205.66 6248 206.13 6247.9 206.61  
6247.8 207.08 6247.7 207.56 6247.6 208.03 6247.5 208.51 6247.4 208.98  
6247.3 209.46 6247.2 209.93 6247.1 210.41 6247 210.88 6246.9 211.36  
6246.8 211.83 6246.7 212.31 6246.6 212.78 6246.5 213.26 6246.4 214.79  
6246.3 217.45 6246.2 220.11 6246.1 222.77 6246 225.42 6245.9 228.08  
6245.8 230.74 6245.7 233.36 6245.6 235.97 6245.5 238.59 6245.4 241.13  
6245.3 242.55 6245.2 242.65 6245.1 242.75 6245 242.85 6244.9 242.95

6244.8  
245.07 6244.8 245.17 6244.9 245.27 6245 245.37 6245.1 245.46  
6245.2 246.89 6245.3 249.4 6245.4 251.91 6245.5 254.42 6245.6 256.93  
6245.7 259.45 6245.8 261.96 6245.9 264.47 6246 266.98 6246.1 269.49  
6246.2 272 6246.3 273.53 6246.4 273.93 6246.5 274.33 6246.6 274.74  
6246.7 275.14 6246.8 275.54 6246.9 275.95 6247 276.35 6247.1 276.75  
6247.2 277.15 6247.3 277.56 6247.4 277.96 6247.5 278.36 6247.6 278.76  
6247.7 279.17 6247.8 279.57 6247.9 279.97 6248 280.38 6248.1 280.78  
6248.2 281.18 6248.3 281.58 6248.4 281.99 6248.5 282.39 6248.6 282.79  
6248.7 283.19 6248.8 283.6 6248.9 283.91 6249.6 284 6249 284.4  
6249.1 284.81 6249.2 285.21 6249.3 285.61 6249.4 286.01 6249.5 286.42  
6249.6 286.82 6249.7 287.22 6249.8 287.63 6249.9 288.03 6250 288.43  
6250.1 288.83 6250.2 289.24 6250.3 289.64 6250.4 290.04 6250.5 290.5  
6250.6 291.1 6250.7 291.69 6250.8 292.29 6250.9 293.45 6251 295.03  
6251.1 296.22 6251.2 297.69 6251.3 299.16 6251.4 300 6251.4  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 131.51 .013 168.35 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 131.51 168.35 50 50 50 .1  
.3  
Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 116.32 6250.89 F  
190.03 300 6251.19 F  
Left Levee Station= 117.57 Elevation= 6250.94  
Right Levee Station= 189.19 Elevation= 6251.25  
  
CROSS SECTION OUTPUT Profile #Flow 1  
  
E.G. Elev (ft) 6251.04 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.59 Wt. n-Val. 0.030  
0.013  
W.S. Elev (ft) 6249.44 Reach Len. (ft) 50.00  
50.00 50.00

Crit W.S. (ft)	6249.44	Flow Area (sq ft)	0.28
108.61			
E.G. Slope (ft/ft)	0.001742	Area (sq ft)	0.28
108.61			
Q Total (cfs)	1100.00	Flow (cfs)	0.21
1099.79			
Top Width (ft)	34.53	Top Width (ft)	1.27
33.26			
Vel Total (ft/s)	10.10	Avg. Vel. (ft/s)	0.73
10.13			
Max Chl Dpth (ft)	4.84	Hydr. Depth (ft)	0.22
3.27			
Conv. Total (cfs)	26356.9	Conv. (cfs)	5.0
26352.0			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	1.35
35.12			
Min Ch El (ft)	6244.60	Shear (lb/sq ft)	0.02
0.34			
Alpha	1.00	Stream Power (lb/ft s)	300.00
117.57	189.19		
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.05
3.10	0.00		
C & E Loss (ft)	0.01	Cum SA (acres)	0.24
0.83	0.01		

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

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

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 957

INPUT  
Description:  
Station Elevation Data num= 322  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6250.9 3.24 6250.9 15.11 6250.8 23.82 6250.7 32.94  
6250.6  
42.06 6250.5 56.55 6250.5 60.36 6250.6 64.17 6250.7 75.25  
6250.8

78.56	6250.9	81.09	6251	83.61	6251.1	85.53	6251.2	87.32
6251.3								
89.11	6251.4	90.9	6251.5	92.69	6251.6	94.48	6251.7	96.27
6251.8								
98.06	6251.9	99.85	6252	101.64	6252.1	103.43	6252.2	105.21
6252.3								
107	6252.4	108.79	6252.5	110.58	6252.6	112.12	6252.7	112.95
6252.8								
113.78	6252.9	114.61	6253	115.44	6253.1	116.27	6253.2	116.51
6253.2								
116.71	6253.1	116.91	6253	117.11	6252.9	117.31	6252.8	117.51
6252.7								
117.71	6252.6	117.91	6252.5	118.11	6252.4	118.31	6252.3	118.55
6252.2								
118.85	6252.1	119.15	6252	119.45	6251.9	119.74	6251.8	120.04
6251.7								
120.34	6251.6	120.64	6251.5	120.93	6251.4	121.23	6251.3	121.53
6251.2								
121.83	6251.1	122.13	6251	122.42	6250.9	122.72	6250.8	123.02
6250.7								
123.32	6250.6	123.68	6250.5	124.07	6250.4	124.47	6250.3	124.86
6250.2								
125.25	6250.1	125.65	6250	126.04	6249.9	126.44	6249.8	126.83
6249.7								
127.23	6249.6	127.62	6249.5	128.01	6249.4	128.41	6249.3	128.8
6249.2								
129.2	6249.1	129.59	6249	129.98	6248.9	130.38	6248.8	130.77
6248.7								
131.17	6248.6	131.53	6248.5	131.83	6248.4	132.13	6248.3	132.43
6248.2								
132.73	6248.1	133.03	6248	133.33	6247.9	133.63	6247.8	133.93
6247.7								
134.23	6247.6	134.53	6247.5	134.83	6247.4	135.13	6247.3	135.43
6247.2								
135.73	6247.1	136.03	6247	136.33	6246.9	136.63	6246.8	136.93
6246.7								
137.23	6246.6	137.53	6246.5	137.83	6246.4	138.13	6246.3	138.43
6246.2								
138.73	6246.1	139.03	6246	139.33	6245.9	139.63	6245.8	139.93
6245.7								
140.23	6245.6	140.53	6245.5	140.83	6245.4	141.13	6245.3	141.43
6245.2								
141.73	6245.1	142.03	6245	142.33	6244.9	142.63	6244.8	142.93
6244.7								
143.23	6244.6	143.53	6244.5	143.83	6244.4	144.13	6244.3	144.43
6244.2								
144.73	6244.1	155.09	6244.1	155.29	6244.2	155.49	6244.3	155.69
6244.4								
155.89	6244.5	156.09	6244.6	156.29	6244.7	156.49	6244.8	156.69
6244.9								
156.89	6245	157.09	6245.1	157.29	6245.2	157.49	6245.3	157.69
6245.4								
157.89	6245.5	158.09	6245.6	158.29	6245.7	158.49	6245.8	158.69



6245.9  
158.89 6246 159.09 6246.1 159.29 6246.2 159.49 6246.3 159.69  
6246.4  
159.89 6246.5 160.09 6246.6 160.29 6246.7 160.49 6246.8 160.69  
6246.9  
160.89 6247 161.09 6247.1 161.29 6247.2 161.49 6247.3 161.69  
6247.4  
161.89 6247.5 162.09 6247.6 162.29 6247.7 162.49 6247.8 162.69  
6247.9  
162.89 6248 163.09 6248.1 163.29 6248.2 163.49 6248.3 163.69  
6248.4  
163.89 6248.5 164.09 6248.6 164.29 6248.7 164.49 6248.8 164.69  
6248.9  
164.89 6249 165.09 6249.1 165.29 6249.2 165.49 6249.3 165.69  
6249.4  
165.89 6249.5 166.09 6249.6 166.29 6249.7 166.49 6249.8 166.69  
6249.9  
166.89 6250 167.09 6250.1 167.29 6250.2 167.49 6250.3 167.74  
6250.4  
168.04 6250.5 168.34 6250.6 169.7 6250.7 169.9 6250.72 170.83  
6250.8  
171.85 6250.9 172.87 6251 173.89 6251.1 188.46 6251.2 189.59  
6251.2  
190.06 6251.1 190.53 6251 191 6250.9 191.47 6250.8 191.93  
6250.7  
192.4 6250.6 192.87 6250.5 193.34 6250.4 193.81 6250.3 194.28  
6250.2  
194.75 6250.1 195.22 6250 195.69 6249.9 196.16 6249.8 196.63  
6249.7  
197.1 6249.6 197.57 6249.5 198.04 6249.4 198.51 6249.3 198.98  
6249.2  
199.45 6249.1 199.92 6249 200.39 6248.9 200.86 6248.8 201.31  
6248.7  
201.65 6248.6 202.09 6248.5 202.55 6248.4 203.01 6248.3 203.47  
6248.2  
203.93 6248.1 204.39 6248 204.85 6247.9 205.31 6247.8 205.77  
6247.7  
206.23 6247.6 206.69 6247.5 207.15 6247.4 207.61 6247.3 208.07  
6247.2  
208.53 6247.1 208.99 6247 209.45 6246.9 209.91 6246.8 210.37  
6246.7  
210.83 6246.6 211.29 6246.5 211.75 6246.4 212.21 6246.3 212.67  
6246.2  
213.13 6246.1 213.95 6246 216.35 6245.9 218.75 6245.8 221.16  
6245.7  
223.56 6245.6 225.96 6245.5 228.35 6245.4 230.74 6245.3 233.13  
6245.2  
235.57 6245.1 238.02 6245 238.26 6244.9 238.35 6244.8 238.45  
6244.7  
238.55 6244.6 238.65 6244.5 240.68 6244.5 240.78 6244.6 240.88  
6244.7  
240.98 6244.8 241.08 6244.9 241.33 6245 243.92 6245.1 246.51  
6245.2

249.1 6245.3 251.71 6245.4 254.36 6245.5 257.01 6245.6 259.65  
6245.7  
262.28 6245.8 264.91 6245.9 267.54 6246 270.17 6246.1 272.8  
6246.2  
274.54 6246.3 274.83 6246.4 275.12 6246.5 275.4 6246.6 275.69  
6246.7  
275.98 6246.8 276.27 6246.9 276.58 6247 276.89 6247.1 277.2  
6247.2  
277.51 6247.3 279.53 6247.4 282.8 6247.5 286.07 6247.6 289.34  
6247.7  
292.61 6247.8 292.72 6247.9 293.18 6247.9 293.55 6248 293.92  
6248.1  
294.3 6248.2 294.67 6248.3 295.04 6248.4 295.41 6248.5 295.79  
6248.6  
296.16 6248.7 296.53 6248.8 296.9 6248.9 297.28 6249 297.65  
6249.1  
298.02 6249.2 298.39 6249.3 298.76 6249.4 299.14 6249.5 299.51  
6249.6  
299.88 6249.7 300 6249.7  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 129.59 .013 169.9 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 129.59 169.9 50 50 50 .1  
  
.3  
Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 115.48 6253.12 F  
190.03 300 6250.8 F  
Left Levee Station= 115.9 Elevation= 6253.2  
Right Levee Station= 189.61 Elevation= 6250.72  
  
CROSS SECTION OUTPUT Profile #Flow 1  
  
E.G. Elev (ft) 6250.53 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.57 Wt. n-Val.  
0.013  
W.S. Elev (ft) 6248.96 Reach Len. (ft) 50.00  
50.00 50.00  
Crit W.S. (ft) 6248.96 Flow Area (sq ft)  
109.52  
E.G. Slope (ft/ft) 0.001816 Area (sq ft)  
109.52  
Q Total (cfs) 1100.00 Flow (cfs)  
1100.00  
Top Width (ft) 35.07 Top Width (ft)  
35.07  
Vel Total (ft/s) 10.04 Avg. Vel. (ft/s)

10.04  
Max Chl Dpth (ft) 4.86 Hydr. Depth (ft)  
3.12  
Conv. Total (cfs) 25811.0 Conv. (cfs)  
25811.0  
Length Wtd. (ft) 50.00 Wetted Per. (ft)  
36.99  
Min Ch El (ft) 6244.10 Shear (lb/sq ft)  
0.34  
Alpha 1.00 Stream Power (lb/ft s) 300.00  
115.90 189.61  
Frctn Loss (ft) 0.08 Cum Volume (acre-ft) 0.05  
2.97 0.00  
C & E Loss (ft) 0.02 Cum SA (acres) 0.24  
0.79 0.01

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 956

INPUT  
Description:  
Station Elevation Data num= 287  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
-36.9 6250.1 -23.07 6250.1 -16.35 6250 -12.08 6249.9 -8.19  
6249.8  
-4.3 6249.7 .09 6249.6 3.84 6249.5 11.19 6249.4 38.67  
6249.4  
38.75 6249.5 65.32 6249.6 66.81 6249.7 68.3 6249.8 69.79  
6249.9  
70.55 6250 71.1 6250.1 71.64 6250.2 72.19 6250.3 72.73  
6250.4  
73.27 6250.5 73.82 6250.6 74.36 6250.7 74.91 6250.8 75.45  
6250.9  
75.99 6251 76.54 6251.1 77.08 6251.2 77.63 6251.3 78.17  
6251.4  
78.72 6251.5 79.26 6251.6 79.8 6251.7 80.35 6251.8 80.89

6251.9  
82.86 6251.9 83.15 6251.8 83.43 6251.7 83.7 6251.6 83.98  
6251.5  
84.26 6251.4 84.54 6251.3 84.82 6251.2 85.1 6251.1 85.38  
6251  
85.66 6250.9 85.93 6250.8 86.21 6250.7 86.49 6250.6 86.77  
6250.5  
87.05 6250.4 87.33 6250.3 87.64 6250.2 87.96 6250.1 88.28  
6250  
88.6 6249.9 88.92 6249.8 89.24 6249.7 89.56 6249.6 89.87  
6249.5  
90.19 6249.4 90.51 6249.3 90.83 6249.2 91.15 6249.1 91.47  
6249  
91.79 6248.9 92.11 6248.8 92.43 6248.7 92.74 6248.6 93.06  
6248.5  
93.38 6248.4 93.7 6248.3 94.02 6248.2 94.34 6248.1 94.65  
6248  
94.95 6247.9 95.25 6247.8 95.55 6247.7 95.85 6247.6 96.15  
6247.5  
96.45 6247.4 96.75 6247.3 97.05 6247.2 97.35 6247.1 97.65  
6247  
97.95 6246.9 98.25 6246.8 98.55 6246.7 98.85 6246.6 99.15  
6246.5  
99.45 6246.4 99.75 6246.3 100.05 6246.2 100.35 6246.1 100.65  
6246  
100.95 6245.9 101.25 6245.8 101.55 6245.7 101.85 6245.6 102.15  
6245.5  
102.45 6245.4 102.75 6245.3 103.05 6245.2 103.35 6245.1 103.65  
6245  
103.95 6244.9 104.25 6244.8 104.55 6244.7 104.85 6244.6 105.15  
6244.5  
105.45 6244.4 105.75 6244.3 106.05 6244.2 106.35 6244.1 106.65  
6244  
106.95 6243.9 107.25 6243.8 107.55 6243.7 107.85 6243.6 118.21  
6243.6  
118.43 6243.7 118.65 6243.8 118.86 6243.9 119.08 6244 119.3  
6244.1  
119.52 6244.2 119.73 6244.3 119.95 6244.4 120.17 6244.5 120.38  
6244.6  
120.6 6244.7 120.82 6244.8 121.04 6244.9 121.25 6245 121.47  
6245.1  
121.69 6245.2 121.91 6245.3 122.12 6245.4 122.34 6245.5 122.56  
6245.6  
122.78 6245.7 122.99 6245.8 123.21 6245.9 123.43 6246 123.64  
6246.1  
123.86 6246.2 124.08 6246.3 124.3 6246.4 124.51 6246.5 124.74  
6246.6  
124.97 6246.7 125.21 6246.8 125.45 6246.9 125.68 6247 125.92  
6247.1  
126.15 6247.2 126.39 6247.3 126.63 6247.4 126.86 6247.5 127.1  
6247.6  
127.33 6247.7 127.57 6247.8 127.81 6247.9 128.04 6248 128.28  
6248.1

128.51	6248.2	128.75	6248.3	128.99	6248.4	129.22	6248.5	129.46
6248.6								
129.7	6248.7	129.93	6248.8	130.17	6248.9	130.4	6249	130.64
6249.1								
130.88	6249.2	131.11	6249.3	131.35	6249.4	132.06	6249.5	134.41
6249.55								
137.06	6249.6	152.67	6249.6	153.33	6249.5	153.99	6249.4	154.66
6249.3								
155.32	6249.2	155.98	6249.1	156.65	6249	157.31	6248.9	157.97
6248.8								
158.64	6248.7	159.3	6248.6	159.96	6248.5	160.62	6248.4	161.28
6248.3								
161.94	6248.2	162.6	6248.1	163.27	6248	163.93	6247.9	164.59
6247.8								
165.25	6247.7	165.91	6247.6	166.57	6247.5	167.23	6247.4	167.89
6247.3								
168.56	6247.2	169.22	6247.1	169.88	6247	170.54	6246.9	171.2
6246.8								
171.86	6246.7	172.52	6246.6	173.18	6246.5	173.84	6246.4	174.51
6246.3								
175.17	6246.2	175.83	6246.1	176.49	6246	178.67	6245.9	181.16
6245.8								
183.64	6245.7	186.13	6245.6	188.61	6245.5	191.09	6245.4	193.57
6245.3								
196.05	6245.2	198.53	6245.1	201.01	6245	203.49	6244.9	205.97
6244.8								
207.42	6244.7	207.52	6244.6	207.62	6244.5	207.72	6244.4	207.82
6244.3								
209.96	6244.3	210.06	6244.4	210.16	6244.5	210.26	6244.6	210.36
6244.7								
211.9	6244.8	214.46	6244.9	217.02	6245	219.59	6245.1	222.15
6245.2								
223.99	6245.3	224.71	6245.3	227.27	6245.4	229.82	6245.5	232.37
6245.6								
234.93	6245.7	237.48	6245.8	241.16	6245.9	245.73	6246	247.84
6246.1								
248.35	6246.2	248.86	6246.3	249.37	6246.4	249.88	6246.5	250.39
6246.6								
250.9	6246.7	251.41	6246.8	251.93	6246.9	252.44	6247	252.95
6247.1								
253.01	6247.7	253.46	6247.2	253.97	6247.3	254.48	6247.4	254.99
6247.5								
255.5	6247.6	256.01	6247.7	256.38	6247.8	256.53	6247.8	257.04
6247.9								
257.55	6248	258.06	6248.1	258.57	6248.2	259.08	6248.3	259.59
6248.4								
260.1	6248.5	260.61	6248.6	261.13	6248.7	261.64	6248.8	262.15
6248.9								
262.66	6249	263.1	6249					
Manning's n Values								
num= 3								
Sta	n Val	Sta	n Val	Sta	n Val			
-36.9	.03	92.43	.013	134.41	.03			

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	92.43	134.41		50	50	.1
.3						
Ineffective Flow	num=	2				
Sta L	Sta R	Elev	Permanent			
-36.9	81.09	6251.92	F			
156.48	263.1	6249.05	F			
Left Levee	Station=	82.77	Elevation=	6251.9		
Right Levee	Station=	152.71	Elevation=	6249.62		

# CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6249.96	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.52	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6248.44	Reach Len. (ft)	50.00
50.00	50.00		
Crit W.S. (ft)	6248.44	Flow Area (sq ft)	
111.21			
E.G. Slope (ft/ft)	0.001768	Area (sq ft)	
111.21			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	35.85	Top Width (ft)	
35.85			
Vel Total (ft/s)	9.89	Avg. Vel. (ft/s)	
9.89			
Max Chl Dpth (ft)	4.84	Hydr. Depth (ft)	
3.10			
Conv. Total (cfs)	26161.8	Conv. (cfs)	
26161.8			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
37.66			
Min Ch El (ft)	6243.60	Shear (lb/sq ft)	
0.33			
Alpha	1.00	Stream Power (lb/ft s)	263.10
82.77	152.71		
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.05
2.85	0.00		
C & E Loss (ft)	0.09	Cum SA (acres)	0.24
0.75	0.01		

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 955

INPUT									
Description:									
Station	Elevation	Data	num=	344					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6249.4	.42	6249.4	2.42	6249.3	4.43	6249.2	6.43	
6249.1	8.31	6249	10.46	6248.9	31.24	6248.8	32.32	6248.7	32.47
6248.6	33.43	6248.5	50.66	6248.5	50.74	6248.6	50.81	6248.7	50.89
6248.8	50.96	6248.9	51.04	6249	51.11	6249.1	51.19	6249.2	51.99
6249.3	60.14	6249.3	82.6	6249.2	105.05	6249.1	108.53	6249.1	108.63
6249.2	108.72	6249.3	108.82	6249.4	108.91	6249.5	109.08	6249.6	110.52
6249.7	111.95	6249.8	112.97	6249.9	113.51	6250	114.05	6250.1	114.59
6250.2	115.13	6250.3	115.67	6250.4	116.21	6250.5	116.75	6250.6	117.29
6250.7	117.83	6250.8	118.37	6250.9	118.91	6251	119.46	6251.1	120
6251.2	120.54	6251.3	120.73	6251.3	121.01	6251.2	121.3	6251.1	121.58
6251	121.87	6250.9	122.16	6250.8	122.44	6250.7	122.73	6250.6	123.01
6250.5	123.3	6250.4	123.58	6250.3	123.87	6250.2	124.15	6250.1	124.44
6250	124.72	6249.9	125.01	6249.8	125.29	6249.7	125.58	6249.6	125.86
6249.5	126.15	6249.4	126.43	6249.3	126.72	6249.2	127	6249.1	127.29
6249	127.57	6248.9	127.86	6248.8	128.14	6248.7	128.43	6248.6	128.72
6248.5	129	6248.4	129.29	6248.3	129.57	6248.2	129.86	6248.1	130.14
6248	130.43	6247.9	130.71	6247.8	131	6247.7	131.28	6247.6	131.57
6247.5	131.87	6247.4	132.17	6247.3	132.47	6247.2	132.77	6247.1	133.07
6247									

