WHITE TANKS FLOOD RETARDING STRUCTURE #4

SPILLWAY DELINEATION STUDY

(FCD 98-32)

HOSKIN ENGINEERING CONSULTANTS, INC.

DEI PROFESSIONAL SERVICES, LLC

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WHITE TANKS
FLOOD RETARDING STRUCTURE #4
SPILLWAY DELINEATION STUDY
(FCD 98-32)

FINAL REPORT
AND
TECHNICAL DATA NOTEBOOK

June 2000

Prepared for:

Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009

Prepared by:

Hoskin Engineering Consultants, Inc.
323 West Roosevelt Street, Suite 200
Phoenix, AZ 85003

in association with :

DEI Professional Services
6225 North 24th Street, Suite 200
Phoenix, AZ 85016

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO. 19690
PAUL W.B. HOSKIN
Date Signed 7/3/00
ARIZONA, U.S.A.

White Tanks
Flood Retarding Structure #4
Spillway Delineation Study
(FCD 98-32)

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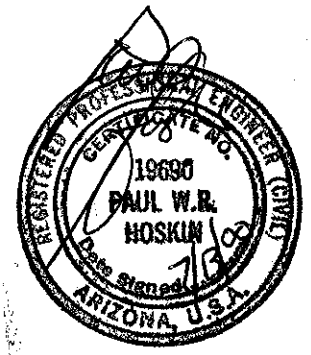

White Tanks
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Spillway Delineation Study
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Executive Summary

This report documents the results of an engineering analysis to determine the extent of potential flooding downstream of the two emergency spillways of the White Tanks Flood Retarding Structure #4 (FRS #4). The study is intended to be used to assist in emergency preparedness during a storm event in which the capacity of the structure is exceeded.

During the course of this study, Data Collection and Field Reconnaissance Reports were prepared. These reports are included as a part of an appendix to this report. The Data Collection Report documents existing studies and engineering plan sets which were obtained during the course of the study, and which provide some background to the study. The Field Reconnaissance Report documents existing conditions within the study area. It also provides the results of a Manning's "n" evaluation which was later used in the hydraulic modeling of spillway flows.

White Tanks FRS #4 is an earthen embankment dam, which is approximately 16 feet above grade at its highest point. Two earthen spillways, both at approximately the same elevation, provide emergency overflow relief for up to one-half of the Probable Maximum Flood (1/2 PMF). Spillway rating curves were established for the East and West Spillways. These rating curves indicated that approximately one-third of the spillway flow would occur over the East Spillway, with the remaining two-thirds of the flow over the West Spillway. The spillway flows were modeled for the 1/3, 2/3, and full discharges using the HEC-RAS model. Different models were established for each of the spillways and for each of the discharges. In addition, fifty percent of the full discharge was modeled for the East Spillway.

Executive Summary (continued)

In order to adequately model the many flow conditions which could occur on the downstream floodplain area, several independent HEC-RAS models were developed for the study area.

The end product of the hydraulic analysis are spillway inundation maps for the 1/3, 2/3, and full spillway discharges. These maps summarize hydraulic data which includes average flow velocities, average flow depths, and average flow travel times.

1 Introduction

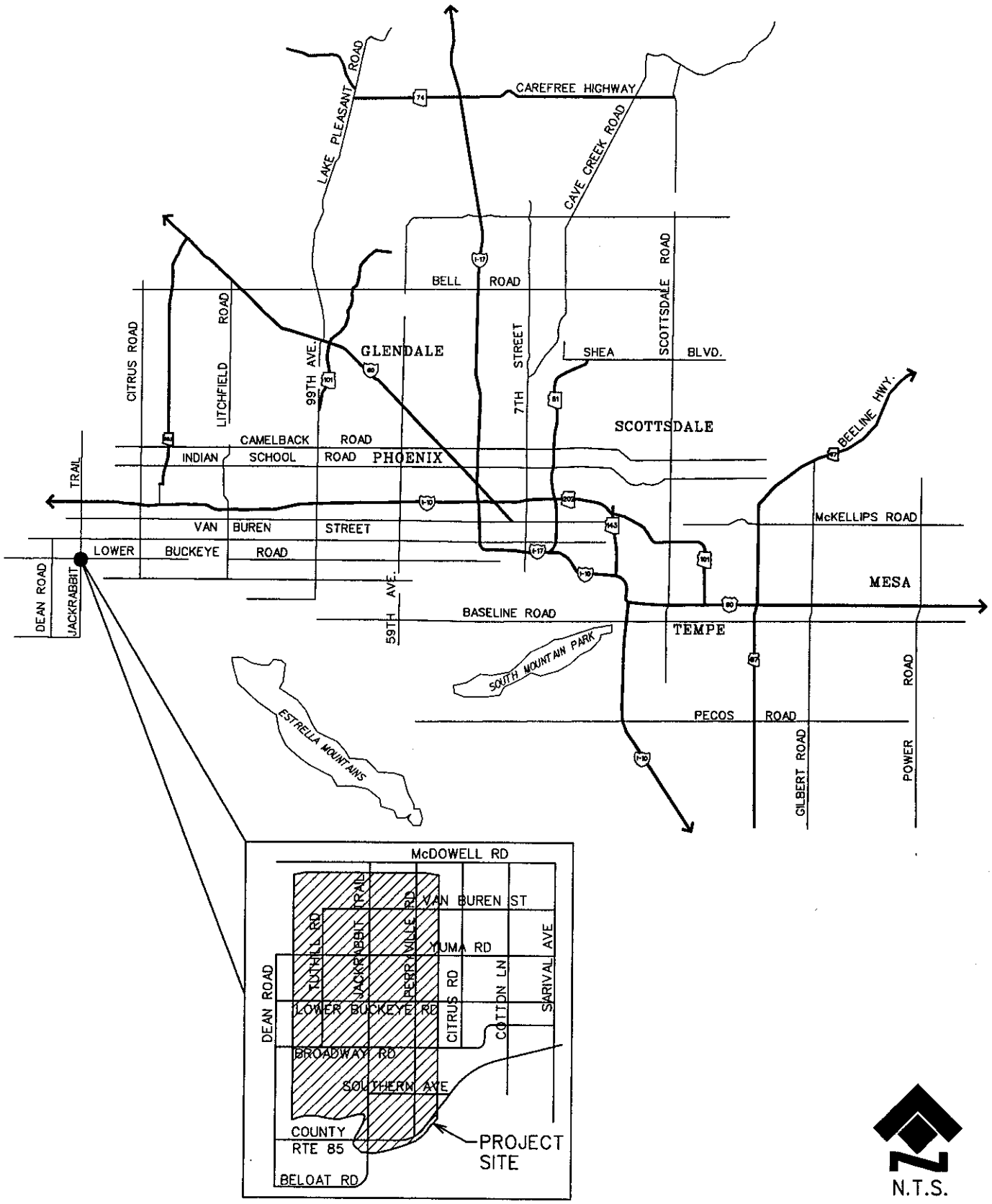
Hoskin Engineering Consultants, Inc., in association with DEI Professional Services, have been contracted by the Flood Control District of Maricopa County (District) to delineate the inundation limits from several White Tanks Flood Retaining Structure #4 (FRS #4) spillway flows. The study is intended primarily for use in flood warning, emergency preparedness and evacuation, and for the identification of potential drainage easements downstream of the spillways.

1.1 Purpose of Study

The purpose of the spillway delineation is to determine the inundation limits and the downstream impacts of the 1/3, 2/3, and full spillway discharges for the White Tanks FRS #4. The study area covers a portion of central Maricopa County, including portions of the City of Goodyear, the Town of Buckeye, and Maricopa County. The study limits are depicted in Figure 1.

1.2 Background

White Tanks FRS #4 was designed and constructed by the Soil Conservation Service (SCS) in 1954. It was built as part of a comprehensive flood control plan which included the construction of McMicken Dam and White Tanks FRS #s 1, 2, and 3. Their joint purpose was to protect irrigated lands, highways, railroads, armed forces installations, and public and private lands from runoff which originates within the White Tanks Mountains. Prior to their construction, flood damage had occurred, and extreme storms in 1951 highlighted the need for a comprehensive plan.



Hoskin Engineering Consultants, Inc.
323 W. Roosevelt St. Ste. 200
Phoenix, Az 85003
Tel. (602) 252-6384
Fax. (602) 252-6385

WHITE TANKS F.R.S. #4

VICINITY & LOCATION MAP
FIGURE 1

FILE NAME:

FRS #4 is located within the southern end of the project and is the smallest of the structures. Its construction included minor modifications to existing structures within the Caterpillar proving grounds. Interstate 10 was completed after the construction of FRS #4. As a result, upstream drainage conditions have been modified and the contributing watershed area has increased. Upstream drainage is now concentrated at Tuthill Road and at Jackrabbit Road before it crosses the freeway.

2 Area Studied

2.1 Scope of Study

The scope of this study is the delineation of three spillway discharges at each of the White Tanks FRS #4 spillways. White Tanks FRS #4 has two emergency spillways; referred to in this report as the East Spillway and the West Spillway. The upstream limits of this study occur at each of the spillways. The downstream limit of study is the point where the inundation limits meet with those of the 100-year floodplain of the Gila River. Discharges were modeled for the 1/3, 2/3, and full spillway discharges, where the full discharge is the ½ Probable Maximum Flood (PMF). Hydrology for the ½ PMF was developed by the District (Ref. 5) and provided to the Consultant. The discharge rates at the east and west spillways were determined using weir flow calculations, see section 3.1 of this report. Topography for the area at a scale of 1 inch = 200 feet, with a 2-foot contour interval, was produced for the White Tanks ADMS (Ref. 9) and used in this study. Hydraulic

models were prepared using the HEC-RAS model (Ref. 6). Final deliverables include this report, a set of floodplain delineation maps, and the HEC-RAS data files on CD. A complete scope of work is included in Appendix A.

2.2 Description of the Study Area

The study area is approximately bounded by Airport Road to the west, 183rd Avenue to the east, Interstate 10 to the north, and the Gila River floodplain to the south (Figure 1). The study covers an area of approximately 12 square miles.

The White Tanks FRS #4 receives runoff from a watershed area of approximately 20.25 square miles, which extends north of Interstate 10. Major flows from north of Interstate 10 cross the freeway at Jackrabbit Road, and at the Tuthill Road alignment. A concrete lined drainage channel exists along the west side of Jackrabbit Road. The lined portion of this channel originates north of McDowell Road where it intercepts flows from the north and west. The channel conveys flows south to the White Tanks FRS #4. At Interstate 10, the channel crosses through the interchange through 5-10'x4' concrete box culverts. The channel enters the White Tanks FRS #4 upstream of the East Spillway.

Dikes along the west side of Tuthill Road, and along the north side of McDowell Road, intercept watershed runoff and direct it toward a channel and dike which follows the Tuthill Road alignment. At Interstate 10, there are 4-10' x 8' concrete box culverts, which convey drainage from west of Tuthill Road across the freeway. A dike separates flow, which enters these culverts from a 12' x 12' equipment underpass on the east side of the Tuthill Road alignment.

Downstream of the FRS, the study area is predominantly agricultural with the exception of existing low-density housing located east of Jackrabbit Road and north of Van Buren Street. A review of field conditions and aerial photographs indicates that a majority of the agricultural areas are currently farmed, however, some areas have been left fallow, possibly for several years. There are existing paved two lane roads on the mile streets. Intermediate roads within the mile sections are generally unpaved. Irrigation ditches crisscross the fields and provide an interruption to the natural drainage patterns. The Roosevelt Irrigation District Canal, the Buckeye Canal, and the Union Pacific/Southern Pacific Railroad each present a barrier to the natural flow of water to the south.

3 Technical Analysis

3.1 Hydrology

The spillways for the FRS were designed by the Soil Conservation Service (SCS) to handle a design storm with a six-inch rainfall center. At the time of design, the runoff produced was estimated to substantially exceed a 100-year storm event. The design storm was assumed centered over the watershed such that it would produce the maximum runoff at the structure. The FRS was also designed to handle 50 years of sedimentation without an effect on its flood retarding capacity. Subsequent excavation, by the Arizona Department of Transportation (ADOT), within the flood retarding pool is likely to have increased the capacity of the FRS.

According to a report prepared by the SCS, dated November 12, 1970, the contributing drainage area to FRS #4 has increased from 10.3 square miles, as originally designed, to 18.8 square miles (Ref. 8). This change was attributed to changes in development within the area. This change in watershed area was also noted in the more recent study by the District (Ref. 5), however the size of watershed area is different. The District study included a hydrologic analysis of the contributing watershed using the HEC-1 model. The design storm selected was the 1/2 Probable Maximum Precipitation (PMP). The PMP was determined to be 12.3 inches over a 6-hour time period. Results from the analysis gives the 1/2 PMF for FRS #4 to be 17,738 cfs.

After flood routing through the storage area of FRS #4, it was determined by the District that the maximum rate of outflow through the emergency spillway would be 5,286 cfs at an elevation of 1,053.4 feet. For the purposes of this inundation study, it was decided to use the full 1/2 PMF flow, approximated at 18,000 cfs, for modeling of the downstream inundation limits. It was assumed that the FRS would be full at the time of the peak inflow. See Section 4 of Appendix B for spillway dimensions.

The full discharge rate was calculated at each spillway using the weir flow equation, and the 2/3 and 1/3 flows were established from this number to give a range of spillway flows. Weir flow calculations are included in Appendix B, and are summarized in Table 1. The discharges have been rounded to the nearest 500 cfs.

Table1: Summary of Flood Discharge Rates

Discharge of ½ PMF	West Spillway	East Spillway
Full Discharge	12000 cfs	6000 cfs
2/3 Discharge	8000 cfs	4000 cfs
1/3 Discharge	4000 cfs	2000 cfs

These discharge rates were used in the HEC-RAS model for the flows exiting the spillways. Downstream of the spillways, additional split flow analysis was conducted and several HEC-RAS models were generated. See Section 3.3 of this report.

Hydraulic analysis of the west spillway indicated that the constructed limits of the spillway and berms would be overtopped to the west with the larger spillway flows. The current 100-year floodplain would be conveyed within a channel that extends from the Interstate 10 freeway, south to a point upstream of the west spillway. The 100-year floodplain limits show the potential for the flow to bypass the entrance to the FRS flood pool, and overtop into the West Spillway. Therefore, there is the potential that the FRS would not be full of floodwater at the time the spillway first starts to overtop. The consequence is that, potentially, the spillway would overtop more frequently than the design condition.

3.2 Topography

Topography for the study used 1 inch = 200 feet, 2-foot contour interval mapping produced for the White Tanks/Agua Fria ADMS (Ref. 9). This mapping forms a basis for the delineation mapping presented in this report.

During the course of the study, it was determined that the existing topographic mapping does not provide sufficiently detailed information for the evaluation of overtopping of the Roosevelt and Buckeye canals, and the Southern Pacific Railroad. Detailed field survey was obtained by Project Engineering Consultants, Inc., for each of these structures. See Appendix B for information on data collection.

3.3 Hydraulic Analysis

HEC-RAS was used to model the spillway flows. Due to the interruption of floodplain flow by the Roosevelt Canal, Buckeye Canal, and Southern Pacific Railroad, the entire flow path analysis was broken into three separate segments. They are as follows:

A. White Tanks FRS #4 to the Roosevelt Irrigation District Canal

B. Roosevelt Irrigation District Canal to the Southern Pacific Railroad

C. Southern Pacific Railroad to the Gila River

Within each segment, several HEC-RAS models were prepared in order to effectively evaluate multiple flow splits. Modeling proceeded from upstream to downstream. The downstream segment was evaluated using the flow information from the upstream segment. The stationing increases from east to west, and the cross sections

were numbered from downstream to upstream. The cross section numbering system assumes a river mile of 20.0 occurs at the East spillway. Cross section numbers for the West spillway were backed in from the point of confluence of the East and West spillway cross sections.

3.3.1 White Tanks FRS #4 to the Roosevelt Irrigation District Canal

Initially, two models were created for this portion of the study; one model for the West spillway, and one for the East spillway. Cross section data, including elevation and stationing, was entered into HEC-RAS. The 10,000-reference station for the West spillway model represents the eastern edge of Tuthill Road. The 10,000-reference station for the East spillway model is the eastern edge of Jackrabbit Trail. Areas of non-conveyance were identified and bank stations were established.

These initial models were run for the full discharge, and a line of flow split was established using the flow distribution option in HEC-RAS. For the West spillway model, the chosen flow split occurs at a point where fifty percent of the flow in the cross-section is east of the split and fifty percent is west of the split. HEC-RAS runs were also made to determine the capacity of the channel along Tuthill Road. The channel can carry approximately 1,000 cfs.

These first two models, in conjunction with field observation, indicated that the spillway flow could be broken into four models, described as follows:

West of Tuthill Road (Model name: WT4A1)

This model was created to determine the water surface elevations occurring west of Tuthill Road. Model WT4A1 is the West spillway model with encroachments along the Tuthill Road channel blocking flow to the east of the channel. By trial and error, it was determined that the flow capacity of this channel is approximately 1,000 cfs. A base flow of 1,000 cfs was thus used for each of the spillway discharges.

The Roosevelt Canal has a slight gradient to the west. Some of the flow, which reaches the canal, will tend to flow to the west. The magnitude of flow to the west was not determined, and the downstream models assume that the full 1,000 cfs will cross the canal. The western floodplain limit was plotted on the delineation maps included in Appendix D. Floodplain limits for the 1/3, 2/3, and full discharges are co-incidental since the 1000 cfs flow west of Tuthill does not change.

Between Tuthill Road and the Split (Model name: WT4A2)

Model WT4A2 was created to determine the water surface elevations occurring between Tuthill Road and a point of flow split approximately 1,800 feet east of Tuthill Road. This model is the West spillway model with encroachments along the Tuthill Road channel to prevent flow to the west, and with encroachments in sections 19.06 and 18.87 to block flow east of the split. The berm located approximately 1,800 feet east of Tuthill Road and just north of the canal physically splits the flow at section 19.06.

Discharge profiles run in this model reflect an overall reduction in the flow of 1,000 cfs, the capacity of the Tuthill channel, at sections 19.84 through 18.87. At sections 19.06 and 18.87, the flow is fifty percent of the total spillway flow. See Section 2 of Appendix D for the flow values.

Results from this model indicate that flow will weir over Roosevelt Canal at an indeterminate length to the west, as the flow combines with flow within the Tuthill channel at a point just north of the canal. For floodplain delineation purposes, the higher water surface between models WT4A3 and WT4A2 was plotted at each cross-section, for each of the 1/3, 2/3, and full discharges.

Between the Split and Jackrabbit Trail (Model name: WT4A3)

Model WT4A3 was created to determine the water surface elevations occurring between the Jackrabbit Trail and a point of flow split approximately 1,800 feet east of Tuthill Road. This model is the western spillway model with encroachments to the west along the Tuthill Road channel, and encroachments from sections 19.06 and 18.87 blocking flow west of the split. The berm located approximately 1,800 feet east of Tuthill Road and just north of the canal physically splits the flow at section 19.06.

Discharge profiles run in this model reflect an overall reduction in the flow by 1,000 cfs, the capacity of the Tuthill channel, at sections 19.84 through 18.87. At sections 19.06 and 18.87, the flow is fifty percent of the

total spillway flow, plus fifteen percent of the eastern spillway flow. See Section 2 of Appendix D for the flow values.

Results from this model indicate that flow will weir over the Roosevelt Canal at one location between Jackrabbit Trail and the split. For floodplain delineation purposes, the higher water surface between models WT4A3 and WT4A2 was plotted at each cross-section, for each of the 1/3, 2/3, and full discharges.

East of Jackrabbit Trail (Model name: WT4A4)

Model WT4A4 is the East spillway model, with encroachments at Jackrabbit Trail blocking flow to the west. Jackrabbit Road is not a physical barrier to flow migrating to the west, except right at the Roosevelt Canal section. Discharge profiles in this model reflect a reduction in flow at section 2010, where approximately fifteen percent of the eastern spillway flow splits to the west and combines with flow from the West spillway. See Section 2 of Appendix D for the flow values.

Results from this model indicate that flow from the East spillway will weir over Roosevelt Canal at two locations east of Jackrabbit Trail. The eastern 1/3, 2/3, and full discharge floodplain boundaries resulting from this model are shown on the delineation maps included in Appendix D. The West floodplain boundaries of this model are also shown on the maps, except for section 18.87. The fifteen percent flow that combines with the western spillway flow is included in model WT4A3.

3.3.2 Roosevelt Irrigation District Canal to the Buckeye Canal

Four primary points have been identified where the flows will overtop the Roosevelt Irrigation District Canal. After the floodwater overtops the Roosevelt Canal, it will travel south, within the second segment, towards the Southern Pacific Railroad and Buckeye Canal. Four flow paths were determined to carry water from the Roosevelt District Canal towards the Southern Pacific Railroad. These flow paths were determined using the Flood Control District, Maricopa County supplied topographic maps for the area. The four channels included are referenced as follows:

1. East of Jackrabbit Trail
2. Between Jackrabbit Trail and the Split
3. Between the Split and Tuthill Road
4. West of Tuthill Road.

Thirteen cross sections were then taken along these flow paths. These cross sections are shown on the delineation maps included in Appendix D. These cross sections were used, in conjunction with the program HEC-RAS, to validate the estimated flow paths and determine their flow characteristics.

The cross section data, including elevation and stationing, was entered into HEC-RAS. The centerline of Jackrabbit Trail was determined to be station 10,000 for each of the cross sections. The stationing was taken from east to west, and the cross-sections were numbered from downstream to upstream. Each flow path was evaluated and mapped independently in HEC-

RAS. Areas of non-conveyance were identified and bank stations were established. Bank stations were adjusted laterally for each flow path along the cross sections. The combination of cross-sections was evaluated and it was determined that at cross-section 16.55, the two center flow paths combined. Once the flow paths were established, computed water surface elevations and adjacent flow paths were examined to determine the potential for lateral movement of flows between flow paths.

Overtopping of water on cross sections was evident. It was determined that a portion of the water in each flow path might weir over to another adjacent flow path. The overflow of this flow was evaluated using the following weir equation:

$$Q = C\,L\,H^{3/2}$$

C = estimated at 2.2
L = length to the next downstream cross-section
H = height of water above the water surface differential or bank

The flow was then transferred to the appropriate channel, and HEC-RAS was re-run. This flow was transferred in an iterative fashion, until overtopping of the channel banks and/or the water level differential between adjacent channels was equal to or less than 0.7 ft. The overtopping tolerance was determined to be around 0.7 ft, which accounts for the percent error on

the topographic maps and the growing vegetation in the area. A spreadsheet showing the height of the differential water level or the overtopping of the banks are included in Appendix D.

At the Buckeye Canal, flow from each of the models intermixes and crosses at only two locations. These two overflow points were identified from top of bank elevations obtained from field survey. Results from the HEC-RAS model for the full discharge indicate that 17,000 cfs will overtop between HEC-RAS stations 7,389 and 12,208 (eastern weir) in a flow width of approximately 4,819 feet. The remaining 1,000 cfs overtops between HEC-RAS stations 9,580 and 10,780 (western weir) with a flow width of approximately 1,200 feet.

This section of the study, between the Roosevelt Canal and the Buckeye Canal, contains numerous local high points or "islands," designated on the plans by an encircled number 1. These "islands" are areas of low water conveyance or areas determined to be above the anticipated water surface. Therefore, they may stay dry during a flood event. The water will most likely surround these pieces of land thus causing some of the water to overflow to adjacent flow paths. Due to the inherent error in the topographic maps used to determine the flow paths, the above areas may in fact be inundated during any of the studied flood events. These "islands" should not be designated as areas of safety. They are solely shown to emphasize the overflow between flow paths.

3.3.3 Buckeye Canal to the Gila River

Two locations were identified where flow overtops Buckeye Canal. The majority of the flow overtops Buckeye Canal at the eastern weir location. Peak flow for the full discharge model is 17,000 cfs at the east weir. A smaller flow overtops Buckeye Canal at the western weir location. Peak flow for the full discharge model is 1,000 cfs at the west weir. The flowpath downstream of each of the weir locations was determined using topographic maps supplied by the Flood Control District of Maricopa County.

Buckeye Canal to Gila River (Model name: WT4C1)

This model was created to determine the water surface elevations between Buckeye Canal and the Gila River floodplain. Only one model was created for this portion of the study, with the main flow from the east weir location and a tributary flow from the west weir location. Cross section data, including elevation and stationing, was entered into HEC-RAS. The low point at the east weir location was chosen as the 10,000-reference station for the main portion of the flow. The low point at the west weir location was chosen as the 10,000-reference station for the smaller tributary flow. Areas of non-conveyance were identified and included in the model. Bank stations were established at the floodplain limits. Where roads or elevated ditches tend to contain the flow, the floodplain limits were projected beyond, thus

ignoring their presence. The 1/3, 2/3, and full discharge floodplain boundaries resulting from this model are shown on the delineation maps included in Appendix D.

4 Conclusions

Tables summarizing the flow depths, velocities, and travel times are included in Appendix D, and are shown on the spillway delineation maps rolled separately from this report. Limits of flooding are also depicted on the spillway delineation maps. Travel times presented on the spillway delineation maps are based upon the average velocity across the entire HEC-RAS wetted cross-section. Roadways that fall within the limits of flooding, such as Tuthill Road and Jackrabbit Trail will convey spillway flood waters south at a faster rate, due to the lower Manning's 'n' value of the road surface.

5 References

1. Dibble & Associates Consulting Engineers, *Conceptual Design Report, White Tanks Flood Retention Structure No. 4 Inlet Improvements, FCD 92-38*, July 29, 1993.
2. Flood Control District of Maricopa County, *Annexes to the Hydrologic and Hydraulic Analysis if White Tanks #4 F.R.S. Spillway*, July 8, 1993.
3. Flood Control District of Maricopa County, *Consultant Guideline*, October 1, 1998.
4. Flood Control District of Maricopa County, *Delineation of Spillway Flow for Three West Side Structures, Contract FCD 98-32*, March 22, 1999.
5. Flood Control District of Maricopa County, *Hydrologic and Hydraulic Analysis of White Tanks #4 F.R.S. Spillway for the ½ Probable Maximum Flood*, July 8, 1993.
6. United States Army Corps of Engineers, Hydrologic Engineering Center, *HEC-RAS River Analysis System, Version 2.2*, September 1998.
7. United States Army Engineer District, Los Angeles Corp of Engineers, *Adobe Dam Design Memorandum No.3, General Design Memorandum Phase II, Project Design Part 2*, April 1979.
8. United States Department of Agriculture, Soil Conservation Service, *Proposal for Rehabilitation, White Tank Mountains Flood Retarding Structures #3 and #4, Maricopa, County, Arizona*, November 1991.
9. WLB Group, *White Tanks/Agua Fria Area Drainage Master Study*, December, 1989.

WHITE TANKS
FLOOD RETARDING STRUCTURE #4
SPILLWAY DELINEATION STUDY
FLOOD RETARDING STRUCTURE
(FCD 98-32)

APPENDIX A: GENERAL DOCUMENTATION

White Tanks
Flood Retarding Structure #4
Spillway Delineation Study

Appendix A: General Documentation

Table of Contents

1 Scope of Work
2 Meeting Minutes

1 Scope of Work

SCOPE OF WORK

DELINEATION OF SPILLWAY FLOWS FOR THREE WEST SIDE STRUCTURES

CONTRACT FCD 98-32

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
SCOPE OF WORK
DELINEATION OF SPILLWAY FLOWS FOR THREE WEST SIDE STRUCTURES
FCD 98-32

GENERAL

The study is to delineate the inundation limits of the 1/3, 2/3, and full spillway discharge values for Adobe Dam, McMicken Dam, and White Tanks #4 Flood Retarding Structure. The combined delineation project consists of approximately 50.5 linear miles of emergency spillway delineations as depicted on exhibits A-1, B-1, & C-1. The consultant will determine the inundation limits using the U.S. Army Corps of Engineers HEC-RAS computer model. The consultant must use sound engineering judgement in the development of the inundation limits. The results of the HEC-RAS model must be analyzed carefully and refinements made to the input parameters in order to obtain the most realistic results. A notice to proceed will be issued for each structure that will be assessed and completed prior to the initiation of a notice to proceed on the remaining structure(s).

All work must be completed within 910 days from Notice to Proceed, which includes a minimum of 150 days for District reviews. Each task will have its' own time length assigned to it. Work will proceed with Task C, then proceed to Task B and then Task A. The order that the Tasks are completed in may be changed with approval from the District's Project Manager. Work will not proceed on a subsequent Task until the preceding task has been completed to the satisfaction of District staff. The overall schedule covers a time period of 130 weeks. Approximate task completion dates are as follows:

Task Description	Time to Task Completion
Task A - Adobe Dam Study	30 weeks
Task B - McMicken Dam Study Phase I	24 weeks
Task B - McMicken Dam Study Phase II	34 weeks
Task B - McMicken Dam Study Phase III	46 weeks
Task C - White Tanks FRS # 4	24 weeks
Task A3 - Adobe Dam Mapping	16 weeks
Task B3 - McMicken Dam Mapping	20 weeks

If any new topographic mapping is developed for this study then the Digital Terrain Model must also be submitted.

TASK B6 - DELIVERABLES

1. One set of the inundation limit exhibits (full size) on mylar sealed by the engineer.

2. 4 copies of the Final Report sealed by the engineer, inundation limit exhibits, and copies of the HEC-RAS models on diskette.

3. All of the CADD data called for in the Final Products Section.

4. Digital Terrain Model if any new topographic mapping is developed for this study.

TASK C - WHITE TANKS #4 FLOOD RETARDING STRUCTURE

No work is to begin on this Task until authorized by the District's Project Manager.

The study limits for the White Tanks FRS #4 study are illustrated on Exhibit 'C-1.' Two spillways will be analyzed for their downstream impacts. The study covers approximately 10 river miles.

TASK C1 - COORDINATION

The consultant will submit a project schedule showing coordination meetings and completion dates for each of the tasks in the scope during the proposal stage. The consultant shall update and resubmit this project schedule whenever changes in the schedule occur.

The consultant shall submit a quarterly estimation of the projected billing within 14 days of Notice to Proceed. Thereafter, this estimation will be updated and submitted to the District's Project Manager at least 10 days prior to the end of each quarter.

The consultant will obtain any necessary Rights of Entry or permits for access to private or public land. The consultant will furnish the District with a list of all property owners notified and a sample Right of Entry letter.

The consultant shall meet with officials from the City of Goodyear, the Town of Buckeye, and other agencies in the study areas. The purpose of this meeting is to notify them about the study and obtain information on current or planned public works projects in the study area.

TASK C2 - DATA COLLECTION

The District will supply some of the topographic mapping for this study in either a GIS or CADD format. The source of the topographic mapping data is the White Tanks/Agua Fria Area Drainage Master Study. This mapping was originally developed using aerial photogrammetry methods. The horizontal scale of the mapping is 1" = 400' and the contour interval is two-feet.

The District will supply the 3 discharge values to be modeled. The consultant will conduct a field reconnaissance of the full study reach. This will include observation of channel and floodplain conditions for estimation of Manning's "n" values, photographic documentation of floodplain characteristics, determination of channel bank stations, observation of possible overflow and split flow areas. The results of the field reconnaissance will be included in the Final Report. However, a draft version of the field reconnaissance results will be submitted to the District prior to beginning the hydraulic modeling. The field reconnaissance section of the Final Report will present the determination of channel and overbank "n" values along with color photographs (or color photocopies) of these areas. Photo locations, structures and "n" values will be displayed on reduced (usually 11" x 17") scale exhibit.

TASK C3 – FIELD SURVEYS

Field surveys will be conducted to better obtain an understanding of the topographic features within the study area. Field surveys will include grades along the flowline and banks of the recently completed concrete channel along Jackrabbit Road, top of bank measurements along the Buckeye and Roosevelt canals, the Southern Pacific Railroad, and structure measurements as necessary.

TASK C4 - HYDRAULIC ANALYSIS

The hydraulic analysis will be preformed using the latest U.S. Army Corps of Engineers HEC-RAS River Analysis System computer model.

The initial location and alignment of cross sections and channel centerline will be submitted for the District's review and approval prior to the initial digitizing of the cross section data and should closely parallel the existing flood insurance study. Cross sections will be spaced approximately every 500 feet, unless geographic or structural constraints dictate closer spacing, and will extend the full width of the inundated area. The use of different cross section spacing will require approval from the District's Project Manger. The orientation of the cross sections may need to be altered after running the HEC-RAS model to ensure that cross sections are perpendicular to flow. Also, to ensure good hydraulic modeling of the spillway discharges, additional cross sections may need to be added, or the existing cross sections may need to be moved. Interpolated cross sections will not be used in the HEC-RAS model. Cross section stationing will be from left to right looking downstream with the thalweg at station 10.000.

Cross section numbering will be in river miles and shall decrease in value in the downstream direction.

Manning's n values are to be determined using the methodology in the USGS report. Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona, April 1991.

Prior to the completion of the final hydraulic models all of the input data must be reviewed to ensure that it agrees with HEC-RAS model results. This includes: the location of the channel centerline, reach lengths, Manning's n values, ineffective flow limits, discharge values, etc...

The HEC-RAS models will usually be developed for subcritical flow. However, in some cases supercritical flow may be experienced and have to be modeled. The HEC-RAS model should be started far enough downstream to eliminate the affects of the starting conditions on the downstream limit of the study area; and reflect a minimized hazard from spillway flows.

For braided channels, each branch should be modeled with its highest anticipated discharge value. This might require more then one HEC-RAS model to delineate the inundation limits in these areas. A rating curve must be determined and the discharge contained within the channel. The percentage of discharge in each overbank and the main channel must be closely assessed within the split flow area, as well as upstream and downstream of it.

The consultant is to setup the HEC-RAS models so that the cross sections are broken into as many segments as practical for determining the maximum depth and velocity along the cross section. The consultant will need to calculate the time it takes for flows to travel from the spillway to each cross section.

Cross sections shall be plotted showing, computed water surface profiles, ineffective flow areas, "n" values, encroachments, channel stationing, and other pertinent information. The consultant is to make refinements to the HEC-RAS model based on review of the model by the District and other interested Agencies. Adjustments to the input parameters for obtaining the most realistic results are considered normal to the scope of work.

TASK C5 - FINAL PRODUCTS

Develop an inundation limit exhibit using the supplied topographic data on 24" x 36" size sheets. The use of any larger size sheets will require approval from the District's Project Manager, and the maximum size allowed is 33" x 46". This exhibit will use the District's standard border, title block, and legend format. Shown on this exhibit will be the inundation limits for the three discharges, cross section locations, thalweg location, supplied topographic data, consultant developed topographic data or revisions, major and appropriate minor road names, and elevation reference marks. This exhibit will be plotted at the same scale as the originally supplied topographic data. The use of a different scale will require approval from the District's Project Manger. A table must be included on this exhibit showing the computed water surface elevation of each cross section for each discharge modeled, and other pertinent

information such as maximum depth, velocity, and travel time from the spillway to each cross section. In the case of split or braided flow the maximum inundation limit should be shown and the maximum water surface elevation for each portion of the cross section listed. At the end of the study one complete set of inundation limit exhibits will be submitted on non-erasable mylar (3 mil or thicker), and will be sealed by the engineer. No sticky backs or other types of tape products shall be applied to the mylars.

An overall final report for the study will be developed. This report will include, a narrative description of the purpose of this study, what steps were undertaken to complete this study, any assumptions made, minutes of meetings, the field reconnaissance report, and a reduced size (11" x 17") copy of the inundation limit exhibit. Included as appendixes to this report should be printouts of the HEC-RAS models, plot of the cross sections, supporting calculations for any other hydraulic analysis done, and a copy of any supplemental survey work performed.

The electronic drawings developed for this study will be submitted in a CADD format that is suitable for translation into the District's Hydrologic Information System (HIS). The drawings will be prepared in conformance with the CADD Data Delivery Specifications portions (primarily Chapter 3 and Appendix C) of the District's HIS Data Delivery Specifications, Revision 3.1, for the following layers:

1. NDXPRJ (CP - 40)
2. PRJ (CP - 60)
3. DQ.TBL (CP - 410)
4. PRJDAT.TBL (CP - 430)
5. SPILLWAY BASELINE ROUTE SYSTEM (CP - 588)
6. SPILLWAY CROSS SECTION (CP - 590)
6. SPILLWAY ZONE (CP - 591)
8. HEC-RAS OUTPUT (CP - 599)

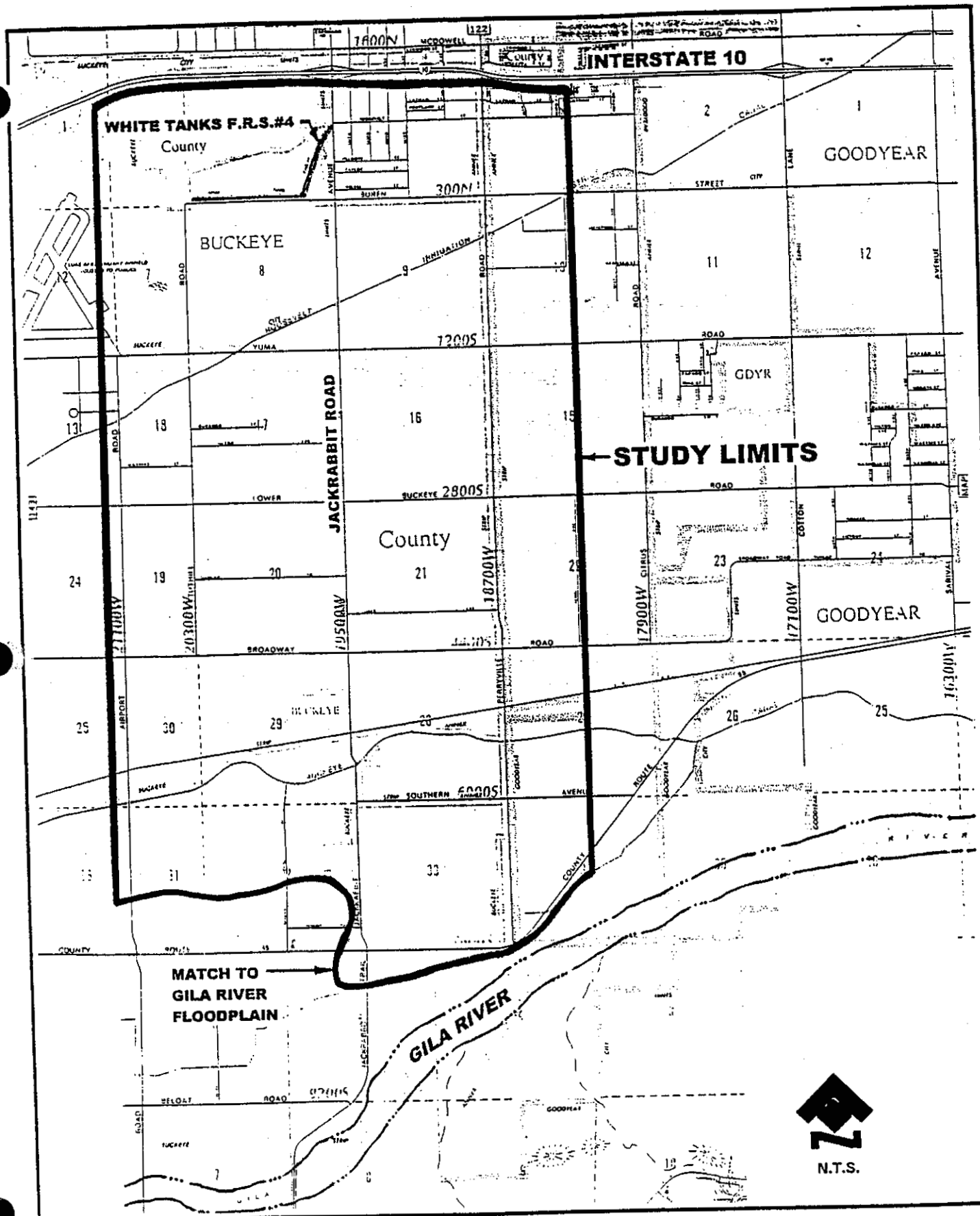
In addition to the above, any topographic data developed for this study by the consultant will also be prepared in conformance with the CADD Data Delivery Specifications portions of the District's HIS Data Delivery Specifications, Revision 3.1, for the following layers:

1. CARTOGRAPHIC FEATURES (CP - 110)
2. CORNERS (CP - 210)
3. MISCELLANEOUS CONTROL SURVEY POINTS (CP - 215)
4. STRUCTURE (CP - 360)
5. BRIDGE (CP - 608)
6. CANAL SYSTEM (CP - 610)
7. CULVERT (CP - 612)
8. FCD PROJECT FACILITY (CP - 620)
9. STREET DETAIL (CP - 660)
10. ELEVATION (LAND) (CP - 710)
11. RIVER SYSTEM (CP - 960)

The consultant is to only fill out those layers for which data is developed during the course of this study. If the consultant has data that doesn't fall into one of the above layers, the consultant shall contact the District in order to determine what to do with that data. The consultant must follow the applicable CADD specifications when developing their CADD files. The CADD files submitted by the consultant will be subject to a rigorous quality control (QC) check by District staff.

TASK C6 - DELIVERABLES

1. One set of the inundation limit exhibits (full size) on mylar sealed by the engineer.
2. 4 copies of the Final Report sealed by the engineer, inundation limit exhibits, and copies of the final HEC-RAS models on diskette.
3. All of the CADD data called for in the Final Products Section.



Hoskin
Engineering
Consultants
520 E. Portland St.
Phoenix, Az 85004
Tel. 462-5775
Fax. 462-5770

WHITE TANKS F.R.S.#4
Study Limits
EXHIBIT 'C-1'

FILE NAME: FILEDIR/ADMIN/AG PRO/ADOBE/ADOBE.DGN

2 Meeting Minutes

Hoskin Engineering Consultants, Inc.
520 E. Portland St.
Phoenix, AZ 85004
Tel. (602) 462-5775
Fax (602) 462-5770

Meeting Minutes

Date Prepared: April 6, 2000

Project: Contract FCD 98-32
Delineation of Spillway Flows for Three West Side Structures

Date: April 15, 1999

Location: Flood Control District of Maricopa County

Attendees: Tim Murphy, FCD
Hal Marron, DEI
Paul Hoskin, HEC

Purpose: Kick-off meeting to discuss project start up.

Discussion:

- Project billing shall follow a format that identifies the budgeted amount for each task, the previously billed amount and the per cent complete.
- Fee retention of 10% will be held from payments until the District agrees to release half of the amount which will occur after the 50% completion stage.
- Each of the projects, Task A, B and C will be kept separate from a billing standpoint.
- A Progress Report will be submitted with the invoice. It will be kept to one page and will summarize in a bulleted format.
- Meeting Minutes will be kept for all formal meetings but not for every visit or telephone call.
- The following record information will be of use:

  Tim Murphy
  Tel. No. (602) 506-4605 Fax (602) 506-4601
  e-mail tmm@mail.maricopa.gov

  Hal Marron
  Tel. No. (602) 954-0038 Fax (602) 944-8605
  e-mail hmarron@deipro.com

  Paul Hoskin
  Tel. No. (602) 462-5775 Fax (602) 462-5770
  e-mail hecph@aol.com

- The Corps now has HEC-RAS 2.2 with a patch fix. This should be used for the study.

- HEC-1 Version 4.1 is now available from the Corps site.
- In the HEC-RAS model, name the project as White Tanks # 4 and the profiles as 1/3, 2/3, and full discharge.
- Use the tributary option for the modeling of the two spillway discharges.
- Try and keep the final report as a single volume.
- We will review the possibility of putting the field photographs in digital form and providing on CD as a final product.
- The reports from other consultants are available if we wish to review at the District.
- When conducting the Manning's 'n' evaluation, we should keep the 'n' values on the higher end of the scale due to changes in crop coverage and the possibility of future development. The purpose of the study is not to try and fine tune the flow velocities.
- In our modeling, first try and address the current situation and then to evaluate other factors such as culvert bridges, culvert blockages and partial flow diversions.
- The CADD files from WLB are broken into separate sheets and include floodplains.
- The aerial photographs from the GIS are from two years ago.
- Land ownership information is available on the Internet. It is possible to download plat information.
- For Survey control, the ERMs from the White Tanks topographic survey will be used.
- Tim will make copies of the SCS and FCD reports for the White Tanks #4 structure as well as the design plans prepared for the Jackrabbit channel by Dibble.
- There is a project notebook for the SCS structure and this is available for review from Tom Rankley. Copies will not be made at this stage.
- Tim will be taking paternity leave starting next week and he will be gone for approximately six weeks. He may be reached at home at 334-9714.

c. Attendees

Hoskin Engineering Consultants, Inc.
520 E. Portland St.
Phoenix, AZ 85004
Tel. (602) 462-5775
Fax (602) 462-5770

Meeting Minutes

Date Prepared: August 12, 1999

Project: Contract FCD 98-32
Delineation of Spillway Flows for Three West Side Structures

Date: July 12, 1999

Location: Flood Control District of Maricopa County

Attendees: Tim Murphy, FCD
Hal Marron, DEI
Paul Hoskin, HEC

Purpose: Project Status Meeting.

Discussion:

- Base sheets will be prepared at a scale which will allow the east-west alignment to fit on a sheet 36-inches in width. Sheet breaks will occur going south.
- In the modeling of the flow which will overtop the canals and railroad, it will be assumed that the dikes will not breach.
- Tim might like to make a change in the next study from the McMicken Dam to the Adobe Dam project. Tim will get back to us with a decision and formal notification. This change might be desirable because there is likely to be less changes on the watershed than for the McMicken Dam project. The District recently selected a consultant to prepare an Area Drainage Master Plan for the watershed area downstream of McMicken Dam. Mapping for the two projects might be coordinated.
- For the Manning's 'n' evaluation, we will establish a range of values. In addition, we will establish a weighted 'n' value based upon various crop types. The effects of changes in 'n' value will be evaluated for their impact on travel time and flow depth. The range will consist of evaluating everything as fallow versus everything with crops. Aerial photographs from various times of the year will be reviewed if possible.
- Inflow to FRS #4 may be reduced by ponding that can occur on the upstream side of I-10. It will be assumed that ponding behind I-10 can occur as a level pool.

c. Attendees

Hoskin Engineering Consultants, Inc.
520 E. Portland St.
Phoenix, AZ 85004
Tel. (602) 462-5775
Fax (602) 462-5770

Meeting Minutes

Date Prepared: September 7, 1999

Project: Contract FCD 98-32
Delineation of Spillway Flows for Three West Side Structures

Date: August 24, 1999

Location: Flood Control District of Maricopa County

Attendees: Tim Murphy, FCD
Hal Marron, DEI
Paul Hoskin, HEC

Purpose: Project Status Meeting.

Discussion:

- Draft copy of Data Collection Report was submitted to Tim for review.
- Aerial Photography for the Adobe Dam area was flown on August 11, 1999. Completion of mapping is scheduled for the second week in October.
- The photographs from the field reconnaissance have been scanned into electronic format and can be provided on CD at some point in time. Not all photographs will be included in the Field Reconnaissance Report.
- Current estimates of spillway flows indicate that the west spillway will discharge approximately 2/3 of the entire flow. We will look at the impact of a 50/50 discharge and see how sensitive the results are to the discharge change.
- A weir flow analysis has been completed for areas where overtopping of the dike along Tuthill Road, along the Roosevelt Canal, and at the two spillways.
- Meetings will be held every two weeks to help keep the project on schedule.
- The HEC-RAS model will be run with a mixed flow regime to determine flow velocities. The floodplain limits will be determined using subcritical flow.
- There is a proposed development underway in an area north of the Roosevelt Canal. The engineering is being performed by David Evans & Associates. A contact there is Gary Timmerman.
- There is an area within the 100-year floodplain which may not be able to enter the FRS on the west side. Instead, the flow may bypass the structure and continue south within Tuthill Road.
- The next meeting is scheduled for September 8, 199 at 11:00 a.m.

C. Attendees

Hoskin Engineering Consultants, Inc.
520 E. Portland St.
Phoenix, AZ 85004
Tel. (602) 462-5775
Fax (602) 462-5770

Meeting Minutes

Date Prepared: September 22, 1999

Project: Contract FCD 98-32
Delineation of Spillway Flows for Three West Side Structures

Date: September 8, 1999

Location: Hoskin Engineering

Attendees: Tim Murphy, FCD
Hal Marron, DEI
Paul Hoskin, HEC

Purpose: Project Status Meeting.

Discussion:

- We should review a flow diversion which could occur at Van Buren Street and Perryville Road due to the elevation of the road. Review the magnitude and mention it in the final report
- The 100-year flow may not enter the structure on the west side. Add additional cross-sections at the point of outflow from the west spillway to help identify the potential flow breakout.
- Check the HEC-2 which was performed for the spillways by David Boggs.
- Need to determine what the PMF is for the structure and develop flow rates within that range. Check the ½ PMF flow which is listed is the report by David Boggs.
- There is a concern that even the 100-year flow may not fully enter the structure, and flow may bypass along the west spillway.
- Given a PMF flow of 18,000 cfs, and the approximate distribution of flow of 1/3 to the east spillway, and 2/3 to the west spillway, the following discharges could be considered for use in the model.

Discharge of ½ PMF	Combined Discharge (cfs)	West Spillway Discharge (cfs)	East Spillway Discharge (cfs)
Full	18,000	12,000	6,000 (use 8,000)
2/3	12,000	8,000	4,000
1/3	6,000	4,000	2,000
Additional		2,000	

- The weir coefficient which was used for the spillways was 3.0. Suggested that a weir coefficient of 2.6 be used. Hal to e-mail excel spreadsheet to Paul.
- There is going to be a HEC-RMS seminar held Sept 27, 28 & 29. Check with Chris Perry.
- Tim will e-mail the HEC-2 file for the west spillway so that the per cent of weir overflow can be estimated.
- In the Data Collection Report, include a summary of the inflow/outflow discharges and include in a separate appendix called hydrology. The Data Collection Report should include copies of relevant pages from past studies and reports.
- We will prepare an outline for the final report.
- Include a special problem section which describes the problem of the potential flow breakout near the west spillway. The spillway rating curves and analysis should be included in a separate section of the report. It should be noted that there is the potential for flow to occur down and the spillway and for there not to be any flood warning since the gages within the structure are based upon the ponding elevation behind the structure.
- There are plans for watershed development, but none has occurred at this time. Manning's 'n' will be based upon current conditions. We will establish an average 'n' value both across a cross-section and between cross-sections: ie. it is not desirable to vary the 'n' value due to local variations in roughness.
- The project schedule should allow for completion of this phase of the work by the end of the year. We should call Kenney Aerial to establish where they lie with the final map production.

C. Attendees

c. Attendees

Hoskin Engineering Consultants, Inc.
520 E. Portland St.
Phoenix, AZ 85004
Tel. (602) 462-5775
Fax (602) 462-5770

Meeting Minutes

Date Prepared: October 6, 1999

Project: Contract FCD 98-32
Delineation of Spillway Flows for Three West Side Structures

Date: September 22, 1999

Location: Hoskin Engineering

Attendees: Tim Murphy, FCD
Hal Marron, DEI
Paul Hoskin, HEC

Purpose: Project Status Meeting.

Discussion:

- Tim had a discussion with Tom Rankley at the District to discuss the potential breakout of the 100-year flow from the west spillway.
- It has been decided to use the 18,000 cfs discharge for the ½ PMF. Initially, the flows that will be modeled will be as follows:

Discharge of ½ PMF	Combined Discharge (cfs)	West Spillway Discharge (cfs)	East Spillway Discharge (cfs)
Full	18,000	12,000	6,000
2/3	12,000	8,000	4,000
1/3	6,000	4,000	2,000
Full (50/50 split)	18,000	9,000	9,000

- We will make the HEC-RAS model runs downstream to the canal and then will make a decision about the which flows to use for the final model.
- In regards to the potential breakout of the 100-year flow downstream of the west spillway, should this area be mapped as a warning to those who develop within the area?
- URS/Greiner will be the engineer responsible for preparation of the Loop 303/White Tanks ADMS update.
- A terrain model (TIN) has been produced for the study area. It was necessary to edit the topography and re-assign contour values because initial terrain models were showing errors in the computed contours. To further improve the results from

the Boss RMS produced cross-sections, one half foot contours were produced with the TIN.

- The Corps has a program called HEC-GEORAS which works within Arc/Info.
- The final mapping product is usually produced at the original mapping scale. In this case that is 1"=400'. Sheet size should be 24"x36". Half scales should be at 11"x17" for inclusion in the report. The current mapping scale which works best with the sheet size of 24"x36" is 1"=500 feet. We need to remember that a table of discharges, velocities, etc. also needs to be included on the final sheets.
- The nextt meeting is scheduled for October 6, 199 at 10:00 a.m. at HEC's office. Paul will send out an e-mail reminder of the time and place.

C. Attendees

c. Attendees

Hoskin Engineering Consultants, Inc.
520 E. Portland St.
Phoenix, AZ 85004
Tel. (602) 462-5775
Fax (602) 462-5770

Meeting Minutes

Date Prepared: October 17, 1999

Project: Contract FCD 98-32
Delineation of Spillway Flows for Three West Side Structures

Date: October 6, 1999

Location: Hoskin Engineering

Attendees: Tim Murphy, FCD
Hal Marron, DEI
Paul Hoskin, HEC

Purpose: Project Status Meeting.

Discussion:

- Aerial base maps for the Manning's 'n' report have been prepared. Photograph locations will be shown on these maps in addition to the representative cross-section locations.
- Cross-sectional information has now been provided for the west and east spillway flow areas.
- Hal volunteered to prepare a diffusion model of the area downstream of the spillways. The results will be compared with those from this study.
- HEC-RAS model will be developed for review at the next meeting.

C. Attendees

Hoskin Engineering Consultants, Inc.
520 E. Portland St.
Phoenix, AZ 85004
Tel. (602) 462-5775
Fax (602) 462-5770

Meeting Minutes

Date Prepared: November 1, 1999

Project: Contract FCD 98-32
Delineation of Spillway Flows for Three West Side Structures

Date: October 18, 1999

Location: Hoskin Engineering

Attendees: Tim Murphy, FCD
Hal Marron, DEI
Paul Hoskin, HEC

Purpose: Project Status Meeting.

Discussion:

- A range of applicable Manning's 'n' values was discussed. A lower 'n' value will be used for fallow areas. Once the HEC-RAS model is satisfactorily running, the sensitivity will be tested. The range will be established for the largest flowrate. A discussion will be included in the report about the range in flow width, depth and velocity. A value of 0.050 - 0.06 was suggested by Tim for fallow land.
- Preliminary results from the HEC-RAS model show that the flow depth is in the range of 1'-2' for the west spillway.
- An assumption will be made as to the per cent of fallow land, with a suggested value of 25%.
- It is preferred that the HEC-RAS model be continuous downstream rather than breaking at each canal or railroad crossing.
- The top of the canal should have a slight gradient to the west. The current profiles which were developed from the TIN show that the top of canal varies.
- By the next meeting we will hav the cross-sections defined downstream to the railroad. The HEC-RAS will be run from the canal upstream.
- For the Manning's 'n' report, two to three photographs will be provided for each typical vegetation type.
- Hal and I will meet next Tuesday to discuss cross-section locations.
- Next meeting will be Tuesday November2, 1999.

c. Attendees

Hoskin Engineering Consultants, Inc.
520 E. Portland St.
Phoenix, AZ 85004
Tel. (602) 462-5775
Fax (602) 462-5770

Meeting Minutes

Date Prepared: December 8, 1999

Project: Contract FCD 98-32
Delineation of Spillway Flows for Three West Side Structures

Date: November 2, 1999

Location: Hoskin Engineering

Attendees: Tim Murphy, FCD
Hal Marron, DEI
Paul Hoskin, HEC
Kristyn Van Meter, HEC

Purpose: Project Status Meeting.

Discussion:

- The methodology applied to the computation of the spillway flows was reviewed. The method applied uses an average width computed based upon the flow area divided by the maximum depth. Tim said he has a copy of an old DOS based program that can be used for an "Uneven Weir." Tim will e-mail a copy of this over.
- Cross-sections have been tentatively placed downstream of the Roosevelt Irrigation District canal. These cross-sections are spaced far apart until the final alignment is established. Experience with the cross-sections north of the RID canal showed that the alignment had to be adjusted several times in order for the flow distributions to give reasonable answers. It was proposed that the cross-sections be spaced at intervals of 1000'-1200'. Tim expressed concern over this spacing and asked that the cross-sections not exceed 1000' feet apart.
- The top of the canal bank cannot be adequately defined with the mapping data. It was suggested that field survey be requested along each of the canals and along the Southern Pacific Railroad. Approximately 14,000 feet of embankment will be shot at approximately 500 foot intervals between Perryville Road and Airport Road.
- The HEC-RAS model should check the sensitivity of the bank stations in regards to the flow distribution. This should be discussed in the final report.
- The floodplain delineation should not show where isolated islands occur.
- Downstream of the canal, Tim would like the study to resume with the 1/3, 2/3 and full discharges.
- For review at the next meeting, the 10' contours will be highlighted.
- A telephone call will be made to Kenney Aerial Mapping to determine the project's status for mapping of the Adobe Dam area.
- The 10% retainage does not need to be shown on the subconsultants invoices.

Next meeting was scheduled for Thursday November 18, 1999, but was later changed to Tuesday November 23, 1999 at the new HEC office

c. Attendees

Hoskin Engineering Consultants, Inc.
520 E. Portland St.
Phoenix, AZ 85004
Tel. (602) 462-5775
Fax (602) 462-5770

Meeting Minutes

Date Prepared: December 8, 1999

Project: Contract FCD 98-32
Delineation of Spillway Flows for Three West Side Structures

Date: November 23, 1999

Location: Hoskin Engineering

Attendees: Tim Murphy, FCD
Hal Marron, DEI
Paul Hoskin, HEC
Kristyn Van Meter, HEC

Purpose: Project Status Meeting.

Discussion:

- The HEC-RAS cross-sections downstream of the Roosevelt canal were reviewed.
- The equipment yard downstream of the east spillway will tend to have ineffective flow areas. The HEC-RAS cross-section printouts were reviewed.
- A sensitivity analysis could be performed for the flow percentages, however, this would require the models to be split into two.
- A review was made of the flow distribution charts whcih have been prepared for the east and west spillways. An area on the east spillway, just east of Jackrabbit Road, appears to have too great a flow capacity because it has a lower elevation than areas west of Jackrabbit Road. The flow block option can be used to correct this.
- A formal review submittal will be made to Tim for the areas north of the canal after field survey information is received from Project Engineering.
- DEI will prepare the HEC-RAS for the three flow areas downstream of the RID canal. HEC will finalize the flow distribution for each of the flow areas.
- Next meeting was scheduled for Thursday November 18, 1999, but was later changed to Thursday December 9, 1999 at the new DEI office.

c. Attendees

Hoskin Engineering Consultants, Inc.
520 E. Portland St.
Phoenix, AZ 85004
Tel. (602) 462-5775
Fax (602) 462-5770

Meeting Minutes

Date Prepared: December 20, 1999

Project: Contract FCD 98-32
Delineation of Spillway Flows for Three West Side Structures

Date: December 9, 1999

Location: Hoskin Engineering

Attendees: Tim Murphy, FCD
Hal Marron, DEI
Paul Hoskin, HEC
Gary Finney, Kenney Aerial Mapping

Purpose: Project Status Meeting.

Discussion:

Adobe Dam Project

- Gary Finney from Kenney Aerial Mapping brought copies of the aerial mapping for one of the areas within the Adobe Dam mapping area. Information was provided in the form of a 1"=200 feet map and also in digital form. The new mapping will be more accurate than the mapping produced for the ACDC ADMS because it was produced at a scale of 1:600 instead of 1:800. The difference should result in an improvement in accuracy of 0.2 feet +/-. The old mapping was produced using hand methods, whereas the new topography has been produced using a terrain model. A terrain model can be produced for the old mapping but this will result in a decrease in accuracy level.
- The major differences that can be observed are the result of construction changes that have occurred over the time period. As a result, it is not possible to provide a good match at the boundary between the old and new topography. In the area of mapping presented, Kenney can produce additional topography to the east if required
- The final mapping product for the entire study area will be delivered December12, 1999.
- Kenney Aerial will talk to Mark Brewer at the Flood Control District to discuss final mapping product.
- Tim took the CD with the digital files to review. The hard copy was provided to Paul.

White Tanks #4

- Paul has been in touch with Project Engineering to determine the progress of the field survey along the canals and railroad. The field work has been completed, however, they asked what datum the field data should be provided in. The topographic mapping is usually provided to NAD 1929.
- The project schedule was reviewed. There have been some delays in the project. A revised schedule was presented with final submittal of all products by March 1, 2000. The schedule of the other two projects has been adjusted sop that the three projects can be completed before the end date presented in the Scope of Work.
- The start date for the commencement of the McMicken Dam mapping will be moved to June 1, 2000.
- The flow splits were reviewed. The flows will be rounded to the nearest 100 cfs.
- Currently, there are 4 HEC-RAS models. These cannot be completed until the field survey data is available. Following that, the HEC-RAS models will be finalized and submitted to Tim for review.
- The next meeting will be December 20, 1999 at the Flood Control District at 2:00 p.m.

c. Attendees

Hoskin Engineering Consultants, Inc.
32 W. Roosevelt, St., Ste. 200
Phoenix, AZ 85003
Tel. (602) 252-8384
Fax (602) 252-8385

Meeting Minutes

Date Prepared: January 11, 2000

Project: Contract FCD 98-32
Delineation of Spillway Flows for Three West Side Structures

Date: December 20, 1999

Location: Flood Control District of Maricopa County

Attendees: Tim Murphy, FCD
Hal Marron, DEI
Paul Hoskin, HEC
Kristyn Van Meter, HEC

Purpose: Project Status Meeting.

Discussion:

- As a point of clarification, the vertical datum will be 1927 NGVD and the horizontal datum is 1983 NAD.
- Tim has been in touch with the GIS personnel in regards to the mapping of the Adobe Dam area. It will not be necessary to produce a map which has the old and new topographic files as a composite file. Since the District already has the old topography, only the new will need to be delivered.
- Hal presented the preliminary results of the HEC-RAS analysis for areas south of the RID canal. A comparison of results between using ineffective flow and flow encroachments shows a slight difference in results. The next step in the analysis will be to test the interaction of flows between each of the flow distribution areas. The flow limits will be modified to bring the water surface elevations closer to a match.
- Flow discharges will all be rounded to the nearest 100 cfs. These will be given to Hal for use in the model below the canal.
- At this stage in the HEC-RAS model, cross-sections are spaced further apart than required. Additional cross-sections will be added after the alignment and discharges appear reasonable.
- The next group meeting is scheduled for January 12, 2000. HEC and DEI will meet on January 5, 2000 to coordinate the project.
- e-mail reminders should be sent to meeting participants the day before.

c. Attendees

Hoskin Engineering Consultants, Inc.
32 W. Roosevelt, St., Ste. 200
Phoenix, AZ 85003
Tel. (602) 252-8384
Fax (602) 252-8385

Meeting Minutes

Date Prepared: January 11, 2000

Project: Contract FCD 98-32
Delineation of Spillway Flows for Three West Side Structures

Date: January 12, 2000

Location: DEI Office

Attendees: Tim Murphy, FCD
Hal Marron, DEI
Elisa Canez, DEI
Paul Hoskin, HEC
Kristyn Van Meter, HEC

Purpose: Project Status Meeting.

Discussion:

- Three different maps will be prepared to illustrate the 1/3, 2/3 and full discharges. Each map will present the water surface elevations along with detailed summary table.
- The flow and water surface elevation will be presented for each cross-section. Because of the complexity of the flow splits, in certain areas the flowrates will also be depicted with flow arrows. For GIS purposes, each cross-section will have the Q and water surface elevation attached.
- The scale of the maps is such that it is difficult to fit the final product on a standard 24"x36" sheet. The maps are currently at a scale of 1" = 500 '. We should try to either fit the maps on 30"x42" sheets or reduce the map scale. Additional splices are not desirable.
- A mapping class has been arranged for engineers working on District projects. This class will be held at the District.
- The 50/50 analysis will be provided on a separate sheet and in a separate section in the appendix. This mapping will not continue south of the canal.
- A draft submittal was made to Tim which includes the HEC-RAS analysis both upstream and downstream of the canal. Included with this submittal is a draft outline of the report including the Data Collection and Field Reconnaissance sections.
- The team will concentrate efforts on the final products while the District is conducting its review.
- The next meeting will be held at the District at 10:00 a.m. Russ Cruff will be invited to attend.

c. Attendees

Hoskin Engineering Consultants, Inc.
323 W. Roosevelt, St., Ste. 200
Phoenix, AZ 85003
Tel. (602) 252-8384
Fax (602) 252-8385

Meeting Minutes

Date Prepared: February 15, 2000

Project: Contract FCD 98-32
Delineation of Spillway Flows for Three West Side Structures

Date: January 27, 2000, 10:00 a.m.

Location: DEI Office

Attendees: Tim Murphy, FCD
Russ Cruff, FCD
Hal Marron, DEI
Elisa Canez, DEI
Paul Hoskin, HEC
Kristyn Van Meter, HEC

Purpose: Project Status Meeting.

Discussion:

- Russ Cruff of the District has completed a review of the report and HEC-RAS models which were submitted. He presented the group with his written comments.
- It was agreed that the cross-section numbering system would be changed so that the 20 mile mark is represented by the top of the spillway. The east and west spillways combine, therefore, it was agreed that the 20 mile mark would b represented by the east spillway and measured south along Jackrabbit Road. The west spillway will back into a number which may be more or less than the 20 mile mark.
- A submittal will be made to the District for the report and models at the next meeting. This submittal will focus on final products and will not include the area south of the Buckeye Canal.
- The main channel does not lie within the limits of several of the models. The HEC-RAS models will be modified so that the bank stations are represented by the limits of effective flow.
- We shall prepare an exhibit which illustrates the various flow models and discharges used in the study.
- The table which represents the flow travel time will be generated in a spreadsheet using data from HEC-RAS. The average flow velocity shall be computed based

upon a weighting across a cross-section. The travel time will be computed based upon the average velocity divided by the flow distance. Also show the maximum flow depth in the table.

- HEC-RAS output shall show headers and footers with the project titles and page numbers.
- Add descriptions to cross-sections.
- Add the name WT4 to all files.
- Add a section in the report to describe the west spillway.
- Flow going west and leaving the project area shall be shown as a "limit of study."
- The next meeting will be held at DEI at 10:30 a.m. on February 15, 2000.

c. Attendees

Hoskin Engineering Consultants, Inc.
323 W. Roosevelt, St., Ste. 200
Phoenix, AZ 85003
Tel. (602) 252-8384
Fax (602) 252-8385

Meeting Minutes

Date Prepared: March 27, 2000

Project: Contract FCD 98-32
Delineation of Spillway Flows for Three West Side Structures

Date: February 15, 2000, 10:00 a.m.

Location: DEI Office

Attendees: Tim Murphy, FCD
Russ Cruff, FCD
Hal Marron, DEI
Elisa Canez, DEI
Paul Hoskin, HEC
Kristyn Van Meter, HEC

Purpose: Project Status Meeting.

Discussion:

- Meeting was held to discuss the steps to be taken to allow for a draft submittal of the floodplain maps and report.
- The next meeting was scheduled for February 22, 2000 at the Flood Control District at 3:00 p.m.

c. Attendees

Hoskin Engineering Consultants, Inc.
323 W. Roosevelt St., Ste. 200
Phoenix, AZ 85003
Tel. (602) 252-8384
Fax (602) 252-8385

Meeting Minutes

Date Prepared: March 27, 2000

Project: Contract FCD 98-32
Delineation of Spillway Flows for Three West Side Structures

Date: February 15, 2000, 2:00 p.m.

Location: Flood Control District

Attendees: Tim Murphy, FCD
Paul Hoskin, HEC
Kristyn Van Meter, HEC

Purpose: Project Status Meeting.

Discussion:

- A meeting was held as a part of the draft report submittal. A meeting was held the previous day with DEI staff for the submittal of the draft floodplain maps. The submittal covers study area from the dam downstream to the Buckeye Canal. The study area below the Buckeye Canal has not yet been studied, awaiting the results of the canal overtopping analysis.
- It was agreed that the proposed HEC-RAS cross-sections downstream of the Buckeye Canal would be submitted to Tim for review the following Monday, February 28, 2000.

c. Attendees

WHITE TANKS
FLOOD RETARDING STRUCTURE #4
SPILLWAY DELINEATION STUDY
(FCD 98-32)

APPENDIX B: DATA COLLECTION

White Tanks
Flood Retarding Structure #4
Spillway Delineation Study

Appendix B: Data Collection

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Figure B-1: Existing Facilities Map

Field Survey Notes

White Tanks/Agua Fria ADMS Elevation Reference Marks

Jackrabbit Trail Channel Calculations
  Channel Sections
  Rating Curve, Sta 19+31 to 28+00
  Rating Curve, Sta 29+00 to 37+00

Spillway Details
  Weir Calculations
  Weir Sections

1 Introduction

The data collection phase of the spillway delineation includes identifying known floodplain locations, collecting hydrologic and hydraulic data used in the design of the Flood Retarding Structure, and collecting information regarding the design of existing structures within the study area. The purpose of this Data Collection Report is to describe the data gathering process and to present the findings. Results from this report are used in later phases of the study.

2 Methods of Data Collection

2.1 Existing Studies

Existing studies and "as-built" plan sets were researched for the FRS, Interstate 10, existing upstream structures, and for contributing areas within the watershed. The Plan Set Bibliography provides a list of available studies, reports, study references, and plan sets. Information was found to be available from the District, the Arizona Department of Transportation (ADOT), the United States Department of Agriculture, Soil Conservation Service (SCS), the Roosevelt Irrigation District, and several engineering firms.

2.2 Field Reconnaissance

A field reconnaissance was conducted to investigate the existing FRS, upstream structures which direct drainage to the FRS, and the downstream area which could potentially be affected by any spillway flows. Results from the field reconnaissance phase of the study are included in Appendix C.

2.3 Field Survey

During the course of the study, it was determined that the existing topographic mapping does not provide sufficiently detailed information for the evaluation of overtopping of the Roosevelt and Buckeye canals, and the Southern Pacific Railroad. Detailed field survey was obtained by Project Engineering Consultants, Inc., for each of these structures. Field elevations were obtained at approximately 500-foot intervals along the top of each embankment. This information was used in the HEC-RAS models developed for this study. Survey notes from Project Engineering Consultants are included in

3 Previously Completed Studies

The studies containing hydrologic and hydraulic analysis of the White Tanks #4 FRS are as follows:

White Tanks/Agua Fria Area Drainage Master Study. This study provides hydrology for the entire White Tanks study area, identifies and delineates 100-year floodplain limits, and proposes structural solutions to improve areas identified as being subject to flooding. Hydrology for this area was prepared using the HEC-1 model. Detailed 1 inch = 200 feet, 2-foot contour interval mapping was produced. This mapping forms a basis for the floodplain delineation mapping presented in this report.

Hydrologic and Hydraulic Analysis of White Tanks #4 FRS Spillway for the 1/2 Probable Maximum Flood. This report summarizes the results from a hydrologic and hydraulic investigation performed by the District. The report includes a HEC-1 analysis which was prepared using the ½ Probable Maximum Precipitation (PMP) to

model the ½ Probable Maximum Flood (PMF). The study evaluates the current water shed which contributes to the FRS, and the effect that Interstate 10 has on diverting flows to the east. The ½ PMP is routed through the basin, and the attenuated flow is routed over the two spillways and the maximum flood depth estimated.

Proposal for Rehabilitation, White Tank Mountains Flood Retarding Structures #3 and #4, Maricopa, County, Arizona. This report contains copies of correspondence from several independent reports conducted from the time the structure was first conceived until the date of the report. Included is a copy of the engineering report prepared ion 1953 and the Work Plan dated April 1954. The report acknowledges that records from the original design are no longer available. However, the original structure was designed for a contributing watershed substantially less than that that exists under present conditions. The current watershed was estimated by the District to be 20.25 square miles. Pertinent design information is noted as follows:

Dam Crest Elevation	1056
Max Water Surface Elevation	1053
Spillway Elevation	1050

Included in an appendix is a Hydrologic Study conducted in 1983 by the District. This study concluded that the FRS would be overtopped by the PMF and that the ½ PMF would overtop by 0.34 feet if the reservoir was full. The ½ PMF was noted as 16, 990 cfs.

The effects of subsidence were noted to have lowered the top of the dam by approximately 0.6 feet. The report concludes that the FRS would need to be raised in order to safely convey the ½ PMF without overtopping.

Conceptual Design Report and *Final Design and Quantity Calculations for White Tanks Flood Retention Structure No. 4 Inlet Improvement FCD 92-38*. The Conceptual Design Report identifies channel design parameters, reviews various types of channel lining and configuration, and provides an economic evaluation. A HEC-2 analysis is included for both the existing and proposed design configurations. The design discharge is shown to be 2206 cfs, although when including for design freeboard, it can be shown that the channel has a significantly greater capacity.

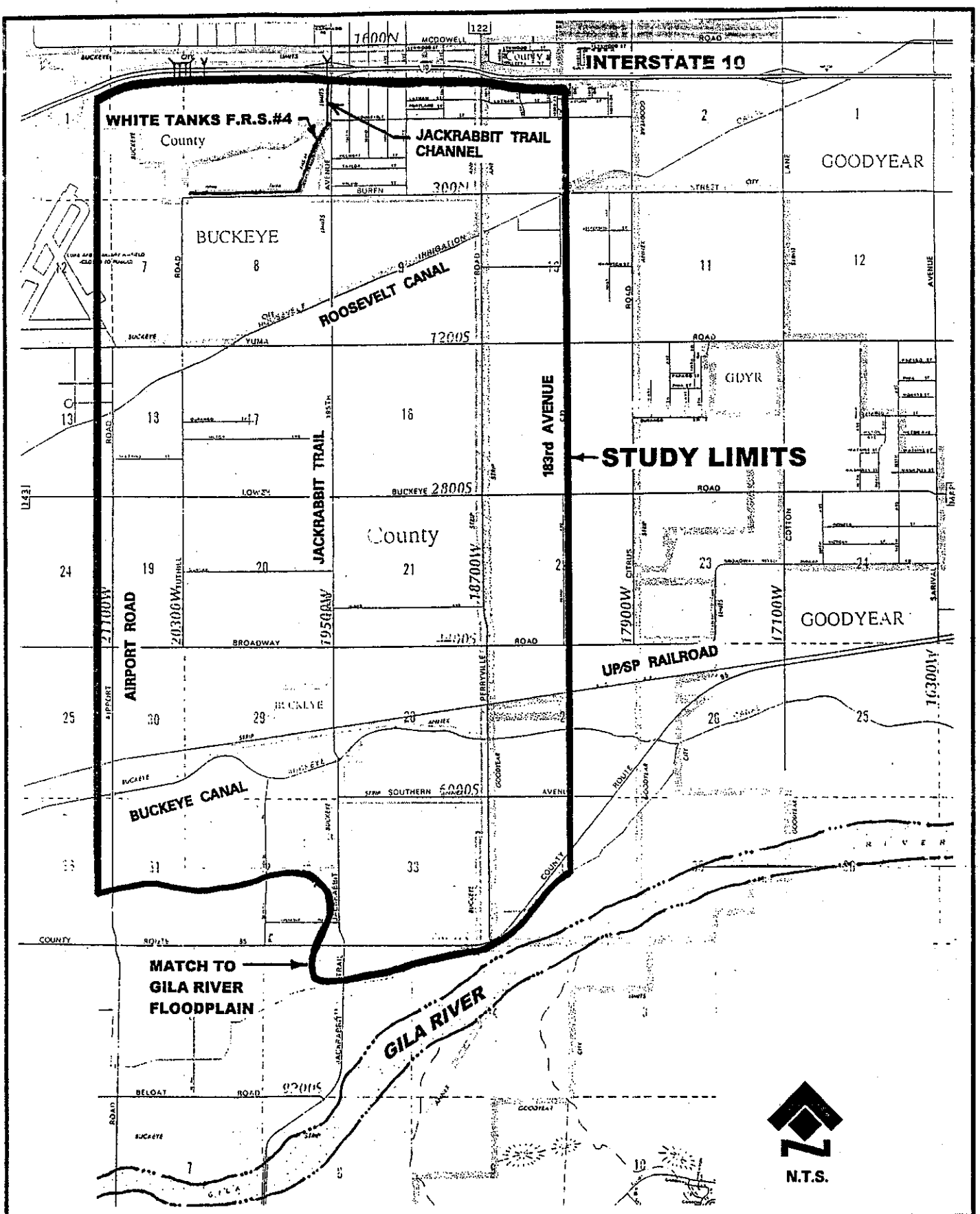
The Final Design and Quantity Calculations Report provides the final design parameters and calculations.

4 Existing Facilities

Major existing regional drainage facilities within the study area include the White Tanks FRS #4, the Buckeye Canal, the Roosevelt Canal, the Union Pacific/Southern Pacific Railroad, and the Jackrabbit Trail channel. The sizes of culverts, channels, and storm drains were determined using as-built plans or field survey data. Locations of each of the listed existing facilities are illustrated on Figure B-1. Brief descriptions of the major existing drainage facilities follow:

4.1 White Tanks Flood Retarding Structure #4

The White Tanks FRS #4 is located south of Interstate 10 between Tuthill Road and Jackrabbit Trail. This structure was designed by the Soil Conservation



Hoskin Engineering Consultants
520 E. Portland St.
Phoenix, Az 85004
Tel. 462-5775
Fax. 462-5770

WHITE TANKS F.R.S.#4
EXISTING FACILITIES MAP
FIGURE B-1

FILE NAME: fig2.dgn

Service in 1954 to protect farmland and irrigation structures from runoff generated by a 10 square mile area in the eastern portion of the White Tanks watershed (Ref. 7). Data collected for the FRS #4 includes design reports and hydrologic and hydraulic studies, provided by several agencies. See the Appendix for specific agencies.

A report prepared by the District, entitled *Hydrologic and Hydraulic Analysis of White Tanks #4 F.R.S. Spillway for the ½Probable Maximum Flood* (Ref. 2) gives the top of dam embankment elevation as between 1055.2 and 1056.3 feet, and provides the following information on the spillway sizes:

Table 1: White Tanks F.R.S. #4 Spillway Sizes

	West Spillway	East Spillway
Bottom Width (ft)	151.6	130.0
Top Width (ft)	227.2	210.0
Height* (ft)	5.5	5.3
Elevation	1048.7	1049.4

** Spillway height defined as the elevation difference between the spillway crest and the top of dam embankment elevation.*

Topographic mapping from the White Tanks ADMP was used to evaluate the spillway crest elevation and spillway width. Information obtained from the topographic mapping appears consistent with that presented in the District report. The spillway width for the west structure varies greatly in width as flow depths increase above the natural grades, which provides confinement on its west bank. Weir flow calculations are included in the appendix.

4.2 Roosevelt Canal

The Roosevelt Canal crosses through the northern portion of the study area. The canal is elevated above grade in many locations and thus interrupts the natural drainage flow patterns. Ponding occurs behind the canal as represented on the Flood Insurance Rate Maps. This canal is under the jurisdiction of the Roosevelt Irrigation District. A field survey was conducted to obtain the top of canal grades at 500-foot intervals.

4.3 Buckeye Canal

The Buckeye Canal crosses through the southern portion of the study area. Like the Roosevelt canal, the Buckeye canal interrupts the natural drainage flow patterns. This channel is under the jurisdiction of the Town of Buckeye. A field survey was conducted to obtain the top of canal grades at 500-foot intervals.

4.4 Jackrabbit Trail Channel

The Jackrabbit Trail channel was recently completed along the west side of Jackrabbit Trail from Roosevelt Street to McDowell Road. Data collected for this channel includes design reports, and construction plans.

Design information from the *Final Design and Quantity Calculations for White Tanks No. 4 FRS Inlet Improvements* (Ref. 4) indicates that the Jackrabbit Trail channel was designed for 2206 cfs. To verify this design flow, rating curves were created for two cross-sections (29+00 and 19+31) using information provided in this design report and on the construction plans. These calculations, which are included in this appendix, verify that the Jackrabbit Trail channel has the capacity to handle

the 100-year design flow of 2206 cfs. Additionally, the full-channel capacity, including all available freeboard, was calculated at each cross-section. At Station 19+31, the capacity was computed to be 6078 cfs, and at Station 29+00 to be 4458 cfs.

4.5 Interstate 10

Interstate 10 crossed the contributing watershed for White Tanks FRS #4. The freeway presents an obstruction to flow which used to flow directly into the FRS. Flow is now diverted through either culverts at the Tuthill Road alignment, or through the Jackrabbit Channel

5 Proposed Facilities

The Town of Buckeye currently has no proposed public works facilities in the planning, engineering, or review stages within the study area.

6 References

1. WLB Group, *White Tanks/Agua Fria Area Drainage Master Study*, December, 1989.
2. Flood Control District of Maricopa County, *Hydrologic and Hydraulic Analysis of White Tanks #4 FRS Spillway for the ½ Probable Maximum Flood and Annexes*, July 8, 1993.
3. United States Department of Agriculture, Soil Conservation Service, *Proposal for Rehabilitation, White Tank Mountains Flood Retarding Structures #3 and #4, Maricopa, County, Arizona*, November, 1991.
4. Dibble & Associates Consulting Engineers, *Conceptual Design Repot and Final Design and Quantity Calculations for White Tanks Flood Retarding Structure No.4 Inlet Improvements FCD 92-38*, July 29, 1993.
5. Flood Control District of Maricopa County, *Annexes to the Hydrologic and Hydraulic Analysis if White Tanks #4 F.R.S. Spillway*, July 8, 1993.
6. Flood Control District of Maricopa County, *Consultant Guideline*, October 1, 1998.
7. Flood Control District of Maricopa County, *Delineation of Spillway Flow for Three West Side Structures, Contract FCD 98-32*, March 22, 1999.
8. United States Army Engineer District, Los Angeles Corp of Engineers, *Adobe Dam Design Memorandum No.3, General Design Memorandum Phase II, Project Design Part 2*, April 1979.

7 Plan Set Bibliography

AGK Engineers, White Tanks F.R.S. No.4, *Breach Location No.1*, Plate 4, *Breach Location No.2*, Plate 5, and *Breach Location No.3*, Plate 6, January, 1991.

Arizona Department of Transportation, Highways Division, *Plan and Profile of Proposed State Highway, Ehrenberg-Phoenix, Maricopa County, I-10-2 (31)*, As-Builts October 26, 1977.

Dibble &Associates Consulting Engineers, *White Tanks #4 F.R.S. Inlet Improvements*, Construction Plans - Roosevelt Street to McDowell Road, 17 Sheets, January 13, 1998.

Federal Emergency Management Agency, *Flood Insurance Rate Map for Maricopa County, Arizona, and Incorporated Areas*: Map Number 04013C2035F, September 30, 1995; Map Number 04013C2045F, September 30, 1995; Map Number 04013C2055E, September 30, 1995; Map Number 04013C2065F, September 30, 1995; Map Number 04013C2510E, September 4, 1991; Map Number 04013C2530E, September 4, 1991.

Flood Control District of Maricopa County, *Maricopa County, Arizona 1996-8 Aerial Photography*, CD-23 and CD-24, December 1996 to January 1998.

Flood Control District of Maricopa County, *White Tanks #3 & #4 F.R.S., Fencing Plans*, August 26, 1982.

Municipal Water Conservation District No.1, *White Tanks Erosion Control Project*, Sheets 1-2, 4, and 16-17, October 1952.

United States Department of Agriculture, Soil Conservation Service, *White Tanks Erosion Control Project*, Structural Details for Outlets K, L, M, N, and O, October 1952.

United States Department of Agriculture, Soil Conservation Service, *White Tanks FRS Subsidence Survey*, September 1986.

United States Geological Survey, Perryville Quadrangle, Photorevised 1982.

WLB Group, *White Tanks/Agua Fria Area Drainage Master Study, Floodplain Map*, Sheets 1-41, 47A-48, 52-53, 57-58, and 62-64, December 1989.

Field Survey Notes

TRANSMITTAL

PROJECT ENGINEERING CONSULTANTS, LTD.
ENGINEERS • PLANNERS • SURVEYORS

TO: Hoskin Enginering Consultants, Inc.	DATE: 12/16/99
~~520 E. Portland~~ 323 W Roosevelt, Suite 200	JOB NO.: 99007
Phoenix, Arizona ~~85004~~	RE: Buckeye
ATTN: Paul	FROM: Chuck Gardiner

THE FOLLOWING ITEMS ARE TRANSMITTED:

■ Herewith ☐ Under Separate Cover

1 Computer Disk w/files
1 Copy of Survey Notes

THE ABOVE ITEMS ARE SUBMITTED:

☐ Per Your Request
☐ For Review
☐ For Recording
☐ For Approval
☐ For Your Use
☐ For Your Signature
☐ Resubmit For Approval
☐ For Bid
☐ For Your Records

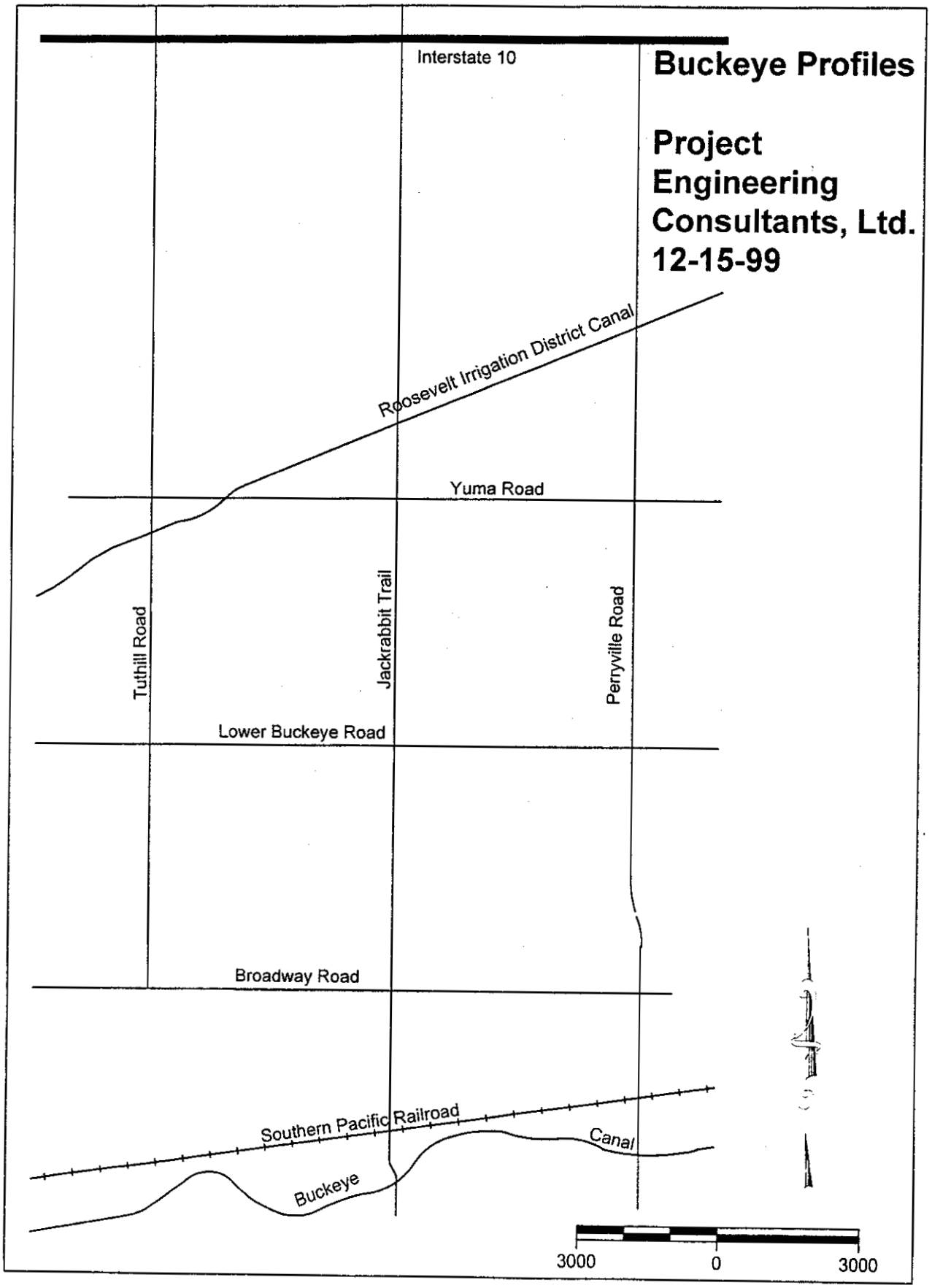
REMARKS:

Have been unable to get the necessary basis of datum from the County, so I'm including 2 sets of datum for your use. One set of datum is on NAD27 SPC (based on U.S. Foot) and the other set of datum is NAD83 SPC (based on the International Foot). The vertical datum for both sets of data is NGVD29. The conversion from NGVD29 to NAVD88 is +2.096'. If you have any questions, please call.

COPY TO:_____

Signed _____

2320 W. Peoria Avenue, Suite C-122, Phoenix, Arizona 85029 (602) 906-1901 FAX (602) 906-3080


Buckeye Profiles
Project Engineering Consultants, Ltd.
12-15-99
Interstate 10
Roosevelt Irrigation District Canal
Yuma Road
Tuthill Road
Jackrabbit Trail
Perryville Road
Lower Buckeye Road
Broadway Road
Southern Pacific Railroad
Canal
Buckeye
3000
0
3000

STA	PT No	TIME ON	TIME OFF	HT.	EPOCHS
BASE 3	101	8:01	1:22	1.559	
BASE 2	100	8:20	1:31	1.825	
ROVER	44	9:16	9:27	2.034	120
	475	9:35	9:36	"	12
	1000	9:43	9:44	"	"
	1001	9:48	9:49	"	"
	1002	9:52	9:53	"	"
	1003	9:56	9:57	"	"
	1004	10:00	10:01	"	"
	1005	10:04	10:05	"	"
	1006	10:06	10:07	"	"
	1007	10:09	10:10	"	"
	1008	10:12	10:13	"	"
	1009	10:15	10:16	"	"
	1010	10:18	10:19	"	"
	45	10:25	10:26	"	"
	1011	10:29	10:30	"	"
	1012	10:31	10:32	"	"
	1013	10:36	10:37	"	"
	1014	10:39	10:40	"	"
	1015	10:42	10:43	"	"
	1016	10:45	10:46	"	"

GPS OBSERVATIONS

Remarks

SESSION "A" 11/30/99

"Jack" FD BC @ I-10 + JACKRABBIT (EAST BANK)

"Lane" FD BC @ I-10 + COTTON LN (WEST BANK)

FD. PK ⌀ @ EAST MEDIAN ON PERRIVILLE RD. BRIDGE

FD BC ON HEADWALL @ N.W. COR OF PERRIVILLE RD. BRIDGE

NORTH BANK OF ROOSEVELT CANAL (2 ft.± from edge)

SET PK ⌀ @

NORTH BANK OF ROOSEVELT CANAL (2 ft.± from edge)

STA	PT NO	TIME ON	TIME OFF	HT.	EPOCHS
ROVER	1017	10:50	10:51	2.034	12
	1018	10:53	10:54	"	"
	1019	10:56	10:57	"	"
	1020	10:58	10:59	"	"
	1021	11:01	11:02	"	"
	46	11:06	11:07	"	"
	1022	11:09	11:10	"	"
	1023	11:12	11:13	"	"
	1024	11:14	11:15	"	"
	1025	11:17	11:18	"	"
	1026	11:20	11:21	"	"
	47	11:26	11:27	"	"
	213	11:50	11:51	"	"
	103	12:54	1:04	"	120

NORTH BANK OF CANAL PROFILE (2 ft.± from edge)
"
"
"
"

FD ½" REBAR W/ CAP "K-WEST RLS# 17600
NORTH BANK OF ROOSEVELT CANAL (2 ft.± from edge)
"
"
"
"

SET ½" REBAR @ N.E. COR CANAL & AIRPORT RD.
FD "213 X 24" BC IN HEADWALL ELEV. 991.04
FD AL-CAP IN CONC. "TON" ON NORTH SIDE OF MC-85

STA	PT No	TIME ON	TIME OFF	HT.	EPOCHS
BASE 2	100	8:10	1:52	1.710	
BASE 3	101	8:23	1:42	1.580	
Rover	4264	9:09	9:19	2.034	120
	1027	10:20	10:21	"	12
	1028	10:26	10:27	"	"
	1029	10:31	10:32	"	"
	1030	10:34	10:35	"	"
	1031	10:38	10:39	"	"
	1032	10:42	10:43	"	"
	1033	10:46	10:47	"	"
	1034	10:55	10:56	"	"
	1035	10:58	10:59	"	"
	1036	11:02	11:03	"	"
	1037	11:06	11:07	"	"
	1038	11:10	11:11	"	"
	1039	11:13	11:14	"	"
	1040	11:17	11:18	"	"
	1041	11:20	11:21	"	"
	1042	11:23	11:24	"	"
	1043	11:28	11:29	"	"
	1044	11:31	11:32	"	"
	1045	11:34	11:35	"	"
	1046	11:37	11:38	"	"

Remark's Session "B" 12/01/99

"LANE"

"Jack"

FD. BC HII @ LOWER BUCKEYE + JACKRABBIT RD.

NORTH RAIL OF SOUTHERN PACIFIC TRACK

STA	PT NO	TIME ON	TIME OFF	HT.	EPOCHS	
ROVER	1047	11:43	11:44	2.034	12	NORTH RAIL OF SOUTHERN PACIFIC TRACK
	1048	11:46	11:47	"	"	"
	1049	11:49	11:50	"	"	"
	1050	11:52	11:53	"	"	"
	1051	11:55	11:56	"	"	"
	1052	11:59	12:00	"	"	"
	1053	12:03	12:04	"	"	"
	1054	12:06	12:07	"	"	"
	1055	12:09	12:10	"	"	"
	1056	12:12	12:13	"	"	"
	1057	12:15	12:16	"	"	"
	48	12:18	12:19	"	"	"
	49	12:26	12:27	"	"	SET PK ⌖ @ AIRPORT RD + SOUTHERN PACIFIC RRT.
	1058	12:29	12:30	"	"	SET PK ⌖ @ AIRPORT RD + BUCKEYE CANAL ~~DRIVE~~
	1059	12:32	12:33	"	"	NORTH BANK OF BUCKEY CANAL (2ft.± from edge)
	1060	12:35	12:36	"	"	"
	1061	12:37	12:38	"	"	"
	1062	12:39	12:40	"	"	"
	1063	12:42	12:43	"	"	"
	1064	12:44	12:45	"	"	"
	1065	12:46	12:47	"	"	"
	1066	12:48	12:49	"	"	"
	1067	12:50	12:51	"	"	"

STA	PT No	TIME ON	TIME OFF	HT.	EPOCHS
ROVER	1068	12:53	12:54	2.034	12
	1069	12:55	12:56	"	"
	1070	12:57	12:58	"	"
	1071	1:00	1:01	"	"
	1072	1:02	1:03	"	"
	1073	1:04	1:05	"	"
	1074	1:08	1:09	"	"
	50	1:13	1:23	"	120

NORTH BANK OF BUCKEYE CANAL (25ft from edge)

"

"

"

"

"

"

"

SET PK ⊕ JACKRABBIT RD. & BUCKEYE CANAL BRIDGE

STA	PT NO	TIME ON	TIME OFF	HT.	EPOCHS
BASE 3	101	8:02	9:05	1.562	
BASE 2	100	8:14	9:15	1.622	
ROVER	4264	8:34	8:44	2.034	120
	~~1075~~			"	"
	— BATTERY FAILURE —				

Remark's SESSION "C" 12/02/99

"JACK"

"LANE"

FD BCHM @ LOWER BUCKEYE RD + JACKRABBIT RD

NORTH BANK OF BUCKEYE CANAL (2ft. ± from edge)

STA.	#	TIME ON	TIME OFF	HT.	EPOCHS
BASE 3	101	8:04	10:09	1.583	
BASE 2	100	8:15	10:17	1.731	
ROVER	4264	8:36	8:46	2.034	120
	1075	8:56	8:57	"	12
	1076	8:59	9:00	"	"
	1077	9:01	9:02	"	"
	1078	9:03	9:04	"	"
	1079	9:05	9:06	"	"
	1080	9:07	9:08	"	"
	1081	9:09	9:10	"	"
	1082	9:11	9:12	"	"
	1083	9:13	9:14	"	"
	1084	9:15	9:16	"	"
	1085	9:18	9:19	"	"
	1086	9:20	9:21	"	"
	1087	9:22	9:23	"	"
	1088	9:26	9:27	"	"
	1089	9:28	9:29	"	"
	51	9:38	9:48	"	120

Remark's SESSION "C" 12/03/99

"JACK"

"LANE"

FD. BCHH @ JACKRABBIT + LOWER BUCKEYE

NORTH BANK OF BUCKEYE CANAL (2 ft.± from edge)

SET ½" Rebar @ NORTH BANK + INT. OF 4, 12" PIPES CROSSING BUCKEYE CANAL (Rebar FLUSH w/ ground)

White Tanks/Agua Fria ADMS Elevation Reference Marks

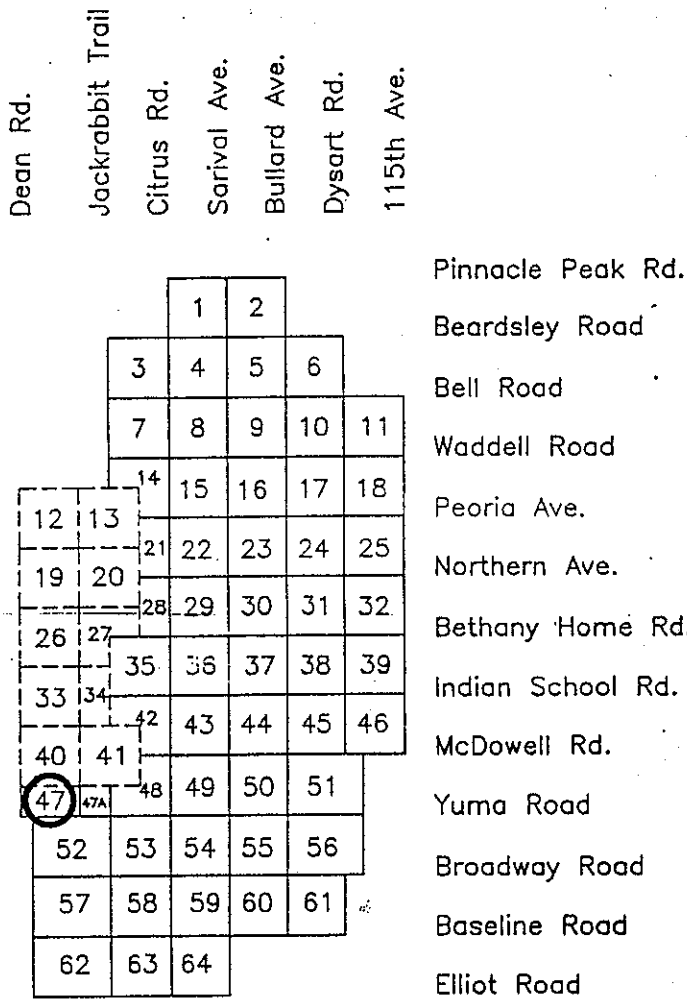
REA

LIMITS

RM No. 208
ELEV. =1044.61

REFERENCE MARKS (RM'S)

NO.	ELEVATION	DESCRIPTION
206	1098.20	Top of 'T' Post Near Section Corner ±4' Underground, Dean Rd. and Van Buren St.
207	1055.81	Stone at the S.E. Corner of Sec 1.
208	1044.61	Cotton Picker Spindel in Power Pole Southeast Corner of Intersection of Tuthill Rd. and Van Buren St.
224	1037.75	Top of AT&T Warning Pole ±75' Southeast of Intersection of Dean Rd. and Yuma Rd.
226	1006.24	3/8' Iron Pin in Pothole, Tuthill Rd. and Yuma Rd.



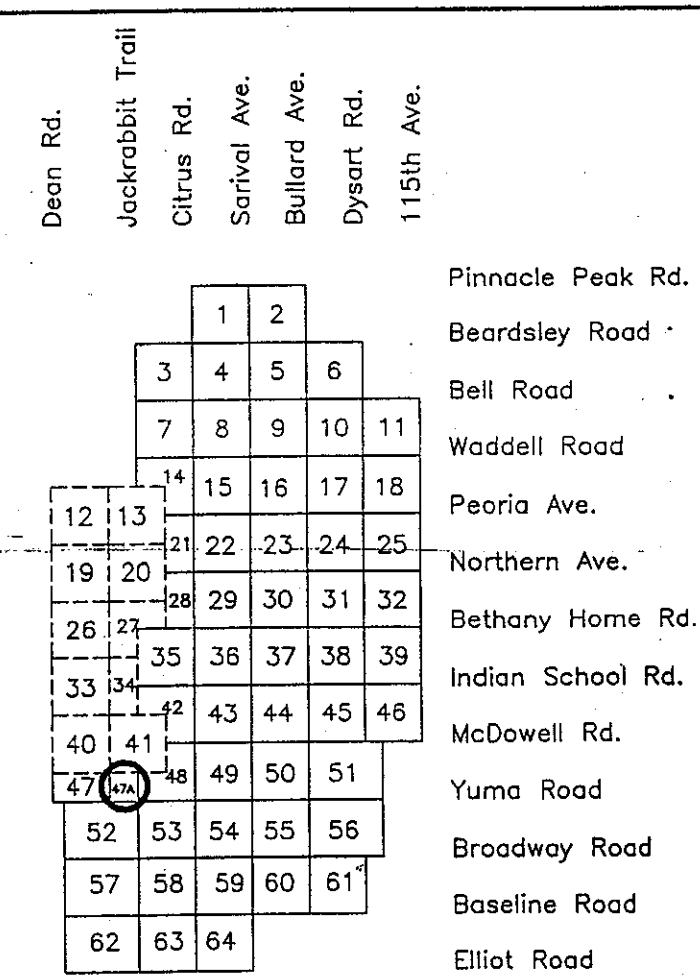
INDEX MAP

N

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO. 15594
MARK T. GAVAN
Date Signed 10-27-92
ARIZONA, U.S.A.