133.37	6246.9	133.67	6246.8	133.97	6246.7	134.27	6246.6	134.57	
6246.5									
134.87	6246.4	135.17	6246.3	135.47	6246.2	135.77	6246.1	136.07	
6246									
136.37	6245.9	136.67	6245.8	136.97	6245.7	137.27	6245.6	137.57	
6245.5									
137.87	6245.4	138.17	6245.3	138.47	6245.2	138.77	6245.1	139.07	
6245									
139.37	6244.9	139.67	6244.8	139.97	6244.7	140.27	6244.6	140.57	
6244.5									
140.87	6244.4	141.17	6244.3	141.47	6244.2	141.77	6244.1	142.07	
6244									
142.37	6243.9	142.67	6243.8	142.97	6243.7	143.27	6243.6	143.57	
6243.5									
143.87	6243.4	144.17	6243.3	144.47	6243.2	144.77	6243.1	155.12	
6243.1									
155.34	6243.2	155.56	6243.3	155.77	6243.4	155.99	6243.5	156.21	
6243.6									
156.43	6243.7	156.64	6243.8	156.86	6243.9	157.08	6244	157.3	
6244.1									
157.51	6244.2	157.71	6244.3	157.92	6244.4	158.13	6244.5	158.33	
6244.6									
158.54	6244.7	158.75	6244.8	158.96	6244.9	159.16	6245	159.37	
6245.1									
159.58	6245.2	159.78	6245.3	159.98	6245.4	160.18	6245.5	160.38	
6245.6									
160.58	6245.7	160.78	6245.8	160.98	6245.9	161.18	6246	161.38	
6246.1									
161.58	6246.2	161.78	6246.3	161.98	6246.4	162.18	6246.5	162.38	
6246.6									
162.58	6246.7	162.78	6246.8	162.98	6246.9	163.18	6247	163.38	
6247.1									
163.58	6247.2	163.78	6247.3	163.98	6247.4	164.18	6247.5	164.38	
6247.6									
164.58	6247.7	164.78	6247.8	164.98	6247.9	165.18	6248	165.38	
6248.1									
165.58	6248.2	165.78	6248.3	165.98	6248.4	166.18	6248.5	166.38	
6248.6									
166.58	6248.7	166.78	6248.8	166.98	6248.9	167.18	6249	167.38	
6249.1									
167.58	6249.2	167.78	6249.3	167.98	6249.4	168.18	6249.5	168.38	
6249.6									
168.71	6249.7	169.15	6249.8	169.58	6249.9	170.02	6250	170.45	
6250.1									
170.89	6250.2	171.32	6250.3	171.76	6250.4	172.19	6250.5	189.87	
6250.5									
190.31	6250.4	190.76	6250.3	191.2	6250.2	191.64	6250.1	192.08	
6250									
192.52	6249.9	192.96	6249.8	193.4	6249.7	193.84	6249.6	194.29	
6249.5									
194.73	6249.4	195.17	6249.3	195.61	6249.2	196.05	6249.1	196.49	
6249									
196.93	6248.9	197.38	6248.8	197.57	6249.6	197.82	6248.7	198.26	

6248.6								
198.7	6248.5	199.14	6248.4	199.58	6248.3	200.02	6248.2	200.46
6248.1								
200.91	6248	201.35	6247.9	201.79	6247.8	201.9	6248.1	202.23
6247.7								
202.67	6247.6	203.11	6247.5	203.55	6247.4	204.03	6247.3	204.68
6247.2								
205.33	6247.1	205.98	6247	206.63	6246.9	207.28	6246.8	207.93
6246.7								
208.58	6246.6	209.22	6246.5	209.87	6246.4	210.52	6246.3	211.17
6246.2								
211.82	6246.1	212.47	6246	213.12	6245.9	214.57	6245.8	217.16
6245.7								
219.75	6245.6	222.35	6245.5	224.94	6245.4	227.53	6245.3	230.14
6245.2								
232.76	6245.1	235.38	6245	238.01	6244.9	240.63	6244.8	243.21
6244.7								
245.79	6244.6	248.37	6244.5	248.7	6244.4	248.8	6244.3	248.9
6244.2								
249	6244.1	249.1	6244	251.15	6244	251.25	6244.1	251.35
6244.2								
251.45	6244.3	251.55	6244.4	251.57	6244.6	251.84	6244.5	254.27
6244.6								
256.71	6244.7	259.14	6244.8	261.58	6244.9	264.01	6245	266.45
6245.1								
268.88	6245.2	271.32	6245.3	273.75	6245.4	276.19	6245.5	276.96
6245.6								
277.4	6245.7	277.83	6245.8	278.26	6245.9	278.69	6246	279.12
6246.1								
279.55	6246.2	279.98	6246.3	280.41	6246.4	280.85	6246.5	281.28
6246.6								
281.71	6246.7	282.14	6246.8	282.57	6246.9	283	6247	283.43
6247.1								
283.86	6247.2	284.29	6247.3	284.73	6247.4	285.16	6247.5	285.59
6247.6								
286.02	6247.7	286.45	6247.8	286.88	6247.9	287.31	6248	287.74
6248.1								
288.17	6248.2	288.61	6248.3	289.04	6248.4	289.47	6248.5	289.9
6248.6								
290.33	6248.7	290.76	6248.8	291.19	6248.9	291.62	6249	292.06
6249.1								
292.49	6249.2	292.92	6249.3	293.35	6249.4	293.78	6249.5	294.21
6249.6								
294.64	6249.7	295.07	6249.8	295.5	6249.9	295.94	6250	296.37
6250.1								
296.8	6250.2	297.23	6250.3	297.66	6250.4	298.09	6250.5	298.52
6250.6								
298.95	6250.7	299.38	6250.8	299.82	6250.9	300	6250.9	
Manning's n Values num= 3								
Sta	n Val	Sta	n Val	Sta	n Val			
0	.03	130.14	.013	169.58	.03			

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.
Expan.					
	130.14	169.58	50	50	50
.3					.1
Ineffective Flow	num=	2			
Sta L	Sta R	Elev	Permanent		
0	118.83	6251.23	F		
190.87	300	6249.99	F		
Left Levee	Station=	120.51	Elevation=	6251.3	
Right Levee	Station=	189.61	Elevation=	6250.08	

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6249.57	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.22	Wt. n-Val.	0.030
0.013			
W.S. Elev (ft)	6248.35	Reach Len. (ft)	50.00
50.00	50.00		
Crit W.S. (ft)	6247.93	Flow Area (sq ft)	0.17
124.19			
E.G. Slope (ft/ft)	0.001227	Area (sq ft)	0.17
124.19			
Q Total (cfs)	1100.00	Flow (cfs)	0.09
1099.91			
Top Width (ft)	36.74	Top Width (ft)	1.00
35.74			
Vel Total (ft/s)	8.85	Avg. Vel. (ft/s)	0.52
8.86			
Max Chl Dpth (ft)	5.25	Hydr. Depth (ft)	0.17
3.47			
Conv. Total (cfs)	31397.8	Conv. (cfs)	2.6
31395.2			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	1.06
37.75			
Min Ch El (ft)	6243.10	Shear (lb/sq ft)	0.01
0.25			
Alpha	1.00	Stream Power (lb/ft s)	300.00
120.51	189.61		
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.05
2.71	0.00		
C & E Loss (ft)	0.12	Cum SA (acres)	0.24
0.71	0.01		

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

CROSS SECTION

INPUT	Description:								
Station	Elevation	Data	num=	344					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6248.9	1.18	6248.9	3.07	6248.8	4.93	6248.7	6.78	
6248.6									
8.63	6248.5	10.48	6248.4	12.33	6248.3	14.18	6248.2	16.03	
6248.1									
17.88	6248	19.73	6247.9	21.57	6247.8	23.42	6247.7	25.27	
6247.6									
33.66	6247.6	35.65	6247.7	37.64	6247.8	39.62	6247.9	41.61	
6248									
43.6	6248.1	45.59	6248.2	47.58	6248.3	49.56	6248.4	50.95	
6248.5									
51.36	6248.6	51.78	6248.7	52.19	6248.8	57.28	6248.8	67.38	
6248.7									
105.39	6248.6	105.58	6248.6	105.78	6248.7	105.89	6248.8	105.99	
6248.9									
106.1	6249	115.98	6249.1	117.05	6249.2	118.12	6249.3	119.19	
6249.4									
120.26	6249.5	121.33	6249.6	121.95	6249.6	122.35	6249.5	122.75	
6249.4									
123.16	6249.3	123.56	6249.2	123.97	6249.1	124.37	6249	124.77	
6248.9									
125.18	6248.8	125.58	6248.7	125.99	6248.6	126.39	6248.5	126.79	
6248.4									
127.2	6248.3	127.6	6248.2	128	6248.1	128.41	6248	128.81	
6247.9									
129.22	6247.8	129.62	6247.7	129.91	6247.6	130.19	6247.5	130.47	
6247.4									
130.75	6247.3	131.03	6247.2	131.31	6247.1	131.59	6247	131.89	
6246.9									
132.19	6246.8	132.49	6246.7	132.79	6246.6	133.09	6246.5	133.39	
6246.4									
133.69	6246.3	133.99	6246.2	134.29	6246.1	134.59	6246	134.89	
6245.9									
135.19	6245.8	135.49	6245.7	135.79	6245.6	136.09	6245.5	136.39	
6245.4									
136.69	6245.3	136.99	6245.2	137.29	6245.1	137.59	6245	137.89	
6244.9									
138.19	6244.8	138.49	6244.7	138.79	6244.6	139.09	6244.5	139.39	
6244.4									
139.69	6244.3	139.99	6244.2	140.29	6244.1	140.59	6244	140.89	
6243.9									
141.19	6243.8	141.49	6243.7	141.79	6243.6	142.09	6243.5	142.39	
6243.4									
142.69	6243.3	142.99	6243.2	143.29	6243.1	143.59	6243	143.89	
6242.9									
144.19	6242.8	144.49	6242.7	144.79	6242.6	155.12	6242.6	155.33	

6242.7									
155.53	6242.8	155.73	6242.9	155.93	6243	156.14	6243.1	156.34	
6243.2									
156.54	6243.3	156.74	6243.4	156.95	6243.5	157.15	6243.6	157.35	
6243.7									
157.55	6243.8	157.75	6243.9	157.96	6244	158.16	6244.1	158.36	
6244.2									
158.56	6244.3	158.77	6244.4	158.97	6244.5	159.17	6244.6	159.37	
6244.7									
159.58	6244.8	159.78	6244.9	159.98	6245	160.18	6245.1	160.39	
6245.2									
160.59	6245.3	160.79	6245.4	160.99	6245.5	161.2	6245.6	161.4	
6245.7									
161.6	6245.8	161.8	6245.9	162	6246	162.21	6246.1	162.41	
6246.2									
162.61	6246.3	162.81	6246.4	163.02	6246.5	163.22	6246.6	163.42	
6246.7									
163.62	6246.8	163.83	6246.9	164.03	6247	164.23	6247.1	164.43	
6247.2									
164.64	6247.3	164.84	6247.4	165.04	6247.5	165.24	6247.6	165.45	
6247.7									
165.65	6247.8	165.85	6247.9	166.05	6248	166.25	6248.1	166.46	
6248.2									
166.66	6248.3	166.86	6248.4	167.07	6248.5	167.27	6248.6	167.48	
6248.7									
167.68	6248.8	167.89	6248.9	168.09	6249	168.3	6249.1	168.51	
6249.2									
168.84	6249.3	169.16	6249.4	169.49	6249.5	169.82	6249.6	170.16	
6249.7									
170.51	6249.8	170.87	6249.9	171.23	6250	171.26	6250.01	171.58	
6250.1									
171.94	6250.2	172.3	6250.3	172.65	6250.4	173.01	6250.5	173.36	
6250.6									
173.72	6250.7	174.08	6250.8	174.43	6250.9	180.76	6251	189.88	
6251									
190.3	6250.9	190.72	6250.8	191.14	6250.7	191.56	6250.6	191.98	
6250.5									
192.39	6250.4	192.81	6250.3	193.23	6250.2	193.65	6250.1	194.07	
6250									
194.49	6249.9	194.91	6249.8	195.33	6249.7	195.75	6249.6	196.17	
6249.5									
196.58	6249.4	197	6249.3	197.42	6249.2	197.84	6249.1	198.26	
6249									
198.68	6248.9	199.1	6248.8	199.52	6248.7	199.94	6248.6	200.36	
6248.5									
200.78	6248.4	201.19	6248.3	201.61	6248.2	202.03	6248.1	202.45	
6248									
202.57	6248.1	202.87	6247.9	203.29	6247.8	203.71	6247.7	204.13	
6247.6									
204.55	6247.5	204.97	6247.4	205.38	6247.3	205.8	6247.2	206.22	
6247.1									
206.64	6247	207.06	6246.9	207.48	6246.8	207.9	6246.7	208.32	
6246.6									

208.74	6246.5	209.16	6246.4	209.57	6246.3	209.99	6246.2	210.41			
6246.1											
210.83	6246	211.22	6245.9	211.61	6245.8	212	6245.7	212.39			
6245.6											
212.79	6245.5	213.18	6245.4	213.96	6245.3	216.58	6245.2	219.2			
6245.1											
221.83	6245	224.41	6244.9	226.98	6244.8	229.56	6244.7	232.14			
6244.6											
234.72	6244.5	237.3	6244.4	239.88	6244.3	241.51	6244.2	241.61			
6244.1											
241.71	6244	241.81	6243.9	241.91	6243.8	246.55	6243.8	246.68			
6243.9											
246.8	6244	246.92	6244.1	247.05	6244.2	251.26	6244.3	254.05			
6244.4											
256.85	6244.5	260.06	6244.6	264.8	6244.7	269.54	6244.8	274.28			
6244.9											
277.8	6245	278.18	6245.1	278.55	6245.2	278.92	6245.3	279.3			
6245.4											
279.67	6245.5	280.05	6245.6	280.42	6245.7	280.8	6245.8	281.17			
6245.9											
281.54	6246	281.92	6246.1	282.29	6246.2	282.67	6246.3	283.04			
6246.4											
283.42	6246.5	283.79	6246.6	284.17	6246.7	284.54	6246.8	284.91			
6246.9											
285.29	6247	285.66	6247.1	286.04	6247.2	286.41	6247.3	286.79			
6247.4											
287.16	6247.5	287.53	6247.6	287.91	6247.7	288.28	6247.8	288.66			
6247.9											
289.03	6248	289.41	6248.1	289.78	6248.2	290.15	6248.3	290.53			
6248.4											
290.9	6248.5	291.28	6248.6	291.65	6248.7	292.03	6248.8	292.4			
6248.9											
292.78	6249	293.15	6249.1	293.52	6249.2	293.9	6249.3	294.27			
6249.4											
294.65	6249.5	295.02	6249.6	295.4	6249.7	295.77	6249.8	296.17			
6249.9											
296.6	6250	297.04	6250.1	297.47	6250.2	297.91	6250.3	298.34			
6250.4											
298.78	6250.5	299.21	6250.6	299.65	6250.7	300	6250.7				
Manning's n Values											
num= 3											
Sta	n Val	Sta	n Val	Sta	n Val						
0	.03	128.41	.013	171.26	.03						
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.											
Expan.	128.41	171.26	34.26	34.26	34.26	.1					
.3											
Ineffective Flow			num= 2								
Sta L	Sta R	Elev	Permanent								
0	5.33	6248.71	F								
189.19	300	6249.59	F								
Left Levee			Station= 121.34		Elevation= 6249.64						

Right Levee	Station= 189.19	Elevation= 6249.64												
CROSS SECTION OUTPUT Profile #Flow 1														
E.G. Elev (ft)	6249.40	Element	Left OB											
Channel Right OB														
Vel Head (ft)	0.82	Wt. n-Val.	0.030											
0.013														
W.S. Elev (ft)	6248.58	Reach Len. (ft)	34.26											
34.26 34.26														
Crit W.S. (ft)	6247.46	Flow Area (sq ft)	0.68											
151.24														
E.G. Slope (ft/ft)	0.000712	Area (sq ft)	0.68											
151.24														
Q Total (cfs)	1100.00	Flow (cfs)	0.39											
1099.61														
Top Width (ft)	41.17	Top Width (ft)	2.35											
38.82														
Vel Total (ft/s)	7.24	Avg. Vel. (ft/s)	0.57											
7.27														
Max Chl Dpth (ft)	5.98	Hydr. Depth (ft)	0.29											
3.90														
Conv. Total (cfs)	41224.9	Conv. (cfs)	14.6											
41210.3														
Length Wtd. (ft)	34.26	Wetted Per. (ft)	2.42											
41.09														
Min Ch El (ft)	6242.60	Shear (lb/sq ft)	0.01											
0.16														
Alpha	1.01	Stream Power (lb/ft s)	300.00											
121.34 189.19														
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.05											
2.55 0.00														
C & E Loss (ft)	0.05	Cum SA (acres)	0.23											
0.66 0.01														
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.														
CROSS SECTION														
RIVER: SC01														
REACH: Sand Creek-DS-1			RS: 953											
INPUT														
Description:														
Station Elevation Data	num= 354													
Sta Elev Sta Elev Sta Elev Sta Elev Sta														
Elev	0 6248.8	.66 6248.8	2.56 6248.7	4.46 6248.6	6.36									

6248.5  
8.26 6248.4 10.16 6248.3 12.06 6248.2 13.96 6248.1 15.85  
6248  
17.75 6247.9 19.65 6247.8 21.55 6247.7 23.45 6247.6 40.6  
6247.6  
42.15 6247.7 43.7 6247.8 45.25 6247.9 46.8 6248 48.35  
6248.1  
49.91 6248.2 51.26 6248.3 52.56 6248.4 101.13 6248.4 101.34  
6248.5  
101.58 6248.6 102.1 6248.7 104.64 6248.8 106.39 6248.8 107.91  
6248.7  
109.42 6248.6 110.94 6248.5 112.45 6248.4 114.32 6248.3 117.89  
6248.2  
121.46 6248.1 122.97 6248 123.58 6247.9 124.18 6247.8 124.79  
6247.7  
125.4 6247.6 126.01 6247.5 126.65 6247.4 127.36 6247.3 128.06  
6247.2  
128.76 6247.1 129.46 6247 130.17 6246.9 130.87 6246.8 131.53  
6246.7  
131.83 6246.6 132.13 6246.5 132.43 6246.4 132.73 6246.3 133.03  
6246.2  
133.33 6246.1 133.63 6246 133.93 6245.9 134.23 6245.8 134.53  
6245.7  
134.83 6245.6 135.13 6245.5 135.43 6245.4 135.73 6245.3 136.03  
6245.2  
136.33 6245.1 136.63 6245 136.93 6244.9 137.23 6244.8 137.53  
6244.7  
137.83 6244.6 138.13 6244.5 138.43 6244.4 138.73 6244.3 139.03  
6244.2  
139.33 6244.1 139.63 6244 139.93 6243.9 140.23 6243.8 140.53  
6243.7  
140.83 6243.6 141.13 6243.5 141.43 6243.4 141.73 6243.3 142.03  
6243.2  
142.33 6243.1 142.63 6243 142.93 6242.9 143.18 6243.4 143.23  
6242.8  
143.53 6242.7 143.83 6242.6 144.13 6242.5 144.43 6242.4 144.73  
6242.3  
155.18 6242.3 155.39 6242.4 155.6 6242.5 155.8 6242.6 156.01  
6242.7  
156.21 6242.8 156.42 6242.9 156.62 6243 156.83 6243.1 157.03  
6243.2  
157.24 6243.3 157.44 6243.4 157.65 6243.5 157.85 6243.6 158.06  
6243.7  
158.26 6243.8 158.47 6243.9 158.68 6244 158.88 6244.1 159.09  
6244.2  
159.29 6244.3 159.5 6244.4 159.7 6244.5 159.91 6244.6 160.11  
6244.7  
160.32 6244.8 160.52 6244.9 160.73 6245 160.93 6245.1 161.14  
6245.2  
161.34 6245.3 161.55 6245.4 161.75 6245.5 161.96 6245.6 162.17  
6245.7  
162.37 6245.8 162.58 6245.9 162.78 6246 162.99 6246.1 163.19  
6246.2

163.4 6246.3 163.6 6246.4 163.81 6246.5 164.01 6246.6 164.22  
6246.7  
164.42 6246.8 164.63 6246.9 164.83 6247 165.04 6247.1 165.24  
6247.2  
165.45 6247.3 165.66 6247.4 165.86 6247.5 166.07 6247.6 166.27  
6247.7  
166.48 6247.8 166.68 6247.9 166.89 6248 167.09 6248.1 167.3  
6248.2  
167.5 6248.3 167.71 6248.4 167.91 6248.5 168.12 6248.6 168.32  
6248.7  
168.54 6248.8 168.85 6248.9 169.15 6249 169.36 6249.07 169.45  
6249.1  
169.75 6249.2 170.06 6249.3 170.36 6249.4 170.66 6249.5 170.96  
6249.6  
171.27 6249.7 171.57 6249.8 171.87 6249.9 172.18 6250 172.48  
6250.1  
172.78 6250.2 173.08 6250.3 173.39 6250.4 173.69 6250.5 173.99  
6250.6  
174.29 6250.7 176.08 6250.8 181.05 6250.9 186.01 6251 189.94  
6251  
190.26 6250.9 190.58 6250.8 190.89 6250.7 191.21 6250.6 191.53  
6250.5  
191.85 6250.4 192.17 6250.3 192.49 6250.2 192.81 6250.1 193.13  
6250  
193.45 6249.9 193.77 6249.8 194.09 6249.7 194.41 6249.6 194.73  
6249.5  
195.05 6249.4 195.37 6249.3 195.69 6249.2 196.02 6249.1 196.37  
6249  
196.71 6248.9 197.06 6248.8 197.41 6248.7 197.76 6248.6 198.1  
6248.5  
198.45 6248.4 198.8 6248.3 199.14 6248.2 199.49 6248.1 199.84  
6248  
200.18 6247.9 200.53 6247.8 200.88 6247.7 201.23 6247.6 201.57  
6247.5  
201.92 6247.4 202.27 6247.3 202.61 6247.2 202.96 6247.1 203.31  
6247  
203.65 6246.9 204 6246.8 204.35 6246.7 204.7 6246.6 205.04  
6246.5  
205.39 6246.4 205.74 6246.3 206.08 6246.2 206.43 6246.1 206.78  
6246  
207.12 6245.9 207.47 6245.8 207.82 6245.7 208.24 6245.6 208.73  
6245.5  
209.24 6245.4 209.25 6245.5 210.25 6245.2 210.76 6245.1 211.26  
6245  
211.33 6245 211.34 6245.1 211.36 6245.2 212.41 6244.9 212.49  
6244.8  
212.56 6244.7 212.64 6244.6 212.71 6244.5 212.77 6244.4 212.78  
6244.2  
212.8 6243.7 212.82 6243.2 212.84 6242.7 212.86 6242.2 212.9  
6241.8  
213.06 6241.8 213.31 6241.9 213.55 6242 213.8 6242.1 214.05  
6242.2  
214.29 6242.3 214.54 6242.4 214.78 6242.5 215.03 6242.6 215.27



6242.7  
215.52 6242.8 215.77 6242.9 216.01 6243 216.26 6243.1 216.52  
6243.2  
216.83 6243.3 217.44 6243.5 218.25 6243.6 218.42 6243.7 218.59  
6243.8  
218.76 6243.9 218.94 6244 222.21 6244.1 225.65 6244.2 232.55  
6244.4  
235.89 6244.5 239.43 6244.6 242.96 6244.7 246.5 6244.8 250.03  
6244.9  
253.56 6245 257.1 6245.1 260.1 6245.2 262.68 6245.3 266.78  
6245.4  
271.15 6245.5 271.91 6245.8 271.99 6245.6 272.71 6245.7 273.18  
6245.9  
273.4 6245.8 274.09 6245.9 274.78 6246 275.45 6246.1 276.09  
6246.2  
276.69 6246.3 277.28 6246.4 277.87 6246.5 278.46 6246.6 279.05  
6246.7  
279.64 6246.8 280.2 6246.9 280.76 6247 281.31 6247.1 281.85  
6247.2  
282.09 6247.3 282.14 6247.4 282.37 6247.3 282.89 6247.4 283.41  
6247.5  
283.93 6247.6 284.45 6247.7 284.97 6247.8 285.5 6247.9 286.02  
6248  
286.55 6248.1 287.07 6248.2 287.58 6248.3 288.07 6248.4 288.56  
6248.5  
289.06 6248.6 289.55 6248.7 290.04 6248.8 290.53 6248.9 291.02  
6249  
291.51 6249.1 292 6249.2 292.49 6249.3 292.98 6249.4 293.47  
6249.5  
293.95 6249.6 294.43 6249.7 294.91 6249.8 295.38 6249.9 295.85  
6250  
296.31 6250.1 296.78 6250.2 297.25 6250.3 297.72 6250.4 298.19  
6250.5  
298.66 6250.6 299.13 6250.7 299.6 6250.8 300 6250.8  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 129.46 .013 169.36 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 129.46 169.36 15.74 15.74 15.74 .1  
.3  
Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 5.33 6248.55 F  
190.45 300 6248.92 F  
Left Levee Station= 105.43 Elevation= 6248.84  
Right Levee Station= 173.7 Elevation= 6250.84  
  
CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft) 6249.33 Element Left OB  
Channel Right OB  
Vel Head (ft) 0.65 Wt. n-Val. 0.030  
0.013  
W.S. Elev (ft) 6248.68 Reach Len. (ft) 15.74  
15.74 15.74  
Crit W.S. (ft) 6247.17 Flow Area (sq ft) 13.36  
167.37  
E.G. Slope (ft/ft) 0.000511 Area (sq ft) 13.36  
167.37  
Q Total (cfs) 1100.00 Flow (cfs) 10.95  
1089.05  
Top Width (ft) 60.07 Top Width (ft) 21.25  
38.82  
Vel Total (ft/s) 6.09 Avg. Vel. (ft/s) 0.82  
6.51  
Max Chl Dpth (ft) 6.88 Hydr. Depth (ft) 0.63  
4.31  
Conv. Total (cfs) 48666.3 Conv. (cfs) 484.5  
48181.8  
Length Wtd. (ft) 15.74 Wetted Per. (ft) 21.34  
41.87  
Min Ch El (ft) 6242.30 Shear (lb/sq ft) 0.02  
0.13  
Alpha 1.13 Stream Power (lb/ft s) 300.00  
105.43 173.70  
Frctn Loss (ft) 0.00 Cum Volume (acre-ft) 0.04  
2.43 0.00  
C & E Loss (ft) 0.10 Cum SA (acres) 0.22  
0.63 0.01

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, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 952

INPUT  
Description:  
Station Elevation Data num= 296  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6248.8 1.04 6248.8 3.29 6248.7 5.19 6248.6 7.09  
6248.5  
8.99 6248.4 10.89 6248.3 12.79 6248.2 14.69 6248.1 16.59

6248  
18.49 6247.9 20.39 6247.8 22.29 6247.7 24.2 6247.6 44.35  
6247.6  
45.86 6247.7 47.38 6247.8 48.9 6247.9 50.41 6248 52.52  
6248.1  
53.98 6248.2 54.41 6248.3 55.51 6248.4 86.44 6248.4 86.61  
6248.5  
86.8 6248.6 87.03 6248.7 89.03 6248.8 91.53 6248.9 94.03  
6249  
96.53 6249.1 99.03 6249.2 101.52 6249.3 104.02 6249.4 106.52  
6249.5  
109.02 6249.6 111.52 6249.7 113 6249.7 114.54 6249.6 116.09  
6249.5  
117.64 6249.4 119.15 6249.3 119.79 6249.2 120.42 6249.1 121.06  
6249  
121.69 6248.9 122.33 6248.8 122.96 6248.7 123.23 6248.6 123.48  
6248.5  
123.73 6248.4 123.98 6248.3 124.23 6248.2 124.48 6248.1 124.73  
6248  
124.98 6247.9 125.22 6247.8 125.47 6247.7 125.72 6247.6 125.97  
6247.5  
126.22 6247.4 126.47 6247.3 126.72 6247.2 126.97 6247.1 127.22  
6247  
127.46 6246.9 127.71 6246.8 127.96 6246.7 128.21 6246.6 128.46  
6246.5  
128.71 6246.4 128.96 6246.3 129.21 6246.2 129.46 6246.1 129.71  
6246  
129.95 6245.9 130.2 6245.8 130.45 6245.7 130.7 6245.6 130.95  
6245.5  
131.2 6245.4 131.45 6245.3 131.7 6245.2 131.95 6245.1 132.19  
6245  
132.44 6244.9 132.67 6244.8 132.9 6244.7 133.14 6244.6 133.37  
6244.5  
133.6 6244.4 133.83 6244.3 134.07 6244.2 134.3 6244.1 134.53  
6244  
134.76 6243.9 135 6243.8 135.23 6243.7 135.46 6243.6 135.69  
6243.5  
135.93 6243.4 136.16 6243.3 136.39 6243.2 136.62 6243.1 136.86  
6243  
137.11 6242.9 137.36 6242.8 137.62 6242.7 137.88 6242.6 138.14  
6242.5  
138.4 6242.4 138.65 6242.3 138.91 6242.2 160.14 6242.2 160.35  
6242.3  
160.56 6242.4 160.78 6242.5 161 6242.6 161.22 6242.7 161.43  
6242.8  
161.64 6242.9 161.86 6243 162.07 6243.1 162.28 6243.2 162.5  
6243.3  
162.71 6243.4 162.93 6243.5 163.15 6243.6 163.59 6243.8 163.81  
6243.9  
164.03 6244 164.25 6244.1 164.47 6244.2 164.68 6244.3 164.9  
6244.4  
165.12 6244.5 165.34 6244.6 165.56 6244.7 165.78 6244.8 166  
6244.9

166.22 6245 166.44 6245.1 166.66 6245.2 166.88 6245.3 167.1  
6245.4  
167.32 6245.5 167.54 6245.6 167.76 6245.7 167.97 6245.8 168.19  
6245.9  
168.41 6246 168.63 6246.1 168.85 6246.2 169.07 6246.3 169.29  
6246.4  
169.51 6246.5 169.73 6246.6 169.95 6246.7 170.17 6246.8 170.39  
6246.9  
170.61 6247 170.83 6247.1 171.04 6247.2 171.26 6247.3 171.48  
6247.4  
171.7 6247.5 171.92 6247.6 172.14 6247.7 172.36 6247.8 172.58  
6247.9  
172.8 6248 173.02 6248.1 173.24 6248.2 173.46 6248.3 173.68  
6248.4  
173.9 6248.5 174.11 6248.6 174.33 6248.7 174.55 6248.8 174.77  
6248.9  
174.99 6249 175.21 6249.1 175.43 6249.2 175.65 6249.3 175.77  
6249.35  
175.87 6249.4 176.09 6249.5 176.31 6249.6 176.53 6249.7 176.75  
6249.8  
176.97 6249.9 177.19 6250 177.4 6250.1 177.62 6250.2 177.84  
6250.3  
178.06 6250.4 178.28 6250.5 178.5 6250.6 178.72 6250.7 178.94  
6250.8  
181.43 6250.9 191.11 6251 197.5 6251 197.88 6250.9 198.27  
6250.8  
198.65 6250.7 199.04 6250.6 199.42 6250.5 199.8 6250.4 200.19  
6250.3  
200.57 6250.2 200.99 6250.1 201.42 6250 201.85 6249.9 202.28  
6249.8  
202.72 6249.7 203.15 6249.6 203.58 6249.5 204.03 6249.4 204.55  
6249.3  
205.06 6249.2 205.57 6249.1 206.09 6249 206.73 6248.9 207.37  
6248.8  
208.08 6248.7 208.97 6248.6 210.16 6248.5 210.88 6248.6 211.93  
6248.7  
213.03 6248.8 213.39 6248.4 213.97 6248.9 215.11 6249 216.2  
6249.1  
217.9 6249.2 219.37 6248.3 219.4 6248.3 219.65 6249.3 222.84  
6248.4  
233.6 6248.4 234.07 6248.3 234.69 6248.5 235.79 6248.6 236.88  
6248.7  
237.98 6248.8 238.87 6248.2 239.07 6248.9 240.17 6249 243.68  
6248.1  
248.49 6248 254.25 6248 255.25 6248.1 256.25 6248.2 257.25  
6248.3  
257.76 6248.1 258.24 6248.4 259.24 6248.5 260.24 6248.6 261.24  
6248.7  
261.28 6248.2 262.89 6248.8 264 6248.9 264.28 6248.2 264.65  
6248.2  
267.02 6248.3 268.85 6248.4 270.38 6248.5 271.85 6248.6 273.03  
6248.7  
274.22 6248.8 275.32 6248.9 276.29 6249 277.27 6249.1 278.24

6249.2  
279.12 6249.3 279.95 6249.4 280.79 6249.5 281.62 6249.6 282.45  
6249.7  
283.22 6249.8 283.95 6249.9 284.68 6250 285.41 6250.1 286.13  
6250.2  
286.86 6250.3 287.57 6250.4 288.5 6250.4 290.96 6250.3 293.43  
6250.2  
295.89 6250.1 298.2 6250 299.2 6250 299.2 6250.53 299.47  
6250.5  
300 6250.5

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 124.73 .013 175.77 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 124.73 175.77 11.7 11.7 11.7 .1

.3  
Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 8.26 6248.48 F  
197.15 300 6249.79 F  
Left Levee Station= 112.97 Elevation= 6249.66  
Right Levee Station= 196.73 Elevation= 6249.9

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6249.23	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.31	Wt. n-Val.	0.030
0.013			
W.S. Elev (ft)	6248.91	Reach Len. (ft)	11.70
11.70 11.70			
Crit W.S. (ft)	6246.00	Flow Area (sq ft)	1.13
245.44			
E.G. Slope (ft/ft)	0.000197	Area (sq ft)	1.13
245.44			
Q Total (cfs)	1100.00	Flow (cfs)	0.39
1099.61			
Top Width (ft)	53.19	Top Width (ft)	3.12
50.07			
Vel Total (ft/s)	4.46	Avg. Vel. (ft/s)	0.34
4.48			
Max Chl Dpth (ft)	6.71	Hydr. Depth (ft)	0.36
4.90			
Conv. Total (cfs)	78290.1	Conv. (cfs)	27.7
78262.3			
Length Wtd. (ft)	11.70	Wetted Per. (ft)	3.27
52.67			
Min Ch El (ft)	6242.20	Shear (lb/sq ft)	0.00
0.06			

Alpha	1.01	Stream Power (lb/ft s)	300.00
112.97 196.73			
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04
2.35 0.00			
C & E Loss (ft)	0.03	Cum SA (acres)	0.22
0.62 0.01			

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

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 951

INPUT  
Description:  
Station Elevation Data num= 233  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6248.7 .89 6248.7 3.39 6248.6 5.87 6248.5 8.26  
6248.4  
10.65 6248.3 12.94 6248.2 15.24 6248.1 17.28 6248 19.18  
6247.9  
21.09 6247.8 22.99 6247.7 24.89 6247.6 47.75 6247.6 49.28  
6247.7  
52.19 6247.8 54.36 6247.9 54.8 6248 55.23 6248.1 55.67  
6248.2  
56.1 6248.3 58.64 6248.4 75.94 6248.4 76.11 6248.5 76.28  
6248.6  
76.47 6248.7 77.9 6248.8 80.37 6248.9 82.84 6249 85.3  
6249.1  
87.77 6249.2 90.24 6249.3 92.71 6249.4 95.18 6249.5 98.56  
6249.6  
102.14 6249.7 105.72 6249.8 109.31 6249.9 111.97 6249.9 112.89  
6249.8  
113.8 6249.7 114.56 6249.6 115.2 6249.5 115.83 6249.4 116.46  
6249.3  
117.1 6249.2 117.73 6249.1 118.36 6249 118.84 6248.9 119.25  
6248.8  
119.65 6248.7 120.06 6248.6 120.46 6248.5 120.87 6248.4 121.27  
6248.3  
121.68 6248.2 122.08 6248.1 122.49 6248 122.89 6247.9 123.3  
6247.8  
123.61 6247.7 123.85 6247.6 124.08 6247.5 124.31 6247.4 124.54  
6247.3  
124.77 6247.2 125.01 6247.1 125.24 6247 125.47 6246.9 125.7  
6246.8  
125.93 6246.7 126.17 6246.6 126.4 6246.5 126.63 6246.4 126.86  
6246.3

127.09	6246.2	127.33	6246.1	127.56	6246	127.79	6245.9	128.03
6245.8								
128.29	6245.7	128.55	6245.6	128.8	6245.5	129.06	6245.4	129.22
6245.5								
129.32	6245.3	129.58	6245.2	129.83	6245.1	130.09	6245	130.35
6244.9								
130.6	6244.8	130.86	6244.7	131.12	6244.6	131.38	6244.5	131.63
6244.4								
131.89	6244.3	132.15	6244.2	132.4	6244.1	132.66	6244	132.92
6243.9								
133.18	6243.8	133.43	6243.7	133.69	6243.6	133.95	6243.5	134.2
6243.4								
134.46	6243.3	134.72	6243.2	134.98	6243.1	135.23	6243	135.49
6242.9								
135.75	6242.8	136	6242.7	136.26	6242.6	136.52	6242.5	136.78
6242.4								
137.03	6242.3	137.29	6242.2	137.55	6242.1	162.15	6242.1	162.41
6242.2								
162.67	6242.3	162.93	6242.4	163.19	6242.5	163.45	6242.6	163.71
6242.7								
163.97	6242.8	164.23	6242.9	164.49	6243	164.75	6243.1	165.01
6243.2								
165.27	6243.3	165.52	6243.4	165.78	6243.5	166.04	6243.6	166.3
6243.7								
166.56	6243.8	166.82	6243.9	167.08	6244	167.34	6244.1	167.6
6244.2								
167.86	6244.3	168.12	6244.4	168.38	6244.5	168.64	6244.6	168.89
6244.7								
169.15	6244.8	169.41	6244.9	169.67	6245	169.93	6245.1	170.19
6245.2								
170.45	6245.3	170.71	6245.4	170.97	6245.5	171.23	6245.6	171.49
6245.7								
171.75	6245.8	172.01	6245.9	172.27	6246	172.52	6246.1	172.78
6246.2								
173.04	6246.3	173.3	6246.4	173.56	6246.5	173.82	6246.6	174.08
6246.7								
174.34	6246.8	174.6	6246.9	174.86	6247	175.12	6247.1	175.38
6247.2								
175.64	6247.3	175.89	6247.4	176.15	6247.5	176.41	6247.6	176.67
6247.7								
176.93	6247.8	177.19	6247.9	177.45	6248	177.71	6248.1	177.97
6248.2								
178.23	6248.3	178.49	6248.4	178.75	6248.5	179.01	6248.6	179.27
6248.7								
179.52	6248.8	179.78	6248.9	180.04	6249	180.22	6249.07	180.3
6249.1								
180.56	6249.2	180.82	6249.3	181.08	6249.4	181.34	6249.5	181.62
6249.6								
182.14	6249.7	182.65	6249.8	183.17	6249.9	183.68	6250	184.19
6250.1								
184.71	6250.2	185.22	6250.3	185.74	6250.4	186.29	6250.5	186.86
6250.6								
187.43	6250.7	188.01	6250.8	195.73	6250.9	216.8	6251	216.92

6251								
223.77	6250.9	227.73	6250.8	231.69	6250.7	235.66	6250.6	239.62
6250.5								
243.59	6250.4	247.55	6250.3	251.52	6250.2	255.54	6250.1	259.58
6250								
263.66	6249.9	267.91	6249.8	272.15	6249.7	276.39	6249.6	280.64
6249.5								
284.88	6249.4	289.12	6249.3	293.37	6249.2	297.6	6249.1	298.61
6249.1								
298.61	6249.46	299.83	6249.4	300	6249.4			
Manning's n	Values		num=	3				
Sta	n Val	Sta	n Val	Sta	n Val			
0	.03	122.49	.013	180.22	.03			
Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.
Expan.								
	122.49	180.22		27.44	27.44	27.44		.1
.3								
Ineffective Flow		num=	2					
Sta L	Sta R	Elev	Permanent					
0	1.98	6248.7	F					
263.74	300	6251.25	F					
Left Levee	Station=	111.71	Elevation=	6249.89				
Right Levee	Station=	219.77	Elevation=	6251				
CROSS SECTION OUTPUT	Profile #Flow 1							
E.G. Elev (ft)		6249.20	Element				Left OB	
Channel Right OB								
Vel Head (ft)		0.22	Wt. n-Val.				0.030	
0.013								
W.S. Elev (ft)		6248.97	Reach Len. (ft)				27.44	
27.44	27.44							
Crit W.S. (ft)		6245.61	Flow Area (sq ft)				1.92	
289.19								
E.G. Slope (ft/ft)		0.000136	Area (sq ft)				1.92	
289.19								
Q Total (cfs)		1100.00	Flow (cfs)				0.67	
1099.33								
Top Width (ft)		61.48	Top Width (ft)				4.00	
57.48								
Vel Total (ft/s)		3.78	Avg. Vel. (ft/s)				0.35	
3.80								
Max Chl Dpth (ft)		6.87	Hydr. Depth (ft)				0.48	
5.03								
Conv. Total (cfs)		94356.6	Conv. (cfs)				57.2	
94299.4								
Length Wtd. (ft)		27.44	Wetted Per. (ft)				4.12	
60.02								
Min Ch El (ft)		6242.10	Shear (lb/sq ft)				0.00	
0.04								

INPUT									
Description:									
Station	Elevation	Data	num=	255					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6249.2	8.43	6249.2	16.42	6249.1	22.67	6249	28.22	
6248.9	33.39	6248.8	38.26	6248.7	42.87	6248.6	47.48	6248.5	52.08
6248.4	66.43	6248.3	69.58	6248.2	72.73	6248.1	75.88	6248	79.03
6247.9	82.18	6247.8	85.33	6247.7	88.48	6247.6	105.48	6247.6	107.05
6247.7	108.63	6247.8	110.21	6247.9	111.78	6248	113.3	6248	113.41
6248.1	113.53	6248.2	113.64	6248.3	113.76	6248.4	116.31	6248.4	120.29
6248.3	124.27	6248.2	128.25	6248.1	133.73	6248.1	136.25	6248.2	138.76
6248.3	141.27	6248.4	143.78	6248.5	146.3	6248.6	148.85	6248.7	155.27
6248.7	158.06	6248.6	160.85	6248.5	163.64	6248.4	165.54	6248.3	165.81
6248.2	166.08	6248.1	166.36	6248	166.63	6247.9	166.9	6247.8	167.17
6247.7	167.45	6247.6	167.72	6247.5	167.99	6247.4	168.26	6247.3	168.54
6247.2	168.81	6247.1	169.08	6247	169.35	6246.9	169.63	6246.8	169.9
6246.7	169.92	6246.7	170.17	6246.6	170.44	6246.5	170.72	6246.4	170.99
6246.3	171.26	6246.2	171.53	6246.1	171.8	6246	172.08	6245.9	172.35

6245.8								
172.62	6245.7	172.89	6245.6	173.17	6245.5	173.44	6245.4	173.71
6245.3								
173.98	6245.2	174.26	6245.1	174.53	6245	174.8	6244.9	175.07
6244.8								
175.34	6244.7	175.59	6244.6	175.84	6244.5	176.09	6244.4	176.34
6244.3								
176.59	6244.2	176.84	6244.1	177.09	6244	177.34	6243.9	177.59
6243.8								
177.84	6243.7	178.09	6243.6	178.34	6243.5	178.59	6243.4	178.84
6243.3								
179.09	6243.2	179.34	6243.1	179.59	6243	179.84	6242.9	180.09
6242.8								
180.34	6242.7	180.58	6242.6	180.82	6242.5	181.07	6242.4	181.31
6242.3								
181.55	6242.2	181.8	6242.1	182.04	6242	217.25	6242	217.57
6242.1								
217.86	6242.2	218.14	6242.3	218.29	6242.7	218.43	6242.4	218.72
6242.5								
219.01	6242.6	219.3	6242.7	219.59	6242.8	219.76	6243	219.87
6242.9								
220.16	6243	220.45	6243.1	220.74	6243.2	221.03	6243.3	221.31
6243.4								
221.6	6243.5	221.89	6243.6	222.18	6243.7	222.47	6243.8	222.75
6243.9								
223.04	6244	223.33	6244.1	223.61	6244.2	223.88	6244.3	224.14
6244.4								
224.41	6244.5	224.67	6244.6	224.94	6244.7	225.2	6244.8	225.47
6244.9								
225.73	6245	226	6245.1	226.24	6245.2	226.26	6245.2	226.53
6245.3								
226.8	6245.4	227.06	6245.5	227.33	6245.6	227.59	6245.7	227.76
6246.1								
227.86	6245.8	228.12	6245.9	228.36	6245.99	228.39	6246	228.65
6246.1								
228.92	6246.2	229.18	6246.3	229.45	6246.4	229.71	6246.5	229.98
6246.6								
230.24	6246.7	230.43	6247	230.51	6246.8	230.77	6246.9	231.04
6247								
231.31	6247.1	231.57	6247.2	231.84	6247.3	232.1	6247.4	232.37
6247.5								
232.63	6247.6	232.9	6247.7	233.16	6247.8	233.43	6247.9	233.69
6248								
233.96	6248.1	234.22	6248.2	234.49	6248.3	234.75	6248.4	235.02
6248.5								
235.29	6248.6	235.55	6248.7	235.82	6248.8	236.08	6248.9	236.35
6249								
236.61	6249.1	236.88	6249.2	237.14	6249.3	237.41	6249.4	237.67
6249.5								
237.97	6249.6	239.22	6249.7	240.48	6249.8	241.73	6249.9	242.99
6249.9								
244.24	6249.8	245.49	6249.7	246.74	6249.6	247.98	6249.5	249.23
6249.4								

CROSS SECTION OUTPUT    Profile #Flow 1			
E.G. Elev (ft)	6249.17	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.13	Wt. n-Val.	0.030
0.013    0.030			
W.S. Elev (ft)	6249.04	Reach Len. (ft)	97.99
97.99    97.99			
Crit W.S. (ft)	6247.11	Flow Area (sq ft)	122.55
355.21    12.28			
E.G. Slope (ft/ft)	0.000061	Area (sq ft)	122.55
355.21    12.28			

[illegible]

66.43 6248.3 69.58 6248.2 72.73 6248.1 75.88 6248 79.03  
6247.9 82.18 6247.8 85.33 6247.7 88.48 6247.6 105.48 6247.6 107.05  
6247.7 108.63 6247.8 110.21 6247.9 111.78 6248 113.3 6248 113.41  
6248.1 113.53 6248.2 113.64 6248.3 113.76 6248.4 116.31 6248.4 120.29  
6248.3 124.27 6248.2 128.25 6248.1 133.73 6248.1 136.25 6248.2 138.76  
6248.3 141.27 6248.4 143.78 6248.5 146.3 6248.6 148.85 6248.7 155.27  
6248.7 158.06 6248.6 160.85 6248.5 163.64 6248.4 165.54 6248.3 165.81  
6248.2 166.08 6248.1 166.36 6248 166.63 6247.9 166.9 6247.8 167.17  
6247.7 167.45 6247.6 167.72 6247.5 167.99 6247.4 168.26 6247.3 168.54  
6247.2 168.81 6247.1 169.08 6247 169.35 6246.9 169.63 6246.8 169.9  
6246.7 169.92 6246.7 170.17 6246.6 170.44 6246.5 170.72 6246.4 170.99  
6246.3 171.26 6246.2 171.53 6246.1 171.8 6246 172.08 6245.9 172.35  
6245.8 172.62 6245.7 172.89 6245.6 173.17 6245.5 173.44 6245.4 173.71  
6245.3 173.98 6245.2 174.26 6245.1 174.53 6245 174.8 6244.9 175.07  
6244.8 175.34 6244.7 175.59 6244.6 175.84 6244.5 176.09 6244.4 176.34  
6244.3 176.59 6244.2 176.84 6244.1 177.09 6244 177.34 6243.9 177.59  
6243.8 177.84 6243.7 178.09 6243.6 178.34 6243.5 178.59 6243.4 178.84  
6243.3 179.09 6243.2 179.34 6243.1 179.59 6243 179.84 6242.9 180.09  
6242.8 180.34 6242.7 180.58 6242.6 180.82 6242.5 181.07 6242.4 181.31  
6242.3 181.55 6242.2 181.8 6242.1 182.04 6242 217.25 6242 217.57  
6242.1 217.86 6242.2 218.14 6242.3 218.29 6242.7 218.43 6242.4 218.72  
6242.5 219.01 6242.6 219.3 6242.7 219.59 6242.8 219.76 6243 219.87  
6242.9 220.16 6243 220.45 6243.1 220.74 6243.2 221.03 6243.3 221.31  
6243.4 221.6 6243.5 221.89 6243.6 222.18 6243.7 222.47 6243.8 222.75  
6243.9 223.04 6244 223.33 6244.1 223.61 6244.2 223.88 6244.3 224.14  
6244.4 224.41 6244.5 224.67 6244.6 224.94 6244.7 225.2 6244.8 225.47  
6244.9 225.73 6245 226 6245.1 226.24 6245.2 226.26 6245.2 226.53

6245.3 226.8 6245.4 227.06 6245.5 227.33 6245.6 227.59 6245.7 227.76  
6246.1 227.86 6245.8 228.12 6245.9 228.36 6245.99 228.39 6246 228.65  
6246.1 228.92 6246.2 229.18 6246.3 229.45 6246.4 229.71 6246.5 229.98  
6246.6 230.24 6246.7 230.43 6247 230.51 6246.8 230.77 6246.9 231.04  
6247 231.31 6247.1 231.57 6247.2 231.84 6247.3 232.1 6247.4 232.37  
6247.5 232.63 6247.6 232.9 6247.7 233.16 6247.8 233.43 6247.9 233.69  
6248 233.96 6248.1 234.22 6248.2 234.49 6248.3 234.75 6248.4 235.02  
6248.5 235.29 6248.6 235.55 6248.7 235.82 6248.8 236.08 6248.9 236.35  
6249 236.61 6249.1 236.88 6249.2 237.14 6249.3 237.41 6249.4 237.67  
6249.5 237.97 6249.6 239.22 6249.7 240.48 6249.8 241.73 6249.9 242.99  
6249.9 244.24 6249.8 245.49 6249.7 246.74 6249.6 247.98 6249.5 249.23  
6249.4 250.48 6249.3 251.72 6249.2 252.97 6249.1 253.06 6247.6 253.62  
6249 254.14 6248.9 254.67 6248.8 255.19 6248.7 255.72 6248.6 256.24  
6248.5 256.77 6248.4 257.29 6248.3 257.82 6248.2 258.35 6248.1 258.87  
6248 259.4 6247.9 259.92 6247.8 260.45 6247.7 263.86 6247.6 267.59  
6247.5 270.82 6247.4 271.32 6247.4 275.06 6247.3 279.67 6247.2 280.8  
6247.4 281.11 6247.3 281.42 6247.2 282.67 6247.2 286.47 6247.3 290.27  
6247.4 290.42 6247.5 297.84 6247.5 308.3 6247.6 314.67 6247.7 317.29  
6247.8 319.91 6247.9 322.52 6248 327.2 6248.1 330.06 6248.2 332.8  
6248.3 335.49 6248.4 337.85 6248.5 339.94 6248.6 349.29 6248.5 352.22  
6248.4 355.14 6248.3 358.06 6248.2 375.36 6248.1 377.01 6248 378.67  
6247.9 380.43 6247.8 382.22 6247.7 386.33 6247.7 397.18 6247.8 400  
6247.8  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 171.8 .013 228.36 .03  
  
Bank Sta: Left Right Coeff Contr. Expan.  
171.8 228.36 .1 .3  
Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent						
167.86	179.01	6247.1	F						
184.59	192.65	6247.1	F						
198.23	214.34	6247.1	F						
219.91	229.83	6247.1	F						
Left Levee	Station=	154.53	Elevation=	6248.7					
Right Levee	Station=	242.21	Elevation=	6249.96					
Downstream	Deck/Roadway	Coordinates							
num=	9								
Sta Hi	Cord	Lo Cord	Sta Hi	Cord	Lo Cord	Sta Hi	Cord	Lo Cord	
5.61	6248	0	5.61	6248	0	73.45	6248	0	
182.55	6247	0	194.99	6247	0	198.01	6247	0	
220.69	6247	0	347.15	6247	0	409.4	6247	0	
Downstream	Bridge	Cross Section Data							
Station	Elevation	Data	num=	241					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev	0	6249.3	1.53	6249.3	16.17	6249.2	28.39	6249.1	40.61
6249	52.83	6248.9	65.06	6248.8	77.28	6248.7	89.5	6248.6	101.72
6248.5	113.94	6248.4	126.17	6248.3	138.06	6248.2	145.74	6248.1	146.57
6248	147.91	6247.9	149.01	6247.8	150.1	6247.7	151.21	6247.6	152.31
6247.5	153.42	6247.4	154.53	6247.3	155.63	6247.2	156.74	6247.1	157.85
6247	158.96	6246.9	160.07	6246.8	161.18	6246.7	162.29	6246.6	163.4
6246.5	164.51	6246.4	165.62	6246.3	165.95	6246.2	166.16	6246.1	166.38
6246	166.59	6245.9	166.8	6245.8	167.02	6245.7	167.23	6245.6	167.45
6245.5	167.66	6245.4	167.88	6245.3	168.09	6245.2	168.31	6245.1	168.52
6245	168.74	6244.9	168.95	6244.8	169.17	6244.7	169.38	6244.6	169.6
6244.5	169.81	6244.4	170.03	6244.3	170.24	6244.2	170.46	6244.1	170.67
6244	170.89	6243.9	171.1	6243.8	171.32	6243.7	171.53	6243.6	171.75
6243.5	171.97	6243.4	172.18	6243.3	172.4	6243.2	172.62	6243.1	172.83
6243	173.05	6242.9	173.27	6242.8	173.48	6242.7	173.7	6242.6	173.92
6242.5	174.14	6242.4	174.36	6242.3	174.58	6242.2	174.8	6242.1	175.02
6242	175.24	6241.9	175.45	6241.8	175.67	6241.7	175.88	6241.6	176.1
6241.5	176.32	6241.4	176.53	6241.3	176.75	6241.2	176.97	6241.1	177.18
6241									

177.4	6240.9	177.61	6240.8	177.83	6240.7	178.05	6240.6	178.26	
6240.5	178.48	6240.4	178.69	6240.3	178.91	6240.2	179.13	6240.1	179.34
6240	179.56	6239.9	180.92	6239.8	185.83	6239.7	190.76	6239.6	195.74
6239.5	200.03	6239.43	201.64	6239.4	202.69	6239.4	209.86	6239.5	216.25
6239.6	217.71	6239.7	219.17	6239.8	220.63	6239.9	222.09	6240	223.55
6240.1	225.01	6240.2	226.41	6240.3	227.16	6240.4	231.88	6240.5	236.96
6240.6	256.33	6240.6	256.73	6240.5	257.13	6240.4	257.53	6240.3	257.92
6240.2	258.32	6240.1	258.72	6240	259.12	6239.9	259.52	6239.8	260.22
6239.7	261.38	6239.6	262.54	6239.5	263.7	6239.4	264.86	6239.3	270.67
6239.2	271.32	6239.2	271.86	6239.3	272.41	6239.4	272.95	6239.5	273.5
6239.6	274.05	6239.7	274.59	6239.8	275.14	6239.9	275.68	6240	276.23
6240.1	276.78	6240.2	277.32	6240.3	277.87	6240.4	278.41	6240.5	278.96
6240.6	279.51	6240.7	280.05	6240.8	284.18	6240.9	291.75	6241	292.24
6241.1	292.72	6241.2	293.19	6241.3	293.67	6241.4	294.14	6241.5	296.25
6241.6	297.56	6241.7	298.86	6241.8	302.26	6241.9	304.38	6242	305.8
6242.1	307	6242.2	308.11	6242.3	309.12	6242.4	310.01	6242.5	310.89
6242.6	311.68	6242.7	312.45	6242.8	313.17	6242.9	313.88	6243	314.55
6243.1	315.21	6243.2	315.83	6243.3	316.44	6243.4	317.05	6243.5	317.62
6243.6	318.19	6243.7	318.76	6243.8	319.29	6243.9	319.82	6244	320.35
6244.1	320.86	6244.2	321.36	6244.3	321.87	6244.4	322.37	6244.5	322.84
6244.6	323.31	6244.7	323.79	6244.8	324.27	6244.9	324.71	6245	325.17
6245.1	325.62	6245.2	326.07	6245.3	326.51	6245.4	326.94	6245.5	327.38
6245.6	327.81	6245.7	328.24	6245.8	328.66	6245.9	329.07	6246	329.49
6246.1	329.9	6246.2	330.32	6246.3	330.87	6246.4	333.78	6246.5	336.6
6246.6	339.34	6246.7	344.79	6246.8	346.32	6246.9	347.86	6247	349.39
6247.1	350.73	6247.2	352.07	6247.3	354.42	6247.4	357.6	6247.5	360.77
6247.6	363.85	6247.7	366.98	6247.8	380.36	6247.8	381	6247.9	385.21



6248  
 385.74 6248 385.82 6247.9 385.9 6247.8 385.98 6247.7 386.06  
 6247.6  
 386.15 6247.5 394.93 6247.5 397.25 6247.6 399.66 6247.7 402.21  
 6247.8  
 405.14 6247.9 408.18 6248 411.21 6248.1 416.26 6248.2 421.39  
 6248.3  
 426.53 6248.4 431.58 6248.5 435.85 6248.6 440.11 6248.7 446.02  
 6248.8  
 462.41 6248.8

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .03 166.38 .013 329.07 .03

Bank Sta: Left Right Coeff Contr. Expan.  
 166.38 329.07 .1 .3

Ineffective Flow num= 4  
 Sta L Sta R Elev Permanent  
 154.72 180.75 6247.14 F  
 185.71 194.38 6247.14 F  
 199.34 250.16 6247.14 F  
 255.11 344.35 6247.14 F

Left Levee Station= 145.97 Elevation= 6248.02  
 Right Levee Station= 385.22 Elevation= 6248

Upstream Embankment side slope = 1 horiz. to 1.0 vertical  
 Downstream Embankment side slope = 2 horiz. to 1.0 vertical  
 Maximum allowable submergence for weir flow = .98  
 Elevation at which weir flow begins =  
 Energy head used in spillway design =  
 Spillway height used in design =  
 Weir crest shape = Broad Crested

Number of Culverts = 3

Culvert Name Shape Rise Span  
 Culvert #1 Circular 4  
 FHWA Chart # 2 - Corrugated Metal Pipe Culvert  
 FHWA Scale # 1 - Headwall  
 Solution Criteria = Highest U.S. EG  
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss  
 Coef Exit Loss Coef  
 1 1 90 .024 .024 0 .5  
 1  
 Upstream Elevation = 6241.91  
 Centerline Station = 217.23  
 Downstream Elevation = 6240.16  
 Centerline Station = 252.53

Culvert Name Shape Rise Span  
 Culvert #2 Circular 4  
 FHWA Chart # 2 - Corrugated Metal Pipe Culvert

FHWA Scale # 1 - Headwall  
 Solution Criteria = Highest U.S. EG  
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss  
 Coef Exit Loss Coef  
 3.64 90 .024 .024 0 .5  
 1  
 Upstream Elevation = 6242.06  
 Centerline Station = 195.75  
 Downstream Elevation = 6239.73  
 Centerline Station = 197.35

Culvert Name Shape Rise Span  
 Culvert #3 Circular 4  
 FHWA Chart # 2 - Corrugated Metal Pipe Culvert  
 FHWA Scale # 1 - Headwall  
 Solution Criteria = Highest U.S. EG  
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss  
 Coef Exit Loss Coef  
 3.9 90 .024 .024 0 .5  
 1  
 Upstream Elevation = 6242.32  
 Centerline Station = 182.04  
 Downstream Elevation = 6240.12  
 Centerline Station = 183.71

CULVERT OUTPUT Profile #Flow 1 Culv Group: Culvert #1

Q Culv Group (cfs)	67.74	Culv Full Len (ft)	90.00
# Barrels	1	Culv Vel US (ft/s)	5.39
Q Barrel (cfs)	67.74	Culv Vel DS (ft/s)	5.39
E.G. US. (ft)	6249.16	Culv Inv El Up (ft)	6241.91
W.S. US. (ft)	6249.04	Culv Inv El Dn (ft)	6240.16
E.G. DS (ft)	6248.25	Culv Frctn Ls (ft)	0.68
W.S. DS (ft)	6245.51	Culv Exit Loss (ft)	0.00
Delta EG (ft)	0.90	Culv Entr Loss (ft)	0.23
Delta WS (ft)	3.52	Q Weir (cfs)	897.12
E.G. IC (ft)	6245.64	Weir Sta Lft (ft)	10.85
E.G. OC (ft)	6249.16	Weir Sta Rgt (ft)	236.80
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	6245.91	Weir Max Depth (ft)	2.17
Culv WS Outlet (ft)	6244.16	Weir Avg Depth (ft)	1.23
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	276.92
Culv Crt Depth (ft)	2.49	Min El Weir Flow (ft)	6247.01

CULVERT OUTPUT Profile #Flow 1 Culv Group: Culvert #2

Q Culv Group (cfs)	67.53	Culv Full Len (ft)	90.00
# Barrels	1	Culv Vel US (ft/s)	5.37
Q Barrel (cfs)	67.53	Culv Vel DS (ft/s)	5.37
E.G. US. (ft)	6249.16	Culv Inv El Up (ft)	6242.06
W.S. US. (ft)	6249.04	Culv Inv El Dn (ft)	6239.73
E.G. DS (ft)	6248.25	Culv Frctn Ls (ft)	0.68

W.S. DS (ft)	6245.51	Culv Exit Loss (ft)	0.00
Delta EG (ft)	0.90	Culv Entr Loss (ft)	0.22
Delta WS (ft)	3.52	Q Weir (cfs)	897.12
E.G. IC (ft)	6245.77	Weir Sta Lft (ft)	10.85
E.G. OC (ft)	6249.16	Weir Sta Rgt (ft)	236.80
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	6246.06	Weir Max Depth (ft)	2.17
Culv WS Outlet (ft)	6243.73	Weir Avg Depth (ft)	1.23
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	276.92
Culv Crt Depth (ft)	2.48	Min El Weir Flow (ft)	6247.01

CULVERT OUTPUT Profile #Flow 1 Culv Group: Culvert #3

Q Culv Group (cfs)	67.62	Culv Full Len (ft)	90.00
# Barrels	1	Culv Vel US (ft/s)	5.38
Q Barrel (cfs)	67.62	Culv Vel DS (ft/s)	5.38
E.G. US. (ft)	6249.16	Culv Inv El Up (ft)	6242.32
W.S. US. (ft)	6249.04	Culv Inv El Dn (ft)	6240.12
E.G. DS (ft)	6248.25	Culv Frctn Ls (ft)	0.68
W.S. DS (ft)	6245.51	Culv Exit Loss (ft)	0.00
Delta EG (ft)	0.90	Culv Entr Loss (ft)	0.22
Delta WS (ft)	3.52	Q Weir (cfs)	897.12
E.G. IC (ft)	6246.04	Weir Sta Lft (ft)	10.85
E.G. OC (ft)	6249.16	Weir Sta Rgt (ft)	236.80
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	6246.32	Weir Max Depth (ft)	2.17
Culv WS Outlet (ft)	6244.12	Weir Avg Depth (ft)	1.23
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	276.92
Culv Crt Depth (ft)	2.48	Min El Weir Flow (ft)	6247.01

CROSS SECTION

RIVER: SC01

REACH: Sand Creek-DS-1 RS: 949

INPUT

Description:

Station	Elevation	Data	num=	241					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6249.3	1.53	6249.3	16.17	6249.2	28.39	6249.1	40.61	
6249									
52.83	6248.9	65.06	6248.8	77.28	6248.7	89.5	6248.6	101.72	
6248.5									
113.94	6248.4	126.17	6248.3	138.06	6248.2	145.74	6248.1	146.57	
6248									
147.91	6247.9	149.01	6247.8	150.1	6247.7	151.21	6247.6	152.31	
6247.5									
153.42	6247.4	154.53	6247.3	155.63	6247.2	156.74	6247.1	157.85	
6247									

158.96	6246.9	160.07	6246.8	161.18	6246.7	162.29	6246.6	163.4	
6246.5									
164.51	6246.4	165.62	6246.3	165.95	6246.2	166.16	6246.1	166.38	
6246									
166.59	6245.9	166.8	6245.8	167.02	6245.7	167.23	6245.6	167.45	
6245.5									
167.66	6245.4	167.88	6245.3	168.09	6245.2	168.31	6245.1	168.52	
6245									
168.74	6244.9	168.95	6244.8	169.17	6244.7	169.38	6244.6	169.6	
6244.5									
169.81	6244.4	170.03	6244.3	170.24	6244.2	170.46	6244.1	170.67	
6244									
170.89	6243.9	171.1	6243.8	171.32	6243.7	171.53	6243.6	171.75	
6243.5									
171.97	6243.4	172.18	6243.3	172.4	6243.2	172.62	6243.1	172.83	
6243									
173.05	6242.9	173.27	6242.8	173.48	6242.7	173.7	6242.6	173.92	
6242.5									
174.14	6242.4	174.36	6242.3	174.58	6242.2	174.8	6242.1	175.02	
6242									
175.24	6241.9	175.45	6241.8	175.67	6241.7	175.88	6241.6	176.1	
6241.5									
176.32	6241.4	176.53	6241.3	176.75	6241.2	176.97	6241.1	177.18	
6241									
177.4	6240.9	177.61	6240.8	177.83	6240.7	178.05	6240.6	178.26	
6240.5									
178.48	6240.4	178.69	6240.3	178.91	6240.2	179.13	6240.1	179.34	
6240									
179.56	6239.9	180.92	6239.8	185.83	6239.7	190.76	6239.6	195.74	
6239.5									
200.03	6239.43	201.64	6239.4	202.69	6239.4	209.86	6239.5	216.25	
6239.6									
217.71	6239.7	219.17	6239.8	220.63	6239.9	222.09	6240	223.55	
6240.1									
225.01	6240.2	226.41	6240.3	227.16	6240.4	231.88	6240.5	236.96	
6240.6									
256.33	6240.6	256.73	6240.5	257.13	6240.4	257.53	6240.3	257.92	
6240.2									
258.32	6240.1	258.72	6240	259.12	6239.9	259.52	6239.8	260.22	
6239.7									
261.38	6239.6	262.54	6239.5	263.7	6239.4	264.86	6239.3	270.67	
6239.2									
271.32	6239.2	271.86	6239.3	272.41	6239.4	272.95	6239.5	273.5	
6239.6									
274.05	6239.7	274.59	6239.8	275.14	6239.9	275.68	6240	276.23	
6240.1									
276.78	6240.2	277.32	6240.3	277.87	6240.4	278.41	6240.5	278.96	
6240.6									
279.51	6240.7	280.05	6240.8	284.18	6240.9	291.75	6241	292.24	
6241.1									
292.72	6241.2	293.19	6241.3	293.67	6241.4	294.14	6241.5	296.25	
6241.6									
297.56	6241.7	298.86	6241.8	302.26	6241.9	304.38	6242	305.8	

6242.1  
307 6242.2 308.11 6242.3 309.12 6242.4 310.01 6242.5 310.89  
6242.6  
311.68 6242.7 312.45 6242.8 313.17 6242.9 313.88 6243 314.55  
6243.1  
315.21 6243.2 315.83 6243.3 316.44 6243.4 317.05 6243.5 317.62  
6243.6  
318.19 6243.7 318.76 6243.8 319.29 6243.9 319.82 6244 320.35  
6244.1  
320.86 6244.2 321.36 6244.3 321.87 6244.4 322.37 6244.5 322.84  
6244.6  
323.31 6244.7 323.79 6244.8 324.27 6244.9 324.71 6245 325.17  
6245.1  
325.62 6245.2 326.07 6245.3 326.51 6245.4 326.94 6245.5 327.38  
6245.6  
327.81 6245.7 328.24 6245.8 328.66 6245.9 329.07 6246 329.49  
6246.1  
329.9 6246.2 330.32 6246.3 330.87 6246.4 333.78 6246.5 336.6  
6246.6  
339.34 6246.7 344.79 6246.8 346.32 6246.9 347.86 6247 349.39  
6247.1  
350.73 6247.2 352.07 6247.3 354.42 6247.4 357.6 6247.5 360.77  
6247.6  
363.85 6247.7 366.98 6247.8 380.36 6247.8 381 6247.9 385.21  
6248  
385.74 6248 385.82 6247.9 385.9 6247.8 385.98 6247.7 386.06  
6247.6  
386.15 6247.5 394.93 6247.5 397.25 6247.6 399.66 6247.7 402.21  
6247.8  
405.14 6247.9 408.18 6248 411.21 6248.1 416.26 6248.2 421.39  
6248.3  
426.53 6248.4 431.58 6248.5 435.85 6248.6 440.11 6248.7 446.02  
6248.8  
462.41 6248.8

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 166.38 .013 329.07 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 166.38 329.07 143.6 143.6 143.6 .1  
.3

Ineffective Flow num= 4  
Sta L Sta R Elev Permanent  
154.72 180.75 6247.14 F  
185.71 194.38 6247.14 F  
199.34 250.16 6247.14 F  
255.11 344.35 6247.14 F

Left Levee Station= 145.97 Elevation= 6248.02  
Right Levee Station= 385.22 Elevation= 6248

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6248.25	Element	Left OB
Channel Right OB			
Vel Head (ft)	2.74	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6245.51	Reach Len. (ft)	143.60
143.60 143.60			
Crit W.S. (ft)	6245.51	Flow Area (sq ft)	
82.78			
E.G. Slope (ft/ft)	0.001370	Area (sq ft)	
743.70			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	159.57	Top Width (ft)	
159.57			
Vel Total (ft/s)	13.29	Avg. Vel. (ft/s)	
13.29			
Max Chl Dpth (ft)	6.31	Hydr. Depth (ft)	
5.57			
Conv. Total (cfs)	29717.5	Conv. (cfs)	
29717.5			
Length Wtd. (ft)	143.60	Wetted Per. (ft)	
14.87			
Min Ch El (ft)	6239.20	Shear (lb/sq ft)	
0.48			
Alpha	1.00	Stream Power (lb/ft s)	462.41
145.97 385.22			
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	
1.41			
C & E Loss (ft)	0.38	Cum SA (acres)	
0.32			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

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

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 948

INPUT

Description:

Station	Elevation	Data	num=	218					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6247.7	19.86	6247.7	37.29	6247.6	91.94	6247.5	94.02	
6247.4									
96.56	6247.4	96.65	6247.5	96.74	6247.6	96.82	6247.7	96.91	
6247.8									
97	6247.9	97.05	6247.9	97.27	6247.8	98.86	6247.7	100.65	
6247.6									
101.78	6247.5	103.19	6247.4	104.44	6247.3	105.78	6247.2	107.35	
6247.1									
108.58	6247	110.16	6246.9	111.78	6246.8	113.16	6246.7	114.83	
6246.6									
116.49	6246.5	118.15	6246.4	119.78	6246.3	120.02	6246.2	120.26	
6246.1									
120.5	6246	120.74	6245.9	120.97	6245.8	121.21	6245.7	121.44	
6245.6									
121.67	6245.5	121.9	6245.4	122.14	6245.3	122.37	6245.2	122.6	
6245.1									
122.84	6245	123.07	6244.9	123.3	6244.8	123.54	6244.7	123.76	
6244.6									
123.99	6244.5	124.21	6244.4	124.43	6244.3	124.66	6244.2	124.89	
6244.1									
125.12	6244	125.35	6243.9	125.57	6243.8	125.8	6243.7	126.03	
6243.6									
126.26	6243.5	126.48	6243.4	126.7	6243.3	126.91	6243.2	127.13	
6243.1									
127.35	6243	127.57	6242.9	127.78	6242.8	128	6242.7	128.21	
6242.6									
128.43	6242.5	128.64	6242.4	128.86	6242.3	129.07	6242.2	129.29	
6242.1									
129.51	6242	129.73	6241.9	129.95	6241.8	130.17	6241.7	130.39	
6241.6									
130.62	6241.5	130.83	6241.4	131.05	6241.3	131.26	6241.2	131.47	
6241.1									
131.69	6241	131.9	6240.9	132.11	6240.8	132.33	6240.7	132.54	
6240.6									
132.75	6240.5	132.97	6240.4	133.18	6240.3	133.39	6240.2	133.6	
6240.1									
133.82	6240	134.03	6239.9	134.25	6239.8	134.47	6239.7	134.68	
6239.6									
134.89	6239.5	135.1	6239.4	135.3	6239.3	135.51	6239.2	135.72	
6239.1									
135.93	6239.3	136.14	6238.9	136.35	6238.8	156.69	6238.8	156.9	
6238.9									
157.11	6239	157.32	6239.1	157.53	6239.2	157.74	6239.3	157.95	
6239.4									

158.16	6239.5	158.37	6239.6	158.58	6239.7	158.79	6239.8	159	
6239.9									
159.21	6240	159.41	6240.1	159.62	6240.2	159.83	6240.3	160.04	
6240.4									
160.25	6240.5	160.46	6240.6	160.66	6240.7	160.87	6240.8	161.08	
6240.9									
161.29	6241	161.5	6241.1	161.71	6241.2	161.92	6241.3	162.12	
6241.4									
162.33	6241.5	162.54	6241.6	162.74	6241.7	162.95	6241.8	163.16	
6241.9									
163.36	6242	163.57	6242.1	163.77	6242.2	163.98	6242.3	164.19	
6242.4									
164.39	6242.5	164.6	6242.6	164.8	6242.7	165.01	6242.8	165.22	
6242.9									
165.42	6243	165.63	6243.1	165.84	6243.2	166.04	6243.3	166.25	
6243.4									
166.46	6243.5	166.66	6243.6	166.87	6243.7	167.07	6243.8	167.28	
6243.9									
167.48	6244	167.69	6244.1	167.89	6244.2	168.09	6244.3	168.3	
6244.4									
168.5	6244.5	168.71	6244.6	168.91	6244.7	169.12	6244.8	169.32	
6244.9									
169.52	6245	169.73	6245.1	169.93	6245.2	170.14	6245.3	170.34	
6245.4									
170.55	6245.5	170.75	6245.6	170.96	6245.7	171.16	6245.8	171.36	
6245.9									
171.57	6246	171.77	6246.1	171.98	6246.2	172.18	6246.3	172.39	
6246.4									
173.2	6246.5	174.29	6246.6	175.38	6246.7	176.47	6246.8	177.56	
6246.9									
178.63	6247	179.73	6247.1	180.89	6247.2	182.05	6247.3	183.21	
6247.4									
184.36	6247.5	185.52	6247.6	189.36	6247.7	193.38	6247.8	197.73	
6247.9									
202.55	6248	207.78	6248	207.88	6247.9	207.98	6247.8	208.09	
6247.7									
208.2	6247.6	209.55	6247.5	212.3	6247.5	216.4	6247.6	220.51	
6247.7									
257.02	6247.7	259.18	6247.8	261.66	6247.9	264.27	6248	266.87	
6248.1									
269.48	6248.2	272.27	6248.3	275.37	6248.4	281.83	6248.5	287.18	
6248.6									
292.54	6248.7	297.89	6248.8	300	6248.8				
Manning's	n Values		num=	3					
Sta	n Val	Sta	n Val	Sta	n Val				
0	.03	120.5	.013	171.57	.03				
Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	
Expan.									
	120.5	171.57		0	0	0		.1	
.3									
Ineffective Flow		num=	2						

Sta L Sta R Elev Permanent  
0 97.05 6247.91 F  
208.04 300 6248 F  
Left Levee Station= 96.63 Elevation= 6247.86  
Right Levee Station= 207.62 Elevation= 6248.06

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6244.22	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.49	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6242.73	Reach Len. (ft)	
Crit W.S. (ft)	6242.73	Flow Area (sq ft)	
112.41			
E.G. Slope (ft/ft)	0.001785	Area (sq ft)	
112.41			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	36.93	Top Width (ft)	
36.93			
Vel Total (ft/s)	9.79	Avg. Vel. (ft/s)	
9.79			
Max Chl Dpth (ft)	3.93	Hydr. Depth (ft)	
3.04			
Conv. Total (cfs)	26034.1	Conv. (cfs)	
26034.1			
Length Wtd. (ft)		Wetted Per. (ft)	
38.97			
Min Ch El (ft)	6238.80	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
96.63 207.62			
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:EXCH

Reach	River Sta.	n1	n2	n3
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EX CHANNEL	1000	.03	.013	.03
EX CHANNEL	999	.03	.03	.03

River:EXOF

Reach	River Sta.	n1	n2	n3
EX OVERFLOW	1001	.03	.013	.03
EX OVERFLOW	1000	.03	.013	.03

River:OVFL

Reach	River Sta.	n1	n2	n3
Overflow Channel	1000	.03	.016	.03
Overflow Channel	999	.03	.016	.03
Overflow Ch-DS-0	998	.03	.013	.03
Overflow Ch-DS-0	997	.03	.033	.03
Overflow Ch-DS-0	996	.03	.033	.03

River:SC01

Reach	River Sta.	n1	n2	n3
Sand Creek	998	.03	.013	.03
Sand Creek	993	.03	.013	.03
Sand Creek-DS-0	992	.03	.013	.03
Sand Creek-DS-0	991	.03	.013	.03
Sand Creek-DS-0	990	.03	.013	.03
Sand Creek-DS-0	989	.03	.013	.03
Sand Creek-DS-0	988	.03	.013	.03
Sand Creek-DS-0	987	.03	.013	.03
Sand Creek-DS-0	986	.03	.013	.03
Sand Creek-DS-0	985	.03	.013	.03
Sand Creek-DS-0	984	.03	.013	.03
Sand Creek-DS-0	983	.03	.013	.03
Sand Creek-DS-0	982	.03	.013	.03
Sand Creek-DS-0	981	.03	.013	.03
Sand Creek-DS-0	980	.03	.013	.03
Sand Creek-DS-0	979	.03	.013	.03
Sand Creek-DS-0	978	.03	.013	.03
Sand Creek-DS-0	977	.03	.013	.03
Sand Creek-DS-0	976	.03	.013	.03
Sand Creek-DS-0	975	.03	.013	.03
Sand Creek-DS-0	974	.03	.013	.03
Sand Creek-DS-0	973	.03	.013	.03
Sand Creek-DS-0	972	.03	.013	.03
Sand Creek-DS-0	971	.03	.013	.03
Sand Creek-DS-0	970	.03	.013	.03

Sand Creek-DS-0-	969	.03	.013	.03
Sand Creek-DS-0-	968	.03	.013	.03
Sand Creek-DS-1	966	.03	.013	.03
Sand Creek-DS-1	965	.03	.013	.03
Sand Creek-DS-1	964	.03	.013	.03
Sand Creek-DS-1	963	.03	.013	.03
Sand Creek-DS-1	962	.03	.013	.03
Sand Creek-DS-1	961	.03	.013	.03
Sand Creek-DS-1	960	.03	.013	.03
Sand Creek-DS-1	959	.03	.013	.03
Sand Creek-DS-1	958	.03	.013	.03
Sand Creek-DS-1	957	.03	.013	.03
Sand Creek-DS-1	956	.03	.013	.03
Sand Creek-DS-1	955	.03	.013	.03
Sand Creek-DS-1	954	.03	.013	.03
Sand Creek-DS-1	953	.03	.013	.03
Sand Creek-DS-1	952	.03	.013	.03
Sand Creek-DS-1	951	.03	.013	.03
Sand Creek-DS-1	950	.03	.013	.03
Sand Creek-DS-1	949.5	Culvert		
Sand Creek-DS-1	949	.03	.013	.03
Sand Creek-DS-1	948	.03	.013	.03

#### SUMMARY OF REACH LENGTHS

##### River: EXCH

Reach	River Sta.	Left	Channel	Right
EX CHANNEL	1000	284.89	284.89	284.89
EX CHANNEL	999	0	0	0

##### River: EXOF

Reach	River Sta.	Left	Channel	Right
EX OVERFLOW	1001	138.8	138.8	138.8
EX OVERFLOW	1000	0	0	0

##### River: OVFL

Reach	River Sta.	Left	Channel	Right
Overflow Channel	1000	24.16	24.16	24.16
Overflow Channel	999	0	0	0
Overflow Ch-DS-0	998	132.75	132.75	132.75
Overflow Ch-DS-0	997	24.72	24.72	24.72

Overflow Ch-DS-0	996	0	0	0
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##### River: SC01

Reach	River Sta.	Left	Channel	Right
Sand Creek	998	33.99	33.99	33.99
Sand Creek	993	40.51	40.51	40.51
Sand Creek-DS-0	992	11.58	11.58	11.58
Sand Creek-DS-0	991	100	100	100
Sand Creek-DS-0-	990	6.48	6.48	6.48
Sand Creek-DS-0-	989	43.52	43.52	43.52
Sand Creek-DS-0-	988	39.44	39.44	39.44
Sand Creek-DS-0-	987	10.56	10.56	10.56
Sand Creek-DS-0-	986	6.48	6.48	6.48
Sand Creek-DS-0-	985	10.39	10.39	10.39
Sand Creek-DS-0-	984	10	10	10
Sand Creek-DS-0-	983	20.18	20.18	20.18
Sand Creek-DS-0-	982	2.95	2.95	2.95
Sand Creek-DS-0-	981	19.23	19.23	19.23
Sand Creek-DS-0-	980	10	10	10
Sand Creek-DS-0-	979	9.51	9.51	9.51
Sand Creek-DS-0-	978	11.26	11.26	11.26
Sand Creek-DS-0-	977	50	50	50
Sand Creek-DS-0-	976	50	50	50
Sand Creek-DS-0-	975	22.55	22.55	22.55
Sand Creek-DS-0-	974	19.92	19.92	19.92
Sand Creek-DS-0-	973	7.53	7.53	7.53
Sand Creek-DS-0-	972	12.38	12.38	12.38
Sand Creek-DS-0-	971	37.63	37.63	37.63
Sand Creek-DS-0-	970	50	50	50
Sand Creek-DS-0-	969	50	50	50
Sand Creek-DS-0-	968	50	50	50
Sand Creek-DS-1	966	50	50	50
Sand Creek-DS-1	965	50	50	50
Sand Creek-DS-1	964	50	50	50
Sand Creek-DS-1	963	50	50	50
Sand Creek-DS-1	962	50	50	50
Sand Creek-DS-1	961	50	50	50
Sand Creek-DS-1	960	50	50	50
Sand Creek-DS-1	959	50	50	50
Sand Creek-DS-1	958	50	50	50
Sand Creek-DS-1	957	50	50	50
Sand Creek-DS-1	956	50	50	50
Sand Creek-DS-1	955	50	50	50
Sand Creek-DS-1	954	34.26	34.26	34.26
Sand Creek-DS-1	953	15.74	15.74	15.74
Sand Creek-DS-1	952	11.7	11.7	11.7
Sand Creek-DS-1	951	27.44	27.44	27.44
Sand Creek-DS-1	950	97.99	97.99	97.99
Sand Creek-DS-1	949.5	Culvert		
Sand Creek-DS-1	949	143.6	143.6	143.6

Sand Creek-DS-1	948	0	0	0
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SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS  
River: EXCH

Reach	River Sta.	Contr.	Expan.
EX CHANNEL	1000	.1	.3
EX CHANNEL	999	.1	.3

River: EXOF

Reach	River Sta.	Contr.	Expan.
EX OVERFLOW	1001	.1	.3
EX OVERFLOW	1000	.1	.3

River: OVFL

Reach	River Sta.	Contr.	Expan.
Overflow Channel	1000	.1	.3
Overflow Channel	999	.1	.3
Overflow Ch-DS-0	998	.1	.3
Overflow Ch-DS-0	997	.1	.3
Overflow Ch-DS-0	996	.1	.3

River: SC01

Reach	River Sta.	Contr.	Expan.
Sand Creek	998	.1	.3
Sand Creek	993	.1	.3
Sand Creek-DS-0	992	.1	.3
Sand Creek-DS-0	991	.1	.3
Sand Creek-DS-0-	990	.1	.3
Sand Creek-DS-0-	989	.1	.3
Sand Creek-DS-0-	988	.1	.3
Sand Creek-DS-0-	987	.1	.3
Sand Creek-DS-0-	986	.1	.3
Sand Creek-DS-0-	985	.1	.3
Sand Creek-DS-0-	984	.1	.3
Sand Creek-DS-0-	983	.1	.3
Sand Creek-DS-0-	982	.1	.3
Sand Creek-DS-0-	981	.1	.3

Sand Creek-DS-0-	980	.1	.3
Sand Creek-DS-0-	979	.1	.3
Sand Creek-DS-0-	978	.1	.3
Sand Creek-DS-0-	977	.1	.3
Sand Creek-DS-0-	976	.1	.3
Sand Creek-DS-0-	975	.1	.3
Sand Creek-DS-0-	974	.1	.3
Sand Creek-DS-0-	973	.1	.3
Sand Creek-DS-0-	972	.1	.3
Sand Creek-DS-0-	971	.1	.3
Sand Creek-DS-0-	970	.1	.3
Sand Creek-DS-0-	969	.1	.3
Sand Creek-DS-0-	968	.1	.3
Sand Creek-DS-1	966	.1	.3
Sand Creek-DS-1	965	.1	.3
Sand Creek-DS-1	964	.1	.3
Sand Creek-DS-1	963	.1	.3
Sand Creek-DS-1	962	.1	.3
Sand Creek-DS-1	961	.1	.3
Sand Creek-DS-1	960	.1	.3
Sand Creek-DS-1	959	.1	.3
Sand Creek-DS-1	958	.1	.3
Sand Creek-DS-1	957	.1	.3
Sand Creek-DS-1	956	.1	.3
Sand Creek-DS-1	955	.1	.3
Sand Creek-DS-1	954	.1	.3
Sand Creek-DS-1	953	.1	.3
Sand Creek-DS-1	952	.1	.3
Sand Creek-DS-1	951	.1	.3
Sand Creek-DS-1	950	.1	.3
Sand Creek-DS-1	949.5	Culvert	
Sand Creek-DS-1	949	.1	.3
Sand Creek-DS-1	948	.1	.3

## **Amendment Appendix**



## USBR Type III Drop and Stilling Basin

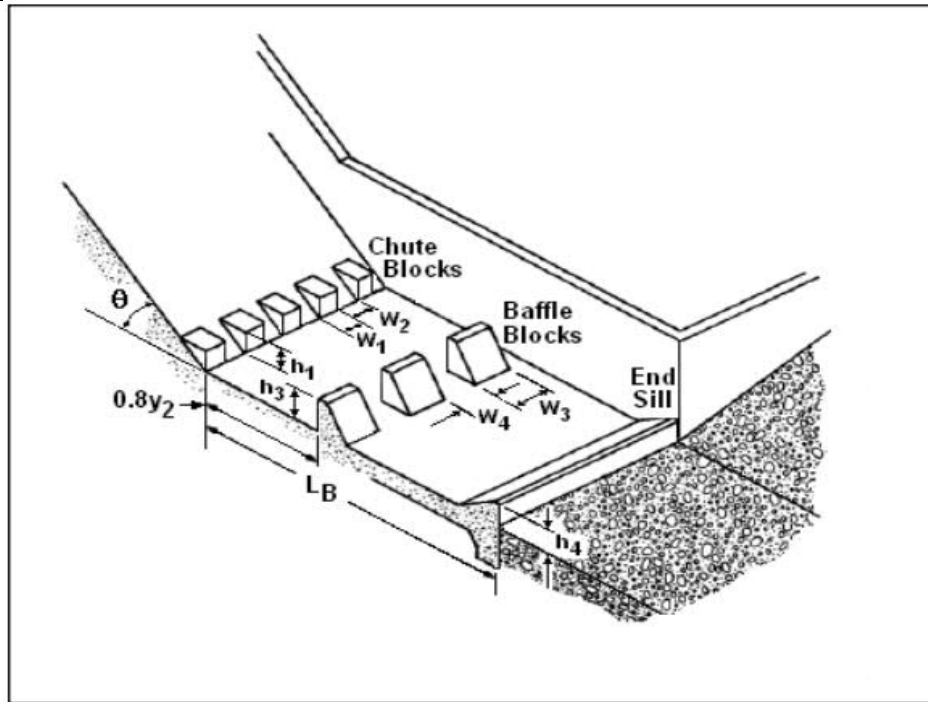
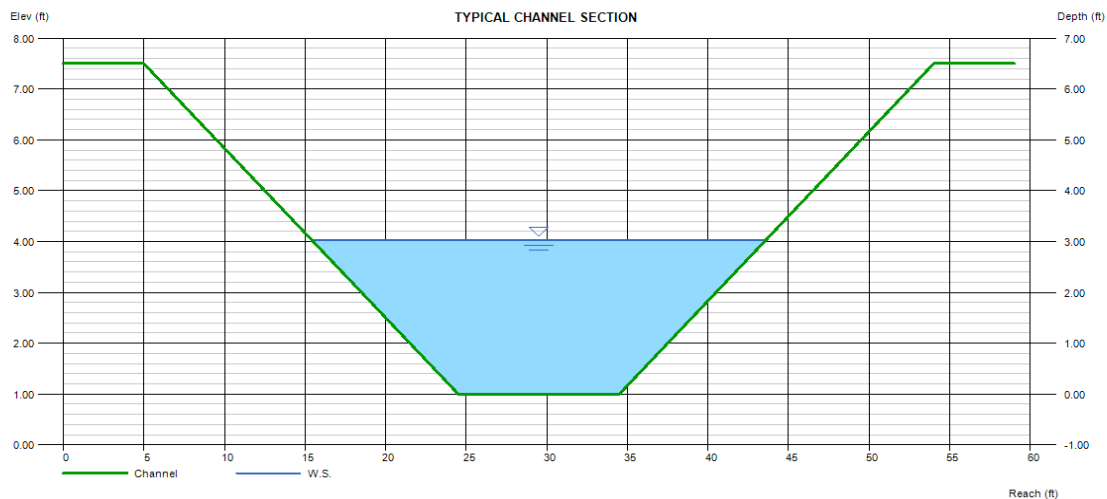


Figure 8.3. USBR Type III Stilling Basin

### Design of Energy Dissipators for Culverts and Channels

#### Upstream Channel Parameters

Channel Flow (Q)	1037 cfs
Channel Bottom Width	10 ft
Sill Slopes (Z:1)	1
Channel Total Depth	6.5 ft
Channel Depth (y <sub>1</sub> )	3.02 ft
Drop Crest Width	35 ft
Upstream Slope	1.00%



## USBR Type III Drop and Stilling Basin (cont...)

### FHWA Criteria Checks

Unit Discharge Over Crest	29.63	cfs/ft	Limit=200 cfs/ft
Transition Slope (St)	7.43%	> as $\Theta$	4.25 °
Velocity Entering Basin(V)	37.98	ft/s	Limit=60 ft/s
Channel Depth Entering Basin (d)	1.78	ft	
Transition Length (St)	160	ft	
Basin Width (Wb)	10	ft	

### Basin Parameter Calculations

$$\text{Froude Number entering Basin: } \frac{V}{(gd)^{1/2}} = 5.016687$$

Determine  $L_b/Y_2$  value from FHWA Table 8.2

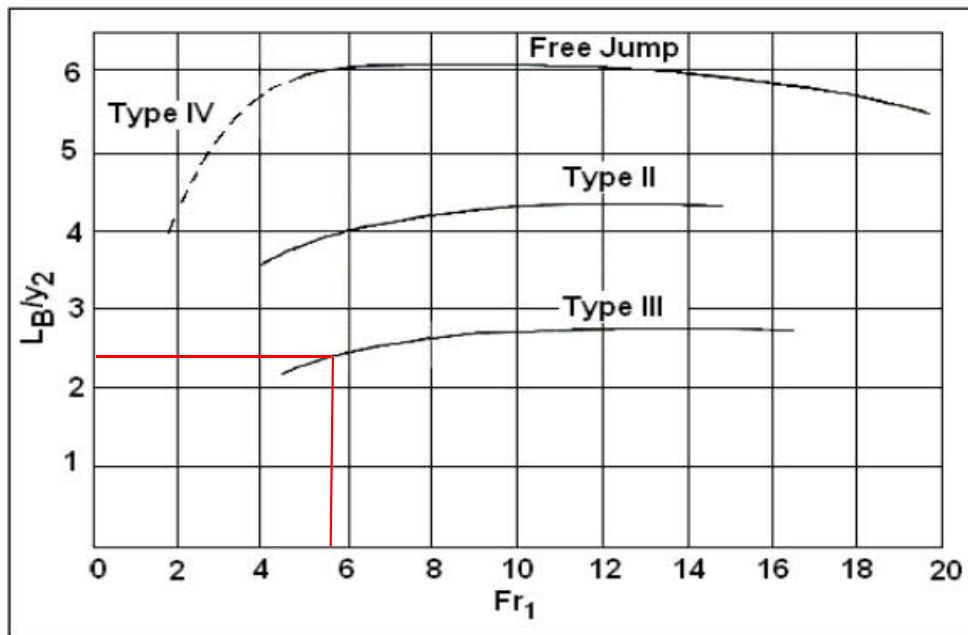


Figure 8.2. Length of Hydraulic Jump on a Horizontal Floor

$L_b/Y_2$ : 2.5      Conservative Approximation

Calculate  $Y_2$

$$Y_2: \frac{C * y_0}{2} (\sqrt{1 + 8Fr} - 1) = 11.76983 \text{ ft}$$

Length of Basin ( $L_b$ ): 29.4245754 ft

$$\text{Length of Basin Floor to Sill Top (Lt): } \frac{L_T(S_T - S_o) - L_b * S_o}{S_s + S_o} = 10.0947 \text{ ft}$$

# USBR Type III Drop and Stilling Basin (cont...)

## Basin Element Sizing

Determine Number of Chute Blocks ( $N_c$ ):	$\frac{W_b}{2y_1}$	=	2.81 → 3
Chute Block Width and Spacing ( $W_1$ & $W_2$ ):	$\frac{W_b}{2N_c}$	=	1.666667
Baffle Block Height( $h_3$ ):	$y_1(0.168 * Fr + 0.58)$		2.53259 ft
Number of Baffle Blocks ( $N_b$ )	$\frac{W_b}{1.5h_3}$	=	2.632351 → 3
Baffle Width and Spacing ( $W_3$ & $W_4$ )	$\frac{W_b}{2N_b}$	=	1.666667
End Sill Height ( $h_4$ )	$y_1(0.0536 * Fr + 1.04)$		2.329832 ft
0.8*Y2			9.41586412 ft