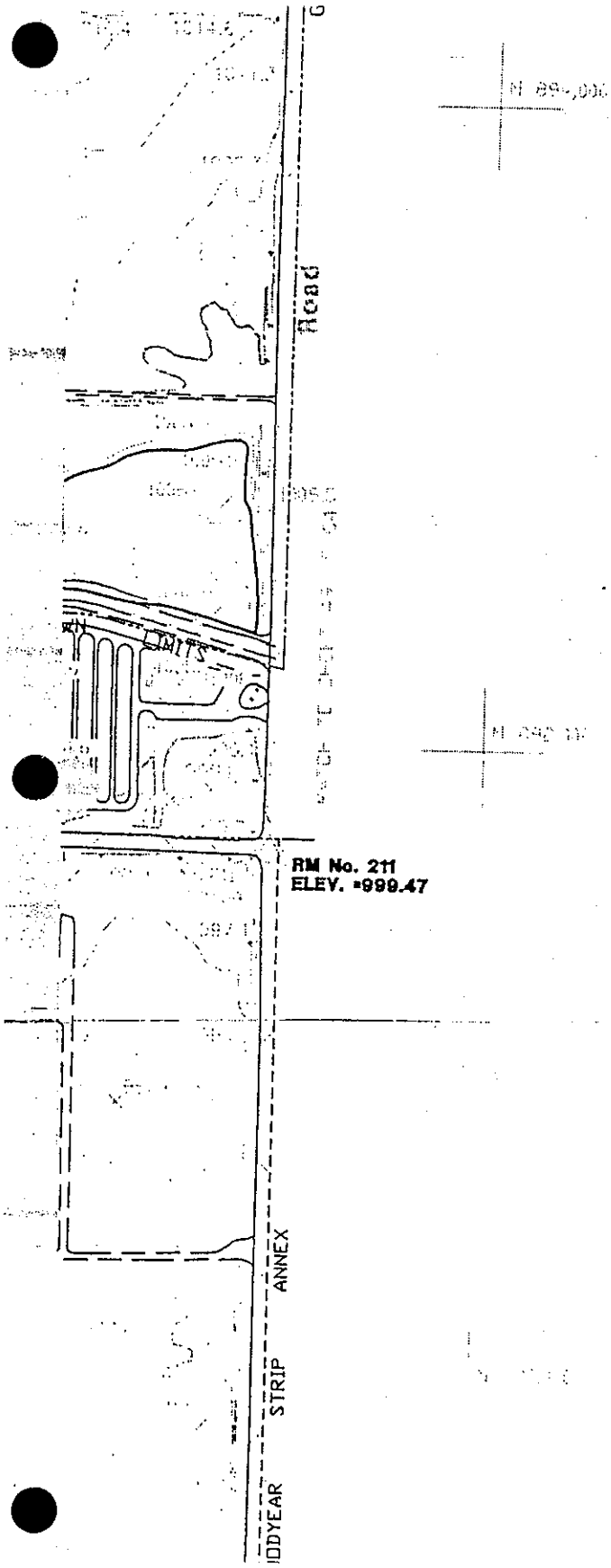
REFERENCE MARKS (RM'S)

NO.	ELEVATION	DESCRIPTION
208	1044.61	Cotton Picker Spindel in Power Pole Southeast Corner of Intersection of Tuthill Rd. and Van Buren St.
209	1030.91	1/2" Open Pipe in Hand Hole, Jackrabbit Trail and Van Buren St.
226	1006.24	3/8" Iron Pin in Pothole, Tuthill Rd. and Yuma Rd.



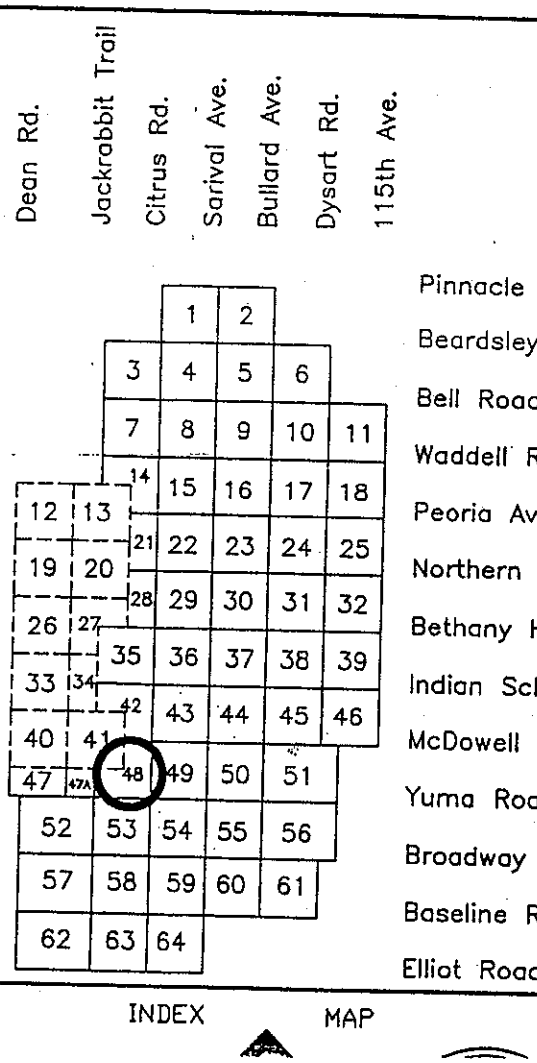
INDEX MAP

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
15594
MARK T

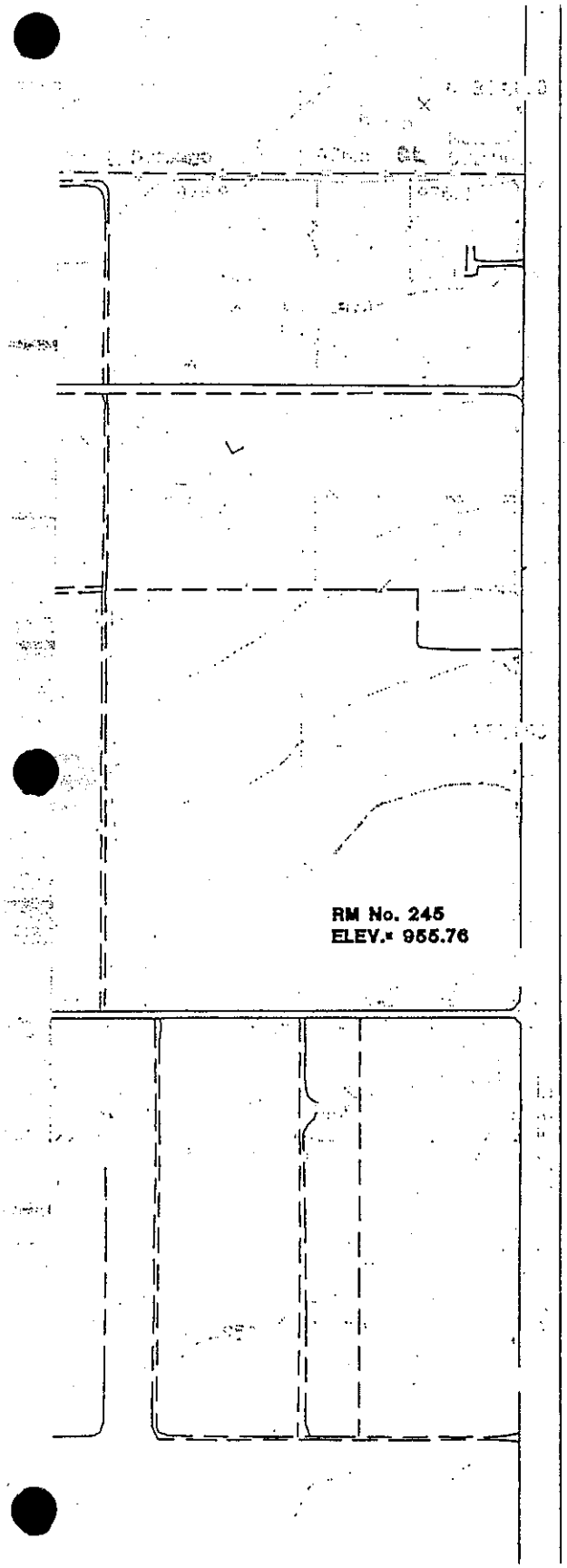


REFERENCE MARKS (RM'S)

NO.	ELEVATION	DESCRIPTION
191	1051.34	Brass Cap in Hand Hole, Perryville Rd. and McDowell R
192	1028.06	Brass Cap in Hand Hole, Citr Rd. and McDowell Rd.
209	1030.91	1/2" Open Pipe in Hand Hole, Jackrabbit Trail and Van Buren St.
210	1012.47	Brass Cap in Hand Hole, Perryville Rd. and Van Buren
211	999.47	Brass Cap in Hand Hole, Citru Rd. and Van Buren St.
227	989.03	3/4" Rod in Hand Hole, Jackrabbit Trail and Yuma Rc
228	977.97	Brass Cap in Hand Hole, Perryville Rd. and Yuma Rd.
229	973.87	Brass Cap in Hand Hole, Citru Rd. and Yuma Rd.

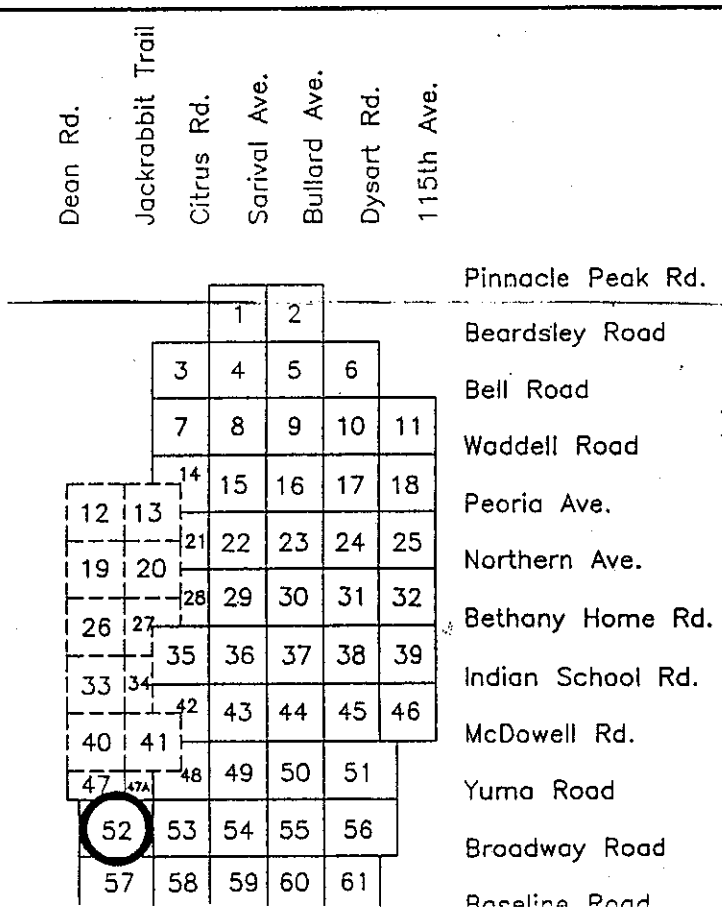


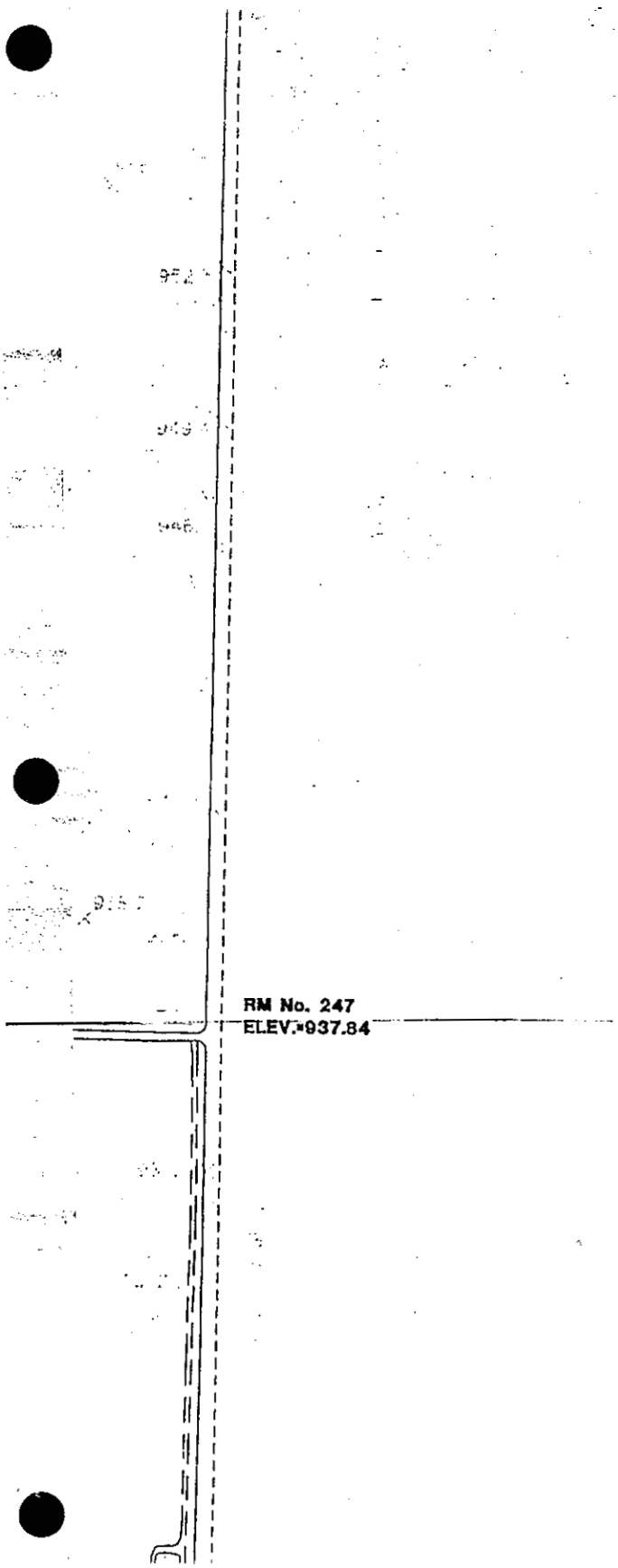
INDEX MAP



REFERENCE MARKS (RM'S)

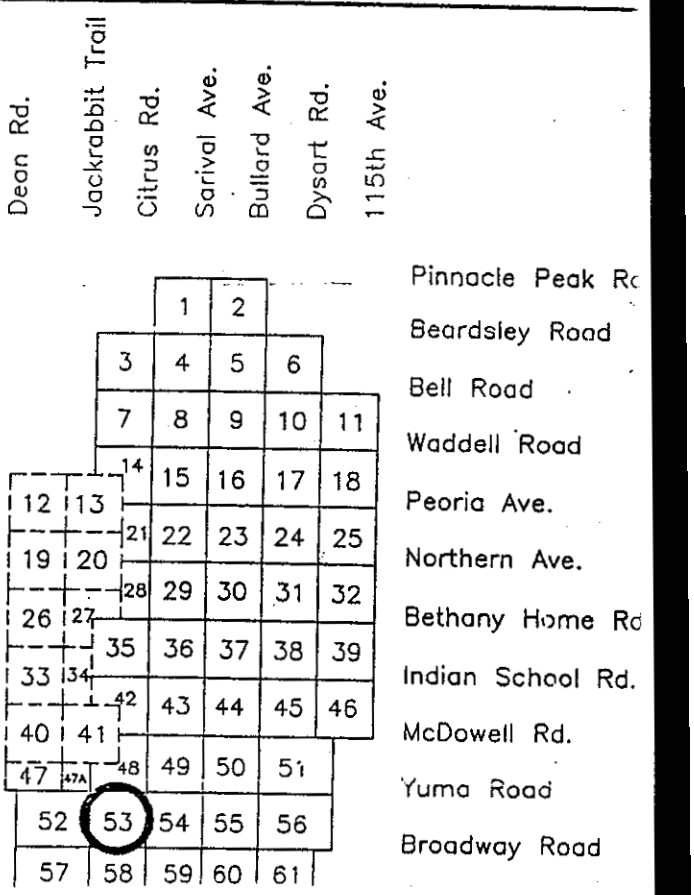
NO.	ELEVATION	DESCRIPTION
224	1037.75	Top of AT&T Warning Pole ±75' Southeast of Intersection of Dean Rd. and Yuma Rd.
226	1006.24	3/8" Iron Pin in Pothole, Tuthill Rd. and Yuma Rd.
227	989.03	3/4" Rod in Hand Hole, Jackrabbit Trail and Yuma Rd.
242	990.31	Brass Cap in Hand Hole, Dean Rd. and Lower Buckeye Rd.
243	974.19	Brass Cap in Hand Hole, Airport Rd. and Lower Buckeye Rd.
245	955.76	Rod in Concrete in Hand Hole, Jackrabbit Tr. and Lower Buckeye Rd.
260	940.96	Rod in Concrete in Hand Hole, Dean Rd. and Broadway Rd.
261	930.65	1/2" Rebar in Hand Hole, Airport Rd. and Broadway Rd.
262	925.51	Rod in Concrete in Hand Hole, Tuthill Rd. and Broadway Rd.
263	916.67	Rod in Concrete in Hand Hole, Jackrabbit Trail and Broadway Rd.

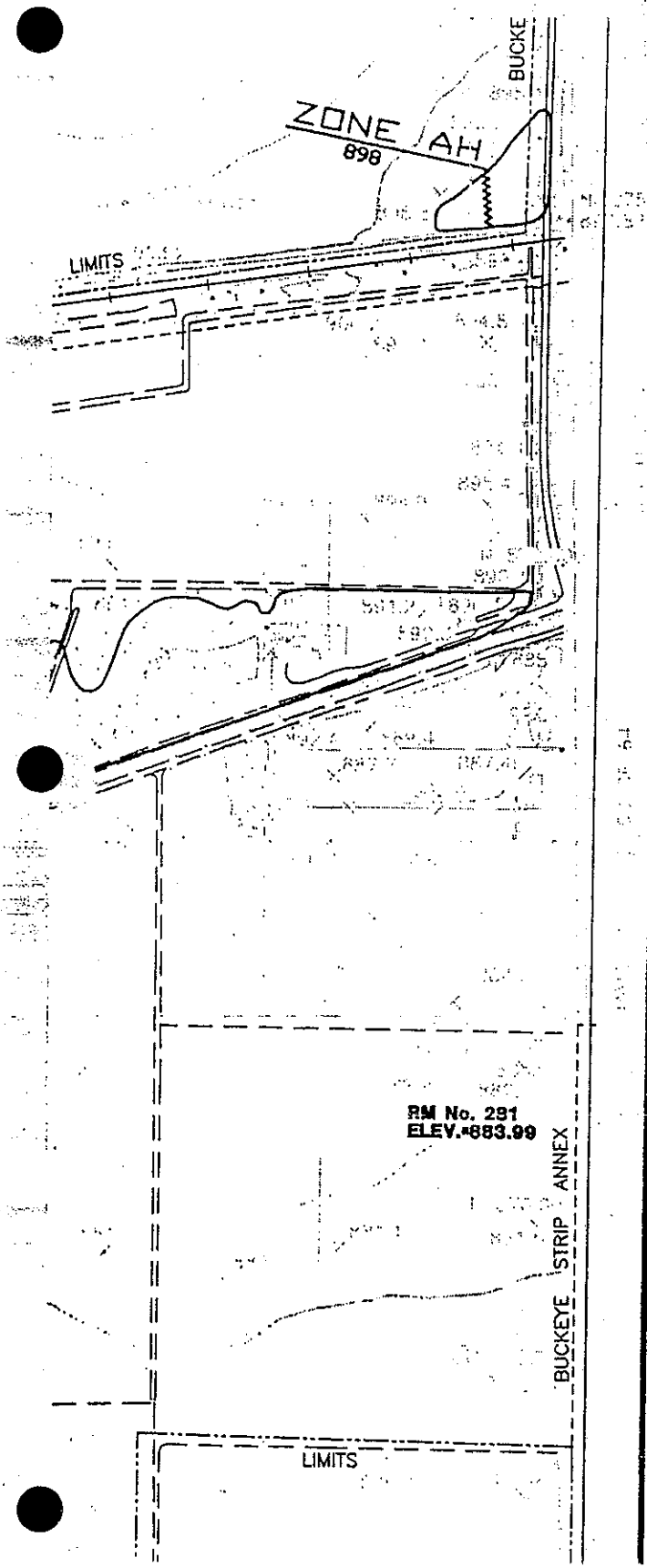




REFERENCE MARKS (RM'S)

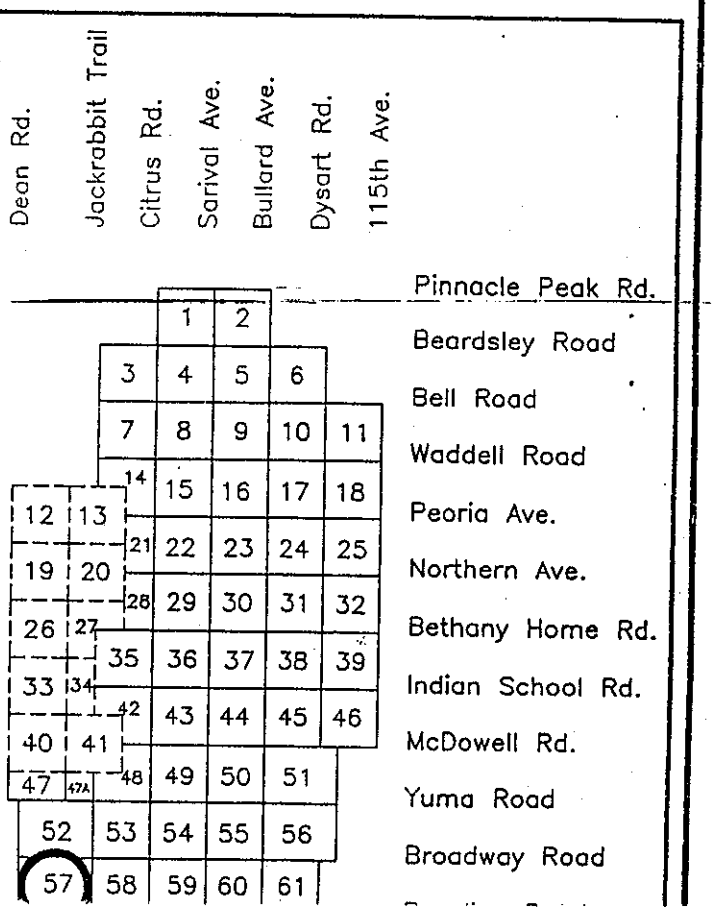
NO.	ELEVATION	DESCRIPTION
227	989.03	3/4" Rod in Hand Hole, Jackrabbit Trail and Yuma Rd.
228	977.97	Brass Cap in Hand Hole, Perryville Rd. and Yuma Rd.
229	973.87	Brass Cap in Hand Hole, Citrus Rc and Yuma Rd.
245	955.76	Rod in Concrete in Hand Hole, Jac rabbit Trail and Lower Buckeye R
246	942.68	Nail in Concrete Headwall at Sout west Corner, Intersection of Perryville Rd. and Lower Buckeye
247	937.84	"X" Chiseled in Concrete Irrigatior Junction Box at Southwest Corne Intersection of Citrus Rd. and Lo Buckeye Rd.
263	916.67	Rod in Concrete in Hand Hole, Jackrabbit Trail and Broadway Rd.
264	910.10	"X" Chiseled in Concrete Headwall Southwest Corner, Intersection of Perryville Rd. and Broadway Rd.
265	902.30	1/2" Iron Pin in Pothole, Citrus Rd. and Broadway Rd.

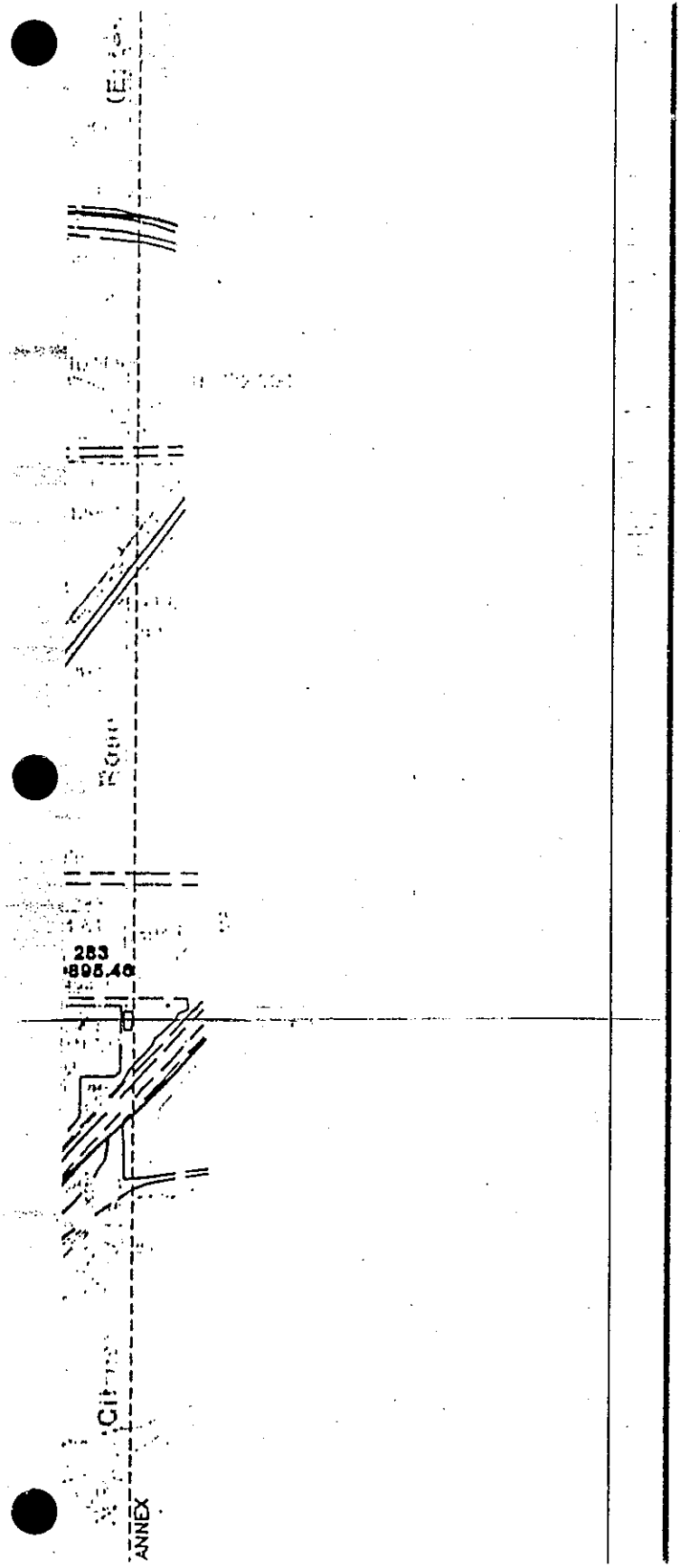




REFERENCE MARKS (RM'S)

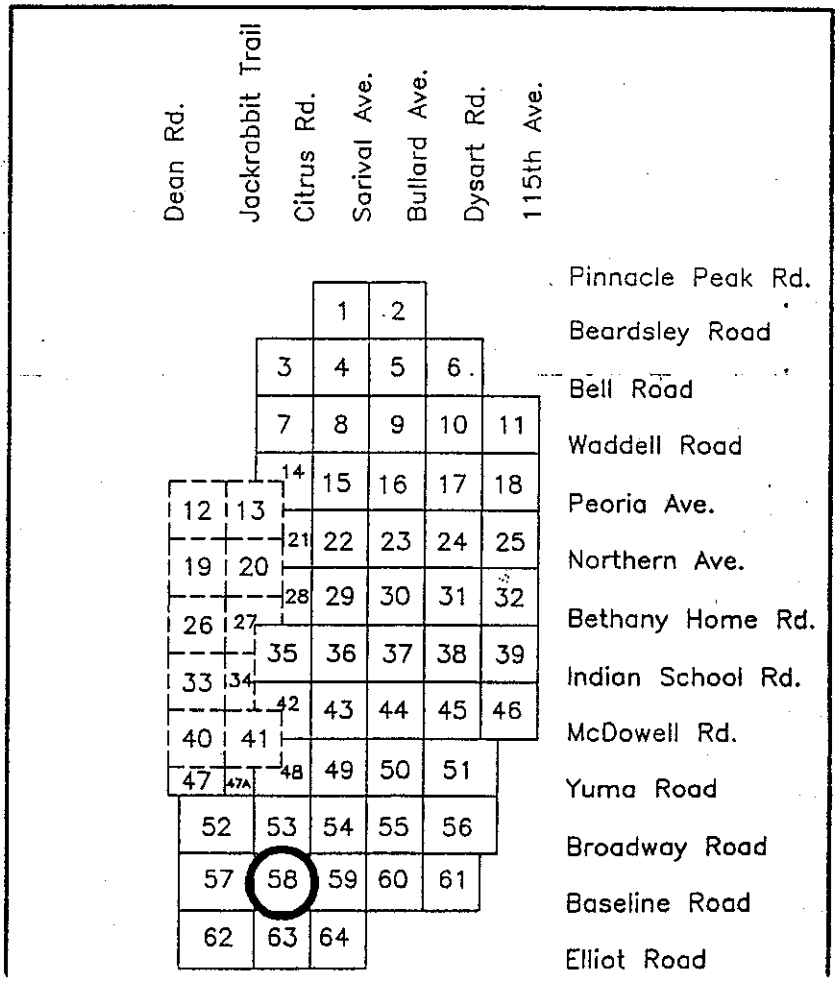
NO.	ELEVATION	DESCRIPTION
260	940.96	Rod in Concrete in Hand Hole, Dean Rd. and Broadway Rd.
261	930.65	1/2" Rebar in Hand Hole, Airport Rd. and Broadway Rd.
262	925.51	Rod in Concrete in Hand Hole, Tuthill Rd. and Broadway Rd.
263	916.67	Rod in Concrete in Hand Hole, Jackrabbit Tr. and Broadway Rd.
278	899.24	Chiseled Square in Northeast Corner of Well Pad East of Intersection of Dean Rd. and Southern Ave.
279	889.56	1/2" Iron Pin in Concrete in Hand Hole, Airport Rd. and Southern Ave. (Extended)
281	883.99	1" Open Pipe Flush with Pavement, Jackrabbit Tr. and Southern Ave.
299	863.27	"X" Chiseled on Headwall at Northwest Corner of Intersection of S.R. 85 and Dean Rd.
300	871.74	Nail in Power Pole Near the Intersection of S.R. 85 and 207th Ave.

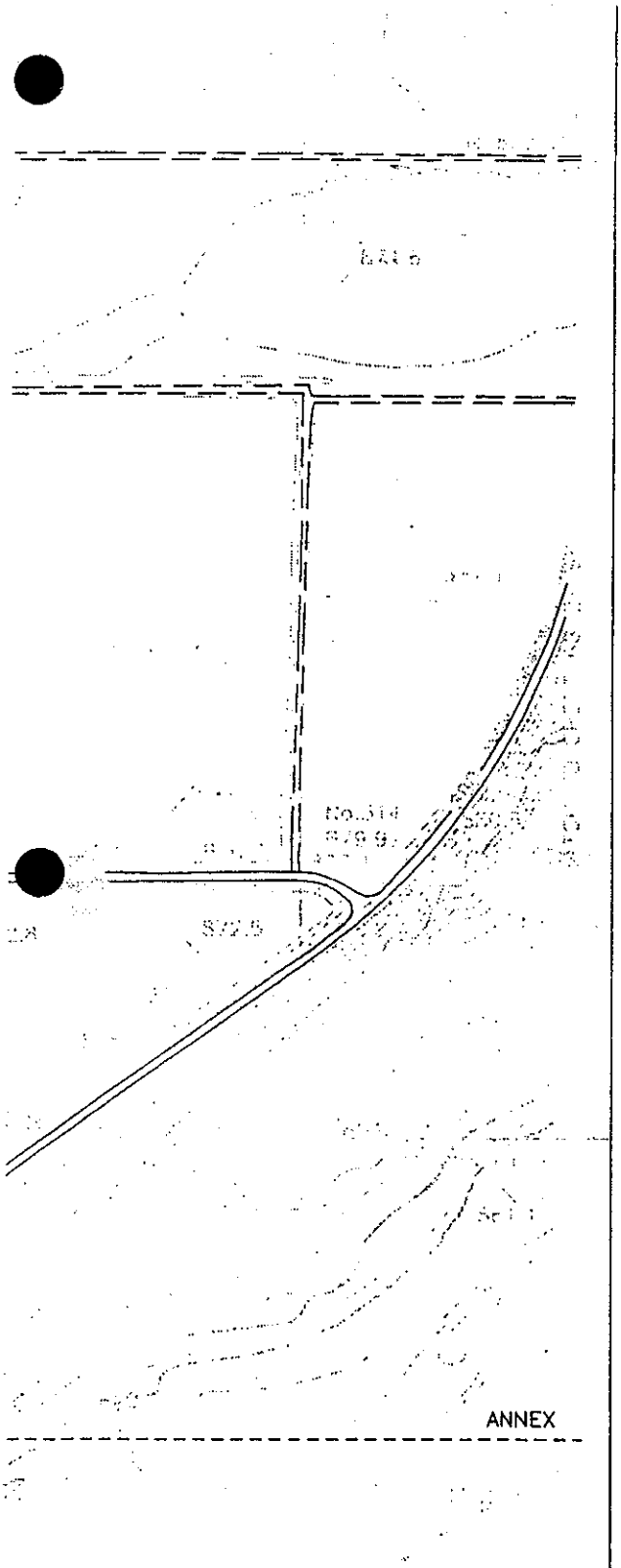




REFERENCE BENCH MARKS (BM's)

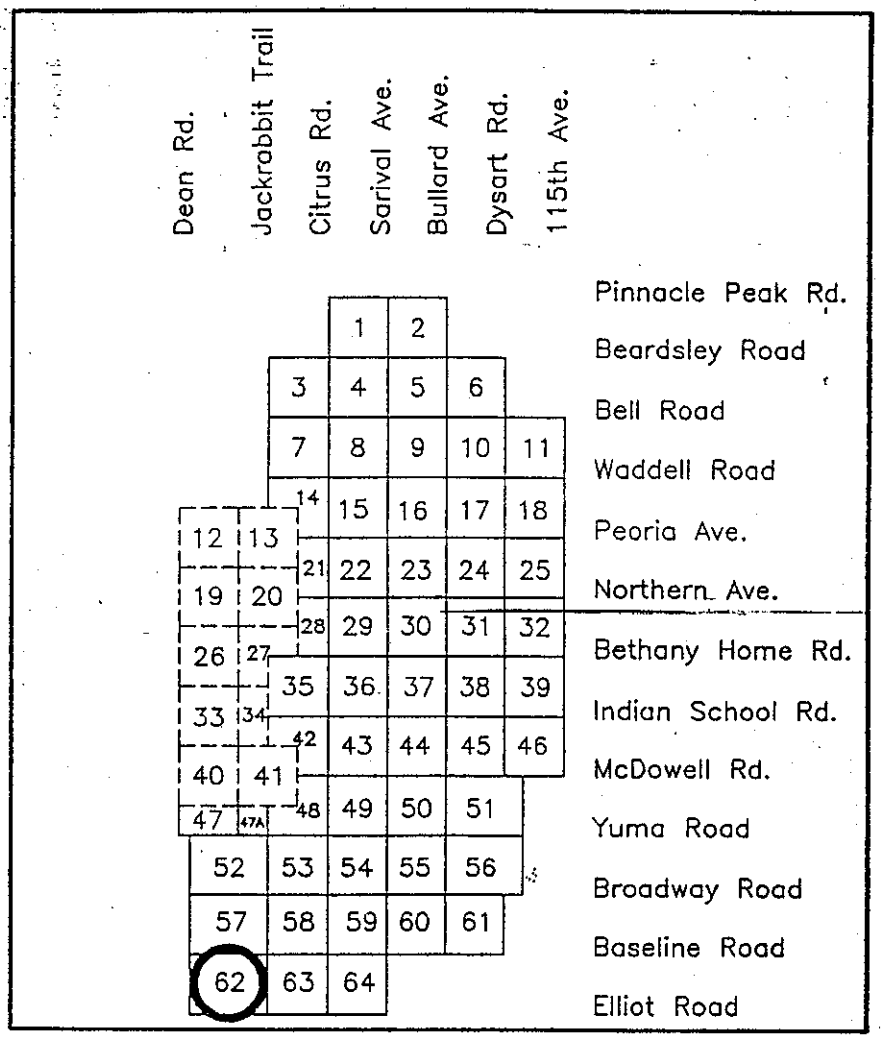
NO.	ELEVATION	DESCRIPTION
263	916.67	Rod in Concrete in Hand Hole, Jackrabbit Tr. and Broadway Rd.
264	910.10	'X' Chiseled in Concrete Headwall at Southwest Corner, Intersection of Perryville Rd. and Broadway Rd.
265	902.30	1/2' Iron Pin in Pothole, Citrus Rd. and Broadway Rd.
281	883.99	1' Open Pipe Flush with Pavement, Jackrabbit Tr. and Southern Ave.
282	886.26	Maricopa County Highway Dept. Brass Cap Flush with Pavement, Perryville Rd. and Southern Ave.
283	895.46	Railroad Spike in Power Pole 23'± South of Intersection of Citrus Rd. and Southern Ave.
301	879.45	Southeast Bolt on Base of Signal Light Northwest Corner of Intersection of S.R. 85 and Jackrabbit Trail.
302	886.37	2' Open Iron Pipe Approx 100' South of S.R. 85, S.R. 85 and Perryville Rd.



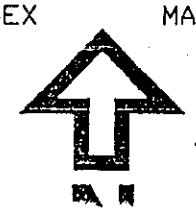


REFERENCE MARKS (RM'S)

NO.	ELEVATION	DESCRIPTION
299	863.27	'X' Chiseled on Headwall at Northwest Corner of Intersection of S.R. 85 and Dean Rd.
300	871.74	Nail in Power Pole Near the Intersection of S.R. 85 and 207th Ave.
311	860.12	Brass Cap in Hand Hole, Dean Rd. and Beloat Rd.
312	868.26	Brass Cap in Hand Hole, Airport Rd. and Beloat Rd.
313	869.83	Brass Cap in Hand Hole, 207th Ave. and Beloat Rd.



INDEX MAP



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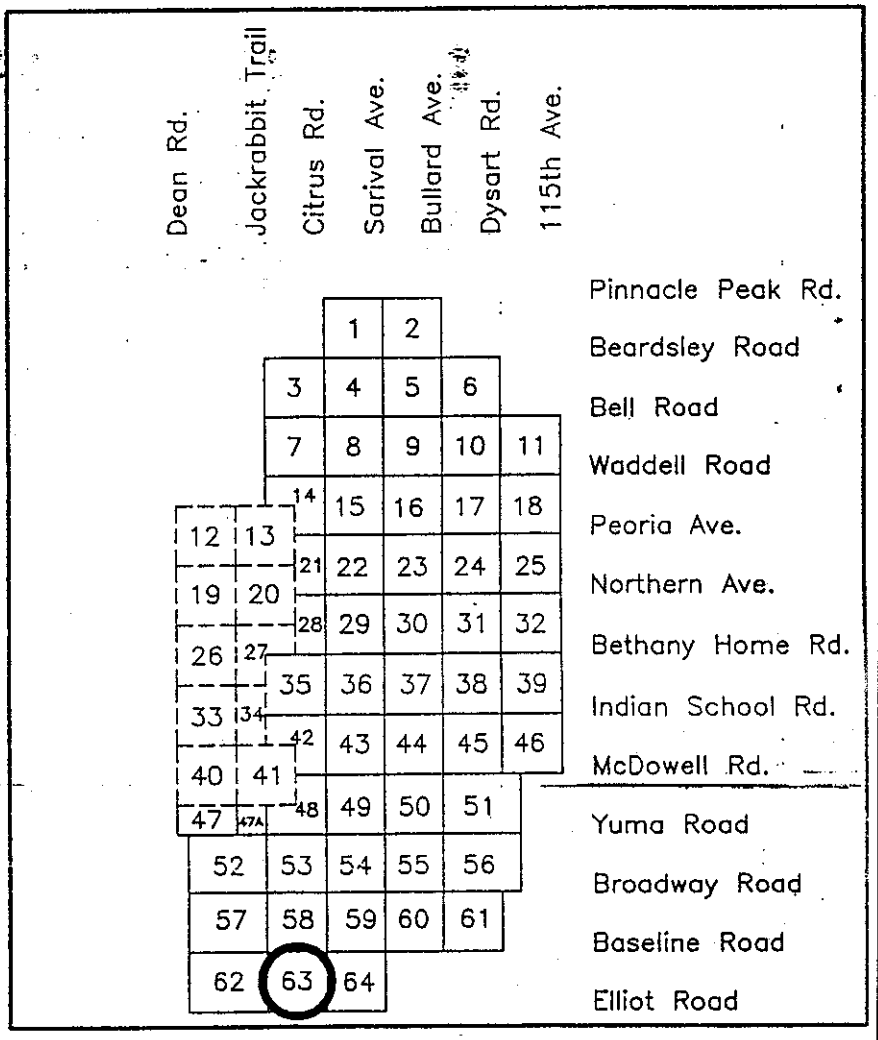
REFERENCE MARKS (RM'S)

NO.	ELEVATION	DESCRIPTION
301	879.45	Southeast Bolt on Base of Signal Light Northwest Corner of Intersection of S.R. 85 and Jackrabbit Trail
302	886.37	2' Open Iron Pipe Approx. 100' South of S.R. 85 and Perryville Rd.
308	882.36	Spike in Pothole, Jackrabbit Trail 1/2 Mile South of Baseline Rd.



INDEX MAP

N

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 15594 MARK T. GAVAN Date Signed 10-29-92 ARIZONA, U.S.A.

400 200 0 400 800 1200

BASE MAP: WHITE TANKS/AGUA FRIA ADMS TOPOGRAPHIC MAPS

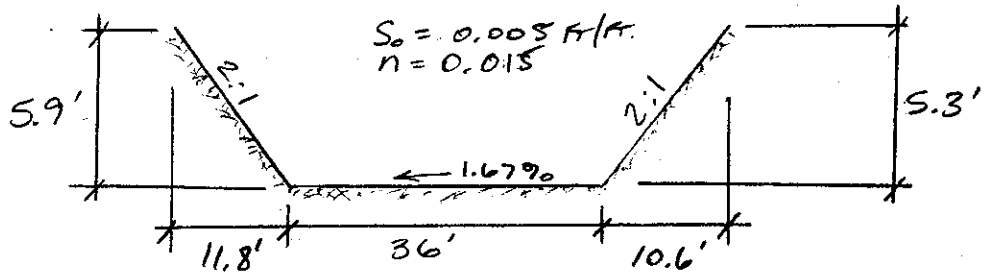
Jackrabbit Trail Channel Calculations

990006 – WHITETANKS FRS 6/8/99

JACKRABBIT TRAIL CHANNEL – INFO. FROM DESIGN PLANS AND DESIGN REPORT BY DIBBLE

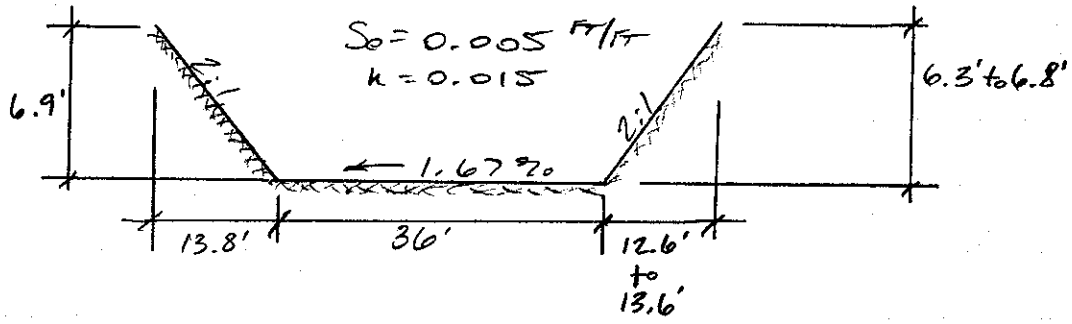
STA 29+00 to 37+00:
(see improvement plans sheet 4)

Q100 = 2206 cfs
Depth = 3.55 ft.



STA 19+31.29 to 28+00:
(see improvement plans sheet 4)

Q100 =
Depth =



STA 19+31 to 28+00

TRAPEZOIDAL CHANNEL ANALYSIS
RATING CURVE COMPUTATION

June 8, 1999

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Channel Bottom Slope (ft/ft)	0.005
Manning's Roughness Coefficient (n-value)	0.015
Channel Left Side Slope (horizontal/vertical)	2.0
Channel Right Side Slope (horizontal/vertical)	2.0
Channel Bottom Width (ft)	36.0
Minimum Flow Depth (ft)	0.1
Maximum Flow Depth (ft)	6.3
Incremental Head (ft)	0.2

COMPUTATION RESULTS

	Flow Depth (ft)	Flow Rate (cfs)	Flow Velocity (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sq ft)	Top Width (ft)
	0.1	5.44	1.5	0.84	0.035	0.135	3.62	36.4
	0.3	34.01	3.1	1.005	0.149	0.449	10.98	37.2
	0.5	79.87	4.32	1.091	0.29	0.79	18.5	38.0
	0.7	140.28	5.36	1.15	0.446	1.146	26.18	38.8
	0.9	213.83	6.29	1.195	0.614	1.514	34.02	39.6
	1.1	299.59	7.13	1.232	0.79	1.89	42.02	40.4
	1.3	396.94	7.91	1.264	0.972	2.272	50.18	41.2
	1.5	505.41	8.64	1.291	1.16	2.66	58.5	42.0
	1.7	624.63	9.33	1.314	1.351	3.051	66.98	42.8
	1.9	754.33	9.98	1.335	1.546	3.446	75.62	43.6
	2.1	894.3	10.59	1.354	1.744	3.844	84.42	44.4
	2.3	1,044.35	11.18	1.372	1.944	4.244	93.38	45.2
	2.5	1,204.35	11.75	1.388	2.145	4.645	102.5	46.0
	2.7	1,374.2	12.29	1.402	2.349	5.049	111.78	46.8
	2.9	1,553.81	12.82	1.416	2.553	5.453	121.22	47.6
	3.1	1,743.1	13.32	1.429	2.759	5.859	130.82	48.4
	3.3	1,942.04	13.81	1.441	2.966	6.266	140.58	49.2
	3.5	2,150.58	14.29	1.452	3.173	6.673	150.5	50.0
	3.7	2,368.7	14.75	1.463	3.381	7.081	160.58	50.8
	3.9	2,596.38	15.2	1.473	3.59	7.49	170.82	51.6
	4.1	2,833.62	15.64	1.482	3.799	7.899	181.22	52.4
	4.3	3,080.42	16.06	1.491	4.009	8.309	191.78	53.2
	4.5	3,336.79	16.48	1.5	4.219	8.719	202.5	54.0
	4.7	3,602.73	16.88	1.508	4.43	9.13	213.38	54.8
	4.9	3,878.27	17.28	1.516	4.641	9.541	224.42	55.6
	5.1	4,163.44	17.67	1.524	4.852	9.952	235.62	56.4
	5.3	4,458.25	18.05	1.531	5.064	10.364	246.98	57.2
	5.5	4,762.74	18.42	1.539	5.275	10.775	258.5	58.0
	5.7	5,076.94	18.79	1.545	5.487	11.187	270.18	58.8
	5.9	5,400.89	19.15	1.552	5.699	11.599	282.02	59.6
	6.1	5,734.63	19.5	1.558	5.912	12.012	294.02	60.4
MAX.	6.3	6,078.2	19.85	1.565	6.124	12.424	306.18	61.2

3.55 → 2205.11 cfs

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STA 29+00 to 37+00

TRAPEZOIDAL CHANNEL ANALYSIS
RATING CURVE COMPUTATION

June 8, 1999

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Channel Bottom Slope (ft/ft)	0.005
Manning's Roughness Coefficient (n-value)	0.015
Channel Left Side Slope (horizontal/vertical)	2.0
Channel Right Side Slope (horizontal/vertical)	2.0
Channel Bottom Width (ft)	36.0
Minimum Flow Depth (ft)	0.1
Maximum Flow Depth (ft)	5.3
Incremental Head (ft)	0.2

COMPUTATION RESULTS

	Flow Depth (ft)	Flow Rate (cfs)	Flow Velocity (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sq ft)	Top Width (ft)	
	0.1	5.44	1.5	0.84	0.035	0.135	3.62	36.4	
	0.3	34.01	3.1	1.005	0.149	0.449	10.98	37.2	
	0.5	79.87	4.32	1.091	0.29	0.79	18.5	38.0	
	0.7	140.28	5.36	1.15	0.446	1.146	26.18	38.8	
	0.9	213.83	6.29	1.195	0.614	1.514	34.02	39.6	
	1.1	299.59	7.13	1.232	0.79	1.89	42.02	40.4	
	1.3	396.94	7.91	1.264	0.972	2.272	50.18	41.2	
	1.5	505.41	8.64	1.291	1.16	2.66	58.5	42.0	
	1.7	624.63	9.33	1.314	1.351	3.051	66.98	42.8	
	1.9	754.33	9.98	1.335	1.546	3.446	75.62	43.6	
	2.1	894.3	10.59	1.354	1.744	3.844	84.42	44.4	
	2.3	1,044.35	11.18	1.372	1.944	4.244	93.38	45.2	
	2.5	1,204.35	11.75	1.388	2.145	4.645	102.5	46.0	
	2.7	1,374.2	12.29	1.402	2.349	5.049	111.78	46.8	
	2.9	1,553.81	12.82	1.416	2.553	5.453	121.22	47.6	
	3.1	1,743.1	13.32	1.429	2.759	5.859	130.82	48.4	
	3.3	1,942.04	13.81	1.441	2.966	6.266	140.58	49.2	
	3.5	2,150.58	14.29	1.452	3.173	6.673	150.5	50.0	3.55 → 2205.11cfs
	3.7	2,368.7	14.75	1.463	3.381	7.081	160.58	50.8	
	3.9	2,596.38	15.2	1.473	3.59	7.49	170.82	51.6	
	4.1	2,833.62	15.64	1.482	3.799	7.899	181.22	52.4	
	4.3	3,080.42	16.06	1.491	4.009	8.309	191.78	53.2	
	4.5	3,336.79	16.48	1.5	4.219	8.719	202.5	54.0	
	4.7	3,602.73	16.88	1.508	4.43	9.13	213.38	54.8	
	4.9	3,878.27	17.28	1.516	4.641	9.541	224.42	55.6	
	5.1	4,163.44	17.67	1.524	4.852	9.952	235.62	56.4	
MAX.	5.3	4,458.25	18.05	1.531	5.064	10.364	246.98	57.2	

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Spillway Details

WEIR CALCULATIONS

Total Flow: 6000 cfs
12000 cfs
18000 cfs

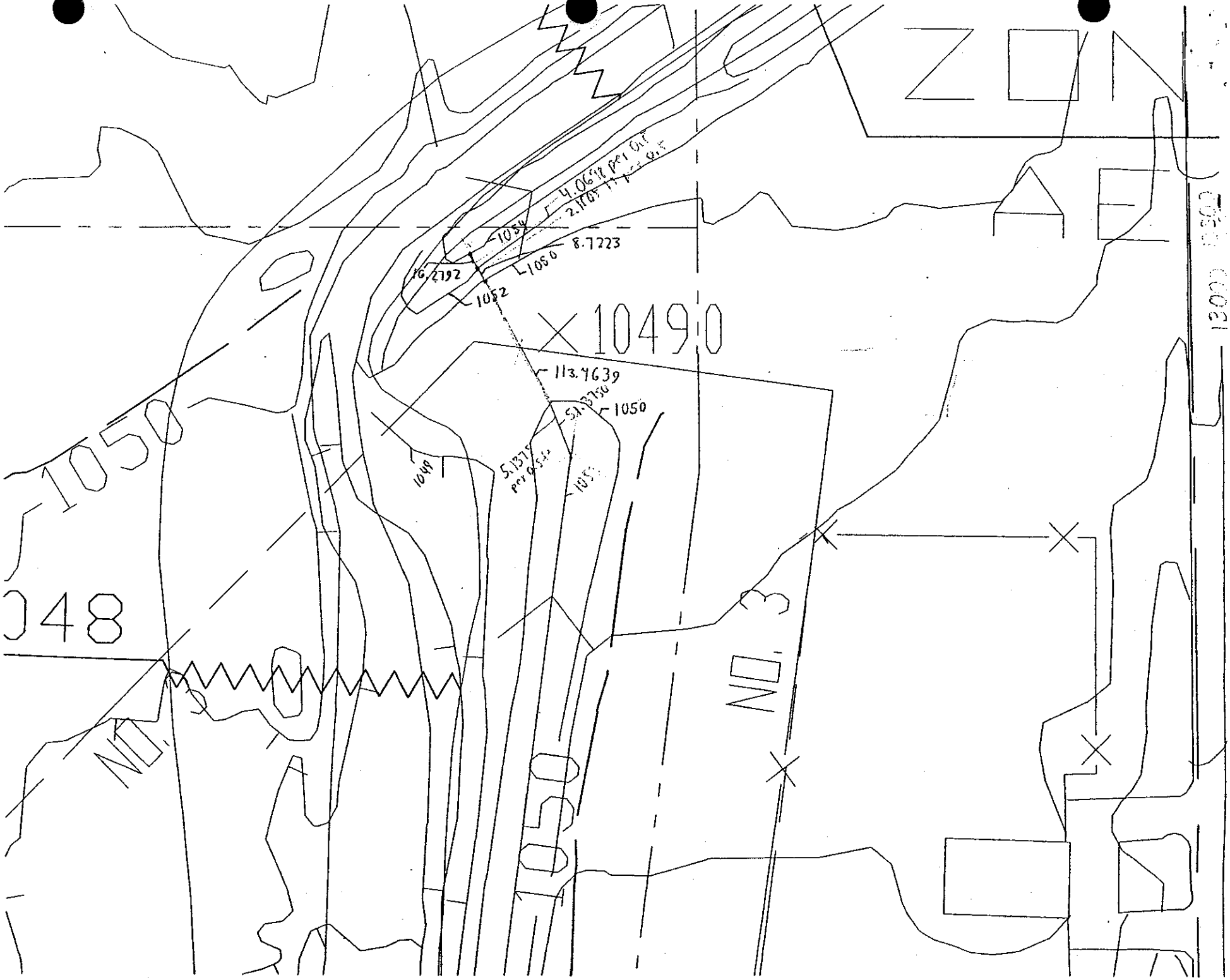
Equation Used

$Q = CLH^{1.5}$

$C = 3.0$

A1-A-1 B1-B1

Elevation (ft)	West Weir Head (ft)	East Weir Head (ft)	Length of West Weir (ft)	Length of East Weir (ft)	Flow out of West Weir (cfs)	Flow out of East Weir (cfs)	Total Flow (cfs)
1048.5	0.0	0.0	0.00	0.00	0.00	0.00	0.00
1049.0	0.5	0.0	56.35	0.00	59.76	0.00	59.76
1049.5	1.0	0.5	112.69	56.73	338.08	60.17	398.25
1050.0	1.5	1.0	169.04	113.46	931.64	340.39	1272.03
1050.5	2.0	1.5	198.18	120.78	1681.64	665.67	2347.32
1051.0	2.5	2.0	227.32	128.10	2695.70	1086.96	3782.67
1051.5	3.0	2.5	256.47	135.42	3997.90	1605.86	5603.76
1052.0	3.5	3.0	285.61	142.74	5610.52	2225.04	7835.55
1052.5	4.0	3.5	324.42	151.94	7786.05	2984.73	10770.78
1053.0	4.5	4.0	363.22	161.15	10401.92	3867.62	14269.54
1053.5	5.0	4.5	402.03	170.36	13484.42	4878.69	18363.10
1054.0	5.5	5.0	440.83	179.57	17058.42	6022.81	23081.23


1050
1049.0
1054
8.7223
1050
1052
113.4639
1050
1049
048
NO. 3
NO. 3

1054.5
TANKS
1048
135.618
33.9095 per o.r
1051
90.6259
22.6563 per o.r
1053
1050
159.9161
Rate 56.3167 per o.r
1048.5
125 per o.r
Top Elevation should be 1055
1050
1049
1048
1047
1055
25.9491
19.6091
15.6675
Tuthill

WHITE TANKS
FLOOD RETARDING STRUCTURE #4
SPILLWAY DELINEATION STUDY
(FCD 98-32)

APPENDIX C: FIELD RECONNAISSANCE

White Tanks
Flood Retarding Structure #4
Spillway Delineation Study

Appendix C: Field Reconnaissance

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2 Manning's 'n' Estimation Methodology C-2
  2.1 Base "n_b" Component C-4
  2.2 Irregularity Component (n_1) C-4
  2.3 Obstruction Component (n_2) C-5
  2.4 Vegetation Component (n_3) C-5
  2.5 Meandering Factor (m_f) C-6
  2.6 Composite Manning's 'n' Value C-6
3 References C-7
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5 Manning's 'n' Calculations C-22

Table 1: Manning's 'n' Value Summary C-6

Figure C-1: Photo Location Map, White Tanks FRS#4 to Roosevelt Canal
Figure C-2: Photo Location Map, Roosevelt Canal to Buckeye Canal
Figure C-3: Photo Location Map, Buckeye Canal to Gila River

1 Introduction

The purpose of the field reconnaissance phase is to present information gained from a field visit of the study area, as well as evaluate and justify the estimation of Manning's 'n' values selected for use in hydraulic modeling. A field reconnaissance trip was made on July 14, 1999. The study area is covered by farm fields in various planting stages, undisturbed desert, and sparse development. Flow from the West spillway enters a channel along the west side of Tuthill Road. An earthen berm separates Tuthill Road from the channel. Flow from the East spillway enters a small ditch along the west side of Jackrabbit Road.

2 Manning's "n" Estimation Methodology

The procedure presented in the report entitled *Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona* (Ref. 1) was used for the estimation of Manning's "n" values. The procedure consists of selecting a base "n" for both the channel and overbank areas, and applying an adjustment factor to account for the roughness associated with channel irregularity, obstructions, vegetation, and channel meandering. Tables 1 and 2 of that report give a range of base "n" and adjustment factors. The photographs which follow were used to prepare a summary of 'n' values for use in this study, based upon the physical conditions which were observed and documented.

The composite Manning's "n" value can be computed as follows:

$$n = (n_b + n_1 + n_2 + n_3) \times m_f$$

Where:
- n = composite "n"
- n_b = base "n" for a straight uniform channel
- n_1 = surface irregularities component
- n_2 = obstruction component
- n_3 = vegetation component
- m_f = meandering factor

Photographs were taken throughout the study area and are presented in this appendix. It was estimated that flow between the FRS spillways and the Roosevelt Canal would be contained in two wide and shallow flowpaths which merge just north of the canal. Each of these flowpaths were modeled with wide cross-sections that cut across distinctive land types, which include farm fields, desert, roadway, and houses/development. Therefore, 'n' value will vary considerably across each cross-section, in accordance with the location of the various land types.

South of the Roosevelt Canal, is was estimated that the flow would be about two feet deep. After a preliminary review of the topography, it was determined that the flow would not be contained within channels and would have a tendency to meander, joining and splitting between several channels. Initially, it was thought that the Manning's 'n' value would vary according to the land use type. Subsequent calibration tests were performed to evaluate the changes in flow depth and velocity as a result of changes in land type. Since this area is predominantly agricultural, the roughness factor will vary significantly as a result of crop type and growing season. It was later decided to select a single representative 'n' value for all crop types.

Wide cross-sections were used in this portion of the HEC-RAS model, and a weighted Manning's "n" value was applied across the entire cross-section, based upon the percentage of fallow fields, fields with crops, and houses. It was possible to use a single weighted 'n' value across the cross-section because there are no defined channels of significant size and the land type is fairly uniform across the cross-section. Since the land does not vary appreciably from cross-section to cross-section, the same weighted "n" value was also applied at each cross-section. downstream of the Roosevelt Canal.

2.1 Base "n_b" Component

Table 1 (Ref.1) gives a wide range of base "n_b" values as reported by Benson & Darymple, and by Chow. The values given by Chow represent the smoothest channel attainable in a given material. A base 'n' value of 0.030 was applied for the entire model due to the uniformity of base material both across each cross-section and throughout the study area. For the roads, a base value of 0.016 was selected.

2.2 Irregularity Component (n_1)

The adjustment for irregularity is based upon the condition of the overbank or channel banks. Adjustment factors range from 0.0 to 0.020 (Ref. 1), depending upon the severity of bank erosion. A low value for irregularity was assigned for areas where there is undeveloped desert or low-density housing/development, as the washes tend to lose their topographic confinement and the banks are not well defined. A higher value for irregularity was assigned for areas where there are farm fields, as

the flowpaths are confined by the rows of crops. For this study, the following irregularity adjustment factors were applied:

Houses/Development	$n_1 = 0.005$
Desert Channel	$n_1 = 0.005$
Desert Overbank	$n_1 = 0.008$
Farm Field areas	$n_1 = 0.015$
Roads	$n_1 = 0.000$

2.3 Obstruction Component (n_2)

The obstruction component was considered to be a factor only for the farm field and housing/development areas of this study. The magnitude of the obstruction component applied in each case was determined by the percentage of cross-section area occupied by obstructions. For areas of housing/development, the amount of obstructions is appreciable, around 20 percent. For farm field areas, the amount of obstructions is minor, around 5 percent. For desert areas, the amount of obstructions is negligible. The following obstruction components were chosen for this study:

Houses/Development	$n_2 = 0.025$
Desert Channel	$n_2 = 0.000$
Desert Overbank	$n_2 = 0.000$
Farm Field	$n_2 = 0.005$
Roads	$n_2 = 0.000$

2.4 Vegetation Component (n_3)

The vegetation component of the Manning's 'n' value varied according to the density of growth and the ratio of flow depth to vegetation height. The approximated flow depth for this model is two feet. Within areas of housing/development, the vegetation varies in density and height, therefore a medium-range vegetation component was selected. In the desert areas, the vegetation is not very dense and is

mostly low-lying, therefore a small vegetation component was selected. A range of large values were chosen for the farm field vegetation component, due to the variation in the stage of crop growth and the dense cover that the crops can produce. The following vegetation components were chosen for this study:

Houses/Development	$n_3 = 0.015$
Desert Channel	$n_3 = 0.010$
Desert Overbank	$n_3 = 0.005$
Farm Field	$n_3 = 0.025$ to 0.050
Roads	$n_3 = 0.000$

2.5 Meandering Factor (m_f)

The meandering factor applies only to flow confined within the channel. For this study, there is no meandering within the channel, and therefore a meandering factor of 1.00 was chosen.

2.6 Composite Manning's 'n' Value

Using the components described in Sections 2.1 through 2.5, the following range of Manning's 'n' values was established for this study.

Table 1: Manning's 'n' Value Summary

Land Type	Base 'n_b'	n_1	n_2	n_3	m_f	Composite 'n'
Houses/Development	0.030	0.005	0.025	0.015	1.0	0.075
Desert Channel	0.030	0.005	0.000	0.010	1.0	0.045
Desert Overbank	0.030	0.008	0.000	0.005	1.0	0.043
Farm Field (low)	0.030	0.015	0.005	0.025	1.0	0.075
Farm Field (high)	0.030	0.015	0.005	0.050	1.0	0.100
Roads	0.016					0.016

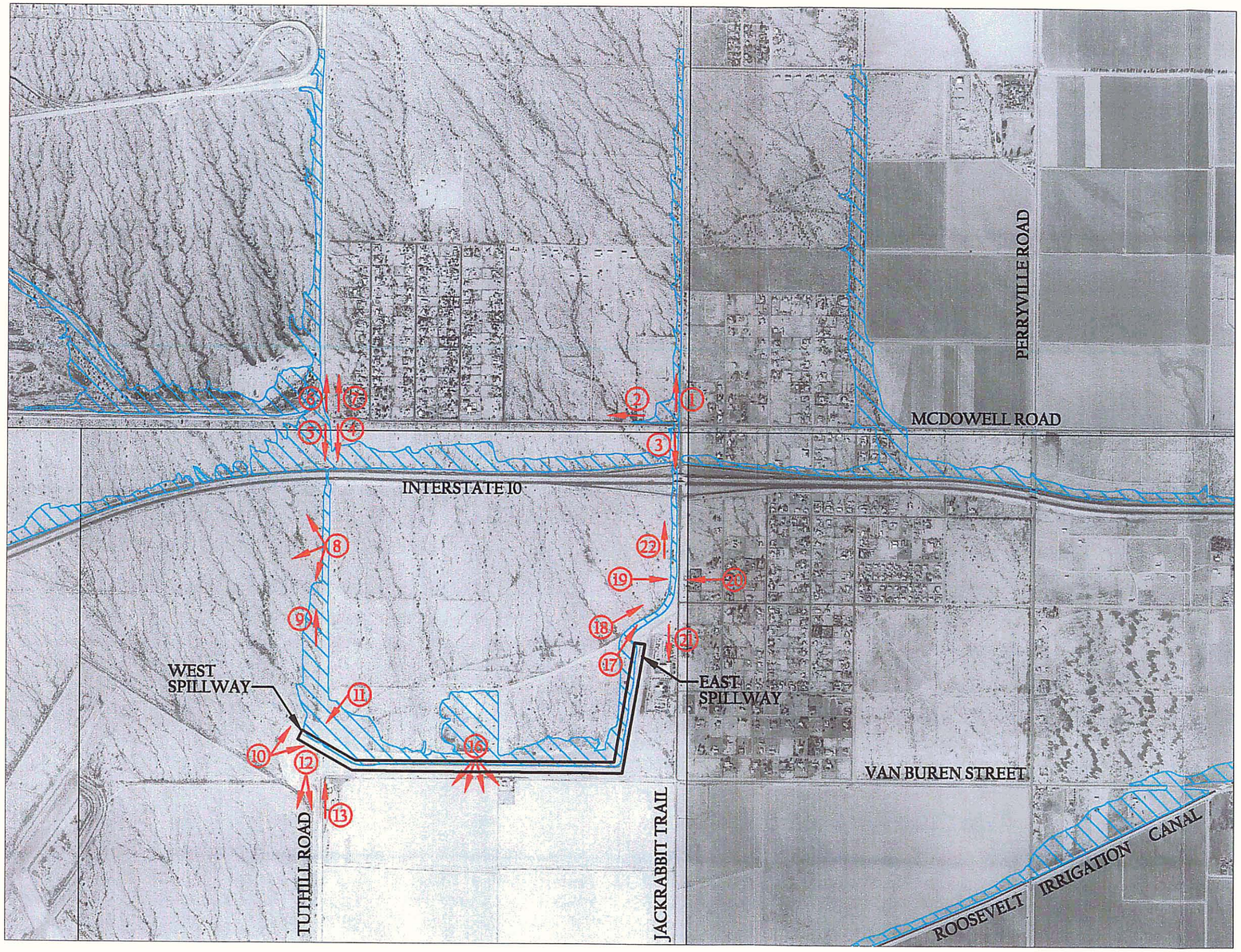
A manning's 'n' of 0.045 was selected for the channel and overbanks of the channel along Tuthill Road. North of the Roosevelt Canal, Tuthill Road was modeled as a channel with the 'n' value established for a road. No other distinct channels were notes within the study area.

For fallow farm fields with no farrowing, a low 'n' value of 0.050 was established. For fields with crops equal or greater in height than the flow depth, an 'n' value of 0.100 was selected. A weighted 'n' value was established for three cross-section scenarios. The result of this analysis indicates that the 'n' value will vary from 0.075 to 0.100 for the majority of the study area. A sensitivity analysis was conducted to determine the change in floodplain width and depth for this range. A comparison of results from the sensitivity runs are shown in Section 5 of this appendix. A review of the results indicates that a change in 'n' value from 0.075 to 0.100 has a small impact on the final floodplain delineation. As a result, a manning's 'n' value of 0.100 was selected for all agricultural areas. Separate 'n' values were only assigned for the channel and road along Tuthill Road, where the change in vegetation could have a distinct impact.

3 References

1. United States Geological Survey, Water Resources Division, *Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona,* April, 1991.

4 Photos

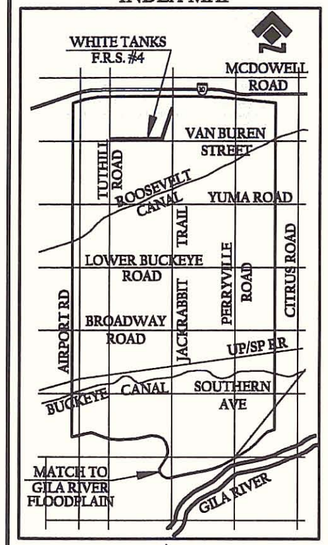


FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
WHITE TANKS FRS #4
SPILLWAY
DELINEATION STUDY
F.C.D. CONTRACT NO. 98-32

LEGEND

- 22 PHOTO NUMBER
- DIRECTION OF PHOTO
- DAM
- 100-YEAR FLOODPLAIN

INDEX MAP



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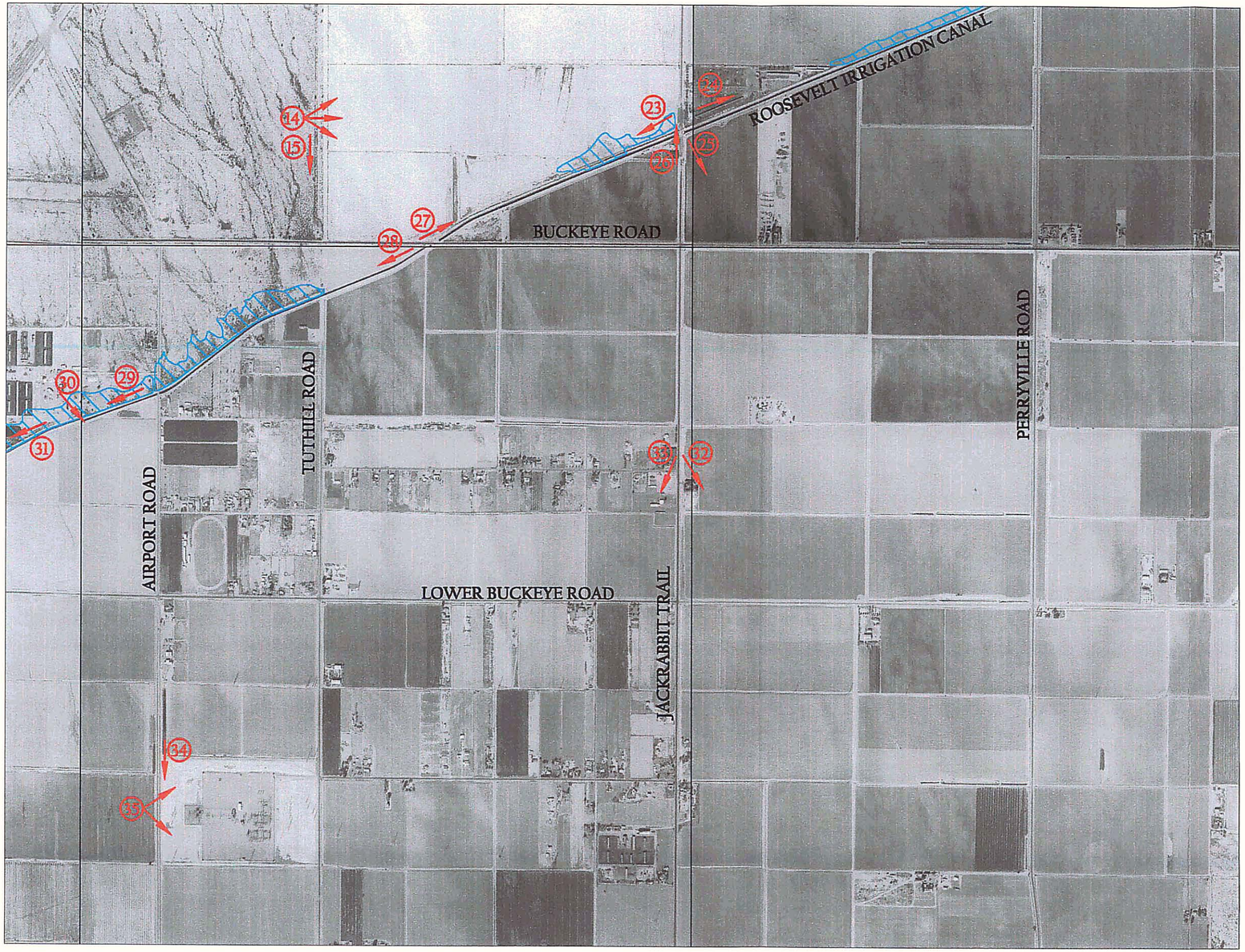
Hoskin Engineering Consultants, Inc.
DEI PROFESSIONAL SERVICES

PHOTO
LOCATION MAP
FIGURE C-1



FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
WHITE TANKS FRS #4
SPILLWAY
DELINEATION STUDY
F.C.D. CONTRACT NO. 98-32

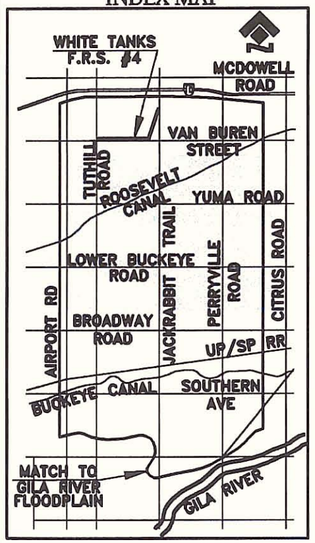
LEGEND

22 PHOTO NUMBER

DIRECTION OF PHOTO

100-YEAR FLOODPLAIN

INDEX MAP



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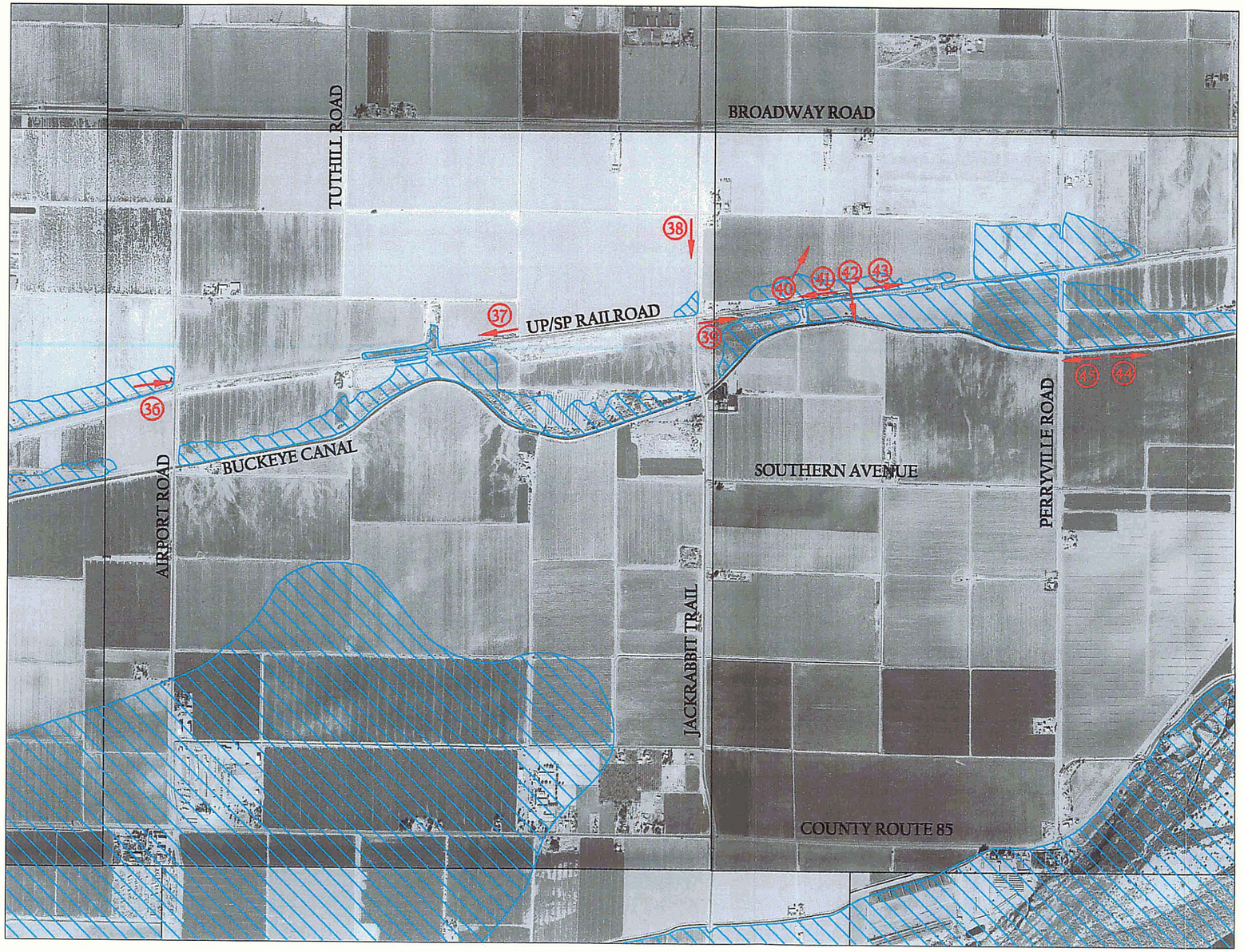
Hoskin
Engineering
Consultants, Inc.
DEI PROFESSIONAL SERVICES

PHOTO
LOCATION MAP
FIGURE C-2



FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
WHITE TANKS FRS #4
SPILLWAY
DELINEATION STUDY
F.C.D. CONTRACT NO. 98-32

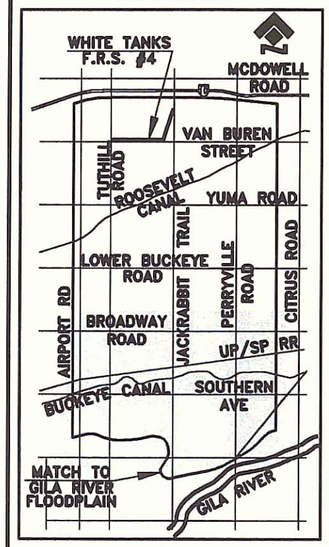
LEGEND

22 PHOTO NUMBER

DIRECTION OF PHOTO

100-YEAR FLOODPLAIN

INDEX MAP



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SCALE: 1"=1500'

Hoskin
Engineering
Consultants, Inc.

DEI PROFESSIONAL SERVICES

PHOTO
LOCATION MAP
FIGURE C-3

White Tanks
Flood Retarding Structure #4
Spillway Delineation Study
(FCD 98-32)

Photographs

WT4-01	Jackrabbit Channel, looking north from McDowell Road
WT4-02	McDowell Road, looking west from Jackrabbit Trail
WT4-03	Jackrabbit Channel, looking south from McDowell Road
WT4-04	Access across I-10, west of Jackrabbit at Tuthill Road
WT4-05	Culvert crossing of I-10, just west of Tuthill Road
WT4-06	Tuthill inflow channel, looking north from McDowell Road
WT4-07	Tuthill embankment, looking north from McDowell Road
WT4-08	Dam and inflow channel, looking south from south of Interstate 10 and north of West Spillway
WT4-09	Tuthill inflow channel, looking north from north of West Spillway
WT4-10	West spillway, looking northeast
WT4-11	Looking south at West Spillway channel outlet
WT4-12	Looking south at spillway channel outlet
WT4-13	Looking north at West Spillway outlet
WT4-14	Looking east from Tuthill Road, about ¾ mile south of dam
WT4-15	Tuthill Road, looking south approximately ¼ mile north of Buckeye Road (Yuma)
WT4-16	Panoramic view looking south from on top of dam
WT4-17	Jackrabbit inlet channel, looking north from dam
WT4-18	Looking east across east spillway
WT4-19	Looking east along Jackrabbit channel from within impoundment area

White Tanks
Flood Retarding Structure #4
Spillway Delineation Study
(FCD 98-32)

Photographs (Cont'd.)

WT4-20	Looking west along Jackrabbit channel from within impoundment area
WT4-21	Looking south along east side of embankment, and west of Jackrabbit Road
WT4-22	Looking north along Jackrabbit Channel toward Interstate 10
WT4-23	Roosevelt Irrigation District canal looking west from Jackrabbit Road
WT4-24	Roosevelt Irrigation District canal looking east from Jackrabbit Road
WT4-25	Looking southeast from south of Roosevelt Irrigation District canal
WT4-26	Looking north along Jackrabbit, from Roosevelt Irrigation District canal
WT4-27	Roosevelt Irrigation District canal, looking east from its crossing of Buckeye Road
WT4-28	Roosevelt Irrigation District canal, looking west from its crossing of Buckeye Road
WT4-29	Area north of Roosevelt Irrigation District canal and west of Tuthill Road
WT4-30	Looking southeast across Roosevelt Irrigation District canal, west of Tuthill Road
WT4-31	Looking west along Roosevelt Irrigation District canal, west of Tuthill Road
WT4-32	Looking southeast from Jackrabbit Trail, from north of Lower Buckeye Road
WT4-33	Looking southwest from Jackrabbit Trail, from north of Lower Buckeye Road
WT4-34	Looking south along Airport Road near the substation
WT4-35	Berm around west side of substation
WT4-36	Southern Pacific Railroad east of Airport Road
WT4-37	Looking west from the north side of the Southern Pacific Railroad, between Jackrabbit Trail and Tuthill Road
WT4-38	Looking south at the Southern Pacific Railroad, along Jackrabbit Trail
WT4-39	Buckeye Canal, looking east from Jackrabbit Trail. Buckeye Canal is unlined.
WT4-40	Looking northeast from Southern Pacific Railroad, east of Jackrabbit Trail
WT4-41	Looking west along Southern Pacific Railroad, east of Jackrabbit Trail
WT4-42	Southern Pacific Railroad trestle, about ½ mile west of Perryville Road
WT4-43	Looking east along north side of Southern Pacific Railroad towards Perryville Road
WT4-44	Looking east along Buckeye Canal from east of Perryville Road
WT4-45	Looking west along Buckeye Canal from east of Perryville Road
WT4-46	Looking north along Perryville Road at Lower Buckeye Road
WT4-47	Looking south along Perryville Road at Lower Buckeye Road
WT4-48	Looking east and northeast along Van Buren at existing homes
WT4-49	Looking northwest at dam and East Spillway

WT4-01 Jackrabbit Channel, looking north from McDowell Road

WT4-02 McDowell Road, looking west from Jackrabbit Channel

WT4-03 Jackrabbit Channel, looking north from McDowell Road

WT4-04 Access across I-10, west of Jackrabbit at Tuthill Road

WT4-05 Culvert crossing of I-10, just west of Tuthill Road

WT4-06 Tuthill inflow channel, looking north from McDowell Road

WT4-07 Tuthill embankment, looking north from McDowell Road

WT4-08 Dam and inflow channel, looking south from south of I-10 and north of West Spillway

WT4-09 Tuthill inflow channel, looking north from north of West Spillway

WT4-10 West Spillway, looking northeast

WT4-11 Looking south at West Spillway channel outlet

WT4-12 Looking south at spillway channel outlet

WT4-16 Panoramic view looking south from on top of dam

WT4-17 Jackrabbit Channel, looking north from dam

WT4-18 Looking east across east spillway

WT4-19Looking east along Jackrabbit Channel from within impoundment area

WT4-20 Looking west along Jackrabbit Channel from within impoundment area

WT4-13 Looking north at West Spillway outlet

WT4-14 Looking east from Tuthill Road,
about 3/4 mile south of dam

WT4-15 Tuthill Roan, looking south approximately
1/4 north of Buckeye Road (yuma)

WT4-21 Looking south along east side of embankment, and west of Jackrabbit Road

WT4-22 Looking north along Jackrabbit Channel toward I-10

WT4-23 Roosevelt Irrigation District Canal, looking west from Jackrabbit Road

WT4-24 Roosevelt Irrigation District Canal, looking east from Jackrabbit Road

WT4-25 Looking southeast from south of Roosevelt Irrigation District Canal

WT4-26 Looking north along Jackrabbit Road from Roosevelt Irrigation District Canal

WT4-27 Roosevelt Irrigation District Canal, looking east from its crossing of Buckeye Road

WT4-28 Roosevelt Irrigation District Canal, looking west from its crossing of Buckeye Road

WT4-29 Area north of Roosevelt Irrigation District Canal and west of Tuthill Road

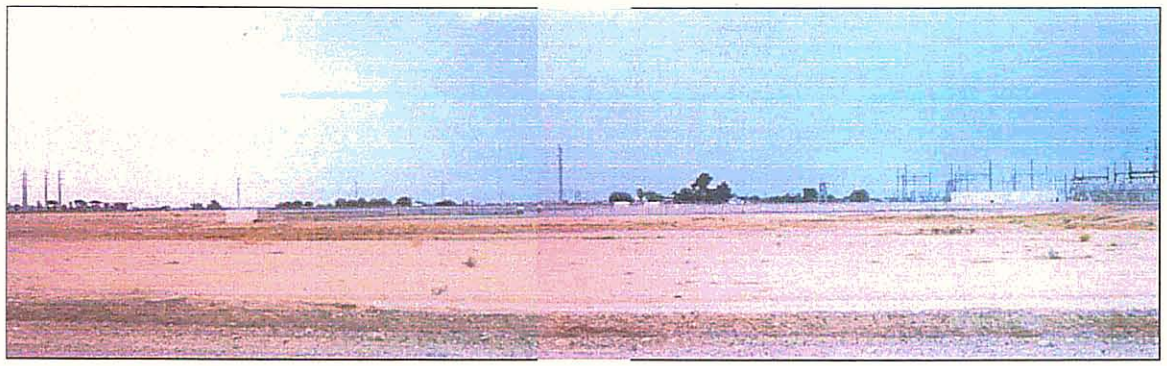
WT4-30 Looking southeast across Roosevelt Irrigation District Canal, west of Tuthill Road

WT4-31 Looking west along Roosevelt Irrigation District Canal, west of Tuthill Road

WT4-32 Looking southeast from Jackrabbit Trail, from north of Lower Buckeye Road

WT4-33 Looking southwest from Jackrabbit Trail, from north of Lower Buckeye Road

WT4-34 Looking south along Airport Road near the substation



WT4-35 Berm around west side of substation

WT4-36 Southern Pacific Railroad east of Airport Road

WT4-37 Looking west from the north side of the Southern Pacific Railroad, between Jackrabbit Trail and Tuthill Road

WT4-38 Looking south at the Southern Pacific Railroad, along Jackrabbit Trail

WT4-39 Buckeye Canal, looking east from Jackrabbit Trail. Buckeye Canal is unlined

WT4-40 Looking northeast from Southern Pacific Railroad, east of Jackrabbit Trail

WT4-41 Looking west along Southern Pacific Railroad, east of Jackrabbit Trail

WT4-42 Southern Pacific Railroad trestle, about 1/2 mile west of Perryville Road

WT4-43 Looking west along Buckeye Canal from east of Perryville Road

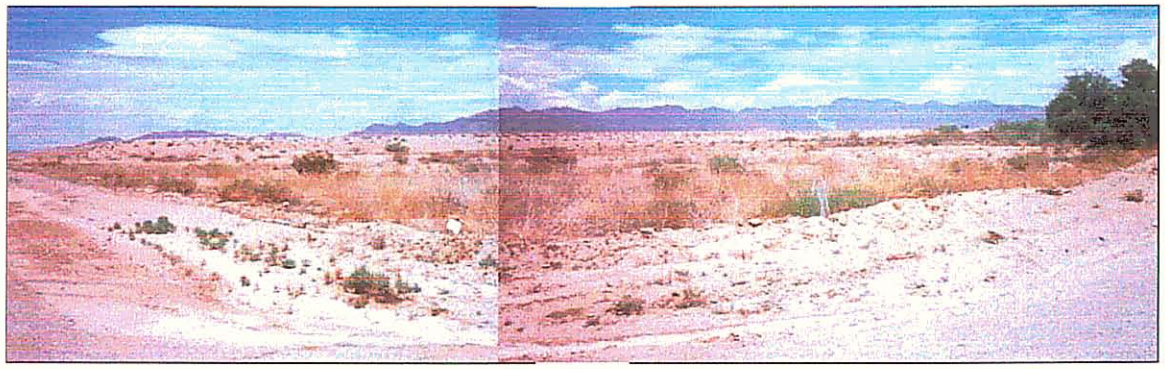
WT4-44 Looking east along Buckeye Canal from east of Perryville Road

WT4-45 Looking west along Buckeye Canal from east of Perryville Road

WT4-46 Looking north along Perryville Road at Lower Buckeye Road

WT4-47 Looking south along Perryville Road at Lower Buckeye Road

WT4-48 Looking east and northeast along Van Buren at existing homes



WT4-49 Looking northwest at dam and East Spillway

5 Manning's 'n' Calculations

MANNING'S 'n' CALCULATIONS

$n = nb + n1 + n2 + n3$

Where:
- nb = base value for n for a straight uniform channel
- n1 = value for surface irregularities
- n2 = value for obstruction
- n3 = value for vegetation

Land Type	Components of Manning's n				n
	n_b	n_1	n_2	n_3	
Farm Fields, Fallow	0.030	0.005	0.005	0.010	0.050
Farm Fields, Crops	0.030	0.015	0.005	0.050	0.100
Desert Overbank	0.030	0.008	0.000	0.005	0.043
Desert Channel	0.030	0.005	0.000	0.010	0.045
Roadway					0.016
Houses/Development	0.030	0.005	0.025	0.015	0.075

Composite Cross-Section

	%	n	Weighted n
Fallow	40%	0.050	0.020
Crops	40%	0.100	0.040
Houses	20%	0.075	0.015
			0.075

	%	n	Weighted n
Fallow	22.5%	0.050	0.011
Crops	67.5%	0.100	0.068
Houses	10%	0.075	0.008
			0.086

	%	n	Weighted n
Fallow	0.0%	0.050	0.000
Crops	100.0%	0.100	0.100
Houses	0%	0.075	0.000
			0.100

Table 1
White Tanks F.R.S. #4 - West Spillway
Manning's 'n' Sensitivity

Varying only the Manning's 'n' value for fields with crops from n = 0.075 to n = 0.100.
Profile = Full Q = 12000 cfs

	W.S.				Flow Depth				Topwidth			
RS	n = 0.100	n = 0.075	Diff.	% Diff	n = 0.100	n = 0.075	Diff.	% Diff	n = 0.100	n = 0.075	Diff	% Diff
1070	1040.5	1040.4	0.2	0%	4.0	3.8	0.2	4%	1686.8	1639.6	47.3	3%
1060	1034.2	1034.0	0.2	0%	2.7	2.5	0.2	8%	1755.1	1545.6	209.4	12%
1050	1030.1	1029.8	0.3	0%	2.1	1.8	0.3	14%	2111.3	1963.6	147.7	7%
1040	1025.1	1024.8	0.2	0%	3.1	2.8	0.2	8%	2818.2	2669.2	149.0	5%
1030	1020.4	1020.2	0.2	0%	2.4	2.1	0.2	9%	3109.4	2980.9	128.5	4%
1020	1014.6	1014.4	0.3	0%	2.1	1.9	0.3	13%	4719.1	4539.0	180.1	4%
1010	1008.1	1007.9	0.2	0%	0.6	0.4	0.2	37%	6176.2	4734.2	1442.0	23%
1000	1004.3	1004.1	0.2	0%	1.8	1.5	0.2	11%	6583.3	6558.0	25.2	0%
990	1000.6	1000.6	0.0	0%	0.6	0.6	0.0	2%	4985.0	4985.0	0.0	0%

	LOB Velocity				Channel Velocity				ROB Velocity			
RS	n = 0.100	n = 0.075	Diff.	% Diff	n = 0.100	n = 0.075	Diff.	% Diff	n = 0.100	n = 0.075	Diff.	% Diff
1070	2.0	2.6	0.6	31%	9.6	9.6	0.0	0%	4.3	4.3	0.0	0%
1060	2.5	3.2	0.7	28%	8.2	8.2	0.1	1%	4.0	3.8	0.2	4%
1050	2.4	3.0	0.6	23%	6.0	5.9	0.1	2%	4.5	4.3	0.2	4%
1040	1.9	2.4	0.5	23%	6.9	7.0	0.1	2%	3.7	4.1	0.4	11%
1030	2.1	2.6	0.5	23%	5.9	5.9	0.0	0%	5.1	4.9	0.2	3%
1020	1.8	2.3	0.4	24%	2.4	2.7	0.3	10%	0.0	0.0	0.0	0%
1010	2.2	2.8	0.6	29%	0.8	0.6	0.2	22%	1.3	0.4	0.8	66%
1000	1.2	1.6	0.4	29%	3.4	3.4	0.0	1%	2.0	1.8	0.2	10%
990	4.2	4.2	0.0	0%	4.4	4.4	0.0	0%	4.3	4.3	0.0	0%

Table 2
White Tanks F.R.S. #4 - East Spillway
Manning's 'n' Sensitivity

Varying only the Manning's 'n' value for fields with crops from n = 0.075 to n = 0.100.
Profile = Full Q = 6000 cfs

	W.S.				Flow Depth				Topwidth			
RS	n = 0.100	n = 0.075	Diff.	% Diff	n = 0.100	n = 0.075	Diff.	% Diff	n = 0.100	n = 0.075	Diff	% Diff
2070	1053.3	1053.3	0.0	0%	4.3	4.3	0.0	0%	476.2	474.2	2.0	0%
2060	1042.7	1042.7	0.0	0%	2.2	2.2	0.0	0%	1319.2	1320.7	1.5	0%
2050	1034.3	1034.3	0.0	0%	2.3	2.3	0.0	0%	1652.8	1650.6	2.2	0%
2040	1028.3	1028.1	0.2	0%	1.8	1.5	0.2	11%	2287.3	2170.1	117.3	5%
2030	1020.8	1020.6	0.1	0%	1.3	1.1	0.1	12%	3775.2	3682.5	92.7	2%
2020	1014.2	1014.0	0.1	0%	1.6	1.5	0.1	9%	4877.6	4719.4	158.2	3%
2010	1009.7	1009.6	0.1	0%	3.2	3.1	0.1	4%	5611.8	5583.0	28.8	1%
2000	1005.2	1005.0	0.2	0%	3.2	3.0	0.2	7%	4484.3	3036.8	1447.5	32%
1990	1003.0	1003.0	0.0	0%	1.0	1.0	0.0	0%	2052.4	2052.4	0.0	0%

	LOB Velocity				Channel Velocity				ROB Velocity			
RS	n = 0.100	n = 0.075	Diff.	% Diff	n = 0.100	n = 0.075	Diff.	% Diff	n = 0.100	n = 0.075	Diff.	% Diff
2070	5.7	5.8	0.0	1%	8.1	8.2	0.1	1%	4.9	4.9	0.0	0%
2060	2.4	2.4	0.0	1%	7.3	7.3	0.1	1%	2.9	2.9	0.0	0%
2050	2.1	2.1	0.0	0%	4.7	4.8	0.0	0%	1.8	1.8	0.0	0%
2040	2.0	2.4	0.4	19%	3.6	3.9	0.3	8%	1.0	1.2	0.2	16%
2030	1.4	1.7	0.3	17%	2.6	2.7	0.1	5%	1.3	1.5	0.3	20%
2020	1.3	1.6	0.3	22%	3.6	4.0	0.4	10%	1.2	1.6	0.4	35%
2010	1.0	1.1	0.1	13%	1.6	2.0	0.4	23%	1.2	1.5	0.3	24%
2000	1.3	1.8	0.4	32%	2.3	2.8	0.5	24%	2.0	2.5	0.5	25%
1990	2.6	2.6	0.0	0%	2.4	2.4	0.0	0%	5.3	5.3	0.0	0%

WHITE TANKS
FLOOD RETARDING STRUCTURE #4
SPILLWAY DELINEATION STUDY
(FCD 98-32)

APPENDIX D: FRS #4 DELINEATION

White Tanks
Flood Retarding Structure #4
Spillway Delineation Study

Appendix D: FRS #4 Delineation

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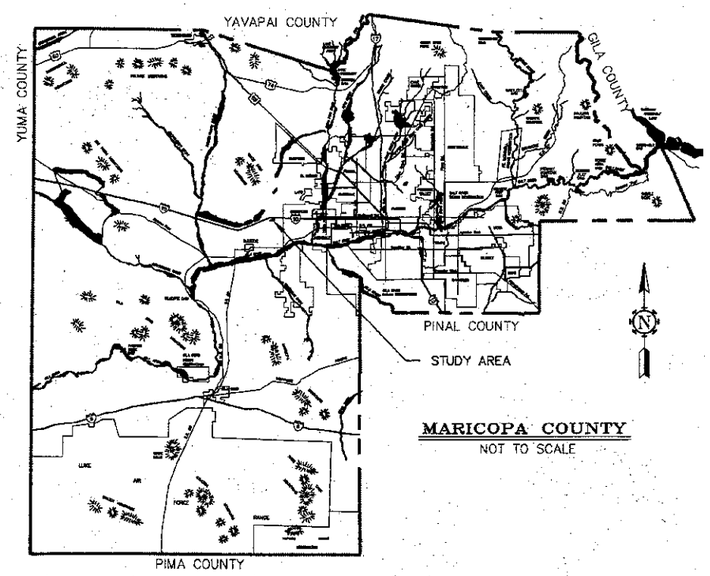
    Model WT4A3_50
    Model WT4A4_50

1 Delineation Maps

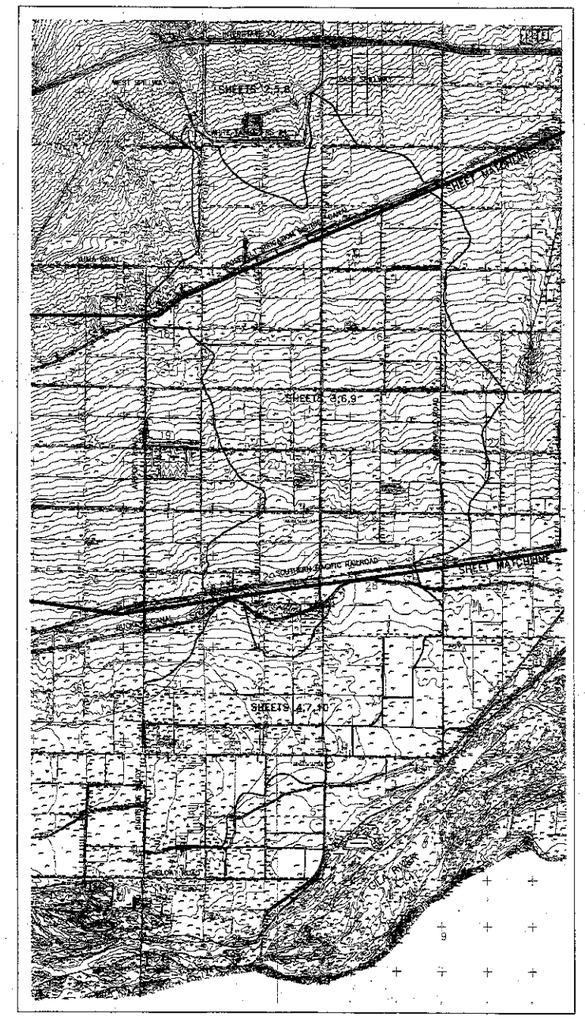
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WHITE TANKS FRS #4
SPILLWAY DELINEATION STUDY

F.C.D. CONTRACT NO. 98-32



MARICOPA COUNTY
NOT TO SCALE



STUDY AREA MAP
AND SHEET INDEX

3000' 0' 3000' 6000'
SCALE: 1" = 3000'

FLOOD CONTROL DISTRICT of MARICOPA COUNTY

AERIAL MAPPING

As prepared for White Tanks ADMS FCDMC Project No. 90-64, By Westen Air Maps, Inc. Flight Date: 12-22-89.

SUPPLEMENTAL FIELD SURVEY

Additional Field Survey Conducted Along Roosevelt Irrigation District Canal 11/30/99, Southern Pacific Railroad 12/01/99 and Buckeye Canal 12/02/99, by

Project Engineering, LTD
3130 N. 35th Ave, Suite 1
Phoenix, Az. 85017

DATUM

HORIZONTAL: North American Datum of 1983
VERTICAL: National Geodetic Vertical Datum of 1929

HYDROLOGY

Hoskin Engineering Consultants
323 W. Roosevelt Street
Phoenix, AZ. 85003
(602) 252-8384

DEI Professional Services, Inc.
6225 North 24th St. Suite 200
Phoenix, AZ. 85016
(602) 954-0038

HYDRAULICS

Hoskin Engineering Consultants, Inc.
323 W. Roosevelt Street, Suite 200
Phoenix, AZ. 85003
(602) 252-8384

DEI Professional Services
6225 North 24th St. Suite 200
Phoenix, AZ. 85016
(602) 954-0038

SHEET INDEX

Sheets 2-4 Full Flow
Sheets 5-7 2/3 Flow
Sheets 8-10 1/3 Flow

MICHAEL S. ELLEGOOD, P.E.
CHIEF ENGINEER AND GENERAL MANAGER

Hoskin Engineering Consultants
DEI PROFESSIONAL SERVICES

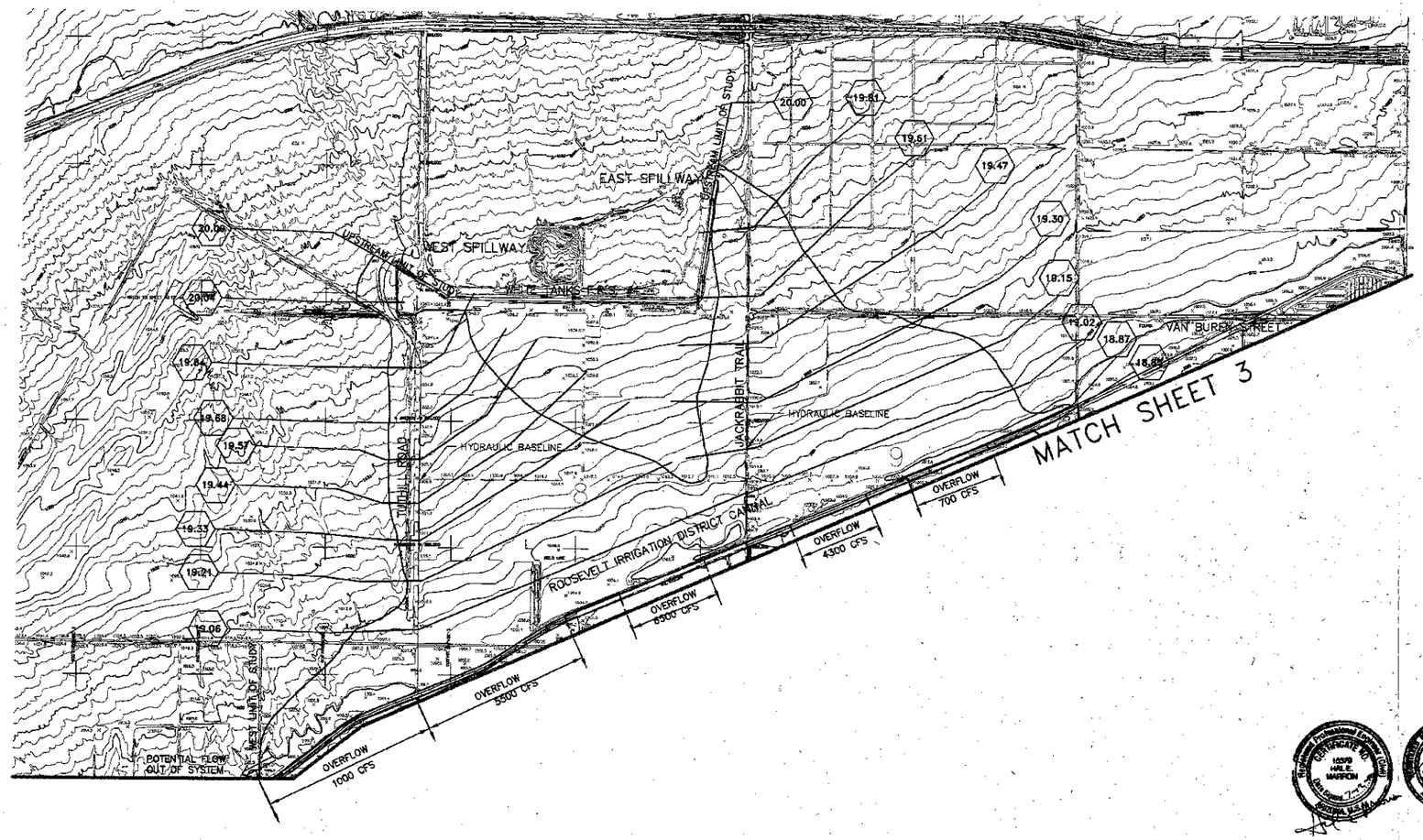
	BY	DATE
DESIGN	EC/KVM	07/00
DESIGN CHK.	HM/PWRH	07/00
PLANS	MLI	07/00
PLANS CHK.	HM/PWRH	07/00

SUBMITTED BY: DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
WHITE TANKS FRS #4
COVER SHEET

RECOMMENDED BY: DATE:
APPROVED BY: DATE:
CHIEF ENGINEER AND GENERAL MANAGER

SHEET 1 OF 10



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WHITE TANKS FRS #4

SPILLWAY DELINEATION STUDY

F.C.D. CONTRACT NO. 98-32

FULL FLOW

LEGEND

INUNDATION BOUNDARY

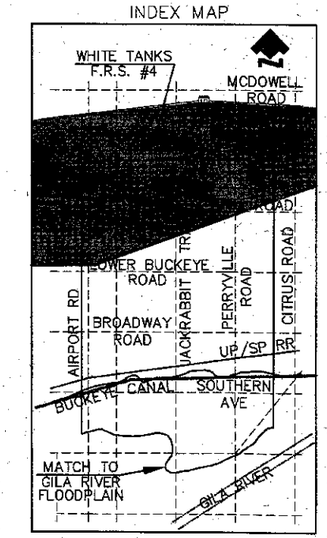
MODEL EFFECTIVE BOUNDARIES

SECTION IDENTIFICATION 3

HYDRAULIC BASELINE

NO.	ELEVATION	DESCRIPTION
208	1044.51	COTTON PICKER SPINDEL IN POWER POLE SOUTHEAST CORNER OF INTERECTION OF TUTHILL & VAN BUREN ST.
209	1030.91	1/2" OPEN PIPE IN HAND HOLE, JACKRABBIT TRAIL & VAN BUREN ST.
210	1012.47	BRASS CAP IN HAND HOLE, PERRYVILLE RD. & VAN BUREN ST.
225	1006.24	3/8" IRON PIN IN POTHOLE, TUTHILL RD. AND YUMA RD.
227	989.03	3/4" ROD IN HAND HOLE, JACKRABBIT TRAIL & YUMA RD.
191	1051.34	BRASS CAP IN HAND HOLE, PERRYVILLE RD. & MCDOWELL RD.

INDEX MAP



NOTE:
ERM INFORMATION PROVIDED BY FLOOD CONTROL DISTRICT OF MARICOPA COUNTY, WHITE TANKS ADMS

HEC-RAS SUMMARY, EAST SPILLWAY FULL FLOW (MODEL WT4A4)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/A4	20.00	6000	1053.30	7.24	0.00	4.30	2.99
EAST SPILLWAY/A4	19.81	6000	1042.77	3.94	0.04	2.27	1.25
EAST SPILLWAY/A4	19.61	6000	1034.37	2.58	0.11	2.37	1.38
EAST SPILLWAY/A4	19.47	6000	1028.32	2.34	0.19	1.82	1.15
EAST SPILLWAY/A4	19.30	6000	1020.88	1.35	0.30	1.88	1.18
EAST SPILLWAY/A4	19.15	6000	1014.02	1.74	0.46	1.52	0.73
EAST SPILLWAY/A4	19.02	5000	1009.98	0.88	0.57	1.98	1.16
EAST SPILLWAY/A4	18.87	5000	1004.46	3.90	0.82	1.10	0.47

HEC-RAS SUMMARY, WEST SPILLWAY FULL FLOW (MODEL WT4A1, WT4A2, WT4A3)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
WEST SPILLWAY/A1-A3	20.09	12000	1053.43	9.48	0.00	5.23	2.74
WEST SPILLWAY/A1-A3	20.04	12000	1050.24	8.46	0.02	6.44	2.23
WEST SPILLWAY/A1-A3	19.84	12000	1040.75	3.78	0.05	4.25	2.01
WEST SPILLWAY/A1-A3	19.68	12000	1034.47	3.24	0.12	3.47	2.06
WEST SPILLWAY/A1-A3	19.57	12000	1030.63	2.44	0.17	3.63	2.32
WEST SPILLWAY/A1-A3	19.44	12000	1023.52	2.55	0.25	4.02	1.74
WEST SPILLWAY/A1-A3	19.33	12000	1020.99	1.97	0.31	3.89	1.82
WEST SPILLWAY/A1-A3	19.21	12000	1015.34	2.13	0.40	3.64	1.27
WEST SPILLWAY/A1-A3	19.06	13000	1009.58	1.10	0.50	4.08	2.13
WEST SPILLWAY/A1-A3	18.87	13000	1003.72	4.46	0.76	2.73	0.77

NOTES:

1. THIS AREA IS ONLY SLIGHTLY ABOVE CALCULATED WATER SURFACE ELEVATION, AND SHOULD NOT BE CONSIDERED SAFE FROM FLOODING DUE TO SPILLWAY FLOOD.
2. AVERAGE VELOCITY (AVG VEL) IS THE FLOW, Q, DIVIDED BY THE TOTAL EFFECTIVE FLOW AREA OF THE CROSS-SECTION.
3. TRAVEL TIME IS CALCULATED FROM THE SPILLWAY TO THE DOWNSTREAM CROSS SECTION, AND IS BASED ON THE AVERAGE VELOCITY FOR THE CROSS SECTION.
4. AVERAGE DEPTH IS THE HYDRAULIC DEPTH.

HEC-RAS SUMMARY, WEST OF TUTHILL ROAD FULL FLOW (MODEL WT4B1)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B1	18.85	1000	999.29	2.8	0.77	0.29	0.24

HEC-RAS SUMMARY, BETWEEN SPLIT AND JACKRABBIT TRAIL FULL FLOW (MODEL WT4B3)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B3	18.85	6500	1002.56	2.76	0.83	3.56	1.11

HEC-RAS SUMMARY, BETWEEN TUTHILL ROAD AND SPLIT FULL FLOW (MODEL WT4B2)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B2	18.85	5500	1001.62	2.37	0.77	2.62	0.93

HEC-RAS SUMMARY, EAST OF JACKRABBIT TRAIL FULL FLOW (MODEL WT4B4)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B4	18.85	5000	1002.89	1.78	0.83	3.89	0.64

WESTERN AIR MAPS, INC.
DATE: 12-22-89

Hoskin Engineering Consultants
DEI PROFESSIONAL SERVICES

	BY	DATE	
DESIGN	EC/KVM	07/00	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	HM/PWRH	07/00	
PLANS	MLJ	07/00	RECOMMENDED BY: DATE
PLANS CHK.	HM/PWRH	07/00	APPROVED BY: DATE
SUBMITTED BY: DATE:			CHIEF ENGINEER AND GENERAL MANAGER
			SHEET 2 OF 10

HEC-RAS SUMMARY, WEST OF TUTHILL ROAD FULL FLOW (MODEL WT4B1)

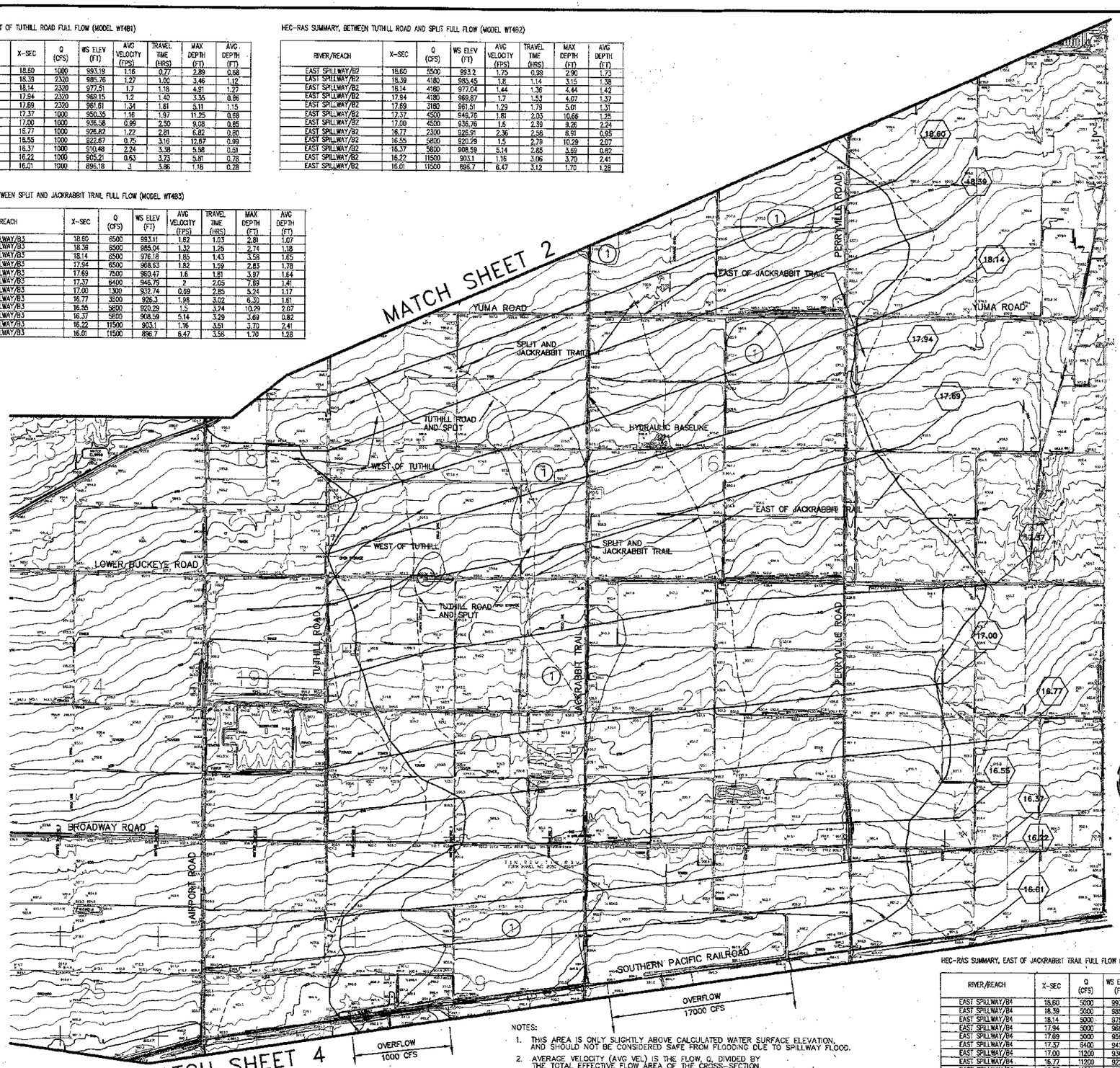
RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B1	18.60	1000	993.18	1.16	0.77	2.89	0.88
EAST SPILLWAY/B1	18.39	2320	985.76	1.27	1.00	3.46	1.12
EAST SPILLWAY/B1	18.14	2320	977.51	1.7	1.18	4.91	1.27
EAST SPILLWAY/B1	17.94	2320	969.15	1.2	1.40	3.35	0.86
EAST SPILLWAY/B1	17.69	2320	961.61	1.34	1.61	5.11	1.15
EAST SPILLWAY/B1	17.37	1000	950.35	1.16	1.97	11.25	0.68
EAST SPILLWAY/B1	17.00	1000	936.58	0.99	2.50	9.08	0.85
EAST SPILLWAY/B1	16.77	1000	926.62	1.22	2.81	6.82	0.80
EAST SPILLWAY/B1	16.55	1000	922.67	0.75	3.16	12.67	0.99
EAST SPILLWAY/B1	16.37	1000	910.48	2.24	3.38	5.98	0.91
EAST SPILLWAY/B1	16.22	1000	905.21	0.63	3.73	5.81	0.78
EAST SPILLWAY/B1	16.01	1000	896.18	3	3.86	1.18	0.28

HEC-RAS SUMMARY, BETWEEN TUTHILL ROAD AND SPLIT FULL FLOW (MODEL WT4B2)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B2	18.60	5500	993.2	1.75	0.98	2.90	1.73
EAST SPILLWAY/B2	18.39	4180	985.45	1.8	1.14	3.15	1.38
EAST SPILLWAY/B2	18.14	4180	977.04	1.44	1.36	4.44	1.42
EAST SPILLWAY/B2	17.94	4180	969.87	1.7	1.53	4.07	1.37
EAST SPILLWAY/B2	17.69	3180	961.51	1.29	1.79	5.01	1.31
EAST SPILLWAY/B2	17.37	4500	949.76	1.81	2.03	10.66	1.25
EAST SPILLWAY/B2	17.00	4500	936.76	1.6	2.39	9.26	2.24
EAST SPILLWAY/B2	16.77	2300	926.91	2.36	2.58	8.51	0.95
EAST SPILLWAY/B2	16.55	5800	920.09	1.5	2.79	10.29	2.07
EAST SPILLWAY/B2	16.37	5800	908.59	5.14	2.85	3.69	0.82
EAST SPILLWAY/B2	16.22	11500	903.1	1.16	3.06	3.70	2.41
EAST SPILLWAY/B2	16.01	11500	896.7	6.47	3.12	1.70	1.28

HEC-RAS SUMMARY, BETWEEN SPLIT AND JACKRABBIT TRAIL FULL FLOW (MODEL WT4B3)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B3	18.60	6500	993.11	1.62	1.03	2.81	1.07
EAST SPILLWAY/B3	18.39	6500	985.04	1.32	1.26	2.74	1.18
EAST SPILLWAY/B3	18.14	6500	976.18	1.85	1.43	3.58	1.65
EAST SPILLWAY/B3	17.94	6500	968.53	1.82	1.59	2.83	1.78
EAST SPILLWAY/B3	17.69	7500	960.47	1.6	1.81	3.97	1.64
EAST SPILLWAY/B3	17.37	6400	946.79	2	2.05	7.69	1.41
EAST SPILLWAY/B3	17.00	1300	932.74	0.69	2.85	5.74	1.17
EAST SPILLWAY/B3	16.77	3500	926.3	1.98	3.02	6.30	1.61
EAST SPILLWAY/B3	16.55	5800	920.29	1.5	3.24	10.29	2.07
EAST SPILLWAY/B3	16.37	5800	908.59	5.14	3.29	3.69	0.82
EAST SPILLWAY/B3	16.22	11500	903.1	1.16	3.51	3.70	2.41
EAST SPILLWAY/B3	16.01	11500	896.7	6.47	3.58	1.70	1.28



WESTERN AIR MAPS, INC.
DATE: 12-22-89

NOTES:

1. THIS AREA IS ONLY SLIGHTLY ABOVE CALCULATED WATER SURFACE ELEVATION, AND SHOULD NOT BE CONSIDERED SAFE FROM FLOODING DUE TO SPILLWAY FLOOD.
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4. AVERAGE DEPTH IS THE HYDRAULIC DEPTH.

HEC-RAS SUMMARY, EAST OF JACKRABBIT TRAIL FULL FLOW (MODEL WT4B4)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B4	18.60	5000	993.26	1.44	1.08	2.96	0.87
EAST SPILLWAY/B4	18.39	5000	985.26	0.99	1.39	2.96	0.90
EAST SPILLWAY/B4	18.14	5000	975.99	1.54	1.64	3.39	1.14
EAST SPILLWAY/B4	17.94	5000	968.19	1.16	1.93	2.39	1.20
EAST SPILLWAY/B4	17.69	5000	959.26	1.51	2.16	2.76	0.91
EAST SPILLWAY/B4	17.37	8400	941.73	1.16	2.79	2.63	1.21
EAST SPILLWAY/B4	17.00	11200	930.31	1.64	3.16	2.81	1.82
EAST SPILLWAY/B4	16.77	11200	922.57	1.67	3.38	2.57	1.69
EAST SPILLWAY/B4	16.55	11200	913.29	1.96	3.57	3.29	1.80
EAST SPILLWAY/B4	16.37	11200	907.66	1.55	3.72	3.98	1.64
EAST SPILLWAY/B4	16.22	5500	903.17	1.06	4.02	3.77	1.89
EAST SPILLWAY/B4	16.01	5500	896.25	4.14	4.10	1.25	0.52

NOTE:
ERM INFORMATION PROVIDED BY FLOOD CONTROL DISTRICT OF MARICOPA COUNTY, WHITE TANKS ADMS

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WHITE TANKS FRS #4

SPILLWAY DELINEATION STUDY

F.C.D. CONTRACT NO. 98-32

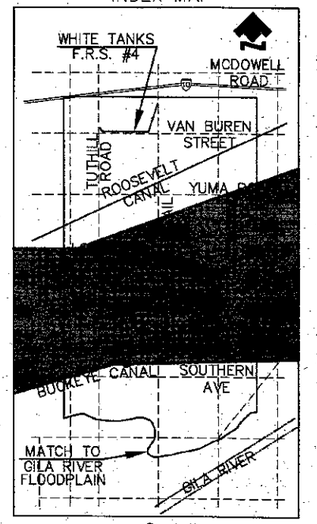
FULL FLOW

LEGEND

INUNDATION BOUNDARY
MODEL EFFECTIVE BOUNDARIES
SECTION IDENTIFICATION 3
HYDRAULIC BASELINE

NO.	ELEVATION	DESCRIPTION
228	977.97	BRASS CAP IN HAND HOLE, PERRYVILLE RD. & YUMA
243	974.19	BRASS CAP IN HAND HOLE, AIRPORT RD. AND LOWER BUCKEYE RD.
245	955.76	ROD IN CONCRETE IN HAND HOLE, JACK-RABBIT TRAIL & LOWER BUCKEYE ROAD
246	942.68	NAIL IN CONCRETE HEADWALL AT SW CORNER, OF PERRYVILLE RD. & LOWER BUCKEYE RD.
261	930.65	1/2" REBAR IN HAND HOLE, AIRPORT RD. AND BROADWAY RD.
262	925.51	ROD IN CONCRETE HAND HOLE, TUTHILL RD. & BROADWAY RD.
263	916.57	ROD IN CONCRETE HAND HOLE, JACK-RABBIT RD. & BROADWAY RD.
264	910.10	"X" CHISELED IN CONCRETE HEADWALL, SW CORNER OF PERRY VILLE RD. & BROADWAY RD.

INDEX MAP



SCALE: 1"= 1000'

0 500' 1000' 2000' 3000'

Hoskin Engineering Consultants
DEI PROFESSIONAL SERVICES

	BY	DATE
DESIGN	EC/KVM	07/00
DESIGN CHK.	HM/PWRH	07/00
PLANS	MLI	07/00
PLANS CHK.	HM/PWRH	07/00

SUBMITTED BY: DATE:

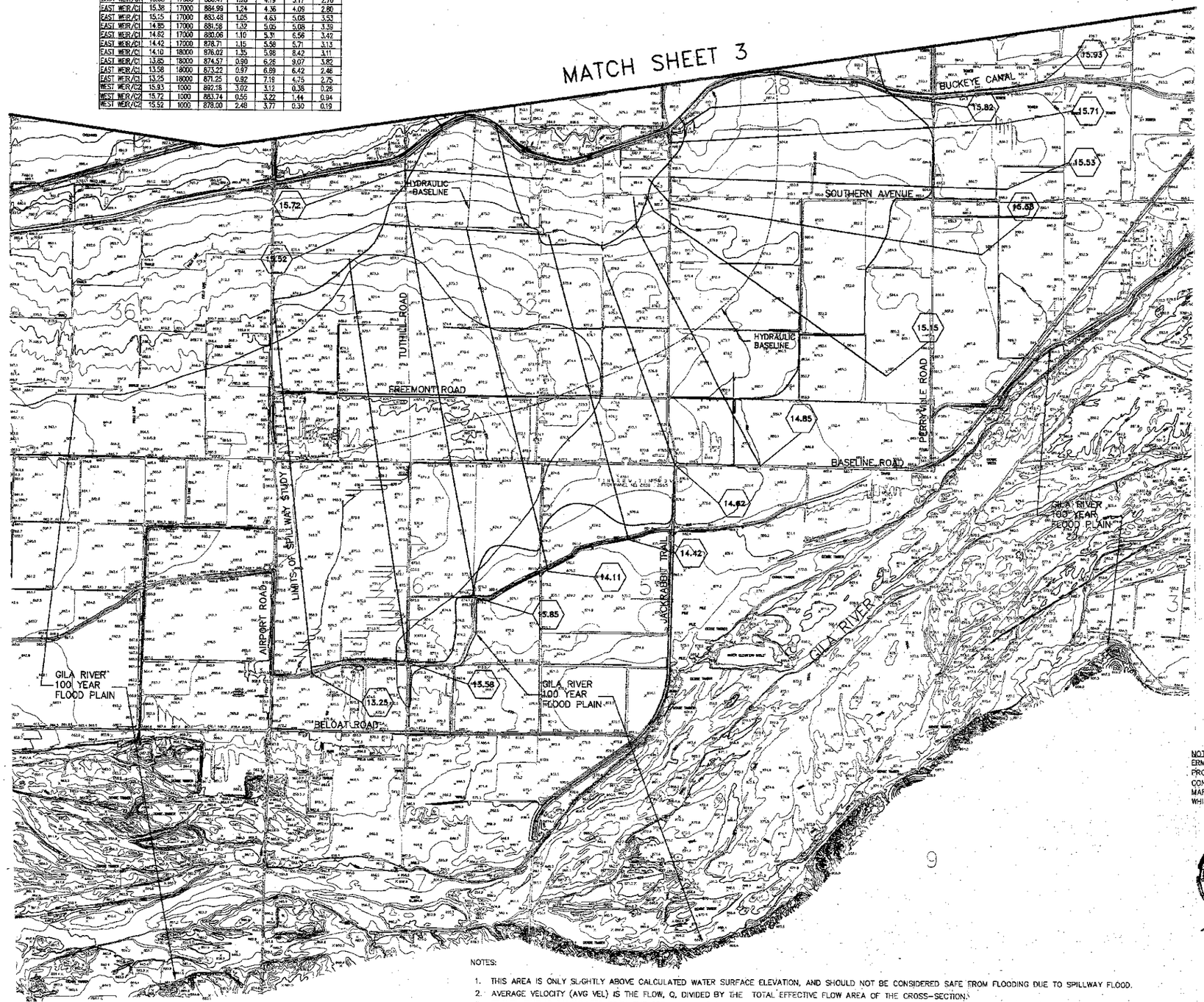
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE
APPROVED BY: DATE
CHIEF ENGINEER AND GENERAL MANAGER

SHEET 3 OF 10

HEC-RAS SUMMARY, EAST AND WEST SPILLWAYS FULL FLOW (MODEL WT4C1)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST WEIR/C1	15.93	17000	892.10	2.71	3.86	2.10	1.30
EAST WEIR/C1	15.82	17000	890.93	1.57	3.92	3.73	2.59
EAST WEIR/C1	15.71	17000	888.78	1.55	4.03	3.78	2.35
EAST WEIR/C1	15.53	17000	886.47	1.28	4.19	3.17	2.70
EAST WEIR/C1	15.38	17000	884.99	1.24	4.36	4.09	2.80
EAST WEIR/C1	15.15	17000	883.48	1.05	4.63	5.08	3.53
EAST WEIR/C1	14.85	17000	881.58	1.32	5.09	5.08	3.39
EAST WEIR/C1	14.62	17000	880.06	1.10	5.31	6.56	3.42
EAST WEIR/C1	14.42	17000	878.71	1.15	5.58	5.71	3.13
EAST WEIR/C1	14.10	18000	876.02	1.35	5.98	8.42	3.11
EAST WEIR/C1	13.85	18000	874.57	0.90	6.26	9.07	3.82
EAST WEIR/C1	13.58	18000	873.22	0.97	6.89	6.42	2.46
EAST WEIR/C1	13.25	18000	871.25	0.92	7.19	4.75	2.75
WEST WEIR/C2	15.93	1000	892.18	3.02	3.12	0.38	0.26
WEST WEIR/C2	15.72	1000	883.74	0.56	3.22	1.44	0.94
WEST WEIR/C2	15.52	1000	878.00	2.48	3.77	0.30	0.19



WESTERN AIR MAPS, INC.
DATE: 12-22-89

NOTES:

1. THIS AREA IS ONLY SLIGHTLY ABOVE CALCULATED WATER SURFACE ELEVATION, AND SHOULD NOT BE CONSIDERED SAFE FROM FLOODING DUE TO SPILLWAY FLOOD.
2. AVERAGE VELOCITY (AVG VEL) IS THE FLOW, Q, DIVIDED BY THE TOTAL EFFECTIVE FLOW AREA OF THE CROSS-SECTION.
3. TRAVEL TIME IS CALCULATED FROM THE SPILLWAY TO THE DOWNSTREAM CROSS SECTION, AND IS BASED ON THE AVERAGE VELOCITY FOR THE CROSS SECTION.
4. AVERAGE DEPTH IS THE HYDRAULIC DEPTH.

NOTE:
ERM INFORMATION PROVIDED BY FLOOD CONTROL DISTRICT OF MARICOPA COUNTY, WHITE TANKS ADMS

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WHITE TANKS FRS #4

SPILLWAY DELINEATION STUDY

F.C.D. CONTRACT NO. 98-32

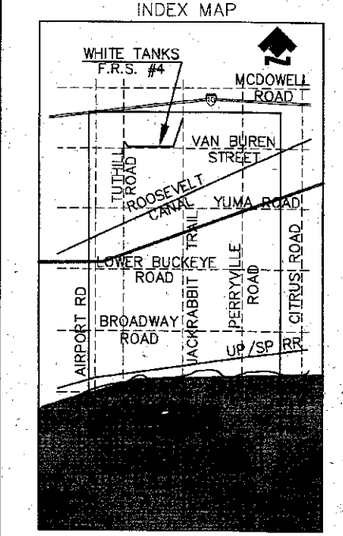
FULL FLOW

LEGEND

INUNDATION BOUNDARY	
MODEL EFFECTIVE BOUNDARIES	
SECTION IDENTIFICATION	3
HYDRAULIC BASELINE	

NO.	ELEVATION	DESCRIPTION
281	883.99	1" OPEN PIPE FLUSH WITH PAVEMENT JACKRABBIT TRAIL & SOUTHERN AVE.
282	886.26	MARICOPA COUNTY HIGHWAY DEPT. BRASS CAP FLUSH WITH PAVEMENT, PERRYVILLE RD. & SOUTHERN AVE
308	882.36	SPIKE IN POTHOLE, JACKRABBIT TRAIL 1/2 MILE SOUTH OF BASELINE RD.
312	868.26	BRASS CAP IN HAND HOLE, AIRPORT RD. AND BELOAT RD.
313	869.83	BRASS CAP IN HAND HOLE, 207TH AVE AND BELOAT RD

INDEX MAP



SCALE: 1" = 1000'

0 500' 1000' 2000' 3000'

Hoskin Engineering Consultants
DEI PROFESSIONAL SERVICES

	BY	DATE
DESIGN	EC/KVM	07/00
DESIGN CHK.	HM/PWRH	07/00
PLANS	MLI	07/00
PLANS CHK.	HM/PWRH	07/00
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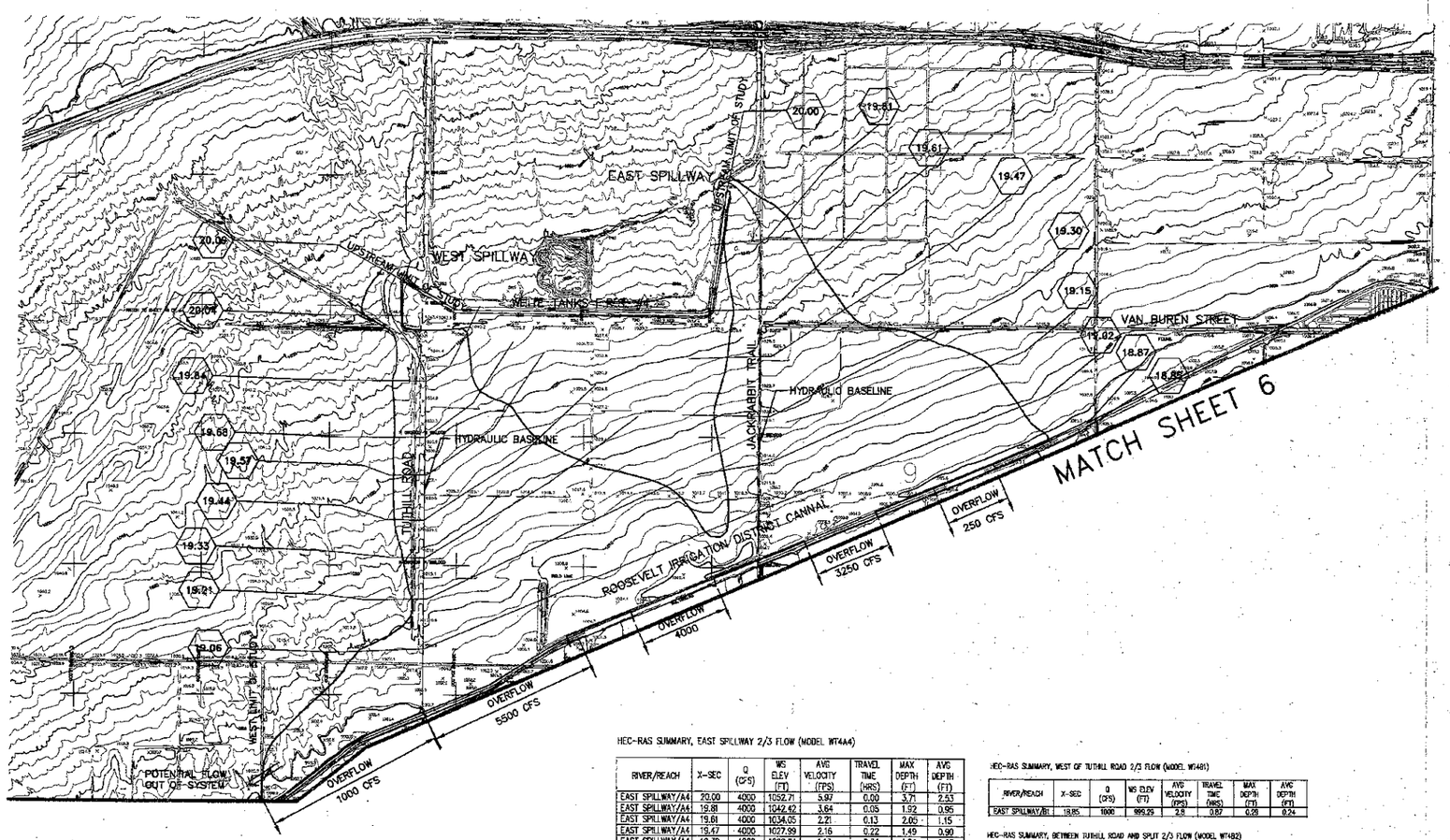
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 4 OF 10



HEC-RAS SUMMARY, EAST SPILLWAY 2/3 FLOW (MODEL WT4A4)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/A4	20.00	4000	1052.71	5.97	0.00	3.71	2.53
EAST SPILLWAY/A4	19.88	4000	1042.42	3.64	0.05	1.92	0.95
EAST SPILLWAY/A4	19.61	4000	1034.05	2.21	0.13	2.05	1.15
EAST SPILLWAY/A4	19.47	4000	1027.99	2.16	0.22	1.49	0.90
EAST SPILLWAY/A4	19.30	4000	1020.64	1.13	0.34	1.64	0.97
EAST SPILLWAY/A4	19.15	4000	1013.81	1.60	0.52	1.31	0.56
EAST SPILLWAY/A4	19.02	3500	1009.77	0.79	0.64	1.77	0.98
EAST SPILLWAY/A4	18.87	3500	1004.32	3.72	0.93	0.96	0.42

HEC-RAS SUMMARY, WEST SPILLWAY 2/3 FLOW (MODEL WT4A1, WT4A2, WT4A3)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
WEST SPILLWAY/A1-A3	20.09	8000	1052.66	8.46	0.00	4.48	2.37
WEST SPILLWAY/A1-A3	20.04	8000	1048.62	7.65	0.02	5.82	1.80
WEST SPILLWAY/A1-A3	19.84	8000	1040.75	3.62	0.06	4.23	1.72
WEST SPILLWAY/A1-A3	19.68	8000	1034.36	2.95	0.13	3.38	1.83
WEST SPILLWAY/A1-A3	19.57	8000	1030.63	2.07	0.18	3.63	1.90
WEST SPILLWAY/A1-A3	19.44	8000	1025.52	2.31	0.27	4.02	1.32
WEST SPILLWAY/A1-A3	19.33	8000	1020.99	1.73	0.34	3.99	1.47
WEST SPILLWAY/A1-A3	19.21	8000	1015.34	1.98	0.45	3.84	1.19
WEST SPILLWAY/A1-A3	19.06	8500	1009.12	0.62	0.56	3.62	1.65
WEST SPILLWAY/A1-A3	18.87	8500	1003.53	3.94	0.65	2.54	0.60

HEC-RAS SUMMARY, WEST OF TUTHILL ROAD 2/3 FLOW (MODEL WT4B1)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B1	18.85	1000	999.29	2.3	0.87	0.09	0.24

HEC-RAS SUMMARY, BETWEEN TUTHILL ROAD AND SPLIT 2/3 FLOW (MODEL WT4B2)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B2	18.85	3500	1000.36	2.07	0.67	2.36	0.72

HEC-RAS SUMMARY, BETWEEN SPLIT AND JACKRABBIT TRAIL 2/3 FLOW (MODEL WT4B3)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B3	18.85	4000	1002.16	2.58	0.94	3.16	0.85

HEC-RAS SUMMARY, EAST OF JACKRABBIT TRAIL 2/3 FLOW (MODEL WT4B4)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B4	18.85	3500	1002.73	1.62	0.65	3.73	0.52

NOTE:
ERM INFORMATION PROVIDED BY FLOOD CONTROL DISTRICT OF MARICOPA COUNTY; WHITE TANKS ADMS

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4. AVERAGE DEPTH IS THE HYDRAULIC DEPTH.

WESTERN AIR MAPS, INC.
DATE: 12-22-89

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WHITE TANKS FRS #4

SPILLWAY DELINEATION STUDY

F.C.D. CONTRACT NO. 98-32

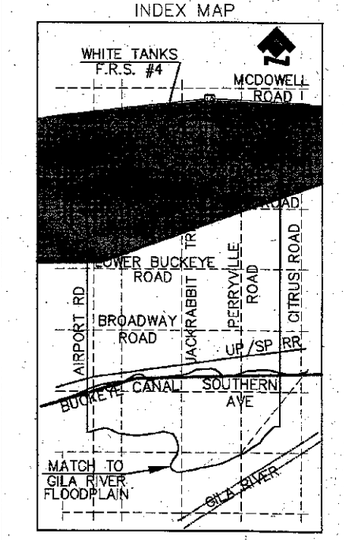
2/3 FLOW

LEGEND

INUNDATION BOUNDARY
MODEL EFFECTIVE BOUNDARIES
SECTION IDENTIFICATION 3
HYDRAULIC BASELINE

NO.	ELEVATION	DESCRIPTION
208	1044.61	COTTON PICKER SPINDEL IN POWER POLE SOUTHEAST CORNER OF INTERECTION OF TUTHILL & VAN BUREN ST.
209	1030.91	1/2" OPEN PIPE IN HAND HOLE, JACKRABBIT TRAIL & VAN BUREN ST.
210	1012.47	BRASS CAP IN HAND HOLE, PERRYVILLE RD. & VAN BUREN ST.
226	1006.24	3/8" IRON PIN IN POTHOLE, TUTHILL RD. AND YUMA RD.
227	989.03	3/4" ROD IN HAND HOLE, JACKRABBIT TRAIL & YUMA RD.
191	1051.34	BRASS CAP IN HAND HOLE, PERRYVILLE RD. & MCDOWELL RD.

INDEX MAP



SCALE: 1"= 1000'
0 500' 1000' 2000' 3000'

Hoskin Engineering Consultants
DEI PROFESSIONAL SERVICES

	BY	DATE	
DESIGN	EC/KVM	07/00	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	HM/PWRH	07/00	
PLANS	MLJ	07/00	RECOMMENDED BY: DATE
PLANS CHK.	HM/PWRH	07/00	APPROVED BY: DATE
SUBMITTED BY: DATE:			CHIEF ENGINEER AND GENERAL MANAGER
			SHEET 5 OF 10

HEC-RAS SUMMARY, WEST OF TUTHILL ROAD 2/3 FLOW (MODEL WT481)

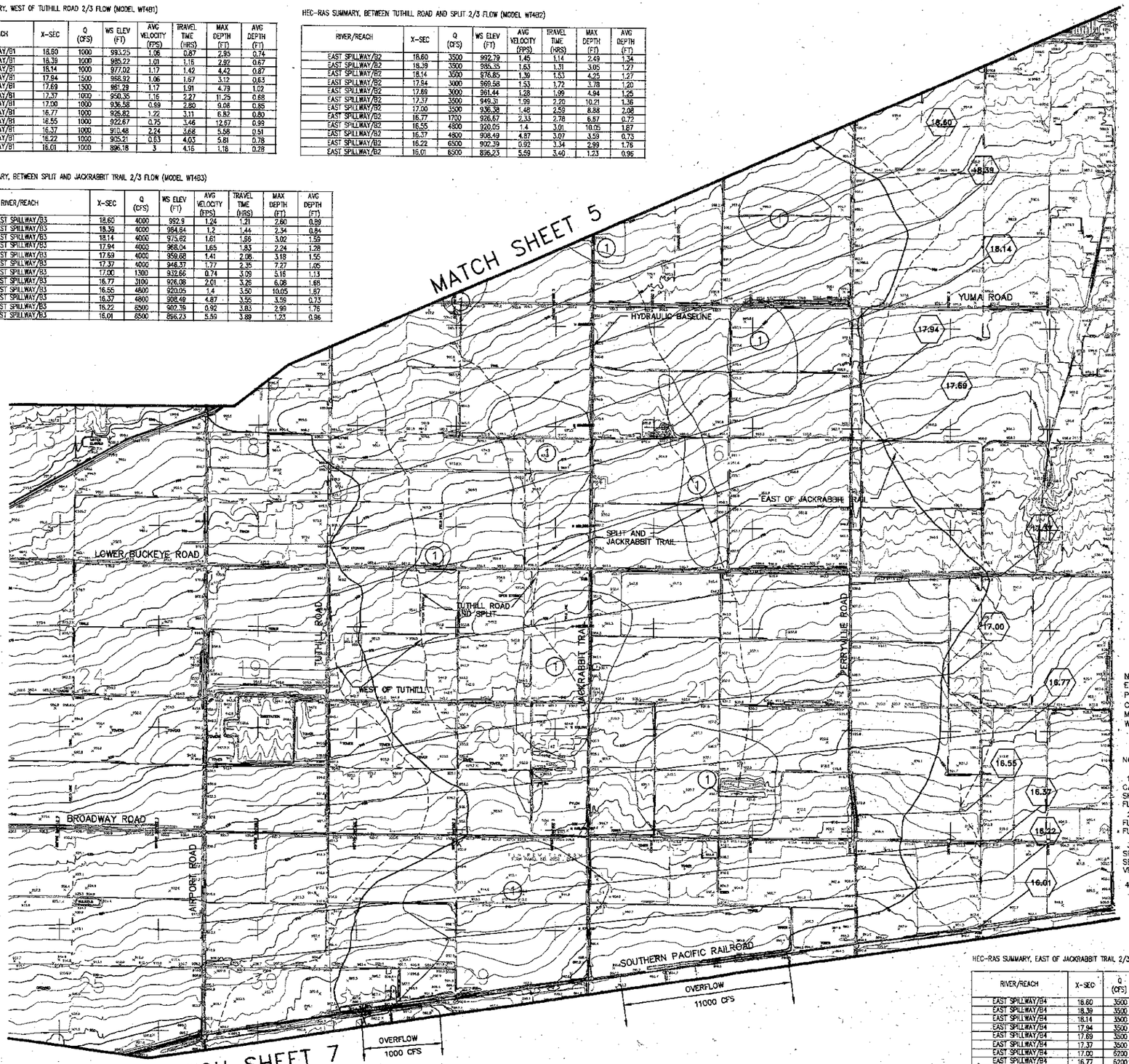
RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B1	18.60	1000	993.25	1.06	0.87	2.95	0.74
EAST SPILLWAY/B1	18.39	1000	985.22	1.01	1.16	2.92	0.67
EAST SPILLWAY/B1	18.14	1000	977.02	1.17	1.42	4.42	0.87
EAST SPILLWAY/B1	17.94	1500	968.92	1.06	1.67	3.12	0.63
EAST SPILLWAY/B1	17.69	1500	961.29	1.17	1.91	4.79	1.02
EAST SPILLWAY/B1	17.37	1000	950.35	1.16	2.27	11.25	0.68
EAST SPILLWAY/B1	17.00	1000	936.58	0.99	2.80	9.08	0.85
EAST SPILLWAY/B1	16.77	1000	926.82	1.22	3.11	6.82	0.80
EAST SPILLWAY/B1	16.55	1000	922.67	0.75	3.46	12.67	0.99
EAST SPILLWAY/B1	16.37	1000	910.48	2.24	3.68	5.58	0.51
EAST SPILLWAY/B1	16.22	1000	905.21	0.83	4.03	5.81	0.78
EAST SPILLWAY/B1	16.01	1000	896.18	3	4.16	1.18	0.28

HEC-RAS SUMMARY, BETWEEN TUTHILL ROAD AND SPLIT 2/3 FLOW (MODEL WT482)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B2	18.60	3500	992.79	1.45	1.14	2.49	1.34
EAST SPILLWAY/B2	18.39	3500	985.35	1.63	1.31	3.05	1.27
EAST SPILLWAY/B2	18.14	3500	976.85	1.39	1.53	4.25	1.27
EAST SPILLWAY/B2	17.94	3000	969.58	1.53	1.72	3.78	1.20
EAST SPILLWAY/B2	17.69	3000	961.44	1.28	1.99	4.94	1.25
EAST SPILLWAY/B2	17.37	3500	949.31	1.99	2.20	10.21	1.36
EAST SPILLWAY/B2	17.00	3500	936.38	1.48	2.59	8.88	2.08
EAST SPILLWAY/B2	16.77	1700	926.67	2.33	2.78	6.57	0.72
EAST SPILLWAY/B2	16.55	4800	920.05	1.4	3.01	10.05	1.87
EAST SPILLWAY/B2	16.37	4800	908.49	4.87	3.07	3.59	0.73
EAST SPILLWAY/B2	16.22	6500	902.39	0.92	3.34	2.99	1.76
EAST SPILLWAY/B2	16.01	6500	896.23	5.59	3.49	1.23	0.96

HEC-RAS SUMMARY, BETWEEN SPLIT AND JACKRABBIT TRAIL 2/3 FLOW (MODEL WT483)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B3	18.60	4000	992.9	1.24	1.21	2.60	0.89
EAST SPILLWAY/B3	18.39	4000	984.84	1.2	1.44	2.34	0.84
EAST SPILLWAY/B3	18.14	4000	975.82	1.61	1.66	3.02	1.59
EAST SPILLWAY/B3	17.94	4000	968.04	1.65	1.83	2.24	1.28
EAST SPILLWAY/B3	17.69	4000	959.68	1.41	2.06	3.18	1.55
EAST SPILLWAY/B3	17.37	4000	948.37	1.77	2.35	7.27	1.05
EAST SPILLWAY/B3	17.00	1300	932.66	0.74	3.09	5.16	1.13
EAST SPILLWAY/B3	16.77	3100	926.08	2.01	3.26	6.08	1.68
EAST SPILLWAY/B3	16.55	4800	920.05	1.4	3.50	10.05	1.87
EAST SPILLWAY/B3	16.37	4800	908.49	4.87	3.55	3.59	0.73
EAST SPILLWAY/B3	16.22	6500	902.39	0.92	3.83	2.99	1.76
EAST SPILLWAY/B3	16.01	6500	896.23	5.59	3.89	1.23	0.96



NOTE:
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4. AVERAGE DEPTH IS THE HYDRAULIC DEPTH.

HEC-RAS SUMMARY, EAST OF JACKRABBIT TRAIL 2/3 FLOW (MODEL WT484)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B4	18.60	3500	993.1	1.23	1.24	2.80	0.74
EAST SPILLWAY/B4	18.39	3500	985.06	0.89	1.58	2.76	0.72
EAST SPILLWAY/B4	18.14	3500	975.75	1.34	1.87	3.15	1.00
EAST SPILLWAY/B4	17.94	3500	967.51	1.06	2.19	2.11	0.69
EAST SPILLWAY/B4	17.69	3500	959.11	1.27	2.46	2.81	0.78
EAST SPILLWAY/B4	17.37	3500	941.04	1.15	3.09	1.94	1.14
EAST SPILLWAY/B4	17.00	6200	929.57	1.36	3.54	2.17	1.41
EAST SPILLWAY/B4	16.77	6200	921.85	1.42	3.80	1.95	1.29
EAST SPILLWAY/B4	16.55	6200	912.65	1.62	4.02	2.65	1.36
EAST SPILLWAY/B4	16.37	6200	907.08	1.31	4.20	2.15	1.26
EAST SPILLWAY/B4	16.22	4500	902.96	0.98	4.53	3.56	1.69
EAST SPILLWAY/B4	16.01	4500	896.16	4.03	4.61	1.18	0.49

WESTERN AIR MAPS, INC.
DATE: 12-22-89

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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2/3 FLOW

LEGEND

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MODEL EFFECTIVE BOUNDARIES
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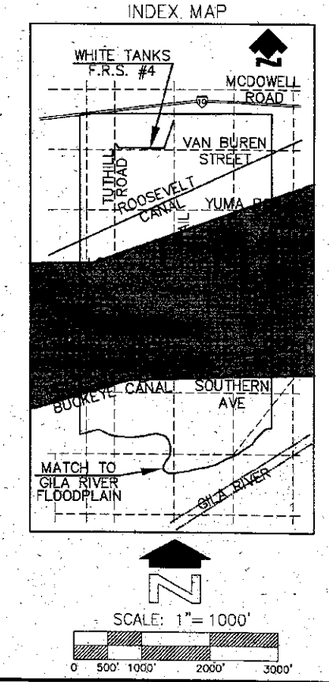
HYDRAULIC BASELINE

NO.	ELEVATION	DESCRIPTION
228	977.97	BRASS CAP IN HAND HOLE, PERRYVILLE RD. & YUMA
243	974.19	BRASS CAP IN HAND HOLE, AIRPORT RD. AND LOWER BUCKEYE RD.
245	955.76	ROD IN CONCRETE IN HAND HOLE, JACK-RABBIT TRAIL & LOWER BUCKEYE ROAD
246	942.65	NAIL IN CONCRETE HEADWALL AT SW CORNER, OF PERRYVILLE RD. & LOWER BUCKEYE RD.
261	930.65	1/2" REBAR IN HAND HOLE, AIRPORT RD. AND BROADWAY RD.
262	925.51	ROD IN CONCRETE HAND HOLE, TUTHILL RD. & BROADWAY RD.
263	916.67	ROD IN CONCRETE HAND HOLE, JACK-RABBIT RD. & BROADWAY RD.
264	910.10	"X" CHISELED IN CONCRETE HEADWALL, SW CORNER OF PERRY VILLE RD. & BROADWAY RD.

INDEX MAP



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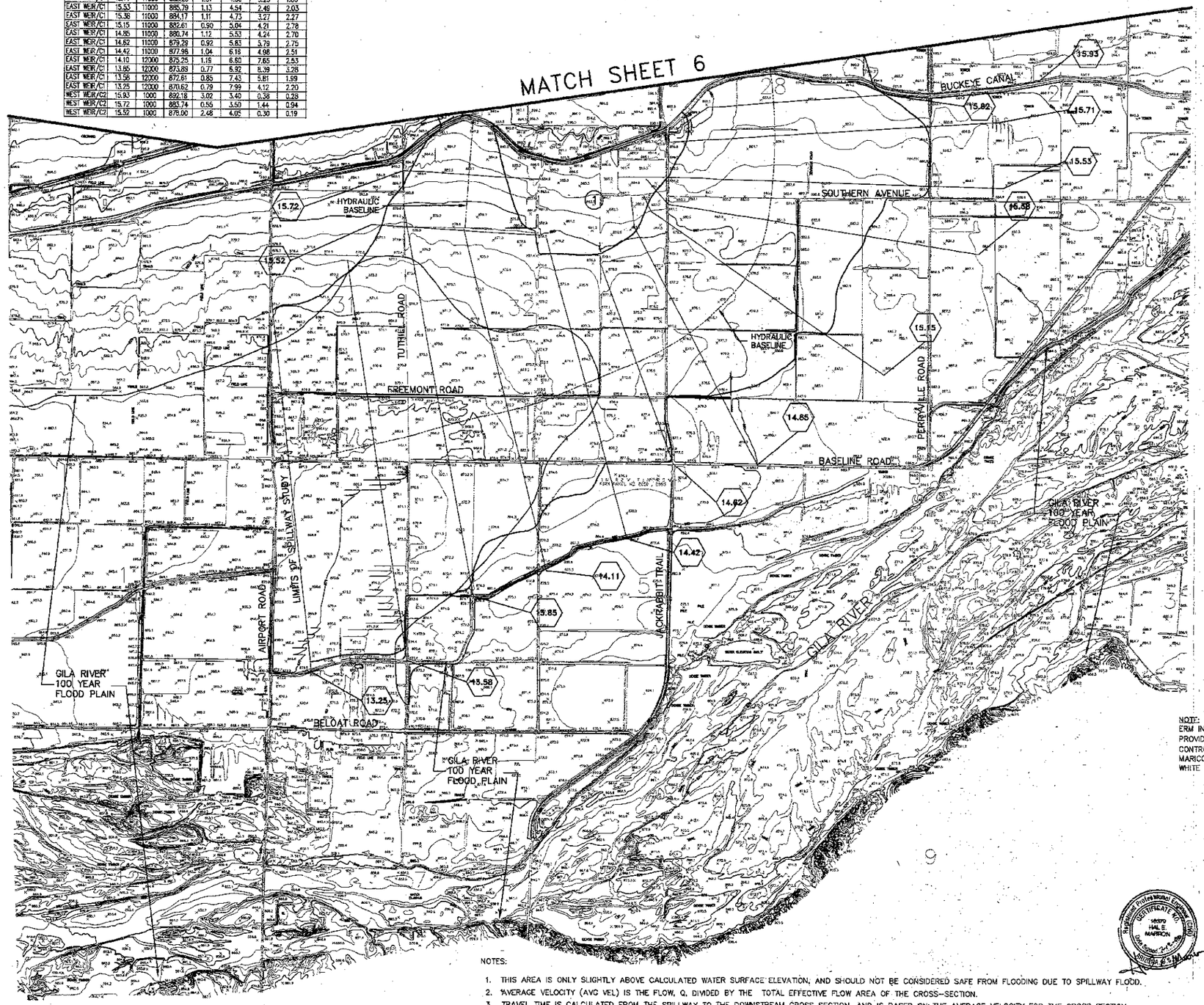
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE
APPROVED BY: DATE
CHIEF ENGINEER AND GENERAL MANAGER

SHEET 6 OF 10

HEC-RAS SUMMARY, EAST SPILLWAY 2/3 FLOW (MODEL WT4C1)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST WEIR/C1	15.93	11000	892.65	2.61	4.16	1.86	0.96
EAST WEIR/C1	15.82	11000	890.26	1.35	4.22	3.06	2.17
EAST WEIR/C1	15.71	11000	888.23	1.31	4.36	3.23	1.86
EAST WEIR/C1	15.53	11000	885.79	1.13	4.94	2.49	2.03
EAST WEIR/C1	15.38	11000	884.17	1.11	4.73	3.27	2.27
EAST WEIR/C1	15.15	11000	882.61	0.90	5.04	4.21	2.78
EAST WEIR/C1	14.85	11000	880.74	1.12	5.53	4.24	2.70
EAST WEIR/C1	14.62	11000	879.29	0.92	5.83	3.79	2.75
EAST WEIR/C1	14.42	11000	877.96	1.04	6.16	4.98	2.51
EAST WEIR/C1	14.10	12000	875.25	1.19	6.60	7.65	2.53
EAST WEIR/C1	13.85	12000	873.89	0.77	6.92	8.39	3.28
EAST WEIR/C1	13.58	12000	872.61	0.85	7.43	5.81	1.99
EAST WEIR/C1	13.25	12000	870.62	0.79	7.99	4.12	2.20
WEST WEIR/C2	15.93	1000	892.18	3.02	3.40	0.38	0.28
WEST WEIR/C2	15.72	1000	883.74	0.55	3.50	1.44	0.94
WEST WEIR/C2	15.52	1000	878.00	2.48	4.05	0.30	0.19



NOTE:
ERM INFORMATION PROVIDED BY FLOOD CONTROL DISTRICT OF MARICOPA COUNTY, WHITE TANKS ADMS

NOTES:

1. THIS AREA IS ONLY SLIGHTLY ABOVE CALCULATED WATER SURFACE ELEVATION, AND SHOULD NOT BE CONSIDERED SAFE FROM FLOODING DUE TO SPILLWAY FLOOD.
2. AVERAGE VELOCITY (AVG VEL) IS THE FLOW, Q, DIVIDED BY THE TOTAL EFFECTIVE FLOW AREA OF THE CROSS-SECTION.
3. TRAVEL TIME IS CALCULATED FROM THE SPILLWAY TO THE DOWNSTREAM CROSS SECTION, AND IS BASED ON THE AVERAGE VELOCITY FOR THE CROSS SECTION.
4. AVERAGE DEPTH IS THE HYDRAULIC DEPTH.

WESTERN AIR MAPS, INC.
DATE: 12-22-89

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WHITE TANKS FRS #4

SPILLWAY DELINEATION STUDY
F.C.D. CONTRACT NO. 98-32

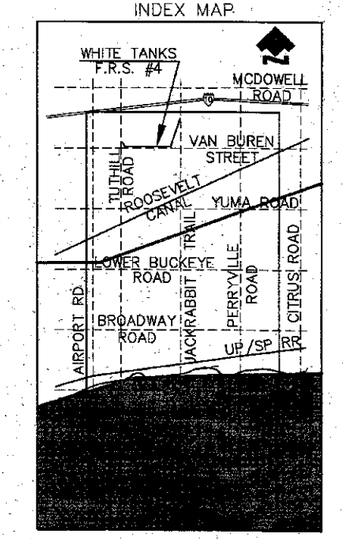
2/3 FLOW

LEGEND

INUNDATION BOUNDARY
MODEL EFFECTIVE BOUNDARIES
SECTION IDENTIFICATION
HYDRAULIC BASELINE 3

NO.	ELEVATION	DESCRIPTION
281	883.99	1" OPEN PIPE FLUSH WITH PAVEMENT JACKRABBIT TRAIL & SOUTHERN AVE.
282	886.26	MARICOPA COUNTY HIGHWAY DEPT. BRASS CAP FLUSH WITH PAVEMENT, PERRYVILLE RD. & SOUTHERN AVE
308	882.36	SPIKE IN POTHOLE, JACKRABBIT TRAIL 1/2 MILE SOUTH OF BACELINE RD.
312	868.26	BRASS CAP IN HAND HOLE, AIRPORT RD. AND BELOAT RD.
313	869.83	BRASS CAP IN HAND HOLE, 207TH AVE AND BELOAT RD

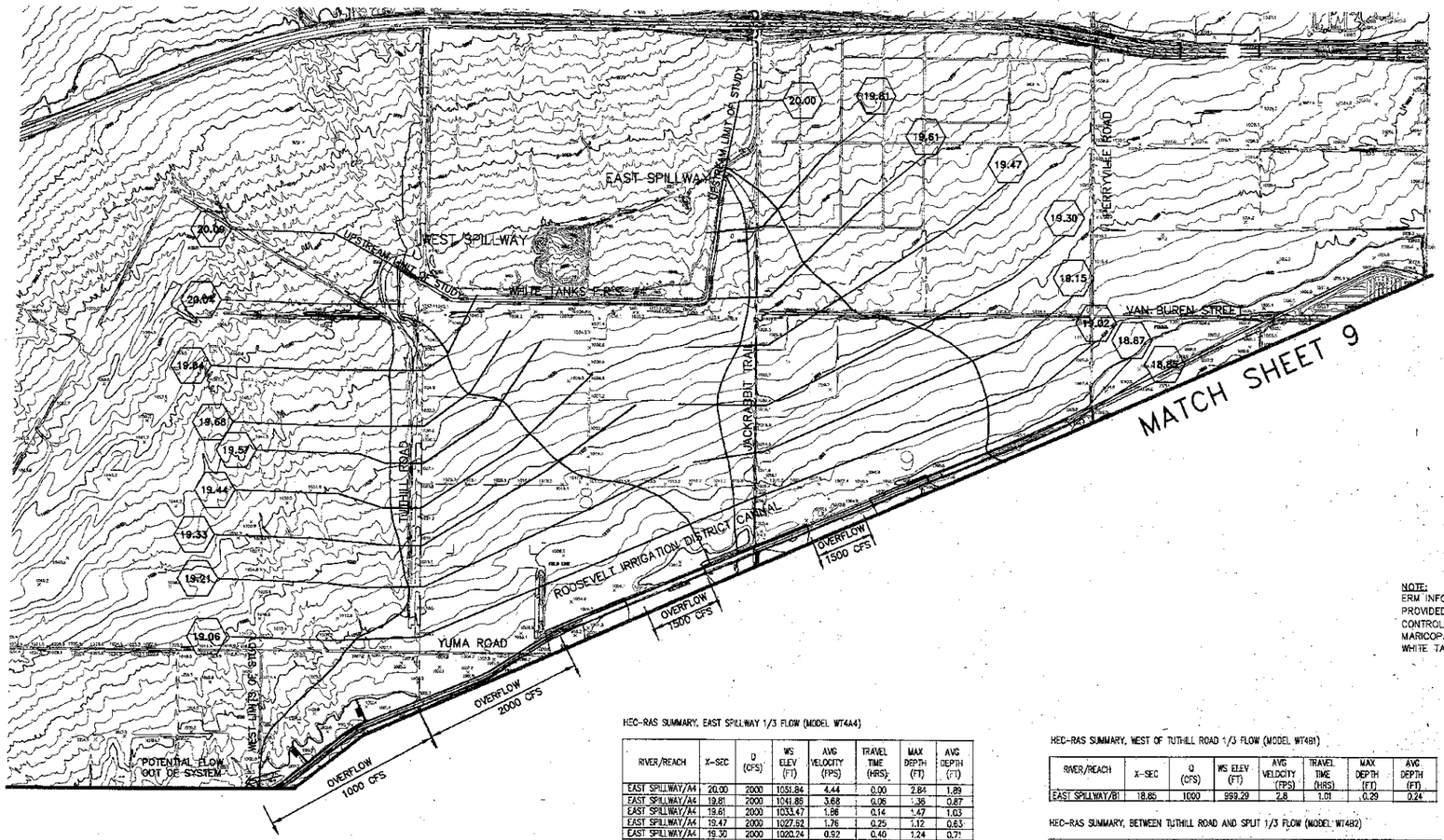
INDEX MAP



SCALE: 1"= 1000'
0 500' 1000' 2000' 3000'

Hoskin Engineering Consultants
DEI PROFESSIONAL SERVICES

	BY	DATE	
DESIGN	EC/KVM	07/00	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
DESIGN CHK.	HM/PWRH	07/00	
PLANS	MLJ	07/00	RECOMMENDED BY: DATE
PLANS CHK.	HM/PWRH	07/00	APPROVED BY: DATE
SUBMITTED BY: DATE:			CHIEF ENGINEER AND GENERAL MANAGER
			SHEET 7 OF 10



NOTE:
ERM INFORMATION PROVIDED BY FLOOD CONTROL DISTRICT OF MARICOPA COUNTY, WHITE TANKS ADMS

HEC-RAS SUMMARY, EAST SPILLWAY 1/3 FLOW (MODEL WT4A4)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/A4	20.00	2000	1051.84	4.44	0.00	2.84	1.89
EAST SPILLWAY/A4	19.81	2000	1041.85	3.68	0.06	1.36	0.87
EAST SPILLWAY/A4	19.61	2000	1033.47	1.86	0.14	1.47	1.03
EAST SPILLWAY/A4	19.47	2000	1027.52	1.76	0.25	1.12	0.63
EAST SPILLWAY/A4	19.30	2000	1020.24	0.92	0.40	1.24	0.71
EAST SPILLWAY/A4	19.15	2000	1013.59	1.27	0.62	1.09	0.38
EAST SPILLWAY/A4	19.02	1500	1009.32	0.59	0.78	1.32	0.65
EAST SPILLWAY/A4	18.87	1500	1003.98	3.74	1.15	0.60	0.43

HEC-RAS SUMMARY, WEST SPILLWAY 1/3 FLOW (MODEL WT4A1, WT4A2, WT4A3)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
WEST SPILLWAY/A1-A3	20.09	4000	1051.98	6.82	0.00	3.46	1.84
WEST SPILLWAY/A1-A3	20.04	4000	1048.90	8.25	0.02	5.09	1.18
WEST SPILLWAY/A1-A3	19.84	4000	1040.75	3.31	0.07	4.25	1.34
WEST SPILLWAY/A1-A3	19.68	4000	1034.38	2.44	0.15	3.38	1.26
WEST SPILLWAY/A1-A3	19.57	4000	1030.63	1.56	0.21	3.63	1.29
WEST SPILLWAY/A1-A3	19.44	4000	1025.52	2.04	0.34	4.02	1.01
WEST SPILLWAY/A1-A3	19.33	4000	1020.99	1.44	0.41	3.99	1.31
WEST SPILLWAY/A1-A3	19.21	4000	1015.34	2.09	0.54	3.84	1.19
WEST SPILLWAY/A1-A3	19.06	4500	1009.00	0.78	0.64	3.50	1.23
WEST SPILLWAY/A1-A3	18.87	4500	1003.28	3.29	1.00	2.29	0.44

HEC-RAS SUMMARY, WEST OF TUTHILL ROAD 1/3 FLOW (MODEL WT4B1)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B1	18.85	1000	999.29	2.8	1.01	0.29	0.24

HEC-RAS SUMMARY, BETWEEN TUTHILL ROAD AND SPLIT 1/3 FLOW (MODEL WT4B2)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B2	18.85	2000	1001.08	1.87	1.01	2.08	0.52

HEC-RAS SUMMARY, BETWEEN SPLIT AND JACKRABBIT TRAIL 1/3 FLOW (MODEL WT4B3)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B3	18.85	1500	1001.84	2.09	1.16	2.64	0.51

HEC-RAS SUMMARY, EAST OF JACKRABBIT TRAIL 1/3 FLOW (MODEL WT4B4)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B4	18.85	1500	1002.35	1.54	1.17	3.36	0.42

NOTES:

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2. AVERAGE VELOCITY (AVG VEL) IS THE FLOW, Q, DIVIDED BY THE TOTAL EFFECTIVE FLOW AREA OF THE CROSS-SECTION.
3. TRAVEL TIME IS CALCULATED FROM THE SPILLWAY TO THE DOWNSTREAM CROSS SECTION, AND IS BASED ON THE AVERAGE VELOCITY FOR THE CROSS SECTION.
4. AVERAGE DEPTH IS THE HYDRAULIC DEPTH.

WESTERN AIR MAPS, INC.
DATE: 12-22-89

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WHITE TANKS FRS #4

SPILLWAY DELINEATION STUDY

F.C.D. CONTRACT NO. 98-32

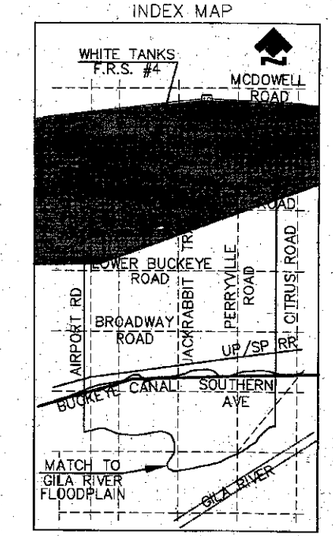
1/3 FLOW

LEGEND

INUNDATION BOUNDARY
MODEL EFFECTIVE BOUNDARIES
SECTION IDENTIFICATION 3
HYDRAULIC BASELINE

NO.	ELEVATION	DESCRIPTION
208	1044.61	COTTON PICKER SPINDEL IN POWER POLE SOUTHEAST CORNER OF INTERECTION OF TUTHILL & VAN BUREN ST.
209	1030.91	1/2" OPEN PIPE IN HAND HOLE, JACKRABBIT TRAIL & VAN BUREN ST.
210	1012.47	BRASS CAP IN HAND HOLE, PERRYVILLE RD. & VAN BUREN ST.
226	1006.24	3/8" IRON PIN IN POTHOLE, TUTHILL RD. AND YUMA RD.
227	988.03	3/4" ROD IN HAND HOLE, JACKRABBIT TRAIL & YUMA RD.
191	1051.34	BRASS CAP IN HAND HOLE, PERRYVALLE RD. & MCDOWELL RD.

INDEX MAP



SCALE: 1"=1000'
0 500' 1000' 2000' 3000'

Hoskin Engineering Consultants
DBA PROFESSIONAL SERVICES

	BY	DATE
DESIGN	EC/KVM	07/00
DESIGN CHK.	HM/PWRH	07/00
PLANS	MLI	07/00
PLANS CHK.	HM/PWRH	07/00
SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE
APPROVED BY: DATE
CHIEF ENGINEER AND GENERAL MANAGER

SHEET 8 OF 10

HEC-RAS SUMMARY, WEST OF TUTHILL ROAD 1/3 FLOW (MODEL WT4B1)

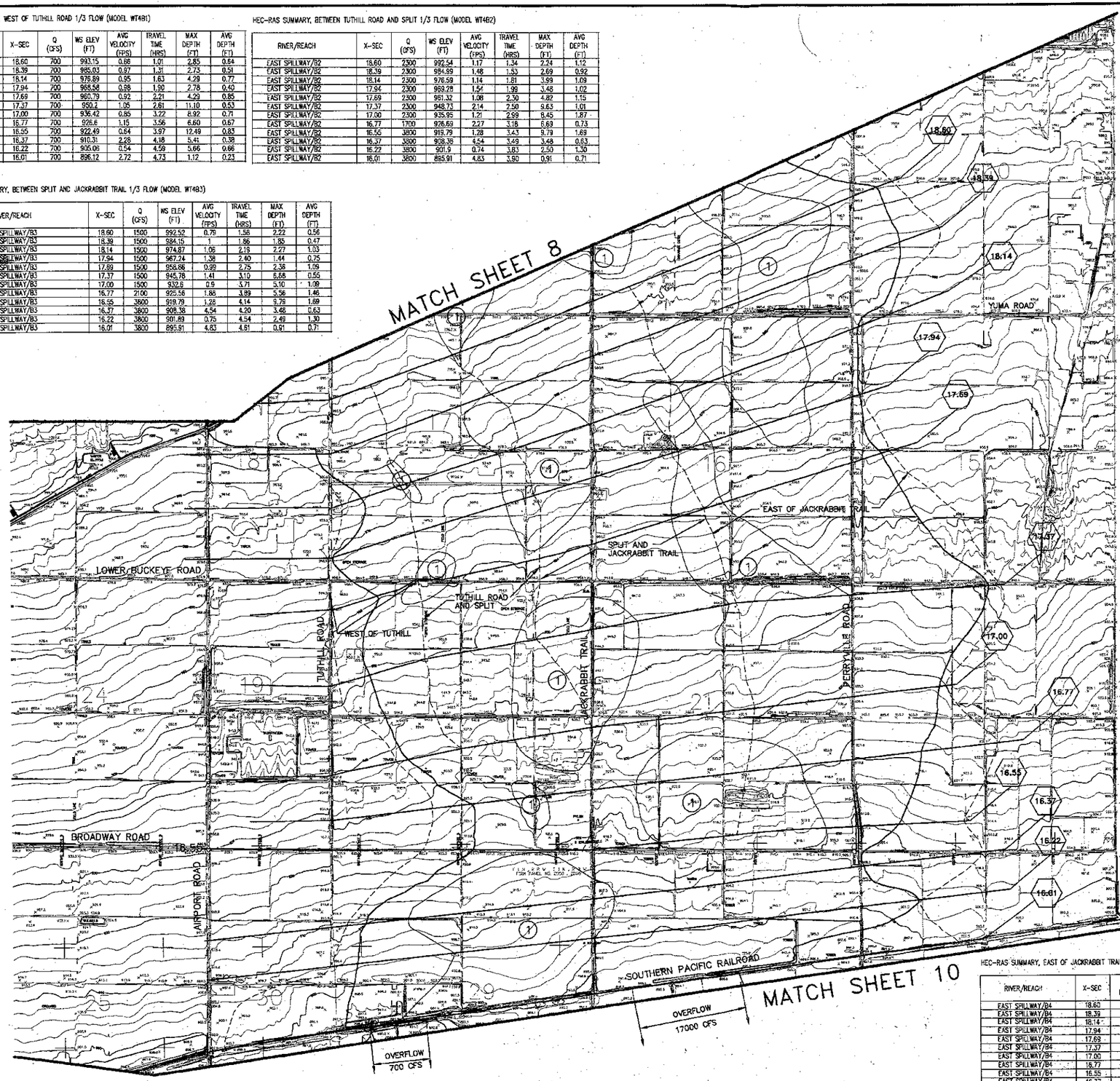
RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B1	18.60	700	993.15	0.88	1.01	2.85	0.54
EAST SPILLWAY/B1	18.39	700	985.03	0.97	1.31	2.73	0.51
EAST SPILLWAY/B1	18.14	700	976.89	0.95	1.63	4.29	0.77
EAST SPILLWAY/B1	17.94	700	968.58	0.98	1.90	2.78	0.40
EAST SPILLWAY/B1	17.69	700	960.79	0.92	2.21	4.29	0.85
EAST SPILLWAY/B1	17.37	700	950.2	1.05	2.61	11.10	0.53
EAST SPILLWAY/B1	17.00	700	936.42	0.85	3.22	8.92	0.71
EAST SPILLWAY/B1	16.77	700	926.6	1.15	3.56	6.60	0.67
EAST SPILLWAY/B1	16.55	700	922.49	0.64	3.97	12.49	0.83
EAST SPILLWAY/B1	16.37	700	910.31	2.28	4.18	5.41	0.38
EAST SPILLWAY/B1	16.22	700	905.06	0.54	4.59	5.66	0.66
EAST SPILLWAY/B1	16.01	700	896.12	2.72	4.73	1.12	0.23

HEC-RAS SUMMARY, BETWEEN TUTHILL ROAD AND SPLIT 1/3 FLOW (MODEL WT4B2)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B2	18.60	2300	992.54	1.17	1.34	2.74	1.12
EAST SPILLWAY/B2	18.39	2300	984.89	1.46	1.53	2.69	0.92
EAST SPILLWAY/B2	18.14	2300	976.59	1.14	1.81	3.99	1.09
EAST SPILLWAY/B2	17.94	2300	969.28	1.54	1.99	3.48	1.02
EAST SPILLWAY/B2	17.69	2300	961.32	1.08	2.30	4.82	1.15
EAST SPILLWAY/B2	17.37	2300	948.73	2.14	2.50	9.63	1.01
EAST SPILLWAY/B2	17.00	2300	935.95	1.21	2.99	8.45	1.87
EAST SPILLWAY/B2	16.77	1700	926.69	2.27	3.18	6.69	0.73
EAST SPILLWAY/B2	16.55	3800	919.79	1.28	3.43	9.79	1.69
EAST SPILLWAY/B2	16.37	3800	908.38	4.54	3.49	3.48	0.63
EAST SPILLWAY/B2	16.22	3800	901.9	0.74	3.83	2.50	1.30
EAST SPILLWAY/B2	16.01	3800	895.91	4.83	3.90	0.91	0.71

HEC-RAS SUMMARY, BETWEEN SPLIT AND JACKRABBIT TRAIL 1/3 FLOW (MODEL WT4B3)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B3	18.60	1500	992.52	0.76	1.56	2.22	0.56
EAST SPILLWAY/B3	18.39	1500	984.15	1	1.86	1.85	0.47
EAST SPILLWAY/B3	18.14	1500	974.87	1.06	2.18	2.27	1.03
EAST SPILLWAY/B3	17.94	1500	967.24	1.38	2.40	1.44	0.75
EAST SPILLWAY/B3	17.69	1500	958.86	0.99	2.75	2.38	1.09
EAST SPILLWAY/B3	17.37	1500	945.78	1.41	3.10	8.68	0.55
EAST SPILLWAY/B3	17.00	1500	932.6	0.9	3.71	5.10	1.09
EAST SPILLWAY/B3	16.77	2100	925.56	1.88	3.89	5.56	1.46
EAST SPILLWAY/B3	16.55	3800	919.79	1.28	4.14	9.79	1.69
EAST SPILLWAY/B3	16.37	3800	908.38	4.54	4.20	3.48	0.63
EAST SPILLWAY/B3	16.22	3800	901.89	0.75	4.54	2.49	1.30
EAST SPILLWAY/B3	16.01	3800	895.91	4.83	4.81	0.91	0.71



WESTERN AIR MAPS, INC.
DATE: 12-22-89

NOTE:
ERM INFORMATION PROVIDED BY FLOOD CONTROL DISTRICT OF MARICOPA COUNTY, WHITE TANKS ADMS

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4. AVERAGE DEPTH IS THE HYDRAULIC DEPTH.

HEC-RAS SUMMARY, EAST OF JACKRABBIT TRAIL 1/3 FLOW (MODEL WT4B4)

RIVER/REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY/B4	18.60	1500	992.73	0.93	1.55	2.43	0.57
EAST SPILLWAY/B4	18.39	1500	984.63	0.77	1.95	2.33	0.50
EAST SPILLWAY/B4	18.14	1500	975.28	1	2.33	2.68	0.74
EAST SPILLWAY/B4	17.94	1500	967.29	0.95	2.69	1.49	0.71
EAST SPILLWAY/B4	17.69	1500	958.81	0.86	3.09	2.31	0.55
EAST SPILLWAY/B4	17.37	1500	940.42	0.97	3.84	1.32	0.71
EAST SPILLWAY/B4	17.00	1500	928.69	0.82	4.58	1.19	0.76
EAST SPILLWAY/B4	16.77	1500	920.36	0.97	4.96	0.86	0.64
EAST SPILLWAY/B4	16.55	1500	911.35	1.11	5.29	1.55	0.89
EAST SPILLWAY/B4	16.37	1500	906.03	0.91	5.55	1.13	0.68
EAST SPILLWAY/B4	16.22	1500	902.15	0.62	6.07	2.75	0.90
EAST SPILLWAY/B4	16.01	1500	895.68	3.57	6.16	0.68	0.39

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WHITE TANKS FRS #4

SPILLWAY DELINEATION STUDY

F.C.D. CONTRACT NO. 98-32

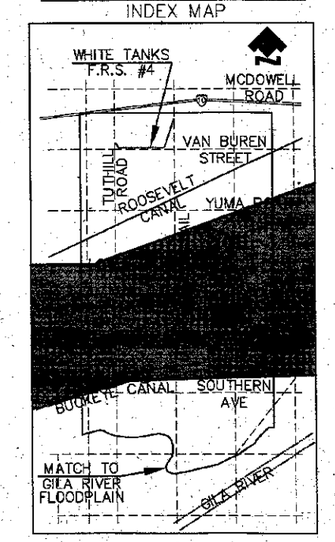
1/3 FLOW

LEGEND

INUNDATION BOUNDARY
MODEL EFFECTIVE BOUNDARIES
SECTION IDENTIFICATION 3
HYDRAULIC BASELINE

NO.	ELEVATION	DESCRIPTION
228	977.97	BRASS CAP IN HAND HOLE, PERRYVILLE RD. & YUMA
243	974.19	BRASS CAP IN HAND HOLE, AIRPORT RD. AND LOWER BUCKEYE RD.
245	955.78	ROD IN CONCRETE IN HAND HOLE, JACK-RABBIT TRAIL & LOWER BUCKEYE ROAD
246	942.68	NAIL IN CONCRETE HEADWALL AT SW CORNER, OF PERRYVILLE RD. & LOWER BUCKEYE RD.
261	930.65	1/2" REBAR IN HAND HOLE, AIRPORT RD. AND BROADWAY RD.
262	925.51	ROD IN CONCRETE HAND HOLE, TUTHILL RD. & BROADWAY RD.
263	916.67	ROD IN CONCRETE HAND HOLE, JACK-RABBIT RD. & BROADWAY RD.
264	910.10	"X" CHISELED IN CONCRETE HEADWALL, SW CORNER OF PERRY VILLE RD. & BROADWAY RD.

INDEX MAP



SCALE: 1" = 1000'
0 500' 1000' 2000' 3000'

Hoskin Engineering Consultants
DBI PROFESSIONAL SERVICES

	BY	DATE
DESIGN	EC/KVM	07/00
DESIGN CHK.	HM/PWRH	07/00
PLANS	MLI	07/00
PLANS CHK.	HM/PWRH	07/00
SUBMITTED BY:		DATE:

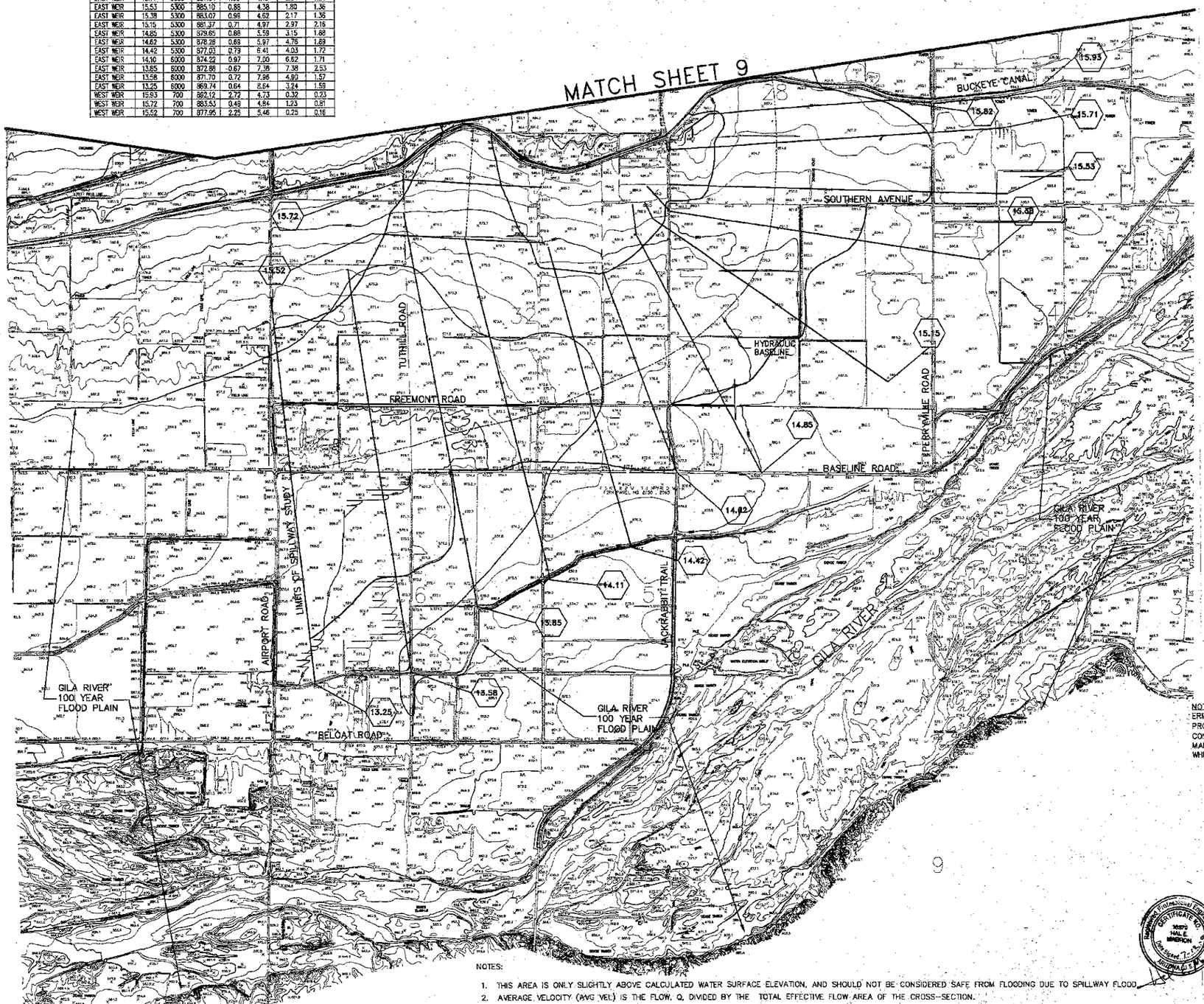
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE
APPROVED BY: DATE
CHIEF ENGINEER AND GENERAL MANAGER

SHEET 9 OF 10

HEC-RAS SUMMARY, EAST SPILLWAY 1/3 FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VEL (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST WEIR	15.93	5300	892.07	2.76	3.90	1.07	0.67
EAST WEIR	15.82	5300	889.40	1.03	3.96	2.20	1.62
EAST WEIR	15.71	5300	887.54	1.00	4.13	2.54	1.74
EAST WEIR	15.53	5300	885.10	0.88	4.38	1.80	1.36
EAST WEIR	15.38	5300	883.07	0.98	4.62	2.17	1.36
EAST WEIR	15.15	5300	881.37	0.71	4.97	2.97	2.16
EAST WEIR	14.85	5300	879.65	0.88	5.59	3.15	1.88
EAST WEIR	14.62	5300	878.28	0.69	5.97	4.76	1.89
EAST WEIR	14.42	5300	877.03	0.79	6.41	4.03	1.72
EAST WEIR	14.10	6000	874.52	0.97	7.00	6.62	1.71
EAST WEIR	13.85	6000	872.86	-0.67	7.38	7.38	2.53
EAST WEIR	13.58	6000	871.70	0.72	7.96	4.80	1.57
EAST WEIR	13.25	6000	869.74	0.64	8.64	3.24	1.59
WEST WEIR	15.93	700	892.12	2.72	4.73	0.32	0.23
WEST WEIR	15.72	700	883.53	0.48	4.84	1.23	0.81
WEST WEIR	15.52	700	877.95	2.25	5.46	0.25	0.16



NOTE:
ERM INFORMATION PROVIDED BY FLOOD CONTROL DISTRICT OF MARICOPA COUNTY, WHITE TANKS ADMS

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4. AVERAGE DEPTH IS THE HYDRAULIC DEPTH.

WESTERN AIR MAPS, INC.
DATE: 12-22-89

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WHITE TANKS FRS #4

SPILLWAY DELINEATION STUDY

F.C.D. CONTRACT NO. 98-32

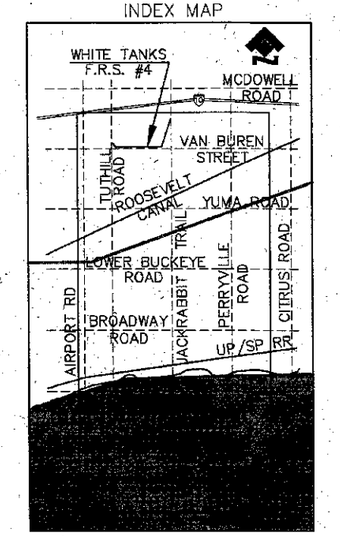
1/3 FLOW

LEGEND

INUNDATION BOUNDARY
MODEL EFFECTIVE BOUNDARIES
SECTION IDENTIFICATION 3
HYDRAULIC BASELINE

NO.	ELEVATION	DESCRIPTION
281	883.99	1" OPEN PIPE FLUSH WITH PAVEMENT JACKRABBIT TRAIL & SOUTHERN AVE.
282	888.28	MARICOPA COUNTY HIGHWAY DEPT. BRASS CAP FLUSH WITH PAVEMENT, PERRYVILLE RD. & SOUTHERN AVE
308	882.36	SPIKE IN POTHOLE, JACKRABBIT TRAIL 1/2 MILE SOUTH OF BACELINE RD.
312	868.28	BRASS CAP IN HAND HOLE, AIRPORT RD. AND BELOAT RD.
313	869.83	BRASS CAP IN HAND HOLE, 207TH AVE AND BELOAT RD

INDEX MAP



SCALE: 1"= 1000'
0 500' 1000' 2000' 3000'

Hoskin Engineering Consultants
DEI PROFESSIONAL SERVICES

	BY	DATE
DESIGN	EC/KVM	07/00
DESIGN CHK.	HM/PWRH	07/00
PLANS	MLI	07/00
PLANS CHK.	HM/PWRH	07/00
SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE
APPROVED BY: DATE
CHIEF ENGINEER AND GENERAL MANAGER

SHEET 10 OF 10

2 Flow Summaries

White Tanks F.R.S. #4
East Spillway Flow Summary

Profile	Total Q (cfs)	West of Jackrabbit		East of Jackrabbit	
		%	Q	%	Q
Full	6000	15	900	85	5100
2/3	4000	15	600	85	3400
1/3	2000	15	300	85	1700
Full 50/50	9000	17	1500	83	7500

White Tanks F.R.S. #4
West Spillway Flow Summary

Profile	Total Q (cfs)	East of Tuthill				Channel and West of Tuthill	
		East of Split		West of Split			
		%	Q	%	Q	%	Q
Full	12000	46	5500	46	5500	8	1000
2/3	8000	41	3300	46	3700	13	1000
1/3	4000	33	1300	42	1700	25	1000
Full 50/50	9000	42	3800	47	4200	11	1000

White Tanks F.R.S. #4
Flow Summary

Profile	Total Q (cfs)	Q (cfs)			
		East of Jackrabbit	Between Jackrabbit and Split	Between Split and Tuthill	West of Tuthill
Full	18000	5000	6500	5500	1000
2/3	12000	3500	4000	3500	1000
1/3	6000	1500	1500	2000	1000
Full 50/50	18000	7500	5500	4000	1000

2.1 FRS to Roosevelt Canal

Flow at Each Cross-Section
Section A - FRS to Roosevelt Canal

	WT4A1				WT4A2				WT4A3			
Section	Full	2/3	1/3	50/50	Full	2/3	1/3	50/50	Full	2/3	1/3	50/50
20.09	12000	8000	4000	9000	12000	8000	4000	9000	12000	8000	4000	9000
20.04	12000	8000	4000	9000	12000	8000	4000	9000	12000	8000	4000	9000
19.84	1000	1000	1000	1000	11000	7000	3000	8000	11000	7000	3000	8000
19.68	1000	1000	1000	1000	11000	7000	3000	8000	11000	7000	3000	8000
19.57	1000	1000	1000	1000	11000	7000	3000	8000	11000	7000	3000	8000
19.44	1000	1000	1000	1000	11000	7000	3000	8000	11000	7000	3000	8000
19.33	1000	1000	1000	1000	11000	7000	3000	8000	11000	7000	3000	8000
19.21	1000	1000	1000	1000	11000	7000	3000	8000	11000	7000	3000	8000
19.06	1000	1000	1000	1000	5500	3500	2000	4000	6500	4000	1500	5500
18.87	1000	1000	1000	1000	5500	3500	2000	4000	6500	4000	1500	5500

	WT4A4			
Section	Full	2/3	1/3	50/50
20.00	6000	4000	2000	9000
19.81	6000	4000	2000	9000
19.61	6000	4000	2000	9000
19.47	6000	4000	2000	9000
19.30	6000	4000	2000	9000
19.15	6000	4000	2000	9000
19.02	5000	3500	1500	7500
18.87	5000	3500	1500	7500

White Tanks F.R.S. #4 - West Spillway
Flow Percentages

			East of Channel		Channel *		West of Channel		Total	
Profile	Q (cfs)	RS	%	Q (cfs)	%	Q (cfs)	%	Q (cfs)	%	Q (cfs)
Full	12000	1070	35	4200	51	6120	14	1680	100	12000
		1060	57	6840	30	3600	13	1560	100	12000
		1050	80	9600	13	1560	7	840	100	12000
		1040	76	9120	18	2160	6	720	100	12000
		1030	81	9720	13	1560	6	720	100	12000
		1020	96	11520	4	480	0	0	100	12000
		1010	99	11880	0	0	1	120	100	12000
2/3	8000	1070	32	2560	55	4400	13	1040	100	8000
		1060	58	4640	32	2560	10	800	100	8000
		1050	82	6560	12	960	6	480	100	8000
		1040	75	6000	19	1520	6	480	100	8000
		1030	80	6400	13	1040	7	560	100	8000
		1020	97	7760	3	240	0	0	100	8000
		1010	100	8000	0	0	0	0	100	8000
1/3	4000	1070	27	1080	64	2560	9	360	100	4000
		1060	61	2440	33	1320	6	240	100	4000
		1050	85	3400	9	360	6	240	100	4000
		1040	70	2800	23	920	7	280	100	4000
		1030	79	3160	14	560	7	280	100	4000
		1020	96	3840	4	160	0	0	100	4000
		1010	100	4000	0	0	0	0	100	4000
Full 50/50	9000	1070	32	2880	55	4950	13	1170	100	9000
		1060	58	5220	31	2790	11	990	100	9000
		1050	82	7380	12	1080	6	540	100	9000
		1040	75	6750	19	1710	6	540	100	9000
		1030	81	7290	13	1170	6	540	100	9000
		1020	97	8730	3	270	0	0	100	9000
		1010	100	9000	0	0	0	0	100	9000

White Tanks F.R.S. #4 - East Spillway
Flow Percentages East and West of Jackrabbit Trail

		West of Jackrabbit Trail		West Average		East of Jackrabbit Trail		East Average		Total	
Profile, Q	RS	%	Q (cfs)	%	Q (cfs)	%	Q (cfs)	%	Q (cfs)	%	Q (cfs)
Full, 6000	2070	35	2126	15	886	65	3874	85	5114	100	6000
	2060	46	2774			54	3226			100	6000
	2050	18	1066			82	4934			100	6000
	2040	11	633			89	5367			100	6000
	2030	17	1007			83	4993			100	6000
	2020	14	839			86	5161			100	6000
	2010	23	1399			77	4601			100	6000
	2000	45	2699			55	3301			100	6000
	1990	82	4891			18	1109			100	6000
2/3, 4000	2070	35	1402	15	600	65	2598	85	3400	100	4000
	2060	43	1702			57	2298			100	4000
	2050	13	524			87	3476			100	4000
	2040	8	332			92	3668			100	4000
	2030	17	670			83	3330			100	4000
	2020	15	605			85	3395			100	4000
	2010	27	1083			73	2917			100	4000
	2000	48	1923			52	2077			100	4000
	1990	88	3534			12	466			100	4000
1/3, 2000	2070	35	1054	15	292	65	1946	85	1708	100	3000
	2060	38	1144			62	1856			100	3000
	2050	13	378			87	2623			100	3000
	2040	6	176			94	2824			100	3000
	2030	13	400			87	2600			100	3000
	2020	18	535			82	2465			100	3000
	2010	35	1044			65	1956			100	3000
	2000	52	1560			48	1440			100	3000
	1990	100	2985			0	15			100	3000
Full 50/50, 9000	2070	36	3262	17	1545	64	5738	83	7455	100	9000
	2060	49	4452			51	4548			100	9000
	2050	21	1910			79	7090			100	9000
	2040	13	1156			87	7844			100	9000
	2030	17	1570			83	7430			100	9000
	2020	14	1219			86	7781			100	9000
	2010	21	1870			79	7130			100	9000
	2000	41	3663			59	5337			100	9000
	1990	74	6693			26	2307			100	9000

2.2 Roosevelt Canal to Buckeye Canal

FLOW SPLITS FOR FULL FLOW					
Cross Section	West of Tuthill Road	Between Tuthill and Spit	Between Split and Jackrabbit Trail	East of Jackrabbit Trail	Total Flow
18.85	1000	5500	6500	5000	18000
18.60	1000	5500	6500	5000	18000
18.39	2320	4180	6500	5000	18000
18.14	2320	4180	6500	5000	18000
17.94	2320	4180	6500	5000	18000
17.69	2320	3180	7500	5000	18000
17.37	1000	4500	6400	6100	18000
17.00	1000	4500	1300	11200	18000
16.77	1000	2300	3500	11200	18000
16.55	1000	5800		11200	18000
16.37	1000	5800		11200	18000
16.22	1000	11500		5500	18000
16.01	1000	11500		5500	18000

FLOW SPLITS FOR 2/3 FLOW					
Cross Section	West of Tuthill Road	Between Tuthill and Spit	Between Split and Jackrabbit Trail	East of Jackrabbit Trail	Total Flow
18.85	1000	3500	4000	3500	12000
18.60	1000	3500	4000	3500	12000
18.39	1000	3500	4000	3500	12000
18.14	1000	3500	4000	3500	12000
17.94	1500	3000	4000	3500	12000
17.69	1500	3000	4000	3500	12000
17.37	1000	3500	4000	3500	12000
17.00	1000	3500	1300	6200	12000
16.77	1000	1700	3100	6200	12000
16.55	1000	4800		6200	12000
16.37	1000	4800		6200	12000
16.22	1000	6500		4500	12000
16.01	1000	6500		4500	12000

FLOW SPLITS FOR 1/3 FLOW					
Cross Section	West of Tuthill Road	Between Tuthill and Spit	Between Split and Jackrabbit Trail	East of Jackrabbit Trail	Total Flow
18.85	1000	2000	1500	1500	6000
18.60	700	2300	1500	1500	6000
18.39	700	2300	1500	1500	6000
18.14	700	2300	1500	1500	6000
17.94	700	2300	1500	1500	6000
17.69	700	2300	1500	1500	6000
17.37	700	2300	1500	1500	6000
17.00	700	2300	1500	1500	6000
16.77	700	1700	2100	1500	6000
16.55	700	3800		1500	6000
16.37	700	3800		1500	6000
16.22	700	3800		1500	6000
16.01	700	3800		1500	6000

Full Flow Water Surface Elevation Differentials

Cross Section	East of Jackrabbit Trail	Water Surface Elevation Differential (West Positive**)	Between Jackrabbit Trail and Split	Water Surface Elevation Differential (West Positive)	Between Split and Tuthill Road	Water Surface Elevation Differential (West Positive)	West of Tuthill Road
18.85	1002.89	N/A	1002.56	0.06	1001.62	1.22	999.29
18.60	993.26	0.1	993.11	-0.1	993.20	0.0	993.19
18.39	985.26	0.2	985.04	-0.4	985.45	0.7	985.76
18.14	975.99	-0.2	976.18	N/A	977.04	-0.5	977.51
17.94	968.19	0.0	968.63	N/A	969.87	0.7	969.15
17.69	959.26	-0.5	960.47	-0.5	961.51	N/A	961.61
17.37	941.73	-0.6	946.79	N/A	949.76	-0.1	950.35
17.00	930.31	-0.7	932.74	N/A	936.76	0.2	936.58
16.77	922.57	0.0	926.30	-0.6	926.91	N/A	923.82
16.55	913.29	-0.3	920.29	N/A	920.29	-0.4	922.67
16.37	907.66	-0.6	908.59	N/A	908.59	N/A	910.48
16.22	903.17	0.1	903.10	N/A	903.10	N/A	905.21
16.01	896.25	-0.5	896.70	N/A	896.70	N/A	896.18

Ineffective Flow

Cross Section 18.85

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	1002.9		1002.5	0.39	1003.8	-0.91
Jackrabbit Trail and Split	1002.6	0.33	1003.8	-1.24	1002.5	0.06
Between Split and Tuthill	1001.6	0.94	1002.5	-0.88	1000.4	1.22
West of Tuthill Road	999.3	2.33	1000.4	-1.11	999	0.29

Cross Section 18.60

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	993.3		994	-0.74	992.5	0.76
Jackrabbit Trail and Split	993.1	0.15	992.5	0.61	992.9	0.21
Between Split and Tuthill	993.2	-0.09	992.9	0.3	992.2	1
West of Tuthill Road	993.2	0.01	992.2	0.99	994	-0.81

Cross Section 18.39

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	985.3		985.7	-0.44	984.5	0.76
Jackrabbit Trail and Split	985.0	0.22	984.5	0.54	984.9	0.14
Between Split and Tuthill	985.5	-0.41	984.9	0.55	984.8	0.65
West of Tuthill Road	985.8	-0.31	987.8	-2.04	990	-4.24

Cross Section 18.14

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	976.0		977.7	-1.71	976	-0.01
Jackrabbit Trail and Split	976.2	-0.19	976	0.18	978	-1.82
Between Split and Tuthill	977.0	-0.86	978	-0.96	976.9	0.14
West of Tuthill Road	977.5	-0.47	976.9	0.61	978.9	-1.39

Cross Section 17.94

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	968.2		968	0.19	968.6	-0.41
Jackrabbit Trail and Split	968.6	-0.44	968.6	0.03	970	-1.37
Between Split and Tuthill	969.9	-1.24	970	-0.13	968.9	0.97
West of Tuthill Road	969.2	0.72	968.9	0.25	971	-1.85

Cross Section 17.69

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	959.3		960	-0.74	960	-0.74
Jackrabbit Trail and Split	960.5	-1.21	960	0.47	961	-0.53
Between Split and Tuthill	961.5	-1.04	961	0.51	962	-0.49
West of Tuthill Road	961.6	-0.1	962	-0.39	962	-0.39

Cross Section 17.37

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)

East of Jackrabbit Trail	941.7		944	-2.27	946.2	-4.47
Jackrabbit Trail and Split	946.8	-5.06	946.2	0.59	950	-3.21
Between Split and Tuthill	949.8	-2.97	950	-0.24	950.2	-0.44
West of Tuthill Road	950.4	-0.59	950.2	0.15	952	-1.65

Cross Section 17.00

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	930.3		930	0.31	932	-1.69
Jackrabbit Trail and Split	932.7	-2.43	932	0.74	938	-5.26
Between Split and Tuthill	936.8	-4.02	938	-1.24	935.6	1.16
West of Tuthill Road	936.6	0.18	935.6	0.98	939	-2.42

Cross Section 16.77

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	922.6		924	-1.43	926.3	-3.73
Jackrabbit Trail and Split	926.3	-3.73	926.3	0	926.1	0.2
Between Split and Tuthill	926.9	-0.61	926.1	0.8	930	-3.09
West of Tuthill Road	923.8	3.09	930	-6.18	929	-5.18

Cross Section 16.55

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	913.3		916	-2.71	920	-6.71
Jackrabbit Trail and Split	920.3	-7	920	0.29	922.3	-2.01
Between Split and Tuthill	920.3	0	922.3	-2.0	922.3	-2.01
West of Tuthill Road	922.7	-2.38	922.3	0.37	925.9	-3.23

Cross Section 16.37

Flow Area	Water Surface Elevation	Difference *(positive east side* higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	907.7		909.4	-1.74	908	-0.34
Jackrabbit Trail and Split	908.6	-0.93	908	0.59	914.6	-6.01
Between Split and Tuthill	908.6	0	914.6	-6.01	914.6	-6.01
West of Tuthill Road	910.5	-1.89	914.6	-4.12	911.5	-1.02

Cross Section 16.22

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	903.2		904	-0.83	902	1.17
Jackrabbit Trail and Split	903.1	0.07	902	1.1	907.7	-4.6
Between Split and Tuthill	903.1	0	907.7	-4.6	907.7	-4.6
West of Tuthill Road	905.2	-2.11	907.7	-2.49	906.7	-1.49

Cross Section 16.01

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	896.3		902.1	-5.85	895	1.25
Jackrabbit Trail and Split	896.7	-0.45	895	1.7	901.9	-5.2
Between Split and Tuthill	896.7	0	901.9	-5.2	901.9	-5.2
West of Tuthill Road	896.2	0.52	901.9	-5.72	901	-4.82

* N/A: No water is overtopping the banks

** Positive number indicated overtopping to the west side. Negative number indicated overtopping to the east.

2/3 Flow Water Surface Elevation *Differentials*

Cross Section	East of Jackrabbit Trail	Water Surface Elevation Differential (West Positive**)	Between Jackrabbit Trail and Split	Water Surface Elevation Differential (West Positive)	Between Split and Tuthill Road	Water Surface Elevation Differential (West Positive)	West of Tuthill Road
18.85	1002.7	N/A	1002.2	N/A	1001.4	0.96	999.29
18.60	993.1	0.2	992.9	0.0	992.8	-0.5	993.25
18.39	985.1	0.4	984.6	-0.5	985.4	0.6	985.22
18.14	975.8	N/A	975.6	N/A	976.9	-0.1	977.02
17.94	967.9	N/A	968.0	N/A	969.6	0.7	968.92
17.69	959.1	N/A	959.7	-0.4	961.4	N/A	961.29
17.37	941.0	-0.2	946.4	N/A	949.3	-0.1	950.35
17.00	929.7	-0.7	932.7	N/A	936.4	-0.2	936.58
16.77	922.0	N/A	926.1	-0.6	926.7	N/A	926.82
16.55	912.7	0.0	920.1	N/A	920.1	-0.4	922.67
16.37	907.1	-0.5	908.5	N/A	908.5	N/A	910.48
16.22	903.0	0.6	902.4	N/A	902.4	N/A	905.21
16.01	896.2	-0.1	896.2	N/A	896.2	N/A	896.18