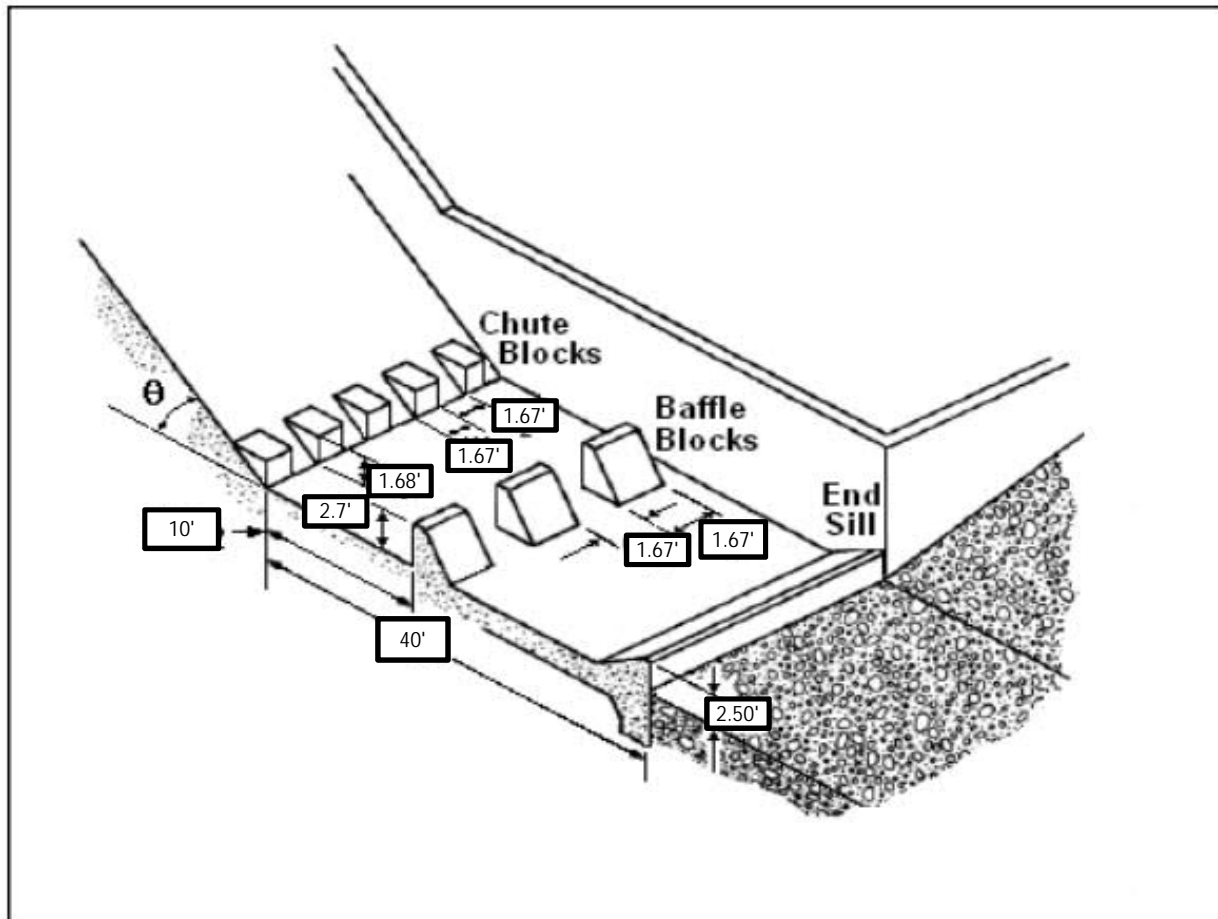


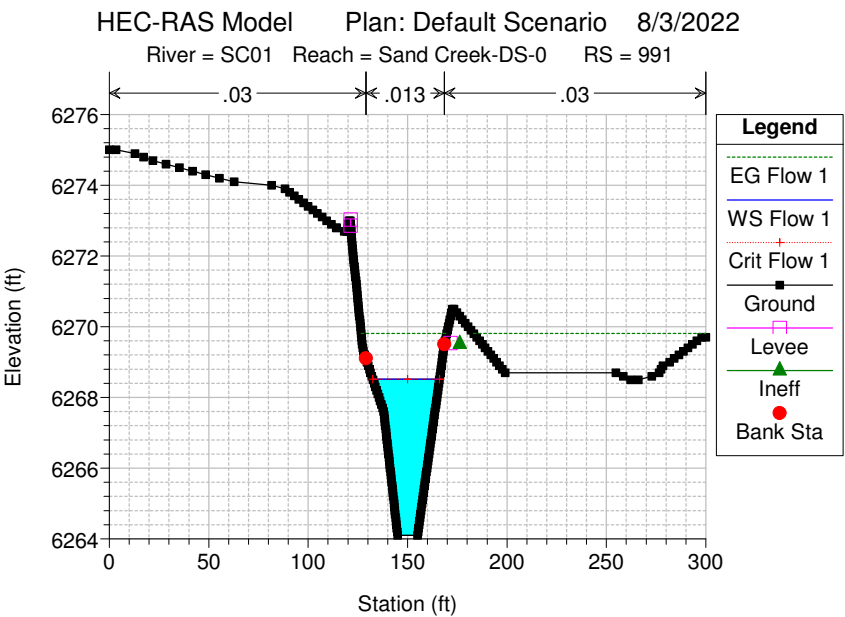
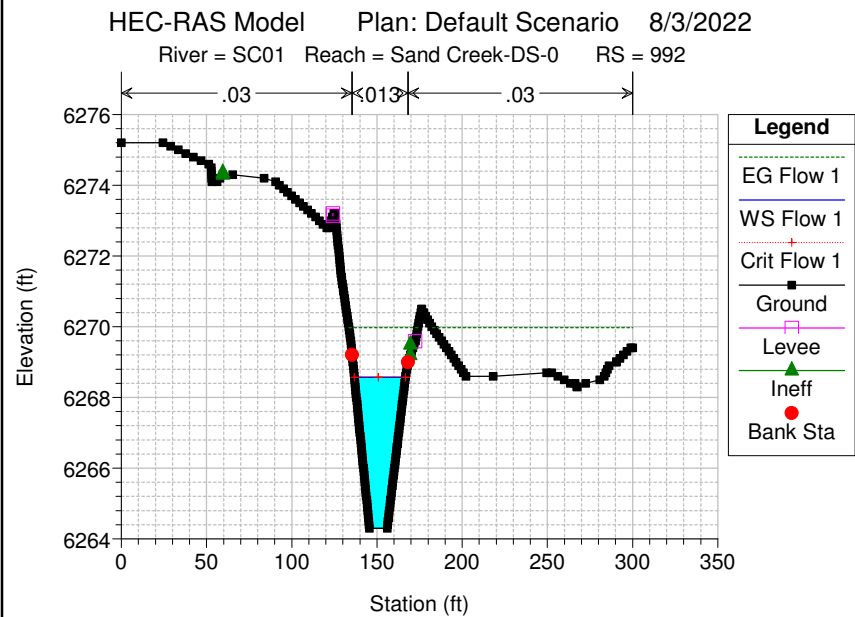
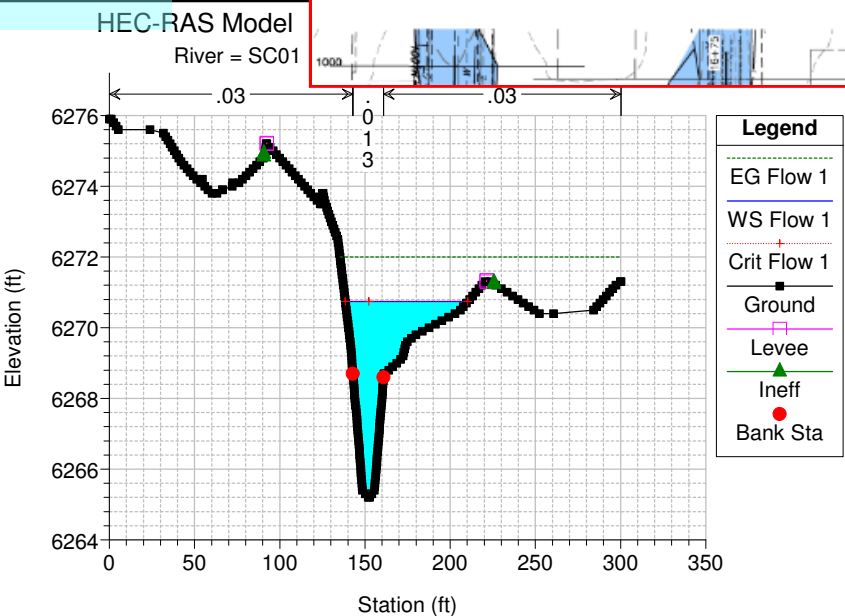
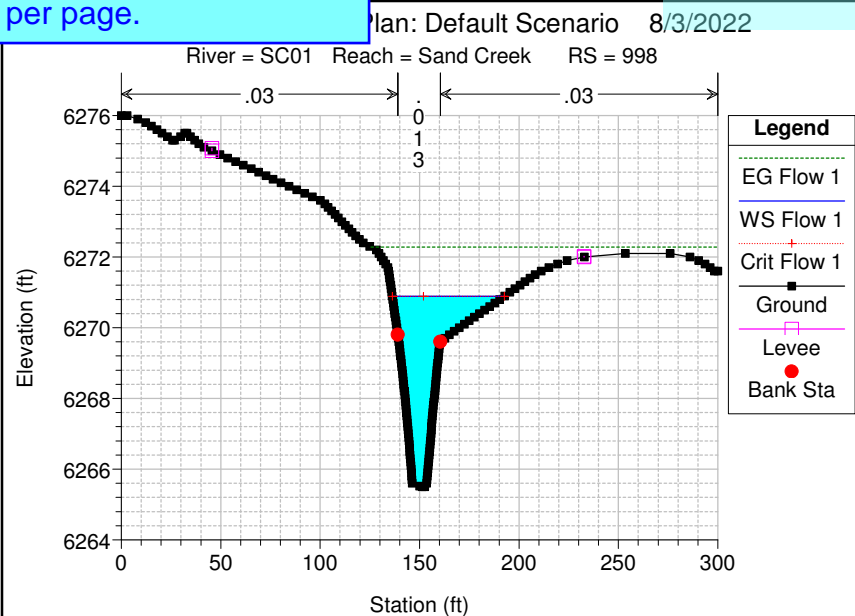
Figure 8.3. USBR Type III Stilling Basin

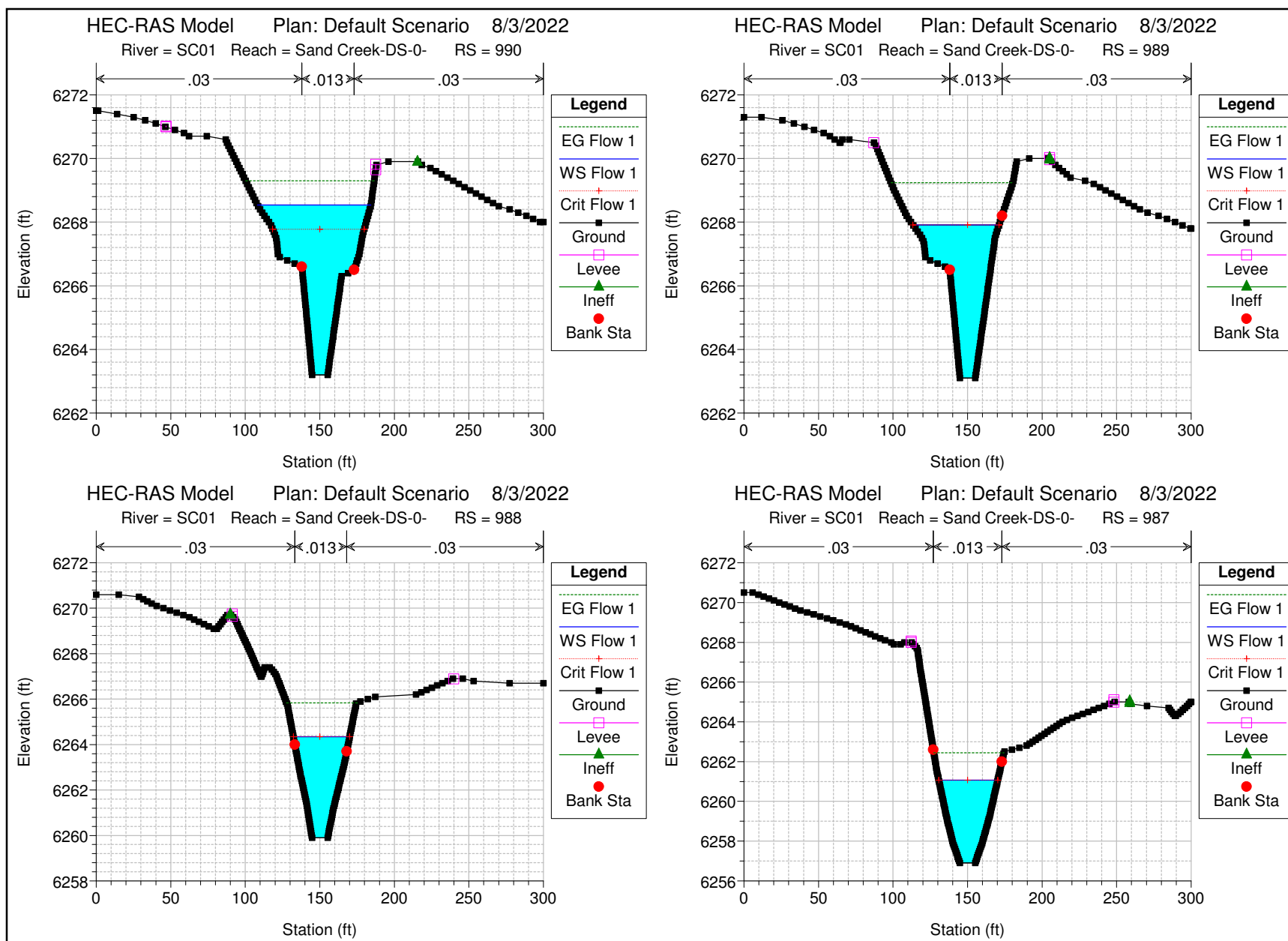
Please provide max. two sections per page for proper review as these are small when providing 4 per page.

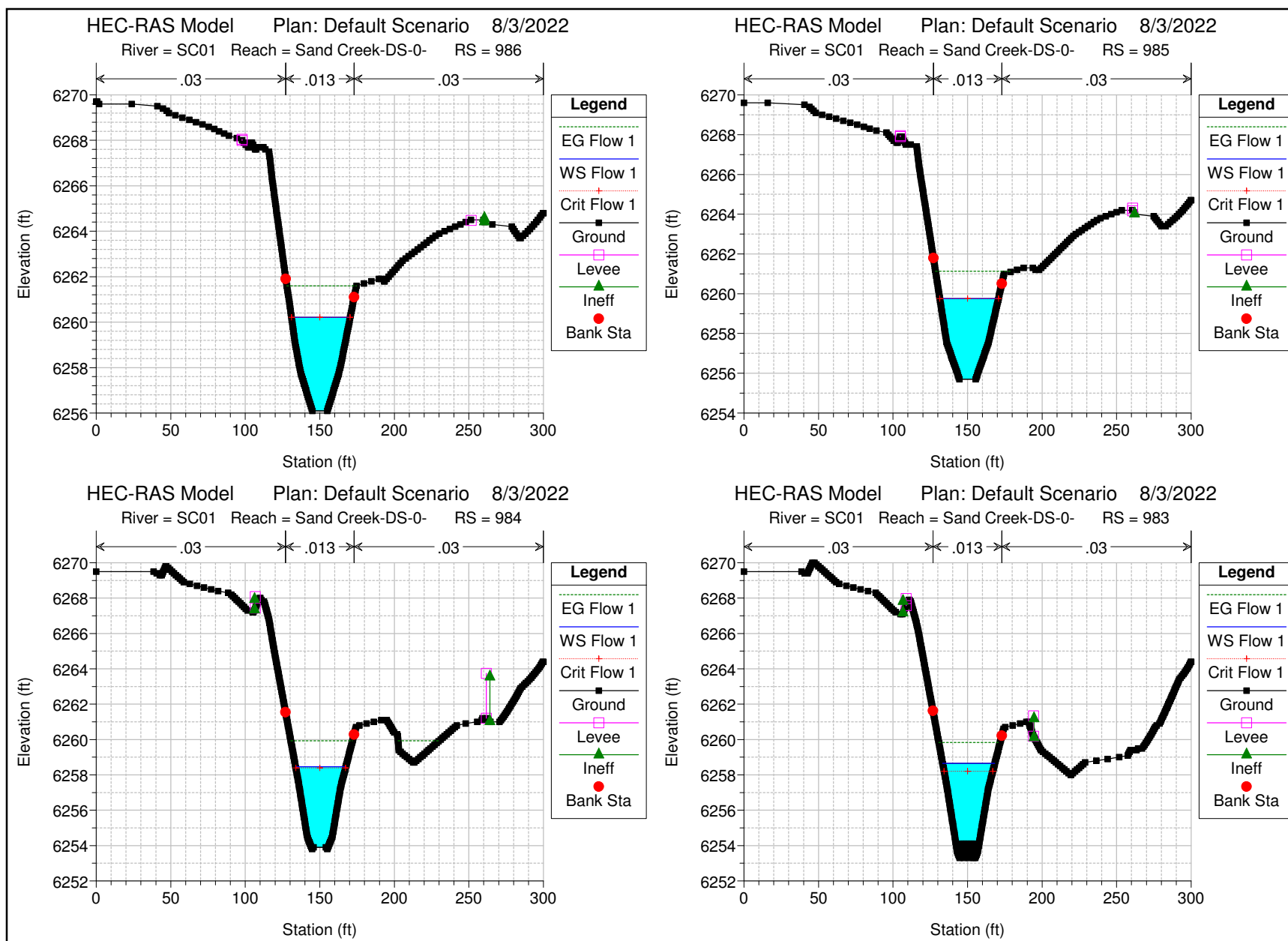
Please provide a revised GeoHecRas Model Overlay that correspond with the new sections.

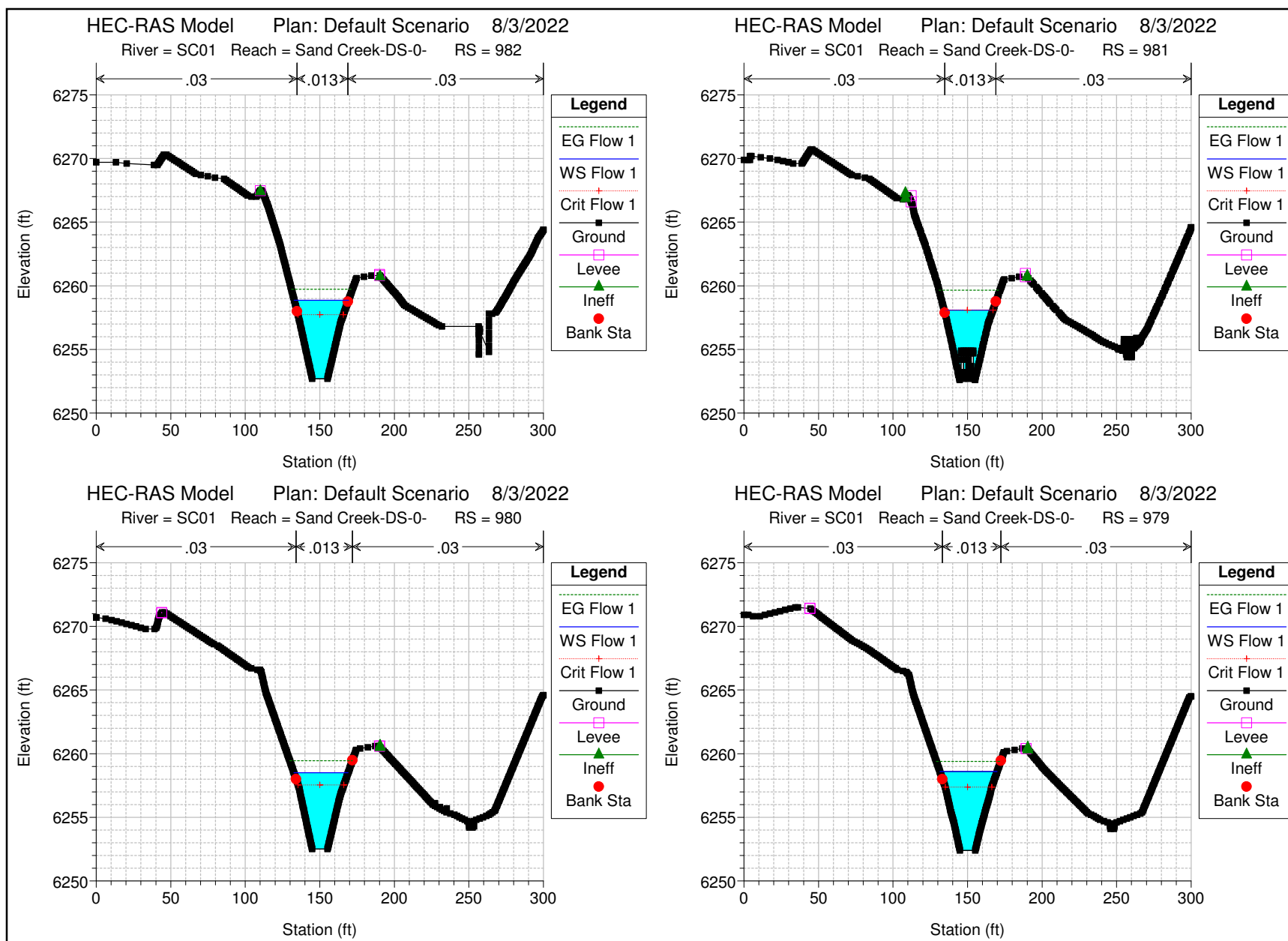
# SAND CREEK CHANNEL GEOHECRAS MODEL OVERLAY