Ineffective Flow

Cross Section 18.85

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	1002.7		1002.5	0.23	1003.8	-1.07
Jackrabbit Trail and Split	1002.2	0.57	1003.8	-1.64	1002.5	-0.34
Between Split and Tuthill	1001.4	0.8	1002.5	-1.14	1000.4	0.96
West of Tuthill Road	999.3	2.07	1000.4	-1.11	999	0.29

Cross Section 18.60

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	993.1		994	-0.9	992.5	0.6
Jackrabbit Trail and Split	992.9	0.2	992.5	0.4	992.9	0
Between Split and Tuthill	992.8	0.11	992.9	-0.11	992.2	0.59
West of Tuthill Road	993.3	-0.46	992.2	1.05	994	-0.75

Cross Section 18.39

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	985.1		985.7	-0.64	984.5	0.56
Jackrabbit Trail and Split	984.6	0.42	984.5	0.14	984.9	-0.26
Between Split and Tuthill	985.4	-0.71	984.9	0.45	984.8	0.55
West of Tuthill Road	985.2	0.13	987.8	-2.58	990	-4.78

Cross Section 18.14

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	975.8		977.7	-1.95	976	-0.25
Jackrabbit Trail and Split	975.6	0.13	976	-0.38	978	-2.38
Between Split and Tuthill	976.9	-1.23	978	-1.15	976.9	-0.05
West of Tuthill Road	977.0	-0.17	976.9	0.12	978.9	-1.88

Cross Section 17.94

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	967.9		968	-0.09	968.6	-0.69
Jackrabbit Trail and Split	968.0	-0.13	968.6	-0.56	970	-1.96
Between Split and Tuthill	969.6	-1.54	970	-0.42	968.9	0.68
West of Tuthill Road	968.9	0.66	968.9	0.02	971	-2.08

Cross Section 17.69

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	959.1		960	-0.89	960	-0.89
Jackrabbit Trail and Split	959.7	-0.57	960	-0.32	961	-1.32
Between Split and Tuthill	961.4	-1.76	961	0.44	962	-0.56
West of Tuthill Road	961.3	0.15	962	-0.71	962	-0.71

Cross Section 17.37

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)

East of Jackrabbit Trail	941.0		944	-2.96	946.2	-5.16
Jackrabbit Trail and Split	946.4	-5.33	946.2	0.17	950	-3.63
Between Split and Tuthill	949.3	-2.94	950	-0.69	950.2	-0.89
West of Tuthill Road	950.4	-1.04	950.2	0.15	952	-1.65

Cross Section 17.00

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	929.7		930	-0.33	932	-2.33
Jackrabbit Trail and Split	932.7	-2.99	932	0.66	938	-5.34
Between Split and Tuthill	936.4	-3.72	938	-1.62	935.6	0.78
West of Tuthill Road	936.6	-0.2	935.6	0.98	939	-2.42

Cross Section 16.77

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	922.0		924	-2.05	926.3	-4.35
Jackrabbit Trail and Split	926.1	-4.13	926.3	-0.22	926.1	-0.02
Between Split and Tuthill	926.7	-0.59	926.1	0.6	930	-3.33
West of Tuthill Road	926.8	-0.15	930	-3.18	929	-2.18

Cross Section 16.55

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	912.7		916	-3.35	920	-7.35
Jackrabbit Trail and Split	920.1	-7.4	920	0.05	922.3	-2.25
Between Split and Tuthill	920.1	0	922.3	-2.3	922.3	-2.25
West of Tuthill Road	922.7	-2.62	922.3	0.37	925.9	-3.23

Cross Section 16.37

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	907.1		909.4	-2.34	908	-0.94
Jackrabbit Trail and Split	908.5	-1.43	908	0.49	914.6	-6.11
Between Split and Tuthill	908.5	0	914.6	-6.11	914.6	-6.11
West of Tuthill Road	910.5	-1.99	914.6	-4.12	911.5	-1.02

Cross Section 16.22

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	903.0		904	-1.04	902	0.96
Jackrabbit Trail and Split	902.4	0.57	902	0.39	907.7	-5.31
Between Split and Tuthill	902.4	0	907.7	-5.31	907.7	-5.31
West of Tuthill Road	905.2	-2.82	907.7	-2.49	906.7	-1.49

Cross Section 16.01

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	896.2		902.1	-5.94	895	1.16
Jackrabbit Trail and Split	896.2	-0.07	895	1.23	901.9	-5.67
Between Split and Tuthill	896.2	0	901.9	-5.67	901.9	-5.67
West of Tuthill Road	896.2	0.05	901.9	-5.72	901	-4.82

* N/A: No water is overtopping the banks

** Positive number indicated overtopping to the west side. Negative number indicated overtopping to the east.

1/3 Flow Water Surface Elevation Differentials

Cross Section	East of Jackrabbit Trail	Water Surface Elevation Differential (West Positive**)	Between Jackrabbit Trail and Split	Water Surface Elevation Differential (West Positive)	Between Split and Tuthill Road	Water Surface Elevation Differential (West Positive)	West of Tuthill Road
18.85	1002.4	N/A	1001.6	N/A	1001.1	0.68	999.3
18.60	992.7	0.2	992.5	N/A	992.5	-0.6	993.2
18.39	984.6	0.1	984.2	-0.1	985.0	0.2	985.0
18.14	975.3	N/A	974.9	N/A	976.6	N/A	976.9
17.94	967.3	N/A	967.2	N/A	969.3	0.4	968.6
17.69	958.8	N/A	958.9	-0.3	961.3	N/A	961.8
17.37	940.4	N/A	945.8	N/A	948.7	0.0	950.2
17.00	928.7	-0.6	932.6	N/A	936.0	-0.5	936.4
16.77	921.0	N/A	925.6	-0.6	926.7	N/A	926.6
16.55	911.6	N/A	919.8	N/A	919.8	-0.2	922.5
16.37	906.0	-0.4	908.4	N/A	908.4	N/A	910.3
16.22	902.2	0.1	901.9	N/A	901.9	N/A	905.1
16.01	895.7	-0.2	895.9	N/A	895.9	N/A	896.1

Ineffective Flow

Cross Section 18.85

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	1002.4		1002.5	-0.14	1003.8	-1.44
Jackrabbit Trail and Split	1001.6	0.72	1003.8	-2.16	1002.5	-0.86
Between Split and Tuthill	1001.1	0.56	1002.5	-1.42	1000.4	0.68
West of Tuthill Road	999.3	1.79	1000.4	-1.11	999	0.29

Cross Section 18.60

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	992.7		994	-1.27	992.5	0.23
Jackrabbit Trail and Split	992.5	0.21	992.5	0.02	992.9	-0.38
Between Split and Tuthill	992.5	-0.02	992.9	-0.36	992.2	0.34
West of Tuthill Road	993.2	-0.61	992.2	0.95	994	-0.85

Cross Section 18.39

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	984.6		985.7	-1.07	984.5	0.13
Jackrabbit Trail and Split	984.2	0.48	984.5	-0.35	984.9	-0.75
Between Split and Tuthill	985.0	-0.84	984.9	0.09	984.8	0.19
West of Tuthill Road	985.0	-0.04	987.8	-2.77	990	-4.97

Cross Section 18.14

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	975.3		977.7	-2.42	976	-0.72
Jackrabbit Trail and Split	974.9	0.41	976	-1.13	978	-3.13
Between Split and Tuthill	976.6	-1.72	978	-1.41	976.9	-0.31
West of Tuthill Road	976.9	-0.3	976.9	-0.01	978.9	-2.01

Cross Section 17.94

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	967.3		968	-0.71	968.6	-1.31
Jackrabbit Trail and Split	967.2	0.05	968.6	-1.36	970	-2.76
Between Split and Tuthill	969.3	-2.04	970	-0.72	968.9	0.38
West of Tuthill Road	968.6	0.7	968.9	-0.32	971	-2.42

Cross Section 17.69

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	958.8		960	-1.19	960	-1.19
Jackrabbit Trail and Split	958.9	-0.05	960	-1.14	961	-2.14
Between Split and Tuthill	961.3	-2.46	961	0.32	962	-0.68
West of Tuthill Road	961.8	-0.47	962	-0.21	962	-0.21

Cross Section 17.37

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)

East of Jackrabbit Trail	940.4		944	-3.58	946.2	-5.78
Jackrabbit Trail and Split	945.8	-5.36	946.2	-0.42	950	-4.22
Between Split and Tuthill	948.7	-2.95	950	-1.27	950.2	-1.47
West of Tuthill Road	950.2	-1.47	950.2	0	952	-1.8

Cross Section 17.00

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	928.7		930	-1.31	932	-3.31
Jackrabbit Trail and Split	932.6	-3.91	932	0.6	938	-5.4
Between Split and Tuthill	936.0	-3.35	938	-2.05	935.6	0.35
West of Tuthill Road	936.4	-0.47	935.6	0.82	939	-2.58

Cross Section 16.77

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	921.0		924	-3.02	926.3	-5.32
Jackrabbit Trail and Split	925.6	-4.58	926.3	-0.74	926.1	-0.54
Between Split and Tuthill	926.7	-1.13	926.1	0.6	930	-3.31
West of Tuthill Road	926.6	0.09	930	-3.4	929	-2.4

Cross Section 16.55

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	911.6		916	-4.45	920	-8.45
Jackrabbit Trail and Split	919.8	-8.24	920	-0.21	922.3	-2.51
Between Split and Tuthill	919.8	0	922.3	-2.5	922.3	-2.51
West of Tuthill Road	922.5	-2.7	922.3	0.19	925.9	-3.41

Cross Section 16.37

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	906.0		909.4	-3.37	908	-1.97
Jackrabbit Trail and Split	908.4	-2.35	908	0.38	914.6	-6.22
Between Split and Tuthill	908.4	0	914.6	-6.22	914.6	-6.22
West of Tuthill Road	910.3	-1.93	914.6	-4.29	911.5	-1.19

Cross Section 16.22

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	902.2		904	-1.85	902	0.15
Jackrabbit Trail and Split	901.9	0.26	902	-0.11	907.7	-5.81
Between Split and Tuthill	901.9	-0.01	907.7	-5.8	907.7	-5.8
West of Tuthill Road	905.1	-3.16	907.7	-2.64	906.7	-1.64

Cross Section 16.01

Flow Area	Water Surface Elevation	Difference (positive east side higher)	East Section Bank	Overflow to East (positive)	West Section Bank	Overflow to West (positive)
East of Jackrabbit Trail	895.7		902.1	-6.42	895	0.68
Jackrabbit Trail and Split	895.9	-0.23	895	0.91	901.9	-5.99
Between Split and Tuthill	895.9	0	901.9	-5.99	901.9	-5.99
West of Tuthill Road	896.1	-0.21	901.9	-5.78	901	-4.88

* N/A: No water is overtopping the banks

** Positive number indicated overtopping to the west side. Negative number indicated overtopping to the east.

2.3 Buckeye Canal to Gila River

Flow at Each Cross-Section
Section C - Buckeye Canal to Gila River

Reach	Section	WT4C1		
		Full	2/3	1/3
EAST WEIR	15.93	17000	11000	5300
EAST WEIR	15.82	17000	11000	5300
EAST WEIR	15.71	17000	11000	5300
EAST WEIR	15.53	17000	11000	5300
EAST WEIR	15.38	17000	11000	5300
EAST WEIR	15.15	17000	11000	5300
EAST WEIR	14.85	17000	11000	5300
EAST WEIR	14.62	17000	11000	5300
EAST WEIR	14.42	17000	11000	5300
EAST WEIR	14.10	18000	12000	6000
EAST WEIR	13.85	18000	12000	6000
EAST WEIR	13.58	18000	12000	6000
EAST WEIR	13.25	18000	12000	6000
WEST WEIR	15.93	1000	1000	700
WEST WEIR	15.72	1000	1000	700
WEST WEIR	15.52	1000	1000	700

3 HEC-RAS Summary Tables

3.1 FRS to Roosevelt Canal

HEC-RAS SUMMARY, EAST SPILLWAY 1/3 FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VEL (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY	20.00	2000	1051.84	4.44	0.00	2.84	1.89
EAST SPILLWAY	19.81	2000	1041.86	3.68	0.06	1.36	0.87
EAST SPILLWAY	19.61	2000	1033.47	1.86	0.14	1.47	1.03
EAST SPILLWAY	19.47	2000	1027.62	1.76	0.25	1.12	0.63
EAST SPILLWAY	19.30	2000	1020.24	0.92	0.40	1.24	0.71
EAST SPILLWAY	19.15	2000	1013.59	1.27	0.62	1.09	0.38
EAST SPILLWAY	19.02	1500	1009.32	0.59	0.78	1.32	0.65
EAST SPILLWAY	18.87	1500	1003.96	3.74	1.15	0.60	0.43

HEC-RAS SUMMARY, EAST SPILLWAY 2/3 FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VEL (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY	20.00	4000	1052.71	5.97	0.00	3.71	2.53
EAST SPILLWAY	19.81	4000	1042.42	3.64	0.05	1.92	0.95
EAST SPILLWAY	19.61	4000	1034.05	2.21	0.13	2.05	1.15
EAST SPILLWAY	19.47	4000	1027.99	2.16	0.22	1.49	0.90
EAST SPILLWAY	19.30	4000	1020.64	1.13	0.34	1.64	0.97
EAST SPILLWAY	19.15	4000	1013.81	1.60	0.52	1.31	0.56
EAST SPILLWAY	19.02	3500	1009.77	0.79	0.64	1.77	0.98
EAST SPILLWAY	18.87	3500	1004.32	3.72	0.93	0.96	0.42

HEC-RAS SUMMARY, EAST SPILLWAY FULL FLOW (MODEL WT4A4)

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VEL (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY	20.00	6000	1053.30	7.24	0.00	4.30	2.99
EAST SPILLWAY	19.81	6000	1042.77	3.94	0.04	2.27	1.25
EAST SPILLWAY	19.61	6000	1034.37	2.58	0.11	2.37	1.38
EAST SPILLWAY	19.47	6000	1028.32	2.34	0.19	1.82	1.15
EAST SPILLWAY	19.30	6000	1020.88	1.35	0.30	1.88	1.18
EAST SPILLWAY	19.15	6000	1014.02	1.74	0.46	1.52	0.73
EAST SPILLWAY	19.02	5000	1009.98	0.88	0.57	1.98	1.16
EAST SPILLWAY	18.87	5000	1004.46	3.90	0.82	1.10	0.47

HEC-RAS SUMMARY, EAST SPILLWAY FULL 50/50 FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VEL (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST SPILLWAY	20.00	9000	1054.05	8.63	0.00	5.05	3.53
EAST SPILLWAY	19.81	9000	1043.19	4.38	0.03	2.69	1.56
EAST SPILLWAY	19.61	9000	1034.78	2.95	0.10	2.78	1.67
EAST SPILLWAY	19.47	9000	1028.72	2.58	0.17	2.22	1.43
EAST SPILLWAY	19.30	9000	1021.2	1.55	0.27	2.20	1.27
EAST SPILLWAY	19.15	9000	1014.27	1.91	0.40	1.77	0.94
EAST SPILLWAY	19.02	7500	1010.28	1.05	0.50	2.28	1.46
EAST SPILLWAY	18.87	7500	1004.64	4.04	0.71	1.28	0.51

HEC-RAS SUMMARY, WEST SPILLWAY 1/3 FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VEL (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
WEST SPILLWAY	20.09	4000	1051.68	6.82	0.00	3.48	1.84
WEST SPILLWAY	20.04	4000	1048.90	6.25	0.02	5.09	1.18
WEST SPILLWAY	19.84	4000	1040.75	3.31	0.07	4.25	1.34
WEST SPILLWAY	19.68	4000	1034.38	2.44	0.15	3.38	1.26
WEST SPILLWAY	19.57	4000	1030.63	1.56	0.21	3.63	1.29
WEST SPILLWAY	19.44	4000	1025.52	2.04	0.34	4.02	1.01
WEST SPILLWAY	19.33	4000	1020.99	1.44	0.41	3.99	1.31
WEST SPILLWAY	19.21	4000	1015.34	2.09	0.54	3.84	1.19
WEST SPILLWAY	19.06	4500	1009.00	0.78	0.64	3.50	1.23
WEST SPILLWAY	18.87	4500	1003.28	3.29	1.00	2.29	0.44

HEC-RAS SUMMARY, WEST SPILLWAY 2/3 FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VEL (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
WEST SPILLWAY	20.09	8000	1052.68	8.46	0.00	4.48	2.37
WEST SPILLWAY	20.04	8000	1049.62	7.65	0.02	5.82	1.80
WEST SPILLWAY	19.84	8000	1040.75	3.62	0.06	4.25	1.72
WEST SPILLWAY	19.68	8000	1034.38	2.95	0.13	3.38	1.83
WEST SPILLWAY	19.57	8000	1030.63	2.07	0.18	3.63	1.90
WEST SPILLWAY	19.44	8000	1025.52	2.31	0.27	4.02	1.32
WEST SPILLWAY	19.33	8000	1020.99	1.73	0.34	3.99	1.47
WEST SPILLWAY	19.21	8000	1015.34	1.98	0.45	3.84	1.19
WEST SPILLWAY	19.06	8500	1009.12	0.92	0.56	3.62	1.66
WEST SPILLWAY	18.87	8500	1003.53	3.94	0.86	2.54	0.60

HEC-RAS SUMMARY, WEST SPILLWAY FULL FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VEL (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
WEST SPILLWAY	20.09	12000	1053.43	9.48	0.00	5.23	2.74
WEST SPILLWAY	20.04	12000	1050.24	8.46	0.02	6.44	2.23
WEST SPILLWAY	19.84	12000	1040.75	3.78	0.05	4.25	2.01
WEST SPILLWAY	19.68	12000	1034.47	3.24	0.12	3.47	2.06
WEST SPILLWAY	19.57	12000	1030.63	2.44	0.17	3.63	2.32
WEST SPILLWAY	19.44	12000	1025.52	2.55	0.25	4.02	1.74
WEST SPILLWAY	19.33	12000	1020.99	1.97	0.31	3.99	1.82
WEST SPILLWAY	19.21	12000	1015.34	2.13	0.40	3.84	1.27
WEST SPILLWAY	19.06	13000	1009.58	1.10	0.50	4.08	2.13
WEST SPILLWAY	18.87	13000	1003.72	4.46	0.76	2.73	0.77

HEC-RAS SUMMARY, WEST SPILLWAY FULL 50/50 FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VEL (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
WEST SPILLWAY	20.09	9000	1052.86	8.84	0.00	4.66	2.46
WEST SPILLWAY	20.04	9000	1049.78	7.90	0.02	5.98	1.93
WEST SPILLWAY	19.84	9000	1040.75	3.57	0.06	4.25	1.56
WEST SPILLWAY	19.68	9000	1034.38	3.08	0.12	3.38	1.95
WEST SPILLWAY	19.57	9000	1030.63	2.15	0.18	3.63	2.01
WEST SPILLWAY	19.44	9000	1025.52	2.39	0.27	4.02	1.43
WEST SPILLWAY	19.33	9000	1020.99	1.77	0.33	3.99	1.59
WEST SPILLWAY	19.21	9000	1015.34	2.00	0.44	3.84	1.19
WEST SPILLWAY	19.06	10500	1009.24	1.01	0.54	3.74	1.79
WEST SPILLWAY	18.87	10500	1003.65	4.18	0.82	2.66	0.65

3.2 Roosevelt Canal to Buckeye Canal

HEC-RAS SUMMARY, WEST OF TUTHILL ROAD 1/3 FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
WEST OF TUTHILL ROAD	18.85	1000	999.29	2.80	1.01	0.29	0.24
WEST OF TUTHILL ROAD	18.60	700	993.15	0.86	1.01	2.85	0.64
WEST OF TUTHILL ROAD	18.39	700	985.03	0.97	1.31	2.73	0.51
WEST OF TUTHILL ROAD	18.14	700	976.89	0.95	1.63	4.29	0.77
WEST OF TUTHILL ROAD	17.94	700	968.58	0.98	1.90	2.78	0.40
WEST OF TUTHILL ROAD	17.69	700	960.79	0.92	2.21	4.29	0.85
WEST OF TUTHILL ROAD	17.37	700	950.20	1.05	2.61	11.10	0.53
WEST OF TUTHILL ROAD	17.00	700	936.42	0.85	3.22	8.92	0.71
WEST OF TUTHILL ROAD	16.77	700	926.60	1.15	3.56	6.60	0.67
WEST OF TUTHILL ROAD	16.55	700	922.49	0.64	3.97	12.49	0.83
WEST OF TUTHILL ROAD	16.37	700	910.31	2.28	4.18	5.41	0.38
WEST OF TUTHILL ROAD	16.22	700	905.06	0.54	4.59	5.66	0.66
WEST OF TUTHILL ROAD	16.01	700	896.12	2.72	4.73	1.12	0.23

HEC-RAS SUMMARY, BETWEEN TUTHILL ROAD AND SPLIT 1/3 FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
BETWEEN TUTHILL AND SPLIT	18.85	2000	1001.08	1.87	1.01	2.08	0.52
BETWEEN TUTHILL AND SPLIT	18.60	2300	992.54	1.17	1.34	2.24	1.12
BETWEEN TUTHILL AND SPLIT	18.39	2300	984.99	1.48	1.53	2.69	0.92
BETWEEN TUTHILL AND SPLIT	18.14	2300	976.59	1.14	1.81	3.99	1.09
BETWEEN TUTHILL AND SPLIT	17.94	2300	969.28	1.54	1.99	3.48	1.02
BETWEEN TUTHILL AND SPLIT	17.69	2300	961.32	1.08	2.30	4.82	1.15
BETWEEN TUTHILL AND SPLIT	17.37	2300	948.73	2.14	2.50	9.63	1.01
BETWEEN TUTHILL AND SPLIT	17.00	2300	935.95	1.21	2.99	8.45	1.87
BETWEEN TUTHILL AND SPLIT	16.77	1700	926.69	2.27	3.18	6.69	0.73
BETWEEN TUTHILL AND SPLIT	16.55	3800	919.79	1.28	3.43	9.79	1.69
BETWEEN TUTHILL AND SPLIT	16.37	3800	908.38	4.54	3.49	3.48	0.63
BETWEEN TUTHILL AND SPLIT	16.22	3800	901.9	0.74	3.83	2.50	1.30
BETWEEN TUTHILL AND SPLIT	16.01	3800	895.91	4.83	3.90	0.91	0.71

HEC-RAS SUMMARY, BETWEEN SPLIT AND JACKRABBIT TRAIL 1/3 FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
BETWEEN SPLIT AND JACKRABBIT TRAIL	18.85	1500	1001.64	2.09	1.16	2.64	0.51
BETWEEN SPLIT AND JACKRABBIT TRAIL	18.60	1500	992.52	0.79	1.58	2.22	0.56
BETWEEN SPLIT AND JACKRABBIT TRAIL	18.39	1500	984.15	1	1.86	1.85	0.47
BETWEEN SPLIT AND JACKRABBIT TRAIL	18.14	1500	974.87	1.06	2.19	2.27	1.03
BETWEEN SPLIT AND JACKRABBIT TRAIL	17.94	1500	967.24	1.38	2.40	1.44	0.75
BETWEEN SPLIT AND JACKRABBIT TRAIL	17.69	1500	958.86	0.99	2.75	2.36	1.09
BETWEEN SPLIT AND JACKRABBIT TRAIL	17.37	1500	945.78	1.41	3.10	6.68	0.55
BETWEEN SPLIT AND JACKRABBIT TRAIL	17.00	1500	932.6	0.9	3.71	5.10	1.09
BETWEEN SPLIT AND JACKRABBIT TRAIL	16.77	2100	925.56	1.88	3.89	5.56	1.46
BETWEEN SPLIT AND JACKRABBIT TRAIL	16.55	3800	919.79	1.28	4.14	9.79	1.69
BETWEEN SPLIT AND JACKRABBIT TRAIL	16.37	3800	908.38	4.54	4.20	3.48	0.63
BETWEEN SPLIT AND JACKRABBIT TRAIL	16.22	3800	901.89	0.75	4.54	2.49	1.30
BETWEEN SPLIT AND JACKRABBIT TRAIL	16.01	3800	895.91	4.83	4.61	0.91	0.71

HEC-RAS SUMMARY, EAST OF JACKRABBIT TRAIL 1/3 FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST OF JACKRABBIT TRAIL	18.85	1500	1002.36	1.54	1.17	3.36	0.42
EAST OF JACKRABBIT TRAIL	18.60	1500	992.73	0.93	1.55	2.43	0.57
EAST OF JACKRABBIT TRAIL	18.39	1500	984.63	0.77	1.95	2.33	0.50
EAST OF JACKRABBIT TRAIL	18.14	1500	975.28	1	2.33	2.68	0.74
EAST OF JACKRABBIT TRAIL	17.94	1500	967.29	0.95	2.69	1.49	0.71
EAST OF JACKRABBIT TRAIL	17.69	1500	958.81	0.86	3.09	2.31	0.55
EAST OF JACKRABBIT TRAIL	17.37	1500	940.42	0.97	3.84	1.32	0.71
EAST OF JACKRABBIT TRAIL	17.00	1500	928.69	0.82	4.58	1.19	0.76
EAST OF JACKRABBIT TRAIL	16.77	1500	920.98	0.97	4.96	0.98	0.64
EAST OF JACKRABBIT TRAIL	16.55	1500	911.55	1.11	5.29	1.55	0.89
EAST OF JACKRABBIT TRAIL	16.37	1500	906.03	0.91	5.55	1.13	0.68
EAST OF JACKRABBIT TRAIL	16.22	1500	902.15	0.62	6.07	2.75	0.90
EAST OF JACKRABBIT TRAIL	16.01	1500	895.68	3.57	6.16	0.68	0.39

HEC-RAS SUMMARY, WEST OF TUTHILL ROAD 2/3 FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
WEST OF TUTHILL ROAD	18.85	1000	999.29	2.80	0.87	0.29	0.24
WEST OF TUTHILL ROAD	18.60	1000	993.25	1.06	0.87	2.95	0.74
WEST OF TUTHILL ROAD	18.39	1000	985.22	1.01	1.16	2.92	0.67
WEST OF TUTHILL ROAD	18.14	1000	977.02	1.17	1.42	4.42	0.87
WEST OF TUTHILL ROAD	17.94	1500	968.92	1.06	1.67	3.12	0.63
WEST OF TUTHILL ROAD	17.69	1500	961.29	1.17	1.91	4.79	1.02
WEST OF TUTHILL ROAD	17.37	1000	950.35	1.16	2.27	11.25	0.68
WEST OF TUTHILL ROAD	17.00	1000	936.58	0.99	2.80	9.08	0.85
WEST OF TUTHILL ROAD	16.77	1000	926.82	1.22	3.11	6.82	0.80
WEST OF TUTHILL ROAD	16.55	1000	922.67	0.75	3.46	12.67	0.99
WEST OF TUTHILL ROAD	16.37	1000	910.48	2.24	3.68	5.58	0.51
WEST OF TUTHILL ROAD	16.22	1000	905.21	0.63	4.03	5.81	0.78
WEST OF TUTHILL ROAD	16.01	1000	896.18	3.00	4.16	1.18	0.28

HEC-RAS SUMMARY, BETWEEN TUTHILL ROAD AND SPLIT 2/3 FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
BETWEEN TUTHILL AND SPLIT	18.85	3500	1001.36	2.07	0.87	2.36	0.72
BETWEEN TUTHILL AND SPLIT	18.60	3500	992.79	1.45	1.14	2.49	1.34
BETWEEN TUTHILL AND SPLIT	18.39	3500	985.35	1.63	1.31	3.05	1.27
BETWEEN TUTHILL AND SPLIT	18.14	3500	976.85	1.39	1.53	4.25	1.27
BETWEEN TUTHILL AND SPLIT	17.94	3000	969.58	1.53	1.72	3.78	1.20
BETWEEN TUTHILL AND SPLIT	17.69	3000	961.44	1.28	1.99	4.94	1.25
BETWEEN TUTHILL AND SPLIT	17.37	3500	949.31	1.99	2.20	10.21	1.36
BETWEEN TUTHILL AND SPLIT	17.00	3500	936.38	1.48	2.59	8.88	2.08
BETWEEN TUTHILL AND SPLIT	16.77	1700	926.67	2.33	2.78	6.67	0.72
BETWEEN TUTHILL AND SPLIT	16.55	4800	920.05	1.4	3.01	10.05	1.87
BETWEEN TUTHILL AND SPLIT	16.37	4800	908.49	4.87	3.07	3.59	0.73
BETWEEN TUTHILL AND SPLIT	16.22	6500	902.39	0.92	3.34	2.99	1.76
BETWEEN TUTHILL AND SPLIT	16.01	6500	896.23	5.59	3.40	1.23	0.96

HEC-RAS SUMMARY, BETWEEN SPLIT AND JACKRABBIT TRAIL 2/3 FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
BETWEEN SPLIT AND JACKRABBIT TRAIL	18.85	4000	1002.16	2.58	0.94	3.16	0.85
BETWEEN SPLIT AND JACKRABBIT TRAIL	18.60	4000	992.9	1.24	1.21	2.60	0.89
BETWEEN SPLIT AND JACKRABBIT TRAIL	18.39	4000	984.64	1.2	1.44	2.34	0.84
BETWEEN SPLIT AND JACKRABBIT TRAIL	18.14	4000	975.62	1.61	1.66	3.02	1.59
BETWEEN SPLIT AND JACKRABBIT TRAIL	17.94	4000	968.04	1.65	1.83	2.24	1.28
BETWEEN SPLIT AND JACKRABBIT TRAIL	17.69	4000	959.68	1.41	2.08	3.18	1.55
BETWEEN SPLIT AND JACKRABBIT TRAIL	17.37	4000	946.37	1.77	2.35	7.27	1.05
BETWEEN SPLIT AND JACKRABBIT TRAIL	17.00	1300	932.66	0.74	3.09	5.16	1.13
BETWEEN SPLIT AND JACKRABBIT TRAIL	16.77	3100	926.08	2.01	3.26	6.08	1.68
BETWEEN SPLIT AND JACKRABBIT TRAIL	16.55	4800	920.05	1.4	3.50	10.05	1.87
BETWEEN SPLIT AND JACKRABBIT TRAIL	16.37	4800	908.49	4.87	3.55	3.59	0.73
BETWEEN SPLIT AND JACKRABBIT TRAIL	16.22	6500	902.39	0.92	3.83	2.99	1.76
BETWEEN SPLIT AND JACKRABBIT TRAIL	16.01	6500	896.23	5.59	3.89	1.23	0.96

HEC-RAS SUMMARY, EAST OF JACKRABBIT TRAIL 2/3 FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST OF JACKRABBIT TRAIL	18.85	3500	1002.73	1.62	0.95	3.73	0.52
EAST OF JACKRABBIT TRAIL	18.60	3500	993.1	1.23	1.24	2.80	0.74
EAST OF JACKRABBIT TRAIL	18.39	3500	985.06	0.89	1.58	2.76	0.72
EAST OF JACKRABBIT TRAIL	18.14	3500	975.75	1.34	1.87	3.15	1.00
EAST OF JACKRABBIT TRAIL	17.94	3500	967.91	1.06	2.19	2.11	0.99
EAST OF JACKRABBIT TRAIL	17.69	3500	959.11	1.27	2.46	2.61	0.78
EAST OF JACKRABBIT TRAIL	17.37	3500	941.04	1.15	3.09	1.94	1.14
EAST OF JACKRABBIT TRAIL	17.00	6200	929.67	1.36	3.54	2.17	1.41
EAST OF JACKRABBIT TRAIL	16.77	6200	921.95	1.42	3.80	1.95	1.29
EAST OF JACKRABBIT TRAIL	16.55	6200	912.65	1.62	4.02	2.65	1.38
EAST OF JACKRABBIT TRAIL	16.37	6200	907.06	1.31	4.20	2.16	1.28
EAST OF JACKRABBIT TRAIL	16.22	4500	902.96	0.98	4.53	3.56	1.69
EAST OF JACKRABBIT TRAIL	16.01	4500	896.16	4.03	4.61	1.16	0.49

HEC-RAS SUMMARY, WEST OF TUTHILL ROAD FULL FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
WEST OF TUTHILL ROAD	18.85	1000	999.29	2.80	0.77	0.29	0.24
WEST OF TUTHILL ROAD	18.60	1000	993.19	1.16	0.77	2.89	0.68
WEST OF TUTHILL ROAD	18.39	2320	985.76	1.27	1.00	3.46	1.12
WEST OF TUTHILL ROAD	18.14	2320	977.51	1.70	1.18	4.91	1.27
WEST OF TUTHILL ROAD	17.94	2320	969.15	1.20	1.40	3.35	0.86
WEST OF TUTHILL ROAD	17.69	2320	961.61	1.34	1.61	5.11	1.15
WEST OF TUTHILL ROAD	17.37	1000	950.35	1.16	1.97	11.25	0.68
WEST OF TUTHILL ROAD	17.00	1000	936.58	0.99	2.50	9.08	0.85
WEST OF TUTHILL ROAD	16.77	1000	926.82	1.22	2.81	6.82	0.80
WEST OF TUTHILL ROAD	16.55	1000	922.67	0.75	3.16	12.67	0.99
WEST OF TUTHILL ROAD	16.37	1000	910.48	2.24	3.38	5.58	0.51
WEST OF TUTHILL ROAD	16.22	1000	905.21	0.63	3.73	5.81	0.78
WEST OF TUTHILL ROAD	16.01	1000	896.18	3.00	3.86	1.18	0.28

HEC-RAS SUMMARY, BETWEEN TUTHILL ROAD AND SPLIT FULL FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
BETWEEN TUTHILL AND SPLIT	18.85	5500	1001.62	2.37	0.77	2.62	0.93
BETWEEN TUTHILL AND SPLIT	18.60	5500	993.2	1.75	0.99	2.90	1.73
BETWEEN TUTHILL AND SPLIT	18.39	4180	985.45	1.8	1.14	3.15	1.38
BETWEEN TUTHILL AND SPLIT	18.14	4180	977.04	1.44	1.36	4.44	1.42
BETWEEN TUTHILL AND SPLIT	17.94	4180	969.87	1.7	1.53	4.07	1.37
BETWEEN TUTHILL AND SPLIT	17.69	3180	961.51	1.29	1.79	5.03	1.31
BETWEEN TUTHILL AND SPLIT	17.37	4500	949.76	1.81	2.03	10.66	1.25
BETWEEN TUTHILL AND SPLIT	17.00	4500	936.76	1.6	2.39	9.26	2.24
BETWEEN TUTHILL AND SPLIT	16.77	2300	926.91	2.36	2.58	6.91	0.95
BETWEEN TUTHILL AND SPLIT	16.55	5800	920.29	1.5	2.79	10.29	2.07
BETWEEN TUTHILL AND SPLIT	16.37	5800	908.59	5.14	2.85	3.69	0.82
BETWEEN TUTHILL AND SPLIT	16.22	11500	903.1	1.16	3.06	3.70	2.41
BETWEEN TUTHILL AND SPLIT	16.01	11500	896.7	6.47	3.12	1.70	1.28

HEC-RAS SUMMARY, BETWEEN SPLIT AND JACKRABBIT TRAIL FULL FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
BETWEEN SPLIT AND JACKRABBIT TRAIL	18.85	6500	1002.56	2.76	0.83	3.56	1.11
BETWEEN SPLIT AND JACKRABBIT TRAIL	18.60	6500	993.11	1.62	1.03	2.81	1.07
BETWEEN SPLIT AND JACKRABBIT TRAIL	18.39	6500	985.04	1.32	1.25	2.74	1.18
BETWEEN SPLIT AND JACKRABBIT TRAIL	18.14	6500	976.18	1.85	1.43	3.58	1.65
BETWEEN SPLIT AND JACKRABBIT TRAIL	17.94	6500	968.63	1.82	1.59	2.83	1.78
BETWEEN SPLIT AND JACKRABBIT TRAIL	17.69	7500	960.47	1.6	1.81	3.97	1.64
BETWEEN SPLIT AND JACKRABBIT TRAIL	17.37	6400	946.79	2	2.05	7.69	1.41
BETWEEN SPLIT AND JACKRABBIT TRAIL	17.00	1300	932.74	0.69	2.85	5.24	1.17
BETWEEN SPLIT AND JACKRABBIT TRAIL	16.77	3500	926.3	1.98	3.02	6.30	1.61
BETWEEN SPLIT AND JACKRABBIT TRAIL	16.55	5800	920.29	1.5	3.24	10.29	2.07
BETWEEN SPLIT AND JACKRABBIT TRAIL	16.37	5800	908.59	5.14	3.29	3.69	0.82
BETWEEN SPLIT AND JACKRABBIT TRAIL	16.22	11500	903.1	1.16	3.51	3.70	2.41
BETWEEN SPLIT AND JACKRABBIT TRAIL	16.01	11500	896.7	6.47	3.56	1.70	1.28

HEC-RAS SUMMARY, EAST OF JACKRABBIT TRAIL FULL FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VELOCITY (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST OF JACKRABBIT TRAIL	18.85	5000	1002.89	1.78	0.83	3.89	0.64
EAST OF JACKRABBIT TRAIL	18.60	5000	993.26	1.44	1.08	2.96	0.87
EAST OF JACKRABBIT TRAIL	18.39	5000	985.26	0.99	1.39	2.96	0.90
EAST OF JACKRABBIT TRAIL	18.14	5000	975.99	1.54	1.64	3.39	1.14
EAST OF JACKRABBIT TRAIL	17.94	5000	968.19	1.16	1.93	2.39	1.20
EAST OF JACKRABBIT TRAIL	17.69	5000	959.26	1.51	2.16	2.76	0.91
EAST OF JACKRABBIT TRAIL	17.37	6400	941.73	1.16	2.79	2.63	1.21
EAST OF JACKRABBIT TRAIL	17.00	11200	930.31	1.64	3.16	2.81	1.82
EAST OF JACKRABBIT TRAIL	16.77	11200	922.57	1.67	3.38	2.57	1.69
EAST OF JACKRABBIT TRAIL	16.55	11200	913.29	1.96	3.57	3.29	1.80
EAST OF JACKRABBIT TRAIL	16.37	11200	907.66	1.55	3.72	2.76	1.64
EAST OF JACKRABBIT TRAIL	16.22	5500	903.17	1.06	4.02	3.77	1.89
EAST OF JACKRABBIT TRAIL	16.01	5500	896.25	4.14	4.10	1.25	0.52

3.3 Buckeye Canal to Gila River

HEC-RAS MODEL WT4C1 SUMMARY, 1/3 FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VEL (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST WEIR	15.93	5300	892.07	2.76	3.90	1.07	0.67
EAST WEIR	15.82	5300	889.40	1.03	3.96	2.20	1.62
EAST WEIR	15.71	5300	887.54	1.00	4.13	2.54	1.24
EAST WEIR	15.53	5300	885.10	0.88	4.38	1.80	1.36
EAST WEIR	15.38	5300	883.07	0.99	4.62	2.17	1.36
EAST WEIR	15.15	5300	881.37	0.71	4.97	2.97	2.16
EAST WEIR	14.85	5300	879.65	0.88	5.59	3.15	1.88
EAST WEIR	14.62	5300	878.26	0.69	5.97	4.76	1.89
EAST WEIR	14.42	5300	877.03	0.79	6.41	4.03	1.72
EAST WEIR	14.10	6000	874.22	0.97	7.00	6.62	1.71
EAST WEIR	13.85	6000	872.88	0.67	7.38	7.38	2.53
EAST WEIR	13.58	6000	871.70	0.72	7.96	4.90	1.57
EAST WEIR	13.25	6000	869.74	0.64	8.64	3.24	1.59
WEST WEIR	15.93	700	892.12	2.72	4.73	0.32	0.23
WEST WEIR	15.72	700	883.53	0.49	4.84	1.23	0.81
WEST WEIR	15.52	700	877.95	2.25	5.46	0.25	0.16

HEC-RAS MODEL WT4C1 SUMMARY, 2/3 FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VEL (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST WEIR	15.93	11000	892.66	2.61	4.16	1.66	0.96
EAST WEIR	15.82	11000	890.26	1.35	4.22	3.06	2.17
EAST WEIR	15.71	11000	888.23	1.31	4.36	3.23	1.86
EAST WEIR	15.53	11000	885.79	1.13	4.54	2.49	2.03
EAST WEIR	15.38	11000	884.17	1.11	4.73	3.27	2.27
EAST WEIR	15.15	11000	882.61	0.90	5.04	4.21	2.78
EAST WEIR	14.85	11000	880.74	1.12	5.53	4.24	2.70
EAST WEIR	14.62	11000	879.29	0.92	5.83	5.79	2.75
EAST WEIR	14.42	11000	877.98	1.04	6.16	4.98	2.51
EAST WEIR	14.10	12000	875.25	1.19	6.60	7.65	2.53
EAST WEIR	13.85	12000	873.89	0.77	6.92	8.39	3.28
EAST WEIR	13.58	12000	872.61	0.85	7.43	5.81	1.99
EAST WEIR	13.25	12000	870.62	0.79	7.99	4.12	2.20
WEST WEIR	15.93	1000	892.18	3.02	3.40	0.38	0.28
WEST WEIR	15.72	1000	883.74	0.55	3.50	1.44	0.94
WEST WEIR	15.52	1000	878.00	2.48	4.05	0.30	0.19

HEC-RAS MODEL WT4C1 SUMMARY, FULL FLOW

REACH	X-SEC	Q (CFS)	WS ELEV (FT)	AVG VEL (FPS)	TRAVEL TIME (HRS)	MAX DEPTH (FT)	AVG DEPTH (FT)
EAST WEIR	15.93	17000	893.10	2.71	3.86	2.10	1.30
EAST WEIR	15.82	17000	890.93	1.57	3.92	3.73	2.59
EAST WEIR	15.71	17000	888.78	1.55	4.03	3.78	2.35
EAST WEIR	15.53	17000	886.47	1.28	4.19	3.17	2.70
EAST WEIR	15.38	17000	884.99	1.24	4.36	4.09	2.80
EAST WEIR	15.15	17000	883.48	1.05	4.63	5.08	3.53
EAST WEIR	14.85	17000	881.58	1.32	5.05	5.08	3.39
EAST WEIR	14.62	17000	880.06	1.10	5.31	6.56	3.42
EAST WEIR	14.42	17000	878.71	1.15	5.58	5.71	3.13
EAST WEIR	14.10	18000	876.02	1.35	5.98	8.42	3.11
EAST WEIR	13.85	18000	874.57	0.90	6.26	9.07	3.82
EAST WEIR	13.58	18000	873.22	0.97	6.69	6.42	2.46
EAST WEIR	13.25	18000	871.25	0.92	7.19	4.75	2.75
WEST WEIR	15.93	1000	892.18	3.02	3.12	0.38	0.28
WEST WEIR	15.72	1000	883.74	0.55	3.22	1.44	0.94
WEST WEIR	15.52	1000	878.00	2.48	3.77	0.30	0.19

4 HEC-RAS Model Printouts

4.1 FRS to Roosevelt Canal

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                    HEC-RAS September 1998 Version 2.2
                      U.S. Army Corp of Engineers
                     Hydrologic Engineering Center
                       609 Second Street, Suite D
                      Davis, California 95616-4687
                             (916) 756-1104

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

PROJECT DATA
Project Title: White Tanks FRS#4, Section A, Model 1
Project File : WT4A1.prj
Run Date and Time: 06/26/2000 10:06:40 AM

Project in English units

Project Description:
Study Name: White Tanks FRS #4 Spillway Delineation Study
Contract No.: FCD 98-32
Purpose of Study: Delineation of the inundation limits of the 1/3, 2/3, and full spillway discharges for the western spillway of the White Tanks Flood Retarding Structure #4.

Model Name: WT4A1
Model Description: Set up to model flow in the channel just west of Tuthill Road, between the west spillway and Roosevelt Irrigation District Canal. Cross-section data east of the channel is set as ineffective flow area on sections 19.84 through 18.87. Capacity of the channel west of Tuthill was calculated to be 1000 cfs.
Flow Profile: Profile #1, 1/3 spillway discharge for the 1/2 PMF
Sections 20.09 to 20.04, Q=4000 cfs
Sections 19.84 to 18.87, Q=1000 cfs
Profile #2, 2/3 spillway discharge for the 1/2 PMF
Sections 20.09 to 20.04, Q=8000 cfs
Sections 19.84 to 18.87, Q=1000 cfs.
Profile #3, Full spillway discharge for the 1/2 PMF
Sections 20.09 to 20.04, Q=12,000 cfs
Sections 19.84 to 18.87, Q=1000 cfs
HEC-RAS Version: Version 2.2, September 1998 with RASPATCH

Consultants: Hoskin Engineering Consultants, Inc.
323 W. Roosevelt Street, Suite 200
Phoenix, AZ 85003
(602)252-8384 Phone
(602)252-8385 Fax
HEC 990006

DEI Professional Services, LLC
6225 N. 24th St., Ste. 200
Phoenix, AZ 85016
(602)954-0038 Phone
(602)944-8605 Fax

PLAN DATA

Plan Title: Section A, West of Tuthill
Plan File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final models\WT4A1.P01

Geometry Title: Section A, West of Tuthill
Geometry File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final models\WT4A1.G01

```
          Flow Title     : Section A, West of Tuthill
          Flow File      : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White
Tanks\hecras\i10-rsvlt\final models\WT4A1.F01

Plan Summary Information:
Number of:  Cross Sections =   10    Mulitple Openings =    0
            Culverts       =    0    Inline Weirs      =    0
            Bridges        =    0

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

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: Between every coordinate point (HEC2 Style)
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow
```

FLOW DATA

Flow Title: Section A, West of Tuthill
Flow File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final models\WT4A1.F01

Flow Data (cfs)

River	Reach	RS	1/3	2/3	Full
West	W1	20.09	4000	8000	12000
West	W1	19.84	1000	1000	1000
West Spillway	A1	20.09	4000	8000	12000
West Spillway	A1	19.84	1000	1000	1000

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
West Spillway	A1	1/3		Critical

GEOMETRY DATA

Geometry Title: Section A, West of Tuthill
Geometry File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final models\WT4A1.G01

CROSS SECTION RIVER: West Spillway
REACH: A1 RS: 20.09

INPUT
Description: Northern Boundary of HEC-RAS Model
1/3 Q=4000 cfs
2/3 Q=8000
cfs
Full Q=12,000 cfs
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
10000	1054	10110	1054	10210	1054	10330	1054	10400	1054
10440	1052	10460	1050	10520	1048.2	10550	1049	10600	1049.2
10630	1049.7	10650	1050	10750	1051.5	10910	1054	11120	1056
11340	1058	11570	1060						

```
Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
   10000    .045   10400     .02   10750    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          10400  10910              500     580     620            .1        .3

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)          1052.39   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.75   Wt. n-Val.                           0.020
  W.S. Elev (ft)          1051.65   Reach Len. (ft)           500.00    580.00    620.00
  Crit W.S. (ft)                    Flow Area (sq ft)                   577.00
  E.G. Slope (ft/ft)     0.003761   Area (sq ft)                        577.00
  Q Total (cfs)           4000.00   Flow (cfs)                         4000.00
  Top Width (ft)           315.79   Top Width (ft)                      315.79
  Vel Total (ft/s)           6.93   Avg. Vel. (ft/s)                      6.93
  Max Chl Dpth (ft)          3.45   Hydr. Depth (ft)                      1.83
  Conv. Total (cfs)       65220.2   Conv. (cfs)                        65220.2
  Length Wtd. (ft)         580.00   Wetted Per. (ft)                    315.92
  Min Ch El (ft)          1048.20   Shear (lb/sq ft)                      0.43
  Alpha                      1.00   Stream Power (lb/ft s)                2.97
  Frctn Loss (ft)            2.85   Cum Volume (acre-ft)      700.71    64.85     14.14
  C & E Loss (ft)            0.04   Cum SA (acres)            341.71    75.31     23.07

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.

CROSS SECTION OUTPUT    Profile #2/3

  E.G. Elev (ft)          1053.79   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              1.17   Wt. n-Val.                           0.020
  W.S. Elev (ft)          1052.62   Reach Len. (ft)           500.00    580.00    620.00
  Crit W.S. (ft)          1052.62   Flow Area (sq ft)                   921.54
  E.G. Slope (ft/ft)     0.003852   Area (sq ft)                        921.54
  Q Total (cfs)           8000.00   Flow (cfs)                         8000.00
  Top Width (ft)           394.05   Top Width (ft)                      394.05
  Vel Total (ft/s)           8.68   Avg. Vel. (ft/s)                      8.68
  Max Chl Dpth (ft)          4.42   Hydr. Depth (ft)                      2.34
  Conv. Total (cfs)      128897.1   Conv. (cfs)                       128897.1
  Length Wtd. (ft)         580.00   Wetted Per. (ft)                    394.23
  Min Ch El (ft)          1048.20   Shear (lb/sq ft)                      0.56
  Alpha                      1.00   Stream Power (lb/ft s)                4.88
  Frctn Loss (ft)            3.09   Cum Volume (acre-ft)      706.99    75.07     14.14
  C & E Loss (ft)            0.07   Cum SA (acres)            341.85    76.54     23.07

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program selected the water surface that had the least amount of error between computed
         and assumed values.
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 OUTPUT    Profile #Full

  E.G. Elev (ft)          1054.82   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              1.39   Wt. n-Val.                           0.020
  W.S. Elev (ft)          1053.43   Reach Len. (ft)           500.00    580.00    620.00
  Crit W.S. (ft)          1053.43   Flow Area (sq ft)                  1266.45
  E.G. Slope (ft/ft)     0.003740   Area (sq ft)                       1266.45
  Q Total (cfs)          12000.00   Flow (cfs)                        12000.00
  Top Width (ft)           461.76   Top Width (ft)                      461.76
  Vel Total (ft/s)           9.48   Avg. Vel. (ft/s)                      9.48
  Max Chl Dpth (ft)          5.23   Hydr. Depth (ft)                      2.74
```

Conv. Total (cfs)	196211.5	Conv. (cfs)		196211.5	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		461.96	
Min Ch El (ft)	1048.20	Shear (lb/sq ft)		0.64	
Alpha	1.00	Stream Power (lb/ft s)		6.07	
Frctn Loss (ft)	3.00	Cum Volume (acre-ft)	712.66	84.92	14.14
C & E Loss (ft)	0.09	Cum SA (acres)	342.02	78.13	23.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
10434.00	10468.00	121.57	27.67	24.54	3.04	1.13	4.39
10468.00	10502.00	591.40	81.46	34.02	14.78	2.40	7.26
10502.00	10536.00	959.32	108.88	34.01	23.98	3.20	8.81
10536.00	10570.00	721.54	91.77	34.01	18.04	2.70	7.86
10570.00	10604.00	632.89	84.82	34.00	15.82	2.49	7.46
10604.00	10638.00	473.91	71.31	34.00	11.85	2.10	6.65
10638.00	10672.00	292.70	53.41	34.00	7.32	1.57	5.48
10672.00	10706.00	152.16	36.07	34.00	3.80	1.06	4.22
10706.00	10740.00	51.04	18.73	34.00	1.28	0.55	2.73
10740.00	10774.00	3.48	2.89	19.33	0.09	0.15	1.21

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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10400.00	10434.00	1.29	1.02	6.40	0.02	0.16	1.26
10434.00	10468.00	345.95	57.13	34.11	4.32	1.68	6.06
10468.00	10502.00	1105.40	114.57	34.02	13.82	3.37	9.65
10502.00	10536.00	1580.84	142.00	34.01	19.76	4.18	11.13
10536.00	10570.00	1276.44	124.88	34.01	15.96	3.67	10.22
10570.00	10604.00	1160.42	117.94	34.00	14.51	3.47	9.84
10604.00	10638.00	947.33	104.42	34.00	11.84	3.07	9.07
10638.00	10672.00	692.40	86.52	34.00	8.66	2.54	8.00
10672.00	10706.00	476.94	69.18	34.00	5.96	2.03	6.89
10706.00	10740.00	294.85	51.84	34.00	3.69	1.52	5.69
10740.00	10774.00	98.49	34.32	34.00	1.23	1.01	2.87
10774.00	10808.00	19.03	16.29	34.00	0.24	0.48	1.17
10808.00	10842.00	0.63	1.46	13.66	0.01	0.11	0.43

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta	Right Sta	Flow	Area	W.P.	% Conv.	Hydr D.	Velocity

(ft)	(ft)	(cfs)	(sq ft)	(ft)		(ft)	(ft/s)
LB 10400.00	10434.00	36.62	12.67	22.54	0.31	0.56	2.89
10434.00	10468.00	656.93	84.53	34.11	5.47	2.49	7.77
10468.00	10502.00	1561.82	141.97	34.02	13.02	4.18	11.00
10502.00	10536.00	2096.51	169.40	34.01	17.47	4.98	12.38
10536.00	10570.00	1755.83	152.29	34.01	14.63	4.48	11.53
10570.00	10604.00	1624.53	145.34	34.00	13.54	4.27	11.18
10604.00	10638.00	1380.58	131.83	34.00	11.50	3.88	10.47
10638.00	10672.00	1082.46	113.92	34.00	9.02	3.35	9.50
10672.00	10706.00	822.05	96.58	34.00	6.85	2.84	8.51
10706.00	10740.00	591.10	79.24	34.00	4.93	2.33	7.46
10740.00	10774.00	248.53	61.72	34.00	2.07	1.82	4.03
10774.00	10808.00	97.39	43.69	34.00	0.81	1.29	2.23
10808.00	10842.00	40.03	25.63	34.00	0.33	0.75	1.56
10842.00	10876.00	5.62	7.63	31.25	0.05	0.24	0.74

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
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: West Spillway
REACH: A1 RS: 20.04

INPUT
Description: 1/3 Q=4000 cfs
2/3 Q=8000 cfs
Full Q=12,000 cfs
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9920	1045	9960	1044.8	10000	1045	10060	1044	10070	1043.8
10080	1044	10200	1045.8	10300	1046	10360	1048	10380	1050
10390	1050.5	10400	1050	10470	1047	10580	1046.4	10610	1047
10625	1048	10630	1050	10650	1050.2	10660	1050	10670	1048
10690	1047.7	10710	1048	10750	1048.2	10790	1048.6	10830	1048.5
10910	1048	10960	1047.3	10990	1048	11030	1050	11050	1052

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9920	.045	10400	.02	10630	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10390	11050	1200	1150	1150	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
9920	10390	

CROSS SECTION OUTPUT Profile #1/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	1049.50	Element			
Vel Head (ft)	0.61	Wt. n-Val.		0.024	
W.S. Elev (ft)	1048.90	Reach Len. (ft)	1200.00	1150.00	1150.00
Crit W.S. (ft)	1048.90	Flow Area (sq ft)		639.54	
E.G. Slope (ft/ft)	0.006681	Area (sq ft)	1579.81	639.54	
Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	992.78	Top Width (ft)	448.95	543.83	
Vel Total (ft/s)	6.25	Avg. Vel. (ft/s)		6.25	
Max Chl Dpth (ft)	5.09	Hydr. Depth (ft)		1.18	
Conv. Total (cfs)	48935.4	Conv. (cfs)		48935.4	
Length Wtd. (ft)	1150.00	Wetted Per. (ft)		544.22	
Min Ch El (ft)	1046.40	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)		3.07	
Frctn Loss (ft)	8.40	Cum Volume (acre-ft)	691.65	56.75	14.14
C & E Loss (ft)	0.13	Cum SA (acres)	339.14	69.58	23.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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 OUTPUT Profile #2/3

E.G. Elev (ft)	1050.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.92	Wt. n-Val.		0.026	
W.S. Elev (ft)	1049.61	Reach Len. (ft)	1200.00	1150.00	1150.00
Crit W.S. (ft)	1049.61	Flow Area (sq ft)		1038.67	
E.G. Slope (ft/ft)	0.007822	Area (sq ft)	1901.23	1038.67	
Q Total (cfs)	8000.00	Flow (cfs)		8000.00	
Top Width (ft)	1035.99	Top Width (ft)	456.05	579.94	
Vel Total (ft/s)	7.70	Avg. Vel. (ft/s)		7.70	
Max Chl Dpth (ft)	5.81	Hydr. Depth (ft)		1.79	
Conv. Total (cfs)	90452.0	Conv. (cfs)		90452.0	
Length Wtd. (ft)	1150.00	Wetted Per. (ft)		580.57	
Min Ch El (ft)	1046.40	Shear (lb/sq ft)		0.87	
Alpha	1.00	Stream Power (lb/ft s)		6.73	
Frctn Loss (ft)	9.31	Cum Volume (acre-ft)	696.08	62.02	14.14
C & E Loss (ft)	0.22	Cum SA (acres)	339.23	70.06	23.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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 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 OUTPUT Profile #Full

E.G. Elev (ft)	1051.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.		0.027	
W.S. Elev (ft)	1050.24	Reach Len. (ft)	1200.00	1150.00	1150.00
Crit W.S. (ft)	1050.24	Flow Area (sq ft)		1419.00	
E.G. Slope (ft/ft)	0.007587	Area (sq ft)	2191.83	1419.00	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	1101.88	Top Width (ft)	464.75	637.13	
Vel Total (ft/s)	8.46	Avg. Vel. (ft/s)		8.46	
Max Chl Dpth (ft)	6.44	Hydr. Depth (ft)		2.23	
Conv. Total (cfs)	137768.0	Conv. (cfs)		137768.0	
Length Wtd. (ft)	1150.00	Wetted Per. (ft)		637.91	
Min Ch El (ft)	1046.40	Shear (lb/sq ft)		1.05	
Alpha	1.00	Stream Power (lb/ft s)		8.91	
Frctn Loss (ft)	8.95	Cum Volume (acre-ft)	700.08	67.04	14.14
C & E Loss (ft)	0.28	Cum SA (acres)	339.35	70.82	23.07

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: Divided flow computed for this cross-section.

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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 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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10390.00	10434.00	2.61	1.45	8.22	0.07	0.18	1.80
10434.00	10478.00	374.77	55.78	44.03	9.37	1.27	6.72
10478.00	10522.00	841.09	90.58	44.00	21.03	2.06	9.29
10522.00	10566.00	1010.78	101.14	44.00	25.27	2.30	9.99
10566.00	10610.00	995.87	100.25	44.01	24.90	2.28	9.93
10610.00	10654.00	146.55	21.93	17.44	3.66	1.27	6.68
10654.00	10698.00	80.59	31.98	32.57	2.01	0.98	2.52
10698.00	10742.00	87.51	37.90	44.00	2.19	0.86	2.31
10742.00	10786.00	41.61	24.26	44.00	1.04	0.55	1.71
10786.00	10830.00	18.80	15.06	44.00	0.47	0.34	1.25
10830.00	10874.00	39.26	23.43	44.00	0.98	0.53	1.68
10874.00	10918.00	79.49	35.78	44.00	1.99	0.81	2.22
10918.00	10962.00	176.71	57.78	44.00	4.42	1.31	3.06
10962.00	11006.00	104.32	42.13	44.03	2.61	0.96	2.48
11006.00	RB 11050.00	0.03	0.09	1.90	0.00	0.05	0.33

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10390.00	10434.00	53.55	13.17	24.81	0.67	0.53	4.07
10434.00	10478.00	850.36	87.04	44.03	10.63	1.98	9.77
10478.00	10522.00	1490.18	121.83	44.00	18.63	2.77	12.23
10522.00	10566.00	1711.60	132.39	44.00	21.40	3.01	12.93
10566.00	10610.00	1692.27	131.50	44.01	21.15	2.99	12.87
10610.00	10654.00	319.20	34.80	19.36	3.99	1.83	9.17
10654.00	10698.00	208.48	56.31	36.19	2.61	1.56	3.70
10698.00	10742.00	257.73	69.16	44.00	3.22	1.57	3.73
10742.00	10786.00	178.72	55.52	44.00	2.23	1.26	3.22
10786.00	10830.00	132.13	46.32	44.00	1.65	1.05	2.85
10830.00	10874.00	174.28	54.69	44.00	2.18	1.24	3.19
10874.00	10918.00	244.68	67.03	44.00	3.06	1.52	3.65
10918.00	10962.00	392.69	89.04	44.00	4.91	2.02	4.41
10962.00	11006.00	284.39	73.38	44.03	3.55	1.67	3.88
11006.00	RB 11050.00	9.74	6.49	16.13	0.12	0.40	1.50

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

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 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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10390.00	10434.00	196.00	33.41	38.79	1.63	0.86	5.87
10434.00	10478.00	1327.09	114.86	44.03	11.06	2.61	11.55
10478.00	10522.00	2063.73	149.65	44.00	17.20	3.40	13.79
10522.00	10566.00	2312.10	160.21	44.00	19.27	3.64	14.43
10566.00	10610.00	2290.48	159.32	44.01	19.09	3.62	14.38
10610.00	10654.00	506.19	50.31	44.42	4.22	1.14	10.06
10654.00	10698.00	328.81	81.01	44.20	2.74	1.84	4.06
10698.00	10742.00	445.07	96.97	44.00	3.71	2.20	4.59
10742.00	10786.00	345.71	83.33	44.00	2.88	1.89	4.15
10786.00	10830.00	284.47	74.13	44.00	2.37	1.68	3.84
10830.00	10874.00	339.98	82.50	44.00	2.83	1.88	4.12
10874.00	10918.00	428.95	94.85	44.00	3.57	2.16	4.52
10918.00	10962.00	607.29	116.86	44.00	5.06	2.66	5.20
10962.00	11006.00	477.66	101.20	44.03	3.98	2.30	4.72
11006.00	RB 11050.00	46.47	20.38	26.42	0.39	0.77	2.28

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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 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: West Spillway
REACH: A1 RS: 19.84

INPUT
Description: Q=1000 cfs. Ineffective flow area blocking all flow east of the channel along Tuthill Road.
Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8790	1041	8810	1040	8840	1039.5	8870	1040	8950	1040.1
9031.92	1040	9154.47	1040	9343.33	1039.5	9492.37	1039	9567.8	1038.5
9636.2	1038	9657.55	1038	9661.34	1038	9792.72	1037.5	9940	1037.37
10000	1037.04	10020.48	1037	10067.24	1036.5	10078.84	1036.5	10140	1036.9
10155.1	1037	10160.59	1037.5	10166.09	1038	10166.19	1038	10179.88	1038.5
10193.36	1039	10206.84	1039.5	10218.1	1040	10220.32	1040	10230.71	1040
10236.59	1039.5	10242.46	1039	10248.34	1038.5	10254.31	1038	10263.83	1038
10287.5	1038	10297.37	1038.5	10307.24	1039	10317.17	1039.5	10327.1	1040
10346.11	1040	10485.18	1040.5	10560.46	1041	10617.79	1041	10697.96	1041
10735.37	1041.5	10771.87	1042	10773.79	1042	10851.1	1042	10853.58	1042
11007.45	1042	11008.85	1042	11105.31	1042.5	11110.67	1042.5	11117.75	1042
11122.71	1042	11141.01	1042	11145.15	1042	11180.08	1042.5	11215.01	1043
11315.24	1043.5	11340.66	1044	11345.91	1044	11420.74	1044.5	11581.66	1044.5
11620.79	1044	11640.15	1044	11640.69	1044	11668.31	1044.5	11722.97	1044.5
11766.55	1044.5	11781.65	1044.5	11790.42	1044.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

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    8790       .1    10000     .01610067.24     .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      10230.7110560.46              870     870     870            .1        .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
    879010230.71  1044.5

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)          1040.94   Element                    Left OB    Channel   Right OB
  Vel Head (ft)              0.18   Wt. n-Val.                            0.045
  W.S. Elev (ft)          1040.75   Reach Len. (ft)             870.00    870.00     870.00
  Crit W.S. (ft)          1040.35   Flow Area (sq ft)                     291.09
  E.G. Slope (ft/ft)     0.010899   Area (sq ft)               2928.80    291.09
  Q Total (cfs)           1000.00   Flow (cfs)                           1000.00
  Top Width (ft)          1728.24   Top Width (ft)             1435.76    292.48
  Vel Total (ft/s)           3.44   Avg. Vel. (ft/s)                        3.44
  Max Chl Dpth (ft)          4.25   Hydr. Depth (ft)                        1.00
  Conv. Total (cfs)         9578.7  Conv. (cfs)                          9578.7
  Length Wtd. (ft)          870.00  Wetted Per. (ft)                     292.61
  Min Ch El (ft)          1038.00   Shear (lb/sq ft)                        0.68
  Alpha                      1.00   Stream Power (lb/ft s)                  2.33
  Frctn Loss (ft)            6.42   Cum Volume (acre-ft)        629.55     44.47      14.14
  C & E Loss (ft)            0.02   Cum SA (acres)              313.18     58.54      23.07

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.

CROSS SECTION OUTPUT    Profile #2/3

  E.G. Elev (ft)          1040.94   Element                    Left OB    Channel   Right OB
  Vel Head (ft)              0.18   Wt. n-Val.                            0.045
  W.S. Elev (ft)          1040.75   Reach Len. (ft)             870.00    870.00     870.00
  Crit W.S. (ft)          1040.35   Flow Area (sq ft)                     291.09
  E.G. Slope (ft/ft)     0.010899   Area (sq ft)               2928.80    291.09
  Q Total (cfs)           1000.00   Flow (cfs)                           1000.00
  Top Width (ft)          1728.24   Top Width (ft)             1435.76    292.48
  Vel Total (ft/s)           3.44   Avg. Vel. (ft/s)                        3.44
  Max Chl Dpth (ft)          4.25   Hydr. Depth (ft)                        1.00
  Conv. Total (cfs)         9578.7  Conv. (cfs)                          9578.7
  Length Wtd. (ft)          870.00  Wetted Per. (ft)                     292.61
  Min Ch El (ft)          1038.00   Shear (lb/sq ft)                        0.68
  Alpha                      1.00   Stream Power (lb/ft s)                  2.33
  Frctn Loss (ft)            6.42   Cum Volume (acre-ft)        629.55     44.47      14.14
  C & E Loss (ft)            0.02   Cum SA (acres)              313.18     58.54      23.07

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.

CROSS SECTION OUTPUT    Profile #Full

  E.G. Elev (ft)          1040.94   Element                    Left OB    Channel   Right OB
  Vel Head (ft)              0.18   Wt. n-Val.                            0.045
  W.S. Elev (ft)          1040.75   Reach Len. (ft)             870.00    870.00     870.00
  Crit W.S. (ft)          1040.35   Flow Area (sq ft)                     291.09
  E.G. Slope (ft/ft)     0.010899   Area (sq ft)               2928.80    291.09
  Q Total (cfs)           1000.00   Flow (cfs)                           1000.00
  Top Width (ft)          1728.24   Top Width (ft)             1435.76    292.48
  Vel Total (ft/s)           3.44   Avg. Vel. (ft/s)                        3.44
  Max Chl Dpth (ft)          4.25   Hydr. Depth (ft)                        1.00
  Conv. Total (cfs)         9578.7  Conv. (cfs)                          9578.7
  Length Wtd. (ft)          870.00  Wetted Per. (ft)                     292.61
  Min Ch El (ft)          1038.00   Shear (lb/sq ft)                        0.68
  Alpha                      1.00   Stream Power (lb/ft s)                  2.33
```

Frctn Loss (ft)	6.42	Cum Volume (acre-ft)	629.55	44.47	14.14
C & E Loss (ft)	0.02	Cum SA (acres)	313.18	58.54	23.07

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10230.71	10252.69	129.50	37.09	22.06	12.95	1.69	3.49
10252.69	10274.68	292.57	60.40	21.99	29.26	2.75	4.84
10274.68	10296.66	276.43	58.38	22.00	27.64	2.66	4.73
10296.66	10318.64	135.57	38.09	22.01	13.56	1.73	3.56
10318.64	10340.63	40.13	18.34	21.99	4.01	0.83	2.19
10340.63	10362.61	32.15	16.05	21.98	3.21	0.73	2.00
10362.61	10384.59	26.73	14.37	21.98	2.67	0.65	1.86
10384.59	10406.58	21.56	12.63	21.98	2.16	0.57	1.71
10406.58	10428.56	16.85	10.89	21.98	1.68	0.50	1.55
10428.56	10450.54	12.61	9.16	21.98	1.26	0.42	1.38
10450.54	10472.53	8.88	7.42	21.98	0.89	0.34	1.20
10472.53	10494.51	5.47	5.55	21.98	0.55	0.25	0.99
10494.51	10516.49	1.53	2.58	21.98	0.15	0.12	0.59
10516.49	10538.48	0.03	0.15	6.69	0.00	0.02	0.20

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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10230.71	10252.69	129.50	37.09	22.06	12.95	1.69	3.49
10252.69	10274.68	292.57	60.40	21.99	29.26	2.75	4.84
10274.68	10296.66	276.43	58.38	22.00	27.64	2.66	4.73
10296.66	10318.64	135.57	38.09	22.01	13.56	1.73	3.56
10318.64	10340.63	40.13	18.34	21.99	4.01	0.83	2.19
10340.63	10362.61	32.15	16.05	21.98	3.21	0.73	2.00
10362.61	10384.59	26.73	14.37	21.98	2.67	0.65	1.86
10384.59	10406.58	21.56	12.63	21.98	2.16	0.57	1.71
10406.58	10428.56	16.85	10.89	21.98	1.68	0.50	1.55
10428.56	10450.54	12.61	9.16	21.98	1.26	0.42	1.38
10450.54	10472.53	8.88	7.42	21.98	0.89	0.34	1.20
10472.53	10494.51	5.47	5.55	21.98	0.55	0.25	0.99
10494.51	10516.49	1.53	2.58	21.98	0.15	0.12	0.59
10516.49	10538.48	0.03	0.15	6.69	0.00	0.02	0.20

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10230.71	10252.69	129.50	37.09	22.06	12.95	1.69	3.49
10252.69	10274.68	292.57	60.40	21.99	29.26	2.75	4.84
10274.68	10296.66	276.43	58.38	22.00	27.64	2.66	4.73
10296.66	10318.64	135.57	38.09	22.01	13.56	1.73	3.56
10318.64	10340.63	40.13	18.34	21.99	4.01	0.83	2.19
10340.63	10362.61	32.15	16.05	21.98	3.21	0.73	2.00
10362.61	10384.59	26.73	14.37	21.98	2.67	0.65	1.86
10384.59	10406.58	21.56	12.63	21.98	2.16	0.57	1.71

10406.58	10428.56	16.85	10.89	21.98	1.68	0.50	1.55
10428.56	10450.54	12.61	9.16	21.98	1.26	0.42	1.38
10450.54	10472.53	8.88	7.42	21.98	0.89	0.34	1.20
10472.53	10494.51	5.47	5.55	21.98	0.55	0.25	0.99
10494.51	10516.49	1.53	2.58	21.98	0.15	0.12	0.59
10516.49	10538.48	0.03	0.15	6.69	0.00	0.02	0.20

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.

CROSS SECTION RIVER: West Spillway
REACH: A1 RS: 19.68

INPUT
Description: Q=1000 cfs
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7930	1036.5	8003.47	1036.5	8131.84	1036	8134.04	1036	8235.56	1035.5
8365.92	1035	8556.26	1034.5	8852.66	1034	8853.02	1034	8942.87	1033.5
9034.3	1033	9092.75	1033	9098.12	1033	9199.34	1032.5	9255.69	1032
9258.21	1032	9352.24	1031.5	9497.86	1031.5	9498.53	1032	9504.07	1032
9561.24	1031.5	9614.69	1031	9675.88	1031	9892.54	1031.5	9915	1031.5
9957.38	1031.5	10000	1031.5	10052.04	1031.5	10073.96	1031.5	10075.36	1031.5
10116.44	1032	10116.63	1032	10130	1032.5	10149.48	1033	10165.8	1033.5
10182.12	1033	10194.38	1033	10196.14	1033	10197.72	1033.5	10200.27	1033
10202.81	1032.5	10205.35	1032	10207.94	1032	10246.51	1032	10247.83	1032
10289.29	1032.5	10330.89	1033	10372.51	1033.5	10413.2	1033	10433.85	1034
10511.86	1034.5	10688.91	1034.5	10693.04	1034.5	10748.12	1033	10844.75	1035.5
10927.31	1035.5	10985.54	1035	10987.38	1035	11016.74	1035.5	11042.81	1036
11043.01	1036	11110.42	1036.5	11158.28	1037				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
7930	.1	10000	.016	10073.96	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10196.14	10511.86	490	570	480	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
7930	10196.14	1037

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1034.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.045	
W.S. Elev (ft)	1034.38	Reach Len. (ft)	490.00	570.00	480.00
Crit W.S. (ft)	1033.58	Flow Area (sq ft)		363.33	
E.G. Slope (ft/ft)	0.005327	Area (sq ft)	3200.29	363.33	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	1868.03	Top Width (ft)	1570.56	297.47	
Vel Total (ft/s)	2.75	Avg. Vel. (ft/s)		2.75	
Max Chl Dpth (ft)	3.38	Hydr. Depth (ft)		1.22	
Conv. Total (cfs)	13701.3	Conv. (cfs)		13701.3	
Length Wtd. (ft)	570.00	Wetted Per. (ft)		297.71	
Min Ch El (ft)	1032.00	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)		1.12	
Frctn Loss (ft)	3.76	Cum Volume (acre-ft)	568.34	37.93	14.14
C & E Loss (ft)	0.00	Cum SA (acres)	283.15	52.65	23.07

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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1034.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.045	
W.S. Elev (ft)	1034.38	Reach Len. (ft)	490.00	570.00	480.00

Crit W.S. (ft)	1033.58	Flow Area (sq ft)		363.33	
E.G. Slope (ft/ft)	0.005327	Area (sq ft)	3200.29	363.33	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	1868.03	Top Width (ft)	1570.56	297.47	
Vel Total (ft/s)	2.75	Avg. Vel. (ft/s)		2.75	
Max Chl Dpth (ft)	3.38	Hydr. Depth (ft)		1.22	
Conv. Total (cfs)	13701.3	Conv. (cfs)		13701.3	
Length Wtd. (ft)	570.00	Wetted Per. (ft)		297.71	
Min Ch El (ft)	1032.00	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)		1.12	
Frctn Loss (ft)	3.76	Cum Volume (acre-ft)	568.34	37.93	14.14
C & E Loss (ft)	0.00	Cum SA (acres)	283.15	52.65	23.07

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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1034.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.045	
W.S. Elev (ft)	1034.38	Reach Len. (ft)	490.00	570.00	480.00
Crit W.S. (ft)	1033.58	Flow Area (sq ft)		363.33	
E.G. Slope (ft/ft)	0.005327	Area (sq ft)	3200.29	363.33	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	1868.03	Top Width (ft)	1570.56	297.47	
Vel Total (ft/s)	2.75	Avg. Vel. (ft/s)		2.75	
Max Chl Dpth (ft)	3.38	Hydr. Depth (ft)		1.22	
Conv. Total (cfs)	13701.3	Conv. (cfs)		13701.3	
Length Wtd. (ft)	570.00	Wetted Per. (ft)		297.71	
Min Ch El (ft)	1032.00	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)		1.12	
Frctn Loss (ft)	3.76	Cum Volume (acre-ft)	568.34	37.93	14.14
C & E Loss (ft)	0.00	Cum SA (acres)	283.15	52.65	23.07

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10196.14	10217.19	126.30	41.67	21.27	12.63	1.98	3.03
10217.19	10238.24	173.27	50.16	21.05	17.33	2.38	3.45
10238.24	10259.28	168.74	49.37	21.05	16.87	2.35	3.42
10259.28	10280.33	142.35	44.58	21.05	14.24	2.12	3.19
10280.33	10301.38	115.09	39.24	21.05	11.51	1.86	2.93
10301.38	10322.43	90.25	33.91	21.05	9.02	1.61	2.66
10322.43	10343.48	67.89	28.59	21.05	6.79	1.36	2.37
10343.48	10364.52	48.16	23.27	21.05	4.82	1.11	2.07
10364.52	10385.57	31.17	17.92	21.05	3.12	0.85	1.74
10385.57	10406.62	17.07	12.49	21.05	1.71	0.59	1.37
10406.62	10427.67	8.69	8.33	21.05	0.87	0.40	1.04
10427.67	10448.72	7.06	7.35	21.05	0.71	0.35	0.96
10448.72	10469.76	3.27	4.64	21.05	0.33	0.22	0.71
10469.76	10490.81	0.67	1.80	21.05	0.07	0.09	0.38
10490.81	RB 10511.86	0.00	0.03	2.80	0.00	0.01	0.08

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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10196.14	10217.19	126.30	41.67	21.27	12.63	1.98	3.03
10217.19	10238.24	173.27	50.16	21.05	17.33	2.38	3.45
10238.24	10259.28	168.74	49.37	21.05	16.87	2.35	3.42
10259.28	10280.33	142.35	44.58	21.05	14.24	2.12	3.19

10280.33	10301.38	115.09	39.24	21.05	11.51	1.86	2.93
10301.38	10322.43	90.25	33.91	21.05	9.02	1.61	2.66
10322.43	10343.48	67.89	28.59	21.05	6.79	1.36	2.37
10343.48	10364.52	48.16	23.27	21.05	4.82	1.11	2.07
10364.52	10385.57	31.17	17.92	21.05	3.12	0.85	1.74
10385.57	10406.62	17.07	12.49	21.05	1.71	0.59	1.37
10406.62	10427.67	8.69	8.33	21.05	0.87	0.40	1.04
10427.67	10448.72	7.06	7.35	21.05	0.71	0.35	0.96
10448.72	10469.76	3.27	4.64	21.05	0.33	0.22	0.71
10469.76	10490.81	0.67	1.80	21.05	0.07	0.09	0.38
10490.81	RB 10511.86	0.00	0.03	2.80	0.00	0.01	0.08

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10196.14	10217.19	126.30	41.67	21.27	12.63	1.98	3.03
10217.19	10238.24	173.27	50.16	21.05	17.33	2.38	3.45
10238.24	10259.28	168.74	49.37	21.05	16.87	2.35	3.42
10259.28	10280.33	142.35	44.58	21.05	14.24	2.12	3.19
10280.33	10301.38	115.09	39.24	21.05	11.51	1.86	2.93
10301.38	10322.43	90.25	33.91	21.05	9.02	1.61	2.66
10322.43	10343.48	67.89	28.59	21.05	6.79	1.36	2.37
10343.48	10364.52	48.16	23.27	21.05	4.82	1.11	2.07
10364.52	10385.57	31.17	17.92	21.05	3.12	0.85	1.74
10385.57	10406.62	17.07	12.49	21.05	1.71	0.59	1.37
10406.62	10427.67	8.69	8.33	21.05	0.87	0.40	1.04
10427.67	10448.72	7.06	7.35	21.05	0.71	0.35	0.96
10448.72	10469.76	3.27	4.64	21.05	0.33	0.22	0.71
10469.76	10490.81	0.67	1.80	21.05	0.07	0.09	0.38
10490.81	RB 10511.86	0.00	0.03	2.80	0.00	0.01	0.08

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.

CROSS SECTION RIVER: West Spillway
REACH: A1 RS: 19.57

INPUT
Description: Q=1000 cfs
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7235	1034	7242.01	1034	7346.11	1033.5	7458.14	1033	7540.92	1032.5
7686.16	1032	7686.76	1032	7837.1	1031.5	8017.52	1031	8148.59	1030.5
8207.12	1030	8212.25	1030	8370.34	1029.5	8396.37	1029	8422.4	1028.5
8448.34	1028	8448.43	1028	8672.26	1027.5	9141.26	1027.5	9195.07	1027.5
9221.67	1027.5	9342.23	1027.5	9647.59	1028	9656.13	1028	9870.84	1028
9890	1028	9903.75	1028	9971.98	1028	9973.2	1028	9982.66	1028
10000	1028	10047.96	1028	10049.24	1028	10067.55	1028.5	10086.68	1029
10101.4	1030	10105.81	1029.5	10123.97	1030	10127.94	1029.5	10132.17	1029
10135	1028.5	10136.4	1028.5	10140.63	1028	10140.77	1028	10143.57	1027.5
10146.51	1027	10156.65	1027	10160.96	1027.5	10165.28	1028	10166.56	1028
10184.33	1028.5	10203.51	1029	10237.65	1029.5	10282.87	1030	10283.53	1030
10536.89	1030.5	10736.17	1031	10794.79	1031.5	10861.15	1032	10861.67	1032
10892.16	1032.5	10940.83	1033	10997.98	1033.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
7235	.1	10000	.01	10067.55	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10123.97	10736.17	570	690	690	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
7235	10123.97	1034

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1030.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.045	
W.S. Elev (ft)	1030.63	Reach Len. (ft)	570.00	690.00	690.00
Crit W.S. (ft)	1029.92	Flow Area (sq ft)		379.60	
E.G. Slope (ft/ft)	0.008364	Area (sq ft)	5111.52	379.60	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	2475.65	Top Width (ft)	2010.04	465.61	
Vel Total (ft/s)	2.63	Avg. Vel. (ft/s)		2.63	
Max Chl Dpth (ft)	3.63	Hydr. Depth (ft)		0.82	
Conv. Total (cfs)	10934.2	Conv. (cfs)		10934.2	
Length Wtd. (ft)	690.00	Wetted Per. (ft)		465.91	
Min Ch El (ft)	1027.00	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		1.12	
Frctn Loss (ft)	5.12	Cum Volume (acre-ft)	521.59	33.07	14.14
C & E Loss (ft)	0.00	Cum SA (acres)	263.02	47.66	23.07

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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1030.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.045	
W.S. Elev (ft)	1030.63	Reach Len. (ft)	570.00	690.00	690.00
Crit W.S. (ft)	1029.92	Flow Area (sq ft)		379.60	
E.G. Slope (ft/ft)	0.008364	Area (sq ft)	5111.52	379.60	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	2475.65	Top Width (ft)	2010.04	465.61	
Vel Total (ft/s)	2.63	Avg. Vel. (ft/s)		2.63	
Max Chl Dpth (ft)	3.63	Hydr. Depth (ft)		0.82	
Conv. Total (cfs)	10934.2	Conv. (cfs)		10934.2	
Length Wtd. (ft)	690.00	Wetted Per. (ft)		465.91	
Min Ch El (ft)	1027.00	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		1.12	
Frctn Loss (ft)	5.12	Cum Volume (acre-ft)	521.59	33.07	14.14
C & E Loss (ft)	0.00	Cum SA (acres)	263.02	47.66	23.07

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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1030.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.045	
W.S. Elev (ft)	1030.63	Reach Len. (ft)	570.00	690.00	690.00
Crit W.S. (ft)	1029.92	Flow Area (sq ft)		379.60	
E.G. Slope (ft/ft)	0.008364	Area (sq ft)	5111.52	379.60	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	2475.65	Top Width (ft)	2010.04	465.61	
Vel Total (ft/s)	2.63	Avg. Vel. (ft/s)		2.63	
Max Chl Dpth (ft)	3.63	Hydr. Depth (ft)		0.82	
Conv. Total (cfs)	10934.2	Conv. (cfs)		10934.2	
Length Wtd. (ft)	690.00	Wetted Per. (ft)		465.91	
Min Ch El (ft)	1027.00	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		1.12	
Frctn Loss (ft)	5.12	Cum Volume (acre-ft)	521.59	33.07	14.14
C & E Loss (ft)	0.00	Cum SA (acres)	263.02	47.66	23.07

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10123.97	10164.78	418.17	108.66	41.09	41.82	2.66	3.85

10164.78	10205.60	287.13	86.50	40.83	28.71	2.12	3.32
10205.60	10246.41	128.19	53.31	40.82	12.82	1.31	2.40
10246.41	10287.22	58.04	33.14	40.81	5.80	0.81	1.75
10287.22	10328.04	33.57	23.86	40.81	3.36	0.58	1.41
10328.04	10368.85	26.22	20.57	40.81	2.62	0.50	1.27
10368.85	10409.66	19.62	17.29	40.81	1.96	0.42	1.14
10409.66	10450.48	13.81	14.00	40.81	1.38	0.34	0.99
10450.48	10491.29	8.84	10.71	40.81	0.88	0.26	0.82
10491.29	10532.10	4.80	7.42	40.81	0.48	0.18	0.65
10532.10	10572.92	1.56	3.79	40.81	0.16	0.09	0.41
10572.92	10613.73	0.05	0.35	16.66	0.01	0.02	0.15

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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10123.97	10164.78	418.17	108.66	41.09	41.82	2.66	3.85
10164.78	10205.60	287.13	86.50	40.83	28.71	2.12	3.32
10205.60	10246.41	128.19	53.31	40.82	12.82	1.31	2.40
10246.41	10287.22	58.04	33.14	40.81	5.80	0.81	1.75
10287.22	10328.04	33.57	23.86	40.81	3.36	0.58	1.41
10328.04	10368.85	26.22	20.57	40.81	2.62	0.50	1.27
10368.85	10409.66	19.62	17.29	40.81	1.96	0.42	1.14
10409.66	10450.48	13.81	14.00	40.81	1.38	0.34	0.99
10450.48	10491.29	8.84	10.71	40.81	0.88	0.26	0.82
10491.29	10532.10	4.80	7.42	40.81	0.48	0.18	0.65
10532.10	10572.92	1.56	3.79	40.81	0.16	0.09	0.41
10572.92	10613.73	0.05	0.35	16.66	0.01	0.02	0.15

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10123.97	10164.78	418.17	108.66	41.09	41.82	2.66	3.85
10164.78	10205.60	287.13	86.50	40.83	28.71	2.12	3.32
10205.60	10246.41	128.19	53.31	40.82	12.82	1.31	2.40
10246.41	10287.22	58.04	33.14	40.81	5.80	0.81	1.75
10287.22	10328.04	33.57	23.86	40.81	3.36	0.58	1.41
10328.04	10368.85	26.22	20.57	40.81	2.62	0.50	1.27
10368.85	10409.66	19.62	17.29	40.81	1.96	0.42	1.14
10409.66	10450.48	13.81	14.00	40.81	1.38	0.34	0.99
10450.48	10491.29	8.84	10.71	40.81	0.88	0.26	0.82
10491.29	10532.10	4.80	7.42	40.81	0.48	0.18	0.65
10532.10	10572.92	1.56	3.79	40.81	0.16	0.09	0.41
10572.92	10613.73	0.05	0.35	16.66	0.01	0.02	0.15

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.

CROSS SECTION RIVER: West Spillway
REACH: A1 RS: 19.44

INPUT
Description: Q=1000 cfs
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6540	1029.8	6585	1029.6	6655	1029.5	6732	1029	7000	1028
7245	1026	7475	1025.5	7890	1024	8223.69	1023	8957.17	1023
9151.16	1023	9209.42	1023	9280.28	1023.5	9373.66	1023.5	9880.43	1023.03
9910.73	1023	9935.52	1022.5	9960.02	1022	9961.4	1022	9967.8	1022
10000	1022	10014.14	1022	10022.18	1022	10041.4	1022	10041.73	1022
10046.88	1022.5	10054.87	1023	10062.85	1023.5	10068.13	1024	10070.95	1024

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10089.85  1024.5 10094.3    102510098.75  1025.510103.21    102610103.55    1026
10112.82    102610116.14    102610117.93  1025.510122.69    102510126.19  1024.5
10129.41    102410129.69    102410132.81  1023.510135.93    102310139.05  1022.5
10140.43  1022.510143.87    102210144.21    102210147.71  1021.510156.08  1021.5
10160.61    102210161.38    102210164.03  1022.510166.68    102310170.09  1023.5
10173.65    102410173.81    1024 10214.5  1024.510429.21    102510486.12  1025.5
10565.94    102610566.76    102610669.56  1026.5   10786    102710839.07  1027.5
10878.66    102810878.84    102810922.29  1028.510942.25  1028.511024.11    1028
11024.51    102811025.35    102811034.92    102811080.52  1028.511120.92    1029
11240.61  1029.511298.72  1029.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    6540      .1   10000    .01610062.85    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      10116.1410565.94              540     580     570             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
    654010116.14    1030

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)            1025.63   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.11   Wt. n-Val.                              0.045
  W.S. Elev (ft)            1025.52   Reach Len. (ft)             540.00     580.00     570.00
  Crit W.S. (ft)            1025.02   Flow Area (sq ft)                      374.10
  E.G. Slope (ft/ft)       0.006487   Area (sq ft)               5570.44     374.10
  Q Total (cfs)             1000.00   Flow (cfs)                            1000.00
  Top Width (ft)            3001.90   Top Width (ft)             2631.13     370.76
  Vel Total (ft/s)             2.67   Avg. Vel. (ft/s)                        2.67
  Max Chl Dpth (ft)            4.02   Hydr. Depth (ft)                        1.01
  Conv. Total (cfs)         12416.1   Conv. (cfs)                           12416.1
  Length Wtd. (ft)           580.00   Wetted Per. (ft)                      371.25
  Min Ch El (ft)            1021.50   Shear (lb/sq ft)                        0.41
  Alpha                        1.00   Stream Power (lb/ft s)                  1.09
  Frctn Loss (ft)              4.41   Cum Volume (acre-ft)        451.70      27.10      14.14
  C & E Loss (ft)              0.01   Cum SA (acres)              232.65      41.04      23.07

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT    Profile #2/3

  E.G. Elev (ft)            1025.63   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.11   Wt. n-Val.                              0.045
  W.S. Elev (ft)            1025.52   Reach Len. (ft)             540.00     580.00     570.00
  Crit W.S. (ft)            1025.02   Flow Area (sq ft)                      374.10
  E.G. Slope (ft/ft)       0.006487   Area (sq ft)               5570.44     374.10
  Q Total (cfs)             1000.00   Flow (cfs)                            1000.00
  Top Width (ft)            3001.90   Top Width (ft)             2631.13     370.76
  Vel Total (ft/s)             2.67   Avg. Vel. (ft/s)                        2.67
  Max Chl Dpth (ft)            4.02   Hydr. Depth (ft)                        1.01
  Conv. Total (cfs)         12416.1   Conv. (cfs)                           12416.1
  Length Wtd. (ft)           580.00   Wetted Per. (ft)                      371.25
  Min Ch El (ft)            1021.50   Shear (lb/sq ft)                        0.41
  Alpha                        1.00   Stream Power (lb/ft s)                  1.09
  Frctn Loss (ft)              4.41   Cum Volume (acre-ft)        451.70      27.10      14.14
  C & E Loss (ft)              0.01   Cum SA (acres)              232.65      41.04      23.07

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT    Profile #Full

  E.G. Elev (ft)            1025.63   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.11   Wt. n-Val.                              0.045
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W.S. Elev (ft)	1025.52	Reach Len. (ft)	540.00	580.00	570.00
Crit W.S. (ft)	1025.02	Flow Area (sq ft)		374.10	
E.G. Slope (ft/ft)	0.006487	Area (sq ft)	5570.44	374.10	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	3001.90	Top Width (ft)	2631.13	370.76	
Vel Total (ft/s)	2.67	Avg. Vel. (ft/s)		2.67	
Max Chl Dpth (ft)	4.02	Hydr. Depth (ft)		1.01	
Conv. Total (cfs)	12416.1	Conv. (cfs)		12416.1	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		371.25	
Min Ch El (ft)	1021.50	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)		1.09	
Frctn Loss (ft)	4.41	Cum Volume (acre-ft)	451.70	27.10	14.14
C & E Loss (ft)	0.01	Cum SA (acres)	232.65	41.04	23.07

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10116.14	10146.13	167.51	53.24	28.53	16.75	1.88	3.15
10146.13	10176.11	410.49	93.26	30.20	41.05	3.11	4.40
10176.11	10206.10	96.77	39.08	29.99	9.68	1.30	2.48
10206.10	10236.09	63.50	30.35	29.99	6.35	1.01	2.09
10236.09	10266.07	55.20	27.90	29.99	5.52	0.93	1.98
10266.07	10296.06	48.47	25.81	29.99	4.85	0.86	1.88
10296.06	10326.05	42.10	23.72	29.99	4.21	0.79	1.78
10326.05	10356.03	36.09	21.62	29.99	3.61	0.72	1.67
10356.03	10386.02	30.45	19.53	29.99	3.05	0.65	1.56
10386.02	10416.01	25.21	17.43	29.99	2.52	0.58	1.45
10416.01	10445.99	18.39	14.43	29.99	1.84	0.48	1.27
10445.99	10475.98	5.63	7.09	29.99	0.56	0.24	0.79
10475.98	10505.97	0.18	0.63	12.65	0.02	0.05	0.28

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10116.14	10146.13	167.51	53.24	28.53	16.75	1.88	3.15
10146.13	10176.11	410.49	93.26	30.20	41.05	3.11	4.40
10176.11	10206.10	96.77	39.08	29.99	9.68	1.30	2.48
10206.10	10236.09	63.50	30.35	29.99	6.35	1.01	2.09
10236.09	10266.07	55.20	27.90	29.99	5.52	0.93	1.98
10266.07	10296.06	48.47	25.81	29.99	4.85	0.86	1.88
10296.06	10326.05	42.10	23.72	29.99	4.21	0.79	1.78
10326.05	10356.03	36.09	21.62	29.99	3.61	0.72	1.67
10356.03	10386.02	30.45	19.53	29.99	3.05	0.65	1.56
10386.02	10416.01	25.21	17.43	29.99	2.52	0.58	1.45
10416.01	10445.99	18.39	14.43	29.99	1.84	0.48	1.27
10445.99	10475.98	5.63	7.09	29.99	0.56	0.24	0.79
10475.98	10505.97	0.18	0.63	12.65	0.02	0.05	0.28

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10116.14	10146.13	167.51	53.24	28.53	16.75	1.88	3.15
10146.13	10176.11	410.49	93.26	30.20	41.05	3.11	4.40

10176.11	10206.10	96.77	39.08	29.99	9.68	1.30	2.48
10206.10	10236.09	63.50	30.35	29.99	6.35	1.01	2.09
10236.09	10266.07	55.20	27.90	29.99	5.52	0.93	1.98
10266.07	10296.06	48.47	25.81	29.99	4.85	0.86	1.88
10296.06	10326.05	42.10	23.72	29.99	4.21	0.79	1.78
10326.05	10356.03	36.09	21.62	29.99	3.61	0.72	1.67
10356.03	10386.02	30.45	19.53	29.99	3.05	0.65	1.56
10386.02	10416.01	25.21	17.43	29.99	2.52	0.58	1.45
10416.01	10445.99	18.39	14.43	29.99	1.84	0.48	1.27
10445.99	10475.98	5.63	7.09	29.99	0.56	0.24	0.79
10475.98	10505.97	0.18	0.63	12.65	0.02	0.05	0.28

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: West Spillway
REACH: A1 RS: 19.33

INPUT
Description: Q=1000 cfs
Station Elevation Data num= 84

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5940	1023.6	6355	1022.6	6490	1022.3	6700	1022	6810	1022
6830	1021.6	6850	1022	6915	1020.8	7325	1020	7837.35	1019
7979.84	1018.5	8120.6	1018	8130.79	1018	8170.37	1018	8175.25	1018
8189.19	1018	8203.94	1018	8342.78	1018	8342.97	1018	8496.11	1018
8525.44	1018	8710.51	1018.5	9008.7	1019	9208.91	1019	9213.94	1019
9428.44	1019	9496.09	1019	9820.57	1019	9972.54	1018.5	10000	1018
10013.98	1018	10061.41	1018.5	10077.12	1019	10092.82	1019.5	10108.52	1020
10109.23	1020	10114.8	1020.5	10119.08	1021	10126.03	1021	10128.26	1020.5
10130.27	1020	10130.49	1020	10136.15	1019.5	10141.57	1019	10147.06	1018.5
10152.5	1018	10153.6	1018	10155.89	1017.5	10159.27	1017	10165.11	1017
10167.37	1017.5	10169.62	1018	10170.38	1018	10173.25	1018.5	10193.95	1019
10211.28	1019.5	10228.79	1020	10231.76	1020	10279.59	1020.5	10330.63	1021
10382.02	1021.5	10537.17	1021.5	10625.66	1021	10664.16	1021	10734.74	1021.5
10760.22	1022	10760.91	1022	10841.54	1022.5	11070.4	1023	11336.24	1023.5
11383.6	1024	11384.52	1024	11391.11	1024.5	11398.62	1025	11406.13	1025.5
11413.7	1026	11413.76	1026	11478.93	1026	11480.22	1026	11493.05	1025.5
11507.16	1025	11521.27	1024.5	11591.99	1024.5	11596.97	1024.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5940	.1	10000	.01	61006	1.41 .045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10126.03	10382.02	700	650	660	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5940	10126.03	1026

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1021.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.045	
W.S. Elev (ft)	1020.99	Reach Len. (ft)	700.00	650.00	660.00
Crit W.S. (ft)	1020.38	Flow Area (sq ft)		266.81	
E.G. Slope (ft/ft)	0.008994	Area (sq ft)	6380.61	266.81	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	3417.46	Top Width (ft)	3214.15	203.31	
Vel Total (ft/s)	3.75	Avg. Vel. (ft/s)		3.75	
Max Chl Dpth (ft)	3.99	Hydr. Depth (ft)		1.31	
Conv. Total (cfs)	10544.2	Conv. (cfs)		10544.2	
Length Wtd. (ft)	650.00	Wetted Per. (ft)		203.78	
Min Ch El (ft)	1017.00	Shear (lb/sq ft)		0.74	
Alpha	1.00	Stream Power (lb/ft s)		2.76	
Frctn Loss (ft)	5.23	Cum Volume (acre-ft)	377.63	22.84	14.14
C & E Loss (ft)	0.04	Cum SA (acres)	196.42	37.21	23.07

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1021.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.045	
W.S. Elev (ft)	1020.99	Reach Len. (ft)	700.00	650.00	660.00
Crit W.S. (ft)	1020.38	Flow Area (sq ft)		266.81	
E.G. Slope (ft/ft)	0.008994	Area (sq ft)	6380.61	266.81	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	3417.46	Top Width (ft)	3214.15	203.31	
Vel Total (ft/s)	3.75	Avg. Vel. (ft/s)		3.75	
Max Chl Dpth (ft)	3.99	Hydr. Depth (ft)		1.31	
Conv. Total (cfs)	10544.2	Conv. (cfs)		10544.2	
Length Wtd. (ft)	650.00	Wetted Per. (ft)		203.78	
Min Ch El (ft)	1017.00	Shear (lb/sq ft)		0.74	
Alpha	1.00	Stream Power (lb/ft s)		2.76	
Frctn Loss (ft)	5.23	Cum Volume (acre-ft)	377.63	22.84	14.14
C & E Loss (ft)	0.04	Cum SA (acres)	196.42	37.21	23.07

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1021.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.045	
W.S. Elev (ft)	1020.99	Reach Len. (ft)	700.00	650.00	660.00
Crit W.S. (ft)	1020.38	Flow Area (sq ft)		266.81	
E.G. Slope (ft/ft)	0.008994	Area (sq ft)	6380.61	266.81	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	3417.46	Top Width (ft)	3214.15	203.31	
Vel Total (ft/s)	3.75	Avg. Vel. (ft/s)		3.75	
Max Chl Dpth (ft)	3.99	Hydr. Depth (ft)		1.31	
Conv. Total (cfs)	10544.2	Conv. (cfs)		10544.2	
Length Wtd. (ft)	650.00	Wetted Per. (ft)		203.78	
Min Ch El (ft)	1017.00	Shear (lb/sq ft)		0.74	
Alpha	1.00	Stream Power (lb/ft s)		2.76	
Frctn Loss (ft)	5.23	Cum Volume (acre-ft)	377.63	22.84	14.14
C & E Loss (ft)	0.04	Cum SA (acres)	196.42	37.21	23.07

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10126.03	10143.10	60.97	21.80	17.18	6.10	1.28	2.80
10143.10	10160.16	250.70	50.93	17.20	25.07	2.98	4.92
10160.16	10177.23	287.26	55.30	17.22	28.73	3.24	5.19
10177.23	10194.29	149.89	37.30	17.07	14.99	2.19	4.02
10194.29	10211.36	101.69	29.55	17.07	10.17	1.73	3.44
10211.36	10228.43	58.42	21.19	17.07	5.84	1.24	2.76
10228.43	10245.49	36.10	15.88	17.07	3.61	0.93	2.27
10245.49	10262.56	25.50	12.89	17.07	2.55	0.76	1.98
10262.56	10279.62	16.27	9.84	17.07	1.63	0.58	1.65
10279.62	10296.69	8.99	6.89	17.07	0.90	0.40	1.30
10296.69	10313.76	3.69	4.04	17.07	0.37	0.24	0.91
10313.76	10330.82	0.52	1.20	15.63	0.05	0.08	0.43

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10126.03	10143.10	60.97	21.80	17.18	6.10	1.28	2.80
10143.10	10160.16	250.70	50.93	17.20	25.07	2.98	4.92
10160.16	10177.23	287.26	55.30	17.22	28.73	3.24	5.19
10177.23	10194.29	149.89	37.30	17.07	14.99	2.19	4.02
10194.29	10211.36	101.69	29.55	17.07	10.17	1.73	3.44
10211.36	10228.43	58.42	21.19	17.07	5.84	1.24	2.76
10228.43	10245.49	36.10	15.88	17.07	3.61	0.93	2.27
10245.49	10262.56	25.50	12.89	17.07	2.55	0.76	1.98
10262.56	10279.62	16.27	9.84	17.07	1.63	0.58	1.65
10279.62	10296.69	8.99	6.89	17.07	0.90	0.40	1.30
10296.69	10313.76	3.69	4.04	17.07	0.37	0.24	0.91
10313.76	10330.82	0.52	1.20	15.63	0.05	0.08	0.43

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10126.03	10143.10	60.97	21.80	17.18	6.10	1.28	2.80
10143.10	10160.16	250.70	50.93	17.20	25.07	2.98	4.92
10160.16	10177.23	287.26	55.30	17.22	28.73	3.24	5.19
10177.23	10194.29	149.89	37.30	17.07	14.99	2.19	4.02
10194.29	10211.36	101.69	29.55	17.07	10.17	1.73	3.44
10211.36	10228.43	58.42	21.19	17.07	5.84	1.24	2.76
10228.43	10245.49	36.10	15.88	17.07	3.61	0.93	2.27
10245.49	10262.56	25.50	12.89	17.07	2.55	0.76	1.98
10262.56	10279.62	16.27	9.84	17.07	1.63	0.58	1.65
10279.62	10296.69	8.99	6.89	17.07	0.90	0.40	1.30
10296.69	10313.76	3.69	4.04	17.07	0.37	0.24	0.91
10313.76	10330.82	0.52	1.20	15.63	0.05	0.08	0.43

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: West Spillway
REACH: A1 RS: 19.21

INPUT
Description: Q=1000 cfs
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5500	1015	5815	1014	6160	1013.5	6280	1012.9	6490	1013.1
6850	1014	7035	1014.2	7165	1014	7770	1012	8020	1011.5
8152.84	1012	8156.63	1012	8428.92	1012.5	8672.76	1013	8851.81	1013.5
9019.45	1014	9071.55	1014	9081.91	1014	9087.94	1014	9228.32	1013.5
9547.69	1013	9765.05	1012.5	9779.24	1012.5	9800.11	1012.7	9838.55	1013
9864.95	1013	9889.89	1012.5	9908.12	1012.5	9926.88	1013	9937.05	1013.5
9946.78	1014	9947.21	1014	10000	1014.5	10008.63	1015	10012.83	1015.5
10017.57	1015.5	10022.55	1015	10027.53	1014.5	10036.46	1014	10036.47	1014
10042.09	1013.5	10043.32	1013	10044.54	1012.5	10047.46	1012.5	10059.26	1013
10072.01	1013.5	10082.38	1014	10085.42	1014	10112.12	1014.5	10138.92	1015
10140	1015	10140.11	1015	10161.37	1015.5	10180.66	1016	10181.19	1016
10218.8	1016.5	10276.09	1016.5	10299.08	1016	10299.75	1016	10309.41	1015.5
10317.27	1015	10325.13	1014.5	10333.06	1014	10333.29	1014	10459.63	1014
10462.16	1014	10533.03	1014.5	10654.91	1015	10745.15	1015.5	11035.98	1016
11038.2	1016	11107.29	1016.5	11204.13	1017	11284.48	1017.5	11366.8	1018
11366.93	1018	11453.71	1018.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
    5500       .1   10000     .01610059.26     .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      10017.5710161.37              770     770     780             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    550010017.57  1018.5 10218.811453.71  1016.5

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)            1015.93   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.60   Wt. n-Val.                            0.024
  W.S. Elev (ft)            1015.34   Reach Len. (ft)             770.00    770.00     780.00
  Crit W.S. (ft)            1015.34   Flow Area (sq ft)                     161.12
  E.G. Slope (ft/ft)       0.007247   Area (sq ft)               9556.93    161.12     344.84
  Q Total (cfs)             1000.00   Flow (cfs)                           1000.00
  Top Width (ft)            5050.00   Top Width (ft)             4511.45    135.15     403.41
  Vel Total (ft/s)             6.21   Avg. Vel. (ft/s)                       6.21
  Max Chl Dpth (ft)            3.84   Hydr. Depth (ft)                       1.19
  Conv. Total (cfs)         11746.7   Conv. (cfs)                         11746.7
  Length Wtd. (ft)           770.00   Wetted Per. (ft)                     135.47
  Min Ch El (ft)            1012.50   Shear (lb/sq ft)                       0.54
  Alpha                        1.00   Stream Power (lb/ft s)                 3.34
  Frctn Loss (ft)              3.29   Cum Volume (acre-ft)        249.57     19.64      11.53
  C & E Loss (ft)              0.17   Cum SA (acres)              134.34     34.69      20.01

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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 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 OUTPUT    Profile #2/3

  E.G. Elev (ft)            1015.93   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.60   Wt. n-Val.                            0.024
  W.S. Elev (ft)            1015.34   Reach Len. (ft)             770.00    770.00     780.00
  Crit W.S. (ft)            1015.34   Flow Area (sq ft)                     161.12
  E.G. Slope (ft/ft)       0.007247   Area (sq ft)               9556.93    161.12     344.84
  Q Total (cfs)             1000.00   Flow (cfs)                           1000.00
  Top Width (ft)            5050.00   Top Width (ft)             4511.45    135.15     403.41
  Vel Total (ft/s)             6.21   Avg. Vel. (ft/s)                       6.21
  Max Chl Dpth (ft)            3.84   Hydr. Depth (ft)                       1.19
  Conv. Total (cfs)         11746.7   Conv. (cfs)                         11746.7
  Length Wtd. (ft)           770.00   Wetted Per. (ft)                     135.47
  Min Ch El (ft)            1012.50   Shear (lb/sq ft)                       0.54
  Alpha                        1.00   Stream Power (lb/ft s)                 3.34
  Frctn Loss (ft)              3.29   Cum Volume (acre-ft)        249.57     19.64      11.53
  C & E Loss (ft)              0.17   Cum SA (acres)              134.34     34.69      20.01

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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         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 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 OUTPUT Profile #Full

E.G. Elev (ft)	1015.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.60	Wt. n-Val.		0.024	
W.S. Elev (ft)	1015.34	Reach Len. (ft)	770.00	770.00	780.00
Crit W.S. (ft)	1015.34	Flow Area (sq ft)		161.12	
E.G. Slope (ft/ft)	0.007247	Area (sq ft)	9556.93	161.12	344.84
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	5050.00	Top Width (ft)	4511.45	135.15	403.41
Vel Total (ft/s)	6.21	Avg. Vel. (ft/s)		6.21	
Max Chl Dpth (ft)	3.84	Hydr. Depth (ft)		1.19	
Conv. Total (cfs)	11746.7	Conv. (cfs)		11746.7	
Length Wtd. (ft)	770.00	Wetted Per. (ft)		135.47	
Min Ch El (ft)	1012.50	Shear (lb/sq ft)		0.54	
Alpha	1.00	Stream Power (lb/ft s)		3.34	
Frctn Loss (ft)	3.29	Cum Volume (acre-ft)	249.57	19.64	11.53
C & E Loss (ft)	0.17	Cum SA (acres)	134.34	34.69	20.01

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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 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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10017.57	10027.16	11.61	3.17	7.99	1.16	0.40	3.66
10027.16	10036.74	74.12	10.38	9.60	7.41	1.08	7.14
10036.74	10046.33	206.25	19.33	9.80	20.62	2.02	10.67
10046.33	10055.92	335.48	25.67	9.59	33.55	2.68	13.07
10055.92	10065.50	154.46	21.86	9.59	15.45	2.28	7.07
10065.50	10075.09	67.22	18.19	9.59	6.72	1.90	3.69
10075.09	10084.68	43.86	14.08	9.60	4.39	1.47	3.11
10084.68	10094.26	33.93	12.07	9.59	3.39	1.26	2.81
10094.26	10103.85	26.28	10.35	9.59	2.63	1.08	2.54
10103.85	10113.44	19.40	8.63	9.59	1.94	0.90	2.25
10113.44	10123.02	13.41	6.91	9.59	1.34	0.72	1.94
10123.02	10132.61	8.34	5.20	9.59	0.83	0.54	1.60
10132.61	10142.20	4.38	3.53	9.59	0.44	0.37	1.24
10142.20	10151.78	1.25	1.66	9.59	0.12	0.17	0.75
10151.78	RB 10161.37	0.02	0.08	2.58	0.00	0.03	0.23

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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 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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10017.57	10027.16	11.61	3.17	7.99	1.16	0.40	3.66
10027.16	10036.74	74.12	10.38	9.60	7.41	1.08	7.14
10036.74	10046.33	206.25	19.33	9.80	20.62	2.02	10.67
10046.33	10055.92	335.48	25.67	9.59	33.55	2.68	13.07
10055.92	10065.50	154.46	21.86	9.59	15.45	2.28	7.07
10065.50	10075.09	67.22	18.19	9.59	6.72	1.90	3.69
10075.09	10084.68	43.86	14.08	9.60	4.39	1.47	3.11
10084.68	10094.26	33.93	12.07	9.59	3.39	1.26	2.81
10094.26	10103.85	26.28	10.35	9.59	2.63	1.08	2.54
10103.85	10113.44	19.40	8.63	9.59	1.94	0.90	2.25
10113.44	10123.02	13.41	6.91	9.59	1.34	0.72	1.94
10123.02	10132.61	8.34	5.20	9.59	0.83	0.54	1.60
10132.61	10142.20	4.38	3.53	9.59	0.44	0.37	1.24
10142.20	10151.78	1.25	1.66	9.59	0.12	0.17	0.75
10151.78	RB 10161.37	0.02	0.08	2.58	0.00	0.03	0.23

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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 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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10017.57	10027.16	11.61	3.17	7.99	1.16	0.40	3.66
10027.16	10036.74	74.12	10.38	9.60	7.41	1.08	7.14
10036.74	10046.33	206.25	19.33	9.80	20.62	2.02	10.67
10046.33	10055.92	335.48	25.67	9.59	33.55	2.68	13.07
10055.92	10065.50	154.46	21.86	9.59	15.45	2.28	7.07
10065.50	10075.09	67.22	18.19	9.59	6.72	1.90	3.69
10075.09	10084.68	43.86	14.08	9.60	4.39	1.47	3.11
10084.68	10094.26	33.93	12.07	9.59	3.39	1.26	2.81
10094.26	10103.85	26.28	10.35	9.59	2.63	1.08	2.54
10103.85	10113.44	19.40	8.63	9.59	1.94	0.90	2.25
10113.44	10123.02	13.41	6.91	9.59	1.34	0.72	1.94
10123.02	10132.61	8.34	5.20	9.59	0.83	0.54	1.60
10132.61	10142.20	4.38	3.53	9.59	0.44	0.37	1.24
10142.20	10151.78	1.25	1.66	9.59	0.12	0.17	0.75
10151.78	RB 10161.37	0.02	0.08	2.58	0.00	0.03	0.23

```
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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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 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.
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         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: West Spillway
REACH: A1                 RS: 19.06

INPUT
Description: Q=1000 cfs
Station Elevation Data     num=     113
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 4297.71    1008 4304.11  1007.5 4309.62    1007 4315.41  1006.5  4319.8  1006.5
 4360.15    1007 4409.68  1007.5 4495.05  1007.5 4649.13    1007 4693.79    1007
 4783.86  1007.5 4844.95    1008 4897.25    1008  5317.5    1008 5317.51    1008
 5345.37  1007.5 5369.35    1007 5393.33  1006.5 5417.32    1006 5419.58    1006
 5491.84  1005.5 5547.94  1005.5  5620.4    1006 5624.39    1006 5645.97    1006
 5657.78    1006 5841.53  1005.5 5945.17  1005.5 6047.79    1006    6073    1006
 6190.08  1006.5 6372.85    1007 6504.78  1007.5 6617.64    1008 6626.52    1008
 7056.33    1008  7059.8    1008 7226.24  1007.5 7548.83    1007 7748.09    1007
 7794.17  1007.5 7838.17    1008 7844.21  1008.5 7856.62    1009 7860.46  1009.5
 7880.31  1009.5  7881.4    1009  7882.5  1008.5  7883.6    1008 7884.69  1007.5
 7885.79    1007 7886.89  1006.5 7887.99    1006 7889.09  1005.5 7890.19    1005
 7891.29  1004.5 7892.39    1004 7893.49  1003.5 7894.59    1003 7895.69  1002.5
 7896.79    1002 7897.89  1001.5 7898.99    1001 7900.09  1000.5 7900.83    1000
 7901.19    1000 7911.95   999.5 7919.89     999 7922.05   998.5 7924.21     998
 7926.36   997.5 7927.07   997.5 7928.22     998 7929.36   998.5 7930.51     999
    7980    1008    8000    1009    8010    1009    8030    1008    8050  1006.5
    8130  1006.7    8320  1007.4    8800  1007.6    8940  1007.4    9280  1007.3
    9590  1007.5    9800  1007.6   10000    1008   10010  1008.5   10050  1008.5
   10060    1008   10070  1007.5   10080    1008   10120  1008.4   10230  1008.3
   10270    1008   10290  1007.9   10410  1007.8   10470    1008   10555  1008.4
   10590  1008.3   10680  1008.9   10815    1008   10845  1007.8   10855    1008
   10890  1008.4   11065  1009.2   11085    1009   11195    1010   11260  1010.3
   11315  1010.3   11330    1010   11435  1008.3

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 4297.71      .1   10000    .016   10050    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         10050   11065              700    1019    1300              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 4297.71   10050  1010.3   11065   11435  1009.2
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  7881.4    8000    1009

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)            1009.03   Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.03   Wt. n-Val.                          0.045
  W.S. Elev (ft)            1009.00   Reach Len. (ft)           700.00   1019.00   1300.00
  Crit W.S. (ft)            1008.53   Flow Area (sq ft)                   706.06
  E.G. Slope (ft/ft)       0.002814   Area (sq ft)             9784.74    706.06     15.07
  Q Total (cfs)             1000.00   Flow (cfs)                         1000.00
  Top Width (ft)            6612.96   Top Width (ft)           5598.85    970.95     43.15
  Vel Total (ft/s)             1.42   Avg. Vel. (ft/s)                      1.42
```

Max Chl Dpth (ft)	3.50	Hydr. Depth (ft)		0.73	
Conv. Total (cfs)	18852.7	Conv. (cfs)		18852.7	
Length Wtd. (ft)	1030.89	Wetted Per. (ft)		971.01	
Min Ch El (ft)	1007.50	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)		0.18	
Frctn Loss (ft)	7.34	Cum Volume (acre-ft)	78.62	11.98	8.31
C & E Loss (ft)	0.01	Cum SA (acres)	44.99	24.91	16.01

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1009.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.045	
W.S. Elev (ft)	1009.00	Reach Len. (ft)	700.00	1019.00	1300.00
Crit W.S. (ft)	1008.53	Flow Area (sq ft)		706.06	
E.G. Slope (ft/ft)	0.002814	Area (sq ft)	9784.74	706.06	15.07
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	6612.96	Top Width (ft)	5598.85	970.95	43.15
Vel Total (ft/s)	1.42	Avg. Vel. (ft/s)		1.42	
Max Chl Dpth (ft)	3.50	Hydr. Depth (ft)		0.73	
Conv. Total (cfs)	18852.7	Conv. (cfs)		18852.7	
Length Wtd. (ft)	1030.89	Wetted Per. (ft)		971.01	
Min Ch El (ft)	1007.50	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)		0.18	
Frctn Loss (ft)	7.34	Cum Volume (acre-ft)	78.62	11.98	8.31
C & E Loss (ft)	0.01	Cum SA (acres)	44.99	24.91	16.01

Warning: Divided flow computed for this cross-section.
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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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1009.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.045	
W.S. Elev (ft)	1009.00	Reach Len. (ft)	700.00	1019.00	1300.00
Crit W.S. (ft)	1008.53	Flow Area (sq ft)		706.06	
E.G. Slope (ft/ft)	0.002814	Area (sq ft)	9784.74	706.06	15.07
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	6612.96	Top Width (ft)	5598.85	970.95	43.15
Vel Total (ft/s)	1.42	Avg. Vel. (ft/s)		1.42	
Max Chl Dpth (ft)	3.50	Hydr. Depth (ft)		0.73	
Conv. Total (cfs)	18852.7	Conv. (cfs)		18852.7	
Length Wtd. (ft)	1030.89	Wetted Per. (ft)		971.01	
Min Ch El (ft)	1007.50	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)		0.18	
Frctn Loss (ft)	7.34	Cum Volume (acre-ft)	78.62	11.98	8.31
C & E Loss (ft)	0.01	Cum SA (acres)	44.99	24.91	16.01

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta	Right Sta	Flow	Area	W.P.	% Conv.	Hydr D.	Velocity

(ft)	(ft)	(cfs)	(sq ft)	(ft)		(ft)	(ft/s)
LB 10050.00	10117.67	95.35	62.98	67.71	9.54	0.93	1.51
10117.67	10185.33	49.47	42.47	67.67	4.95	0.63	1.16
10185.33	10253.00	61.40	48.35	67.67	6.14	0.71	1.27
10253.00	10320.67	116.34	70.95	67.67	11.63	1.05	1.64
10320.67	10388.33	136.18	77.98	67.67	13.62	1.15	1.75
10388.33	10456.00	134.46	77.39	67.67	13.45	1.14	1.74
10456.00	10523.67	90.75	61.13	67.67	9.08	0.90	1.48
10523.67	10591.33	53.86	44.70	67.67	5.39	0.66	1.21
10591.33	10659.00	29.92	31.41	67.67	2.99	0.46	0.95
10659.00	10726.67	9.12	15.40	67.67	0.91	0.23	0.59
10726.67	10794.33	50.48	42.99	67.67	5.05	0.64	1.17
10794.33	10862.00	113.41	69.87	67.67	11.34	1.03	1.62
10862.00	10929.67	47.39	41.39	67.67	4.74	0.61	1.14
10929.67	10997.33	11.58	17.77	67.67	1.16	0.26	0.65
10997.33	RB 11065.00	0.29	1.28	23.62	0.03	0.05	0.23

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10050.00	10117.67	95.35	62.98	67.71	9.54	0.93	1.51
10117.67	10185.33	49.47	42.47	67.67	4.95	0.63	1.16
10185.33	10253.00	61.40	48.35	67.67	6.14	0.71	1.27
10253.00	10320.67	116.34	70.95	67.67	11.63	1.05	1.64
10320.67	10388.33	136.18	77.98	67.67	13.62	1.15	1.75
10388.33	10456.00	134.46	77.39	67.67	13.45	1.14	1.74
10456.00	10523.67	90.75	61.13	67.67	9.08	0.90	1.48
10523.67	10591.33	53.86	44.70	67.67	5.39	0.66	1.21
10591.33	10659.00	29.92	31.41	67.67	2.99	0.46	0.95
10659.00	10726.67	9.12	15.40	67.67	0.91	0.23	0.59
10726.67	10794.33	50.48	42.99	67.67	5.05	0.64	1.17
10794.33	10862.00	113.41	69.87	67.67	11.34	1.03	1.62
10862.00	10929.67	47.39	41.39	67.67	4.74	0.61	1.14
10929.67	10997.33	11.58	17.77	67.67	1.16	0.26	0.65
10997.33	RB 11065.00	0.29	1.28	23.62	0.03	0.05	0.23

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10050.00	10117.67	95.35	62.98	67.71	9.54	0.93	1.51
10117.67	10185.33	49.47	42.47	67.67	4.95	0.63	1.16
10185.33	10253.00	61.40	48.35	67.67	6.14	0.71	1.27
10253.00	10320.67	116.34	70.95	67.67	11.63	1.05	1.64
10320.67	10388.33	136.18	77.98	67.67	13.62	1.15	1.75
10388.33	10456.00	134.46	77.39	67.67	13.45	1.14	1.74
10456.00	10523.67	90.75	61.13	67.67	9.08	0.90	1.48
10523.67	10591.33	53.86	44.70	67.67	5.39	0.66	1.21
10591.33	10659.00	29.92	31.41	67.67	2.99	0.46	0.95
10659.00	10726.67	9.12	15.40	67.67	0.91	0.23	0.59
10726.67	10794.33	50.48	42.99	67.67	5.05	0.64	1.17
10794.33	10862.00	113.41	69.87	67.67	11.34	1.03	1.62
10862.00	10929.67	47.39	41.39	67.67	4.74	0.61	1.14
10929.67	10997.33	11.58	17.77	67.67	1.16	0.26	0.65

```
  10997.33     RB 11065.00      0.29       1.28       23.62       0.03       0.05       0.23

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION          RIVER: West Spillway
REACH: A1                 RS: 18.87

INPUT
Description: North Bank, Roosevelt Canal
Q=1000 cfs
Survey Date 12/15/99
Station Elevation Data     num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4660 1004.32    5220 1003.04    5710 1002.76    6230 1003.31    6770 1004.68
    7330 1003.63    7820 1002.88    8350 1003.21    8880 1002.24    9390 1002.06
    9830  1002.4   101201001.774   10330 1001.32   10890  1001.3   11390 1001.04
   11930    1001   12420 1000.99

Manning's n Values         num=       1
     Sta   n Val
    4660    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         10120   11390                 0       0       0              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4660    9830 1004.68   11430   12420

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)            1001.68   Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.14   Wt. n-Val.                          0.045      0.045
  W.S. Elev (ft)            1001.53   Reach Len. (ft)
  Crit W.S. (ft)            1001.53   Flow Area (sq ft)                  318.04      19.82
  E.G. Slope (ft/ft)       0.042609   Area (sq ft)                       318.04     541.68
  Q Total (cfs)             1000.00   Flow (cfs)                         915.40      84.60
  Top Width (ft)            2188.99   Top Width (ft)                    1158.99    1030.00
  Vel Total (ft/s)             2.96   Avg. Vel. (ft/s)                     2.88       4.27
  Max Chl Dpth (ft)            0.54   Hydr. Depth (ft)                     0.27       0.50
  Conv. Total (cfs)          4844.5   Conv. (cfs)                       4434.7      409.8
  Length Wtd. (ft)                    Wetted Per. (ft)                  1158.99      40.00
  Min Ch El (ft)            1001.04   Shear (lb/sq ft)                     0.73       1.32
  Alpha                        1.04   Stream Power (lb/ft s)               2.10       5.63
  Frctn Loss (ft)                     Cum Volume (acre-ft)
  C & E Loss (ft)                     Cum SA (acres)


CROSS SECTION OUTPUT    Profile #2/3

  E.G. Elev (ft)            1001.68   Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.14   Wt. n-Val.                          0.045      0.045
  W.S. Elev (ft)            1001.53   Reach Len. (ft)
  Crit W.S. (ft)            1001.53   Flow Area (sq ft)                  318.04      19.82
  E.G. Slope (ft/ft)       0.042609   Area (sq ft)                       318.04     541.68
  Q Total (cfs)             1000.00   Flow (cfs)                         915.40      84.60
  Top Width (ft)            2188.99   Top Width (ft)                    1158.99    1030.00
  Vel Total (ft/s)             2.96   Avg. Vel. (ft/s)                     2.88       4.27
  Max Chl Dpth (ft)            0.54   Hydr. Depth (ft)                     0.27       0.50
  Conv. Total (cfs)          4844.5   Conv. (cfs)                       4434.7      409.8
  Length Wtd. (ft)                    Wetted Per. (ft)                  1158.99      40.00
  Min Ch El (ft)            1001.04   Shear (lb/sq ft)                     0.73       1.32
  Alpha                        1.04   Stream Power (lb/ft s)               2.10       5.63
  Frctn Loss (ft)                     Cum Volume (acre-ft)
  C & E Loss (ft)                     Cum SA (acres)
```

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1001.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.045	0.045
W.S. Elev (ft)	1001.53	Reach Len. (ft)			
Crit W.S. (ft)	1001.53	Flow Area (sq ft)		318.04	19.82
E.G. Slope (ft/ft)	0.042609	Area (sq ft)		318.04	541.68
Q Total (cfs)	1000.00	Flow (cfs)		915.40	84.60
Top Width (ft)	2188.99	Top Width (ft)		1158.99	1030.00
Vel Total (ft/s)	2.96	Avg. Vel. (ft/s)		2.88	4.27
Max Chl Dpth (ft)	0.54	Hydr. Depth (ft)		0.27	0.50
Conv. Total (cfs)	4844.5	Conv. (cfs)		4434.7	409.8
Length Wtd. (ft)		Wetted Per. (ft)		1158.99	40.00
Min Ch El (ft)	1001.04	Shear (lb/sq ft)		0.73	1.32
Alpha	1.04	Stream Power (lb/ft s)		2.10	5.63
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
10204.67	10289.33	3.71	3.68	58.32	0.37	0.06	1.01
10289.33	10374.00	34.81	16.37	84.67	3.48	0.19	2.13
10374.00	10458.67	42.24	18.38	84.67	4.22	0.22	2.30
10458.67	10543.33	43.22	18.63	84.67	4.32	0.22	2.32
10543.33	10628.00	44.22	18.89	84.67	4.42	0.22	2.34
10628.00	10712.67	45.23	19.15	84.67	4.52	0.23	2.36
10712.67	10797.33	46.24	19.40	84.67	4.62	0.23	2.38
10797.33	10882.00	47.26	19.66	84.67	4.73	0.23	2.40
10882.00	10966.67	54.17	21.34	84.67	5.42	0.25	2.54
10966.67	11051.33	70.78	25.05	84.67	7.08	0.30	2.83
11051.33	11136.00	89.19	28.78	84.67	8.92	0.34	3.10
11136.00	11220.67	109.26	32.51	84.67	10.93	0.38	3.36
11220.67	11305.33	130.93	36.24	84.67	13.09	0.43	3.61
11305.33	RB 11390.00	154.15	39.96	84.67	15.41	0.47	3.86
11390.00	11458.67	84.59	19.82	40.00	8.46	0.50	4.27

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
10204.67	10289.33	3.71	3.68	58.32	0.37	0.06	1.01
10289.33	10374.00	34.81	16.37	84.67	3.48	0.19	2.13
10374.00	10458.67	42.24	18.38	84.67	4.22	0.22	2.30
10458.67	10543.33	43.22	18.63	84.67	4.32	0.22	2.32
10543.33	10628.00	44.22	18.89	84.67	4.42	0.22	2.34
10628.00	10712.67	45.23	19.15	84.67	4.52	0.23	2.36
10712.67	10797.33	46.24	19.40	84.67	4.62	0.23	2.38
10797.33	10882.00	47.26	19.66	84.67	4.73	0.23	2.40
10882.00	10966.67	54.17	21.34	84.67	5.42	0.25	2.54
10966.67	11051.33	70.78	25.05	84.67	7.08	0.30	2.83
11051.33	11136.00	89.19	28.78	84.67	8.92	0.34	3.10
11136.00	11220.67	109.26	32.51	84.67	10.93	0.38	3.36
11220.67	11305.33	130.93	36.24	84.67	13.09	0.43	3.61
11305.33	RB 11390.00	154.15	39.96	84.67	15.41	0.47	3.86
11390.00	11458.67	84.59	19.82	40.00	8.46	0.50	4.27

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
10204.67	10289.33	3.71	3.68	58.32	0.37	0.06	1.01
10289.33	10374.00	34.81	16.37	84.67	3.48	0.19	2.13
10374.00	10458.67	42.24	18.38	84.67	4.22	0.22	2.30
10458.67	10543.33	43.22	18.63	84.67	4.32	0.22	2.32
10543.33	10628.00	44.22	18.89	84.67	4.42	0.22	2.34

10628.00	10712.67	45.23	19.15	84.67	4.52	0.23	2.36
10712.67	10797.33	46.24	19.40	84.67	4.62	0.23	2.38
10797.33	10882.00	47.26	19.66	84.67	4.73	0.23	2.40
10882.00	10966.67	54.17	21.34	84.67	5.42	0.25	2.54
10966.67	11051.33	70.78	25.05	84.67	7.08	0.30	2.83
11051.33	11136.00	89.19	28.78	84.67	8.92	0.34	3.10
11136.00	11220.67	109.26	32.51	84.67	10.93	0.38	3.36
11220.67	11305.33	130.93	36.24	84.67	13.09	0.43	3.61
11305.33	RB 11390.00	154.15	39.96	84.67	15.41	0.47	3.86
11390.00	11458.67	84.59	19.82	40.00	8.46	0.50	4.27

SUMMARY OF MANNING'S N VALUES

River:West Spillway

Reach	River Sta.	n1	n2	n3
A1	20.09	.045	.02	.045
A1	20.04	.045	.02	.045
A1	19.84	.1	.016	.045
A1	19.68	.1	.016	.045
A1	19.57	.1	.016	.045
A1	19.44	.1	.016	.045
A1	19.33	.1	.016	.045
A1	19.21	.1	.016	.045
A1	19.06	.1	.016	.045
A1	18.87	.045		

SUMMARY OF REACH LENGTHS

River: West Spillway

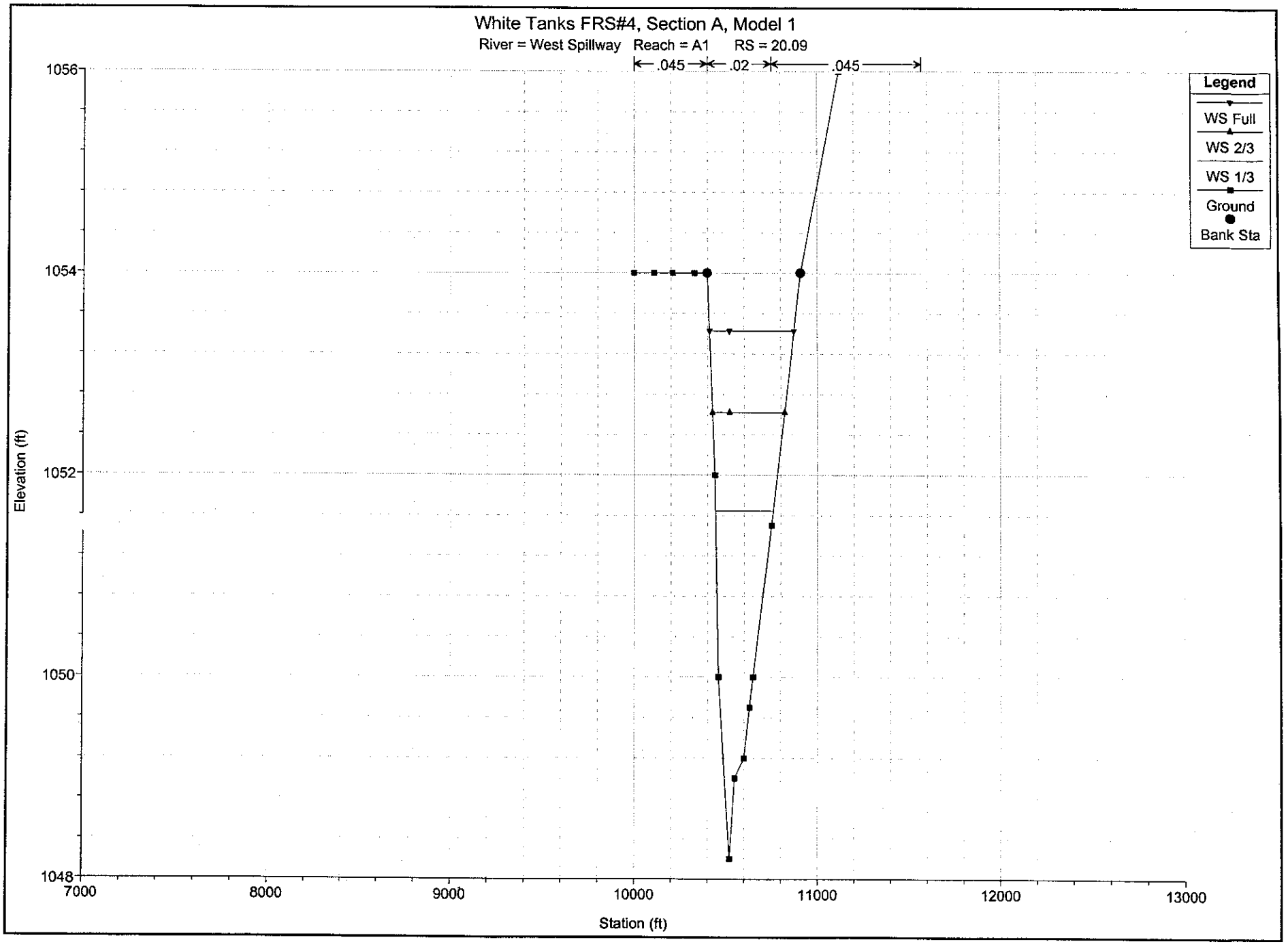
Reach	River Sta.	Left	Channel	Right
A1	20.09	500	580	620
A1	20.04	1200	1150	1150
A1	19.84	870	870	870
A1	19.68	490	570	480
A1	19.57	570	690	690
A1	19.44	540	580	570
A1	19.33	700	650	660
A1	19.21	770	770	780
A1	19.06	700	1019	1300
A1	18.87	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: West Spillway

Reach	River Sta.	Contr.	Expan.
A1	20.09	.1	.3
A1	20.04	.1	.3
A1	19.84	.1	.3
A1	19.68	.1	.3
A1	19.57	.1	.3
A1	19.44	.1	.3
A1	19.33	.1	.3
A1	19.21	.1	.3
A1	19.06	.1	.3
A1	18.87	.1	.3

HEC-RAS Plan: WT4A1 River: West Spillway Reach: A1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
A1	18.87	1000.00	1001.04	1001.53	1001.53	1001.68	0.042609	2.88	337.86	2188.99	0.97
A1	18.87	1000.00	1001.04	1001.53	1001.53	1001.68	0.042609	2.88	337.86	2188.99	0.97
A1	18.87	1000.00	1001.04	1001.53	1001.53	1001.68	0.042609	2.88	337.86	2188.99	0.97
A1	19.06	1000.00	1007.50	1009.00	1008.53	1009.03	0.002814	1.42	706.06	6612.96	0.29
A1	19.06	1000.00	1007.50	1009.00	1008.53	1009.03	0.002814	1.42	706.06	6612.96	0.29
A1	19.06	1000.00	1007.50	1009.00	1008.53	1009.03	0.002814	1.42	706.06	6612.96	0.29
A1	19.21	1000.00	1012.50	1015.34	1015.34	1015.93	0.007247	6.21	161.12	5050.00	1.00
A1	19.21	1000.00	1012.50	1015.34	1015.34	1015.93	0.007247	6.21	161.12	5050.00	1.00
A1	19.21	1000.00	1012.50	1015.34	1015.34	1015.93	0.007247	6.21	161.12	5050.00	1.00
A1	19.33	1000.00	1017.00	1020.99	1020.38	1021.21	0.008994	3.75	266.81	3417.46	0.58
A1	19.33	1000.00	1017.00	1020.99	1020.38	1021.21	0.008994	3.75	266.81	3417.46	0.58
A1	19.33	1000.00	1017.00	1020.99	1020.38	1021.21	0.008994	3.75	266.81	3417.46	0.58
A1	19.44	1000.00	1021.50	1025.52	1025.02	1025.63	0.006487	2.67	374.10	3001.90	0.47
A1	19.44	1000.00	1021.50	1025.52	1025.02	1025.63	0.006487	2.67	374.10	3001.90	0.47
A1	19.44	1000.00	1021.50	1025.52	1025.02	1025.63	0.006487	2.67	374.10	3001.90	0.47
A1	19.57	1000.00	1027.00	1030.63	1029.92	1030.74	0.008364	2.63	379.60	2475.65	0.51
A1	19.57	1000.00	1027.00	1030.63	1029.92	1030.74	0.008364	2.63	379.60	2475.65	0.51
A1	19.57	1000.00	1027.00	1030.63	1029.92	1030.74	0.008364	2.63	379.60	2475.65	0.51
A1	19.68	1000.00	1032.00	1034.38	1033.58	1034.50	0.005327	2.75	363.33	1868.03	0.44
A1	19.68	1000.00	1032.00	1034.38	1033.58	1034.50	0.005327	2.75	363.33	1868.03	0.44
A1	19.68	1000.00	1032.00	1034.38	1033.58	1034.50	0.005327	2.75	363.33	1868.03	0.44
A1	19.84	1000.00	1038.00	1040.75	1040.35	1040.94	0.010899	3.44	291.09	1728.24	0.61
A1	19.84	1000.00	1038.00	1040.75	1040.35	1040.94	0.010899	3.44	291.09	1728.24	0.61
A1	19.84	1000.00	1038.00	1040.75	1040.35	1040.94	0.010899	3.44	291.09	1728.24	0.61
A1	20.04	4000.00	1046.40	1048.90	1048.90	1049.50	0.006681	6.25	639.54	992.78	1.02
A1	20.04	8000.00	1046.40	1049.61	1049.61	1050.53	0.007822	7.70	1038.67	1035.99	1.01
A1	20.04	12000.00	1046.40	1050.24	1050.24	1051.35	0.007587	8.46	1419.00	1101.88	1.00
A1	20.09	4000.00	1048.20	1051.65		1052.39	0.003761	6.93	577.00	315.79	0.90
A1	20.09	8000.00	1048.20	1052.62	1052.62	1053.79	0.003852	8.68	921.54	394.05	1.00
A1	20.09	12000.00	1048.20	1053.43	1053.43	1054.82	0.003740	9.48	1266.45	461.76	1.01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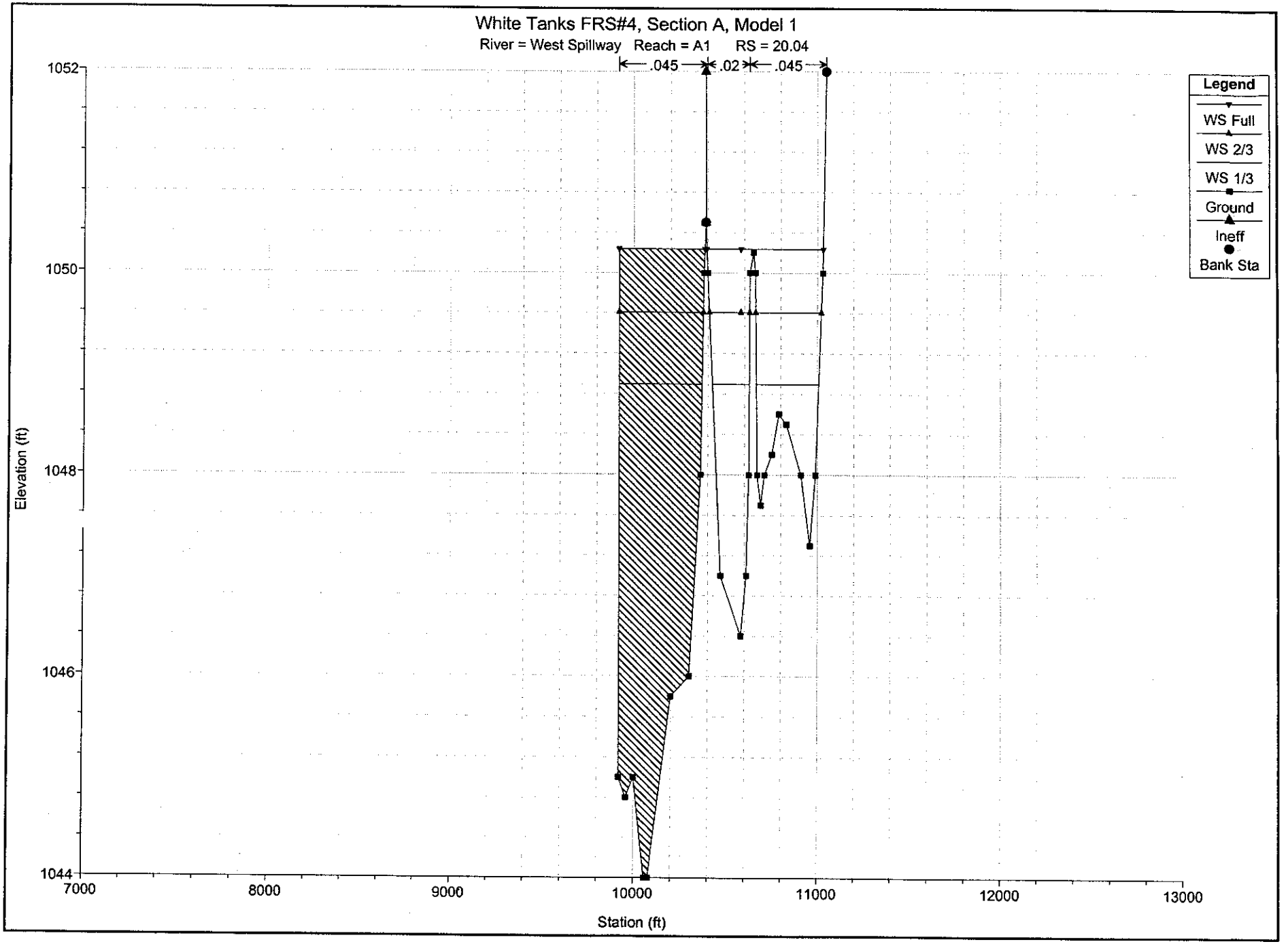
River = West Spillway Reach = A1 RS = 20.09
.045
.02
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Bank Sta
Elevation (ft)
1056
1054
1052
1050
1048
7000
8000
9000
10000
11000
12000
13000
Station (ft)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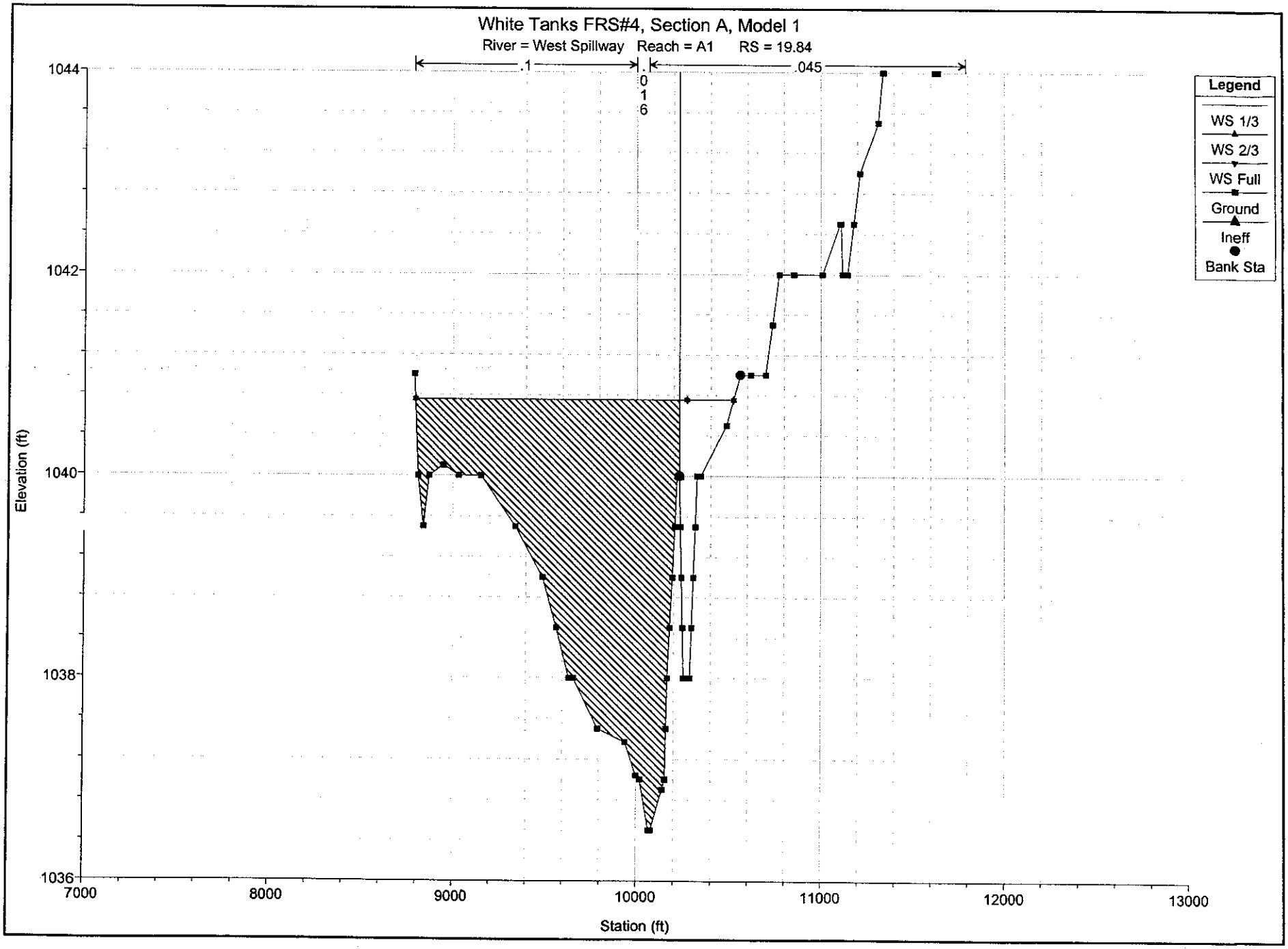
River = West Spillway Reach = A1 RS = 20.04
.045
.02
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1052
1050
1048
1046
1044
7000
8000
9000
10000
11000
12000
13000
Station (ft)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.1
.016
.045
Legend
WS 1/3
WS 2/3
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
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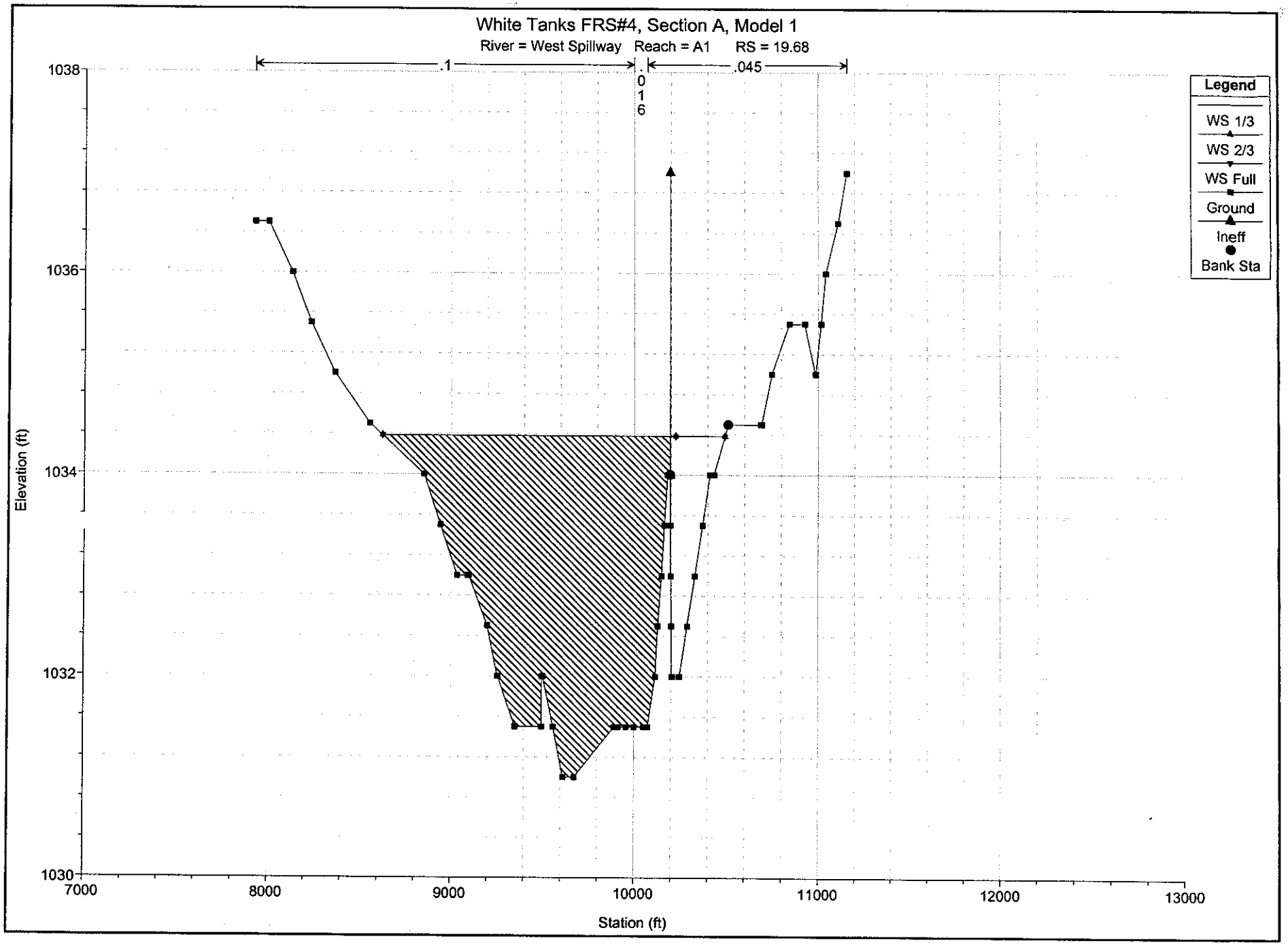
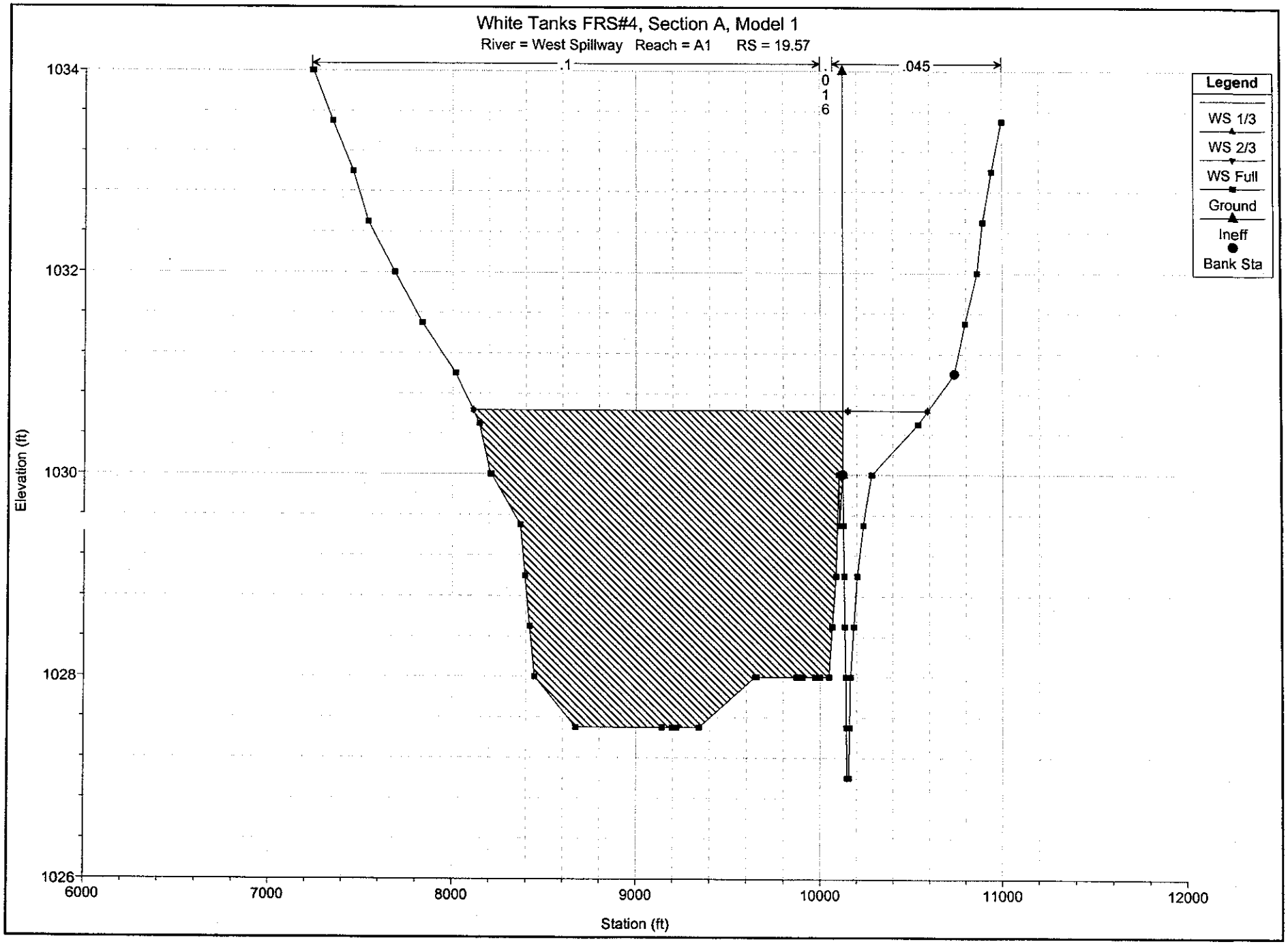
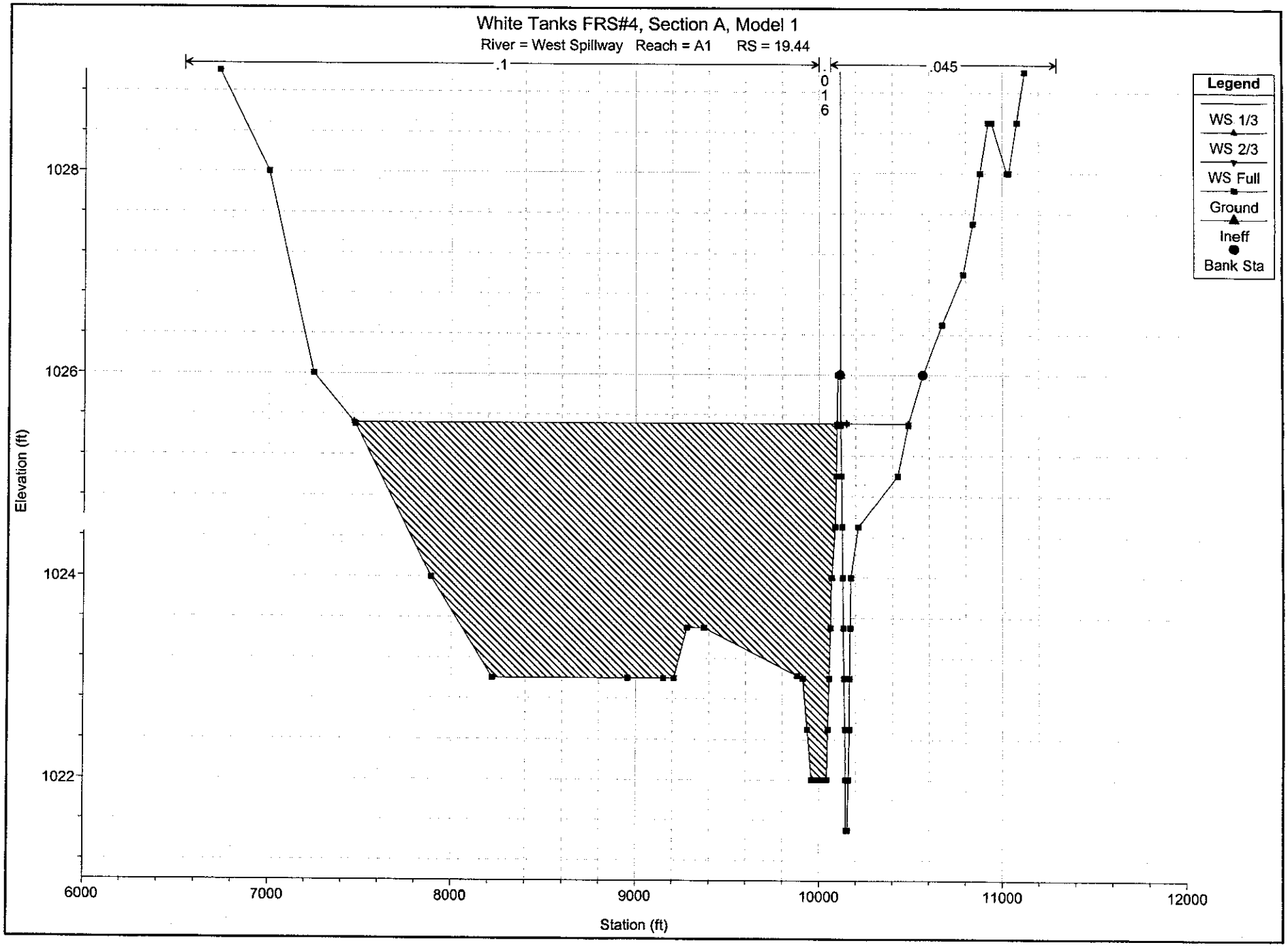
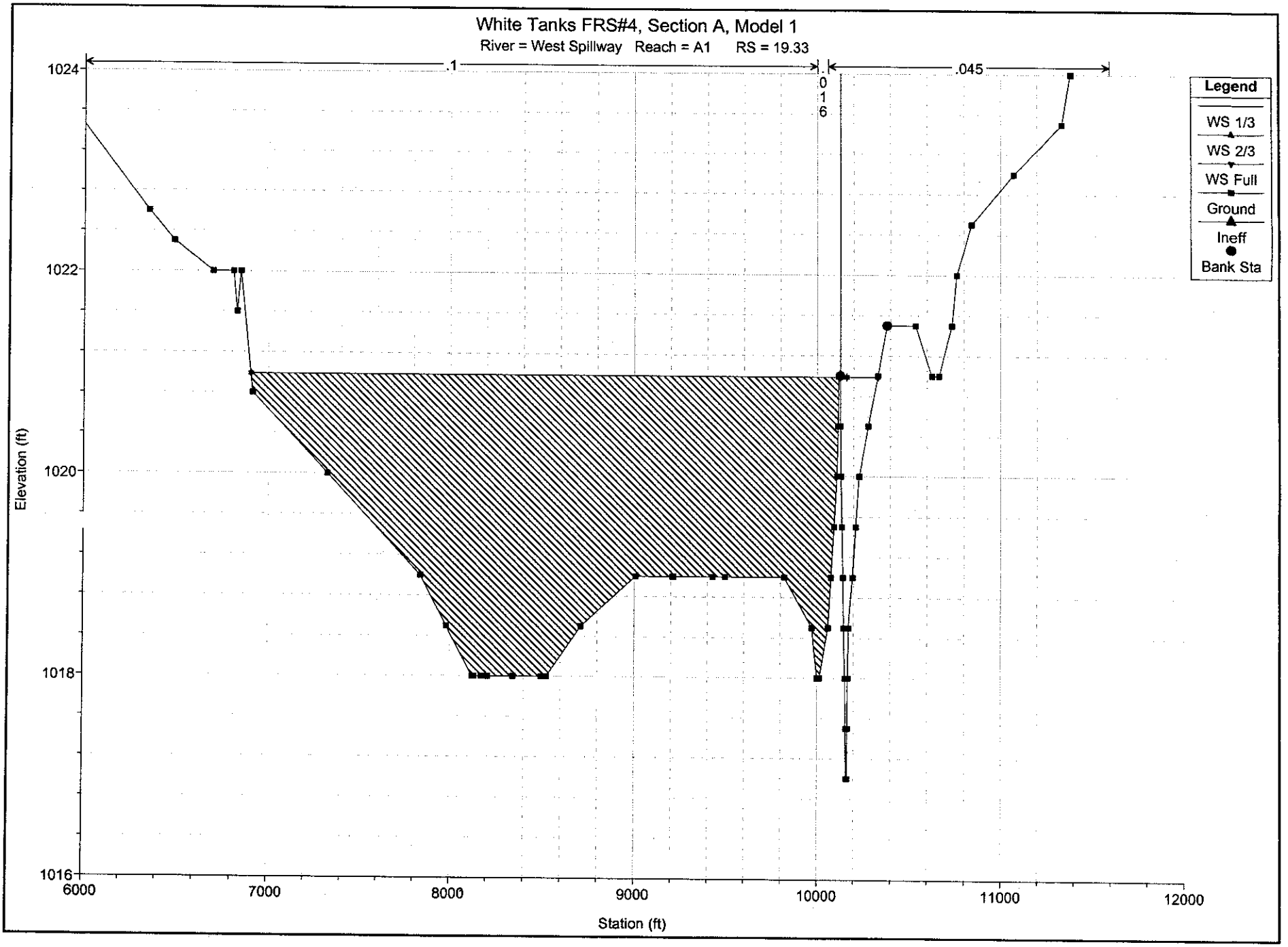
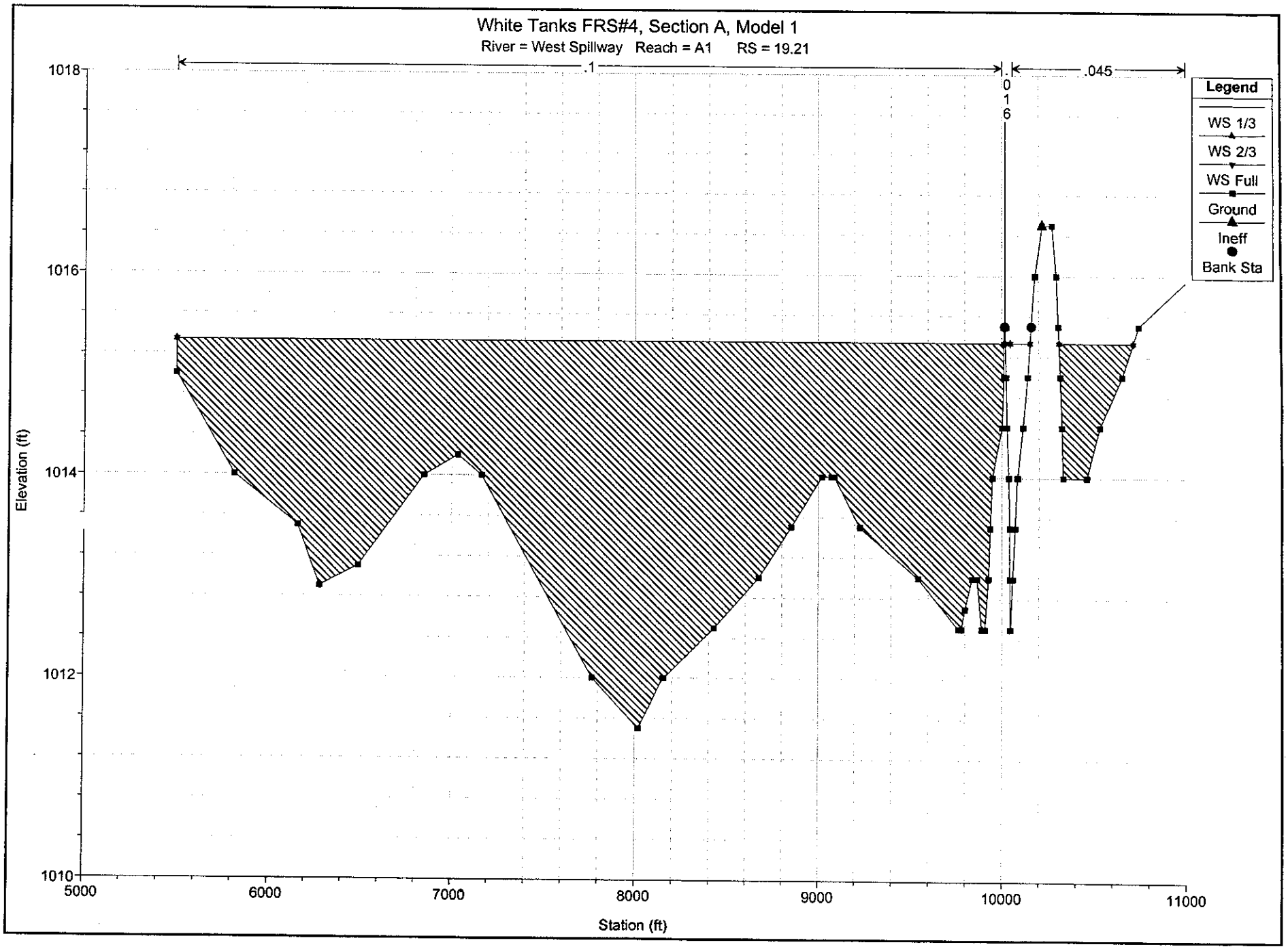
1042
1040
1038
1036
7000
8000
9000
10000
11000
12000
13000
Station (ft)

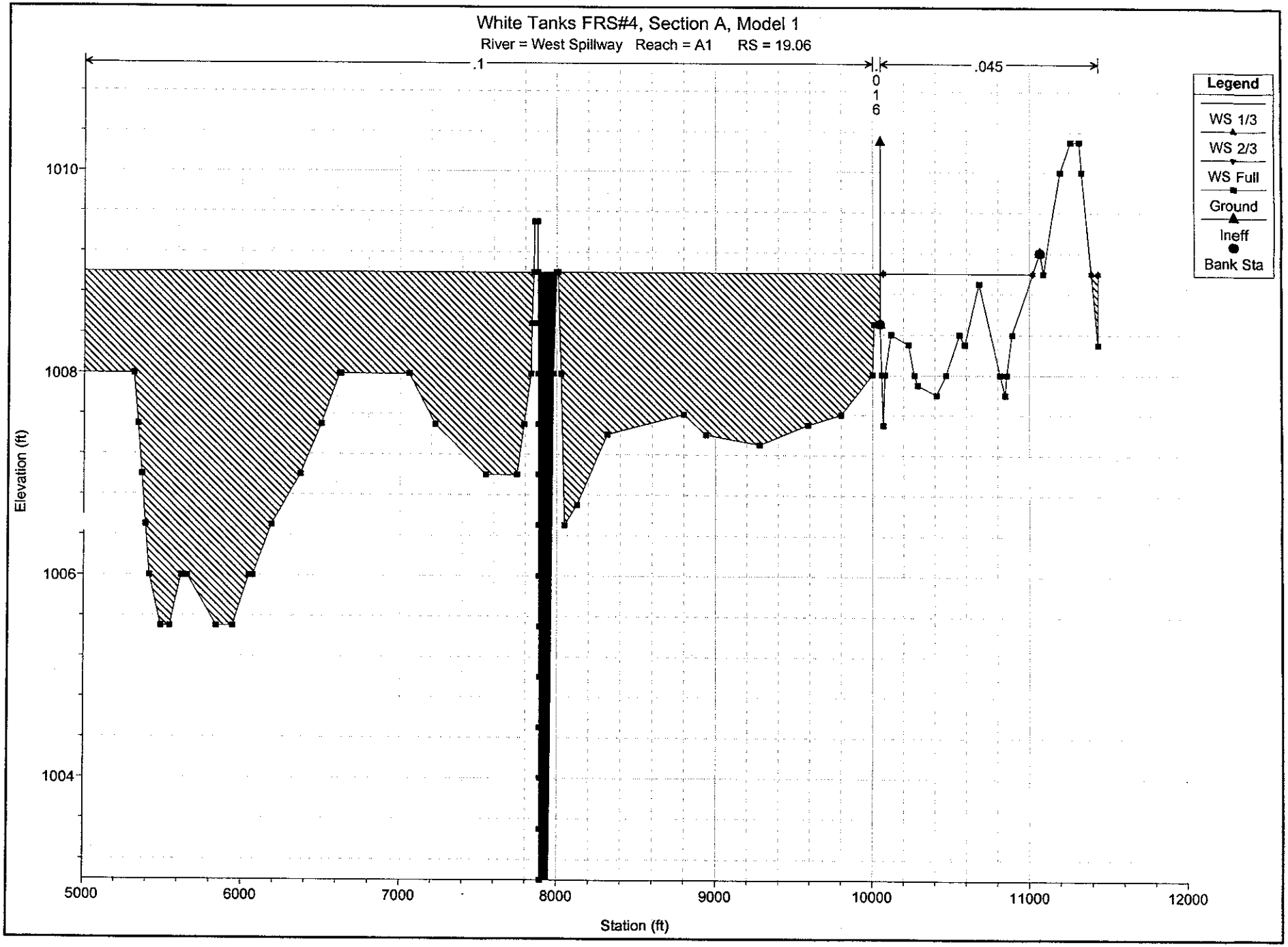

White Tanks FRS#4, Section A, Model 1
River = West Spillway Reach = A1 RS = 19.68
.1
.016
.045
Legend
WS 1/3
WS 2/3
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
1038
1036
1034
1032
1030
7000
8000
9000
10000
11000
12000
13000
Station (ft)

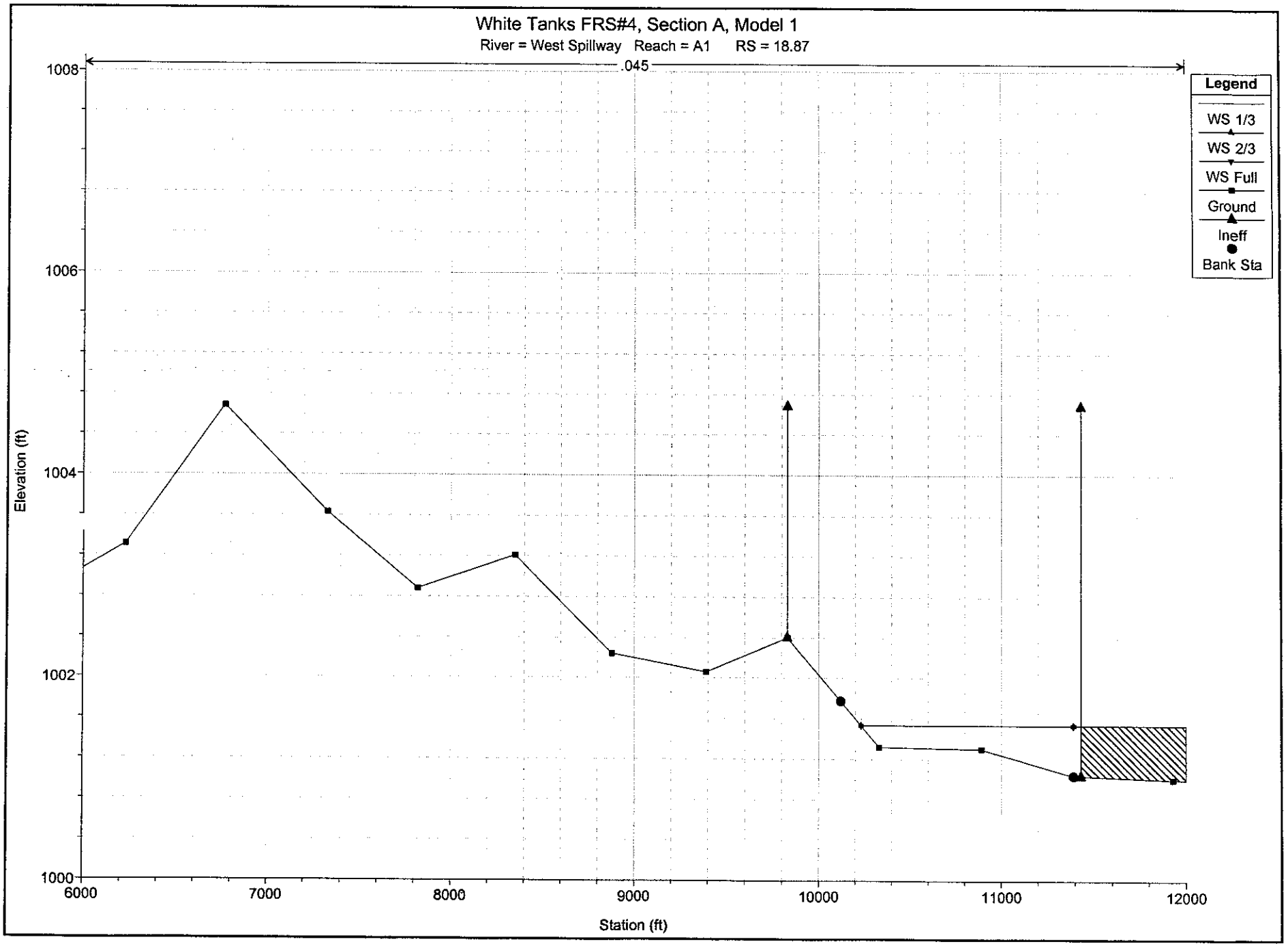

White Tanks FRS#4, Section A, Model 1
River = West Spillway Reach = A1 RS = 19.57
.1
.016
.045
Legend
WS 1/3
WS 2/3
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1032
1030
1028
1026
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS#4, Section A, Model 1
River = West Spillway Reach = A1 RS = 19.44
.1
.016
.045
Legend
WS 1/3
WS 2/3
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
1028
1026
1024
1022
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS#4, Section A, Model 1
River = West Spillway Reach = A1 RS = 19.33
.1
.016
.045
Legend
WS 1/3
WS 2/3
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
1024
1022
1020
1018
1016
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS#4, Section A, Model 1
River = West Spillway Reach = A1 RS = 19.21
.1
.016
.045
Legend
WS 1/3
WS 2/3
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
1018
1016
1014
1012
1010
5000
6000
7000
8000
9000
10000
11000
Station (ft)


White Tanks FRS#4, Section A, Model 1
River = West Spillway Reach = A1 RS = 19.06
.1
.016
.045
Legend
WS 1/3
WS 2/3
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
1010
1008
1006
1004
5000
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS#4, Section A, Model 1
River = West Spillway Reach = A1 RS = 18.87
.045
Legend
WS 1/3
WS 2/3
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
1008
1006
1004
1002
1000
6000
7000
8000
9000
10000
11000
12000
Station (ft)

```
                    HEC-RAS September 1998 Version 2.2
                      U.S. Army Corp of Engineers
                     Hydrologic Engineering Center
                       609 Second Street, Suite D
                      Davis, California 95616-4687
                             (916) 756-1104

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

PROJECT DATA
Project Title: White Tanks FRS #4, Section A, Model 2
Project File : WT4A2.prj
Run Date and Time: 06/26/2000 10:07:20 AM

Project in English units

Project Description:
Study Name: White Tanks FRS #4 Spillway Delineation Study
Contract No.: FCD 98-32
Purpose of Study: Delineation of the inundation limits of the 1/3, 2/3, and full spillway discharges for the western spillway of the White Tanks Flood Retarding Structure #4.

Model Name: WT4A2
Model Description: Set up to model the portion of west spillway flow which weirs over the Roosevelt Canal between Tuthill Road and a point of flow split approximately 1800 feet east of Tuthill Road. Northern boundary is the west spillway, southern boundary is the Roosevelt Irrigation District Canal.Cross-section data west of Tuthill Road is set as ineffective flow on all cross-sections. Cross-section data east of the flow split is set as ineffective flow area on sections 19.06 and 18.87.

Flow Profiles: Profile #1, 1/3 spillway discharge for the 1/2 PMF
Sections 20.09 to 20.04, Q=4000 cfs
Sections 19.84 to 19.21. Q=3000 cfs
Sections 19.06 to 18.87, Q=2000 cfs
Profile #2, 2/3 spillway discharge for the 1/2 PMF
Sections 20.09 to 20.04, Q=8000 cfs
Sections 19.84 to 19.21, Q=7000 cfs
Sections 19.06 to 18.87, Q=3500 cfs.
Profile #3, Full spillway discharge for the 1/2 PMF
Sections 20.09 to 20.04, Q=12,000 cfs
Sections 19.84 to 19.21, Q=11,000 cfs
Sections 19.06 to 18.87, Q=5500 cfs

HEC-RAS Version: Version 2.2, September 1998 with RASPATCH

Consultants: Hoskin Engineering Consultants, Inc.
323 W. Roosevelt Street, Suite 200
Phoenix, AZ 85003
(602)252-8384 Phone
(602)252-8385 Fax
HEC 990006

DEI Professional Services, LLC
6225 N. 24th St., Ste. 200
Phoenix, AZ 85016
(602)954-0038 Phone
(602)944-8605 Fax

PLAN DATA

Plan Title: Section A, Between Tuthill and Split
Plan File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final models\WT4A2.P01

Geometry Title: Section A, Between Tuthill and Split
Geometry File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final models\WT4A2.G01

Flow Title : Section A, Between Tuthill and Split
Flow File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final models\WT4A2.F01

Plan Summary Information:

Number of:	Cross Sections =	10	Mulitple Openings =	0
	Culverts =	0	Inline Weirs =	0
	Bridges =	0		

Computational Information

Water surface calculation tolerance =	0.01
Critical depth calculaton tolerance =	0.01
Maximum number of interations =	20
Maximum difference tolerance =	0.3
Flow tolerance factor =	0.001

Computation Options

Critical depth computed only where necessary	
Conveyance Calculation Method:	Between every coordinate point (HEC2 Style)
Friction Slope Method:	Average Conveyance
Computational Flow Regime:	Subcritical Flow

FLOW DATA

Flow Title: Section A, Between Tuthill and Split
Flow File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final models\WT4A2.F01

Flow Data (cfs)

River	Reach	RS	1/3	2/3	Full
West	W1	20.09	4000	8000	12000
West	W1	19.84	3000	7000	11000
West	W1	19.06	2000	3500	5500
West Spillway	A2	20.09	4000	8000	12000
West Spillway	A2	19.84	3000	7000	11000
West Spillway	A2	19.06	2000	3500	5500

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
West Spillway	A2	1/3		Critical

GEOMETRY DATA

Geometry Title: Section A, Between Tuthill and Split
Geometry File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final models\WT4A2.G01

CROSS SECTION RIVER: West Spillway
REACH: A2 RS: 20.09

```
INPUT
Description: Northern Boundary of HEC-RAS Model
1/3 Q=4000 cfs
2/3 Q=8000
            cfs
Full Q=12,000 cfs
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
   10000    1054   10110    1054   10210    1054   10330    1054   10400    1054
   10440    1052   10460    1050   10520  1048.2   10550    1049   10600  1049.2
   10630  1049.7   10650    1050   10750  1051.5   10910    1054   11120    1056
   11340    1058   11570    1060

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
   10000    .045   10400     .02   10910    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         10400   10910              500     580     620             .1       .3

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)            1052.40   Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.72   Wt. n-Val.                          0.020
  W.S. Elev (ft)            1051.68   Reach Len. (ft)           500.00    580.00    620.00
  Crit W.S. (ft)                      Flow Area (sq ft)                   586.47
  E.G. Slope (ft/ft)       0.003728   Area (sq ft)                        586.47
  Q Total (cfs)             4000.00   Flow (cfs)                         4000.00
  Top Width (ft)             318.00   Top Width (ft)                      318.00
  Vel Total (ft/s)             6.82   Avg. Vel. (ft/s)                      6.82
  Max Chl Dpth (ft)            3.48   Hydr. Depth (ft)                      1.84
  Conv. Total (cfs)         65508.9   Conv. (cfs)                        65508.9
  Length Wtd. (ft)           580.00   Wetted Per. (ft)                    318.14
  Min Ch El (ft)            1048.20   Shear (lb/sq ft)                      0.43
  Alpha                        1.00   Stream Power (lb/ft s)                2.93
  Frctn Loss (ft)              2.87   Cum Volume (acre-ft)      122.69    228.81     69.59
  C & E Loss (ft)              0.04   Cum SA (acres)             68.67    232.68     65.31

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.

CROSS SECTION OUTPUT    Profile #2/3

  E.G. Elev (ft)            1053.79   Element                  Left OB    Channel   Right OB
  Vel Head (ft)                1.12   Wt. n-Val.                          0.020
  W.S. Elev (ft)            1052.67   Reach Len. (ft)           500.00    580.00    620.00
  Crit W.S. (ft)            1052.62   Flow Area (sq ft)                   941.42
  E.G. Slope (ft/ft)       0.004157   Area (sq ft)                        941.42
  Q Total (cfs)             8000.00   Flow (cfs)                         8000.00
  Top Width (ft)             398.26   Top Width (ft)                      398.26
  Vel Total (ft/s)             8.50   Avg. Vel. (ft/s)                      8.50
  Max Chl Dpth (ft)            4.47   Hydr. Depth (ft)                      2.36
  Conv. Total (cfs)        124077.1   Conv. (cfs)                       124077.1
  Length Wtd. (ft)           580.00   Wetted Per. (ft)                    398.45
  Min Ch El (ft)            1048.20   Shear (lb/sq ft)                      0.61
  Alpha                        1.00   Stream Power (lb/ft s)                5.21
  Frctn Loss (ft)              3.20   Cum Volume (acre-ft)      156.39    397.85     95.03
  C & E Loss (ft)              0.06   Cum SA (acres)             74.11    282.31     77.38

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.

CROSS SECTION OUTPUT    Profile #Full

  E.G. Elev (ft)            1054.82   Element                  Left OB    Channel   Right OB
  Vel Head (ft)                1.39   Wt. n-Val.                          0.020
```

W.S. Elev (ft)	1053.43	Reach Len. (ft)	500.00	580.00	620.00
Crit W.S. (ft)	1053.43	Flow Area (sq ft)		1266.45	
E.G. Slope (ft/ft)	0.004239	Area (sq ft)		1266.45	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	461.76	Top Width (ft)		461.76	
Vel Total (ft/s)	9.48	Avg. Vel. (ft/s)		9.48	
Max Chl Dpth (ft)	5.23	Hydr. Depth (ft)		2.74	
Conv. Total (cfs)	184305.8	Conv. (cfs)		184305.8	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		461.96	
Min Ch El (ft)	1048.20	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		6.87	
Frctn Loss (ft)	3.26	Cum Volume (acre-ft)	192.68	547.92	127.81
C & E Loss (ft)	0.08	Cum SA (acres)	82.85	313.04	93.32

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
10434.00	10468.00	123.17	28.40	24.84	3.08	1.15	4.34
10468.00	10502.00	590.30	82.47	34.02	14.76	2.43	7.16
10502.00	10536.00	952.58	109.90	34.01	23.81	3.23	8.67
10536.00	10570.00	718.54	92.79	34.01	17.96	2.73	7.74
10570.00	10604.00	631.20	85.84	34.00	15.78	2.52	7.35
10604.00	10638.00	474.41	72.33	34.00	11.86	2.13	6.56
10638.00	10672.00	295.32	54.42	34.00	7.38	1.60	5.43
10672.00	10706.00	155.82	37.08	34.00	3.90	1.09	4.20
10706.00	10740.00	54.50	19.74	34.00	1.36	0.58	2.76
10740.00	10774.00	4.16	3.49	21.24	0.10	0.16	1.19

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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10400.00	10434.00	1.83	1.37	7.41	0.02	0.18	1.34
10434.00	10468.00	349.56	58.83	34.11	4.37	1.73	5.94
10468.00	10502.00	1090.02	116.27	34.02	13.63	3.42	9.37
10502.00	10536.00	1551.49	143.70	34.01	19.39	4.23	10.80
10536.00	10570.00	1256.14	126.59	34.01	15.70	3.72	9.92
10570.00	10604.00	1143.47	119.64	34.00	14.29	3.52	9.56
10604.00	10638.00	936.36	106.13	34.00	11.70	3.12	8.82
10638.00	10672.00	688.19	88.22	34.00	8.60	2.59	7.80
10672.00	10706.00	477.88	70.88	34.00	5.97	2.08	6.74
10706.00	10740.00	299.40	53.54	34.00	3.74	1.57	5.59
10740.00	10774.00	154.66	36.02	34.00	1.93	1.06	4.29
10774.00	10808.00	48.62	17.99	34.00	0.61	0.53	2.70
10808.00	10842.00	2.38	2.22	16.87	0.03	0.13	1.07

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)

LB 10400.00	10434.00	35.67	12.67	22.54	0.30	0.56	2.82
10434.00	10468.00	639.86	84.53	34.11	5.33	2.49	7.57
10468.00	10502.00	1521.25	141.97	34.02	12.68	4.18	10.72
10502.00	10536.00	2042.05	169.40	34.01	17.02	4.98	12.05
10536.00	10570.00	1710.22	152.29	34.01	14.25	4.48	11.23
10570.00	10604.00	1582.33	145.34	34.00	13.19	4.27	10.89
10604.00	10638.00	1344.72	131.83	34.00	11.21	3.88	10.20
10638.00	10672.00	1054.34	113.92	34.00	8.79	3.35	9.25
10672.00	10706.00	800.69	96.58	34.00	6.67	2.84	8.29
10706.00	10740.00	575.75	79.24	34.00	4.80	2.33	7.27
10740.00	10774.00	379.63	61.72	34.00	3.16	1.82	6.15
10774.00	10808.00	213.44	43.69	34.00	1.78	1.29	4.89
10808.00	10842.00	87.73	25.63	34.00	0.73	0.75	3.42
10842.00	10876.00	12.31	7.63	31.25	0.10	0.24	1.61

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
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: West Spillway
REACH: A2 RS: 20.04

INPUT
Description: 1/3 Q=4000 cfs
2/3 Q=8000 cfs
Full Q=12,000 cfs
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9920	1045	9960	1044.8	10000	1045	10060	1044	10070	1043.8
10080	1044	10200	1045.8	10300	1046	10360	1048	10380	1050
10390	1050.5	10400	1050	10470	1047	10580	1046.4	10610	1047
10625	1048	10630	1050	10650	1050.2	10660	1050	10670	1048
10690	1047.7	10710	1048	10750	1048.2	10790	1048.6	10830	1048.5
10910	1048	10960	1047.3	10990	1048	11030	1050	11050	1052

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9920	.045	10390	.02	10630	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10390	11050	1200	1150	1150	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
9920	10390	

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1049.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.		0.024	
W.S. Elev (ft)	1048.89	Reach Len. (ft)	1200.00	1150.00	1150.00
Crit W.S. (ft)	1048.89	Flow Area (sq ft)		637.42	
E.G. Slope (ft/ft)	0.006735	Area (sq ft)	1578.05	637.42	
Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	992.54	Top Width (ft)	448.91	543.63	
Vel Total (ft/s)	6.28	Avg. Vel. (ft/s)		6.28	
Max Chl Dpth (ft)	5.09	Hydr. Depth (ft)		1.17	
Conv. Total (cfs)	48742.1	Conv. (cfs)		48742.1	
Length Wtd. (ft)	1150.00	Wetted Per. (ft)		544.02	
Min Ch El (ft)	1046.40	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)		3.09	
Frctn Loss (ft)	7.34	Cum Volume (acre-ft)	113.64	220.66	69.59
C & E Loss (ft)	0.13	Cum SA (acres)	66.09	226.94	65.31

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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 OUTPUT Profile #2/3

E.G. Elev (ft)	1050.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.026	
W.S. Elev (ft)	1049.62	Reach Len. (ft)	1200.00	1150.00	1150.00
Crit W.S. (ft)	1049.62	Flow Area (sq ft)		1046.03	
E.G. Slope (ft/ft)	0.007677	Area (sq ft)	1907.02	1046.03	
Q Total (cfs)	8000.00	Flow (cfs)		8000.00	
Top Width (ft)	1036.76	Top Width (ft)	456.18	580.58	
Vel Total (ft/s)	7.65	Avg. Vel. (ft/s)		7.65	
Max Chl Dpth (ft)	5.82	Hydr. Depth (ft)		1.80	
Conv. Total (cfs)	91306.3	Conv. (cfs)		91306.3	
Length Wtd. (ft)	1150.00	Wetted Per. (ft)		581.21	
Min Ch El (ft)	1046.40	Shear (lb/sq ft)		0.86	
Alpha	1.00	Stream Power (lb/ft s)		6.60	
Frctn Loss (ft)	8.15	Cum Volume (acre-ft)	145.45	384.62	95.03
C & E Loss (ft)	0.20	Cum SA (acres)	71.49	275.79	77.38

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1051.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.12	Wt. n-Val.		0.027	
W.S. Elev (ft)	1050.23	Reach Len. (ft)	1200.00	1150.00	1150.00
Crit W.S. (ft)	1050.23	Flow Area (sq ft)		1414.57	
E.G. Slope (ft/ft)	0.007790	Area (sq ft)	2188.60	1414.57	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	1101.53	Top Width (ft)	464.61	636.92	
Vel Total (ft/s)	8.48	Avg. Vel. (ft/s)		8.48	
Max Chl Dpth (ft)	6.43	Hydr. Depth (ft)		2.22	
Conv. Total (cfs)	135957.3	Conv. (cfs)		135957.3	
Length Wtd. (ft)	1150.00	Wetted Per. (ft)		637.70	
Min Ch El (ft)	1046.40	Shear (lb/sq ft)		1.08	
Alpha	1.00	Stream Power (lb/ft s)		9.15	
Frctn Loss (ft)	8.18	Cum Volume (acre-ft)	180.12	530.07	127.81
C & E Loss (ft)	0.27	Cum SA (acres)	80.18	305.72	93.32

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10390.00	10434.00	2.54	1.42	8.13	0.06	0.17	1.80
10434.00	10478.00	374.33	55.61	44.03	9.36	1.26	6.73
10478.00	10522.00	841.74	90.41	44.00	21.04	2.05	9.31
10522.00	10566.00	1011.91	100.97	44.00	25.30	2.29	10.02
10566.00	10610.00	996.96	100.07	44.01	24.92	2.27	9.96
10610.00	10654.00	146.44	21.86	17.43	3.66	1.27	6.70
10654.00	10698.00	80.41	31.86	32.55	2.01	0.98	2.52
10698.00	10742.00	87.19	37.73	44.00	2.18	0.86	2.31
10742.00	10786.00	41.28	24.09	44.00	1.03	0.55	1.71
10786.00	10830.00	18.51	14.89	44.00	0.46	0.34	1.24
10830.00	10874.00	38.93	23.26	44.00	0.97	0.53	1.67
10874.00	10918.00	79.17	35.61	44.00	1.98	0.81	2.22
10918.00	10962.00	176.53	57.61	44.00	4.41	1.31	3.06
10962.00	11006.00	104.02	41.96	44.03	2.60	0.95	2.48
11006.00	RB 11050.00	0.03	0.08	1.82	0.00	0.05	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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10390.00	10434.00	54.76	13.49	25.11	0.68	0.54	4.06
10434.00	10478.00	851.40	87.60	44.03	10.64	1.99	9.72
10478.00	10522.00	1487.47	122.39	44.00	18.59	2.78	12.15
10522.00	10566.00	1707.46	132.95	44.00	21.34	3.02	12.84
10566.00	10610.00	1688.26	132.06	44.01	21.10	3.00	12.78
10610.00	10654.00	319.50	35.04	19.39	3.99	1.84	9.12
10654.00	10698.00	209.08	56.77	36.25	2.61	1.57	3.68
10698.00	10742.00	258.76	69.72	44.00	3.23	1.58	3.71
10742.00	10786.00	180.01	56.08	44.00	2.25	1.27	3.21
10786.00	10830.00	133.53	46.87	44.00	1.67	1.07	2.85
10830.00	10874.00	175.59	55.24	44.00	2.19	1.26	3.18
10874.00	10918.00	245.76	67.59	44.00	3.07	1.54	3.64
10918.00	10962.00	393.08	89.60	44.00	4.91	2.04	4.39
10962.00	11006.00	285.30	73.94	44.03	3.57	1.68	3.86
11006.00	RB 11050.00	10.06	6.69	16.38	0.13	0.41	1.50

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10390.00	10434.00	183.37	33.14	38.65	1.53	0.86	5.53
10434.00	10478.00	1328.10	114.55	44.03	11.07	2.60	11.59
10478.00	10522.00	2067.45	149.34	44.00	17.23	3.39	13.84
10522.00	10566.00	2316.79	159.90	44.00	19.31	3.63	14.49
10566.00	10610.00	2295.08	159.01	44.01	19.13	3.61	14.43
10610.00	10654.00	506.16	50.01	44.42	4.22	1.14	10.12
10654.00	10698.00	328.45	80.71	44.20	2.74	1.83	4.07
10698.00	10742.00	445.05	96.67	44.00	3.71	2.20	4.60
10742.00	10786.00	345.39	83.03	44.00	2.88	1.89	4.16
10786.00	10830.00	283.99	73.83	44.00	2.37	1.68	3.85
10830.00	10874.00	339.65	82.20	44.00	2.83	1.87	4.13
10874.00	10918.00	428.87	94.54	44.00	3.57	2.15	4.54
10918.00	10962.00	607.80	116.55	44.00	5.07	2.65	5.22
10962.00	11006.00	477.74	100.89	44.03	3.98	2.29	4.74
11006.00	RB 11050.00	46.10	20.20	26.35	0.38	0.77	2.28

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

```
CROSS SECTION          RIVER: West Spillway
REACH: A2                 RS: 19.84

INPUT
Description: Flow decreases due to 1000 cfs contained within channel west of
             Tuthill Road.
1/3 Q=3000 cfs
2/3 Q=7000 cfs
Full Q=11,000 cfs
Station Elevation Data     num=      73
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
    8790     1041     8810     1040     8840   1039.5     8870     1040     8950   1040.1
 9031.92     1040  9154.47     1040  9343.33   1039.5  9492.37     1039   9567.8   1038.5
  9636.2     1038  9657.55     1038  9661.34     1038  9792.72   1037.5     9940  1037.37
   10000  1037.0410020.48     103710067.24  1036.510078.84   1036.5    10140   1036.9
 10155.1     103710160.59  1037.510166.09     103810166.19     103810179.88   1038.5
10193.36     103910206.84  1039.5 10218.1     104010220.32     104010230.71     1040
10236.59   1039.510242.46     103910248.34  1038.510254.31     103810263.83     1038
 10287.5     103810297.37  1038.510307.24     103910317.17   1039.5 10327.1     1040
10346.11     104010485.18  1040.510560.46     104110617.79     104110697.96     1041
10735.37   1041.510771.87     104210773.79     1042 10851.1     104210853.58     1042
11007.45     104211008.85     104211105.31  1042.511110.67   1042.511117.75     1042
11122.71     104211141.01     104211145.15     104211180.08   1042.511215.01     1043
11315.24   1043.511340.66     104411345.91     104411420.74   1044.511581.66   1044.5
11620.79     104411640.15     104411640.69     104411668.31   1044.511722.97   1044.5
11766.55   1044.511781.65  1044.511790.42   1044.5

Manning's n Values         num=       3
     Sta    n Val     Sta    n Val     Sta    n Val
    8790       .1   10000     .01610067.24     .045

Bank Sta: Left    Right     Lengths: Left Channel    Right      Coeff Contr.    Expan.
          879010230.71               870      870      870              .1        .3
Ineffective Flow      num=        2
   Sta L    Sta R     Elev    Sta L    Sta R     Elev
    8790     8950  1040.110230.7111790.42   1044.5
```

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1039.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.042	
W.S. Elev (ft)	1038.86	Reach Len. (ft)	870.00	870.00	870.00
Crit W.S. (ft)	1038.32	Flow Area (sq ft)		879.98	
E.G. Slope (ft/ft)	0.005949	Area (sq ft)		879.98	40.43
Q Total (cfs)	3000.00	Flow (cfs)		3000.00	
Top Width (ft)	737.10	Top Width (ft)		676.64	60.47
Vel Total (ft/s)	3.41	Avg. Vel. (ft/s)		3.41	
Max Chl Dpth (ft)	2.36	Hydr. Depth (ft)		1.30	
Conv. Total (cfs)	38894.4	Conv. (cfs)		38894.4	
Length Wtd. (ft)	870.00	Wetted Per. (ft)		676.71	
Min Ch El (ft)	1036.50	Shear (lb/sq ft)		0.48	
Alpha	1.00	Stream Power (lb/ft s)		1.65	
Frctn Loss (ft)	6.07	Cum Volume (acre-ft)	91.90	200.63	69.05
C & E Loss (ft)	0.03	Cum SA (acres)	59.91	210.83	64.51

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1040.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.046	
W.S. Elev (ft)	1039.95	Reach Len. (ft)	870.00	870.00	870.00
Crit W.S. (ft)	1039.07	Flow Area (sq ft)		1798.70	
E.G. Slope (ft/ft)	0.006488	Area (sq ft)		1811.07	125.19
Q Total (cfs)	7000.00	Flow (cfs)		7000.00	
Top Width (ft)	1194.62	Top Width (ft)		1099.69	94.93
Vel Total (ft/s)	3.89	Avg. Vel. (ft/s)		3.89	
Max Chl Dpth (ft)	3.45	Hydr. Depth (ft)		1.72	
Conv. Total (cfs)	86906.4	Conv. (cfs)		86906.4	
Length Wtd. (ft)	870.00	Wetted Per. (ft)		1045.31	
Min Ch El (ft)	1036.50	Shear (lb/sq ft)		0.70	
Alpha	1.00	Stream Power (lb/ft s)		2.71	
Frctn Loss (ft)	6.25	Cum Volume (acre-ft)	119.18	346.90	93.38
C & E Loss (ft)	0.03	Cum SA (acres)	65.21	253.61	76.12

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1040.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.051	
W.S. Elev (ft)	1040.69	Reach Len. (ft)	870.00	870.00	870.00
Crit W.S. (ft)	1039.67	Flow Area (sq ft)		2833.32	
E.G. Slope (ft/ft)	0.006465	Area (sq ft)		2833.32	271.97
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	1716.89	Top Width (ft)		1434.43	282.46
Vel Total (ft/s)	3.88	Avg. Vel. (ft/s)		3.88	
Max Chl Dpth (ft)	4.19	Hydr. Depth (ft)		1.98	
Conv. Total (cfs)	136806.5	Conv. (cfs)		136806.5	
Length Wtd. (ft)	870.00	Wetted Per. (ft)		1434.55	
Min Ch El (ft)	1036.50	Shear (lb/sq ft)		0.80	
Alpha	1.00	Stream Power (lb/ft s)		3.09	
Frctn Loss (ft)	6.26	Cum Volume (acre-ft)	149.97	474.00	124.22
C & E Loss (ft)	0.02	Cum SA (acres)	73.78	278.38	89.60

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: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.