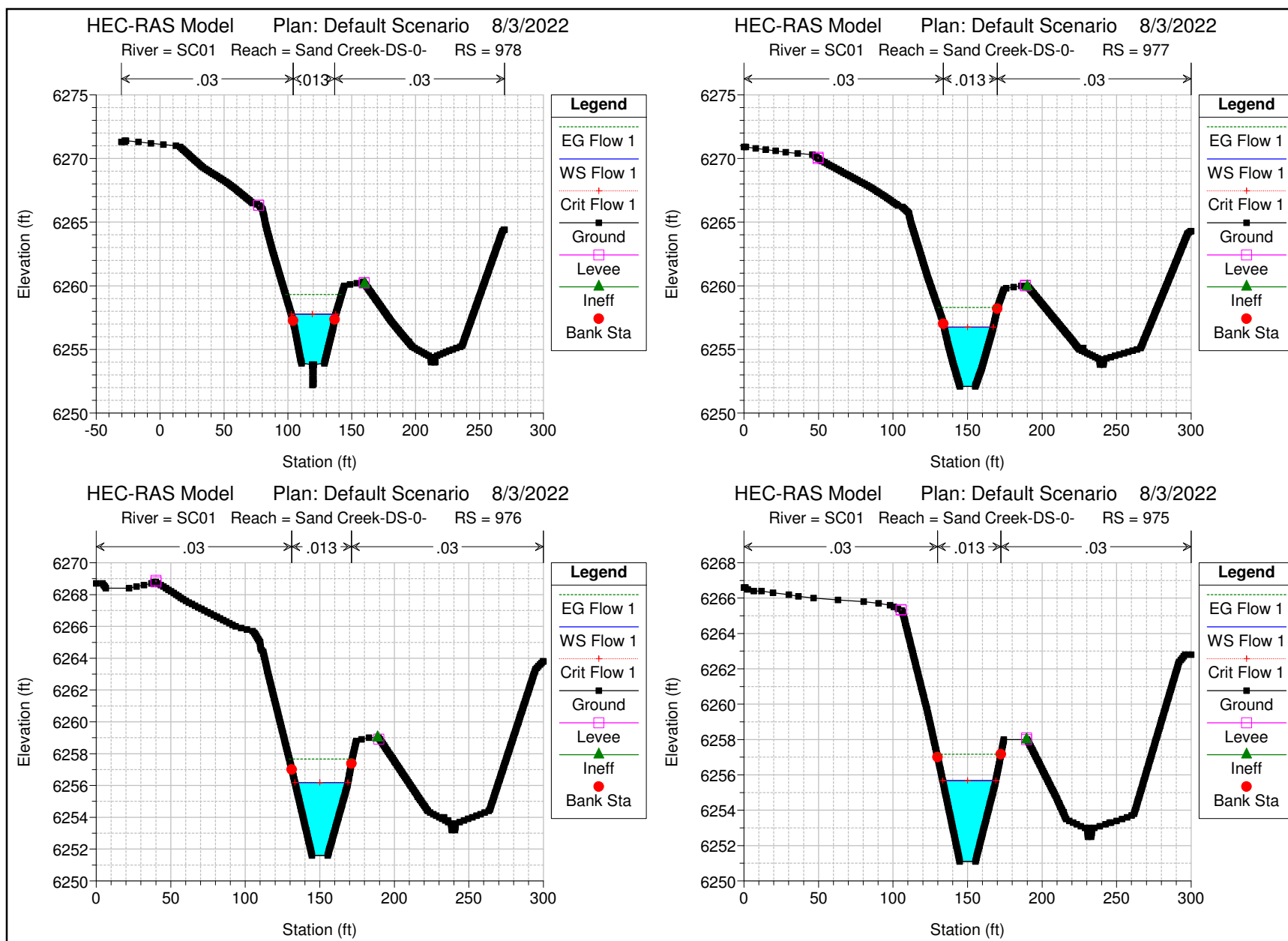




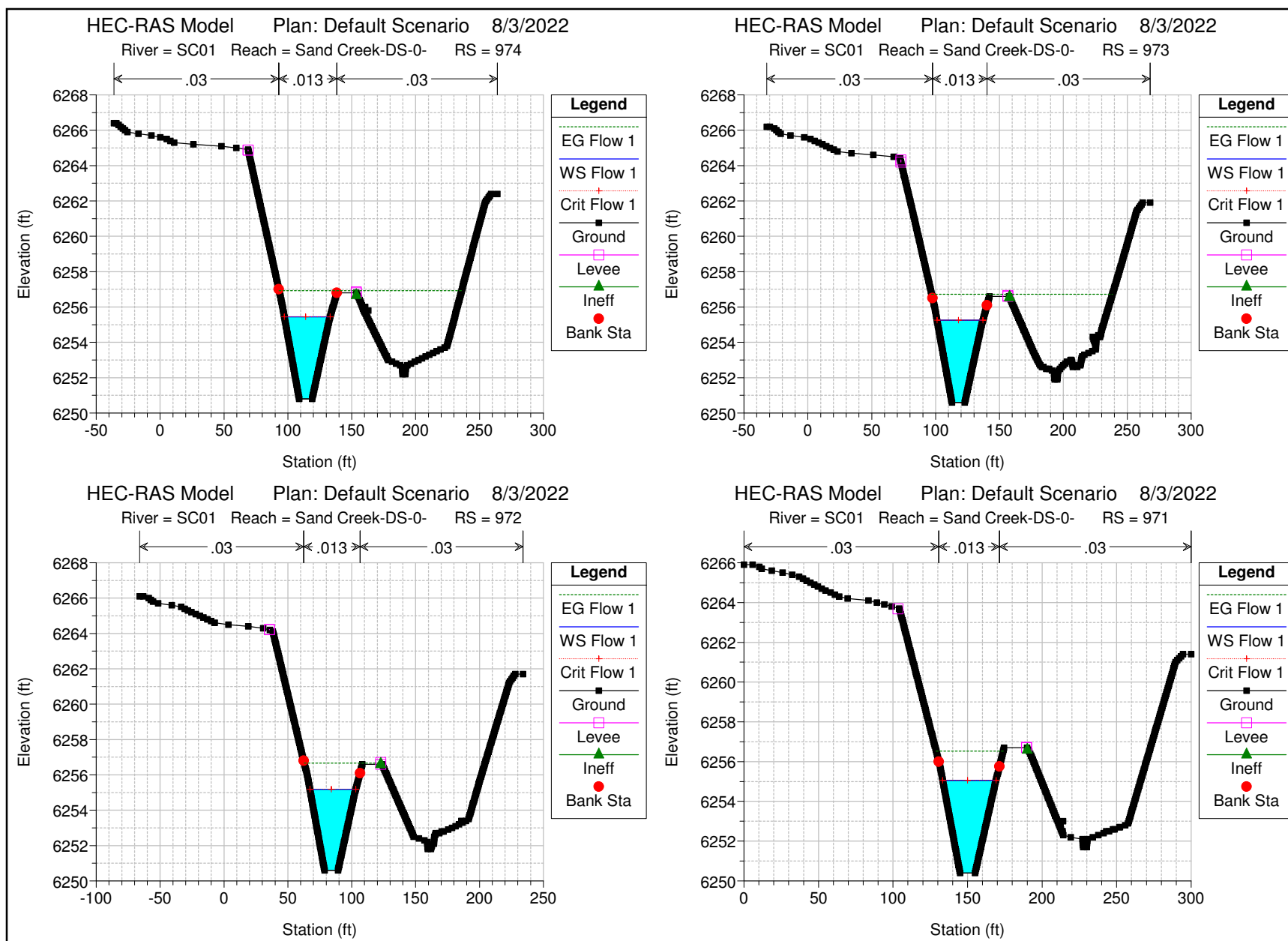


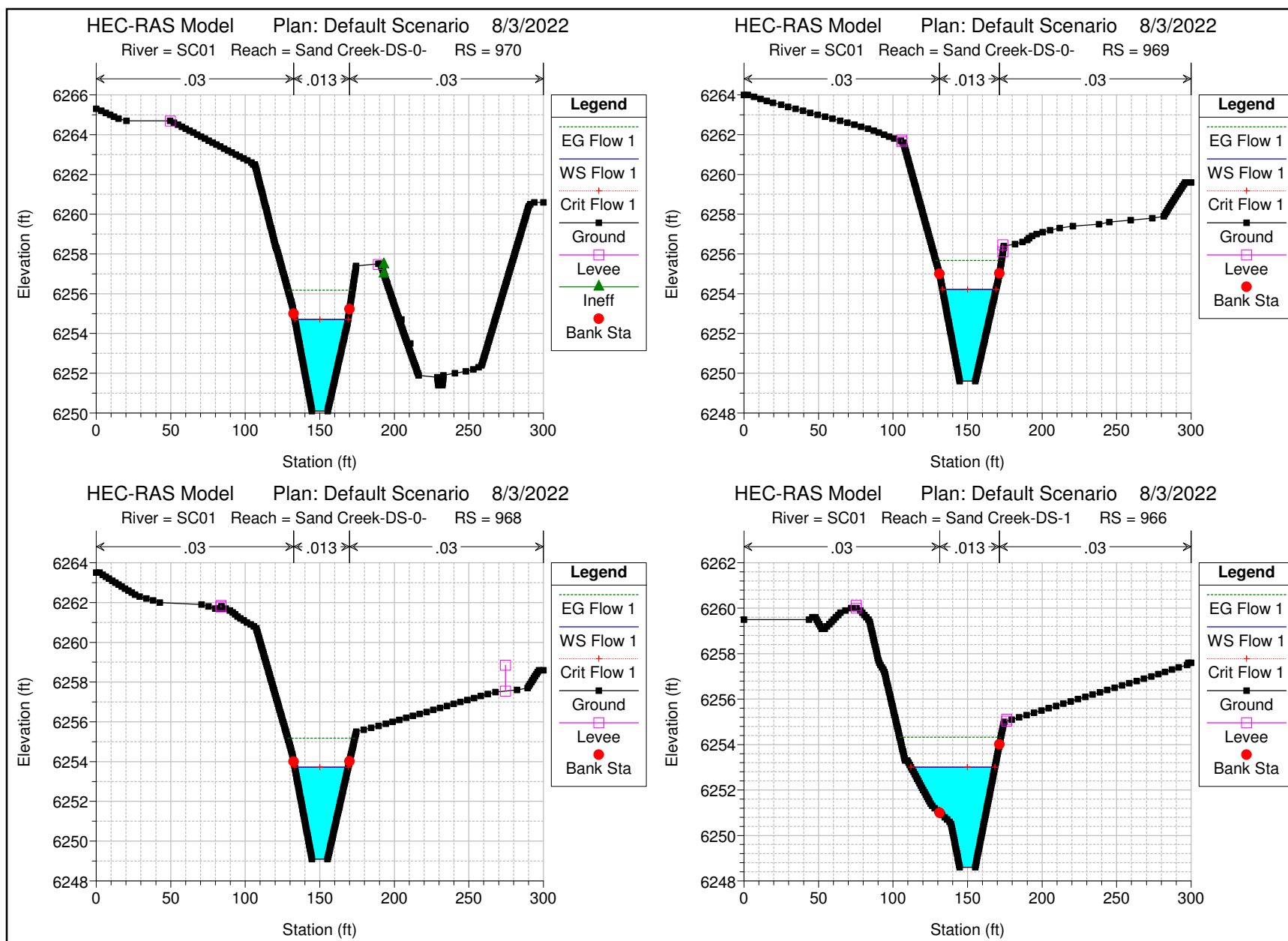


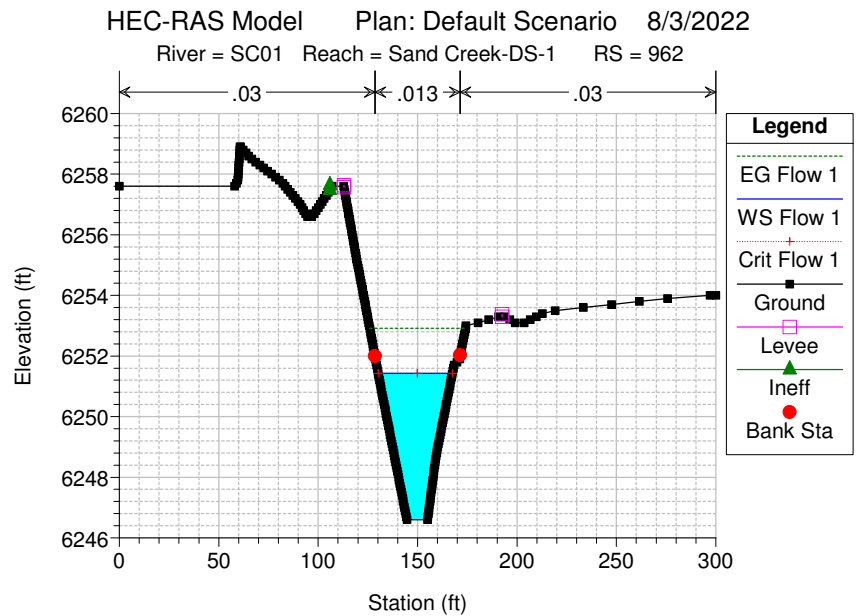
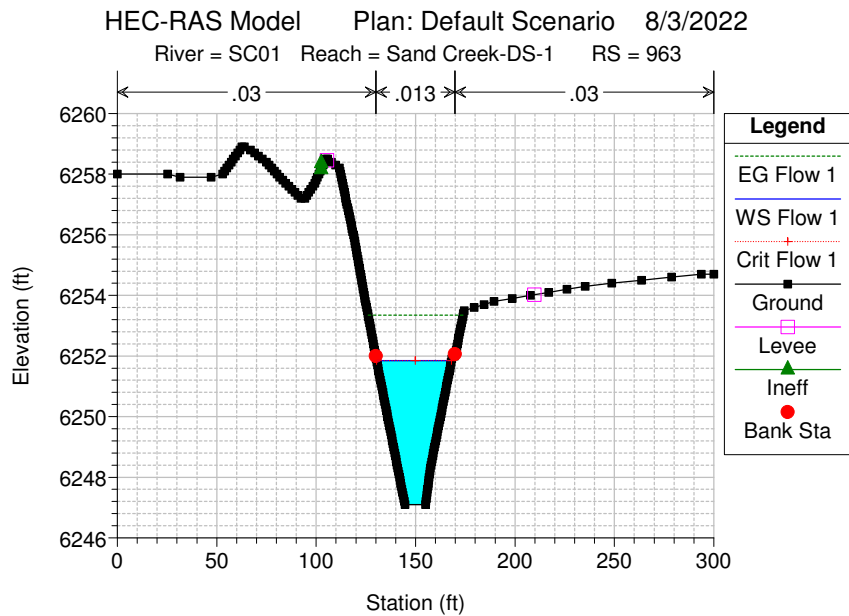
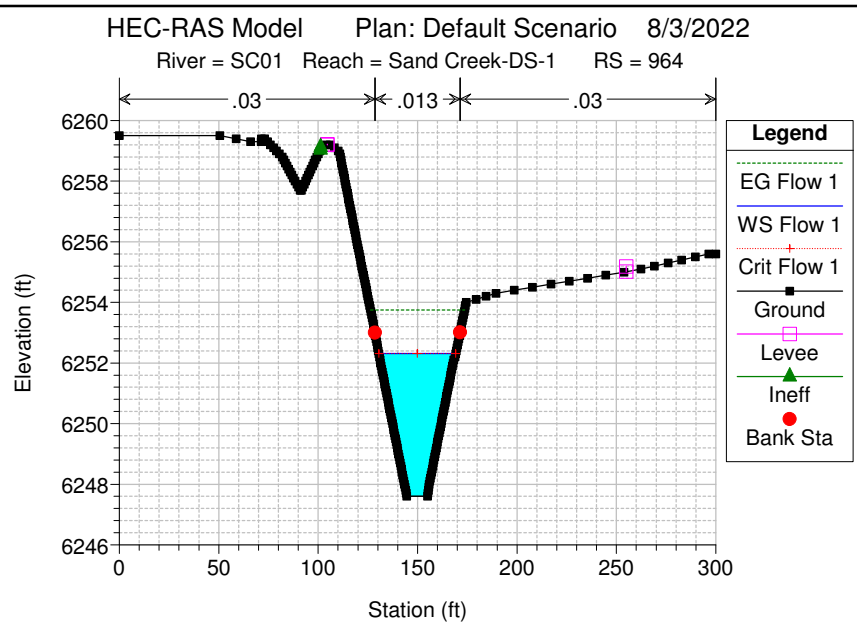
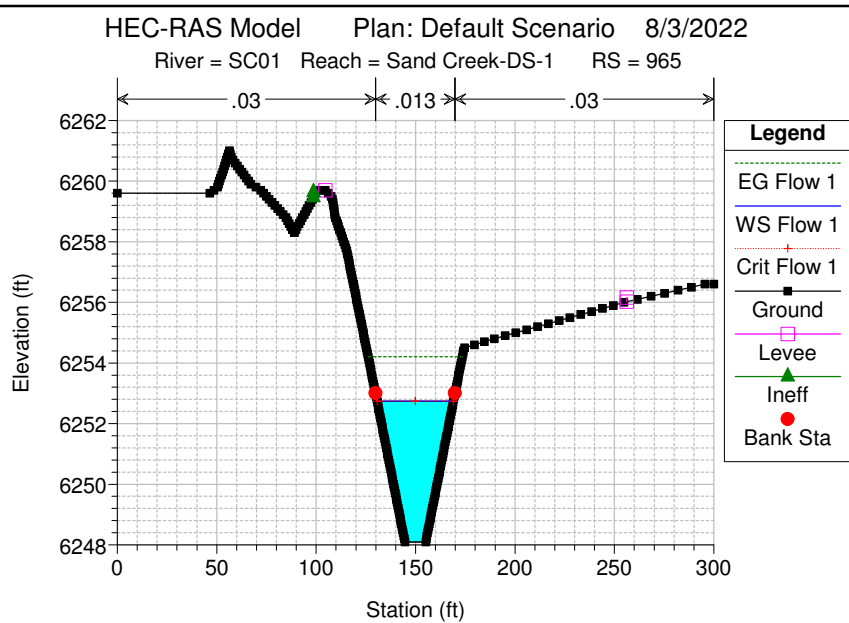