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

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9462.33	9558.38	2.13	6.81	45.35	0.07	0.15	0.31
9558.38	9654.43	49.57	60.79	96.05	1.65	0.63	0.82
9654.43	9750.47	109.90	98.01	96.05	3.66	1.02	1.12
9750.47	9846.52	173.27	128.80	96.05	5.78	1.34	1.35
9846.52	9942.57	198.08	139.56	96.05	6.60	1.45	1.42
9942.57	10038.62	925.45	168.92	96.05	30.85	1.76	5.48
10038.62	10134.66	1364.53	212.39	96.05	45.48	2.21	6.42
10134.66	RB 10230.71	177.06	64.69	55.07	5.90	1.18	2.74

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9078.14	9174.19	0.00	0.01	2.34	0.00	0.00	0.02
9174.19	9270.24	3.72	12.81	96.05	0.05	0.13	0.29
9270.24	9366.28	22.20	37.42	96.05	0.32	0.39	0.59
9366.28	9462.33	57.84	66.47	96.05	0.83	0.69	0.87
9462.33	9558.38	123.04	104.55	96.05	1.76	1.09	1.18
9558.38	9654.43	264.72	165.57	96.05	3.78	1.72	1.60
9654.43	9750.47	371.18	202.79	96.05	5.30	2.11	1.83
9750.47	9846.52	469.77	233.58	96.05	6.71	2.43	2.01
9846.52	9942.57	506.42	244.35	96.05	7.23	2.54	2.07
9942.57	10038.62	2010.61	273.70	96.05	28.72	2.85	7.35
10038.62	10134.66	2676.55	317.18	96.05	38.24	3.30	8.44
10134.66	RB 10230.71	493.96	140.28	82.48	7.06	1.70	3.52

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8790.00	8886.05	68.44	71.71	89.79	0.62	0.80	0.95
8886.05	8982.09	47.89	59.46	96.05	0.44	0.62	0.81
8982.09	9078.14	54.65	64.37	96.05	0.50	0.67	0.85
9078.14	9174.19	57.56	66.40	96.05	0.52	0.69	0.87
9174.19	9270.24	83.68	83.11	96.05	0.76	0.87	1.01
9270.24	9366.28	128.93	107.72	96.05	1.17	1.12	1.20
9366.28	9462.33	191.95	136.77	96.05	1.75	1.42	1.40
9462.33	9558.38	289.06	174.85	96.05	2.63	1.82	1.65
9558.38	9654.43	476.04	235.87	96.05	4.33	2.46	2.02
9654.43	9750.47	607.74	273.09	96.05	5.52	2.84	2.23
9750.47	9846.52	726.16	303.88	96.05	6.60	3.16	2.39
9846.52	9942.57	769.55	314.65	96.05	7.00	3.28	2.45
9942.57	10038.62	2901.70	344.00	96.05	26.38	3.58	8.44
10038.62	10134.66	3725.66	387.48	96.05	33.87	4.03	9.62
10134.66	RB 10230.71	871.00	209.98	96.13	7.92	2.19	4.15

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: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find 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: West Spillway
REACH: A2                 RS: 19.68

INPUT
Description: 1/3 Q=3000 cfs
2/3 Q=7000 cfs
Full Q=11,000 cfs
Station Elevation Data    num=      63
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    7930  1036.5 8003.47  1036.5 8131.84    1036 8134.04    1036 8235.56  1035.5
 8365.92    1035 8556.26  1034.5 8852.66    1034 8853.02    1034 8942.87  1033.5
  9034.3    1033 9092.75    1033 9098.12    1033 9199.34  1032.5 9255.69    1032
 9258.21    1032 9352.24  1031.5 9497.86  1031.5 9498.53    1032 9504.07    1032
 9561.24  1031.5 9614.69    1031 9675.88    1031 9892.54  1031.5    9915  1031.5
 9957.38  1031.5   10000  1031.510052.04  1031.510073.96  1031.510075.36  1031.5
10116.44    103210116.63    1032   10130  1032.510149.48    1033 10165.8  1033.5
10182.12    103410194.38    103410196.14    103410197.72  1033.510200.27    1033
10202.81  1032.510205.35    103210207.94    103210246.51    103210247.83    1032
10289.29  1032.510330.89    103310372.51  1033.5 10413.2    103410433.85    1034
10511.86  1034.510688.91  1034.510693.04  1034.510748.12    103510844.75  1035.5
10927.31  1035.510985.54    103510987.38    103511016.74  1035.511042.81    1036
11043.01    103611110.42  1036.511158.28    1037

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    7930      .1   10000    .01610073.96    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       8556.2610196.14              490     570     480              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
10196.1411158.28    1037

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)            1032.95   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.09   Wt. n-Val.                              0.068
  W.S. Elev (ft)            1032.86   Reach Len. (ft)             490.00     570.00     480.00
  Crit W.S. (ft)            1032.16   Flow Area (sq ft)                     1278.03
  E.G. Slope (ft/ft)       0.008358   Area (sq ft)                          1278.03      69.47
  Q Total (cfs)             3000.00   Flow (cfs)                            3000.00
  Top Width (ft)            1136.87   Top Width (ft)                        1018.33     118.54
  Vel Total (ft/s)             2.35   Avg. Vel. (ft/s)                         2.35
  Max Chl Dpth (ft)            1.86   Hydr. Depth (ft)                         1.26
  Conv. Total (cfs)         32814.3   Conv. (cfs)                           32814.3
  Length Wtd. (ft)           570.00   Wetted Per. (ft)                      1018.52
  Min Ch El (ft)            1031.00   Shear (lb/sq ft)                         0.65
  Alpha                        1.00   Stream Power (lb/ft s)                   1.54
  Frctn Loss (ft)              3.94   Cum Volume (acre-ft)         91.90     179.08      67.96
  C & E Loss (ft)              0.02   Cum SA (acres)               59.91     193.91      62.73


Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT    Profile #2/3

  E.G. Elev (ft)            1033.91   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.14   Wt. n-Val.                              0.067
  W.S. Elev (ft)            1033.77   Reach Len. (ft)             490.00     570.00     480.00
  Crit W.S. (ft)            1032.73   Flow Area (sq ft)                     2346.34
  E.G. Slope (ft/ft)       0.008021   Area (sq ft)                          2346.34     213.80
  Q Total (cfs)             7000.00   Flow (cfs)                            7000.00
  Top Width (ft)            1478.86   Top Width (ft)                        1280.97     197.90
```

Vel Total (ft/s)	2.98	Avg. Vel. (ft/s)		2.98	
Max Chl Dpth (ft)	2.77	Hydr. Depth (ft)		1.83	
Conv. Total (cfs)	78162.0	Conv. (cfs)		78162.0	
Length Wtd. (ft)	570.00	Wetted Per. (ft)		1281.17	
Min Ch El (ft)	1031.00	Shear (lb/sq ft)		0.92	
Alpha	1.00	Stream Power (lb/ft s)		2.74	
Frctn Loss (ft)	4.13	Cum Volume (acre-ft)	119.18	305.39	89.99
C & E Loss (ft)	0.02	Cum SA (acres)	65.21	229.84	73.20

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1034.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.066	
W.S. Elev (ft)	1034.47	Reach Len. (ft)	490.00	570.00	480.00
Crit W.S. (ft)	1033.18	Flow Area (sq ft)		3345.97	
E.G. Slope (ft/ft)	0.008096	Area (sq ft)		3345.97	391.11
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	1936.31	Top Width (ft)		1624.61	311.70
Vel Total (ft/s)	3.29	Avg. Vel. (ft/s)		3.29	
Max Chl Dpth (ft)	3.47	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	122252.5	Conv. (cfs)		122252.5	
Length Wtd. (ft)	570.00	Wetted Per. (ft)		1624.82	
Min Ch El (ft)	1031.00	Shear (lb/sq ft)		1.04	
Alpha	1.00	Stream Power (lb/ft s)		3.42	
Frctn Loss (ft)	4.27	Cum Volume (acre-ft)	149.97	412.29	117.60
C & E Loss (ft)	0.02	Cum SA (acres)	73.78	247.83	83.66

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9102.89	9212.21	8.82	18.76	86.39	0.29	0.22	0.47
9212.21	9321.54	115.91	96.64	109.33	3.86	0.88	1.20
9321.54	9430.86	231.92	146.52	109.33	7.73	1.34	1.58
9430.86	9540.19	198.98	133.74	109.49	6.63	1.22	1.49
9540.19	9649.51	320.36	177.86	109.33	10.68	1.63	1.80
9649.51	9758.84	375.84	195.75	109.33	12.53	1.79	1.92
9758.84	9868.16	294.12	168.97	109.33	9.80	1.55	1.74
9868.16	9977.49	240.40	149.71	109.33	8.01	1.37	1.61
9977.49	10086.81	1115.51	148.23	109.33	37.18	1.36	7.53
10086.81	RB 10196.14	98.13	41.84	57.35	3.27	0.73	2.35

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
8884.24	8993.56	14.65	27.59	99.81	0.21	0.28	0.53
8993.56	9102.89	81.38	80.06	109.33	1.16	0.73	1.02
9102.89	9212.21	153.07	116.96	109.33	2.19	1.07	1.31
9212.21	9321.54	362.33	196.15	109.33	5.18	1.79	1.85
9321.54	9430.86	528.57	246.03	109.33	7.55	2.25	2.15
9430.86	9540.19	483.10	233.24	109.49	6.90	2.13	2.07
9540.19	9649.51	645.49	277.37	109.33	9.22	2.54	2.33
9649.51	9758.84	716.36	295.25	109.33	10.23	2.70	2.43
9758.84	9868.16	611.39	268.48	109.33	8.73	2.46	2.28

9868.16	9977.49	540.05	249.22	109.33	7.72	2.28	2.17
9977.49	10086.81	2517.80	247.73	109.33	35.97	2.27	10.16
10086.81	RB 10196.14	345.81	108.27	87.94	4.94	1.23	3.19

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8556.26	8665.58	1.66	7.46	94.06	0.02	0.08	0.22
8665.58	8774.91	13.11	27.43	109.33	0.12	0.25	0.48
8774.91	8884.24	35.02	49.46	109.33	0.32	0.45	0.71
8884.24	8993.56	120.78	103.97	109.33	1.10	0.95	1.16
8993.56	9102.89	239.27	156.69	109.33	2.18	1.43	1.53
9102.89	9212.21	340.38	193.59	109.33	3.09	1.77	1.76
9212.21	9321.54	602.77	272.78	109.33	5.48	2.50	2.21
9321.54	9430.86	797.46	322.65	109.33	7.25	2.95	2.47
9430.86	9540.19	744.73	309.87	109.49	6.77	2.83	2.40
9540.19	9649.51	930.68	354.00	109.33	8.46	3.24	2.63
9649.51	9758.84	1010.39	371.88	109.33	9.19	3.40	2.72
9758.84	9868.16	892.08	345.11	109.33	8.11	3.16	2.58
9868.16	9977.49	810.65	325.85	109.33	7.37	2.98	2.49
9977.49	10086.81.	3785.69	324.36	109.33	34.42	2.97	11.67
10086.81	RB 10196.14	675.35	180.89	109.36	6.14	1.65	3.73

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.

CROSS SECTION RIVER: West Spillway
REACH: A2 RS: 19.57

INPUT
Description: 1/3 Q=3000 cfs
2/3 Q=7000 cfs
Full Q=11,000 cfs
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7235	1034	7242.01	1034	7346.11	1033.5	7458.14	1033	7540.92	1032.5
7686.16	1032	7686.76	1032	7837.1	1031.5	8017.52	1031	8148.59	1030.5
8207.12	1030	8212.25	1030	8370.34	1029.5	8396.37	1029	8422.4	1028.5
8448.34	1028	8448.43	1028	8672.26	1027.5	9141.26	1027.5	9195.07	1027.5
9221.67	1027.5	9342.23	1027.5	9647.59	1028	9656.13	1028	9870.84	1028
9890	1028	9903.75	1028	9971.98	1028	9973.2	1028	9982.66	1028
10000	102810047.96		102810049.24		102810067.55		1028.510086.68		1029
10101.4	103010105.81		1029.510123.97		103010127.94		1029.510132.17		1029
10135	1028.5	10136.4	1028.510140.63		102810140.77		102810143.57		1027.5
10146.51	102710156.65		102710160.96		1027.510165.28		102810166.56		1028
10184.33	1028.510203.51		102910237.65		1029.510282.87		103010283.53		1030
10536.89	1030.510736.17		103110794.79		1031.510861.15		103210861.67		1032
10892.16	1032.510940.83		103310997.98		1033.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
7235	.1	10000	.01610067.55		.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8148.5910123.97		570	690	690	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
10123.9710997.98		1034

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft) 1028.99 Element Left OB Channel Right OB

Vel Head (ft)	0.03	Wt. n-Val.		0.089	
W.S. Elev (ft)	1028.96	Reach Len. (ft)	570.00	690.00	690.00
Crit W.S. (ft)	1028.18	Flow Area (sq ft)		2046.29	
E.G. Slope (ft/ft)	0.005860	Area (sq ft)		2046.29	63.22
Q Total (cfs)	3000.00	Flow (cfs)		3000.00	
Top Width (ft)	1756.37	Top Width (ft)		1686.76	69.61
Vel Total (ft/s)	1.47	Avg. Vel. (ft/s)		1.47	
Max Chl Dpth (ft)	1.96	Hydr. Depth (ft)		1.21	
Conv. Total (cfs)	39188.7	Conv. (cfs)		39188.7	
Length Wtd. (ft)	690.00	Wetted Per. (ft)		1686.78	
Min Ch El (ft)	1027.50	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)		0.65	
Frctn Loss (ft)	5.09	Cum Volume (acre-ft)	91.90	157.33	67.23
C & E Loss (ft)	0.00	Cum SA (acres)	59.91	176.21	61.69

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	1029.76	Element			
Vel Head (ft)	0.07	Wt. n-Val.		0.086	
W.S. Elev (ft)	1029.69	Reach Len. (ft)	570.00	690.00	690.00
Crit W.S. (ft)	1028.54	Flow Area (sq ft)		3305.83	
E.G. Slope (ft/ft)	0.006568	Area (sq ft)		3305.83	134.26
Q Total (cfs)	7000.00	Flow (cfs)		7000.00	
Top Width (ft)	1924.97	Top Width (ft)		1796.27	128.70
Vel Total (ft/s)	2.12	Avg. Vel. (ft/s)		2.12	
Max Chl Dpth (ft)	2.69	Hydr. Depth (ft)		1.84	
Conv. Total (cfs)	86371.8	Conv. (cfs)		86371.8	
Length Wtd. (ft)	690.00	Wetted Per. (ft)		1796.34	
Min Ch El (ft)	1027.50	Shear (lb/sq ft)		0.75	
Alpha	1.00	Stream Power (lb/ft s)		1.60	
Frctn Loss (ft)	5.16	Cum Volume (acre-ft)	119.18	268.40	88.07
C & E Loss (ft)	0.00	Cum SA (acres)	65.21	209.70	71.40

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

			Left OB	Channel	Right OB
E.G. Elev (ft)	1030.35	Element			
Vel Head (ft)	0.10	Wt. n-Val.		0.085	
W.S. Elev (ft)	1030.25	Reach Len. (ft)	570.00	690.00	690.00
Crit W.S. (ft)	1028.84	Flow Area (sq ft)		4365.97	
E.G. Slope (ft/ft)	0.006929	Area (sq ft)		4365.97	235.32
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	2234.94	Top Width (ft)		1946.60	288.34
Vel Total (ft/s)	2.52	Avg. Vel. (ft/s)		2.52	
Max Chl Dpth (ft)	3.25	Hydr. Depth (ft)		2.24	
Conv. Total (cfs)	132147.2	Conv. (cfs)		132147.2	
Length Wtd. (ft)	690.00	Wetted Per. (ft)		1946.70	
Min Ch El (ft)	1027.50	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)		2.44	
Frctn Loss (ft)	5.22	Cum Volume (acre-ft)	149.97	361.83	114.15
C & E Loss (ft)	0.00	Cum SA (acres)	73.78	224.47	80.36

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)

8280.28	8411.97	0.51	1.77	13.56	0.02	0.13	0.29
8411.97	8543.67	132.78	123.91	131.70	4.43	0.94	1.07
8543.67	8675.36	233.59	173.89	131.69	7.79	1.32	1.34
8675.36	8807.05	276.39	192.36	131.69	9.21	1.46	1.44
8807.05	8938.74	276.39	192.36	131.69	9.21	1.46	1.44
8938.74	9070.43	276.38	192.36	131.69	9.21	1.46	1.44
9070.43	9202.13	276.39	192.36	131.69	9.21	1.46	1.44
9202.13	9333.82	276.38	192.36	131.69	9.21	1.46	1.44
9333.82	9465.51	247.23	179.92	131.69	8.24	1.37	1.37
9465.51	9597.20	185.80	151.58	131.69	6.19	1.15	1.23
9597.20	9728.89	141.26	128.59	131.69	4.71	0.98	1.10
9728.89	9860.59	137.48	126.52	131.69	4.58	0.96	1.09
9860.59	9992.28	137.47	126.52	131.69	4.58	0.96	1.09
9992.28	RB 10123.97	401.96	71.80	92.91	13.40	0.77	5.60

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
8280.28	8411.97	15.94	30.57	102.66	0.23	0.30	0.52
8411.97	8543.67	363.11	220.34	131.70	5.19	1.67	1.65
8543.67	8675.36	510.56	270.33	131.69	7.29	2.05	1.89
8675.36	8807.05	570.02	288.80	131.69	8.14	2.19	1.97
8807.05	8938.74	570.02	288.80	131.69	8.14	2.19	1.97
8938.74	9070.43	570.01	288.80	131.69	8.14	2.19	1.97
9070.43	9202.13	570.02	288.80	131.69	8.14	2.19	1.97
9202.13	9333.82	570.01	288.80	131.69	8.14	2.19	1.97
9333.82	9465.51	529.67	276.36	131.69	7.57	2.10	1.92
9465.51	9597.20	442.27	248.02	131.69	6.32	1.88	1.78
9597.20	9728.89	376.10	225.03	131.69	5.37	1.71	1.67
9728.89	9860.59	370.33	222.95	131.69	5.29	1.69	1.66
9860.59	9992.28	370.32	222.95	131.69	5.29	1.69	1.66
9992.28	RB 10123.97	1171.62	145.27	113.37	16.74	1.28	8.06

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8148.59	8280.28	15.33	29.70	102.91	0.14	0.29	0.52
8280.28	8411.97	103.59	103.14	131.70	0.94	0.78	1.00
8411.97	8543.67	594.48	294.24	131.70	5.40	2.23	2.02
8543.67	8675.36	772.19	344.23	131.69	7.02	2.61	2.24
8675.36	8807.05	842.47	362.70	131.69	7.66	2.75	2.32
8807.05	8938.74	842.47	362.70	131.69	7.66	2.75	2.32
8938.74	9070.43	842.46	362.70	131.69	7.66	2.75	2.32
9070.43	9202.13	842.47	362.70	131.69	7.66	2.75	2.32
9202.13	9333.82	842.46	362.70	131.69	7.66	2.75	2.32
9333.82	9465.51	794.84	350.26	131.69	7.23	2.66	2.27
9465.51	9597.20	690.58	321.92	131.69	6.28	2.44	2.15
9597.20	9728.89	610.37	298.93	131.69	5.55	2.27	2.04
9728.89	9860.59	603.32	296.85	131.69	5.48	2.25	2.03
9860.59	9992.28	603.31	296.85	131.69	5.48	2.25	2.03
9992.28	RB 10123.97	1999.66	216.35	131.77	18.18	1.64	9.24

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.

CROSS SECTION RIVER: West Spillway

```
REACH: A2                    RS: 19.44

INPUT
Description: 1/3 Q=3000 cfs
2/3 Q=7000 cfs
Full Q=11,000 cfs
Station Elevation Data     num=       77
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    6540  1029.8    6585  1029.6    6655  1029.5    6732    1029    7000    1028
    7245    1026    7475  1025.5    7890    1024 8223.69    1023 8957.17    1023
 9151.16    1023 9209.42    1023 9280.28  1023.5 9373.66  1023.5 9880.43 1023.03
 9910.73    1023 9935.52  1022.5 9960.02    1022  9961.4    1022  9967.8    1022
   10000    102210014.14    102210022.18    1022 10041.4    102210041.73    1022
10046.88  1022.510054.87    102310062.85  1023.510068.13    102410070.95    1024
10089.85  1024.5 10094.3    102510098.75  1025.510103.21    102610103.55    1026
10112.82    102610116.14    102610117.93  1025.510122.69    102510126.19  1024.5
10129.41    102410129.69    102410132.81  1023.510135.93    102310139.05  1022.5
10140.43  1022.510143.87    102210144.21    102210147.71  1021.510156.08  1021.5
10160.61    102210161.38    102210164.03  1022.510166.68    102310170.09  1023.5
10173.65    102410173.81    1024 10214.5  1024.510429.21    102510486.12  1025.5
10565.94    102610566.76    102610669.56  1026.5   10786    102710839.07  1027.5
10878.66    102810878.84    102810922.29  1028.510942.25  1028.511024.11    1028
11024.51    102811025.35    102811034.92    102811080.52  1028.511120.92    1029
11240.61  1029.511298.72  1029.5

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    6540      .1   10000    .01610062.85    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          747510098.75              540     580     570             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
10116.1411298.72    1030

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)          1023.90   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.06   Wt. n-Val.                          0.066
  W.S. Elev (ft)          1023.85   Reach Len. (ft)          540.00    580.00    570.00
  Crit W.S. (ft)          1023.46   Flow Area (sq ft)                 1586.20
  E.G. Slope (ft/ft)     0.009883   Area (sq ft)                      1586.20     61.09
  Q Total (cfs)           3000.00   Flow (cfs)                        3000.00
  Top Width (ft)          2166.89   Top Width (ft)                    2124.99     41.90
  Vel Total (ft/s)           1.89   Avg. Vel. (ft/s)                     1.89
  Max Chl Dpth (ft)          2.35   Hydr. Depth (ft)                     0.75
  Conv. Total (cfs)       30177.8   Conv. (cfs)                      30177.8
  Length Wtd. (ft)         580.00   Wetted Per. (ft)                 2125.08
  Min Ch El (ft)          1022.00   Shear (lb/sq ft)                     0.46
  Alpha                      1.00   Stream Power (lb/ft s)               0.87
  Frctn Loss (ft)            4.28   Cum Volume (acre-ft)      91.90   128.56     66.24
  C & E Loss (ft)            0.01   Cum SA (acres)            59.91   146.02     60.81


Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT    Profile #2/3

  E.G. Elev (ft)          1024.60   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.08   Wt. n-Val.                          0.075
  W.S. Elev (ft)          1024.52   Reach Len. (ft)          540.00    580.00    570.00
  Crit W.S. (ft)          1023.80   Flow Area (sq ft)                 3094.67
  E.G. Slope (ft/ft)     0.008737   Area (sq ft)                      3094.67    102.74
  Q Total (cfs)           7000.00   Flow (cfs)                        7000.00
  Top Width (ft)          2440.86   Top Width (ft)                    2343.86     96.99
  Vel Total (ft/s)           2.26   Avg. Vel. (ft/s)                     2.26
  Max Chl Dpth (ft)          3.02   Hydr. Depth (ft)                     1.32
```

Conv. Total (cfs)	74887.9	Conv. (cfs)		74887.9	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		2343.97	
Min Ch El (ft)	1022.00	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)		1.63	
Frctn Loss (ft)	4.36	Cum Volume (acre-ft)	119.18	217.71	86.20
C & E Loss (ft)	0.01	Cum SA (acres)	65.21	176.91	69.61

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1025.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.078	
W.S. Elev (ft)	1025.03	Reach Len. (ft)	540.00	580.00	570.00
Crit W.S. (ft)	1024.05	Flow Area (sq ft)		4334.81	
E.G. Slope (ft/ft)	0.008289	Area (sq ft)		4334.81	209.77
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	2800.96	Top Width (ft)		2490.38	310.58
Vel Total (ft/s)	2.54	Avg. Vel. (ft/s)		2.54	
Max Chl Dpth (ft)	3.53	Hydr. Depth (ft)		1.74	
Conv. Total (cfs)	120819.2	Conv. (cfs)		120819.2	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		2490.51	
Min Ch El (ft)	1022.00	Shear (lb/sq ft)		0.90	
Alpha	1.00	Stream Power (lb/ft s)		2.29	
Frctn Loss (ft)	4.46	Cum Volume (acre-ft)	149.97	292.92	110.62
C & E Loss (ft)	0.01	Cum SA (acres)	73.78	189.33	75.61

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
7824.83	7999.75	1.41	5.08	58.24	0.05	0.09	0.28
7999.75	8174.67	62.05	76.38	174.92	2.07	0.44	0.81
8174.67	8349.58	179.20	144.32	174.92	5.97	0.83	1.24
8349.58	8524.50	186.72	147.92	174.92	6.22	0.85	1.26
8524.50	8699.42	186.72	147.92	174.92	6.22	0.85	1.26
8699.42	8874.33	186.72	147.92	174.92	6.22	0.85	1.26
8874.33	9049.25	186.72	147.92	174.92	6.22	0.85	1.26
9049.25	9224.17	185.11	147.15	174.92	6.17	0.84	1.26
9224.17	9399.08	56.07	71.87	174.92	1.87	0.41	0.78
9399.08	9574.00	65.32	78.77	174.92	2.18	0.45	0.83
9574.00	9748.92	109.09	107.15	174.92	3.64	0.61	1.02
9748.92	9923.83	164.77	137.22	174.92	5.49	0.78	1.20
9923.83	RB 10098.75	1430.10	226.61	142.75	47.67	1.59	6.31

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
7649.92	7824.83	4.08	11.18	78.67	0.06	0.14	0.36
7824.83	7999.75	94.26	101.31	174.92	1.35	0.58	0.93
7999.75	8174.67	279.08	194.31	174.92	3.99	1.11	1.44
8174.67	8349.58	460.00	262.25	174.92	6.57	1.50	1.75
8349.58	8524.50	470.58	265.86	174.92	6.72	1.52	1.77
8524.50	8699.42	470.58	265.86	174.92	6.72	1.52	1.77
8699.42	8874.33	470.57	265.85	174.92	6.72	1.52	1.77

8874.33	9049.25	470.58	265.86	174.92	6.72	1.52	1.77
9049.25	9224.17	468.31	265.09	174.92	6.69	1.52	1.77
9224.17	9399.08	268.37	189.80	174.92	3.83	1.09	1.41
9399.08	9574.00	284.83	196.71	174.92	4.07	1.12	1.45
9574.00	9748.92	356.55	225.08	174.92	5.09	1.29	1.58
9748.92	9923.83	439.45	255.16	174.92	6.28	1.46	1.72
9923.83	RB 10098.75	2462.77	330.34	166.29	35.18	1.99	7.46

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 7475.00	7649.92	0.93	3.77	45.70	0.01	0.08	0.25
7649.92	7824.83	67.17	84.18	174.92	0.61	0.48	0.80
7824.83	7999.75	263.28	191.05	174.92	2.39	1.09	1.38
7999.75	8174.67	509.92	284.06	174.92	4.64	1.62	1.80
8174.67	8349.58	728.99	352.00	174.92	6.63	2.01	2.07
8349.58	8524.50	741.47	355.60	174.92	6.74	2.03	2.09
8524.50	8699.42	741.47	355.60	174.92	6.74	2.03	2.09
8699.42	8874.33	741.46	355.60	174.92	6.74	2.03	2.09
8874.33	9049.25	741.47	355.60	174.92	6.74	2.03	2.09
9049.25	9224.17	738.80	354.83	174.92	6.72	2.03	2.08
9224.17	9399.08	496.50	279.55	174.92	4.51	1.60	1.78
9399.08	9574.00	517.10	286.45	174.92	4.70	1.64	1.81
9574.00	9748.92	605.26	314.83	174.92	5.50	1.80	1.92
9748.92	9923.83	704.67	344.91	174.92	6.41	1.97	2.04
9923.83	RB 10098.75	3401.50	416.78	170.88	30.92	2.44	8.16

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: West Spillway
REACH: A2 RS: 19.33

INPUT
Description: 1/3 Q=3000 cfs
2/3 Q=7000 cfs
Full Q=11,000 cfs
Station Elevation Data num= 84

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5940	1023.6	6355	1022.6	6490	1022.3	6700	1022	6810	1022
6830	1021.6	6850	1022	6915	1020.8	7325	1020	7837.35	1019
7979.84	1018.5	8120.6	1018	8130.79	1018	8170.37	1018	8175.25	1018
8189.19	1018	8203.94	1018	8342.78	1018	8342.97	1018	8496.11	1018
8525.44	1018	8710.51	1018.5	9008.7	1019	9208.91	1019	9213.94	1019
9428.44	1019	9496.09	1019	9820.57	1019	9972.54	1018.5	10000	1018
10013.98	101810061.41		1018.510077.12		101910092.82		1019.510108.52		1020
10109.23	1020	10114.8	1020.510119.08		102110126.03		102110128.26		1020.5
10130.27	102010130.49		102010136.15		1019.510141.57		101910147.06		1018.5
10152.5	1018	10153.6	101810155.89		1017.510159.27		101710165.11		1017
10167.37	1017.510169.62		101810170.38		101810173.25		1018.510193.95		1019
10211.28	1019.510228.79		102010231.76		102010279.59		1020.510330.63		1021
10382.02	1021.510537.17		1021.510625.66		102110664.16		102110734.74		1021.5
10760.22	102210760.91		102210841.54		1022.5	11070.4	102311336.24		1023.5
11383.6	102411384.52		102411391.11		1024.511398.62		102511406.13		1025.5
11413.7	102611413.76		102611478.93		102611480.22		102611493.05		1025.5
11507.16	102511521.27		1024.511591.99		1024.511596.97		1024.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5940	.1	10000	.01610061.41		.045

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          691510126.03               700     650     660          .1        .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
10126.0311596.97    1026
```

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1019.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.079	
W.S. Elev (ft)	1019.59	Reach Len. (ft)	700.00	650.00	660.00
Crit W.S. (ft)	1018.88	Flow Area (sq ft)		2279.34	
E.G. Slope (ft/ft)	0.005604	Area (sq ft)		2279.34	80.44
Q Total (cfs)	3000.00	Flow (cfs)		3000.00	
Top Width (ft)	2637.99	Top Width (ft)		2558.84	79.15
Vel Total (ft/s)	1.32	Avg. Vel. (ft/s)		1.32	
Max Chl Dpth (ft)	2.59	Hydr. Depth (ft)		0.89	
Conv. Total (cfs)	40074.7	Conv. (cfs)		40074.7	
Length Wtd. (ft)	650.00	Wetted Per. (ft)		2558.87	
Min Ch El (ft)	1018.00	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		0.41	
Frctn Loss (ft)	6.21	Cum Volume (acre-ft)	91.90	102.82	65.32
C & E Loss (ft)	0.00	Cum SA (acres)	59.91	114.84	60.01

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1020.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.082	
W.S. Elev (ft)	1020.18	Reach Len. (ft)	700.00	650.00	660.00
Crit W.S. (ft)	1019.28	Flow Area (sq ft)		3885.34	
E.G. Slope (ft/ft)	0.006542	Area (sq ft)		3885.34	136.68
Q Total (cfs)	7000.00	Flow (cfs)		7000.00	
Top Width (ft)	2996.32	Top Width (ft)		2877.14	119.18
Vel Total (ft/s)	1.80	Avg. Vel. (ft/s)		1.80	
Max Chl Dpth (ft)	3.18	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	86541.9	Conv. (cfs)		86541.9	
Length Wtd. (ft)	650.00	Wetted Per. (ft)		2877.18	
Min Ch El (ft)	1018.00	Shear (lb/sq ft)		0.55	
Alpha	1.00	Stream Power (lb/ft s)		0.99	
Frctn Loss (ft)	6.14	Cum Volume (acre-ft)	119.18	171.24	84.63
C & E Loss (ft)	0.00	Cum SA (acres)	65.21	142.15	68.20

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1020.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.083	
W.S. Elev (ft)	1020.60	Reach Len. (ft)	700.00	650.00	660.00
Crit W.S. (ft)	1019.51	Flow Area (sq ft)		5136.84	
E.G. Slope (ft/ft)	0.007239	Area (sq ft)		5136.84	195.39
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	3257.91	Top Width (ft)		3096.30	161.60
Vel Total (ft/s)	2.14	Avg. Vel. (ft/s)		2.14	
Max Chl Dpth (ft)	3.60	Hydr. Depth (ft)		1.66	
Conv. Total (cfs)	129290.8	Conv. (cfs)		129290.8	
Length Wtd. (ft)	650.00	Wetted Per. (ft)		3096.37	

Min Ch El (ft)	1018.00	Shear (lb/sq ft)		0.75	
Alpha	1.00	Stream Power (lb/ft s)		1.61	
Frctn Loss (ft)	6.19	Cum Volume (acre-ft)	149.97	229.86	107.97
C & E Loss (ft)	0.00	Cum SA (acres)	73.78	152.13	72.52

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
7343.14	7557.21	0.03	0.41	20.50	0.00	0.02	0.07
7557.21	7771.27	21.40	53.29	214.07	0.71	0.25	0.40
7771.27	7985.34	133.41	159.78	214.07	4.45	0.75	0.83
7985.34	8199.41	396.58	307.19	214.07	13.22	1.44	1.29
8199.41	8413.48	468.93	339.68	214.07	15.63	1.59	1.38
8413.48	8627.55	436.97	325.60	214.07	14.57	1.52	1.34
8627.55	8841.62	240.47	227.53	214.07	8.02	1.06	1.06
8841.62	9055.69	118.77	149.02	214.07	3.96	0.70	0.80
9055.69	9269.76	89.34	125.61	214.07	2.98	0.59	0.71
9269.76	9483.82	89.34	125.61	214.07	2.98	0.59	0.71
9483.82	9697.89	89.34	125.61	214.07	2.98	0.59	0.71
9697.89	9911.96	106.22	139.36	214.07	3.54	0.65	0.76
9911.96	RB 10126.03	809.21	200.65	183.61	26.97	1.09	4.03

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
7129.07	7343.14	2.92	11.61	109.07	0.04	0.11	0.25
7343.14	7557.21	56.81	90.28	214.07	0.81	0.42	0.63
7557.21	7771.27	178.97	179.73	214.07	2.56	0.84	1.00
7771.27	7985.34	388.68	286.22	214.07	5.55	1.34	1.36
7985.34	8199.41	776.76	433.63	214.07	11.10	2.03	1.79
8199.41	8413.48	876.17	466.12	214.07	12.52	2.18	1.88
8413.48	8627.55	832.50	452.04	214.07	11.89	2.11	1.84
8627.55	8841.62	553.82	353.97	214.07	7.91	1.65	1.56
8841.62	9055.69	364.62	275.45	214.07	5.21	1.29	1.32
9055.69	9269.76	314.47	252.05	214.07	4.49	1.18	1.25
9269.76	9483.82	314.47	252.05	214.07	4.49	1.18	1.25
9483.82	9697.89	314.47	252.05	214.07	4.49	1.18	1.25
9697.89	9911.96	343.56	265.79	214.07	4.91	1.24	1.29
9911.96	RB 10126.03	1681.80	314.36	199.28	24.03	1.58	5.35

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 6915.00	7129.07	3.12	11.75	109.75	0.03	0.11	0.27
7129.07	7343.14	60.03	90.54	214.07	0.55	0.42	0.66
7343.14	7557.21	188.65	179.98	214.07	1.72	0.84	1.05
7557.21	7771.27	369.55	269.42	214.07	3.36	1.26	1.37

7771.27	7985.34	643.83	375.91	214.07	5.85	1.76	1.71
7985.34	8199.41	1117.48	523.32	214.07	10.16	2.44	2.14
8199.41	8413.48	1235.50	555.81	214.07	11.23	2.60	2.22
8413.48	8627.55	1183.76	541.73	214.07	10.76	2.53	2.19
8627.55	8841.62	848.63	443.67	214.07	7.71	2.07	1.91
8841.62	9055.69	613.40	365.15	214.07	5.58	1.71	1.68
9055.69	9269.76	549.29	341.75	214.07	4.99	1.60	1.61
9269.76	9483.82	549.28	341.75	214.07	4.99	1.60	1.61
9483.82	9697.89	549.28	341.75	214.07	4.99	1.60	1.61
9697.89	9911.96	586.59	355.49	214.07	5.33	1.66	1.65
9911.96	RB 10126.03	2501.61	398.81	203.72	22.74	1.96	6.27

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: West Spillway
REACH: A2 RS: 19.21

INPUT
Description: 1/3 Q=3000 cfs
2/3 Q=7000 cfs
Full Q=11,000 cfs
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5500	1015	5815	1014	6160	1013.5	6280	1012.9	6490	1013.1
6850	1014	7035	1014.2	7165	1014	7770	1012	8020	1011.5
8152.84	1012	8156.63	1012	8428.92	1012.5	8672.76	1013	8851.81	1013.5
9019.45	1014	9071.55	1014	9081.91	1014	9087.94	1014	9228.32	1013.5
9547.69	1013	9765.05	1012.5	9779.24	1012.5	9800.11	1012.7	9838.55	1013
9864.95	1013	9889.89	1012.5	9908.12	1012.5	9926.88	1013	9937.05	1013.5
9946.78	1014	9947.21	1014	10000	1014.5	10008.63	1015	10012.83	1015.5
10017.57	1015.5	10022.55	1015	10027.53	1014.5	10036.46	1014	10036.47	1014
10042.09	1013.5	10043.32	1013	10044.54	1012.5	10047.46	1012.5	10059.26	1013
10072.01	1013.5	10082.38	1014	10085.42	1014	10112.12	1014.5	10138.92	1015
10140	1015	10140.11	1015	10161.37	1015.5	10180.66	1016	10181.19	1016
10218.8	1016.5	10276.09	1016.5	10299.08	1016	10299.75	1016	10309.41	1015.5
10317.27	1015	10325.13	1014.5	10333.06	1014	10333.29	1014	10459.63	1014
10462.16	1014	10533.03	1014.5	10654.91	1015	10745.15	1015.5	11035.98	1016
11038.2	1016	11107.29	1016.5	11204.13	1017	11284.48	1017.5	11366.8	1018
11366.93	1018	11453.71	1018.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5500	.1	10000	.01	10059.26	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5500	10008.63	770	770	780	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
10017.57	11453.71	1018.5

CROSS SECTION OUTPUT Profile #1/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	1013.40	Element			
Vel Head (ft)	0.05	Wt. n-Val.		0.100	
W.S. Elev (ft)	1013.36	Reach Len. (ft)	770.00	770.00	780.00
Crit W.S. (ft)	1012.79	Flow Area (sq ft)		1748.35	
E.G. Slope (ft/ft)	0.020980	Area (sq ft)		1748.35	12.14
Q Total (cfs)	3000.00	Flow (cfs)		3000.00	
Top Width (ft)	2481.89	Top Width (ft)		2456.02	25.87
Vel Total (ft/s)	1.72	Avg. Vel. (ft/s)		1.72	
Max Chl Dpth (ft)	1.86	Hydr. Depth (ft)		0.71	
Conv. Total (cfs)	20711.8	Conv. (cfs)		20711.8	
Length Wtd. (ft)	770.00	Wetted Per. (ft)		2456.05	
Min Ch El (ft)	1011.50	Shear (lb/sq ft)		0.93	
Alpha	1.00	Stream Power (lb/ft s)		1.60	
Frctn Loss (ft)	4.71	Cum Volume (acre-ft)	91.90	72.77	64.61

C & E Loss (ft)	0.01	Cum SA (acres)	59.91	77.42	59.22

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	1014.08	Element			
Vel Head (ft)	0.05	Wt. n-Val.		0.100	
W.S. Elev (ft)	1014.03	Reach Len. (ft)	770.00	770.00	780.00
Crit W.S. (ft)	1013.24	Flow Area (sq ft)		3873.74	
E.G. Slope (ft/ft)	0.014841	Area (sq ft)		3873.74	41.21
Q Total (cfs)	7000.00	Flow (cfs)		7000.00	
Top Width (ft)	4069.53	Top Width (ft)		3883.83	185.70
Vel Total (ft/s)	1.81	Avg. Vel. (ft/s)		1.81	
Max Chl Dpth (ft)	2.53	Hydr. Depth (ft)		1.00	
Conv. Total (cfs)	57460.5	Conv. (cfs)		57460.5	
Length Wtd. (ft)	770.00	Wetted Per. (ft)		3883.88	
Min Ch El (ft)	1011.50	Shear (lb/sq ft)		0.92	
Alpha	1.00	Stream Power (lb/ft s)		1.67	
Frctn Loss (ft)	4.94	Cum Volume (acre-ft)	119.18	113.35	83.28
C & E Loss (ft)	0.01	Cum SA (acres)	65.21	91.71	65.89

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

			Left OB	Channel	Right OB
E.G. Elev (ft)	1014.48	Element			
Vel Head (ft)	0.06	Wt. n-Val.		0.100	
W.S. Elev (ft)	1014.42	Reach Len. (ft)	770.00	770.00	780.00
Crit W.S. (ft)	1013.51	Flow Area (sq ft)		5466.25	
E.G. Slope (ft/ft)	0.013347	Area (sq ft)		5466.25	128.83
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	4580.01	Top Width (ft)		4306.90	273.12
Vel Total (ft/s)	2.01	Avg. Vel. (ft/s)		2.01	
Max Chl Dpth (ft)	2.92	Hydr. Depth (ft)		1.27	
Conv. Total (cfs)	95213.4	Conv. (cfs)		95213.4	
Length Wtd. (ft)	770.00	Wetted Per. (ft)		4306.95	
Min Ch El (ft)	1011.50	Shear (lb/sq ft)		1.06	
Alpha	1.00	Stream Power (lb/ft s)		2.13	
Frctn Loss (ft)	4.86	Cum Volume (acre-ft)	149.97	150.75	105.51
C & E Loss (ft)	0.01	Cum SA (acres)	73.78	96.90	69.23

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
6101.15	6401.73	56.45	69.04	212.73	1.88	0.32	0.82
6401.73	6702.30	23.71	39.24	190.30	0.79	0.21	0.60
6702.30	7303.45						
7303.45	7604.03	92.94	98.35	243.93	3.10	0.40	0.94
7604.03	7904.60	768.85	379.88	300.58	25.63	1.26	2.02
7904.60	8205.18	1146.18	482.72	300.58	38.21	1.61	2.37
8205.18	8505.75	509.89	296.91	300.58	17.00	0.99	1.72
8505.75	8806.33	99.55	110.46	294.15	3.32	0.38	0.90
8806.33	9106.90						
9106.90	9407.48	1.69	5.87	86.57	0.06	0.07	0.29

9407.48	9708.05	114.07	120.91	300.58	3.80	0.40	0.94
9708.05	RB 10008.63	186.68	144.98	226.07	6.22	0.64	1.29

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
5800.58	6101.15	38.71	69.07	296.67	0.55	0.23	0.56
6101.15	6401.73	349.08	259.79	300.58	4.99	0.86	1.34
6401.73	6702.30	280.69	227.93	300.58	4.01	0.76	1.23
6702.30	7002.88	15.63	32.72	178.58	0.22	0.18	0.48
7002.88	7303.45	20.32	36.67	160.15	0.29	0.23	0.55
7303.45	7604.03	436.19	296.94	300.58	6.23	0.99	1.47
7604.03	7904.60	1345.76	583.77	300.58	19.23	1.94	2.31
7904.60	8205.18	1763.65	686.61	300.58	25.20	2.28	2.57
8205.18	8505.75	1042.34	500.81	300.58	14.89	1.67	2.08
8505.75	8806.33	479.51	314.30	300.58	6.85	1.05	1.53
8806.33	9106.90	47.21	78.22	300.58	0.67	0.26	0.60
9106.90	9407.48	154.33	159.20	300.58	2.20	0.53	0.97
9407.48	9708.05	506.51	324.80	300.58	7.24	1.08	1.56
9708.05	RB 10008.63	520.06	302.94	242.72	7.43	1.25	1.72

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 5500.00	5800.58	10.37	21.51	116.41	0.09	0.18	0.48
5800.58	6101.15	196.85	183.85	300.58	1.79	0.61	1.07
6101.15	6401.73	644.63	374.60	300.58	5.86	1.25	1.72
6401.73	6702.30	555.86	342.74	300.58	5.05	1.14	1.62
6702.30	7002.88	124.23	139.48	300.58	1.13	0.46	0.89
7002.88	7303.45	121.54	137.66	300.58	1.10	0.46	0.88
7303.45	7604.03	754.67	411.75	300.58	6.86	1.37	1.83
7604.03	7904.60	1821.37	698.58	300.58	16.56	2.32	2.61
7904.60	8205.18	2289.83	801.42	300.58	20.82	2.67	2.86
8205.18	8505.75	1475.31	615.61	300.58	13.41	2.05	2.40
8505.75	8806.33	808.43	429.11	300.58	7.35	1.43	1.88
8806.33	9106.90	213.49	193.02	300.58	1.94	0.64	1.11
9106.90	9407.48	382.80	274.01	300.58	3.48	0.91	1.40
9407.48	9708.05	841.68	439.61	300.58	7.65	1.46	1.91
9708.05	RB 10008.63	758.94	403.33	283.05	6.90	1.43	1.88

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: West Spillway
REACH: A2 RS: 19.06

INPUT
Description: Flow modeled only in portion of cross-section between Tuthill Road and a split approximately 1800 west of Tuthill Road.
1/3 Q=2000 cfs
2/3 Q=3500 cfs
Full Q=5500 cfs

Station Elevation Data num= 112

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4297.71	1008	4304.11	1007.5	4309.62	1007	4315.41	1006.5	4319.8	1006.5
4360.15	1007	4409.68	1007.5	4495.05	1007.5	4649.13	1007	4693.79	1007
4783.86	1007.5	4844.95	1008	4897.25	1008	5317.5	1008	5345.37	1007.5
5369.35	1007	5393.33	1006.5	5417.32	1006	5419.58	1006	5491.84	1005.5
5547.94	1005.5	5620.4	1006	5624.39	1006	5645.97	1006	5657.78	1006
5841.53	1005.5	5945.17	1005.5	6047.79	1006	6073	1006	6190.08	1006.5
6372.85	1007	6504.78	1007.5	6617.64	1008	6626.52	1008	7056.33	1008
7059.8	1008	7226.24	1007.5	7548.83	1007	7748.09	1007	7794.17	1007.5
7838.17	1008	7844.21	1008.5	7856.62	1009	7860.46	1009.5	7880.31	1009.5
7881.4	1009	7882.5	1008.5	7883.6	1008	7884.69	1007.5	7885.79	1007
7886.89	1006.5	7887.99	1006	7889.09	1005.5	7890.19	1005	7891.29	1004.5
7892.39	1004	7893.49	1003.5	7894.59	1003	7895.69	1002.5	7896.79	1002
7897.89	1001.5	7898.99	1001	7900.09	1000.5	7900.83	1000	7901.19	1000
7911.95	999.5	7919.89	999	7922.05	998.5	7924.21	998	7926.36	997.5
7927.07	997.5	7928.22	998	7929.36	998.5	7930.51	999	7980	1008
8000	1009	8010	1009	8030	1008	8050	1006.5	8130	1006.7
8320	1007.4	8800	1007.6	8940	1007.4	9280	1007.3	9590	1007.5
9800	1007.6	10000	1008	10010	1008.5	10050	1008.5	10060	1008
10070	1007.5	10080	1008	10120	1008.4	10230	1008.3	10270	1008
10290	1007.9	10410	1007.8	10470	1008	10555	1008.4	10590	1008.3
10680	1008.9	10815	1008	10845	1007.8	10855	1008	10890	1008.4
11065	1009.2	11085	1009	11195	1010	11260	1010.3	11315	1010.3
11330	1010	11435	1008.3						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4297.71	.1	10000	.016	10050	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8000	10050	700	1019	1300	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
4297.71	8000		10050	11435	

Blocked Obstructions num= 1

Sta L	Sta R	Elev
7881.4	8000	1009

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1008.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.099	
W.S. Elev (ft)	1008.67	Reach Len. (ft)	700.00	1019.00	1300.00
Crit W.S. (ft)	1007.71	Flow Area (sq ft)		2490.88	
E.G. Slope (ft/ft)	0.002150	Area (sq ft)	5446.54	2490.88	409.46
Q Total (cfs)	2000.00	Flow (cfs)		2000.00	
Top Width (ft)	6435.95	Top Width (ft)	3550.68	2033.37	851.91
Vel Total (ft/s)	0.80	Avg. Vel. (ft/s)		0.80	
Max Chl Dpth (ft)	3.17	Hydr. Depth (ft)		1.23	
Conv. Total (cfs)	43136.0	Conv. (cfs)		43136.0	
Length Wtd. (ft)	1019.00	Wetted Per. (ft)		2033.45	
Min Ch El (ft)	1006.50	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)		0.13	
Frctn Loss (ft)	5.75	Cum Volume (acre-ft)	43.76	35.30	60.84
C & E Loss (ft)	0.02	Cum SA (acres)	28.53	37.74	51.36

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1009.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.097	

W.S. Elev (ft)	1009.12	Reach Len. (ft)	700.00	1019.00	1300.00
Crit W.S. (ft)	1007.87	Flow Area (sq ft)		3403.98	
E.G. Slope (ft/ft)	0.002281	Area (sq ft)	7051.85	3403.98	843.31
Q Total (cfs)	3500.00	Flow (cfs)		3500.00	
Top Width (ft)	6799.96	Top Width (ft)	3678.65	2050.00	1071.31
Vel Total (ft/s)	1.03	Avg. Vel. (ft/s)		1.03	
Max Chl Dpth (ft)	3.62	Hydr. Depth (ft)		1.66	
Conv. Total (cfs)	73286.8	Conv. (cfs)		73286.8	
Length Wtd. (ft)	1019.00	Wetted Per. (ft)		2050.10	
Min Ch El (ft)	1006.50	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)		0.24	
Frctn Loss (ft)	5.90	Cum Volume (acre-ft)	56.86	49.03	75.36
C & E Loss (ft)	0.03	Cum SA (acres)	32.69	39.27	54.63

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1009.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.096	
W.S. Elev (ft)	1009.58	Reach Len. (ft)	700.00	1019.00	1300.00
Crit W.S. (ft)	1008.04	Flow Area (sq ft)		4363.17	
E.G. Slope (ft/ft)	0.002393	Area (sq ft)	8775.78	4363.17	1374.80
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	6930.79	Top Width (ft)	3702.29	2050.00	1178.50
Vel Total (ft/s)	1.26	Avg. Vel. (ft/s)		1.26	
Max Chl Dpth (ft)	4.08	Hydr. Depth (ft)		2.13	
Conv. Total (cfs)	112423.8	Conv. (cfs)		112423.8	
Length Wtd. (ft)	1019.00	Wetted Per. (ft)		2050.10	
Min Ch El (ft)	1006.50	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)		0.40	
Frctn Loss (ft)	6.06	Cum Volume (acre-ft)	72.41	63.88	92.05
C & E Loss (ft)	0.04	Cum SA (acres)	41.06	40.71	56.23

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8000.00	8136.67	208.49	211.33	120.10	10.42	1.76	0.99
8136.67	8273.33	222.24	231.23	136.67	11.11	1.69	0.96
8273.33	8410.00	140.55	175.65	136.67	7.03	1.29	0.80
8410.00	8546.67	125.76	164.31	136.67	6.29	1.20	0.77
8546.67	8683.33	115.99	156.53	136.67	5.80	1.15	0.74
8683.33	8820.00	106.98	149.12	136.67	5.35	1.09	0.72
8820.00	8956.67	124.19	163.09	136.67	6.21	1.19	0.76
8956.67	9093.33	142.01	176.74	136.67	7.10	1.29	0.80
9093.33	9230.00	149.44	182.24	136.67	7.47	1.33	0.82
9230.00	9366.67	152.14	184.21	136.67	7.61	1.35	0.83
9366.67	9503.33	137.47	173.33	136.67	6.87	1.27	0.79
9503.33	9640.00	122.18	161.49	136.67	6.11	1.18	0.76
9640.00	9776.67	110.40	151.97	136.67	5.52	1.11	0.73
9776.67	9913.33	88.72	133.28	136.67	4.44	0.98	0.67
9913.33	RB 10050.00	53.45	76.34	136.68	2.67	0.56	0.70

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8000.00	8136.67	295.78	268.08	136.75	8.45	1.96	1.10
8136.67	8273.33	341.97	292.40	136.67	9.77	2.14	1.17
8273.33	8410.00	240.65	236.82	136.67	6.88	1.73	1.02
8410.00	8546.67	221.76	225.48	136.67	6.34	1.65	0.98
8546.67	8683.33	209.15	217.70	136.67	5.98	1.59	0.96
8683.33	8820.00	197.42	210.29	136.67	5.64	1.54	0.94
8820.00	8956.67	219.75	224.25	136.67	6.28	1.64	0.98
8956.67	9093.33	242.50	237.91	136.67	6.93	1.74	1.02
9093.33	9230.00	251.91	243.41	136.67	7.20	1.78	1.03
9230.00	9366.67	255.32	245.38	136.67	7.29	1.80	1.04
9366.67	9503.33	236.73	234.50	136.67	6.76	1.72	1.01
9503.33	9640.00	217.15	222.66	136.67	6.20	1.63	0.98
9640.00	9776.67	201.89	213.13	136.67	5.77	1.56	0.95
9776.67	9913.33	173.27	194.45	136.67	4.95	1.42	0.89
9913.33	RB 10050.00	194.75	137.51	136.68	5.56	1.01	1.42

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8000.00	8136.67	434.08	332.03	136.75	7.89	2.43	1.31
8136.67	8273.33	488.54	356.35	136.67	8.88	2.61	1.37
8273.33	8410.00	368.27	300.77	136.67	6.70	2.20	1.22
8410.00	8546.67	345.42	289.43	136.67	6.28	2.12	1.19
8546.67	8683.33	330.08	281.64	136.67	6.00	2.06	1.17
8683.33	8820.00	315.73	274.23	136.67	5.74	2.01	1.15
8820.00	8956.67	342.98	288.20	136.67	6.24	2.11	1.19
8956.67	9093.33	370.49	301.86	136.67	6.74	2.21	1.23
9093.33	9230.00	381.81	307.35	136.67	6.94	2.25	1.24
9230.00	9366.67	385.89	309.32	136.67	7.02	2.26	1.25
9366.67	9503.33	363.54	298.44	136.67	6.61	2.18	1.22
9503.33	9640.00	339.82	286.61	136.67	6.18	2.10	1.19
9640.00	9776.67	321.21	277.08	136.67	5.84	2.03	1.16
9776.67	9913.33	285.93	258.40	136.67	5.20	1.89	1.11
9913.33	RB 10050.00	426.23	201.46	136.68	7.75	1.47	2.12

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: West Spillway
REACH: A2 RS: 18.87

INPUT
Description: North Bank, Roosevelt Canal
1/3 Q=2000 cfs

2/3 Q=3500 cfs
Full
Q=5500 cfs
Survey Date 12/15/99
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4660	1004.32	5220	1003.04	5710	1002.76	6230	1003.31	6770	1004.68
7330	1003.63	7820	1002.88	8350	1003.21	8880	1002.24	9390	1002.06
9830	1002.4	101201001.774		10330	1001.32	10890	1001.3	11390	1001.04
11930	1001	12420	1000.99						

Manning's n Values num= 1

Sta	n Val
4660	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8350	9830	0	0	0	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
4660	8350		9830	12420	

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1002.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.045	
W.S. Elev (ft)	1002.69	Reach Len. (ft)			
Crit W.S. (ft)	1002.69	Flow Area (sq ft)		527.44	
E.G. Slope (ft/ft)	0.039166	Area (sq ft)		527.44	3667.74
Q Total (cfs)	2000.00	Flow (cfs)		2000.00	
Top Width (ft)	3783.27	Top Width (ft)		1193.27	2590.00
Vel Total (ft/s)	3.79	Avg. Vel. (ft/s)		3.79	
Max Chl Dpth (ft)	1.70	Hydr. Depth (ft)		0.44	
Conv. Total (cfs)	10105.9	Conv. (cfs)		10105.9	
Length Wtd. (ft)		Wetted Per. (ft)		1193.27	
Min Ch El (ft)	1002.06	Shear (lb/sq ft)		1.08	
Alpha	1.00	Stream Power (lb/ft s)		4.10	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1003.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.045	
W.S. Elev (ft)	1002.89	Reach Len. (ft)			
Crit W.S. (ft)	1002.89	Flow Area (sq ft)		787.79	
E.G. Slope (ft/ft)	0.035558	Area (sq ft)	24.22	787.79	4207.12
Q Total (cfs)	3500.00	Flow (cfs)		3500.00	
Top Width (ft)	4287.36	Top Width (ft)	390.30	1307.06	2590.00
Vel Total (ft/s)	4.44	Avg. Vel. (ft/s)		4.44	
Max Chl Dpth (ft)	1.90	Hydr. Depth (ft)		0.60	
Conv. Total (cfs)	18560.9	Conv. (cfs)		18560.9	
Length Wtd. (ft)		Wetted Per. (ft)		1307.06	
Min Ch El (ft)	1002.06	Shear (lb/sq ft)		1.34	
Alpha	1.00	Stream Power (lb/ft s)		5.94	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1003.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.045	
W.S. Elev (ft)	1003.12	Reach Len. (ft)			
Crit W.S. (ft)	1003.12	Flow Area (sq ft)		1098.03	
E.G. Slope (ft/ft)	0.032753	Area (sq ft)	235.70	1098.03	4794.07
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	

Top Width (ft)	5428.90	Top Width (ft)	1408.02	1430.88	2590.00
Vel Total (ft/s)	5.01	Avg. Vel. (ft/s)		5.01	
Max Chl Dpth (ft)	2.13	Hydr. Depth (ft)		0.77	
Conv. Total (cfs)	30390.3	Conv. (cfs)		30390.3	
Length Wtd. (ft)		Wetted Per. (ft)		1430.88	
Min Ch El (ft)	1002.06	Shear (lb/sq ft)		1.57	
Alpha	1.00	Stream Power (lb/ft s)		7.86	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
8547.33	8646.00	0.02	0.08	9.27	0.00	0.01	0.26
8646.00	8744.67	14.68	10.58	98.67	0.73	0.11	1.39
8744.67	8843.33	76.09	28.40	98.67	3.80	0.29	2.68
8843.33	8942.00	154.15	43.38	98.67	7.71	0.44	3.55
8942.00	9040.67	181.27	47.81	98.67	9.06	0.48	3.79
9040.67	9139.33	203.49	51.25	98.67	10.17	0.52	3.97
9139.33	9238.00	226.74	54.68	98.67	11.34	0.55	4.15
9238.00	9336.67	250.97	58.12	98.67	12.55	0.59	4.32
9336.67	9435.33	267.59	60.39	98.67	13.38	0.61	4.43
9435.33	9534.00	225.30	54.47	98.67	11.27	0.55	4.14
9534.00	9632.67	175.88	46.95	98.67	8.79	0.48	3.75
9632.67	9731.33	131.46	39.43	98.67	6.57	0.40	3.33
9731.33	RB 9830.00	92.36	31.90	98.67	4.62	0.32	2.90

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
8448.67	8547.33	0.25	0.54	24.39	0.01	0.02	0.46
8547.33	8646.00	20.37	13.31	98.67	0.58	0.13	1.53
8646.00	8744.67	83.91	31.13	98.67	2.40	0.32	2.70
8744.67	8843.33	178.39	48.95	98.67	5.10	0.50	3.64
8843.33	8942.00	278.37	63.93	98.67	7.95	0.65	4.35
8942.00	9040.67	311.26	68.36	98.67	8.89	0.69	4.55
9040.67	9139.33	337.77	71.79	98.67	9.65	0.73	4.70
9139.33	9238.00	365.14	75.23	98.67	10.43	0.76	4.85
9238.00	9336.67	393.35	78.66	98.67	11.24	0.80	5.00
9336.67	9435.33	412.52	80.94	98.67	11.79	0.82	5.10
9435.33	9534.00	363.46	75.02	98.67	10.38	0.76	4.84
9534.00	9632.67	304.78	67.50	98.67	8.71	0.68	4.52
9632.67	9731.33	250.28	59.97	98.67	7.15	0.61	4.17
9731.33	RB 9830.00	200.17	52.45	98.67	5.72	0.53	3.82

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8350.00	8448.67	1.58	2.25	49.55	0.03	0.05	0.70
8448.67	8547.33	31.57	17.86	98.67	0.57	0.18	1.77
8547.33	8646.00	100.05	35.67	98.67	1.82	0.36	2.80
8646.00	8744.67	196.55	53.49	98.67	3.57	0.54	3.67
8744.67	8843.33	317.37	71.31	98.67	5.77	0.72	4.45
8843.33	8942.00	436.10	86.29	98.67	7.93	0.87	5.05
8942.00	9040.67	474.05	90.72	98.67	8.62	0.92	5.23
9040.67	9139.33	504.34	94.15	98.67	9.17	0.95	5.36
9139.33	9238.00	535.39	97.59	98.67	9.73	0.99	5.49
9238.00	9336.67	567.17	101.02	98.67	10.31	1.02	5.61
9336.67	9435.33	588.65	103.30	98.67	10.70	1.05	5.70

9435.33	9534.00	533.49	97.38	98.67	9.70	0.99	5.48
9534.00	9632.67	466.60	89.86	98.67	8.48	0.91	5.19
9632.67	9731.33	403.31	82.33	98.67	7.33	0.83	4.90
9731.33	RB 9830.00	343.77	74.81	98.67	6.25	0.76	4.60

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:West Spillway

Reach	River Sta.	n1	n2	n3
A2	20.09	.045	.02	.045
A2	20.04	.045	.02	.045
A2	19.84	.1	.016	.045
A2	19.68	.1	.016	.045
A2	19.57	.1	.016	.045
A2	19.44	.1	.016	.045
A2	19.33	.1	.016	.045
A2	19.21	.1	.016	.045
A2	19.06	.1	.016	.045
A2	18.87	.045		

SUMMARY OF REACH LENGTHS

River: West Spillway

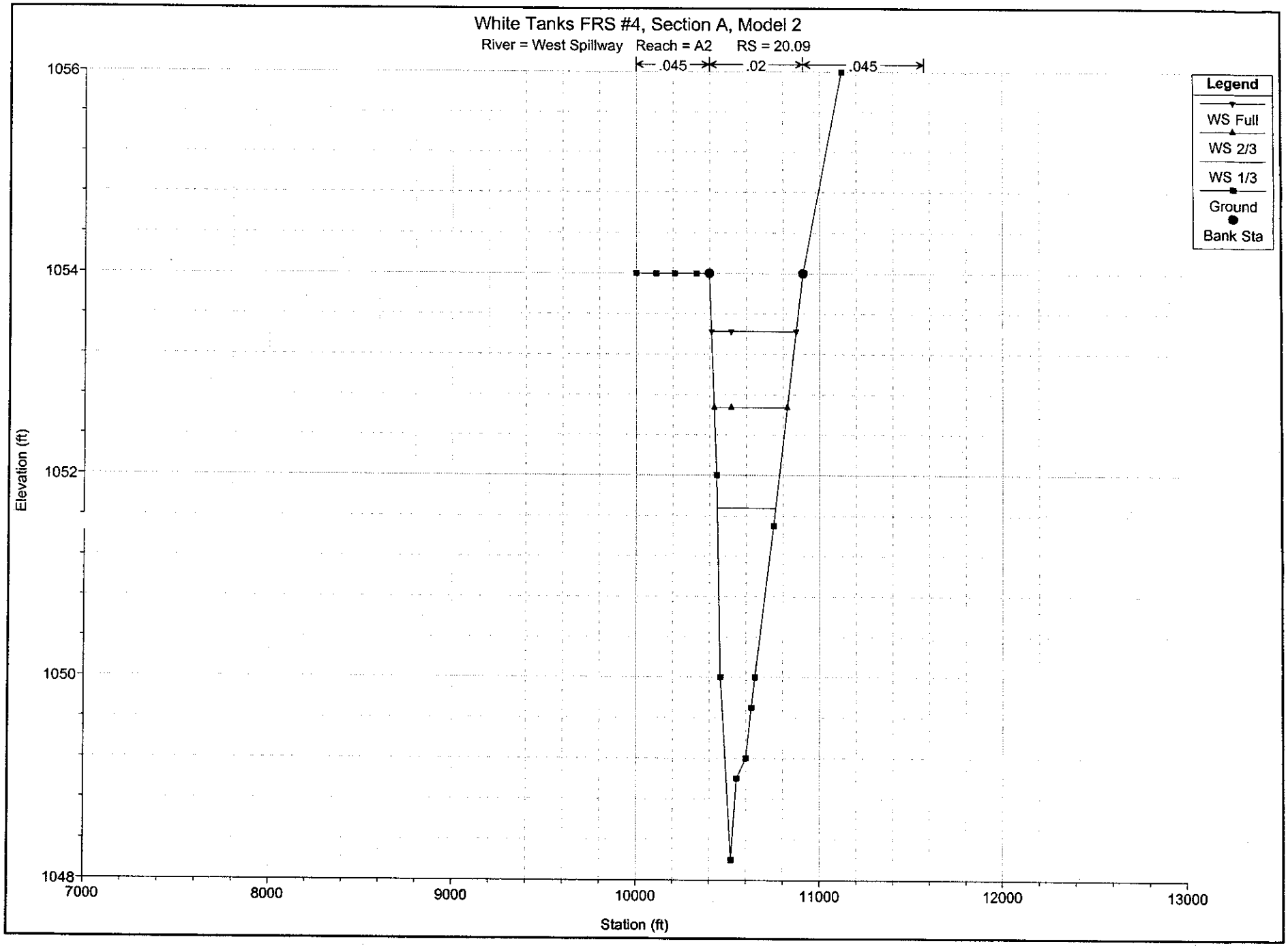
Reach	River Sta.	Left	Channel	Right
A2	20.09	500	580	620
A2	20.04	1200	1150	1150
A2	19.84	870	870	870
A2	19.68	490	570	480
A2	19.57	570	690	690
A2	19.44	540	580	570
A2	19.33	700	650	660
A2	19.21	770	770	780
A2	19.06	700	1019	1300
A2	18.87	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: West Spillway

Reach	River Sta.	Contr.	Expan.
A2	20.09	.1	.3
A2	20.04	.1	.3
A2	19.84	.1	.3
A2	19.68	.1	.3
A2	19.57	.1	.3
A2	19.44	.1	.3
A2	19.33	.1	.3
A2	19.21	.1	.3
A2	19.06	.1	.3
A2	18.87	.1	.3

HEC-RAS Plan: WT4A2 River: West Spillway Reach: A2

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
A2	18.87	2000.00	1002.06	1002.69	1002.69	1002.91	0.039166	3.79	527.44	3783.27	1.01
A2	18.87	3500.00	1002.06	1002.89	1002.89	1003.20	0.035558	4.44	787.79	4287.36	1.01
A2	18.87	5500.00	1002.06	1003.12	1003.12	1003.51	0.032753	5.01	1098.03	5428.90	1.01
A2	19.06	2000.00	1006.50	1008.67	1007.71	1008.68	0.002150	0.80	2490.88	6435.95	0.13
A2	19.06	3500.00	1006.50	1009.12	1007.87	1009.13	0.002281	1.03	3403.98	6799.96	0.14
A2	19.06	5500.00	1006.50	1009.58	1008.04	1009.61	0.002393	1.26	4363.17	6930.79	0.15
A2	19.21	3000.00	1011.50	1013.36	1012.79	1013.40	0.020980	1.72	1748.35	2481.89	0.36
A2	19.21	7000.00	1011.50	1014.03	1013.24	1014.08	0.014841	1.81	3873.74	4069.53	0.32
A2	19.21	11000.00	1011.50	1014.42	1013.51	1014.48	0.013347	2.01	5466.25	4580.01	0.31
A2	19.33	3000.00	1018.00	1019.59	1018.88	1019.61	0.005604	1.32	2279.34	2637.99	0.25
A2	19.33	7000.00	1018.00	1020.18	1019.28	1020.23	0.006542	1.80	3885.34	2996.32	0.27
A2	19.33	11000.00	1018.00	1020.60	1019.51	1020.67	0.007239	2.14	5136.84	3257.91	0.29
A2	19.44	3000.00	1022.00	1023.85	1023.46	1023.90	0.009883	1.89	1586.20	2166.89	0.39
A2	19.44	7000.00	1022.00	1024.52	1023.80	1024.60	0.008737	2.26	3094.67	2440.86	0.35
A2	19.44	11000.00	1022.00	1025.03	1024.05	1025.13	0.008289	2.54	4334.81	2800.96	0.34
A2	19.57	3000.00	1027.50	1028.96	1028.18	1028.99	0.005860	1.47	2046.29	1756.37	0.23
A2	19.57	7000.00	1027.50	1029.69	1028.54	1029.76	0.006568	2.12	3305.83	1924.97	0.28
A2	19.57	11000.00	1027.50	1030.25	1028.84	1030.35	0.006929	2.52	4365.97	2234.94	0.30
A2	19.68	3000.00	1031.00	1032.86	1032.16	1032.95	0.008358	2.35	1278.03	1136.87	0.37
A2	19.68	7000.00	1031.00	1033.77	1032.73	1033.91	0.008021	2.98	2346.34	1478.86	0.39
A2	19.68	11000.00	1031.00	1034.47	1033.18	1034.64	0.008096	3.29	3345.97	1936.31	0.40
A2	19.84	3000.00	1036.50	1038.86	1038.32	1039.04	0.005949	3.41	879.98	737.10	0.53
A2	19.84	7000.00	1036.50	1039.95	1039.07	1040.19	0.006488	3.89	1798.70	1194.62	0.52
A2	19.84	11000.00	1036.50	1040.69	1039.67	1040.92	0.006465	3.88	2833.32	1716.89	0.49
A2	20.04	4000.00	1046.40	1048.89	1048.89	1049.50	0.006735	6.28	637.42	992.54	1.02
A2	20.04	8000.00	1046.40	1049.62	1049.62	1050.53	0.007677	7.65	1046.03	1036.76	1.00
A2	20.04	12000.00	1046.40	1050.23	1050.23	1051.35	0.007790	8.48	1414.57	1101.53	1.00
A2	20.09	4000.00	1048.20	1051.68		1052.40	0.003728	6.82	586.47	318.00	0.89
A2	20.09	8000.00	1048.20	1052.67	1052.62	1053.79	0.004157	8.50	941.42	398.26	0.97
A2	20.09	12000.00	1048.20	1053.43	1053.43	1054.82	0.004239	9.48	1266.45	461.76	1.01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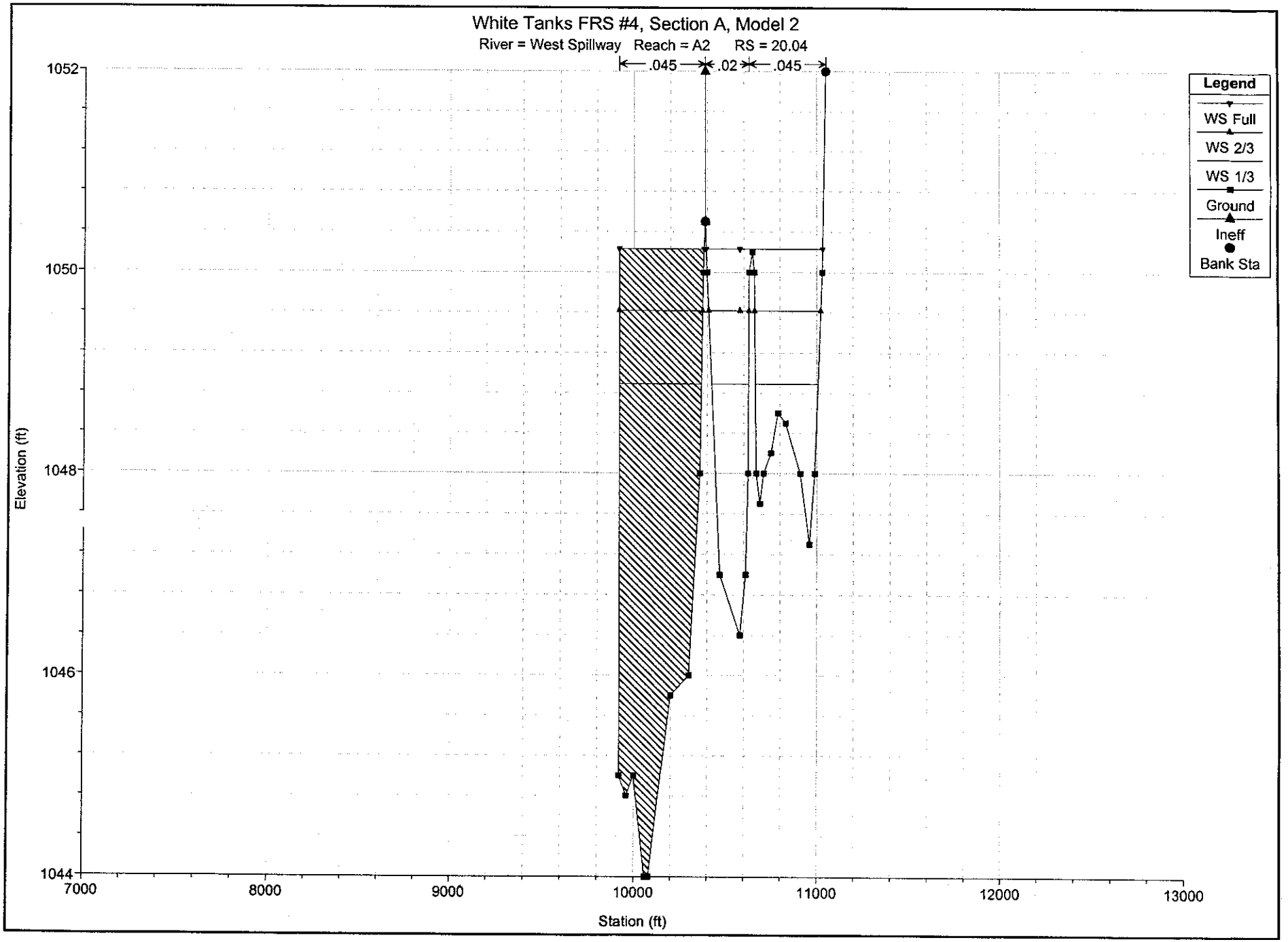
.045
.02
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Bank Sta
Elevation (ft)
1056
1054
1052
1050
1048
7000
8000
9000
10000
11000
12000
13000
Station (ft)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River = West Spillway Reach = A2 RS = 20.04
.045
.02
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
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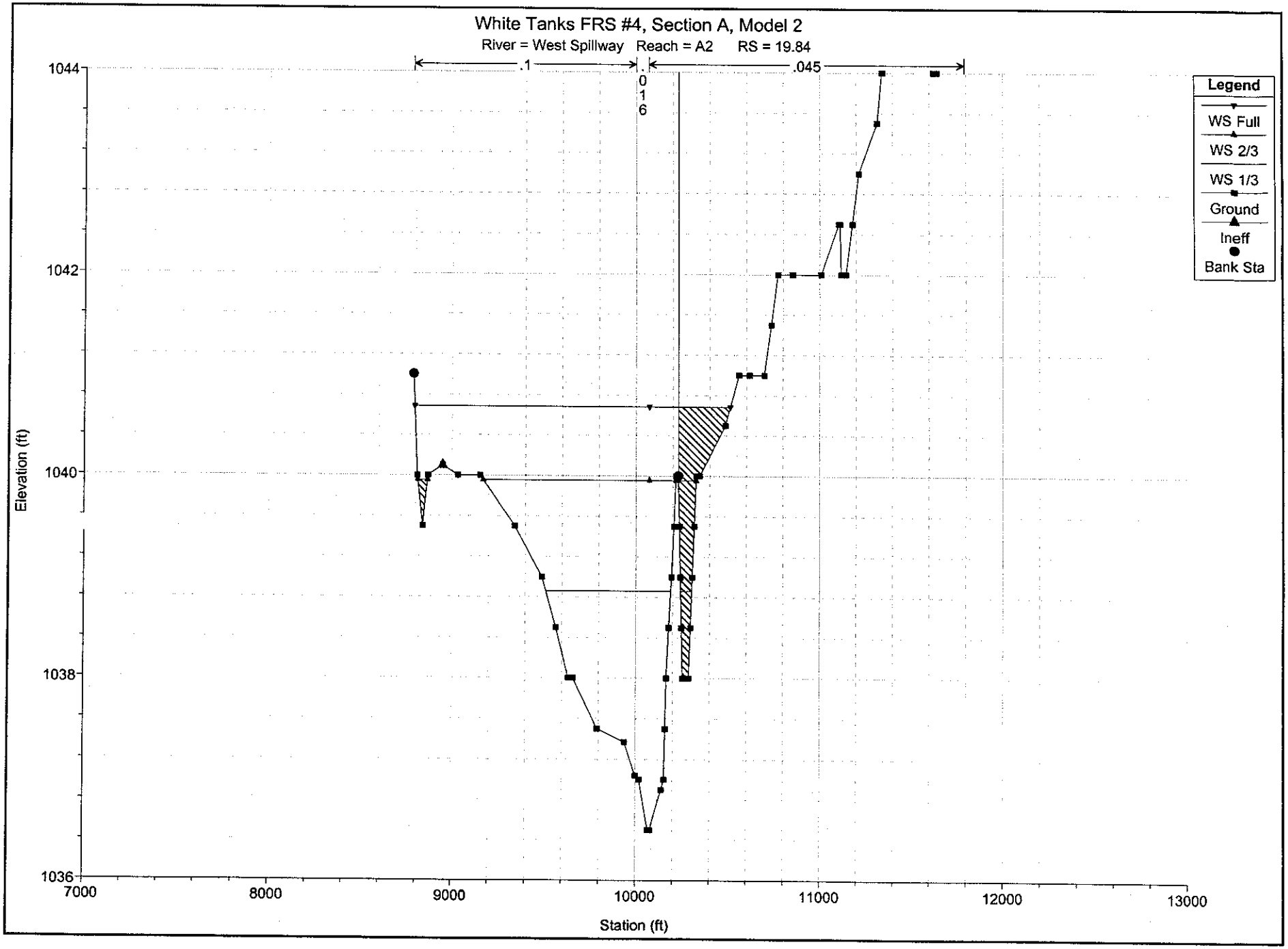
1050
1048
1046
1044
7000
8000
9000
10000
11000
12000
13000
Station (ft)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.016
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
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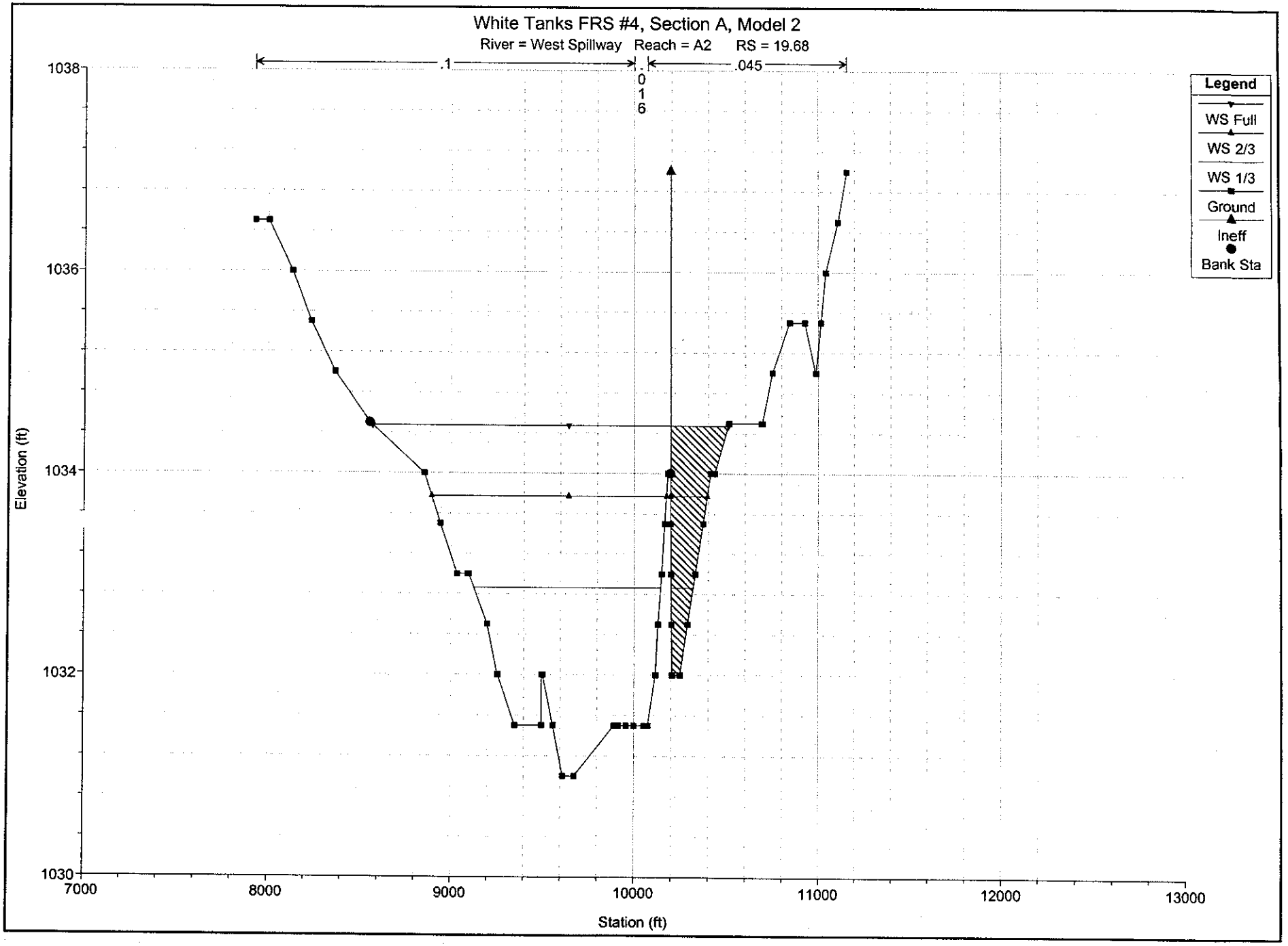
1042
1040
1038
1036
7000
8000
9000
10000
11000
12000
13000
Station (ft)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.1
.016
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
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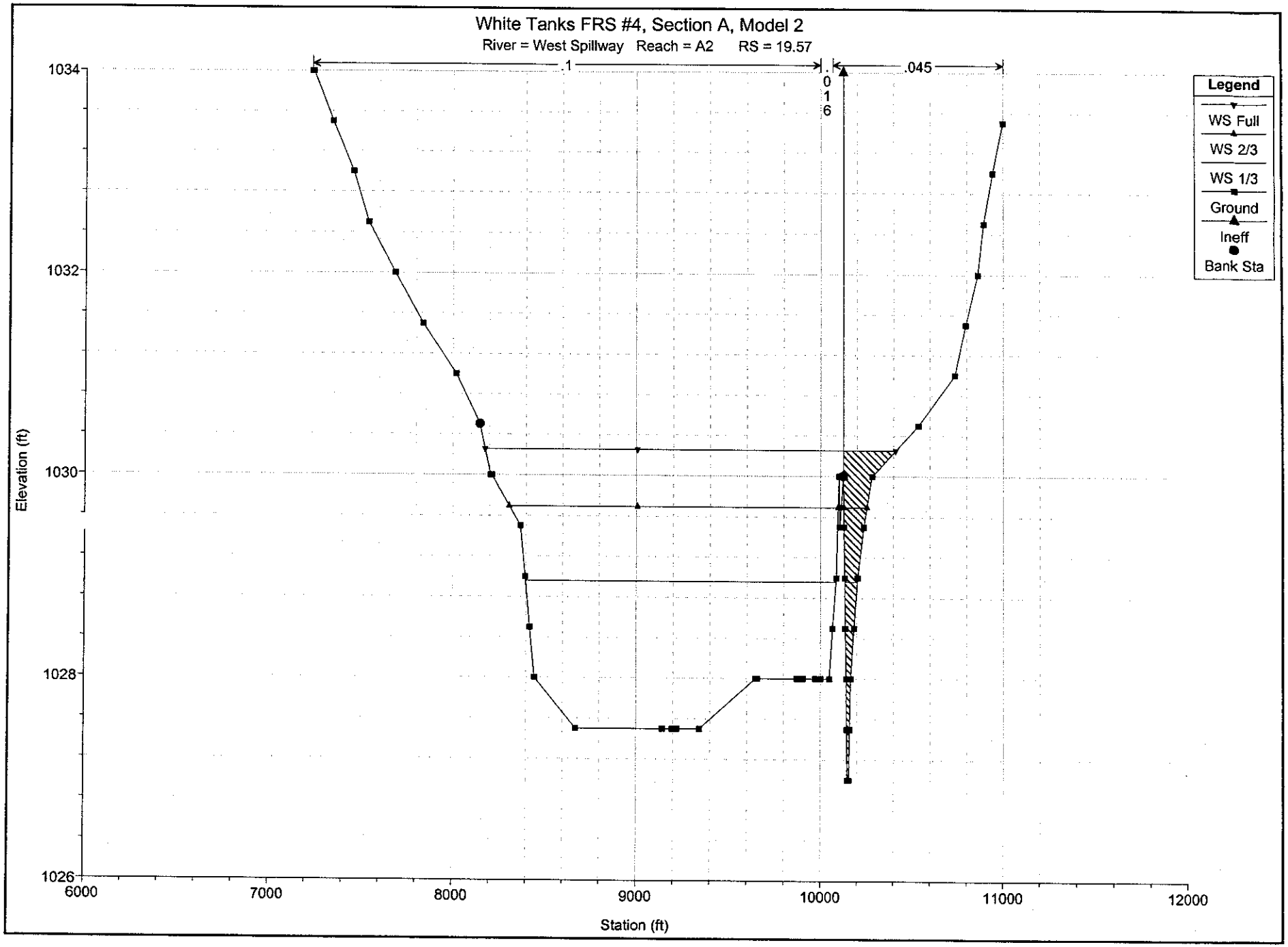
1036
1034
1032
1030
7000
8000
9000
10000
11000
12000
13000
Station (ft)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River = West Spillway Reach = A2 RS = 19.57
.1
.016
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
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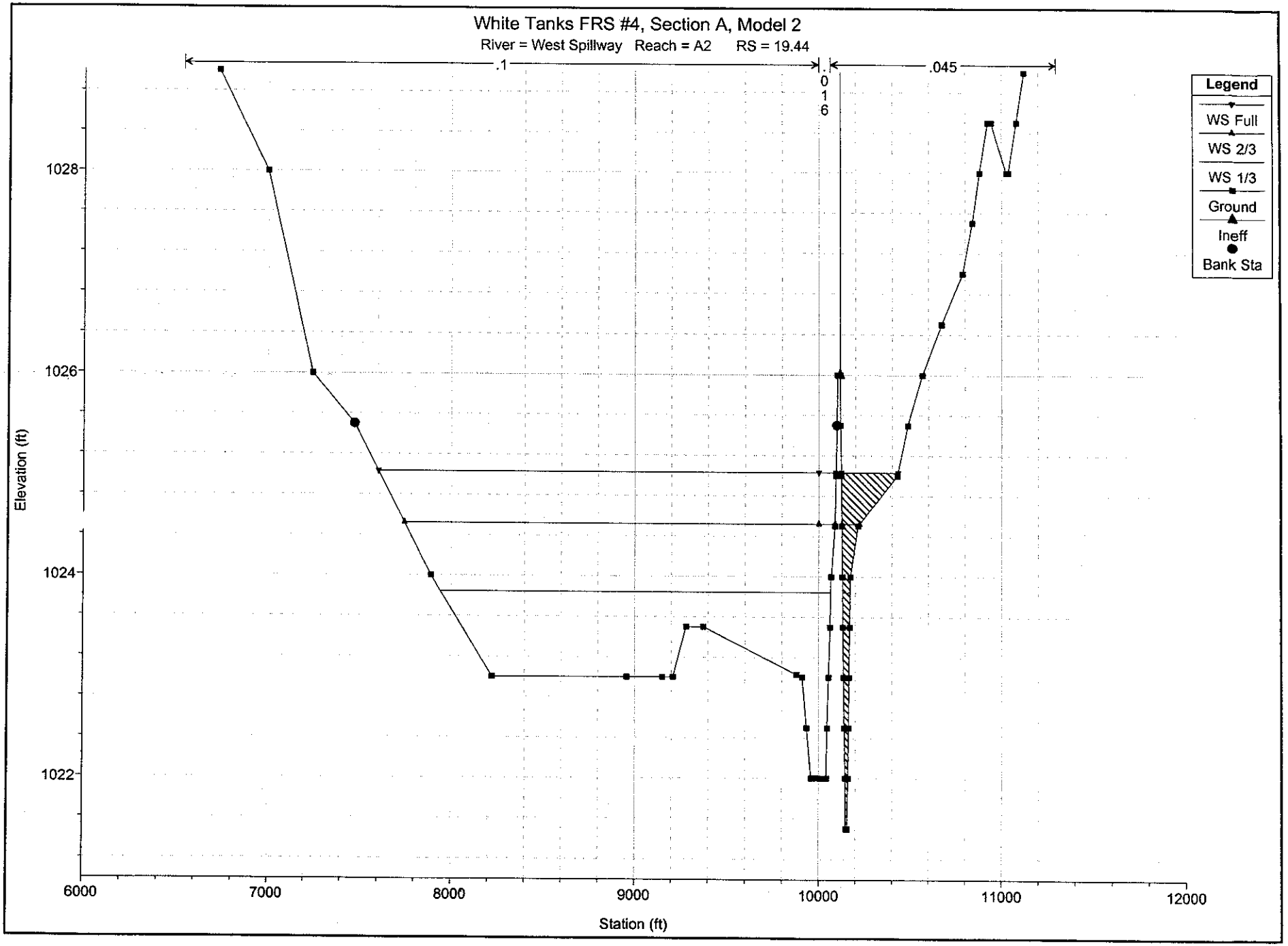
1032
1030
1028
1026
6000
7000
8000
9000
10000
11000
12000
Station (ft)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.016
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
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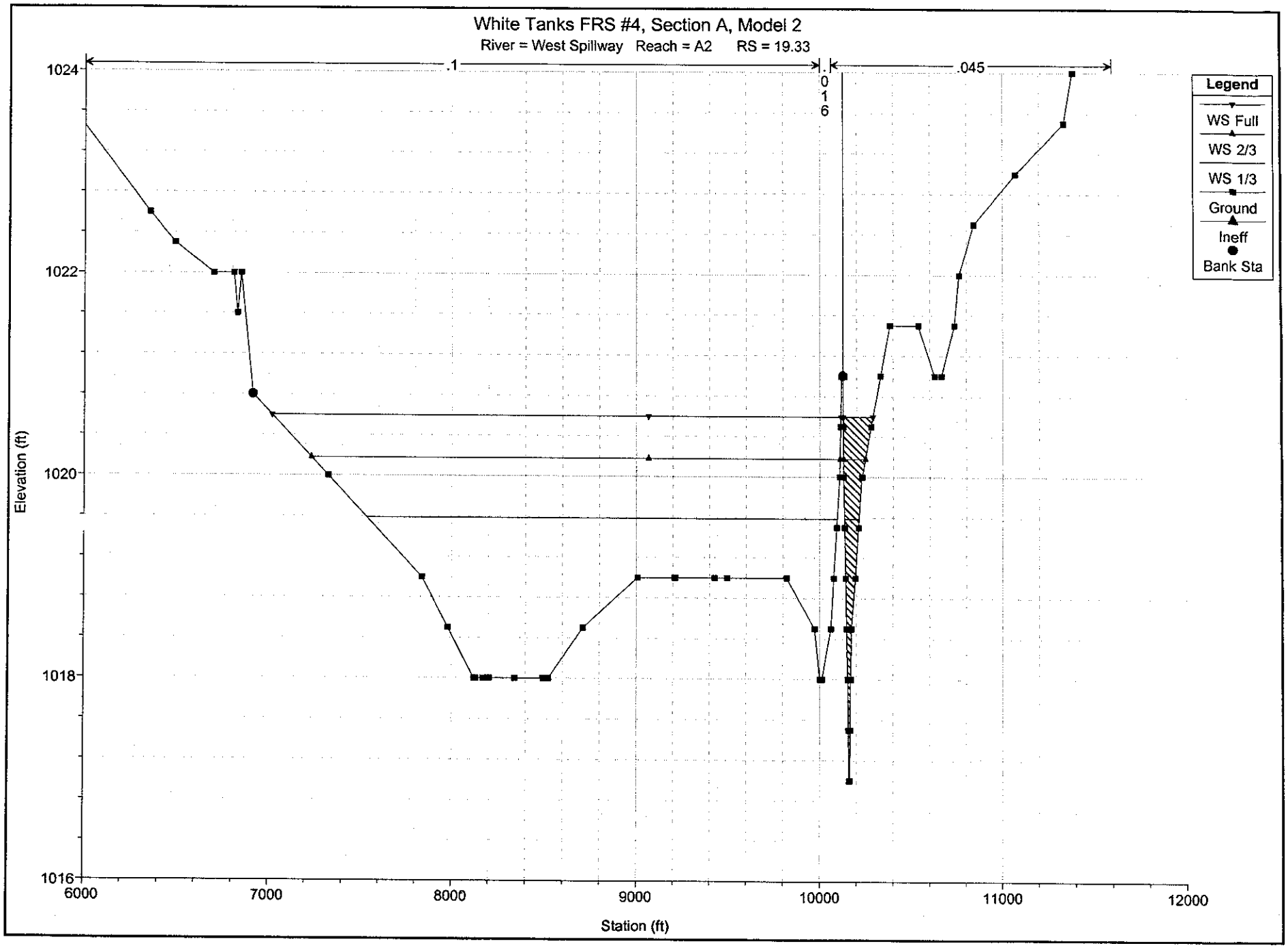
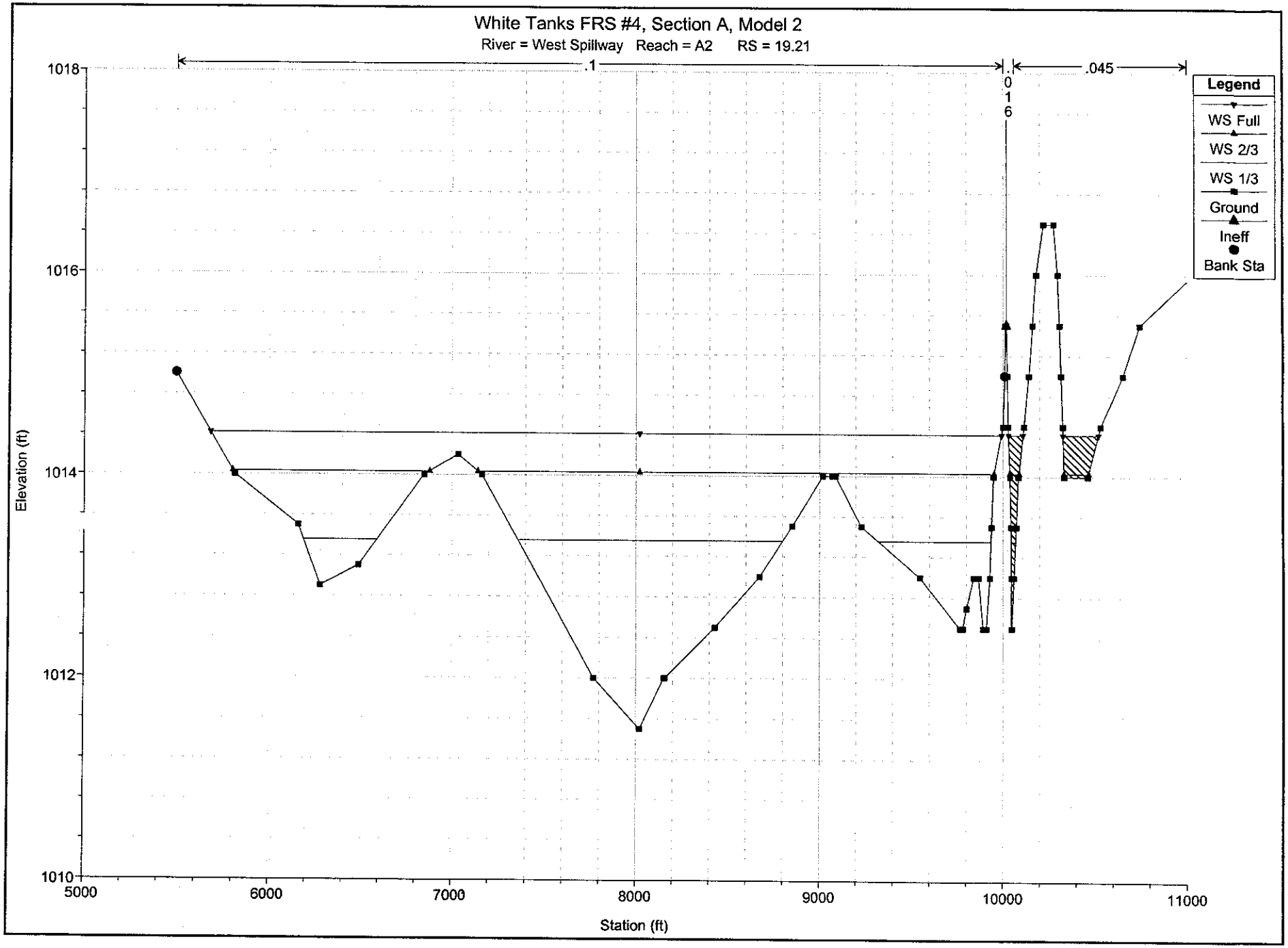
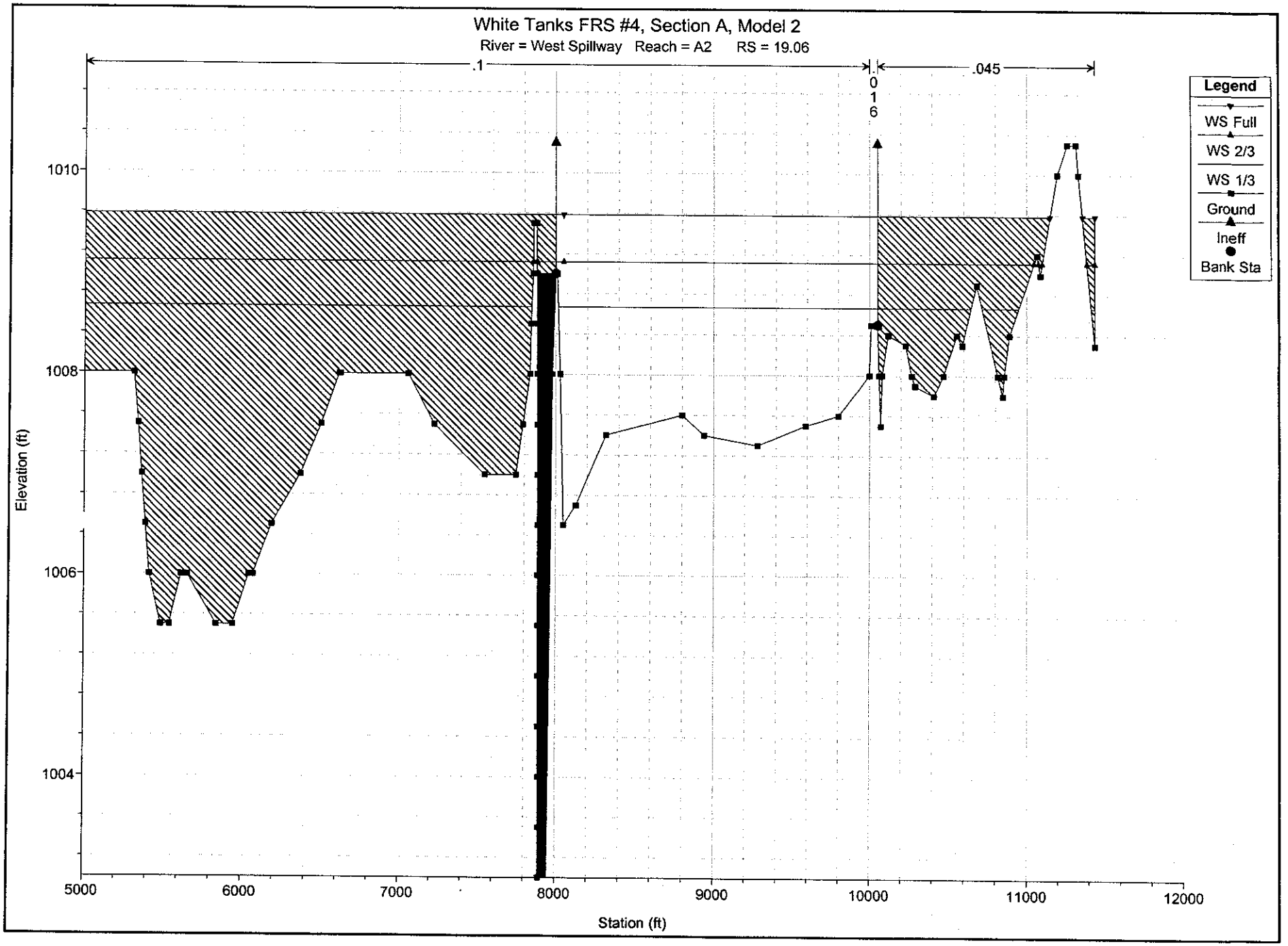
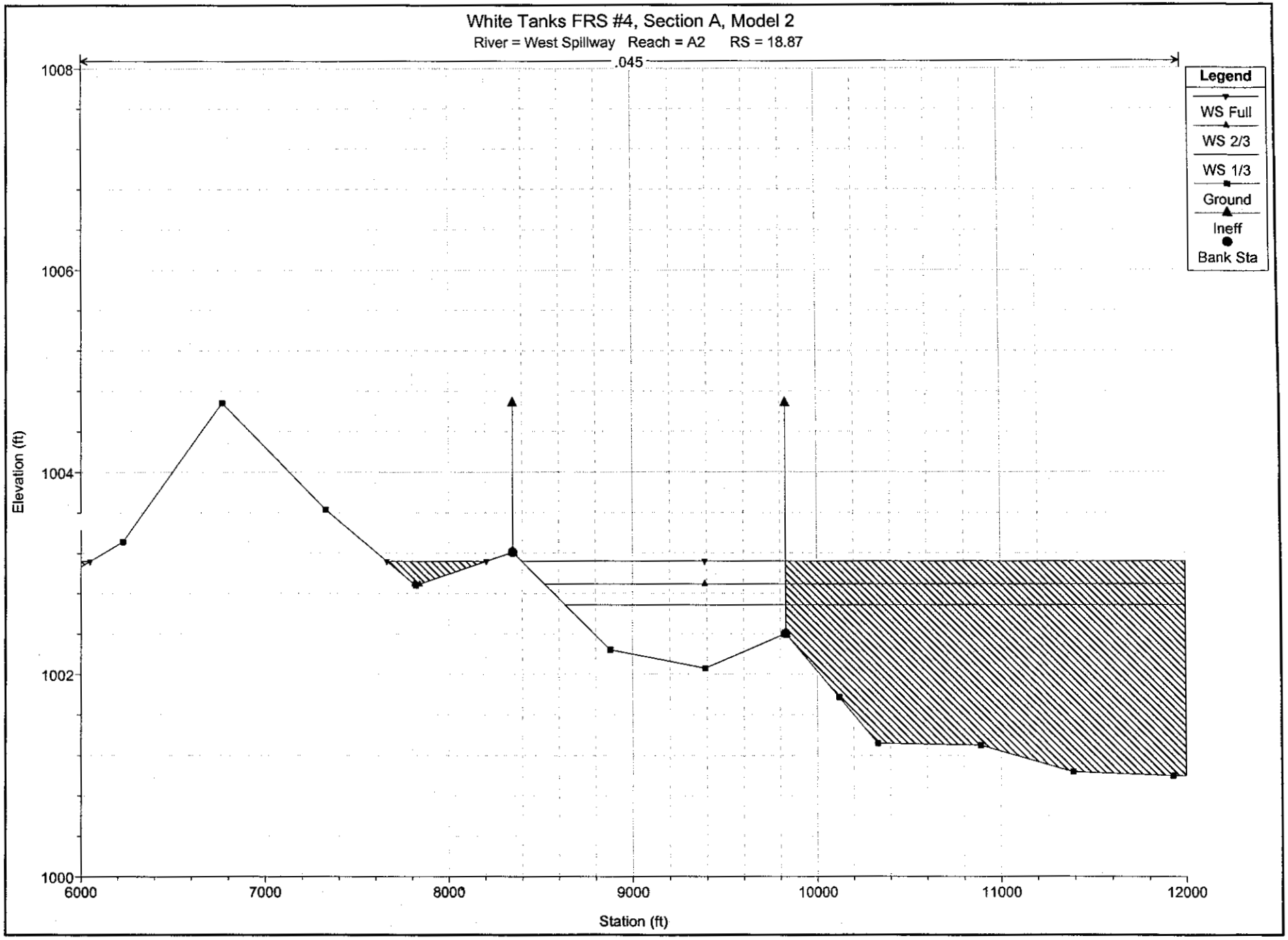
1026
1024
1022
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS #4, Section A, Model 2
River = West Spillway Reach = A2 RS = 19.33
.1
.016
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1024
1022
1020
1018
1016
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS #4, Section A, Model 2
River = West Spillway Reach = A2 RS = 19.21
.1
.016
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1018
1016
1014
1012
1010
5000
6000
7000
8000
9000
10000
11000
Station (ft)


White Tanks FRS #4, Section A, Model 2
River = West Spillway Reach = A2 RS = 19.06
.1
.016
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1010
1008
1006
1004
5000
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS #4, Section A, Model 2
River = West Spillway Reach = A2 RS = 18.87
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1008
1006
1004
1002
1000
6000
7000
8000
9000
10000
11000
12000
Station (ft)

```
                    HEC-RAS September 1998 Version 2.2
                      U.S. Army Corp of Engineers
                     Hydrologic Engineering Center
                       609 Second Street, Suite D
                      Davis, California 95616-4687
                            (916) 756-1104

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

PROJECT DATA
Project Title: White Tanks FRS #4, Section A, Model 3
Project File : WT4A3.prj
Run Date and Time: 06/26/2000 10:07:56 AM

Project in English units

Project Description:
Study Name: White Tanks FRS #4 Spillway Delineation Study
Contract No.: FCD 98-32
Purpose of Study: Delineation of the inundation limits of the 1/3, 2/3, and full spillway discharges for the western spillway of the White Tanks Flood Retarding Structure #4.

Model Name: WT4A3
Model Description: Set up to model the portion of west spillway flow which weirs over the Roosevelt Canal between Jackrabbit Trail and a point of flow split approximately 1800 feet east of Tuthill Road. Northern boundary is the west spillway, southern boundary is the Roosevelt Irrigation District Canal. Cross-section data west of Tuthill Road is set as ineffective flow on all cross-sections. Cross-section data west of the flow split is set as ineffective flow area on sections 19.06 and 18.87.

Flow Profiles: Profile #1, 1/3 spillway discharge for the 1/2 PMF
Sections 20.09 to 20.04, Q=4000 cfs
Sections 19.84 to 19.21, Q=3000 cfs
Sections 19.06 to 18.87, Q=1500 cfs.
Profile #2, 2/3 spillway discharge for the 1/2 PMF
Sections 20.09 to20.04, Q=8000 cfs
Sections 19.84 to 19.21, Q=7000 cfs
Sections 19.06 to 18.87, Q=4000 cfs.
Profile #3, Full spillway discharge for the 1/2 PMF
Sections 20.09 to 20.04, Q=12,000 cfs
Sections 19.84 to 19.21, Q=11,000 cfs
Sections 19.06 to 18.87, Q=6500 cfs.

HEC-RAS Version: Version 2.2, September 1998 with RASPATCH

Consultants: Hoskin Engineering Consultants, Inc.
323 W. Roosevelt Street, Suite 200
Phoenix, AZ 85003
(602)252-8384 Phone
(602)252-8385 Fax
HEC 990006

DEI Professional Services, LLC
6225 N. 24th St., Ste. 200
Phoenix, AZ 85016
(602)954-0038 Phone
(602)944-8605 Fax

PLAN DATA

Plan Title: Section A, Between Split and Jackrabbit
Plan File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\WT4A3.P01

Geometry Title: Section A, Between Split and Jackrabbit
Geometry File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\WT4A3.G01

Flow Title : Section A, Between Split and Jackrabbit
Flow File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\WT4A3.F01

Plan Summary Information:
Number of: Cross Sections = 10 Mulitple Openings = 0
Culverts = 0 Inline Weirs = 0
Bridges = 0

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

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: Between every coordinate point (HEC2 Style)
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Section A, Between Split and Jackrabbit
Flow File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\WT4A3.F01

Flow Data (cfs)

River	Reach	RS	1/3	2/3	Full
West	W1	20.09	4000	8000	12000
West	W1	19.84	3000	7000	11000
West	W1	19.06	1500	4000	6500
West Spillway	A3	20.09	4000	8000	12000
West Spillway	A3	19.84	3000	7000	11000
West Spillway	A3	19.06	1500	4000	6500

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
West Spillway	A3	1/3		Critical

GEOMETRY DATA

Geometry Title: Section A, Between Split and Jackrabbit
Geometry File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\WT4A3.G01

CROSS SECTION RIVER: West Spillway
REACH: A3 RS: 20.09

INPUT
Description: Northern Boundary of HEC-RAS Model
1/3 Q=4000 cfs
2/3 Q=8000
cfs
Full Q=12,000 cfs
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
10000	1054	10110	1054	10210	1054	10330	1054	10400	1054
10440	1052	10460	1050	10520	1048.2	10550	1049	10600	1049.2
10630	1049.7	10650	1050	10750	1051.5	10910	1054	11120	1056
11340	1058	11570	1060						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
10000	.045	10400	.02	10910	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10400	10910	500	580	620	.1	.3

CROSS SECTION OUTPUT Profile #1/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	1052.40	Element			
Vel Head (ft)	0.72	Wt. n-Val.		0.020	
W.S. Elev (ft)	1051.68	Reach Len. (ft)	500.00	580.00	620.00
Crit W.S. (ft)		Flow Area (sq ft)		586.47	
E.G. Slope (ft/ft)	0.003728	Area (sq ft)		586.47	
Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	318.00	Top Width (ft)		318.00	
Vel Total (ft/s)	6.82	Avg. Vel. (ft/s)		6.82	
Max Chl Dpth (ft)	3.48	Hydr. Depth (ft)		1.84	
Conv. Total (cfs)	65508.9	Conv. (cfs)		65508.9	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		318.14	
Min Ch El (ft)	1048.20	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		2.93	
Frctn Loss (ft)	2.87	Cum Volume (acre-ft)	30.79	224.56	120.83
C & E Loss (ft)	0.04	Cum SA (acres)	8.76	243.62	111.77

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.

CROSS SECTION OUTPUT Profile #2/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	1053.79	Element			
Vel Head (ft)	1.11	Wt. n-Val.		0.020	
W.S. Elev (ft)	1052.68	Reach Len. (ft)	500.00	580.00	620.00
Crit W.S. (ft)	1052.62	Flow Area (sq ft)		945.12	
E.G. Slope (ft/ft)	0.004114	Area (sq ft)		945.12	
Q Total (cfs)	8000.00	Flow (cfs)		8000.00	
Top Width (ft)	399.04	Top Width (ft)		399.04	
Vel Total (ft/s)	8.46	Avg. Vel. (ft/s)		8.46	
Max Chl Dpth (ft)	4.48	Hydr. Depth (ft)		2.37	
Conv. Total (cfs)	124727.9	Conv. (cfs)		124727.9	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		399.22	
Min Ch El (ft)	1048.20	Shear (lb/sq ft)		0.61	
Alpha	1.00	Stream Power (lb/ft s)		5.15	
Frctn Loss (ft)	3.21	Cum Volume (acre-ft)	37.10	423.43	187.75
C & E Loss (ft)	0.06	Cum SA (acres)	8.90	319.55	139.76

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.

CROSS SECTION OUTPUT Profile #Full

			Left OB	Channel	Right OB
E.G. Elev (ft)	1054.82	Element			
Vel Head (ft)	1.39	Wt. n-Val.		0.020	

W.S. Elev (ft)	1053.43	Reach Len. (ft)	500.00	580.00	620.00
Crit W.S. (ft)	1053.43	Flow Area (sq ft)		1266.45	
E.G. Slope (ft/ft)	0.004239	Area (sq ft)		1266.45	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	461.76	Top Width (ft)		461.76	
Vel Total (ft/s)	9.48	Avg. Vel. (ft/s)		9.48	
Max Chl Dpth (ft)	5.23	Hydr. Depth (ft)		2.74	
Conv. Total (cfs)	184305.8	Conv. (cfs)		184305.8	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		461.96	
Min Ch El (ft)	1048.20	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		6.87	
Frctn Loss (ft)	3.23	Cum Volume (acre-ft)	42.71	586.91	242.69
C & E Loss (ft)	0.08	Cum SA (acres)	9.07	355.27	159.87

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
10434.00	10468.00	123.17	28.40	24.84	3.08	1.15	4.34
10468.00	10502.00	590.30	82.47	34.02	14.76	2.43	7.16
10502.00	10536.00	952.58	109.90	34.01	23.81	3.23	8.67
10536.00	10570.00	718.54	92.79	34.01	17.96	2.73	7.74
10570.00	10604.00	631.20	85.84	34.00	15.78	2.52	7.35
10604.00	10638.00	474.41	72.33	34.00	11.86	2.13	6.56
10638.00	10672.00	295.32	54.42	34.00	7.38	1.60	5.43
10672.00	10706.00	155.82	37.08	34.00	3.90	1.09	4.20
10706.00	10740.00	54.50	19.74	34.00	1.36	0.58	2.76
10740.00	10774.00	4.16	3.49	21.24	0.10	0.16	1.19

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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10400.00	10434.00	1.95	1.44	7.59	0.02	0.19	1.35
10434.00	10468.00	350.79	59.15	34.11	4.38	1.74	5.93
10468.00	10502.00	1089.06	116.59	34.02	13.61	3.43	9.34
10502.00	10536.00	1548.79	144.02	34.01	19.36	4.24	10.75
10536.00	10570.00	1254.57	126.90	34.01	15.68	3.73	9.89
10570.00	10604.00	1142.32	119.96	34.00	14.28	3.53	9.52
10604.00	10638.00	935.94	106.44	34.00	11.70	3.13	8.79
10638.00	10672.00	688.57	88.54	34.00	8.61	2.60	7.78
10672.00	10706.00	478.84	71.20	34.00	5.99	2.09	6.73
10706.00	10740.00	300.72	53.86	34.00	3.76	1.58	5.58
10740.00	10774.00	156.08	36.34	34.00	1.95	1.07	4.30
10774.00	10808.00	49.78	18.31	34.00	0.62	0.54	2.72
10808.00	10842.00	2.59	2.38	17.46	0.03	0.14	1.09

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)

LB 10400.00	10434.00	35.67	12.67	22.54	0.30	0.56	2.82
10434.00	10468.00	639.86	84.53	34.11	5.33	2.49	7.57
10468.00	10502.00	1521.25	141.97	34.02	12.68	4.18	10.72
10502.00	10536.00	2042.05	169.40	34.01	17.02	4.98	12.05
10536.00	10570.00	1710.22	152.29	34.01	14.25	4.48	11.23
10570.00	10604.00	1582.33	145.34	34.00	13.19	4.27	10.89
10604.00	10638.00	1344.72	131.83	34.00	11.21	3.88	10.20
10638.00	10672.00	1054.34	113.92	34.00	8.79	3.35	9.25
10672.00	10706.00	800.69	96.58	34.00	6.67	2.84	8.29
10706.00	10740.00	575.75	79.24	34.00	4.80	2.33	7.27
10740.00	10774.00	379.63	61.72	34.00	3.16	1.82	6.15
10774.00	10808.00	213.44	43.69	34.00	1.78	1.29	4.89
10808.00	10842.00	87.73	25.63	34.00	0.73	0.75	3.42
10842.00	10876.00	12.31	7.63	31.25	0.10	0.24	1.61

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
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: West Spillway
REACH: A3 RS: 20.04

INPUT
Description: 1/3 Q=4000 cfs
2/3 Q=8000 cfs
Full Q=12,000 cfs
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9920	1045	9960	1044.8	10000	1045	10060	1044	10070	1043.8
10080	1044	10200	1045.8	10300	1046	10360	1048	10380	1050
10390	1050.5	10400	1050	10470	1047	10580	1046.4	10610	1047
10625	1048	10630	1050	10650	1050.2	10660	1050	10670	1048
10690	1047.7	10710	1048	10750	1048.2	10790	1048.6	10830	1048.5
10910	1048	10960	1047.3	10990	1048	11030	1050	11050	1052

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9920	.045	10400	.02	10630	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10390	11050	1200	1150	1150	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
9920	10390	

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1049.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.		0.024	
W.S. Elev (ft)	1048.89	Reach Len. (ft)	1200.00	1150.00	1150.00
Crit W.S. (ft)	1048.89	Flow Area (sq ft)		637.42	
E.G. Slope (ft/ft)	0.006735	Area (sq ft)	1578.05	637.42	
Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	992.54	Top Width (ft)	448.91	543.63	
Vel Total (ft/s)	6.28	Avg. Vel. (ft/s)		6.28	
Max Chl Dpth (ft)	5.09	Hydr. Depth (ft)		1.17	
Conv. Total (cfs)	48742.1	Conv. (cfs)		48742.1	
Length Wtd. (ft)	1150.00	Wetted Per. (ft)		544.02	
Min Ch El (ft)	1046.40	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)		3.09	
Frctn Loss (ft)	7.01	Cum Volume (acre-ft)	21.74	216.41	120.83
C & E Loss (ft)	0.13	Cum SA (acres)	6.18	237.89	111.77

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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 OUTPUT Profile #2/3

E.G. Elev (ft)	1050.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.92	Wt. n-Val.		0.026	
W.S. Elev (ft)	1049.60	Reach Len. (ft)	1200.00	1150.00	1150.00
Crit W.S. (ft)	1049.60	Flow Area (sq ft)		1038.46	
E.G. Slope (ft/ft)	0.007827	Area (sq ft)	1901.06	1038.46	
Q Total (cfs)	8000.00	Flow (cfs)		8000.00	
Top Width (ft)	1035.97	Top Width (ft)	456.05	579.92	
Vel Total (ft/s)	7.70	Avg. Vel. (ft/s)		7.70	
Max Chl Dpth (ft)	5.80	Hydr. Depth (ft)		1.79	
Conv. Total (cfs)	90427.5	Conv. (cfs)		90427.5	
Length Wtd. (ft)	1150.00	Wetted Per. (ft)		580.55	
Min Ch El (ft)	1046.40	Shear (lb/sq ft)		0.87	
Alpha	1.00	Stream Power (lb/ft s)		6.73	
Frctn Loss (ft)	8.00	Cum Volume (acre-ft)	26.19	410.23	187.75
C & E Loss (ft)	0.21	Cum SA (acres)	6.28	313.03	139.76

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1051.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.12	Wt. n-Val.		0.027	
W.S. Elev (ft)	1050.23	Reach Len. (ft)	1200.00	1150.00	1150.00
Crit W.S. (ft)	1050.23	Flow Area (sq ft)		1414.57	
E.G. Slope (ft/ft)	0.007657	Area (sq ft)	2188.60	1414.57	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	1101.53	Top Width (ft)	464.61	636.92	
Vel Total (ft/s)	8.48	Avg. Vel. (ft/s)		8.48	
Max Chl Dpth (ft)	6.43	Hydr. Depth (ft)		2.22	
Conv. Total (cfs)	137137.3	Conv. (cfs)		137137.3	
Length Wtd. (ft)	1150.00	Wetted Per. (ft)		637.70	
Min Ch El (ft)	1046.40	Shear (lb/sq ft)		1.06	
Alpha	1.00	Stream Power (lb/ft s)		9.00	
Frctn Loss (ft)	7.92	Cum Volume (acre-ft)	30.15	569.06	242.69
C & E Loss (ft)	0.27	Cum SA (acres)	6.40	347.95	159.87

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10390.00	10434.00	2.54	1.42	8.13	0.06	0.17	1.80
10434.00	10478.00	374.33	55.61	44.03	9.36	1.26	6.73
10478.00	10522.00	841.74	90.41	44.00	21.04	2.05	9.31
10522.00	10566.00	1011.91	100.97	44.00	25.30	2.29	10.02
10566.00	10610.00	996.96	100.07	44.01	24.92	2.27	9.96
10610.00	10654.00	146.44	21.86	17.43	3.66	1.27	6.70
10654.00	10698.00	80.41	31.86	32.55	2.01	0.98	2.52
10698.00	10742.00	87.19	37.73	44.00	2.18	0.86	2.31
10742.00	10786.00	41.28	24.09	44.00	1.03	0.55	1.71
10786.00	10830.00	18.51	14.89	44.00	0.46	0.34	1.24
10830.00	10874.00	38.93	23.26	44.00	0.97	0.53	1.67
10874.00	10918.00	79.17	35.61	44.00	1.98	0.81	2.22
10918.00	10962.00	176.53	57.61	44.00	4.41	1.31	3.06
10962.00	11006.00	104.02	41.96	44.03	2.60	0.95	2.48
11006.00	RB 11050.00	0.03	0.08	1.82	0.00	0.05	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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10390.00	10434.00	53.52	13.16	24.81	0.67	0.53	4.07
10434.00	10478.00	850.33	87.02	44.03	10.63	1.98	9.77
10478.00	10522.00	1490.26	121.82	44.00	18.63	2.77	12.23
10522.00	10566.00	1711.72	132.38	44.00	21.40	3.01	12.93
10566.00	10610.00	1692.39	131.48	44.01	21.15	2.99	12.87
10610.00	10654.00	319.19	34.79	19.36	3.99	1.83	9.17
10654.00	10698.00	208.46	56.30	36.19	2.61	1.56	3.70
10698.00	10742.00	257.70	69.14	44.00	3.22	1.57	3.73
10742.00	10786.00	178.68	55.50	44.00	2.23	1.26	3.22
10786.00	10830.00	132.09	46.30	44.00	1.65	1.05	2.85
10830.00	10874.00	174.24	54.67	44.00	2.18	1.24	3.19
10874.00	10918.00	244.65	67.02	44.00	3.06	1.52	3.65
10918.00	10962.00	392.68	89.02	44.00	4.91	2.02	4.41
10962.00	11006.00	284.36	73.37	44.03	3.55	1.67	3.88
11006.00	RB 11050.00	9.73	6.48	16.12	0.12	0.40	1.50

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10390.00	10434.00	194.46	33.14	38.65	1.62	0.86	5.87
10434.00	10478.00	1326.86	114.55	44.03	11.06	2.60	11.58
10478.00	10522.00	2065.51	149.34	44.00	17.21	3.39	13.83
10522.00	10566.00	2314.61	159.90	44.00	19.29	3.63	14.48
10566.00	10610.00	2292.93	159.01	44.01	19.11	3.61	14.42
10610.00	10654.00	505.69	50.01	44.42	4.21	1.14	10.11
10654.00	10698.00	328.14	80.71	44.20	2.73	1.83	4.07
10698.00	10742.00	444.63	96.67	44.00	3.71	2.20	4.60
10742.00	10786.00	345.07	83.03	44.00	2.88	1.89	4.16
10786.00	10830.00	283.72	73.83	44.00	2.36	1.68	3.84
10830.00	10874.00	339.33	82.20	44.00	2.83	1.87	4.13
10874.00	10918.00	428.47	94.54	44.00	3.57	2.15	4.53
10918.00	10962.00	607.23	116.55	44.00	5.06	2.65	5.21
10962.00	11006.00	477.29	100.89	44.03	3.98	2.29	4.73
11006.00	RB 11050.00	46.05	20.20	26.35	0.38	0.77	2.28

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

```
CROSS SECTION          RIVER: West Spillway
REACH: A3                 RS: 19.84

INPUT
Description: Flow decreases due to 1000 cfs contained within channel west of
             Tuthill Road.
1/3 Q=3000 cfs
2/3 Q=7000 cfs
Full Q=11,000 cfs
Station Elevation Data     num=      73
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
    8790     1041    8810     1040    8840   1039.5    8870     1040    8950   1040.1
 9031.92     1040 9154.47     1040 9343.33   1039.5 9492.37     1039  9567.8   1038.5
  9636.2     1038 9657.55     1038 9661.34     1038 9792.72   1037.5    9940  1037.37
   10000  1037.0410020.48     103710067.24   1036.510078.84   1036.5   10140   1036.9
 10155.1     103710160.59   1037.510166.09     103810166.19     103810179.88   1038.5
10193.36     103910206.84   1039.5 10218.1     104010220.32     104010230.71     1040
10236.59   1039.510242.46     103910248.34   1038.510254.31     103810263.83     1038
 10287.5     103810297.37   1038.510307.24     103910317.17   1039.5 10327.1     1040
10346.11     104010485.18   1040.510560.46     104110617.79     104110697.96     1041
10735.37   1041.510771.87     104210773.79     1042 10851.1     104210853.58     1042
11007.45     104211008.85     104211105.31   1042.511110.67   1042.511117.75     1042
11122.71     104211141.01     104211145.15     104211180.08   1042.511215.01     1043
11315.24   1043.511340.66     104411345.91     104411420.74   1044.511581.66   1044.5
11620.79     104411640.15     104411640.69     104411668.31   1044.511722.97   1044.5
11766.55   1044.511781.65   1044.511790.42   1044.5

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    8790      .1   10000    .01610067.24    .045

Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.   Expan.
          879010230.71               870     870     870              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    8790    8950  1040.110230.7111790.42    1046
```

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1039.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.042	
W.S. Elev (ft)	1038.92	Reach Len. (ft)	870.00	870.00	870.00
Crit W.S. (ft)	1038.32	Flow Area (sq ft)		917.50	
E.G. Slope (ft/ft)	0.005380	Area (sq ft)		917.50	43.81
Q Total (cfs)	3000.00	Flow (cfs)		3000.00	
Top Width (ft)	748.63	Top Width (ft)		686.43	62.20
Vel Total (ft/s)	3.27	Avg. Vel. (ft/s)		3.27	
Max Chl Dpth (ft)	2.42	Hydr. Depth (ft)		1.34	
Conv. Total (cfs)	40900.7	Conv. (cfs)		40900.7	
Length Wtd. (ft)	870.00	Wetted Per. (ft)		686.50	
Min Ch El (ft)	1036.50	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)		1.47	
Frctn Loss (ft)	6.18	Cum Volume (acre-ft)		195.88	120.25
C & E Loss (ft)	0.02	Cum SA (acres)		221.65	110.95

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1040.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.		0.045	
W.S. Elev (ft)	1040.06	Reach Len. (ft)	870.00	870.00	870.00
Crit W.S. (ft)	1039.07	Flow Area (sq ft)		1920.40	
E.G. Slope (ft/ft)	0.006125	Area (sq ft)		1940.45	136.99
Q Total (cfs)	7000.00	Flow (cfs)		7000.00	
Top Width (ft)	1488.90	Top Width (ft)		1356.86	132.04
Vel Total (ft/s)	3.65	Avg. Vel. (ft/s)		3.65	
Max Chl Dpth (ft)	3.56	Hydr. Depth (ft)		1.54	
Conv. Total (cfs)	89442.0	Conv. (cfs)		89442.0	
Length Wtd. (ft)	870.00	Wetted Per. (ft)		1247.90	
Min Ch El (ft)	1036.50	Shear (lb/sq ft)		0.59	
Alpha	1.00	Stream Power (lb/ft s)		2.14	
Frctn Loss (ft)	6.40	Cum Volume (acre-ft)		370.90	185.94
C & E Loss (ft)	0.02	Cum SA (acres)		287.47	138.01

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1040.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.051	
W.S. Elev (ft)	1040.72	Reach Len. (ft)	870.00	870.00	870.00
Crit W.S. (ft)	1039.67	Flow Area (sq ft)		2884.81	
E.G. Slope (ft/ft)	0.006179	Area (sq ft)		2884.81	282.20
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	1723.01	Top Width (ft)		1435.15	287.86
Vel Total (ft/s)	3.81	Avg. Vel. (ft/s)		3.81	
Max Chl Dpth (ft)	4.22	Hydr. Depth (ft)		2.01	
Conv. Total (cfs)	139933.0	Conv. (cfs)		139933.0	
Length Wtd. (ft)	870.00	Wetted Per. (ft)		1435.27	
Min Ch El (ft)	1036.50	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)		2.96	
Frctn Loss (ft)	6.35	Cum Volume (acre-ft)		512.31	238.97
C & E Loss (ft)	0.01	Cum SA (acres)		320.60	156.07

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: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.

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

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9462.33	9558.38	3.17	9.54	53.65	0.11	0.18	0.33
9558.38	9654.43	54.12	66.07	96.05	1.80	0.69	0.82
9654.43	9750.47	113.98	103.30	96.05	3.80	1.08	1.10
9750.47	9846.52	176.05	134.08	96.05	5.87	1.40	1.31
9846.52	9942.57	200.24	144.85	96.05	6.67	1.51	1.38
9942.57	10038.62	923.18	174.21	96.05	30.77	1.81	5.30
10038.62	10134.66	1350.72	217.68	96.05	45.02	2.27	6.21
10134.66	RB 10230.71	178.54	67.76	56.55	5.95	1.20	2.64

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
8982.09	9078.14	0.55	4.23	95.23	0.01	0.04	0.13
9078.14	9174.19	1.06	6.26	96.05	0.02	0.07	0.17
9174.19	9270.24	9.25	22.97	96.05	0.13	0.24	0.40
9270.24	9366.28	31.11	47.58	96.05	0.44	0.50	0.65
9366.28	9462.33	68.85	76.64	96.05	0.98	0.80	0.90
9462.33	9558.38	134.86	114.72	96.05	1.93	1.19	1.18
9558.38	9654.43	274.54	175.73	96.05	3.92	1.83	1.56
9654.43	9750.47	378.16	212.96	96.05	5.40	2.22	1.78
9750.47	9846.52	473.59	243.74	96.05	6.77	2.54	1.94
9846.52	9942.57	508.98	254.51	96.05	7.27	2.65	2.00
9942.57	10038.62	2002.45	283.87	96.05	28.61	2.96	7.05
10038.62	10134.66	2649.11	327.34	96.05	37.84	3.41	8.09
10134.66	RB 10230.71	467.49	149.84	96.13	6.68	1.56	3.12

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8790.00	8886.05	71.77	74.94	90.51	0.65	0.83	0.96
8886.05	8982.09	51.54	62.91	96.05	0.47	0.65	0.82
8982.09	9078.14	58.40	67.81	96.05	0.53	0.71	0.86
9078.14	9174.19	61.34	69.84	96.05	0.56	0.73	0.88
9174.19	9270.24	87.71	86.56	96.05	0.80	0.90	1.01
9270.24	9366.28	133.10	111.16	96.05	1.21	1.16	1.20
9366.28	9462.33	196.00	140.22	96.05	1.78	1.46	1.40
9462.33	9558.38	292.52	178.30	96.05	2.66	1.86	1.64
9558.38	9654.43	477.74	239.32	96.05	4.34	2.49	2.00
9654.43	9750.47	607.91	276.54	96.05	5.53	2.88	2.20
9750.47	9846.52	724.84	307.33	96.05	6.59	3.20	2.36
9846.52	9942.57	767.66	318.10	96.05	6.98	3.31	2.41
9942.57	10038.62	2888.87	347.45	96.05	26.26	3.62	8.31
10038.62	10134.66	3703.90	390.92	96.05	33.67	4.07	9.47
10134.66	RB 10230.71	876.69	213.42	96.13	7.97	2.22	4.11

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: The parabolic search method failed to converge on critical depth. The program will try the

```
        cross section slice/secant method to find 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: West Spillway
REACH: A3                 RS: 19.68

INPUT
Description: 1/3 Q=3000 cfs
2/3 Q=7000 cfs
Full Q=11,000 cfs
Station Elevation Data    num=      63
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    7930  1036.5 8003.47  1036.5 8131.84    1036 8134.04    1036 8235.56  1035.5
 8365.92    1035 8556.26  1034.5 8852.66    1034 8853.02    1034 8942.87  1033.5
  9034.3    1033 9092.75    1033 9098.12    1033 9199.34  1032.5 9255.69    1032
 9258.21    1032 9352.24  1031.5 9497.86  1031.5 9498.53    1032 9504.07    1032
 9561.24  1031.5 9614.69    1031 9675.88    1031 9892.54  1031.5    9915  1031.5
 9957.38  1031.5   10000  1031.510052.04  1031.510073.96  1031.510075.36  1031.5
10116.44    103210116.63    1032   10130  1032.510149.48    1033 10165.8  1033.5
10182.12    103410194.38    103410196.14    103410197.72  1033.510200.27    1033
10202.81  1032.510205.35    103210207.94    103210246.51    103210247.83    1032
10289.29  1032.510330.89    103310372.51  1033.5 10413.2    103410433.85    1034
10511.86  1034.510688.91  1034.510693.04  1034.510748.12    103510844.75  1035.5
10927.31  1035.510985.54    103510987.38    103511016.74  1035.511042.81    1036
11043.01    103611110.42  1036.511158.28    1037

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    7930      .1   10000    .01610073.96    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       8556.2610196.14               490     570     480              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
10196.1411158.28    1037

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)            1032.89   Element                   Left OB    Channel   Right OB
  Vel Head (ft)                0.10   Wt. n-Val.                            0.068
  W.S. Elev (ft)            1032.79   Reach Len. (ft)            490.00     570.00     480.00
  Crit W.S. (ft)            1032.16   Flow Area (sq ft)                    1203.11
  E.G. Slope (ft/ft)       0.010031   Area (sq ft)                         1203.11      60.91
  Q Total (cfs)             3000.00   Flow (cfs)                           3000.00
  Top Width (ft)            1112.40   Top Width (ft)                       1000.41     111.99
  Vel Total (ft/s)             2.49   Avg. Vel. (ft/s)                        2.49
  Max Chl Dpth (ft)            1.79   Hydr. Depth (ft)                        1.20
  Conv. Total (cfs)         29954.3   Conv. (cfs)                         29954.3
  Length Wtd. (ft)           570.00   Wetted Per. (ft)                    1000.60
  Min Ch El (ft)            1031.00   Shear (lb/sq ft)                        0.75
  Alpha                        1.00   Stream Power (lb/ft s)                  1.88
  Frctn Loss (ft)              3.80   Cum Volume (acre-ft)                 174.71     119.21
  C & E Loss (ft)              0.02   Cum SA (acres)                       204.81     109.21


Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT    Profile #2/3

  E.G. Elev (ft)            1033.85   Element                   Left OB    Channel   Right OB
  Vel Head (ft)                0.15   Wt. n-Val.                            0.067
  W.S. Elev (ft)            1033.70   Reach Len. (ft)            490.00     570.00     480.00
  Crit W.S. (ft)            1032.73   Flow Area (sq ft)                    2253.40
```

E.G. Slope (ft/ft)	0.009016	Area (sq ft)	2253.40	199.58
Q Total (cfs)	7000.00	Flow (cfs)	7000.00	
Top Width (ft)	1457.19	Top Width (ft)	1265.46	191.72
Vel Total (ft/s)	3.11	Avg. Vel. (ft/s)	3.11	
Max Chl Dpth (ft)	2.70	Hydr. Depth (ft)	1.78	
Conv. Total (cfs)	73722.0	Conv. (cfs)	73722.0	
Length Wtd. (ft)	570.00	Wetted Per. (ft)	1265.67	
Min Ch El (ft)	1031.00	Shear (lb/sq ft)	1.00	
Alpha	1.00	Stream Power (lb/ft s)	3.11	
Frctn Loss (ft)	3.97	Cum Volume (acre-ft)	329.02	182.58
C & E Loss (ft)	0.03	Cum SA (acres)	261.28	134.78

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

			Left OB	Channel	Right OB
E.G. Elev (ft)	1034.59	Element			
Vel Head (ft)	0.18	Wt. n-Val.		0.066	
W.S. Elev (ft)	1034.41	Reach Len. (ft)	490.00	570.00	480.00
Crit W.S. (ft)	1033.18	Flow Area (sq ft)		3241.13	
E.G. Slope (ft/ft)	0.008738	Area (sq ft)		3241.13	371.08
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	1887.41	Top Width (ft)		1585.90	301.51
Vel Total (ft/s)	3.39	Avg. Vel. (ft/s)		3.39	
Max Chl Dpth (ft)	3.41	Hydr. Depth (ft)		2.04	
Conv. Total (cfs)	117673.3	Conv. (cfs)		117673.3	
Length Wtd. (ft)	570.00	Wetted Per. (ft)		1586.11	
Min Ch El (ft)	1031.00	Shear (lb/sq ft)		1.11	
Alpha	1.00	Stream Power (lb/ft s)		3.78	
Frctn Loss (ft)	4.13	Cum Volume (acre-ft)		451.13	232.45
C & E Loss (ft)	0.03	Cum SA (acres)		290.43	150.19

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9102.89	9212.21	5.90	12.91	71.37	0.20	0.18	0.46
9212.21	9321.54	109.91	88.53	109.33	3.66	0.81	1.24
9321.54	9430.86	231.47	138.41	109.33	7.72	1.27	1.67
9430.86	9540.19	196.74	125.62	109.49	6.56	1.15	1.57
9540.19	9649.51	325.26	169.75	109.33	10.84	1.55	1.92
9649.51	9758.84	384.37	187.64	109.33	12.81	1.72	2.05
9758.84	9868.16	297.37	160.86	109.33	9.91	1.47	1.85
9868.16	9977.49	240.43	141.60	109.33	8.01	1.30	1.70
9977.49	10086.81	1114.89	140.12	109.33	37.16	1.28	7.96
10086.81	RB 10196.14	93.67	37.70	54.46	3.12	0.69	2.48

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
8884.24	8993.56	10.64	20.79	86.69	0.15	0.24	0.51
8993.56	9102.89	72.41	72.08	109.33	1.03	0.66	1.00
9102.89	9212.21	144.23	108.98	109.33	2.06	1.00	1.32
9212.21	9321.54	358.38	188.17	109.33	5.12	1.72	1.90

9321.54	9430.86	530.33	238.04	109.33	7.58	2.18	2.23
9430.86	9540.19	483.22	225.26	109.49	6.90	2.06	2.15
9540.19	9649.51	651.73	269.39	109.33	9.31	2.46	2.42
9649.51	9758.84	725.45	287.27	109.33	10.36	2.63	2.53
9758.84	9868.16	616.29	260.50	109.33	8.80	2.38	2.37
9868.16	9977.49	542.24	241.24	109.33	7.75	2.21	2.25
9977.49	10086.81	2527.39	239.75	109.33	36.11	2.19	10.54
10086.81	RB 10196.14	337.68	101.94	85.55	4.82	1.19	3.31

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8556.26	8665.58	0.42	2.58	55.34	0.00	0.05	0.16
8665.58	8774.91	8.27	20.29	109.33	0.08	0.19	0.41
8774.91	8884.24	28.17	42.32	109.33	0.26	0.39	0.67
8884.24	8993.56	111.90	96.83	109.33	1.02	0.89	1.16
8993.56	9102.89	230.92	149.55	109.33	2.10	1.37	1.54
9102.89	9212.21	333.50	186.45	109.33	3.03	1.71	1.79
9212.21	9321.54	601.57	265.64	109.33	5.47	2.43	2.26
9321.54	9430.86	801.40	315.51	109.33	7.29	2.89	2.54
9430.86	9540.19	747.25	302.73	109.49	6.79	2.77	2.47
9540.19	9649.51	938.41	346.86	109.33	8.53	3.17	2.71
9649.51	9758.84	1020.46	364.74	109.33	9.28	3.34	2.80
9758.84	9868.16	898.68	337.97	109.33	8.17	3.09	2.66
9868.16	9977.49	814.96	318.71	109.33	7.41	2.92	2.56
9977.49	10086.81	3805.34	317.22	109.33	34.59	2.90	12.00
10086.81	RB 10196.14	658.74	173.75	109.36	5.99	1.59	3.79

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.

CROSS SECTION RIVER: West Spillway
REACH: A3 RS: 19.57

INPUT
Description: 1/3 Q=3000 cfs
2/3 Q=7000 cfs
Full Q=11,000 cfs
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7235	1034	7242.01	1034	7346.11	1033.5	7458.14	1033	7540.92	1032.5
7686.16	1032	7686.76	1032	7837.1	1031.5	8017.52	1031	8148.59	1030.5
8207.12	1030	8212.25	1030	8370.34	1029.5	8396.37	1029	8422.4	1028.5
8448.34	1028	8448.43	1028	8672.26	1027.5	9141.26	1027.5	9195.07	1027.5
9221.67	1027.5	9342.23	1027.5	9647.59	1028	9656.13	1028	9870.84	1028
9890	1028	9903.75	1028	9971.98	1028	9973.2	1028	9982.66	1028
10000	1028	10047.96	1028	10049.24	1028	10067.55	1028.5	10086.68	1029
10101.4	1030	10105.81	1029.5	10123.97	1030	10127.94	1029.5	10132.17	1029
10135	1028.5	10136.4	1028.5	10140.63	1028	10140.77	1028	10143.57	1027.5
10146.51	1027	10156.65	1027	10160.96	1027.5	10165.28	1028	10166.56	1028
10184.33	1028.5	10203.51	1029	10237.65	1029.5	10282.87	1030	10283.53	1030
10536.89	1030.5	10736.17	1031	10794.79	1031.5	10861.15	1032	10861.67	1032
10892.16	1032.5	10940.83	1033	10997.98	1033.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
7235	.1	10000	.01	10067.55	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8148.59	10123.97	570	690	690	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev

10123.9710997.98 1034

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1029.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.088	
W.S. Elev (ft)	1029.04	Reach Len. (ft)	570.00	690.00	690.00
Crit W.S. (ft)	1028.18	Flow Area (sq ft)		2178.53	
E.G. Slope (ft/ft)	0.004737	Area (sq ft)		2178.53	68.83
Q Total (cfs)	3000.00	Flow (cfs)		3000.00	
Top Width (ft)	1767.24	Top Width (ft)		1692.91	74.33
Vel Total (ft/s)	1.38	Avg. Vel. (ft/s)		1.38	
Max Chl Dpth (ft)	2.04	Hydr. Depth (ft)		1.29	
Conv. Total (cfs)	43590.5	Conv. (cfs)		43590.5	
Length Wtd. (ft)	690.00	Wetted Per. (ft)		1692.94	
Min Ch El (ft)	1027.50	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)		0.52	
Frctn Loss (ft)	5.24	Cum Volume (acre-ft)		152.58	118.49
C & E Loss (ft)	0.00	Cum SA (acres)		187.18	108.19

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1029.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.086	
W.S. Elev (ft)	1029.79	Reach Len. (ft)	570.00	690.00	690.00
Crit W.S. (ft)	1028.55	Flow Area (sq ft)		3485.95	
E.G. Slope (ft/ft)	0.005607	Area (sq ft)		3485.95	147.51
Q Total (cfs)	7000.00	Flow (cfs)		7000.00	
Top Width (ft)	1972.05	Top Width (ft)		1833.59	138.46
Vel Total (ft/s)	2.01	Avg. Vel. (ft/s)		2.01	
Max Chl Dpth (ft)	2.79	Hydr. Depth (ft)		1.90	
Conv. Total (cfs)	93479.6	Conv. (cfs)		93479.6	
Length Wtd. (ft)	690.00	Wetted Per. (ft)		1833.67	
Min Ch El (ft)	1027.50	Shear (lb/sq ft)		0.67	
Alpha	1.00	Stream Power (lb/ft s)		1.34	
Frctn Loss (ft)	5.36	Cum Volume (acre-ft)		291.47	180.67
C & E Loss (ft)	0.00	Cum SA (acres)		241.00	132.96

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1030.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.085	
W.S. Elev (ft)	1030.35	Reach Len. (ft)	570.00	690.00	690.00
Crit W.S. (ft)	1028.83	Flow Area (sq ft)		4543.48	
E.G. Slope (ft/ft)	0.006100	Area (sq ft)		4543.48	263.64
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	2291.67	Top Width (ft)		1957.25	334.43
Vel Total (ft/s)	2.42	Avg. Vel. (ft/s)		2.42	
Max Chl Dpth (ft)	3.35	Hydr. Depth (ft)		2.32	
Conv. Total (cfs)	140839.2	Conv. (cfs)		140839.2	
Length Wtd. (ft)	690.00	Wetted Per. (ft)		1957.35	
Min Ch El (ft)	1027.50	Shear (lb/sq ft)		0.88	
Alpha	1.00	Stream Power (lb/ft s)		2.14	
Frctn Loss (ft)	5.43	Cum Volume (acre-ft)		400.20	228.95
C & E Loss (ft)	0.00	Cum SA (acres)		267.25	146.68

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
8280.28	8411.97	0.92	2.99	17.63	0.03	0.17	0.31
8411.97	8543.67	136.50	134.21	131.70	4.55	1.02	1.02
8543.67	8675.36	231.38	184.20	131.69	7.71	1.40	1.26
8675.36	8807.05	271.33	202.67	131.69	9.04	1.54	1.34
8807.05	8938.74	271.33	202.67	131.69	9.04	1.54	1.34
8938.74	9070.43	271.32	202.67	131.69	9.04	1.54	1.34
9070.43	9202.13	271.33	202.67	131.69	9.04	1.54	1.34
9202.13	9333.82	271.32	202.67	131.69	9.04	1.54	1.34
9333.82	9465.51	244.13	190.22	131.69	8.14	1.44	1.28
9465.51	9597.20	186.57	161.88	131.69	6.22	1.23	1.15
9597.20	9728.89	144.55	138.90	131.69	4.82	1.05	1.04
9728.89	9860.59	140.96	136.82	131.69	4.70	1.04	1.03
9860.59	9992.28	140.96	136.82	131.69	4.70	1.04	1.03
9992.28	RB 10123.97	417.40	79.16	94.99	13.91	0.83	5.27

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8148.59	8280.28	0.00	0.01	2.34	0.00	0.00	0.03
8280.28	8411.97	21.31	42.31	131.70	0.30	0.32	0.50
8411.97	8543.67	367.09	233.41	131.70	5.24	1.77	1.57
8543.67	8675.36	507.28	283.40	131.69	7.25	2.15	1.79
8675.36	8807.05	563.57	301.87	131.69	8.05	2.29	1.87
8807.05	8938.74	563.57	301.87	131.69	8.05	2.29	1.87
8938.74	9070.43	563.57	301.87	131.69	8.05	2.29	1.87
9070.43	9202.13	563.57	301.87	131.69	8.05	2.29	1.87
9202.13	9333.82	563.57	301.87	131.69	8.05	2.29	1.87
9333.82	9465.51	525.38	289.42	131.69	7.51	2.20	1.82
9465.51	9597.20	442.47	261.09	131.69	6.32	1.98	1.69
9597.20	9728.89	379.48	238.10	131.69	5.42	1.81	1.59
9728.89	9860.59	373.97	236.02	131.69	5.34	1.79	1.58
9860.59	9992.28	373.97	236.02	131.69	5.34	1.79	1.58
9992.28	RB 10123.97	1191.20	156.81	119.32	17.02	1.31	7.60

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8148.59	8280.28	21.72	39.54	113.56	0.20	0.35	0.55
8280.28	8411.97	116.81	115.12	131.70	1.06	0.87	1.01
8411.97	8543.67	596.57	306.22	131.70	5.42	2.33	1.95
8543.67	8675.36	767.58	356.21	131.69	6.98	2.70	2.15
8675.36	8807.05	835.05	374.68	131.69	7.59	2.85	2.23
8807.05	8938.74	835.05	374.68	131.69	7.59	2.85	2.23
8938.74	9070.43	835.04	374.67	131.69	7.59	2.85	2.23

9070.43	9202.13	835.05	374.68	131.69	7.59	2.85	2.23
9202.13	9333.82	835.04	374.67	131.69	7.59	2.85	2.23
9333.82	9465.51	789.34	362.23	131.69	7.18	2.75	2.18
9465.51	9597.20	689.12	333.89	131.69	6.26	2.54	2.06
9597.20	9728.89	611.89	310.91	131.69	5.56	2.36	1.97
9728.89	9860.59	605.09	308.83	131.69	5.50	2.35	1.96
9860.59	9992.28	605.08	308.83	131.69	5.50	2.35	1.96
9992.28	RB 10123.97	2021.57	228.33	131.77	18.38	1.73	8.85

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.

CROSS SECTION RIVER: West Spillway
REACH: A3 RS: 19.44

INPUT
Description: 1/3 Q=3000 cfs
2/3 Q=7000 cfs
Full Q=11,000 cfs
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6540	1029.8	6585	1029.6	6655	1029.5	6732	1029	7000	1028
7245	1026	7475	1025.5	7890	1024	8223.69	1023	8957.17	1023
9151.16	1023	9209.42	1023	9280.28	1023.5	9373.66	1023.5	9880.43	1023.03
9910.73	1023	9935.52	1022.5	9960.02	1022	9961.4	1022	9967.8	1022
10000	102210014.14		102210022.18		1022	10041.4	102210041.73		1022
10046.88	1022.510054.87		102310062.85		1023.510068.13		102410070.95		1024
10089.85	1024.5	10094.3	102510098.75		1025.510103.21		102610103.55		1026
10112.82	102610116.14		102610117.93		1025.510122.69		102510126.19		1024.5
10129.41	102410129.69		102410132.81		1023.510135.93		102310139.05		1022.5
10140.43	1022.510143.87		102210144.21		102210147.71		1021.510156.08		1021.5
10160.61	102210161.38		102210164.03		1022.510166.68		102310170.09		1023.5
10173.65	102410173.81		1024	10214.5	1024.510429.21		102510486.12		1025.5
10565.94	102610566.76		102610669.56		1026.5	10786	102710839.07		1027.5
10878.66	102810878.84		102810922.29		1028.510942.25		1028.511024.11		1028
11024.51	102811025.35		102811034.92		102811080.52		1028.511120.92		1029
11240.61	1029.511298.72		1029.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
6540	.1	10000	.01	61006	2.85 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
7475 10094.3 540 580 570 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev
10116.14	11298.72	1030

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1023.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.063	
W.S. Elev (ft)	1023.75	Reach Len. (ft)	540.00	580.00	570.00
Crit W.S. (ft)	1023.46	Flow Area (sq ft)		1379.94	
E.G. Slope (ft/ft)	0.014102	Area (sq ft)		1379.94	57.06
Q Total (cfs)	3000.00	Flow (cfs)		3000.00	
Top Width (ft)	2131.90	Top Width (ft)		2091.31	40.59
Vel Total (ft/s)	2.17	Avg. Vel. (ft/s)		2.17	
Max Chl Dpth (ft)	2.25	Hydr. Depth (ft)		0.66	
Conv. Total (cfs)	25262.9	Conv. (cfs)		25262.9	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		2091.39	
Min Ch El (ft)	1022.00	Shear (lb/sq ft)		0.58	
Alpha	1.00	Stream Power (lb/ft s)		1.26	
Frctn Loss (ft)	4.11	Cum Volume (acre-ft)		124.40	117.49
C & E Loss (ft)	0.02	Cum SA (acres)		157.21	107.28

Warning: Divided flow computed for this cross-section.

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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1024.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.074	
W.S. Elev (ft)	1024.39	Reach Len. (ft)	540.00	580.00	570.00
Crit W.S. (ft)	1023.80	Flow Area (sq ft)		2792.55	
E.G. Slope (ft/ft)	0.011652	Area (sq ft)		2792.55	91.71
Q Total (cfs)	7000.00	Flow (cfs)		7000.00	
Top Width (ft)	2382.20	Top Width (ft)		2303.56	78.64
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)		2.51	
Max Chl Dpth (ft)	2.89	Hydr. Depth (ft)		1.21	
Conv. Total (cfs)	64849.2	Conv. (cfs)		64849.2	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		2303.66	
Min Ch El (ft)	1022.00	Shear (lb/sq ft)		0.88	
Alpha	1.00	Stream Power (lb/ft s)		2.21	
Frctn Loss (ft)	4.09	Cum Volume (acre-ft)		241.75	178.77
C & E Loss (ft)	0.02	Cum SA (acres)		208.24	131.24

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1025.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.077	
W.S. Elev (ft)	1024.89	Reach Len. (ft)	540.00	580.00	570.00
Crit W.S. (ft)	1024.03	Flow Area (sq ft)		3970.98	
E.G. Slope (ft/ft)	0.010644	Area (sq ft)		3970.98	167.40
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	2704.91	Top Width (ft)		2448.30	256.60
Vel Total (ft/s)	2.77	Avg. Vel. (ft/s)		2.77	
Max Chl Dpth (ft)	3.39	Hydr. Depth (ft)		1.62	
Conv. Total (cfs)	106622.3	Conv. (cfs)		106622.3	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		2448.43	
Min Ch El (ft)	1022.00	Shear (lb/sq ft)		1.08	
Alpha	1.00	Stream Power (lb/ft s)		2.99	
Frctn Loss (ft)	4.12	Cum Volume (acre-ft)		332.77	225.53
C & E Loss (ft)	0.02	Cum SA (acres)		232.36	142.00

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
7824.24	7998.86	0.17	0.91	24.70	0.01	0.04	0.19
7998.86	8173.48	47.53	58.62	174.62	1.58	0.34	0.81
8173.48	8348.10	171.97	126.80	174.62	5.73	0.73	1.36
8348.10	8522.72	180.60	130.58	174.62	6.02	0.75	1.38
8522.72	8697.34	180.60	130.58	174.62	6.02	0.75	1.38
8697.34	8871.96	180.60	130.58	174.62	6.02	0.75	1.38
8871.96	9046.58	180.60	130.58	174.62	6.02	0.75	1.38
9046.58	9221.20	179.47	130.09	174.62	5.98	0.74	1.38
9221.20	9395.82	43.80	55.81	174.62	1.46	0.32	0.78
9395.82	9570.44	50.79	61.00	174.62	1.69	0.35	0.83

9570.44	9745.06	95.82	89.28	174.62	3.19	0.51	1.07
9745.06	9919.68	153.34	118.37	174.62	5.11	0.68	1.30
9919.68	RB 10094.30	1534.71	216.73	145.86	51.16	1.49	7.08

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
7649.62	7824.24	0.89	3.21	42.11	0.01	0.08	0.28
7824.24	7998.86	70.55	78.03	174.62	1.01	0.45	0.90
7998.86	8173.48	260.20	170.74	174.62	3.72	0.98	1.52
8173.48	8348.10	455.53	238.93	174.62	6.51	1.37	1.91
8348.10	8522.72	467.59	242.70	174.62	6.68	1.39	1.93
8522.72	8697.34	467.59	242.70	174.62	6.68	1.39	1.93
8697.34	8871.96	467.59	242.70	174.62	6.68	1.39	1.93
8871.96	9046.58	467.59	242.70	174.62	6.68	1.39	1.93
9046.58	9221.20	466.02	242.21	174.62	6.66	1.39	1.92
9221.20	9395.82	253.11	167.94	174.62	3.62	0.96	1.51
9395.82	9570.44	266.27	173.12	174.62	3.80	0.99	1.54
9570.44	9745.06	342.64	201.40	174.62	4.89	1.15	1.70
9745.06	9919.68	429.04	230.49	174.62	6.13	1.32	1.86
9919.68	RB 10094.30	2585.38	315.68	166.10	36.93	1.90	8.19

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 7475.00	7649.62	0.00	0.04	4.64	0.00	0.01	0.06
7649.62	7824.24	41.06	58.03	174.62	0.37	0.33	0.71
7824.24	7998.86	233.34	164.59	174.62	2.12	0.94	1.42
7998.86	8173.48	491.37	257.30	174.62	4.47	1.47	1.91
8173.48	8348.10	727.04	325.49	174.62	6.61	1.86	2.23
8348.10	8522.72	741.16	329.27	174.62	6.74	1.89	2.25
8522.72	8697.34	741.16	329.27	174.62	6.74	1.89	2.25
8697.34	8871.96	741.16	329.27	174.62	6.74	1.89	2.25
8871.96	9046.58	741.16	329.27	174.62	6.74	1.89	2.25
9046.58	9221.20	739.32	328.78	174.62	6.72	1.88	2.25
9221.20	9395.82	482.47	254.50	174.62	4.39	1.46	1.90
9395.82	9570.44	498.97	259.69	174.62	4.54	1.49	1.92
9570.44	9745.06	592.77	287.96	174.62	5.39	1.65	2.06
9745.06	9919.68	695.91	317.06	174.62	6.33	1.82	2.19
9919.68	RB 10094.30	3533.10	400.47	173.72	32.12	2.31	8.82

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: West Spillway
REACH: A3 RS: 19.33

INPUT
Description: 1/3 Q=3000 cfs

```
2/3 Q=7000 cfs
Full Q=11,000 cfs
Station Elevation Data    num=      84
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    5940  1023.6    6355  1022.6    6490  1022.3    6700    1022    6810    1022
    6830  1021.6    6850    1022    6915  1020.8    7325    1020 7837.35    1019
 7979.84  1018.5  8120.6    1018 8130.79    1018 8170.37    1018 8175.25    1018
 8189.19    1018 8203.94    1018 8342.78    1018 8342.97    1018 8496.11    1018
 8525.44    1018 8710.51  1018.5  9008.7    1019 9208.91    1019 9213.94    1019
 9428.44    1019 9496.09    1019 9820.57    1019 9972.54  1018.5   10000    1018
10013.98    101810061.41  1018.510077.12    101910092.82  1019.510108.52    1020
10109.23    1020 10114.8  1020.510119.08    102110126.03    102110128.26  1020.5
10130.27    102010130.49    102010136.15  1019.510141.57    101910147.06  1018.5
 10152.5    1018 10153.6    101810155.89  1017.510159.27    101710165.11    1017
10167.37  1017.510169.62    101810170.38    101810173.25  1018.510193.95    1019
10211.28  1019.510228.79    102010231.76    102010279.59  1020.510330.63    1021
10382.02  1021.510537.17  1021.510625.66    102110664.16    102110734.74  1021.5
10760.22    102210760.91    102210841.54  1022.5 11070.4    102311336.24  1023.5
 11383.6    102411384.52    102411391.11  1024.511398.62    102511406.13  1025.5
 11413.7    102611413.76    102611478.93    102611480.22    102611493.05  1025.5
11507.16    102511521.27  1024.511591.99  1024.511596.97  1024.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    5940      .1   10000    .01610061.41    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          685010126.03               700     650     660              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
10126.0311596.97    1030

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)          1019.70   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.02   Wt. n-Val.                           0.079
  W.S. Elev (ft)          1019.68   Reach Len. (ft)           700.00    650.00     660.00
  Crit W.S. (ft)          1018.88   Flow Area (sq ft)                  2508.57
  E.G. Slope (ft/ft)     0.004250   Area (sq ft)                       2508.57      87.65
  Q Total (cfs)           3000.00   Flow (cfs)                         3000.00
  Top Width (ft)          2690.36   Top Width (ft)                     2607.09      83.26
  Vel Total (ft/s)           1.20   Avg. Vel. (ft/s)                      1.20
  Max Chl Dpth (ft)          2.68   Hydr. Depth (ft)                      0.96
  Conv. Total (cfs)       46018.0   Conv. (cfs)                       46018.0
  Length Wtd. (ft)         650.00   Wetted Per. (ft)                  2607.12
  Min Ch El (ft)          1018.00   Shear (lb/sq ft)                      0.26
  Alpha                      1.00   Stream Power (lb/ft s)                0.31
  Frctn Loss (ft)            6.44   Cum Volume (acre-ft)                 98.51     116.55
  C & E Loss (ft)            0.01   Cum SA (acres)                      125.93     106.47


Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT    Profile #2/3

  E.G. Elev (ft)          1020.38   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.04   Wt. n-Val.                           0.082
  W.S. Elev (ft)          1020.34   Reach Len. (ft)           700.00    650.00     660.00
  Crit W.S. (ft)          1019.28   Flow Area (sq ft)                  4349.78
  E.G. Slope (ft/ft)     0.004725   Area (sq ft)                       4349.78     156.90
  Q Total (cfs)           7000.00   Flow (cfs)                         7000.00
  Top Width (ft)          3095.50   Top Width (ft)                     2960.46     135.04
  Vel Total (ft/s)           1.61   Avg. Vel. (ft/s)                      1.61
  Max Chl Dpth (ft)          3.34   Hydr. Depth (ft)                      1.47
  Conv. Total (cfs)      101832.1   Conv. (cfs)                      101832.1
```

Length Wtd. (ft)	650.00	Wetted Per. (ft)	2960.51	
Min Ch El (ft)	1018.00	Shear (lb/sq ft)	0.43	
Alpha	1.00	Stream Power (lb/ft s)	0.70	
Frctn Loss (ft)	6.56	Cum Volume (acre-ft)	194.20	177.15
C & E Loss (ft)	0.01	Cum SA (acres)	173.19	129.84

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

			Left OB	Channel	Right OB
E.G. Elev (ft)	1020.87	Element			
Vel Head (ft)	0.06	Wt. n-Val.		0.083	
W.S. Elev (ft)	1020.81	Reach Len. (ft)	700.00	650.00	660.00
Crit W.S. (ft)	1019.51	Flow Area (sq ft)		5814.25	
E.G. Slope (ft/ft)	0.005071	Area (sq ft)		5814.25	232.58
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	3387.58	Top Width (ft)		3203.08	184.50
Vel Total (ft/s)	1.89	Avg. Vel. (ft/s)		1.89	
Max Chl Dpth (ft)	3.81	Hydr. Depth (ft)		1.82	
Conv. Total (cfs)	154467.5	Conv. (cfs)		154467.5	
Length Wtd. (ft)	650.00	Wetted Per. (ft)		3203.16	
Min Ch El (ft)	1018.00	Shear (lb/sq ft)		0.57	
Alpha	1.00	Stream Power (lb/ft s)		1.09	
Frctn Loss (ft)	6.65	Cum Volume (acre-ft)		267.62	222.92
C & E Loss (ft)	0.01	Cum SA (acres)		194.73	139.12

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
7286.80	7505.21	0.01	0.19	13.97	0.00	0.01	0.05
7505.21	7723.61	18.06	52.51	218.40	0.60	0.24	0.34
7723.61	7942.01	108.71	154.13	218.40	3.62	0.71	0.71
7942.01	8160.41	347.11	309.32	218.40	11.57	1.42	1.12
8160.41	8378.81	459.34	365.94	218.40	15.31	1.68	1.26
8378.81	8597.22	444.87	358.98	218.40	14.83	1.64	1.24
8597.22	8815.62	267.93	264.82	218.40	8.93	1.21	1.01
8815.62	9034.02	139.22	178.79	218.40	4.64	0.82	0.78
9034.02	9252.42	101.07	147.54	218.40	3.37	0.68	0.69
9252.42	9470.82	101.07	147.54	218.40	3.37	0.68	0.69
9470.82	9689.23	101.07	147.54	218.40	3.37	0.68	0.69
9689.23	9907.63	115.70	160.01	218.40	3.86	0.73	0.72
9907.63	RB 10126.03	795.82	221.26	190.73	26.53	1.16	3.60

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
7068.40	7286.80	4.32	17.59	134.29	0.06	0.13	0.25
7286.80	7505.21	60.13	103.77	218.40	0.86	0.48	0.58

7505.21	7723.61	174.81	196.87	218.40	2.50	0.90	0.89
7723.61	7942.01	349.80	298.50	218.40	5.00	1.37	1.17
7942.01	8160.41	702.84	453.69	218.40	10.04	2.08	1.55
8160.41	8378.81	855.02	510.31	218.40	12.21	2.34	1.68
8378.81	8597.22	835.67	503.35	218.40	11.94	2.30	1.66
8597.22	8815.62	591.72	409.18	218.40	8.45	1.87	1.45
8815.62	9034.02	399.28	323.16	218.40	5.70	1.48	1.24
9034.02	9252.42	337.02	291.90	218.40	4.81	1.34	1.15
9252.42	9470.82	337.02	291.91	218.40	4.81	1.34	1.15
9470.82	9689.23	337.02	291.91	218.40	4.81	1.34	1.15
9689.23	9907.63	361.35	304.37	218.40	5.16	1.39	1.19
9907.63	RB 10126.03	1654.00	353.27	205.40	23.63	1.72	4.68

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 6850.00	7068.40	7.18	24.70	154.02	0.07	0.16	0.29
7068.40	7286.80	73.16	114.39	218.40	0.67	0.52	0.64
7286.80	7505.21	197.35	207.47	218.40	1.79	0.95	0.95
7505.21	7723.61	366.07	300.57	218.40	3.33	1.38	1.22
7723.61	7942.01	594.82	402.19	218.40	5.41	1.84	1.48
7942.01	8160.41	1024.67	557.39	218.40	9.32	2.55	1.84
8160.41	8378.81	1203.95	614.00	218.40	10.95	2.81	1.96
8378.81	8597.22	1181.29	607.04	218.40	10.74	2.78	1.95
8597.22	8815.62	891.96	512.88	218.40	8.11	2.35	1.74
8815.62	9034.02	656.84	426.85	218.40	5.97	1.95	1.54
9034.02	9252.42	578.65	395.60	218.40	5.26	1.81	1.46
9252.42	9470.82	578.66	395.60	218.40	5.26	1.81	1.46
9470.82	9689.23	578.66	395.60	218.40	5.26	1.81	1.46
9689.23	9907.63	609.37	408.07	218.40	5.54	1.87	1.49
9907.63	RB 10126.03	2457.37	451.90	209.91	22.34	2.15	5.44

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: West Spillway
REACH: A3 RS: 19.21

INPUT
Description: 1/3 Q=3000 cfs
2/3 Q=7000 cfs
Full Q=11,000 cfs
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5500	1015	5815	1014	6160	1013.5	6280	1012.9	6490	1013.1
6850	1014	7035	1014.2	7165	1014	7770	1012	8020	1011.5
8152.84	1012	8156.63	1012	8428.92	1012.5	8672.76	1013	8851.81	1013.5
9019.45	1014	9071.55	1014	9081.91	1014	9087.94	1014	9228.32	1013.5
9547.69	1013	9765.05	1012.5	9779.24	1012.5	9800.11	1012.7	9838.55	1013
9864.95	1013	9889.89	1012.5	9908.12	1012.5	9926.88	1013	9937.05	1013.5
9946.78	1014	9947.21	1014	10000	1014.5	10008.63	1015	10012.83	1015.5
10017.57	1015.5	10022.55	1015	10027.53	1014.5	10036.46	1014	10036.47	1014
10042.09	1013.5	10043.32	1013	10044.54	1012.5	10047.46	1012.5	10059.26	1013
10072.01	1013.5	10082.38	1014	10085.42	1014	10112.12	1014.5	10138.92	1015
10140	1015	10140.11	1015	10161.37	1015.5	10180.66	1016	10181.19	1016
10218.8	1016.5	10276.09	1016.5	10299.08	1016	10299.75	1016	10309.41	1015.5
10317.27	1015	10325.13	1014.5	10333.06	1014	10333.29	1014	10459.63	1014

```
10462.16    101410533.03  1014.510654.91    101510745.15  1015.511035.98    1016
 11038.2    101611107.29  1016.511204.13    101711284.48  1017.5 11366.8    1018
11366.93    101811453.71  1018.5

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    5500      .1   10000    .01610059.26    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          5500   10000              770     770     780            .1        .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
10017.5711453.71    1019

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)          1013.25   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.08   Wt. n-Val.                          0.100
  W.S. Elev (ft)          1013.17   Reach Len. (ft)           770.00    770.00     780.00
  Crit W.S. (ft)          1012.79   Flow Area (sq ft)                  1323.13
  E.G. Slope (ft/ft)     0.043038   Area (sq ft)                       1323.13       7.79
  Q Total (cfs)           3000.00   Flow (cfs)                         3000.00
  Top Width (ft)          2118.13   Top Width (ft)                     2097.49      20.64
  Vel Total (ft/s)           2.27   Avg. Vel. (ft/s)                      2.27
  Max Chl Dpth (ft)          1.67   Hydr. Depth (ft)                      0.63
  Conv. Total (cfs)        14460.9  Conv. (cfs)                       14460.9
  Length Wtd. (ft)          770.00  Wetted Per. (ft)                  2097.51
  Min Ch El (ft)          1011.50   Shear (lb/sq ft)                      1.69
  Alpha                      1.00   Stream Power (lb/ft s)                3.84
  Frctn Loss (ft)            5.43   Cum Volume (acre-ft)                 69.92     115.83
  C & E Loss (ft)            0.02   Cum SA (acres)                       90.83     105.68

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT    Profile #2/3

  E.G. Elev (ft)          1013.81   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.10   Wt. n-Val.                          0.100
  W.S. Elev (ft)          1013.72   Reach Len. (ft)           770.00    770.00     780.00
  Crit W.S. (ft)          1013.24   Flow Area (sq ft)                  2759.37
  E.G. Slope (ft/ft)     0.035075   Area (sq ft)                       2759.37      23.35
  Q Total (cfs)           7000.00   Flow (cfs)                         7000.00
  Top Width (ft)          3207.16   Top Width (ft)                     3170.37      36.80
  Vel Total (ft/s)           2.54   Avg. Vel. (ft/s)                      2.54
  Max Chl Dpth (ft)          2.22   Hydr. Depth (ft)                      0.87
  Conv. Total (cfs)        37376.8  Conv. (cfs)                       37376.8
  Length Wtd. (ft)          770.00  Wetted Per. (ft)                  3170.41
  Min Ch El (ft)          1011.50   Shear (lb/sq ft)                      1.91
  Alpha                      1.00   Stream Power (lb/ft s)                4.83
  Frctn Loss (ft)            5.21   Cum Volume (acre-ft)                141.16     175.78
  C & E Loss (ft)            0.03   Cum SA (acres)                      127.45     128.54

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT    Profile #Full

  E.G. Elev (ft)          1014.21   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.11   Wt. n-Val.                          0.100
  W.S. Elev (ft)          1014.10   Reach Len. (ft)           770.00    770.00     780.00
```

Crit W.S. (ft)	1013.52	Flow Area (sq ft)	4155.69	
E.G. Slope (ft/ft)	0.030421	Area (sq ft)	4155.69	55.03
Q Total (cfs)	11000.00	Flow (cfs)	11000.00	
Top Width (ft)	4228.10	Top Width (ft)	4026.09	202.02
Vel Total (ft/s)	2.65	Avg. Vel. (ft/s)	2.65	
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)	1.03	
Conv. Total (cfs)	63067.8	Conv. (cfs)	63067.8	
Length Wtd. (ft)	770.00	Wetted Per. (ft)	4026.14	
Min Ch El (ft)	1011.50	Shear (lb/sq ft)	1.96	
Alpha	1.00	Stream Power (lb/ft s)	5.19	
Frctn Loss (ft)	5.13	Cum Volume (acre-ft)	193.24	220.74
C & E Loss (ft)	0.03	Cum SA (acres)	140.80	136.19

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
6100.00	6400.00	25.76	32.53	173.65	0.86	0.19	0.79
6400.00	6700.00	5.44	10.94	117.32	0.18	0.09	0.50
6700.00	7300.00						
7300.00	7600.00	60.69	55.60	183.40	2.02	0.30	1.09
7600.00	7900.00	806.48	319.61	300.00	26.88	1.07	2.52
7900.00	8200.00	1309.86	427.57	300.00	43.66	1.43	3.06
8200.00	8500.00	512.23	243.42	300.00	17.07	0.81	2.10
8500.00	8800.00	66.68	64.74	233.02	2.22	0.28	1.03
8800.00	9400.00						
9400.00	9700.00	56.70	61.35	259.79	1.89	0.24	0.92
9700.00	RB 10000.00	156.16	107.37	230.32	5.21	0.47	1.45

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
5800.00	6100.00	2.07	5.66	88.37	0.03	0.06	0.37
6100.00	6400.00	247.73	163.04	300.00	3.54	0.54	1.52
6400.00	6700.00	176.97	133.24	300.00	2.53	0.44	1.33
6700.00	7000.00	0.47	1.62	36.01	0.01	0.05	0.29
7000.00	7300.00	1.68	3.94	48.80	0.02	0.08	0.43
7300.00	7600.00	340.01	197.15	300.00	4.86	0.66	1.72
7600.00	7900.00	1517.15	483.64	300.00	21.67	1.61	3.14
7900.00	8200.00	2122.58	591.59	300.00	30.32	1.97	3.59
8200.00	8500.00	1140.08	407.44	300.00	16.29	1.36	2.80
8500.00	8800.00	415.96	222.50	300.00	5.94	0.74	1.87
8800.00	9100.00	16.63	22.64	123.90	0.24	0.18	0.73
9100.00	9400.00	65.92	66.48	232.05	0.94	0.29	0.99
9400.00	9700.00	421.00	224.12	300.00	6.01	0.75	1.88
9700.00	RB 10000.00	531.76	236.31	241.27	7.60	0.98	2.25

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 5500.00	5800.00	0.10	0.51	17.97	0.00	0.03	0.20
5800.00	6100.00	85.74	89.90	300.00	0.78	0.30	0.95
6100.00	6400.00	569.30	279.93	300.00	5.18	0.93	2.03
6400.00	6700.00	471.94	250.14	300.00	4.29	0.83	1.89
6700.00	7000.00	35.39	48.89	246.82	0.32	0.20	0.72
7000.00	7300.00	38.84	47.82	203.04	0.35	0.24	0.81
7300.00	7600.00	689.55	314.04	300.00	6.27	1.05	2.20
7600.00	7900.00	2031.46	600.53	300.00	18.47	2.00	3.38
7900.00	8200.00	2675.88	708.49	300.00	24.33	2.36	3.78
8200.00	8500.00	1620.31	524.34	300.00	14.73	1.75	3.09
8500.00	8800.00	784.80	339.40	300.00	7.13	1.13	2.31
8800.00	9100.00	107.95	103.22	300.00	0.98	0.34	1.05
9100.00	9400.00	260.58	175.15	300.00	2.37	0.58	1.49
9400.00	9700.00	791.03	341.01	300.00	7.19	1.14	2.32
9700.00	RB 10000.00	837.14	332.30	258.30	7.61	1.29	2.52

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: West Spillway
REACH: A3 RS: 19.06

INPUT
Description: Flow modeled only in portion of cross-section between Jackrabbit Trail and a split approximately 1800 west of Tuthill Road.
1/3
Q=1500 cfs
2/3 Q=4000 cfs
Full Q=6500 cfs
Station Elevation Data num= 113

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4297.71	1008	4304.11	1007.5	4309.62	1007	4315.41	1006.5	4319.8	1006.5
4360.15	1007	4409.68	1007.5	4495.05	1007.5	4649.13	1007	4693.79	1007
4783.86	1007.5	4844.95	1008	4897.25	1008	5317.5	1008	5317.51	1008
5345.37	1007.5	5369.35	1007	5393.33	1006.5	5417.32	1006	5419.58	1006
5491.84	1005.5	5547.94	1005.5	5620.4	1006	5624.39	1006	5645.97	1006
5657.78	1006	5841.53	1005.5	5945.17	1005.5	6047.79	1006	6073	1006
6190.08	1006.5	6372.85	1007	6504.78	1007.5	6617.64	1008	6626.52	1008
7056.33	1008	7059.8	1008	7226.24	1007.5	7548.83	1007	7748.09	1007
7794.17	1007.5	7838.17	1008	7844.21	1008.5	7856.62	1009	7860.46	1009.5
7880.31	1009.5	7881.4	1009	7882.5	1008.5	7883.6	1008	7884.69	1007.5
7885.79	1007	7886.89	1006.5	7887.99	1006	7889.09	1005.5	7890.19	1005
7891.29	1004.5	7892.39	1004	7893.49	1003.5	7894.59	1003	7895.69	1002.5
7896.79	1002	7897.89	1001.5	7898.99	1001	7900.09	1000.5	7900.83	1000
7901.19	1000	7911.95	999.5	7919.89	999	7922.05	998.5	7924.21	998
7926.36	997.5	7927.07	997.5	7928.22	998	7929.36	998.5	7930.51	999
7980	1008	8000	1009	8010	1009	8030	1008	8050	1006.5
8130	1006.7	8320	1007.4	8800	1007.6	8940	1007.4	9280	1007.3
9590	1007.5	9800	1007.6	10000	1008	10010	1008.5	10050	1008.5
10060	1008	10070	1007.5	10080	1008	10120	1008.4	10230	1008.3
10270	1008	10290	1007.9	10410	1007.8	10470	1008	10555	1008.4
10590	1008.3	10680	1008.9	10815	1008	10845	1007.8	10855	1008
10890	1008.4	11065	1009.2	11085	1009	11195	1010	11260	1010.3
11315	1010.3	11330	1010	11435	1008.3				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4297.71	.1	10000	.016	10050	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4297.71	8000	700	1019	1300	.1	.3

```
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
    8000   11435    1012
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  7881.4    8000    1009
```

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1007.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	1007.79	Reach Len. (ft)	700.00	1019.00	1300.00
Crit W.S. (ft)	1006.26	Flow Area (sq ft)		2549.31	
E.G. Slope (ft/ft)	0.001488	Area (sq ft)		2549.31	761.81
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	4326.32	Top Width (ft)		2451.47	1874.84
Vel Total (ft/s)	0.59	Avg. Vel. (ft/s)		0.59	
Max Chl Dpth (ft)	2.29	Hydr. Depth (ft)		1.04	
Conv. Total (cfs)	38880.9	Conv. (cfs)		38880.9	
Length Wtd. (ft)	1019.00	Wetted Per. (ft)		2451.57	
Min Ch El (ft)	1005.50	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)		0.06	
Frctn Loss (ft)	4.37	Cum Volume (acre-ft)		35.70	108.93
C & E Loss (ft)	0.01	Cum SA (acres)		50.63	88.71

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1008.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	1008.57	Reach Len. (ft)	700.00	1019.00	1300.00
Crit W.S. (ft)	1006.75	Flow Area (sq ft)		5098.61	
E.G. Slope (ft/ft)	0.001720	Area (sq ft)		5098.61	2620.40
Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	6374.65	Top Width (ft)		3548.24	2826.41
Vel Total (ft/s)	0.78	Avg. Vel. (ft/s)		0.78	
Max Chl Dpth (ft)	3.07	Hydr. Depth (ft)		1.44	
Conv. Total (cfs)	96460.4	Conv. (cfs)		96460.4	
Length Wtd. (ft)	1019.00	Wetted Per. (ft)		3548.95	
Min Ch El (ft)	1005.50	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)		0.12	
Frctn Loss (ft)	4.79	Cum Volume (acre-ft)		71.70	152.11
C & E Loss (ft)	0.02	Cum SA (acres)		68.07	102.91

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1009.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	1009.04	Reach Len. (ft)	700.00	1019.00	1300.00
Crit W.S. (ft)	1007.18	Flow Area (sq ft)		6777.28	
E.G. Slope (ft/ft)	0.001845	Area (sq ft)		6777.28	4015.67
Q Total (cfs)	6500.00	Flow (cfs)		6500.00	
Top Width (ft)	6762.61	Top Width (ft)		3677.92	3084.69
Vel Total (ft/s)	0.96	Avg. Vel. (ft/s)		0.96	
Max Chl Dpth (ft)	3.54	Hydr. Depth (ft)		1.84	

Conv. Total (cfs)	151330.1	Conv. (cfs)	151330.1	
Length Wtd. (ft)	1019.00	Wetted Per. (ft)	3679.11	
Min Ch El (ft)	1005.50	Shear (lb/sq ft)	0.21	
Alpha	1.00	Stream Power (lb/ft s)	0.20	
Frctn Loss (ft)	5.01	Cum Volume (acre-ft)	96.61	184.29
C & E Loss (ft)	0.03	Cum SA (acres)	72.71	106.76

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 4297.71	4544.53	38.76	127.44	244.22	2.58	0.52	0.30
4544.53	4791.35	51.18	151.21	246.82	3.41	0.61	0.34
4791.35	5038.17	0.36	3.25	28.17	0.02	0.12	0.11
5038.17	5284.99						
5284.99	5531.81	204.13	320.53	202.72	13.61	1.58	0.64
5531.81	5778.63	361.10	488.32	246.82	24.07	1.98	0.74
5778.63	6025.45	433.09	544.60	246.82	28.87	2.21	0.80
6025.45	6272.26	221.17	363.88	246.82	14.74	1.47	0.61
6272.26	6519.08	61.42	168.70	246.82	4.09	0.68	0.36
6519.08	6765.90	0.65	5.89	51.58	0.04	0.11	0.11
6765.90	7012.72						
7012.72	7259.54	3.84	24.76	130.46	0.26	0.19	0.15
7259.54	7506.36	40.81	132.00	246.82	2.72	0.53	0.31
7506.36	7753.18	77.47	193.91	246.82	5.16	0.79	0.40
7753.18	RB 8000.00	6.03	24.83	66.68	0.40	0.37	0.24

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 4297.71	4544.53	201.72	319.29	247.46	5.04	1.29	0.63
4544.53	4791.35	228.05	343.33	246.82	5.70	1.39	0.66
4791.35	5038.17	58.98	152.51	246.82	1.47	0.62	0.39
5038.17	5284.99	51.59	140.75	246.82	1.29	0.57	0.37
5284.99	5531.81	433.37	504.68	246.84	10.83	2.04	0.86
5531.81	5778.63	713.14	680.44	246.82	17.83	2.76	1.05
5778.63	6025.45	814.13	736.72	246.82	20.35	2.98	1.11
6025.45	6272.26	509.32	556.00	246.82	12.73	2.25	0.92
6272.26	6519.08	247.75	360.82	246.82	6.19	1.46	0.69
6519.08	6765.90	65.40	162.27	246.82	1.63	0.66	0.40
6765.90	7012.72	51.59	140.75	246.82	1.29	0.57	0.37
7012.72	7259.54	92.56	199.87	246.82	2.31	0.81	0.46
7259.54	7506.36	207.19	324.12	246.82	5.18	1.31	0.64
7506.36	7753.18	277.27	386.03	246.82	6.93	1.56	0.72
7753.18	RB 8000.00	47.94	91.07	92.80	1.20	0.98	0.53

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 4297.71	4544.53	365.83	435.53	247.93	5.63	1.76	0.84
4544.53	4791.35	401.29	459.56	246.82	6.17	1.86	0.87
4791.35	5038.17	164.10	268.75	246.82	2.52	1.09	0.61
5038.17	5284.99	152.31	256.99	246.82	2.34	1.04	0.59
5284.99	5531.81	662.60	620.92	246.84	10.19	2.52	1.07
5531.81	5778.63	1003.89	796.68	246.82	15.44	3.23	1.26
5778.63	6025.45	1124.85	852.96	246.82	17.31	3.46	1.32
6025.45	6272.26	756.41	672.24	246.82	11.64	2.72	1.13
6272.26	6519.08	427.07	477.06	246.82	6.57	1.93	0.90
6519.08	6765.90	174.16	278.51	246.82	2.68	1.13	0.63
6765.90	7012.72	152.31	256.99	246.82	2.34	1.04	0.59
7012.72	7259.54	215.09	316.11	246.82	3.31	1.28	0.68
7259.54	7506.36	373.73	440.35	246.82	5.75	1.78	0.85
7506.36	7753.18	465.35	502.27	246.82	7.16	2.03	0.93
7753.18	RB 8000.00	61.01	142.39	222.49	0.94	0.64	0.43

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: West Spillway
REACH: A3 RS: 18.87

INPUT
Description: North Bank, Roosevelt Canal
1/3 Q=1500 cfs
2/3 Q=4000 cfs
Full
Q=6500 cfs
Survey Date 12/15/99
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4240	1005.98	4660	1004.32	5220	1003.04	5710	1002.76	6230	1003.31
6770	1004.68	7330	1003.63	7820	1002.88	8350	1003.21	8880	1002.24
9390	1002.06	9830	1002.4	101201001.774		10330	1001.32	10890	1001.3
11390	1001.04	11930	1001	12420	1000.99				

Manning's n Values num= 1

Sta	n Val
4240	.045

Bank Sta: Left 4660 Right 8350 Lengths: Left 0 Channel 0 Right 0 Coeff Contr. .1 Expan. .3
Ineffective Flow num= 1

Sta L	Sta R	Elev
8350	12420	1006

CROSS SECTION OUTPUT Profile #1/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	1003.42	Element			
Vel Head (ft)	0.14	Wt. n-Val.		0.045	
W.S. Elev (ft)	1003.28	Reach Len. (ft)			
Crit W.S. (ft)	1003.28	Flow Area (sq ft)		502.46	
E.G. Slope (ft/ft)	0.047374	Area (sq ft)		502.46	6538.50
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	5946.92	Top Width (ft)		1876.92	4070.00
Vel Total (ft/s)	2.99	Avg. Vel. (ft/s)		2.99	
Max Chl Dpth (ft)	2.29	Hydr. Depth (ft)		0.27	
Conv. Total (cfs)	6891.6	Conv. (cfs)		6891.6	
Length Wtd. (ft)		Wetted Per. (ft)		1876.92	

Min Ch El (ft)	1002.76	Shear (lb/sq ft)	0.79
Alpha	1.00	Stream Power (lb/ft s)	2.36
Frctn Loss (ft)		Cum Volume (acre-ft)	
C & E Loss (ft)		Cum SA (acres)	

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #2/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	1003.77	Element			
Vel Head (ft)	0.23	Wt. n-Val.		0.045	
W.S. Elev (ft)	1003.53	Reach Len. (ft)			
Crit W.S. (ft)	1003.53	Flow Area (sq ft)		1031.74	
E.G. Slope (ft/ft)	0.039479	Area (sq ft)		1031.74	7573.38
Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	6341.33	Top Width (ft)		2271.33	4070.00
Vel Total (ft/s)	3.88	Avg. Vel. (ft/s)		3.88	
Max Chl Dpth (ft)	2.54	Hydr. Depth (ft)		0.45	
Conv. Total (cfs)	20131.5	Conv. (cfs)		20131.5	
Length Wtd. (ft)		Wetted Per. (ft)		2271.33	
Min Ch El (ft)	1002.76	Shear (lb/sq ft)		1.12	
Alpha	1.00	Stream Power (lb/ft s)		4.34	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #Full

			Left OB	Channel	Right OB
E.G. Elev (ft)	1004.02	Element			
Vel Head (ft)	0.30	Wt. n-Val.		0.045	
W.S. Elev (ft)	1003.72	Reach Len. (ft)			
Crit W.S. (ft)	1003.72	Flow Area (sq ft)		1482.13	
E.G. Slope (ft/ft)	0.036142	Area (sq ft)		1482.13	8334.77
Q Total (cfs)	6500.00	Flow (cfs)		6500.00	
Top Width (ft)	6608.23	Top Width (ft)		2538.23	4070.00
Vel Total (ft/s)	4.39	Avg. Vel. (ft/s)		4.39	
Max Chl Dpth (ft)	2.73	Hydr. Depth (ft)		0.58	
Conv. Total (cfs)	34190.4	Conv. (cfs)		34190.4	
Length Wtd. (ft)		Wetted Per. (ft)		2538.24	
Min Ch El (ft)	1002.76	Shear (lb/sq ft)		1.32	
Alpha	1.00	Stream Power (lb/ft s)		5.78	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
4906.00	5152.00	1.21	1.55	36.78	0.08	0.04	0.78
5152.00	5398.00	163.05	62.68	246.00	10.87	0.25	2.60
5398.00	5644.00	362.41	101.22	246.00	24.16	0.41	3.58
5644.00	5890.00	412.59	109.41	246.00	27.51	0.44	3.77
5890.00	6136.00	108.00	48.96	246.00	7.20	0.20	2.21
6136.00	6382.00	1.54	2.24	65.15	0.10	0.03	0.69
6382.00	7366.00						
7366.00	7612.00	1.64	2.15	52.99	0.11	0.04	0.76
7612.00	7858.00	171.94	64.71	246.00	11.46	0.26	2.66
7858.00	8104.00	213.13	73.61	246.00	14.21	0.30	2.90
8104.00	RB 8350.00	64.49	35.93	246.00	4.30	0.15	1.79

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
4906.00	5152.00	46.13	25.04	148.02	1.15	0.17	1.84
5152.00	5398.00	480.95	125.23	246.00	12.02	0.51	3.84
5398.00	5644.00	752.14	163.77	246.00	18.80	0.67	4.59
5644.00	5890.00	815.88	171.96	246.00	20.40	0.70	4.74
5890.00	6136.00	396.34	111.51	246.00	9.91	0.45	3.55
6136.00	6382.00	72.12	35.57	182.20	1.80	0.20	2.03
6382.00	7366.00						
7366.00	7612.00	67.31	36.74	219.12	1.68	0.17	1.83
7612.00	7858.00	494.01	127.26	246.00	12.35	0.52	3.88
7858.00	8104.00	552.91	136.16	246.00	13.82	0.55	4.06
8104.00	RB 8350.00	322.22	98.48	246.00	8.06	0.40	3.27

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
4906.00	5152.00	142.53	60.38	229.86	2.19	0.26	2.36
5152.00	5398.00	774.06	171.25	246.00	11.91	0.70	4.52
5398.00	5644.00	1085.67	209.79	246.00	16.70	0.85	5.17
5644.00	5890.00	1157.22	217.98	246.00	17.80	0.89	5.31
5890.00	6136.00	673.44	157.53	246.00	10.36	0.64	4.28
6136.00	6382.00	201.75	76.43	246.00	3.10	0.31	2.64
6382.00	6628.00	0.04	0.13	9.93	0.00	0.01	0.31
6628.00	7120.00						
7120.00	7366.00	6.70	6.46	84.44	0.10	0.08	1.04
7366.00	7612.00	227.83	82.21	246.00	3.51	0.33	2.77
7612.00	7858.00	789.41	173.28	246.00	12.14	0.70	4.56
7858.00	8104.00	858.12	182.18	246.00	13.20	0.74	4.71
8104.00	RB 8350.00	583.22	144.50	246.00	8.97	0.59	4.04

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:West Spillway

Reach	River Sta.	n1	n2	n3
A3	20.09	.045	.02	.045
A3	20.04	.045	.02	.045
A3	19.84	.1	.016	.045
A3	19.68	.1	.016	.045
A3	19.57	.1	.016	.045
A3	19.44	.1	.016	.045
A3	19.33	.1	.016	.045
A3	19.21	.1	.016	.045
A3	19.06	.1	.016	.045
A3	18.87	.045		

SUMMARY OF REACH LENGTHS

River: West Spillway

Reach	River Sta.	Left	Channel	Right
A3	20.09	500	580	620

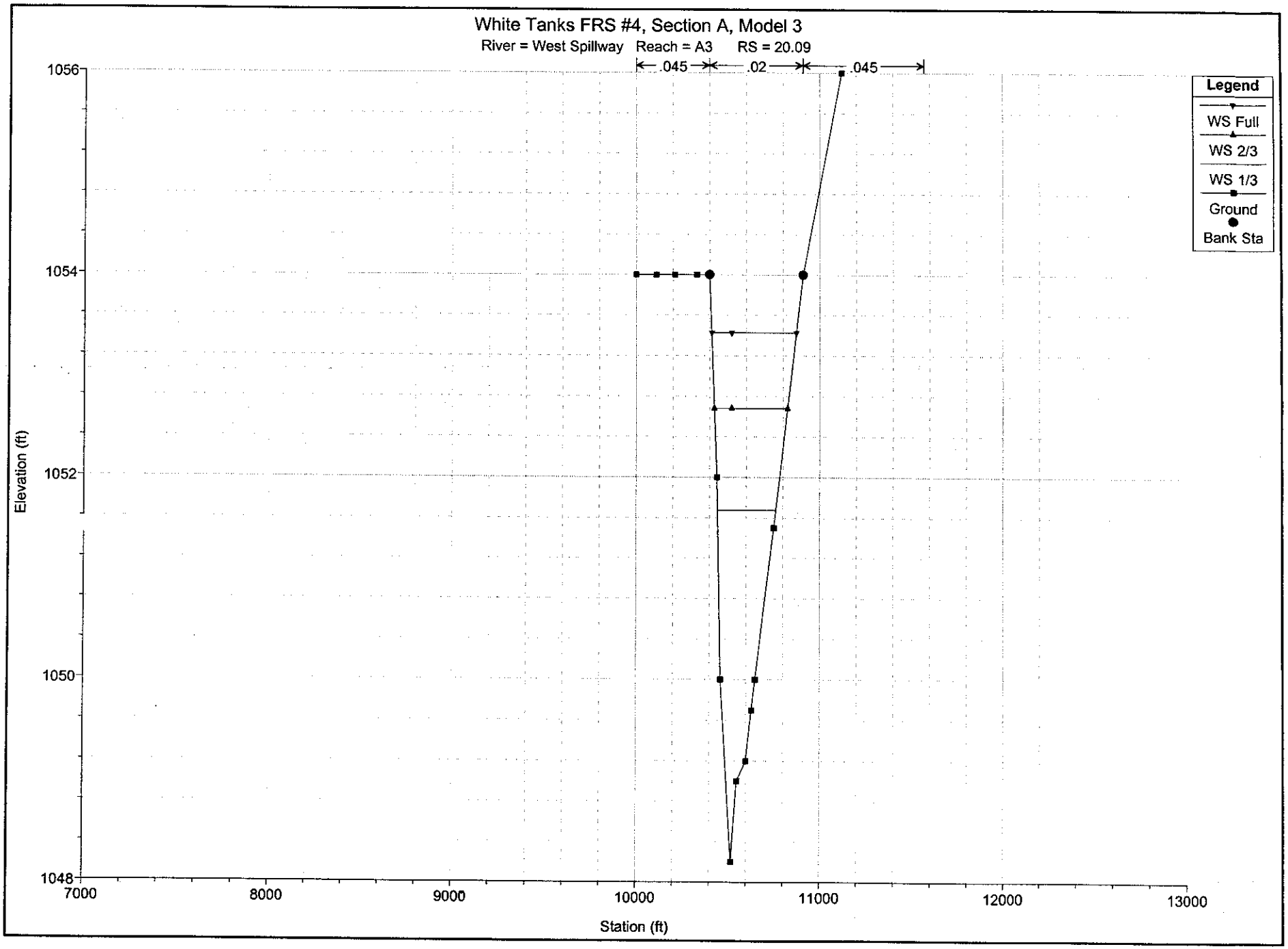
A3	20.04	1200	1150	1150
A3	19.84	870	870	870
A3	19.68	490	570	480
A3	19.57	570	690	690
A3	19.44	540	580	570
A3	19.33	700	650	660
A3	19.21	770	770	780
A3	19.06	700	1019	1300
A3	18.87	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: West Spillway

Reach	River Sta.	Contr.	Expan.
A3	20.09	.1	.3
A3	20.04	.1	.3
A3	19.84	.1	.3
A3	19.68	.1	.3
A3	19.57	.1	.3
A3	19.44	.1	.3
A3	19.33	.1	.3
A3	19.21	.1	.3
A3	19.06	.1	.3
A3	18.87	.1	.3

HEC-RAS Plan: WT4A3 River: West Spillway Reach: A3

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
A3	18.87	1500.00	1002.76	1003.28	1003.28	1003.42	0.047374	2.99	502.46	5946.92	1.02
A3	18.87	4000.00	1002.76	1003.53	1003.53	1003.77	0.039479	3.88	1031.74	6341.33	1.01
A3	18.87	6500.00	1002.76	1003.72	1003.72	1004.02	0.036142	4.39	1482.13	6608.23	1.01
A3	19.06	1500.00	1005.50	1007.79	1006.26	1007.80	0.001488	0.59	2549.31	4326.32	0.10
A3	19.06	4000.00	1005.50	1008.57	1006.75	1008.58	0.001720	0.78	5098.61	6374.65	0.12
A3	19.06	6500.00	1005.50	1009.04	1007.18	1009.06	0.001845	0.96	6777.28	6762.61	0.12
A3	19.21	3000.00	1011.50	1013.17	1012.79	1013.25	0.043038	2.27	1323.13	2118.13	0.50
A3	19.21	7000.00	1011.50	1013.72	1013.24	1013.81	0.035075	2.54	2759.37	3207.16	0.48
A3	19.21	11000.00	1011.50	1014.10	1013.52	1014.21	0.030421	2.65	4155.69	4228.10	0.46
A3	19.33	3000.00	1018.00	1019.68	1018.88	1019.70	0.004250	1.20	2508.57	2690.36	0.21
A3	19.33	7000.00	1018.00	1020.34	1019.28	1020.36	0.004725	1.61	4349.78	3095.50	0.23
A3	19.33	11000.00	1018.00	1020.81	1019.51	1020.87	0.005071	1.89	5814.25	3387.58	0.25
A3	19.44	3000.00	1022.00	1023.75	1023.46	1023.82	0.014102	2.17	1379.94	2131.90	0.47
A3	19.44	7000.00	1022.00	1024.39	1023.80	1024.49	0.011652	2.51	2792.55	2382.20	0.40
A3	19.44	11000.00	1022.00	1024.89	1024.03	1025.00	0.010644	2.77	3970.98	2704.91	0.38
A3	19.57	3000.00	1027.50	1029.04	1028.18	1029.07	0.004737	1.38	2178.53	1767.24	0.21
A3	19.57	7000.00	1027.50	1029.79	1028.55	1029.85	0.005607	2.01	3485.95	1972.05	0.26
A3	19.57	11000.00	1027.50	1030.35	1028.83	1030.44	0.006100	2.42	4543.48	2291.67	0.28
A3	19.68	3000.00	1031.00	1032.79	1032.16	1032.89	0.010031	2.49	1203.11	1112.40	0.40
A3	19.68	7000.00	1031.00	1033.70	1032.73	1033.85	0.009016	3.11	2253.40	1457.19	0.41
A3	19.68	11000.00	1031.00	1034.41	1033.18	1034.59	0.008738	3.39	3241.13	1887.41	0.42
A3	19.84	3000.00	1036.50	1038.92	1038.32	1039.08	0.005380	3.27	917.50	748.63	0.50
A3	19.84	7000.00	1036.50	1040.06	1039.07	1040.27	0.006125	3.65	1920.40	1488.90	0.52
A3	19.84	11000.00	1036.50	1040.72	1039.67	1040.95	0.006179	3.81	2884.81	1723.01	0.47
A3	20.04	4000.00	1046.40	1048.89	1048.89	1049.50	0.006735	6.28	637.42	992.54	1.02
A3	20.04	8000.00	1046.40	1049.60	1049.60	1050.53	0.007827	7.70	1038.46	1035.97	1.01
A3	20.04	12000.00	1046.40	1050.23	1050.23	1051.35	0.007657	8.48	1414.57	1101.53	1.00
A3	20.09	4000.00	1048.20	1051.68		1052.40	0.003728	6.82	586.47	318.00	0.89
A3	20.09	8000.00	1048.20	1052.68	1052.62	1053.79	0.004114	8.46	945.12	399.04	0.97
A3	20.09	12000.00	1048.20	1053.43	1053.43	1054.82	0.004239	9.48	1266.45	461.76	1.01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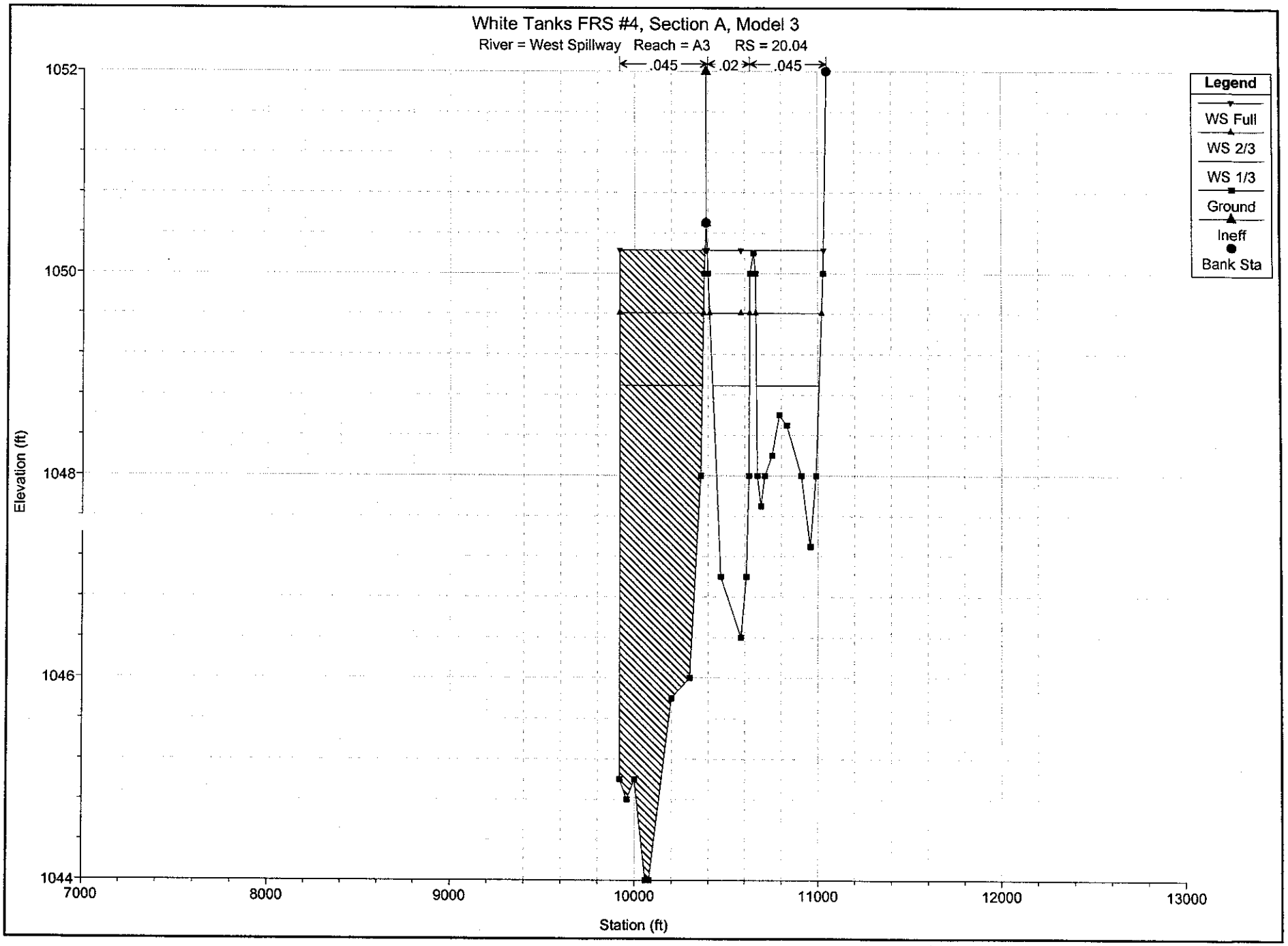
.045
.02
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Bank Sta
Elevation (ft)
1056
1054
1052
1050
1048
7000
8000
9000
10000
11000
12000
13000
Station (ft)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.02
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
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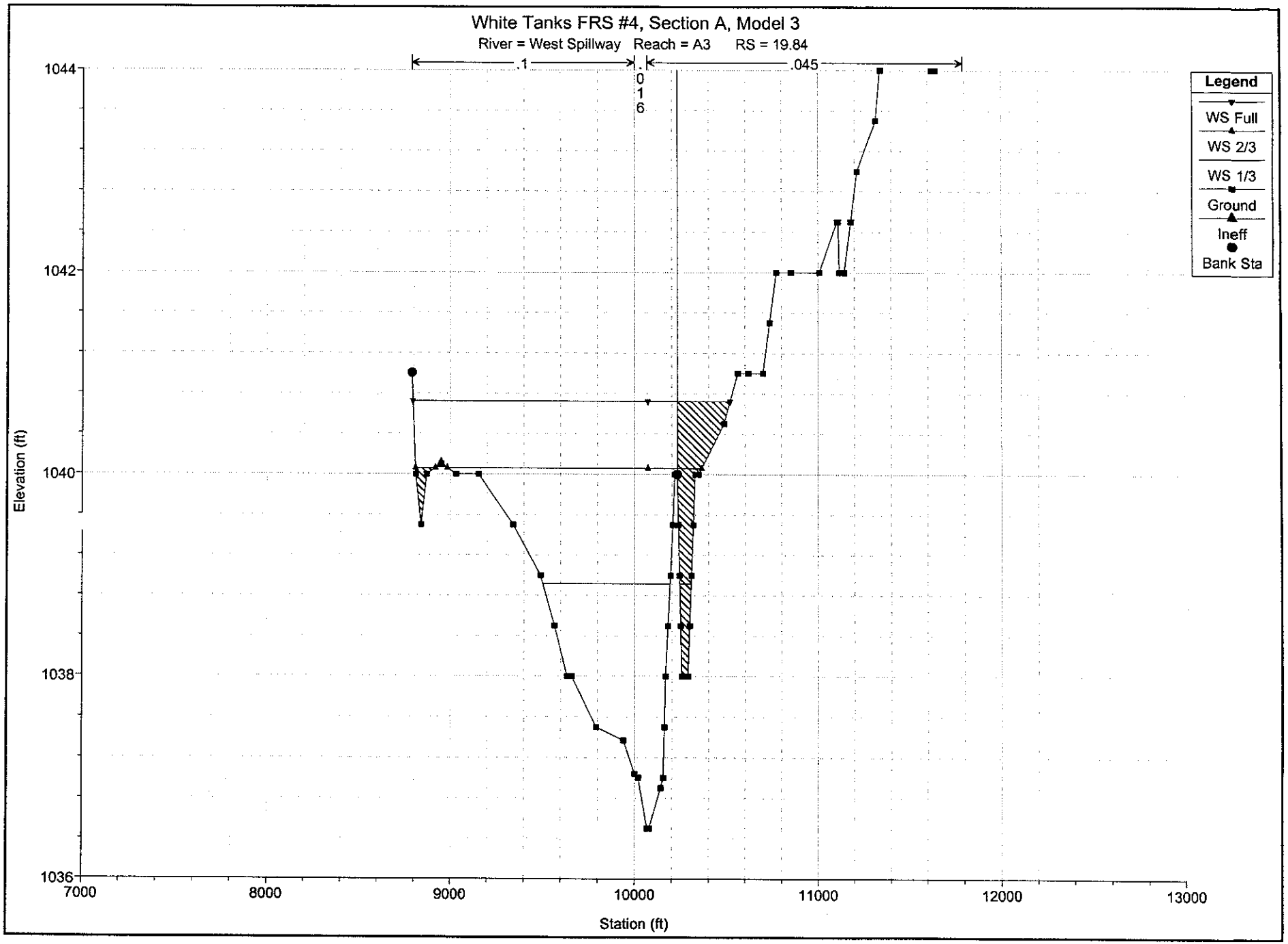
1050
1048
1046
1044
7000
8000
9000
10000
11000
12000
13000
Station (ft)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.1
.016
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
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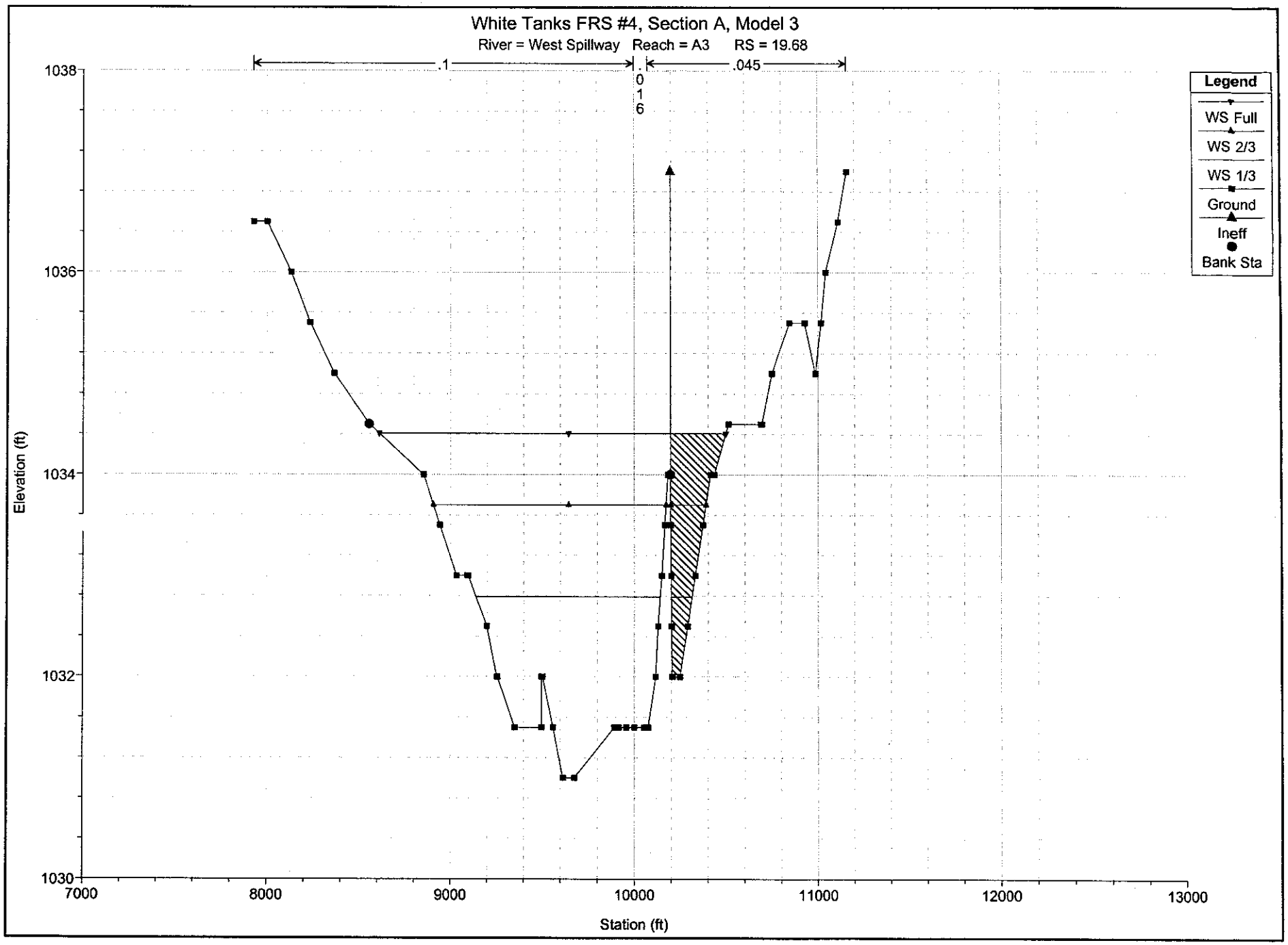
1042
1040
1038
1036
7000
8000
9000
10000
11000
12000
13000
Station (ft)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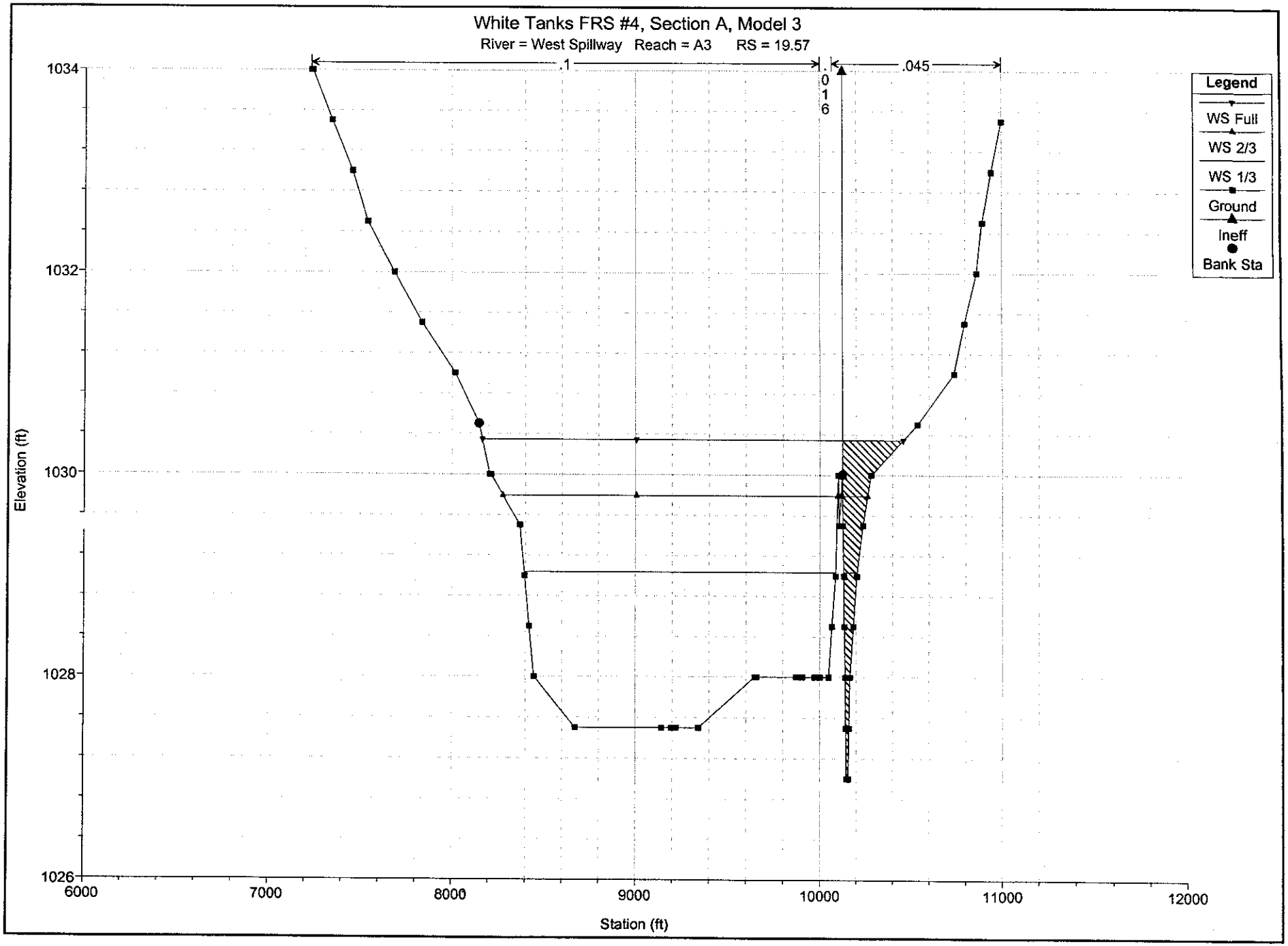
.016
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1038
1036
1034
1032
1030
7000
8000
9000
10000
11000
12000
13000
Station (ft)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.016
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
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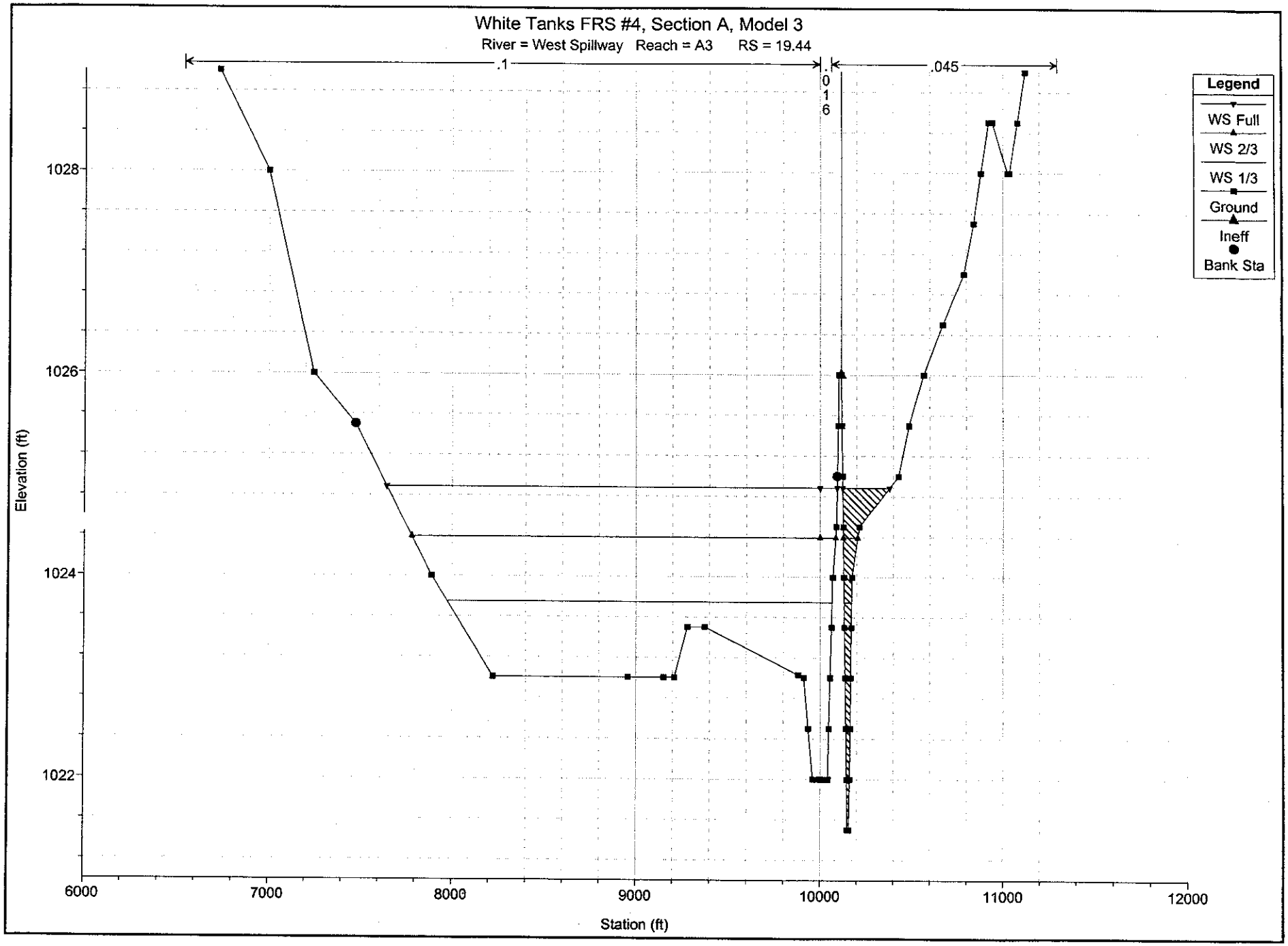
1032
1030
1028
1026
6000
7000
8000
9000
10000
11000
12000
Station (ft)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.016
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
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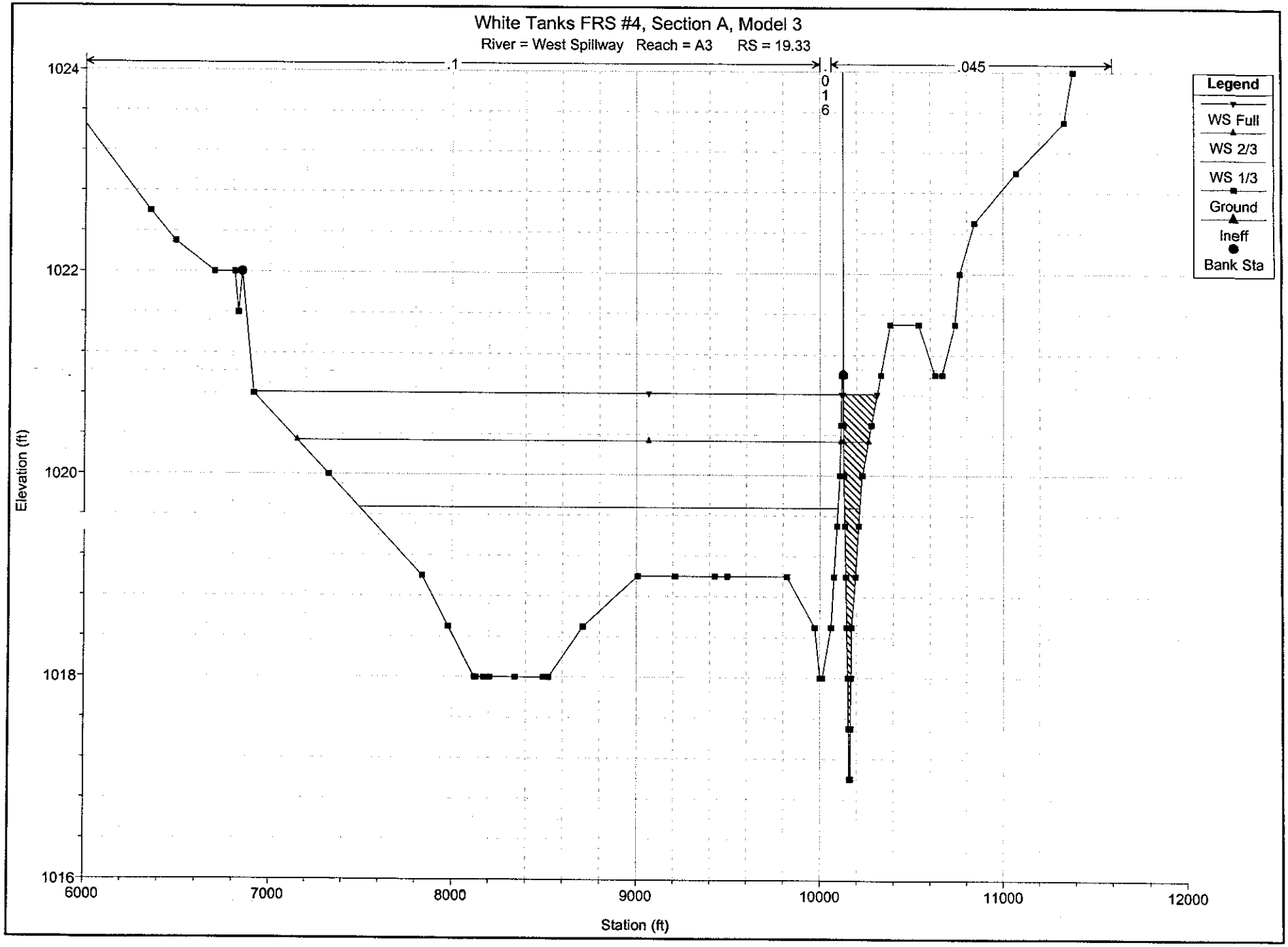
1026
1024
1022
6000
7000
8000
9000
10000
11000
12000
Station (ft)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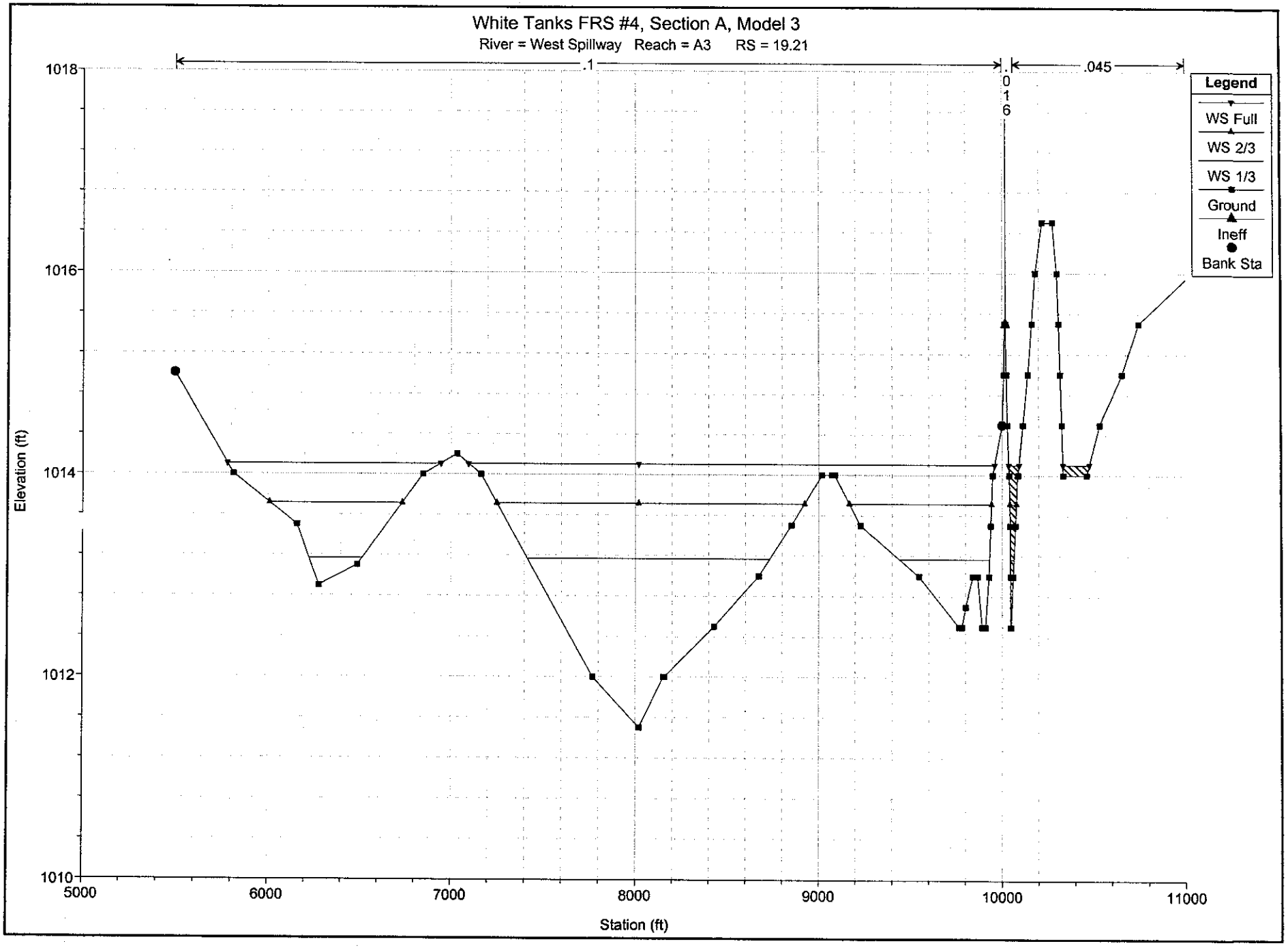
.016
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1024
1022
1020
1018
1016
6000
7000
8000
9000
10000
11000
12000
Station (ft)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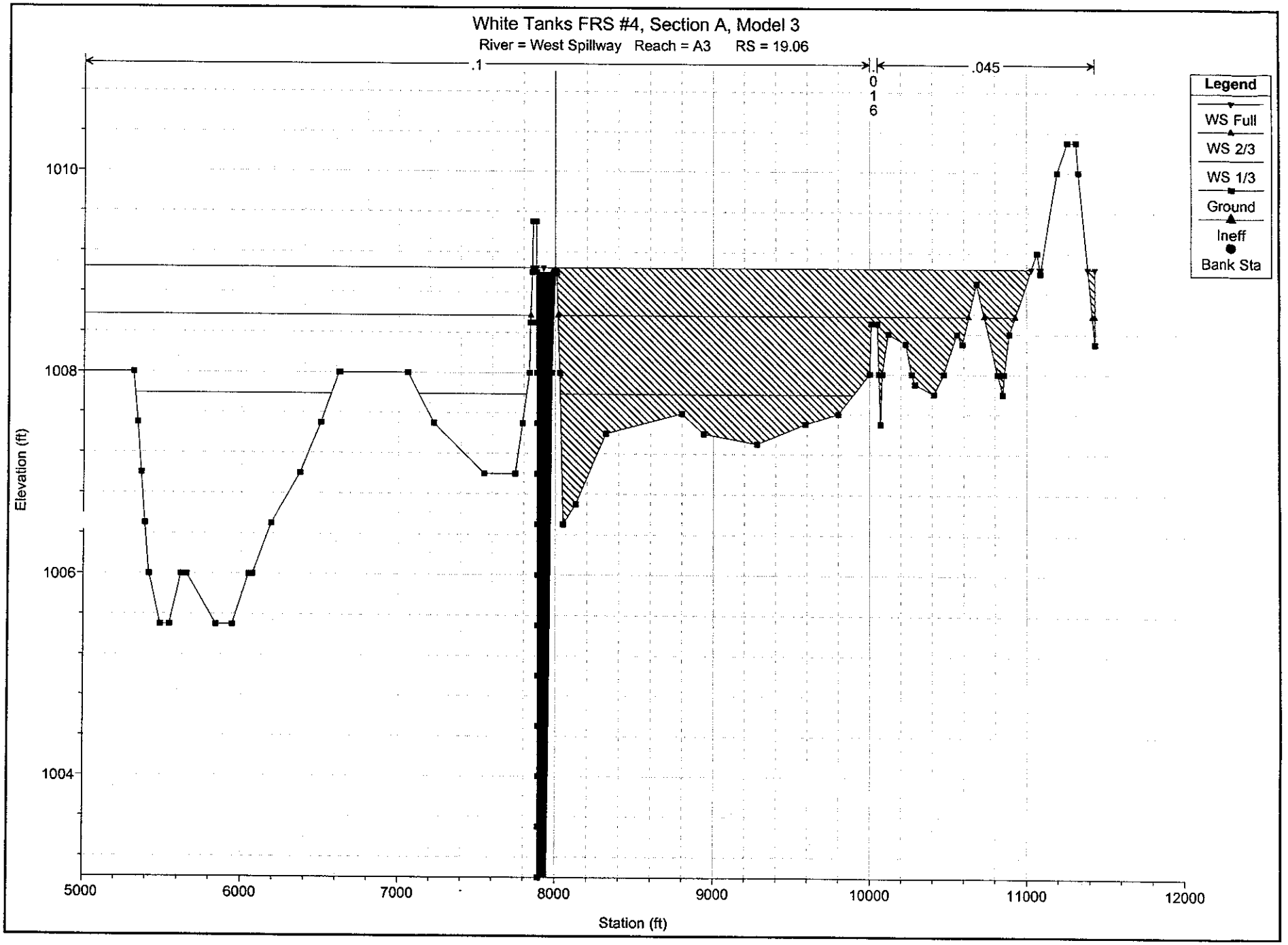
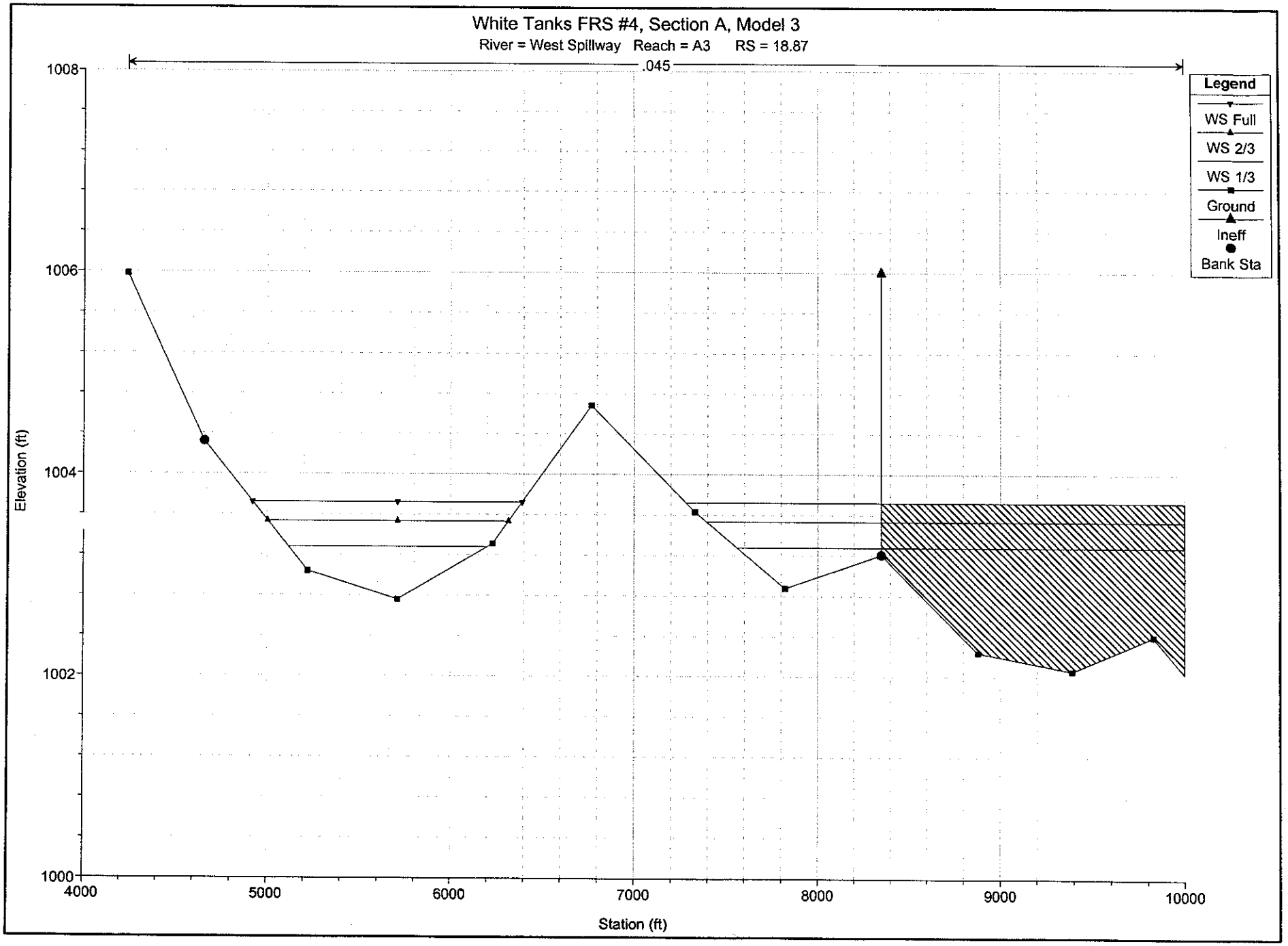
.1
.045
0
1
6
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1018
1016
1014
1012
1010
5000
6000
7000
8000
9000
10000
11000
Station (ft)


White Tanks FRS #4, Section A, Model 3
River = West Spillway Reach = A3 RS = 19.06
.1
.016
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1010
1008
1006
1004
5000
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS #4, Section A, Model 3
River = West Spillway Reach = A3 RS = 18.87
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1008
1006
1004
1002
1000
4000
5000
6000
7000
8000
9000
10000
Station (ft)