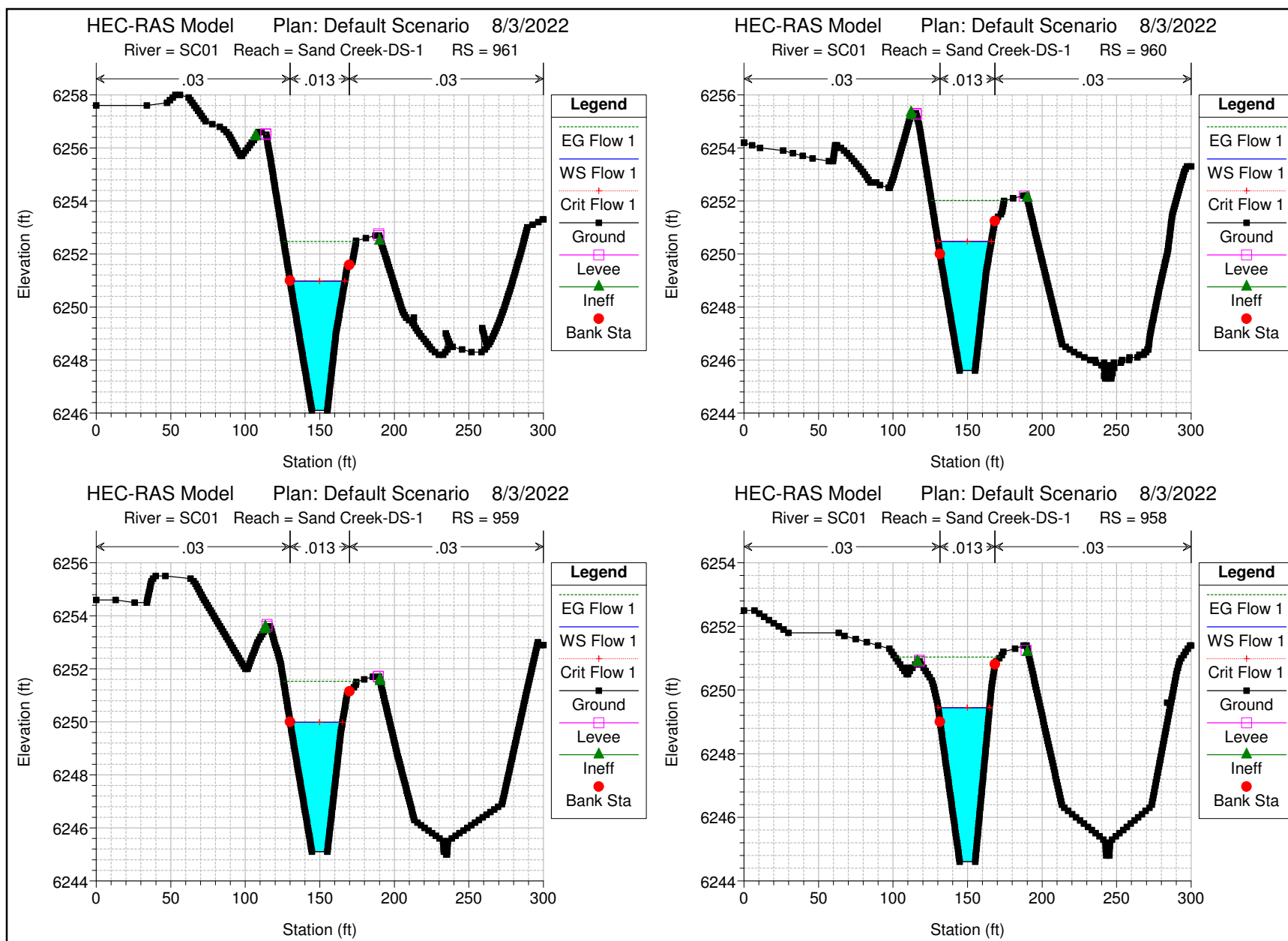


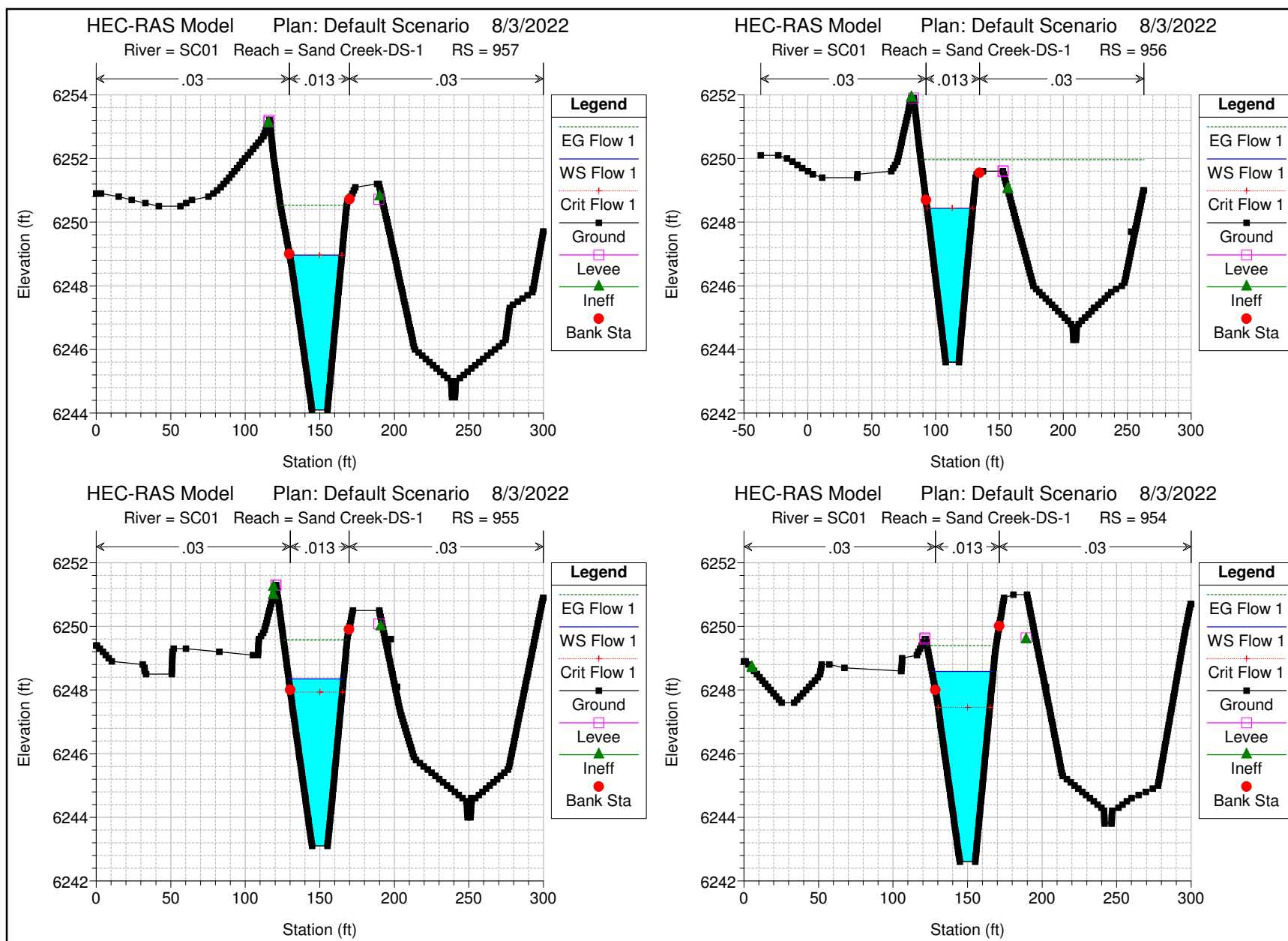




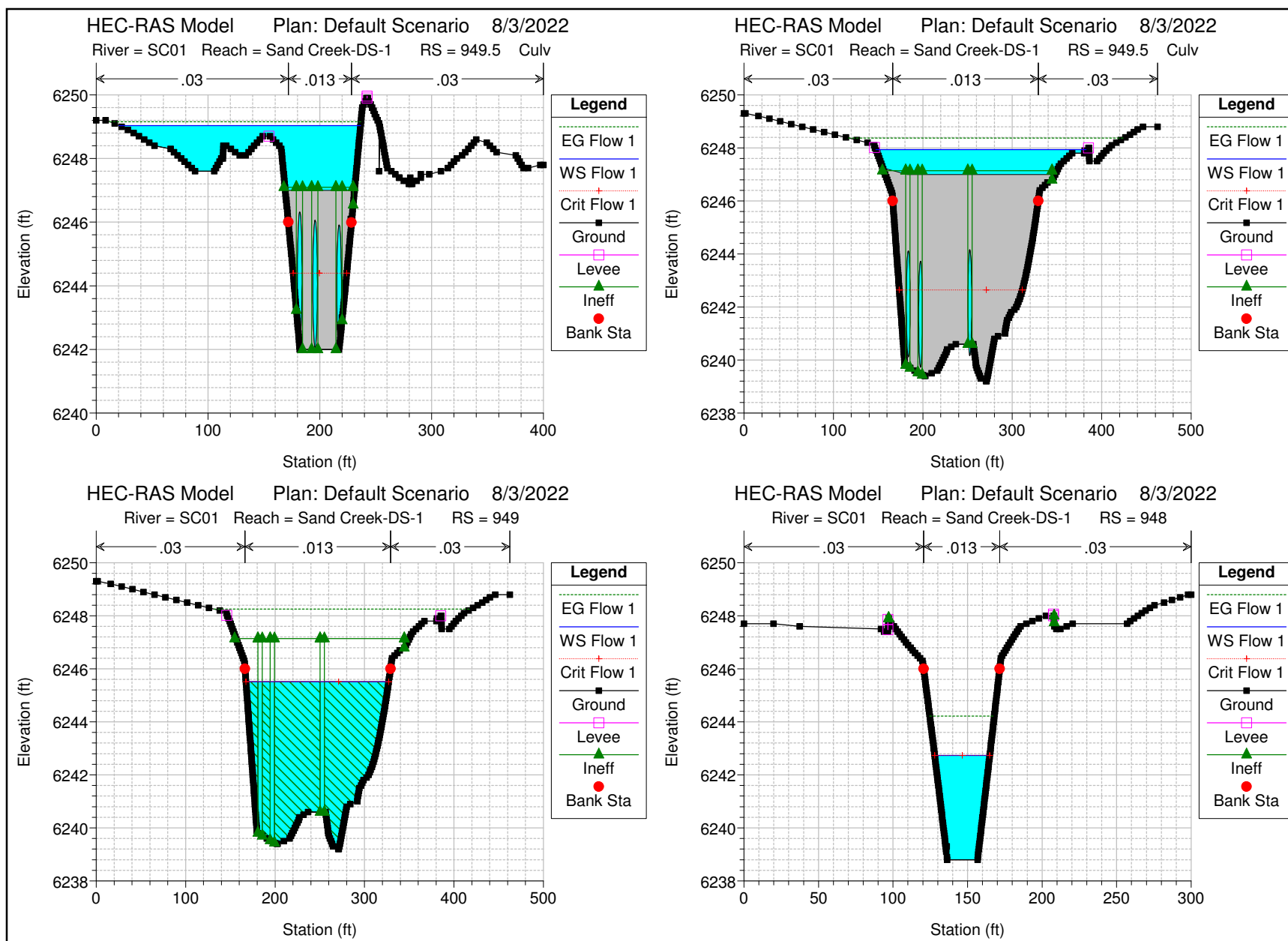




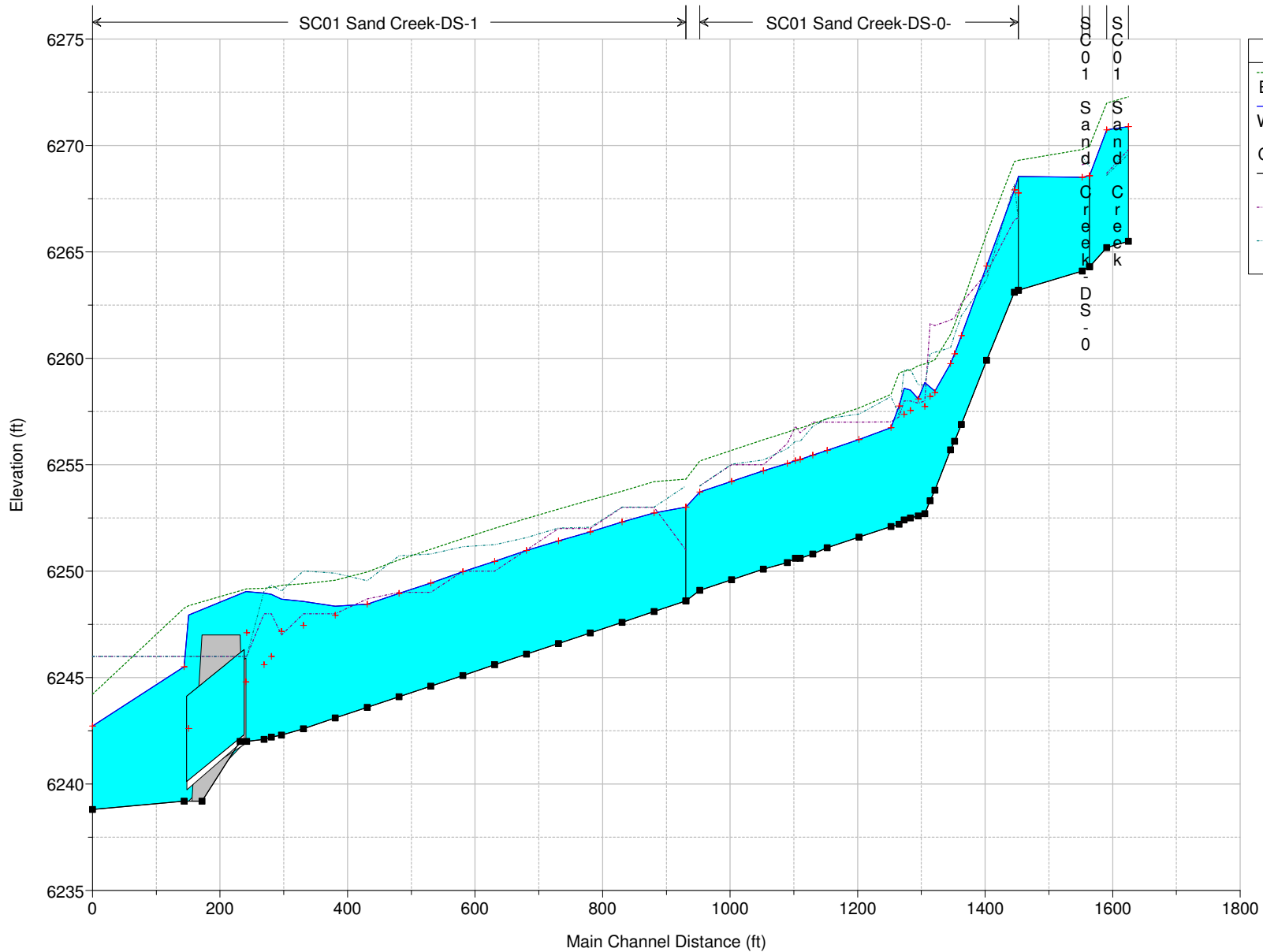








HEC-RAS Model Plan: Default Scenario 8/3/2022



Legend	
EG Flow 1	
WS Flow 1	
Crit Flow 1	
Ground	
LOB	
ROB	



HEC-RAS Plan: Default Scenario Profile: Flow 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	998	Flow 1	820.00	6265.50	6270.89	6270.89	6272.28	0.001362	9.64	103.80	56.32	0.87
Sand Creek	993	Flow 1	820.00	6265.20	6270.74	6270.74	6272.00	0.001080	9.43	128.24	71.77	0.79
Sand Creek-DS-0	992	Flow 1	820.02	6264.30	6268.57	6268.57	6269.98	0.001829	9.51	86.27	30.02	0.99
Sand Creek-DS-0	991	Flow 1	820.02	6264.10	6268.51	6268.51	6269.81	0.001850	9.15	89.57	33.50	0.99
Sand Creek-DS-0	990	Flow 1	1037.00	6263.20	6268.54	6267.78	6269.30	0.000697	7.21	181.85	76.02	0.65
Sand Creek-DS-0	989	Flow 1	1037.00	6263.10	6267.92	6267.92	6269.24	0.001524	9.40	128.51	57.84	0.93
Sand Creek-DS-0	988	Flow 1	1037.00	6259.90	6264.34	6264.34	6265.84	0.001768	9.82	106.31	37.75	0.99
Sand Creek-DS-0	987	Flow 1	1037.00	6256.90	6261.07	6261.07	6262.45	0.001807	9.42	110.06	39.56	1.00
Sand Creek-DS-0	986	Flow 1	1037.00	6256.10	6260.21	6260.21	6261.59	0.001807	9.44	109.84	39.35	1.00
Sand Creek-DS-0	985	Flow 1	1037.00	6255.70	6259.75	6259.75	6261.13	0.001786	9.41	110.26	39.34	0.99
Sand Creek-DS-0	984	Flow 1	1037.00	6253.80	6258.46	6258.39	6259.93	0.001694	9.75	106.38	33.71	0.97
Sand Creek-DS-0	983	Flow 1	1037.00	6253.30	6258.65	6258.21	6259.84	0.001444	8.74	118.69	34.98	0.84
Sand Creek-DS-0	982	Flow 1	1037.00	6252.70	6258.86	6257.74	6259.74	0.000742	7.52	138.70	36.39	0.66
Sand Creek-DS-0	981	Flow 1	1037.00	6252.60	6258.09	6258.09	6259.66	0.002717	10.04	103.36	32.76	0.99
Sand Creek-DS-0	980	Flow 1	1037.00	6252.50	6258.51	6257.55	6259.45	0.000857	7.78	133.57	36.40	0.70
Sand Creek-DS-0	979	Flow 1	1037.00	6252.40	6258.60	6257.37	6259.40	0.000698	7.19	144.73	38.42	0.64
Sand Creek-DS-0	978	Flow 1	1037.00	6252.20	6257.76	6257.76	6259.31	0.001939	10.01	104.09	34.75	0.99
Sand Creek-DS-0	977	Flow 1	1037.00	6252.10	6256.75	6256.75	6258.30	0.001795	10.02	103.48	32.90	1.00
Sand Creek-DS-0	976	Flow 1	1037.00	6251.60	6256.19	6256.19	6257.67	0.001803	9.76	106.20	35.57	1.00
Sand Creek-DS-0	975	Flow 1	1037.00	6251.10	6255.68	6255.68	6257.17	0.001823	9.79	105.88	35.61	1.00
Sand Creek-DS-0	974	Flow 1	1037.00	6250.80	6255.45	6255.45	6256.92	0.001804	9.74	106.50	35.84	1.00
Sand Creek-DS-0	973	Flow 1	1037.00	6250.60	6255.25	6255.25	6256.72	0.001805	9.74	106.46	35.84	1.00
Sand Creek-DS-0	972	Flow 1	1037.00	6250.60	6255.19	6255.19	6256.67	0.001830	9.78	106.04	35.87	1.00
Sand Creek-DS-0	971	Flow 1	1037.00	6250.40	6255.06	6255.06	6256.53	0.001786	9.71	106.74	35.77	0.99
Sand Creek-DS-0	970	Flow 1	1037.00	6250.10	6254.71	6254.71	6256.17	0.001777	9.71	106.85	35.74	0.99
Sand Creek-DS-0	969	Flow 1	1037.00	6249.60	6254.22	6254.22	6255.68	0.001780	9.69	106.96	35.89	0.99
Sand Creek-DS-0	968	Flow 1	1037.00	6249.10	6253.72	6253.72	6255.18	0.001784	9.71	106.85	35.86	0.99
Sand Creek-DS-1	966	Flow 1	1100.00	6248.60	6253.01	6253.01	6254.32	0.001599	9.39	133.91	56.36	0.95
Sand Creek-DS-1	965	Flow 1	1100.00	6248.10	6252.74	6252.74	6254.20	0.001793	9.71	113.30	38.38	1.00
Sand Creek-DS-1	964	Flow 1	1100.00	6247.60	6252.31	6252.31	6253.75	0.001776	9.64	114.09	38.73	0.99
Sand Creek-DS-1	963	Flow 1	1100.00	6247.10	6251.84	6251.84	6253.34	0.001829	9.83	111.93	37.63	1.00
Sand Creek-DS-1	962	Flow 1	1100.00	6246.60	6251.43	6251.43	6252.92	0.001794	9.80	112.24	37.25	1.00
Sand Creek-DS-1	961	Flow 1	1100.00	6246.10	6250.98	6250.98	6252.47	0.001774	9.81	112.08	36.70	0.99
Sand Creek-DS-1	960	Flow 1	1100.00	6245.60	6250.47	6250.47	6252.02	0.001738	9.99	110.37	35.80	0.99
Sand Creek-DS-1	959	Flow 1	1100.00	6245.10	6249.98	6249.98	6251.53	0.001776	9.98	110.20	35.02	0.99
Sand Creek-DS-1	958	Flow 1	1100.00	6244.60	6249.44	6249.44	6251.04	0.001742	10.13	108.89	34.53	0.99
Sand Creek-DS-1	957	Flow 1	1100.00	6244.10	6248.96	6248.96	6250.53	0.001816	10.04	109.52	35.07	1.00
Sand Creek-DS-1	956	Flow 1	1100.00	6243.60	6248.44	6248.44	6249.96	0.001768	9.89	111.21	35.85	0.99
Sand Creek-DS-1	955	Flow 1	1100.00	6243.10	6248.35	6247.93	6249.57	0.001227	8.86	124.36	36.74	0.84
Sand Creek-DS-1	954	Flow 1	1100.00	6242.60	6248.58	6247.46	6249.40	0.000712	7.27	151.93	41.17	0.65
Sand Creek-DS-1	953	Flow 1	1100.00	6242.30	6248.68	6247.17	6249.33	0.000511	6.51	180.73	60.07	0.55
Sand Creek-DS-1	952	Flow 1	1100.00	6242.20	6248.91	6246.00	6249.23	0.000197	4.48	246.57	53.19	0.36
Sand Creek-DS-1	951	Flow 1	1100.00	6242.10	6248.97	6245.61	6249.20	0.000136	3.80	291.11	61.48	0.30
Sand Creek-DS-1	950	Flow 1	1100.00	6242.00	6249.04	6247.11	6249.17	0.000061	2.96	490.03	216.00	0.21
Sand Creek-DS-1	949.5		Culvert									
Sand Creek-DS-1	949	Flow 1	1100.00	6239.20	6245.51	6245.51	6248.25	0.001370	13.29	82.78	159.57	0.99
Sand Creek-DS-1	948	Flow 1	1100.00	6238.80	6242.73	6242.73	6244.22	0.001785	9.79	112.41	36.93	0.99

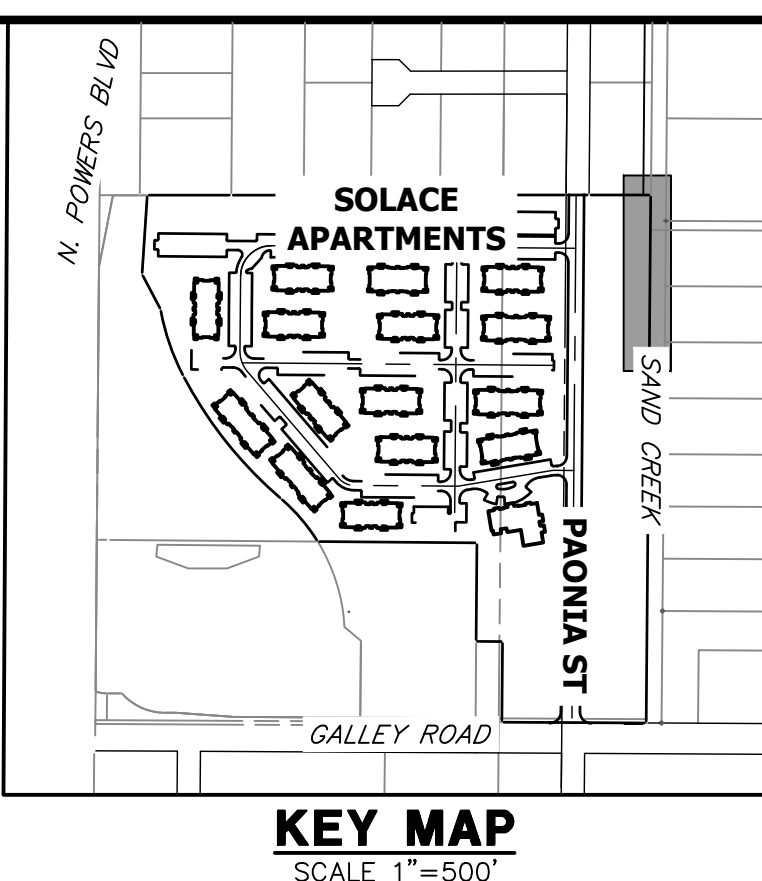
provide HEC RAS calcs of revised model

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

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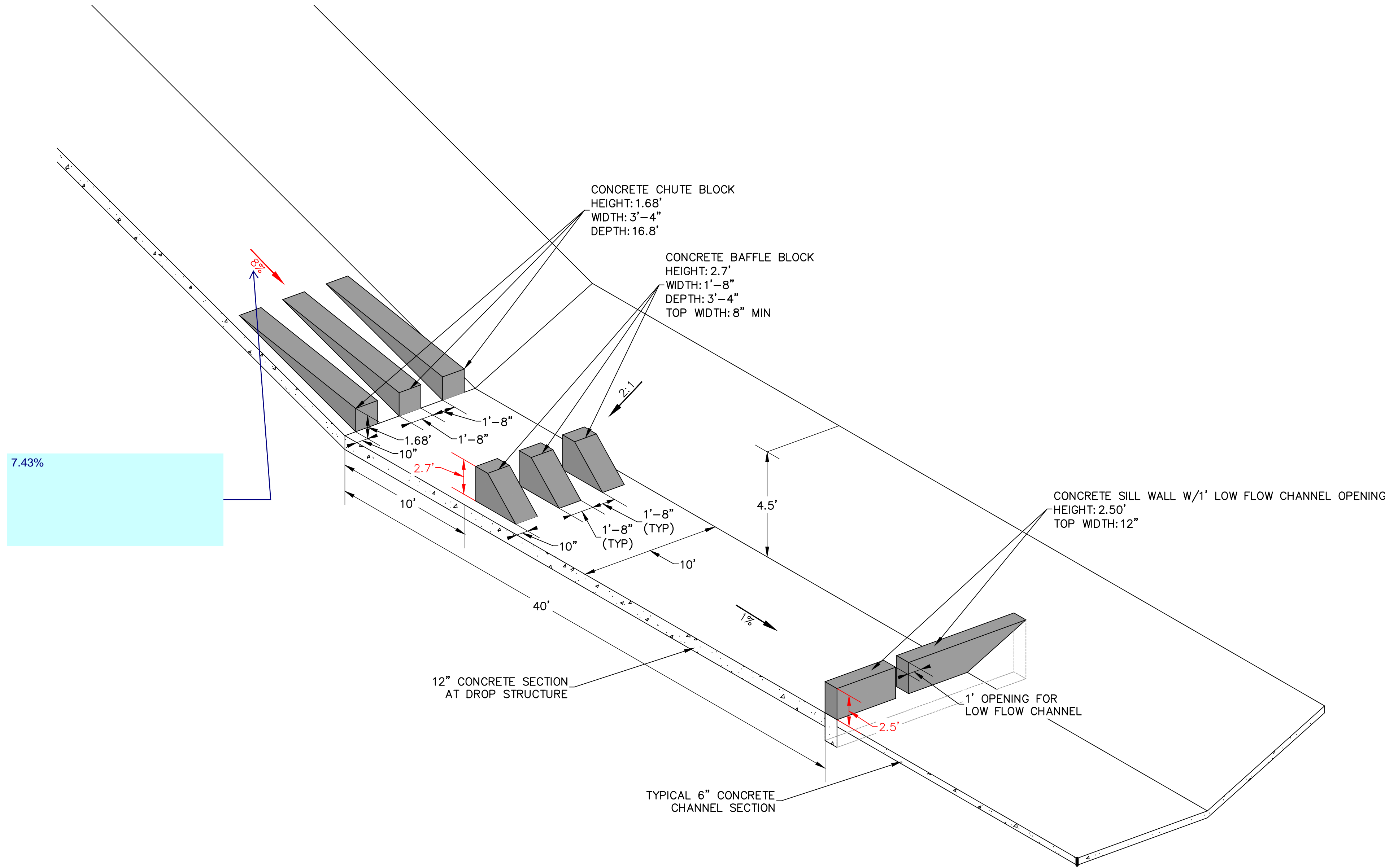
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	V-SCALE	1"=2'				
	DATE	08/03/22				
	DESIGNED BY	JBP				
	DRAWN BY	JBP				
CHANNEL PLAN AND PROFILES	CHECKED BY					
SHEET 4 OF 10						
JOB NO. 25174.00						





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Mike Bramlett  
32314  
08/03/22

MIKE A. BRAMLETT, P.E.  
COLORADO P.E. 32314  
FOR AND ON BEHALF OF JR ENGINEERING

SAND CREEK CENTER  
TRIBUTARY

DROP STRUCTURE DETAIL  
SHEETS

SHEET 9 OF 10

JOB NO. 25174.00

BY DATE

No. REVISION

H-SCALE  
V-SCALE  
DATE  
DESIGNED BY  
DRAWN BY  
CHECKED BY

N/A  
N/A  
08/03/22  
JBP  
JBP

J.R. ENGINEERING  
A Western Company



Central 303-740-9888 • Colorado Springs 719-583-2583  
Fort Collins 970-491-9888 • www.jrengineering.com

PREPARED FOR  
CS POWERS & GALLEY LLC  
510 S. NEIL ST.  
CHAMPAIGN, IL 61820  
OFFICE PHONE (734) 216-2577

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