```
HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

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

PROJECT DATA
Project Title: White Tanks FRS #4, Section A, Model 4
Project File : WT4A4.prj
Run Date and Time: 06/26/2000 10:08:38 AM

Project in English units

Project Description:
Study Name: White Tanks FRS #4 Spillway Delineation Study
Contract No.: FCD 98-32
Purpose of Study: Delineation of the inundation limits of the 1/3, 2/3, and full spillway discharges for the eastern spillway of the White Tanks Flood Retarding Structure #4.

Model Name: WT4A4
Model Description: Set up to model the portion of east spillway flow which weirs over the Roosevelt Canal to the east of Jackrabbit Trail. Northern boundary is the East Spillway, southern boundary is the Roosevelt Irrigation District Canal.
Flow Profiles: Profile #1, 1/3 spillway discharge for the 1/2 PMF
Sections 20.00 to 19.15, Q=2000 cfs
Sections 19.02 and 18.87, Q=1500 cfs.
Profile #2, 2/3 spillway discharge for the 1/2 PMF
Sections 20.00 to 19.15, Q=4000 cfs
Sections 19.02 and 18.87, Q=3500 cfs.
Profile #3, Full spillway discharge for the 1/2 PMF
Sections 20.00 to 19.15, Q=6000 cfs
Sections 19.02 and 18.87, Q=5000 cfs.

HEC-RAS Version: Version 2.2, September 1998 with RASPATCH

Consultants: Hoskin Engineering Consultants, Inc.
323 W. Roosevelt Street, Suite 200
Phoenix, AZ 85003
(602)252-8384 Phone
(602)252-8385 Fax
HEC 990006

DEI Professional Services, LLC
6225 N. 24th St., Ste. 200
Phoenix, AZ 85016
(602)954-0038 Phone
(602)944-8605 Fax

PLAN DATA

Plan Title: Section A, East of Jackrabbit
Plan File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final models\WT4A4.p02

```
          Geometry Title: Section A, East of Jackrabbit
          Geometry File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White
Tanks\hecras\i10-rsvlt\final models\WT4A4.g02

          Flow Title    : Section A, East of Jackrabbit
          Flow File     : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White
Tanks\hecras\i10-rsvlt\final models\WT4A4.f01

Plan Summary Information:
Number of:  Cross Sections =    8    Mulitple Openings =    0
            Culverts       =    0    Inline Weirs      =    0
            Bridges        =    0

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

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


FLOW DATA

Flow Title: Section A, East of Jackrabbit
Flow File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final
models\WT4A4.f01

Flow Data (cfs)

  River          Reach          RS                 1/3            2/3            Full
  East Spillway  A4             20.00              2000           4000           6000
  East Spillway  A4             19.02              1500           3500           5000


Boundary Conditions

  River          Reach          Profile                     Upstream                Downstream

  East Spillway  A4             1/3                                                   Critical


GEOMETRY DATA

Geometry Title: Section A, East of Jackrabbit
Geometry File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-
rsvlt\final models\WT4A4.g02

CROSS SECTION          RIVER: East Spillway
REACH: A4                 RS: 20.00

INPUT
Description: White Tanks FRS #4 Eastern Spillway
Northern Boundary of HEC-RAS
             Model
1/3 Q=2000 cfs
2/3 Q=4000 cfs
Full Q=6000 cfs
Station Elevation Data    num=      53
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8796	1060	8853.18	1059.5	8912.47	1059	8972.95	1058.5	9033.42	1058
9033.47	1058	9078.32	1057.5	9127.18	1057	9169.03	1056.5	9209.87	1056
9210.87	1056	9284.28	1055.5	9366.39	1055	9440.19	1054.5	9508.73	1054
9548.7	1053.5	9589.92	1053	9635.69	1052.5	9680.18	1052	9681.67	1052
9683.8	1051.5	9685.94	1051	9688.07	1050.5	9693.34	1050	9702.32	1050.5
9712.89	1051	9724.94	1051.5	9736.99	1052	9747.98	1052.5	9758.59	1053
9769.2	1053.5	9779.81	1054	9781.02	1054	9790.07	1054.5	9799.5	1054.5
9807.8	1054	9815.74	1054	9822.5	1053.5	9829.25	1053	9836.01	1052.5
9841.82	1052	9842.63	1052	9852.27	1051.5	9861.91	1051	9871.55	1050.5
9876.3	1050.3	9886.16	1050.1	9909	1050	9946	1049.6	10000	1049
10026	1049.5	10056	1050	10102	1053				

Manning's n Values num= 1

Sta	n Val
8796	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9822.5	10102	1200	1000	800	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
8796	9790.5	1054.5

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1052.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.045	
W.S. Elev (ft)	1051.84	Reach Len. (ft)	1200.00	1000.00	800.00
Crit W.S. (ft)	1051.17	Flow Area (sq ft)		450.01	
E.G. Slope (ft/ft)	0.007776	Area (sq ft)	46.55	450.01	
Q Total (cfs)	2000.00	Flow (cfs)		2000.00	
Top Width (ft)	289.33	Top Width (ft)	50.80	238.52	
Vel Total (ft/s)	4.44	Avg. Vel. (ft/s)		4.44	
Max Chl Dpth (ft)	2.84	Hydr. Depth (ft)		1.89	
Conv. Total (cfs)	22680.7	Conv. (cfs)		22680.7	
Length Wtd. (ft)	1000.00	Wetted Per. (ft)		238.64	
Min Ch El (ft)	1049.00	Shear (lb/sq ft)		0.92	
Alpha	1.00	Stream Power (lb/ft s)		4.07	
Frctn Loss (ft)	10.05	Cum Volume (acre-ft)	0.64	178.54	
C & E Loss (ft)	0.03	Cum SA (acres)	0.70	281.18	

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1053.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.		0.045	
W.S. Elev (ft)	1052.71	Reach Len. (ft)	1200.00	1000.00	800.00
Crit W.S. (ft)	1052.02	Flow Area (sq ft)		670.05	
E.G. Slope (ft/ft)	0.009472	Area (sq ft)	123.82	670.05	
Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	400.85	Top Width (ft)	136.36	264.48	
Vel Total (ft/s)	5.97	Avg. Vel. (ft/s)		5.97	
Max Chl Dpth (ft)	3.71	Hydr. Depth (ft)		2.53	
Conv. Total (cfs)	41098.9	Conv. (cfs)		41098.9	
Length Wtd. (ft)	1000.00	Wetted Per. (ft)		264.66	
Min Ch El (ft)	1049.00	Shear (lb/sq ft)		1.50	
Alpha	1.00	Stream Power (lb/ft s)		8.94	
Frctn Loss (ft)	10.54	Cum Volume (acre-ft)	1.86	304.19	0.80
C & E Loss (ft)	0.10	Cum SA (acres)	3.17	349.91	2.13

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1054.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.81	Wt. n-Val.		0.045	
W.S. Elev (ft)	1053.30	Reach Len. (ft)	1200.00	1000.00	800.00
Crit W.S. (ft)	1052.70	Flow Area (sq ft)		828.64	
E.G. Slope (ft/ft)	0.011170	Area (sq ft)	222.21	828.64	
Q Total (cfs)	6000.00	Flow (cfs)		6000.00	
Top Width (ft)	476.23	Top Width (ft)	199.47	276.76	
Vel Total (ft/s)	7.24	Avg. Vel. (ft/s)		7.24	
Max Chl Dpth (ft)	4.30	Hydr. Depth (ft)		2.99	
Conv. Total (cfs)	56771.2	Conv. (cfs)		56771.2	
Length Wtd. (ft)	1000.00	Wetted Per. (ft)		277.27	
Min Ch El (ft)	1049.00	Shear (lb/sq ft)		2.08	
Alpha	1.00	Stream Power (lb/ft s)		15.09	
Frctn Loss (ft)	10.93	Cum Volume (acre-ft)	4.17	394.00	1.60
C & E Loss (ft)	0.17	Cum SA (acres)	6.65	368.99	2.32

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9841.13	9859.77	7.06	5.13	14.08	0.35	0.36	1.38
9859.77	9878.40	67.90	22.32	18.65	3.39	1.20	3.04
9878.40	9897.03	124.38	32.08	18.63	6.22	1.72	3.88
9897.03	9915.67	138.53	34.23	18.63	6.93	1.84	4.05
9915.67	9934.30	161.44	37.52	18.63	8.07	2.01	4.30
9934.30	9952.93	189.32	41.28	18.63	9.47	2.22	4.59
9952.93	9971.57	219.54	45.11	18.63	10.98	2.42	4.87
9971.57	9990.20	251.72	48.98	18.63	12.59	2.63	5.14
9990.20	10008.83	275.01	51.65	18.64	13.75	2.77	5.32
10008.83	10027.47	230.29	46.43	18.64	11.51	2.49	4.96
10027.47	10046.10	181.62	40.27	18.64	9.08	2.16	4.51
10046.10	10064.73	127.84	32.63	18.65	6.39	1.75	3.92
10064.73	10083.37	25.35	12.36	18.67	1.27	0.66	2.05
10083.37	RB 10102.00	0.01	0.02	0.86	0.00	0.03	0.25

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9822.50	9841.13	3.48	2.53	8.04	0.09	0.32	1.37
9841.13	9859.77	66.83	20.89	18.66	1.67	1.12	3.20
9859.77	9878.40	185.86	38.58	18.65	4.65	2.07	4.82
9878.40	9897.03	270.85	48.35	18.63	6.77	2.59	5.60
9897.03	9915.67	291.17	50.49	18.63	7.28	2.71	5.77
9915.67	9934.30	323.48	53.78	18.63	8.09	2.89	6.01
9934.30	9952.93	362.07	57.54	18.63	9.05	3.09	6.29
9952.93	9971.57	403.18	61.38	18.63	10.08	3.29	6.57
9971.57	9990.20	446.31	65.24	18.63	11.16	3.50	6.84
9990.20	10008.83	477.17	67.91	18.64	11.93	3.64	7.03
10008.83	10027.47	417.65	62.70	18.64	10.44	3.36	6.66
10027.47	10046.10	351.48	56.53	18.64	8.79	3.03	6.22
10046.10	10064.73	275.79	48.89	18.65	6.89	2.62	5.64
10064.73	10083.37	112.93	28.63	18.67	2.82	1.54	3.95
10083.37	RB 10102.00	11.75	6.61	14.27	0.29	0.46	1.78

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9822.50	9841.13	21.81	9.51	15.94	0.36	0.60	2.29
9841.13	9859.77	146.60	31.76	18.66	2.44	1.70	4.62
9859.77	9878.40	306.70	49.46	18.65	5.11	2.65	6.20
9878.40	9897.03	414.36	59.22	18.63	6.91	3.18	7.00
9897.03	9915.67	439.67	61.36	18.63	7.33	3.29	7.16
9915.67	9934.30	479.66	64.65	18.63	7.99	3.47	7.42
9934.30	9952.93	527.09	68.42	18.63	8.78	3.67	7.70
9952.93	9971.57	577.24	72.25	18.63	9.62	3.88	7.99
9971.57	9990.20	629.55	76.11	18.63	10.49	4.08	8.27
9990.20	10008.83	666.78	78.78	18.64	11.11	4.23	8.46
10008.83	10027.47	594.83	73.57	18.64	9.91	3.95	8.09
10027.47	10046.10	514.10	67.40	18.64	8.57	3.62	7.63
10046.10	10064.73	420.48	59.77	18.65	7.01	3.21	7.04
10064.73	10083.37	210.71	39.50	18.67	3.51	2.12	5.33
10083.37	RB 10102.00	50.44	16.86	18.97	0.84	0.90	2.99

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: A4 RS: 19.81

INPUT
Description: 1/3 Q=2000 cfs
2/3 Q=4000 cfs
Full Q=6000 cfs
Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8415.86	1046	8421.46	1046	8482.54	1045.5	8594.62	1045	8602.7	1045
8605.64	1045	8832.38	1044.5	9044.48	1044	9048.28	1044	9062.71	1044
9186.32	1044	9186.51	1044	9186.74	1043.5	9343.33	1043	9419.83	1042.5
9522.4	1042	9525.11	1042	9620.66	1041.5	9729.35	1041	9834.89	1040.5
9885.86	1040.5	9899.91	1040.5	9912.15	1040.5	9951.63	1040.5	10000	1040.5
10065.86	1040.91	10080.01	1041	10115.86	1041.43	10121.02	1041.51	10202.72	1042
10300.02	1042	10512.04	1042	10513.75	1042	10553.83	1042	10560.86	1042
10593.95	1042	10594.28	1042	10596.19	1042.51	10598.11	1043	10600.04	1043.5
10601.97	1044	10602.15	1044	10604.32	1044.51	10606.66	1045	10609.01	1045.5
10611.24	1046	10611.28	1046	10612.53	1046.51	10613.89	1047	10615.24	1047.5
10616.6	1048	10617.95	1048.51	10619.31	1049	10620.59	1049.51	10623.18	1050
10662.12	1050	10665.45	1049.51	10668.07	1049	10669.2	1048.51	10670.33	1048
10671.45	1047.51	10672.58	1047	10674.09	1046.51	10676.37	1046	10678.65	1045.5
10680.93	1045	10683.2	1044.51	10685.48	1044	10695.26	1043.51	10705.15	1043
10715.16	1042.51	10725.17	1042	10806.93	1042	10819.13	1042.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
8415.86	.075	9951.63	.016	10000	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9343.33	10598.11	900	1070	1050	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
10623.18	10819.13	1050

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1042.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.		0.044	
W.S. Elev (ft)	1041.86	Reach Len. (ft)	900.00	1070.00	1050.00
Crit W.S. (ft)	1041.62	Flow Area (sq ft)		543.85	
E.G. Slope (ft/ft)	0.013583	Area (sq ft)		543.85	
Q Total (cfs)	2000.00	Flow (cfs)		2000.00	
Top Width (ft)	627.45	Top Width (ft)		627.45	
Vel Total (ft/s)	3.68	Avg. Vel. (ft/s)		3.68	
Max Chl Dpth (ft)	1.36	Hydr. Depth (ft)		0.87	
Conv. Total (cfs)	17160.6	Conv. (cfs)		17160.6	
Length Wtd. (ft)	1070.00	Wetted Per. (ft)		627.46	
Min Ch El (ft)	1040.50	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		2.70	
Frctn Loss (ft)	8.50	Cum Volume (acre-ft)		167.13	
C & E Loss (ft)	0.05	Cum SA (acres)		271.24	

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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1042.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.		0.046	
W.S. Elev (ft)	1042.42	Reach Len. (ft)	900.00	1070.00	1050.00
Crit W.S. (ft)	1042.15	Flow Area (sq ft)		1099.04	
E.G. Slope (ft/ft)	0.011821	Area (sq ft)		1099.04	37.76
Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	1258.80	Top Width (ft)		1158.61	100.20
Vel Total (ft/s)	3.64	Avg. Vel. (ft/s)		3.64	
Max Chl Dpth (ft)	1.92	Hydr. Depth (ft)		0.95	
Conv. Total (cfs)	36790.2	Conv. (cfs)		36790.2	
Length Wtd. (ft)	1070.00	Wetted Per. (ft)		1158.67	
Min Ch El (ft)	1040.50	Shear (lb/sq ft)		0.70	
Alpha	1.00	Stream Power (lb/ft s)		2.55	
Frctn Loss (ft)	8.46	Cum Volume (acre-ft)	0.16	283.88	0.46
C & E Loss (ft)	0.04	Cum SA (acres)	1.29	333.58	1.21

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1043.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.046	
W.S. Elev (ft)	1042.77	Reach Len. (ft)	900.00	1070.00	1050.00
Crit W.S. (ft)	1042.39	Flow Area (sq ft)		1523.53	
E.G. Slope (ft/ft)	0.010696	Area (sq ft)		1523.53	75.41
Q Total (cfs)	6000.00	Flow (cfs)		6000.00	
Top Width (ft)	1328.37	Top Width (ft)		1218.96	109.41
Vel Total (ft/s)	3.94	Avg. Vel. (ft/s)		3.94	
Max Chl Dpth (ft)	2.27	Hydr. Depth (ft)		1.25	
Conv. Total (cfs)	58013.8	Conv. (cfs)		58013.8	
Length Wtd. (ft)	1070.00	Wetted Per. (ft)		1219.07	
Min Ch El (ft)	1040.50	Shear (lb/sq ft)		0.83	
Alpha	1.00	Stream Power (lb/ft s)		3.29	
Frctn Loss (ft)	8.50	Cum Volume (acre-ft)	1.10	367.00	0.91
C & E Loss (ft)	0.04	Cum SA (acres)	3.90	351.82	1.32

Warning: Divided flow computed for this cross-section.

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9510.63	9594.29	2.27	4.64	42.14	0.11	0.11	0.49
9594.29	9677.94	43.02	35.72	83.65	2.15	0.43	1.20
9677.94	9761.59	126.44	68.20	83.65	6.32	0.82	1.85
9761.59	9845.24	242.93	100.92	83.65	12.15	1.21	2.41
9845.24	9928.89	296.12	113.64	83.65	14.81	1.36	2.61
9928.89	10012.55	953.59	113.15	83.65	47.68	1.35	8.43
10012.55	10096.20	300.74	84.42	83.65	15.04	1.01	3.56
10096.20	10179.85	34.89	23.16	83.41	1.74	0.28	1.51

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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9426.98	9510.63	8.02	13.12	73.38	0.20	0.18	0.61
9510.63	9594.29	61.41	46.90	83.65	1.54	0.56	1.31
9594.29	9677.94	156.69	82.27	83.65	3.92	0.98	1.90
9677.94	9761.59	272.83	114.75	83.65	6.82	1.37	2.38
9761.59	9845.24	414.43	147.47	83.65	10.36	1.76	2.81
9845.24	9928.89	475.75	160.20	83.65	11.89	1.92	2.97
9928.89	10012.55	1533.69	159.70	83.65	38.34	1.91	9.60
10012.55	10096.20	566.84	130.98	83.65	14.17	1.57	4.33
10096.20	10179.85	198.14	69.71	83.66	4.95	0.83	2.84
10179.85	10263.50	66.84	36.32	83.65	1.67	0.43	1.84
10263.50	10347.15	62.00	34.72	83.65	1.55	0.42	1.79
10347.15	10430.81	62.00	34.72	83.65	1.55	0.42	1.79
10430.81	10514.46	62.00	34.72	83.65	1.55	0.42	1.79
10514.46	RB 10598.11	59.34	33.46	81.46	1.48	0.41	1.77

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9343.33	9426.98	4.26	7.71	48.71	0.07	0.16	0.55
9426.98	9510.63	51.45	42.69	83.65	0.86	0.51	1.21
9510.63	9594.29	136.68	76.73	83.65	2.28	0.92	1.78
9594.29	9677.94	257.12	112.10	83.65	4.29	1.34	2.29
9677.94	9761.59	392.93	144.58	83.65	6.55	1.73	2.72
9761.59	9845.24	552.03	177.30	83.65	9.20	2.12	3.11
9845.24	9928.89	619.65	190.03	83.65	10.33	2.27	3.26
9928.89	10012.55	1998.39	189.53	83.65	33.31	2.27	10.54
10012.55	10096.20	781.88	160.81	83.65	13.03	1.92	4.86
10096.20	10179.85	351.53	99.54	83.66	5.86	1.19	3.53
10179.85	10263.50	177.89	66.15	83.65	2.96	0.79	2.69
10263.50	10347.15	170.78	64.55	83.65	2.85	0.77	2.65
10347.15	10430.81	170.78	64.55	83.65	2.85	0.77	2.65
10430.81	10514.46	170.78	64.55	83.65	2.85	0.77	2.65
10514.46	RB 10598.11	163.86	62.73	82.87	2.73	0.76	2.61

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Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION          RIVER: East Spillway
REACH: A4                 RS: 19.61

INPUT
Description: 1/3 Q=2000 cfs
2/3 Q=4000 cfs
Full Q=6000 cfs
Station Elevation Data    num=      77
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    7530  1037.5 7908.15    1037 7974.49  1036.5  8369.7    1036 8369.86    1036
 8477.95  1035.5 8664.47    1035 8781.31  1034.5 8843.79    1034 8843.88    1034
 8846.34    1034 8847.48    1034 8985.29    1034 8986.91    1034 9052.68  1033.5
 9224.98    1033 9301.15  1032.5 9310.59  1032.5  9367.4  1032.5 9591.24    1032
 9705.27    1032 9779.91    1032    9800    1032  9880.2    1032 9958.84    1032
   100001032.41210008.79  1032.510058.74    1033   100701033.11310108.62  1033.5
10171.55    103410173.34    103410180.91    103410337.14  1033.510364.03  1033.5
10396.63    1034 10510.1  1034.510560.22    103510591.76  1035.510623.27    1036
 10623.3    103610642.23  1036.510661.15    103710680.08  1037.510692.89  1037.5
10696.02    103710698.97  1036.510700.43  1036.510701.52    103710702.61  1037.5
10703.69    103810704.78  1038.510706.78    103910711.29  1039.510712.78    1040
 10715.8    104010716.64  1040.510717.48    104110718.33  1041.510719.17    1042
10720.01  1042.510720.85    104310721.69  1043.510722.53    104410723.37  1044.5
10724.22    104510725.06  1045.5 10725.9    104610726.74  1046.510727.58    1047
10728.42  1047.5 10729.5    104810730.82  1048.510732.14    104910733.46  1049.5
 10734.4    105010783.19    1050

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    7530    .075 9958.84    .01610008.79    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       8781.31 10510.1               800     730     750             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
10171.5510783.19    1034

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)            1033.52   Element                   Left OB    Channel   Right OB
  Vel Head (ft)                0.05   Wt. n-Val.                            0.060
  W.S. Elev (ft)            1033.47   Reach Len. (ft)            800.00    730.00     750.00
  Crit W.S. (ft)            1032.77   Flow Area (sq ft)                   1073.68
  E.G. Slope (ft/ft)       0.005277   Area (sq ft)                        1073.68
  Q Total (cfs)             2000.00   Flow (cfs)                          2000.00
  Top Width (ft)            1040.53   Top Width (ft)                      1040.53
  Vel Total (ft/s)             1.86   Avg. Vel. (ft/s)                       1.86
  Max Chl Dpth (ft)            1.47   Hydr. Depth (ft)                       1.03
  Conv. Total (cfs)         27531.0   Conv. (cfs)                        27531.0
  Length Wtd. (ft)           730.00   Wetted Per. (ft)                   1040.54
  Min Ch El (ft)            1032.00   Shear (lb/sq ft)                       0.34
  Alpha                        1.00   Stream Power (lb/ft s)                 0.63
  Frctn Loss (ft)              5.85   Cum Volume (acre-ft)                147.27
  C & E Loss (ft)              0.00   Cum SA (acres)                      250.76


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.

CROSS SECTION OUTPUT    Profile #2/3

  E.G. Elev (ft)            1034.13   Element                   Left OB    Channel   Right OB
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Vel Head (ft)	0.08	Wt. n-Val.		0.059	
W.S. Elev (ft)	1034.05	Reach Len. (ft)	800.00	730.00	750.00
Crit W.S. (ft)	1033.14	Flow Area (sq ft)		1811.28	
E.G. Slope (ft/ft)	0.005592	Area (sq ft)		1811.28	
Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	1570.97	Top Width (ft)		1570.97	
Vel Total (ft/s)	2.21	Avg. Vel. (ft/s)		2.21	
Max Chl Dpth (ft)	2.05	Hydr. Depth (ft)		1.15	
Conv. Total (cfs)	53490.8	Conv. (cfs)		53490.8	
Length Wtd. (ft)	730.00	Wetted Per. (ft)		1570.99	
Min Ch El (ft)	1032.00	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)		0.89	
Frctn Loss (ft)	6.07	Cum Volume (acre-ft)	0.16	248.14	
C & E Loss (ft)	0.00	Cum SA (acres)	1.29	300.06	

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.

CROSS SECTION OUTPUT Profile #Full

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1034.47				
Vel Head (ft)	0.10	Wt. n-Val.		0.059	
W.S. Elev (ft)	1034.37	Reach Len. (ft)	800.00	730.00	750.00
Crit W.S. (ft)	1033.44	Flow Area (sq ft)		2327.19	
E.G. Slope (ft/ft)	0.006124	Area (sq ft)		2327.19	
Q Total (cfs)	6000.00	Flow (cfs)		6000.00	
Top Width (ft)	1682.57	Top Width (ft)		1682.57	
Vel Total (ft/s)	2.58	Avg. Vel. (ft/s)		2.58	
Max Chl Dpth (ft)	2.37	Hydr. Depth (ft)		1.38	
Conv. Total (cfs)	76668.5	Conv. (cfs)		76668.5	
Length Wtd. (ft)	730.00	Wetted Per. (ft)		1682.59	
Min Ch El (ft)	1032.00	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)		1.36	
Frctn Loss (ft)	6.06	Cum Volume (acre-ft)	1.10	319.71	
C & E Loss (ft)	0.01	Cum SA (acres)	3.90	316.19	

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9011.81	9127.07	1.51	5.66	62.44	0.08	0.09	0.27
9127.07	9242.32	27.01	40.70	115.25	1.35	0.35	0.66
9242.32	9357.57	120.58	99.90	115.25	6.03	0.87	1.21
9357.57	9472.83	172.11	123.67	115.25	8.61	1.07	1.39
9472.83	9588.08	246.01	153.23	115.25	12.30	1.33	1.61
9588.08	9703.33	289.27	168.87	115.25	14.46	1.47	1.71
9703.33	9818.58	289.30	168.88	115.25	14.47	1.47	1.71
9818.58	9933.84	289.30	168.88	115.25	14.46	1.47	1.71
9933.84	10049.09	549.95	128.12	115.26	27.50	1.11	4.29
10049.09	10164.34	14.95	15.75	56.07	0.75	0.28	0.95

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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta	Right Sta	Flow	Area	W.P.	% Conv.	Hydr D.	Velocity

(ft)	(ft)	(cfs)	(sq ft)	(ft)		(ft)	(ft/s)
LB 8781.31	8896.56	0.50	2.88	59.21	0.01	0.05	0.17
8896.56	9011.81	1.86	8.29	115.25	0.05	0.07	0.22
9011.81	9127.07	57.98	65.24	115.25	1.45	0.57	0.89
9127.07	9242.32	134.86	108.26	115.25	3.37	0.94	1.25
9242.32	9357.57	278.99	167.46	115.25	6.97	1.45	1.67
9357.57	9472.83	348.08	191.23	115.25	8.70	1.66	1.82
9472.83	9588.08	442.31	220.79	115.25	11.06	1.92	2.00
9588.08	9703.33	495.75	236.43	115.25	12.39	2.05	2.10
9703.33	9818.58	495.79	236.44	115.25	12.39	2.05	2.10
9818.58	9933.84	495.79	236.44	115.25	12.39	2.05	2.10
9933.84	10049.09	1062.42	195.68	115.26	26.56	1.70	5.43
10049.09	10164.34	106.05	68.99	115.26	2.65	0.60	1.54
10164.34	10279.59	15.46	21.73	115.25	0.39	0.19	0.71
10279.59	10394.85	64.06	50.98	115.26	1.60	0.44	1.26
10394.85	RB 10510.10	0.09	0.42	13.47	0.00	0.03	0.21

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8781.31	8896.56	16.84	27.95	98.84	0.28	0.28	0.60
8896.56	9011.81	33.44	44.85	115.25	0.56	0.39	0.75
9011.81	9127.07	131.09	101.79	115.25	2.18	0.88	1.29
9127.07	9242.32	235.89	144.82	115.25	3.93	1.26	1.63
9242.32	9357.57	417.60	204.01	115.25	6.96	1.77	2.05
9357.57	9472.83	501.82	227.78	115.25	8.36	1.98	2.20
9472.83	9588.08	615.00	257.34	115.25	10.25	2.23	2.39
9588.08	9703.33	678.55	272.98	115.25	11.31	2.37	2.49
9703.33	9818.58	678.60	272.99	115.25	11.31	2.37	2.49
9818.58	9933.84	678.59	272.99	115.25	11.31	2.37	2.49
9933.84	10049.09	1512.10	232.23	115.26	25.20	2.01	6.51
10049.09	10164.34	232.02	105.54	115.26	3.87	0.92	2.20
10164.34	10279.59	86.24	58.28	115.25	1.44	0.51	1.48
10279.59	10394.85	169.88	87.53	115.26	2.83	0.76	1.94
10394.85	RB 10510.10	12.34	16.10	85.45	0.21	0.19	0.77

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

CROSS SECTION RIVER: East Spillway
REACH: A4 RS: 19.47

INPUT
Description: 1/3 Q=2000 cfs
2/3 Q=4000 cfs
Full Q=6000 cfs
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6222.15	1031	6388.53	1031	6417.56	1030.5	6447.41	1030	6447.89	1030
6593.69	1029.5	6795.31	1029	6802.03	1028.5	6805.56	1028	6807.47	1028
6878.91	1028	6881.87	1028	6928.24	1028.5	7016.14	1029	7102.52	1029
7124.11	1029	7188.79	1029.5	7252.94	1030	7253.42	1030	7352.7	1030
7362.55	1030	7424.94	1029.5	7449.59	1029.5	7464.59	1029.5	7767.39	1029
7852.82	1028.5	8008.81	1028.5	8072.41	1028.5	8132.41	1028.5	8186.13	1029
8270.76	1029	8358.58	1028.5	8428.72	1028	8429.77	1028	8464.15	1027.5
8510.99	1027.5	8596.88	1027.5	8654.48	1027	8688.47	1026.5	8732.66	1026.5
8764.87	1026.5	8768.47	1026	8772.51	1026	8788.07	1026	8789.21	1026
8796.14	1026.5	8806.74	1026.5	8810.22	1026	8813.71	1026	8814.98	1026
8835.34	1026	8864.01	1026	8905.34	1026.5	8946.67	1027	8949.42	1027

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 8960.86  1026.5 8994.12    1026 8994.14    1026  9001.5    1026 9025.48    1026
 9027.36    1026 9075.61    1026 9076.58    1026 9076.69    1026 9078.12    1026
 9364.41    1026 9403.47    1026 9487.49  1026.5    9680  1026.9 9742.15  1026.5
 9767.19  1026.5    9800  1026.7 9933.42    1027 9940.03  1027.5 9943.87  1027.5
 9953.43    1027 9960.42  1026.5 9962.15  1026.5   10000  1026.510022.151026.841
10032.52    102710178.54  1027.510493.15    102810493.33    1028 10665.7  1028.5
10867.14    102910997.14  1029.511109.98    1030

Manning's n Values          num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 6222.15    .075 8814.98      .1 9960.42    .016   10000      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       8358.58 10665.7               860     920     910              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
 6222.15 8270.76    1029
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 8654.48    9680  1026.9
```

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1027.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.076	
W.S. Elev (ft)	1027.62	Reach Len. (ft)	860.00	920.00	910.00
Crit W.S. (ft)	1027.26	Flow Area (sq ft)		1133.48	
E.G. Slope (ft/ft)	0.013650	Area (sq ft)		1133.48	
Q Total (cfs)	2000.00	Flow (cfs)		2000.00	
Top Width (ft)	1795.59	Top Width (ft)		1795.59	
Vel Total (ft/s)	1.76	Avg. Vel. (ft/s)		1.76	
Max Chl Dpth (ft)	1.12	Hydr. Depth (ft)		0.63	
Conv. Total (cfs)	17118.5	Conv. (cfs)		17118.5	
Length Wtd. (ft)	920.00	Wetted Per. (ft)		1795.65	
Min Ch El (ft)	1026.50	Shear (lb/sq ft)		0.54	
Alpha	1.00	Stream Power (lb/ft s)		0.95	
Frctn Loss (ft)	7.41	Cum Volume (acre-ft)		128.77	
C & E Loss (ft)	0.01	Cum SA (acres)		226.99	

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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1028.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.079	
W.S. Elev (ft)	1027.99	Reach Len. (ft)	860.00	920.00	910.00
Crit W.S. (ft)	1027.51	Flow Area (sq ft)		1848.87	
E.G. Slope (ft/ft)	0.013629	Area (sq ft)		1848.87	
Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	2054.95	Top Width (ft)		2054.95	
Vel Total (ft/s)	2.16	Avg. Vel. (ft/s)		2.16	
Max Chl Dpth (ft)	1.49	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	34263.8	Conv. (cfs)		34263.8	
Length Wtd. (ft)	920.00	Wetted Per. (ft)		2055.01	
Min Ch El (ft)	1026.50	Shear (lb/sq ft)		0.77	
Alpha	1.00	Stream Power (lb/ft s)		1.66	
Frctn Loss (ft)	7.39	Cum Volume (acre-ft)	0.16	217.47	
C & E Loss (ft)	0.02	Cum SA (acres)	1.29	269.67	

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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1028.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.081	
W.S. Elev (ft)	1028.32	Reach Len. (ft)	860.00	920.00	910.00
Crit W.S. (ft)	1027.69	Flow Area (sq ft)		2560.23	
E.G. Slope (ft/ft)	0.012137	Area (sq ft)	29.58	2560.23	
Q Total (cfs)	6000.00	Flow (cfs)		6000.00	
Top Width (ft)	2328.32	Top Width (ft)	108.29	2220.03	
Vel Total (ft/s)	2.34	Avg. Vel. (ft/s)		2.34	
Max Chl Dpth (ft)	1.82	Hydr. Depth (ft)		1.15	
Conv. Total (cfs)	54461.9	Conv. (cfs)		54461.9	
Length Wtd. (ft)	920.00	Wetted Per. (ft)		2220.10	
Min Ch El (ft)	1026.50	Shear (lb/sq ft)		0.87	
Alpha	1.00	Stream Power (lb/ft s)		2.05	
Frctn Loss (ft)	7.48	Cum Volume (acre-ft)	0.83	278.76	
C & E Loss (ft)	0.02	Cum SA (acres)	2.91	283.49	

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8358.58	8512.39	3.09	6.08	56.24	0.15	0.11	0.51
8512.39	8666.20	35.00	38.98	153.81	1.75	0.25	0.90
8666.20	8820.00	196.12	110.17	153.81	9.81	0.72	1.78
8820.00	8973.81	146.50	109.37	153.81	7.33	0.71	1.34
8973.81	9127.62	148.30	110.17	153.81	7.41	0.72	1.35
9127.62	9281.43	148.30	110.17	153.81	7.41	0.72	1.35
9281.43	9435.24	148.30	110.17	153.81	7.41	0.72	1.35
9435.24	9589.04	148.30	110.17	153.81	7.41	0.72	1.35
9589.04	9742.85	177.90	122.89	153.81	8.89	0.80	1.45
9742.85	9896.66	217.37	138.59	153.81	10.87	0.90	1.57
9896.66	10050.47	596.59	119.46	153.86	29.83	0.78	4.99
10050.47	10204.28	33.91	45.45	153.81	1.70	0.30	0.75
10204.28	10358.08	0.34	1.79	47.46	0.02	0.04	0.19

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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8358.58	8512.39	37.98	31.72	81.79	0.95	0.39	1.20
8512.39	8666.20	158.23	96.14	153.81	3.96	0.63	1.65
8666.20	8820.00	395.25	167.33	153.81	9.88	1.09	2.36
8820.00	8973.81	296.49	166.52	153.81	7.41	1.08	1.78
8973.81	9127.62	298.88	167.33	153.81	7.47	1.09	1.79
9127.62	9281.43	298.88	167.33	153.81	7.47	1.09	1.79
9281.43	9435.24	298.88	167.33	153.81	7.47	1.09	1.79
9435.24	9589.04	298.88	167.33	153.81	7.47	1.09	1.79
9589.04	9742.85	337.67	180.04	153.81	8.44	1.17	1.88
9742.85	9896.66	388.16	195.74	153.81	9.70	1.27	1.98
9896.66	10050.47	1013.82	176.62	153.86	25.35	1.15	5.74
10050.47	10204.28	132.28	102.61	153.81	3.31	0.67	1.29
10204.28	10358.08	39.85	49.95	153.81	1.00	0.32	0.80
10358.08	10511.89	4.73	12.91	127.46	0.12	0.10	0.37

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8358.58	8512.39	91.53	66.73	128.62	1.53	0.52	1.37
8512.39	8666.20	304.00	147.28	153.81	5.07	0.96	2.06
8666.20	8820.00	581.74	218.47	153.81	9.70	1.42	2.66
8820.00	8973.81	437.21	217.67	153.81	7.29	1.42	2.01
8973.81	9127.62	439.90	218.47	153.81	7.33	1.42	2.01
9127.62	9281.43	439.90	218.47	153.81	7.33	1.42	2.01
9281.43	9435.24	439.90	218.47	153.81	7.33	1.42	2.01
9435.24	9589.04	439.90	218.47	153.81	7.33	1.42	2.01
9589.04	9742.85	483.38	231.18	153.81	8.06	1.50	2.09
9742.85	9896.66	539.32	246.88	153.81	8.99	1.61	2.18
9896.66	10050.47	1375.65	227.76	153.86	22.93	1.48	6.04
10050.47	10204.28	244.94	153.75	153.81	4.08	1.00	1.59
10204.28	10358.08	121.78	101.10	153.81	2.03	0.66	1.20
10358.08	10511.89	55.78	63.28	153.81	0.93	0.41	0.88
10511.89	RB 10665.70	5.09	12.25	91.90	0.08	0.13	0.42

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: East Spillway
REACH: A4 RS: 19.30

INPUT
Description: 1/3 Q=2000 cfs
2/3 Q=4000 cfs
Full Q=6000 cfs
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5440	1021.5	5581.05	1021.5	5986.79	1021.5	6118.77	1021.5	6197.42	1021.5
6219.23	1021.5	6236.56	1021.5	6399.89	1021	6694.22	1021	6721.27	1021
6775.75	1020.5	6829.64	1020.5	6836.51	1021	6853.93	1021	6875.71	1021
7036.85	1021	7118.87	1020.5	7177.06	1020	7179.54	1020	7494.26	1019.5
8199.47	1019	8518.27	1019	8587.17	1019	8592.2	1019	8660.62	1019.5
9041.97	1020	9042.45	1020	9198.03	1020.5	9302.92	1020.5	9351.45	1020.5
9359.31	1020.5	9680.84	1020	9683.02	1020	9780	1019.621	9810.98	1019.5
10000	1019.5	10001.98	1019.5	10004.98	1019.5	10035.37	1019.5	10060	1019.5
10290.06	1019.5	10571.1	1020	10574.51	1020	10682.18	1020.5	10840.14	1021
10953.19	1021.5	11035.6	1022	11138.78	1022.5	11231.94	1023		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
5440	.045	6836.51	.11	0001.98	.016	10035.37	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
7036.85	10840.14	730	750	830	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5440	7036.85	1021

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1020.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.094	
W.S. Elev (ft)	1020.24	Reach Len. (ft)	730.00	750.00	830.00
Crit W.S. (ft)	1019.63	Flow Area (sq ft)		2174.66	
E.G. Slope (ft/ft)	0.005313	Area (sq ft)		2174.66	

Q Total (cfs)	2000.00	Flow (cfs)	2000.00
Top Width (ft)	3062.10	Top Width (ft)	3062.10
Vel Total (ft/s)	0.92	Avg. Vel. (ft/s)	0.92
Max Chl Dpth (ft)	1.24	Hydr. Depth (ft)	0.71
Conv. Total (cfs)	27437.8	Conv. (cfs)	27437.8
Length Wtd. (ft)	750.00	Wetted Per. (ft)	3062.11
Min Ch El (ft)	1019.00	Shear (lb/sq ft)	0.24
Alpha	1.00	Stream Power (lb/ft s)	0.22
Frctn Loss (ft)	6.63	Cum Volume (acre-ft)	93.84
C & E Loss (ft)	0.00	Cum SA (acres)	175.69

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	1020.66	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.094	
W.S. Elev (ft)	1020.64	Reach Len. (ft)	730.00	750.00	830.00
Crit W.S. (ft)	1019.83	Flow Area (sq ft)		3524.68	
E.G. Slope (ft/ft)	0.005347	Area (sq ft)	8.59	3524.68	
Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	3700.26	Top Width (ft)	70.80	3629.46	
Vel Total (ft/s)	1.13	Avg. Vel. (ft/s)		1.13	
Max Chl Dpth (ft)	1.64	Hydr. Depth (ft)		0.97	
Conv. Total (cfs)	54703.2	Conv. (cfs)		54703.2	
Length Wtd. (ft)	750.00	Wetted Per. (ft)		3629.47	
Min Ch El (ft)	1019.00	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)		0.37	
Frctn Loss (ft)	6.81	Cum Volume (acre-ft)	0.07	160.72	
C & E Loss (ft)	0.00	Cum SA (acres)	0.59	209.64	

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

			Left OB	Channel	Right OB
E.G. Elev (ft)	1020.91	Element			
Vel Head (ft)	0.03	Wt. n-Val.		0.094	
W.S. Elev (ft)	1020.88	Reach Len. (ft)	730.00	750.00	830.00
Crit W.S. (ft)	1019.98	Flow Area (sq ft)		4428.74	
E.G. Slope (ft/ft)	0.005871	Area (sq ft)	29.63	4428.74	
Q Total (cfs)	6000.00	Flow (cfs)		6000.00	
Top Width (ft)	3847.98	Top Width (ft)	100.88	3747.10	
Vel Total (ft/s)	1.35	Avg. Vel. (ft/s)		1.35	
Max Chl Dpth (ft)	1.88	Hydr. Depth (ft)		1.18	
Conv. Total (cfs)	78304.6	Conv. (cfs)		78304.6	
Length Wtd. (ft)	750.00	Wetted Per. (ft)		3747.11	
Min Ch El (ft)	1019.00	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		0.59	
Frctn Loss (ft)	6.85	Cum Volume (acre-ft)	0.25	204.95	
C & E Loss (ft)	0.00	Cum SA (acres)	0.85	220.47	

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 7036.85	7290.40	16.69	39.71	140.77	0.83	0.28	0.42
7290.40	7543.96	108.38	154.39	253.55	5.42	0.61	0.70
7543.96	7797.51	192.98	218.25	253.55	9.65	0.86	0.88
7797.51	8051.06	264.73	263.84	253.55	13.24	1.04	1.00
8051.06	8304.61	338.01	305.50	253.55	16.90	1.20	1.11
8304.61	8558.17	352.53	313.30	253.55	17.63	1.24	1.13
8558.17	8811.72	174.81	205.68	253.55	8.74	0.81	0.85
8811.72	9065.27	47.12	93.67	253.55	2.36	0.37	0.50
9065.27	9318.82	0.75	4.10	50.51	0.04	0.08	0.18
9318.82	9572.38	0.15	1.44	43.08	0.01	0.03	0.10
9572.38	9825.93	44.15	90.08	253.55	2.21	0.36	0.49
9825.93	10079.48	251.22	186.53	253.55	12.56	0.74	1.35
10079.48	10333.03	146.36	184.88	253.55	7.32	0.73	0.79
10333.03	10586.59	61.44	109.83	253.55	3.07	0.43	0.56
10586.59	RB 10840.14	0.68	3.47	38.67	0.03	0.09	0.20

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 7036.85	7290.40	69.58	106.18	194.14	1.74	0.55	0.66
7290.40	7543.96	253.05	256.36	253.55	6.33	1.01	0.99
7543.96	7797.51	366.61	320.22	253.55	9.17	1.26	1.14
7797.51	8051.06	457.65	365.81	253.55	11.44	1.44	1.25
8051.06	8304.61	547.77	407.46	253.55	13.69	1.61	1.34
8304.61	8558.17	565.38	415.27	253.55	14.13	1.64	1.36
8558.17	8811.72	342.93	307.65	253.55	8.57	1.21	1.11
8811.72	9065.27	161.26	195.64	253.55	4.03	0.77	0.82
9065.27	9318.82	24.57	63.26	253.55	0.61	0.25	0.39
9318.82	9572.38	29.25	70.24	253.55	0.73	0.28	0.42
9572.38	9825.93	156.36	192.04	253.55	3.91	0.76	0.81
9825.93	10079.48	521.10	288.50	253.55	13.03	1.14	1.81
10079.48	10333.03	305.17	286.85	253.55	7.63	1.13	1.06
10333.03	10586.59	184.07	211.79	253.55	4.60	0.84	0.87
10586.59	RB 10840.14	15.26	37.39	139.13	0.38	0.27	0.41

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 7036.85	7290.40	128.98	158.70	234.35	2.15	0.68	0.81
7290.40	7543.96	390.85	318.51	253.55	6.51	1.26	1.23
7543.96	7797.51	529.99	382.37	253.55	8.83	1.51	1.39
7797.51	8051.06	639.43	427.96	253.55	10.66	1.69	1.49
8051.06	8304.61	746.50	469.62	253.55	12.44	1.85	1.59
8304.61	8558.17	767.30	477.42	253.55	12.79	1.88	1.61
8558.17	8811.72	501.27	369.80	253.55	8.35	1.46	1.36
8811.72	9065.27	274.72	257.79	253.55	4.58	1.02	1.07
9065.27	9318.82	82.67	125.41	253.55	1.38	0.49	0.66
9318.82	9572.38	90.49	132.40	253.55	1.51	0.52	0.68
9572.38	9825.93	268.37	254.19	253.55	4.47	1.00	1.06
9825.93	10079.48	775.91	350.65	253.55	12.93	1.38	2.21

10079.48	10333.03	455.17	349.00	253.55	7.59	1.38	1.30
10333.03	10586.59	304.02	273.94	253.55	5.07	1.08	1.11
10586.59	RB 10840.14	44.31	80.99	216.57	0.74	0.37	0.55

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: East Spillway
REACH: A4 RS: 19.15

INPUT
Description: 1/3 Q=2000 cfs
2/3 Q=4000 cfs
Full Q=6000 cfs
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5413.61	1014.5	5496.77	1015	5609.3	1015	5748.62	1014.5	5914.6	1014
5915.55	1014	6375.55	1013.5	8605.61	1013	8979.76	1013	9639.57	1013.5
9783.29	1013.5	9783.61	1013.5	9845.63	1013.5	9918.46	1013.5	9949.42	1013
9992.34	1012.5	10000	1012.5	10013.61	1012.52	10063.61	1012.622	10259.7	1013
10417.34	1013.5	10635.63	1014	10640.6	1014	10966.28	1014.5	11200.61	1015

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5413.61	.1	9949.42	.016	9992.34	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5748.62	10966.28	670	700	770	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5413.61	5609.3	1015

CROSS SECTION OUTPUT Profile #1/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	1013.62	Element			
Vel Head (ft)	0.03	Wt. n-Val.		0.083	
W.S. Elev (ft)	1013.59	Reach Len. (ft)	670.00	700.00	770.00
Crit W.S. (ft)	1013.36	Flow Area (sq ft)		1570.41	
E.G. Slope (ft/ft)	0.017530	Area (sq ft)		1570.41	
Q Total (cfs)	2000.00	Flow (cfs)		2000.00	
Top Width (ft)	4167.06	Top Width (ft)		4167.06	
Vel Total (ft/s)	1.27	Avg. Vel. (ft/s)		1.27	
Max Chl Dpth (ft)	1.09	Hydr. Depth (ft)		0.38	
Conv. Total (cfs)	15105.6	Conv. (cfs)		15105.6	
Length Wtd. (ft)	700.00	Wetted Per. (ft)		4167.07	
Min Ch El (ft)	1012.50	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)		0.53	
Frctn Loss (ft)	4.29	Cum Volume (acre-ft)		61.60	
C & E Loss (ft)	0.01	Cum SA (acres)		113.46	

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.

CROSS SECTION OUTPUT Profile #2/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	1013.85	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.087	
W.S. Elev (ft)	1013.81	Reach Len. (ft)	670.00	700.00	770.00
Crit W.S. (ft)	1013.52	Flow Area (sq ft)		2507.33	
E.G. Slope (ft/ft)	0.018646	Area (sq ft)		2507.33	
Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	4461.66	Top Width (ft)		4461.66	

Vel Total (ft/s)	1.60	Avg. Vel. (ft/s)	1.60
Max Chl Dpth (ft)	1.31	Hydr. Depth (ft)	0.56
Conv. Total (cfs)	29293.1	Conv. (cfs)	29293.1
Length Wtd. (ft)	700.00	Wetted Per. (ft)	4461.67
Min Ch El (ft)	1012.50	Shear (lb/sq ft)	0.65
Alpha	1.00	Stream Power (lb/ft s)	1.04
Frctn Loss (ft)	4.06	Cum Volume (acre-ft)	108.79
C & E Loss (ft)	0.01	Cum SA (acres)	139.99

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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1014.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.089	
W.S. Elev (ft)	1014.02	Reach Len. (ft)	670.00	700.00	770.00
Crit W.S. (ft)	1013.63	Flow Area (sq ft)		3454.65	
E.G. Slope (ft/ft)	0.016536	Area (sq ft)		3454.65	
Q Total (cfs)	6000.00	Flow (cfs)		6000.00	
Top Width (ft)	4741.12	Top Width (ft)		4741.12	
Vel Total (ft/s)	1.74	Avg. Vel. (ft/s)		1.74	
Max Chl Dpth (ft)	1.52	Hydr. Depth (ft)		0.73	
Conv. Total (cfs)	46659.4	Conv. (cfs)		46659.4	
Length Wtd. (ft)	700.00	Wetted Per. (ft)		4741.13	
Min Ch El (ft)	1012.50	Shear (lb/sq ft)		0.75	
Alpha	1.00	Stream Power (lb/ft s)		1.31	
Frctn Loss (ft)	4.06	Cum Volume (acre-ft)		137.09	
C & E Loss (ft)	0.01	Cum SA (acres)		147.40	

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
6096.46	6444.31	3.27	10.80	153.72	0.16	0.07	0.30
6444.31	6792.15	25.23	51.05	347.84	1.26	0.15	0.49
6792.15	7140.00	51.32	78.17	347.84	2.57	0.22	0.66
7140.00	7487.84	84.33	105.30	347.84	4.22	0.30	0.80
7487.84	7835.68	123.57	132.44	347.84	6.18	0.38	0.93
7835.68	8183.53	168.59	159.57	347.84	8.43	0.46	1.06
8183.53	8531.37	219.01	186.69	347.84	10.95	0.54	1.17
8531.37	8879.22	256.84	205.43	347.84	12.84	0.59	1.25
8879.22	9227.06	211.59	182.88	347.84	10.58	0.53	1.16
9227.06	9574.90	71.05	95.02	347.84	3.55	0.27	0.75
9574.90	9922.75	12.72	33.86	347.84	0.64	0.10	0.38
9922.75	10270.59	736.15	279.66	347.85	36.81	0.80	2.63
10270.59	10618.44	36.32	49.57	187.07	1.82	0.26	0.73

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

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 5748.62	6096.46	0.00	0.02	5.66	0.00	0.00	0.04
6096.46	6444.31	41.12	65.86	347.84	1.03	0.19	0.62

6444.31	6792.15	122.18	126.59	347.84	3.05	0.36	0.97
6792.15	7140.00	168.86	153.71	347.84	4.22	0.44	1.10
7140.00	7487.84	221.41	180.84	347.84	5.54	0.52	1.22
7487.84	7835.68	279.50	207.98	347.84	6.99	0.60	1.34
7835.68	8183.53	342.88	235.11	347.84	8.57	0.68	1.46
8183.53	8531.37	411.31	262.23	347.84	10.28	0.75	1.57
8531.37	8879.22	461.44	280.96	347.84	11.54	0.81	1.64
8879.22	9227.06	401.38	258.41	347.84	10.03	0.74	1.55
9227.06	9574.90	200.82	170.56	347.84	5.02	0.49	1.18
9574.90	9922.75	95.80	109.39	347.84	2.39	0.31	0.88
9922.75	10270.59	1157.63	355.20	347.85	28.94	1.02	3.26
10270.59	10618.44	95.66	100.48	281.88	2.39	0.36	0.95

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 5748.62	6096.46	8.51	20.63	186.97	0.14	0.11	0.41
6096.46	6444.31	132.76	137.47	347.84	2.21	0.40	0.97
6444.31	6792.15	244.27	198.20	347.84	4.07	0.57	1.23
6792.15	7140.00	302.48	225.32	347.84	5.04	0.65	1.34
7140.00	7487.84	365.60	252.45	347.84	6.09	0.73	1.45
7487.84	7835.68	433.41	279.59	347.84	7.22	0.80	1.55
7835.68	8183.53	505.75	306.72	347.84	8.43	0.88	1.65
8183.53	8531.37	582.46	333.84	347.84	9.71	0.96	1.74
8531.37	8879.22	637.95	352.58	347.84	10.63	1.01	1.81
8879.22	9227.06	571.41	330.03	347.84	9.52	0.95	1.73
9227.06	9574.90	341.11	242.17	347.84	5.69	0.70	1.41
9574.90	9922.75	209.98	181.01	347.84	3.50	0.52	1.16
9922.75	10270.59	1480.40	426.81	347.85	24.67	1.23	3.47
10270.59	10618.44	183.81	167.11	347.85	3.06	0.48	1.10
10618.44	RB 10966.28	0.11	0.76	32.18	0.00	0.02	0.15

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.

CROSS SECTION RIVER: East Spillway
REACH: A4 RS: 19.02

INPUT
Description: Fifteen percent of the total flow splits from this model and joins model WT4A3.
1/3 Q=1500 cfs
2/3 Q=3500 cfs
Full Q=5000 cfs
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5108.24	1008.5	5225.44	1009	5344.58	1009.5	5420	1009.8	5770.66	1009.5
6551.8	1009	6947.86	1009	7150.85	1009	7836.05	1008.5	8390.99	1008
8392.32	1008	8667.66	1008	8669.81	1008	8760.68	1008.5	8988.24	1008.65
9028.24	1008.68	9495.22	1009	9631.57	1009	9776.29	1008.5	9798.24	1008.293
9829.27	1008	10000	1008						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5108.24	.1	8988.24	.016	9028.24	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5108.24	10000	690	800	700	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5108.24	5420	1009.8	10000	10000	1010.5

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1009.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.095	
W.S. Elev (ft)	1009.32	Reach Len. (ft)	690.00	800.00	700.00
Crit W.S. (ft)	1008.54	Flow Area (sq ft)		2551.56	
E.G. Slope (ft/ft)	0.002521	Area (sq ft)		2630.67	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	4142.58	Top Width (ft)		4142.58	
Vel Total (ft/s)	0.59	Avg. Vel. (ft/s)		0.59	
Max Chl Dpth (ft)	1.32	Hydr. Depth (ft)		0.65	
Conv. Total (cfs)	29874.1	Conv. (cfs)		29874.1	
Length Wtd. (ft)	800.00	Wetted Per. (ft)		3950.32	
Min Ch El (ft)	1008.00	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)		0.06	
Frctn Loss (ft)	5.12	Cum Volume (acre-ft)		27.84	
C & E Loss (ft)	0.02	Cum SA (acres)		46.69	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1009.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.095	
W.S. Elev (ft)	1009.77	Reach Len. (ft)	690.00	800.00	700.00
Crit W.S. (ft)	1008.82	Flow Area (sq ft)		4457.19	
E.G. Slope (ft/ft)	0.002558	Area (sq ft)		4647.01	
Q Total (cfs)	3500.00	Flow (cfs)		3500.00	
Top Width (ft)	4845.21	Top Width (ft)		4845.21	
Vel Total (ft/s)	0.79	Avg. Vel. (ft/s)		0.79	
Max Chl Dpth (ft)	1.77	Hydr. Depth (ft)		0.98	
Conv. Total (cfs)	69201.5	Conv. (cfs)		69201.5	
Length Wtd. (ft)	800.00	Wetted Per. (ft)		4543.46	
Min Ch El (ft)	1008.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)		0.12	
Frctn Loss (ft)	5.22	Cum Volume (acre-ft)		51.31	
C & E Loss (ft)	0.02	Cum SA (acres)		65.21	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1009.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.095	
W.S. Elev (ft)	1009.98	Reach Len. (ft)	690.00	800.00	700.00
Crit W.S. (ft)	1008.94	Flow Area (sq ft)		5665.26	
E.G. Slope (ft/ft)	0.002608	Area (sq ft)		5665.26	
Q Total (cfs)	5000.00	Flow (cfs)		5000.00	
Top Width (ft)	4891.76	Top Width (ft)		4891.76	
Vel Total (ft/s)	0.88	Avg. Vel. (ft/s)		0.88	
Max Chl Dpth (ft)	1.98	Hydr. Depth (ft)		1.16	
Conv. Total (cfs)	97903.6	Conv. (cfs)		97903.6	
Length Wtd. (ft)	800.00	Wetted Per. (ft)		4895.22	
Min Ch El (ft)	1008.00	Shear (lb/sq ft)		0.19	

Alpha	1.00	Stream Power (lb/ft s)	0.17
Frctn Loss (ft)	5.27	Cum Volume (acre-ft)	63.81
C & E Loss (ft)	0.02	Cum SA (acres)	70.00

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
5760.48	6086.59	0.01	0.41	35.59	0.00	0.01	0.03
6086.59	6412.71	6.67	41.46	326.12	0.44	0.13	0.16
6412.71	6738.83	28.15	98.35	326.12	1.88	0.30	0.29
6738.83	7064.94	31.16	104.54	326.12	2.08	0.32	0.30
7064.94	7391.06	42.31	125.59	326.12	2.82	0.39	0.34
7391.06	7717.18	92.27	200.51	326.12	6.15	0.61	0.46
7717.18	8043.30	162.69	281.79	326.12	10.85	0.86	0.58
8043.30	8369.41	263.57	376.40	326.12	17.57	1.15	0.70
8369.41	8695.53	327.31	428.63	326.12	21.82	1.31	0.76
8695.53	9021.65	195.15	256.78	326.12	13.01	0.79	0.76
9021.65	9347.77	83.39	173.94	326.12	5.56	0.53	0.48
9347.77	9673.88	36.57	115.08	326.12	2.44	0.35	0.32
9673.88	RB 10000.00	230.74	348.09	327.44	15.38	1.07	0.66

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
5434.36	5760.48	6.75	39.05	302.16	0.19	0.13	0.17
5760.48	6086.59	41.13	119.04	326.12	1.18	0.37	0.35
6086.59	6412.71	87.41	187.12	326.12	2.50	0.57	0.47
6412.71	6738.83	136.05	244.01	326.12	3.89	0.75	0.56
6738.83	7064.94	141.85	250.20	326.12	4.05	0.77	0.57
7064.94	7391.06	162.30	271.25	326.12	4.64	0.83	0.60
7391.06	7717.18	243.69	346.17	326.12	6.96	1.06	0.70
7717.18	8043.30	346.33	427.45	326.12	9.90	1.31	0.81
8043.30	8369.41	483.30	522.06	326.12	13.81	1.60	0.93
8369.41	8695.53	566.54	574.29	326.12	16.19	1.76	0.99
8695.53	9021.65	453.50	402.44	326.12	12.96	1.23	1.13
9021.65	9347.77	240.36	319.60	326.12	6.87	0.98	0.75
9347.77	9673.88	151.95	260.75	326.12	4.34	0.80	0.58
9673.88	RB 10000.00	438.83	493.75	327.89	12.54	1.51	0.89

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 5108.24	5434.36	154.10	257.23	327.60	3.08	0.79	0.60

5434.36	5760.48	35.68	106.74	326.12	0.71	0.33	0.33
5760.48	6086.59	90.83	186.97	326.12	1.82	0.57	0.49
6086.59	6412.71	152.39	255.06	326.12	3.05	0.78	0.60
6412.71	6738.83	213.15	311.94	326.12	4.26	0.96	0.68
6738.83	7064.94	220.25	318.14	326.12	4.41	0.98	0.69
7064.94	7391.06	245.08	339.19	326.12	4.90	1.04	0.72
7391.06	7717.18	341.79	414.11	326.12	6.84	1.27	0.83
7717.18	8043.30	460.76	495.39	326.12	9.22	1.52	0.93
8043.30	8369.41	616.57	589.99	326.12	12.33	1.81	1.05
8369.41	8695.53	710.20	642.22	326.12	14.20	1.97	1.11
8695.53	9021.65	617.21	470.37	326.12	12.34	1.44	1.31
9021.65	9347.77	343.67	387.53	326.12	6.87	1.19	0.89
9347.77	9673.88	232.55	328.68	326.12	4.65	1.01	0.71
9673.88	RB 10000.00	565.76	561.68	328.10	11.32	1.72	1.01

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: A4 RS: 18.87

INPUT
Description: North Bank, Roosevelt Canal
1/3 Q=1500 cfs
2/3 Q=3500 cfs
Full
Q=5000 cfs
Survey Date 12/15/99
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4700	1005.33	5230	1004.69	5750	1004.5	6290	1004.08	6830	1004.19
7350	1004.56	7830	1004.74	8350	1003.48	8880	1003.36	9420	1004.9
9800	1005.74	9910	1005.98	10000	1005.67				

Manning's n Values num= 1

Sta	n Val
4700	.045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
5750 9420 0 0 0 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev
9910	10000	1005.98

CROSS SECTION OUTPUT Profile #1/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	1004.18	Element			
Vel Head (ft)	0.22	Wt. n-Val.		0.045	
W.S. Elev (ft)	1003.96	Reach Len. (ft)			
Crit W.S. (ft)	1003.96	Flow Area (sq ft)		401.54	
E.G. Slope (ft/ft)	0.039910	Area (sq ft)		401.54	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	942.28	Top Width (ft)		942.28	
Vel Total (ft/s)	3.74	Avg. Vel. (ft/s)		3.74	
Max Chl Dpth (ft)	0.60	Hydr. Depth (ft)		0.43	
Conv. Total (cfs)	7508.4	Conv. (cfs)		7508.4	
Length Wtd. (ft)		Wetted Per. (ft)		942.28	
Min Ch El (ft)	1003.36	Shear (lb/sq ft)		1.06	
Alpha	1.00	Stream Power (lb/ft s)		3.97	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1004.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.045	
W.S. Elev (ft)	1004.32	Reach Len. (ft)			
Crit W.S. (ft)	1004.32	Flow Area (sq ft)		940.56	
E.G. Slope (ft/ft)	0.040780	Area (sq ft)		940.56	
Q Total (cfs)	3500.00	Flow (cfs)		3500.00	
Top Width (ft)	2256.18	Top Width (ft)		2256.18	
Vel Total (ft/s)	3.72	Avg. Vel. (ft/s)		3.72	
Max Chl Dpth (ft)	0.96	Hydr. Depth (ft)		0.42	
Conv. Total (cfs)	17331.8	Conv. (cfs)		17331.8	
Length Wtd. (ft)		Wetted Per. (ft)		2256.18	
Min Ch El (ft)	1003.36	Shear (lb/sq ft)		1.06	
Alpha	1.00	Stream Power (lb/ft s)		3.95	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1004.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.045	
W.S. Elev (ft)	1004.46	Reach Len. (ft)			
Crit W.S. (ft)	1004.46	Flow Area (sq ft)		1283.47	
E.G. Slope (ft/ft)	0.038097	Area (sq ft)		1283.47	
Q Total (cfs)	5000.00	Flow (cfs)		5000.00	
Top Width (ft)	2731.22	Top Width (ft)		2731.22	
Vel Total (ft/s)	3.90	Avg. Vel. (ft/s)		3.90	
Max Chl Dpth (ft)	1.10	Hydr. Depth (ft)		0.47	
Conv. Total (cfs)	25616.7	Conv. (cfs)		25616.7	
Length Wtd. (ft)		Wetted Per. (ft)		2731.22	
Min Ch El (ft)	1003.36	Shear (lb/sq ft)		1.12	
Alpha	1.00	Stream Power (lb/ft s)		4.35	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
7952.00	8196.67	2.41	2.66	46.82	0.16	0.06	0.91
8196.67	8441.33	290.02	91.12	244.67	19.33	0.37	3.18
8441.33	8686.00	527.70	130.49	244.67	35.18	0.53	4.04
8686.00	8930.67	593.99	140.10	244.67	39.60	0.57	4.24
8930.67	9175.33	85.88	37.18	161.46	5.73	0.23	2.31

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 5750.00	5994.67	0.02	0.12	17.55	0.00	0.01	0.18
5994.67	6239.33	30.42	26.62	244.67	0.87	0.11	1.14
6239.33	6484.00	101.07	54.71	244.67	2.89	0.22	1.85
6484.00	6728.67	69.70	43.78	244.67	1.99	0.18	1.59
6728.67	6973.33	29.94	26.37	244.67	0.86	0.11	1.14
6973.33	7218.00	0.22	0.69	44.10	0.01	0.02	0.31
7218.00	7952.00						
7952.00	8196.67	87.96	45.94	194.73	2.51	0.24	1.91
8196.67	8441.33	727.48	178.81	244.67	20.79	0.73	4.07
8441.33	8686.00	1013.61	218.18	244.67	28.96	0.89	4.65
8686.00	8930.67	1089.03	227.78	244.67	31.12	0.93	4.78
8930.67	9175.33	348.57	114.99	244.67	9.96	0.47	3.03
9175.33	RB 9420.00	1.99	2.57	42.47	0.06	0.06	0.77

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 5750.00	5994.67	13.10	14.69	194.36	0.26	0.08	0.89
5994.67	6239.33	118.08	60.26	244.67	2.36	0.25	1.96
6239.33	6484.00	223.43	88.35	244.67	4.47	0.36	2.53
6484.00	6728.67	179.28	77.42	244.67	3.59	0.32	2.32
6728.67	6973.33	117.26	60.01	244.67	2.35	0.25	1.95
6973.33	7218.00	19.24	20.04	237.36	0.38	0.08	0.96
7218.00	7707.33						
7707.33	7952.00	0.01	0.06	6.81	0.00	0.01	0.20
7952.00	8196.67	175.98	76.56	244.67	3.52	0.31	2.30
8196.67	8441.33	964.28	212.45	244.67	19.29	0.87	4.54
8441.33	8686.00	1280.17	251.83	244.67	25.60	1.03	5.08
8686.00	8930.67	1362.55	261.43	244.67	27.25	1.07	5.21
8930.67	9175.33	531.67	148.64	244.67	10.63	0.61	3.58
9175.33	RB 9420.00	14.95	11.73	90.68	0.30	0.13	1.28

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:East Spillway

Reach	River Sta.	n1	n2	n3	n4
A4	20.00	.045			
A4	19.81	.075	.016	.045	
A4	19.61	.075	.016	.045	
A4	19.47	.075	.1	.016	.1
A4	19.30	.045	.1	.016	.1
A4	19.15	.1	.016	.1	
A4	19.02	.1	.016	.1	
A4	18.87	.045			

SUMMARY OF REACH LENGTHS

River: East Spillway

Reach	River Sta.	Left	Channel	Right
A4	20.00	1200	1000	800
A4	19.81	900	1070	1050
A4	19.61	800	730	750
A4	19.47	860	920	910
A4	19.30	730	750	830
A4	19.15	670	700	770
A4	19.02	690	800	700
A4	18.87	0	0	0

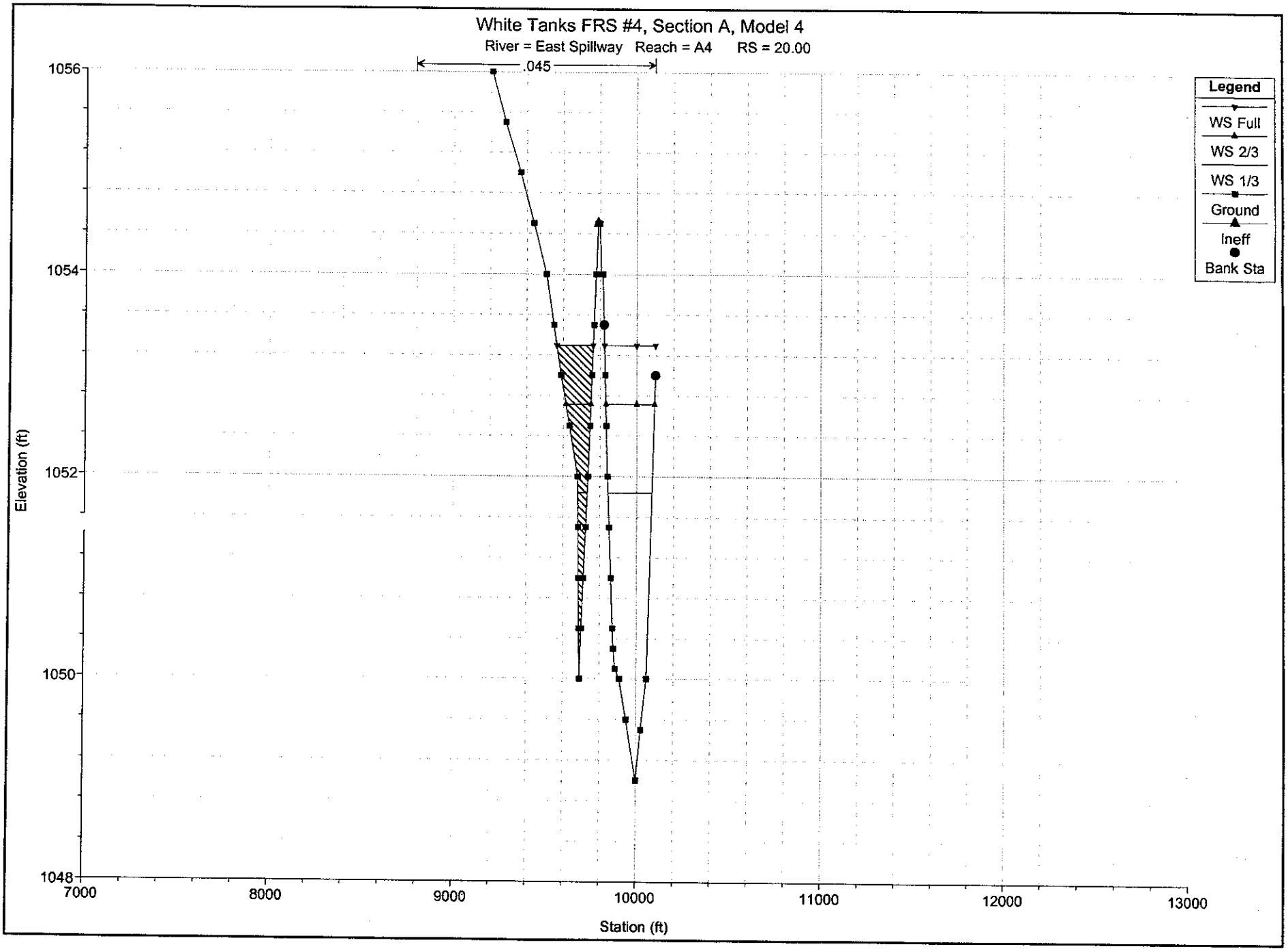
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: East Spillway

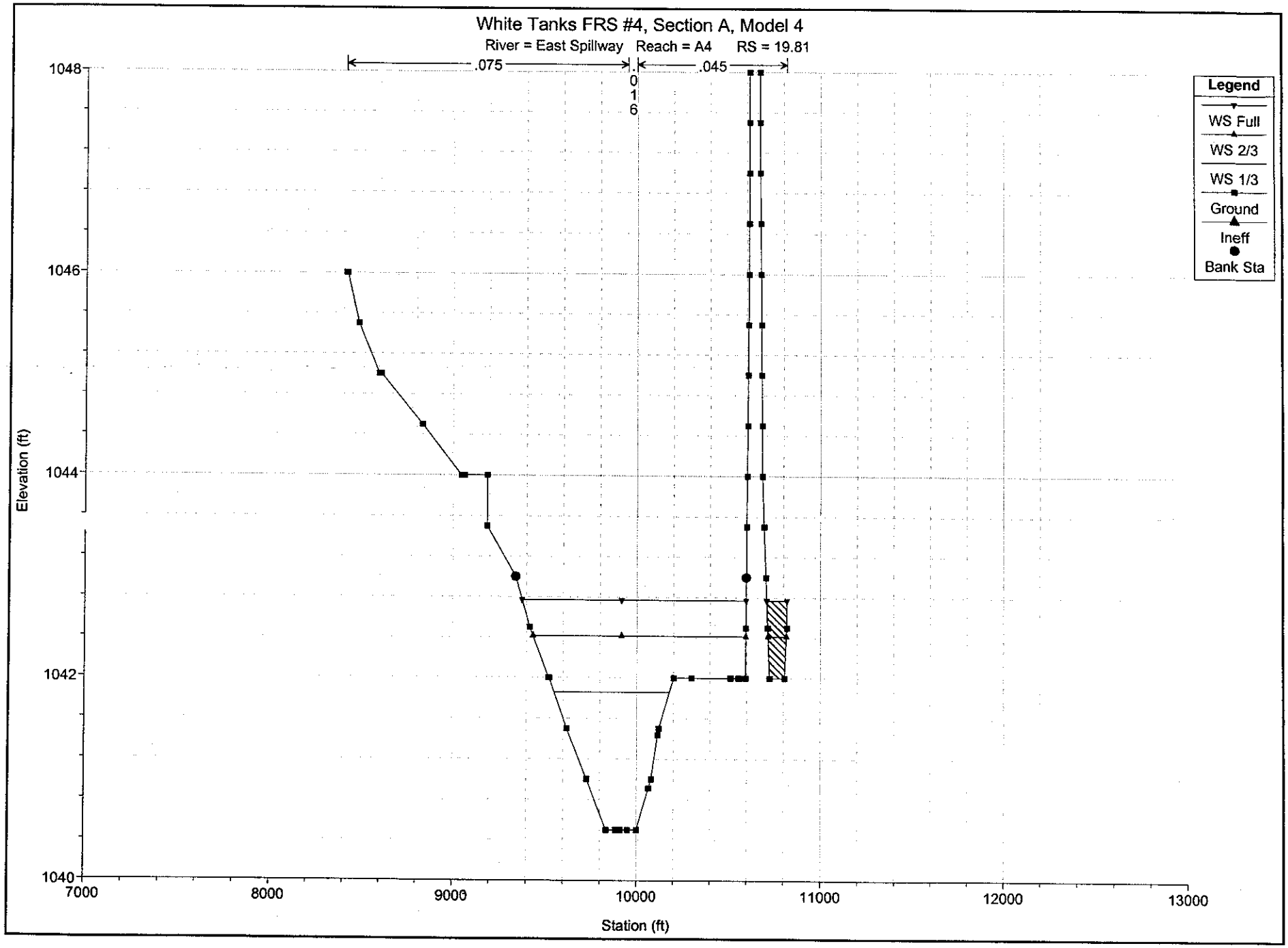
Reach	River Sta.	Contr.	Expan.

A4	20.00	.1	.3
A4	19.81	.1	.3
A4	19.61	.1	.3
A4	19.47	.1	.3
A4	19.30	.1	.3
A4	19.15	.1	.3
A4	19.02	.1	.3
A4	18.87	.1	.3

HEC-RAS Plan: WT4A4 River: East Spillway Reach: A4

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
A4	18.87	1500.00	1003.36	1003.96	1003.96	1004.18	0.039910	3.74	401.54	942.28	1.01
A4	18.87	3500.00	1003.36	1004.32	1004.32	1004.54	0.040780	3.72	940.56	2256.18	1.02
A4	18.87	5000.00	1003.36	1004.46	1004.46	1004.70	0.038097	3.90	1283.47	2731.22	1.00
A4	19.02	1500.00	1008.00	1009.32	1008.54	1009.33	0.002521	0.59	2551.56	4142.58	0.13
A4	19.02	3500.00	1008.00	1009.77	1008.82	1009.78	0.002558	0.79	4457.19	4845.21	0.14
A4	19.02	5000.00	1008.00	1009.98	1008.94	1009.99	0.002608	0.88	5665.26	4891.76	0.14
A4	19.15	2000.00	1012.50	1013.59	1013.36	1013.62	0.017530	1.27	1570.41	4167.06	0.37
A4	19.15	4000.00	1012.50	1013.81	1013.52	1013.85	0.018646	1.60	2507.33	4461.66	0.38
A4	19.15	6000.00	1012.50	1014.02	1013.63	1014.06	0.016536	1.74	3454.65	4741.12	0.36
A4	19.30	2000.00	1019.00	1020.24	1019.63	1020.25	0.005313	0.92	2174.66	3062.10	0.19
A4	19.30	4000.00	1019.00	1020.64	1019.83	1020.66	0.005347	1.13	3524.68	3700.26	0.20
A4	19.30	6000.00	1019.00	1020.88	1019.98	1020.91	0.005871	1.35	4428.74	3847.98	0.22
A4	19.47	2000.00	1026.50	1027.62	1027.26	1027.66	0.013650	1.76	1133.48	1795.59	0.39
A4	19.47	4000.00	1026.50	1027.99	1027.51	1028.06	0.013629	2.16	1848.87	2054.95	0.40
A4	19.47	6000.00	1026.50	1028.32	1027.69	1028.41	0.012137	2.34	2560.23	2328.32	0.38
A4	19.61	2000.00	1032.00	1033.47	1032.77	1033.52	0.005277	1.86	1073.68	1040.53	0.32
A4	19.61	4000.00	1032.00	1034.05	1033.14	1034.13	0.005592	2.21	1811.28	1570.97	0.36
A4	19.61	6000.00	1032.00	1034.37	1033.44	1034.47	0.006124	2.58	2327.19	1682.57	0.39
A4	19.81	2000.00	1040.50	1041.86	1041.62	1042.07	0.013583	3.68	543.85	627.45	0.70
A4	19.81	4000.00	1040.50	1042.42	1042.15	1042.62	0.011821	3.64	1099.04	1258.80	0.66
A4	19.81	6000.00	1040.50	1042.77	1042.39	1043.01	0.010696	3.94	1523.53	1328.37	0.62
A4	20.00	2000.00	1049.00	1051.84	1051.17	1052.15	0.007776	4.44	450.01	289.33	0.57
A4	20.00	4000.00	1049.00	1052.71	1052.02	1053.27	0.009472	5.97	670.05	400.85	0.66
A4	20.00	6000.00	1049.00	1053.30	1052.70	1054.11	0.011170	7.24	828.64	476.23	0.74


White Tanks FRS #4, Section A, Model 4
River = East Spillway Reach = A4 RS = 20.00
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1056
1054
1052
1050
1048
7000
8000
9000
10000
11000
12000
13000
Station (ft)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River = East Spillway Reach = A4 RS = 19.81
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.045
0
1
6
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
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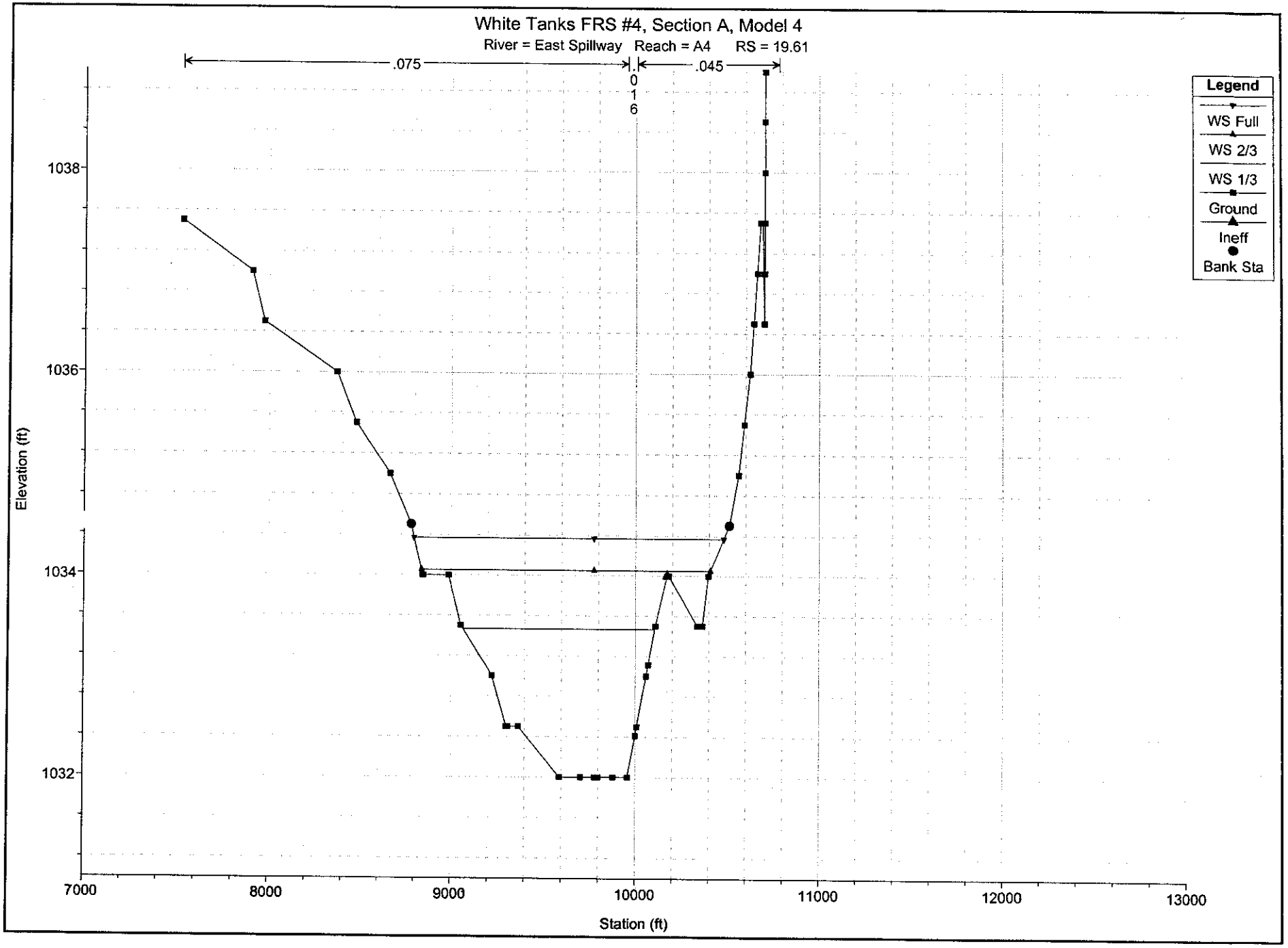
1046
1044
1042
1040
7000
8000
9000
10000
11000
12000
13000
Station (ft)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River = East Spillway Reach = A4 RS = 19.61
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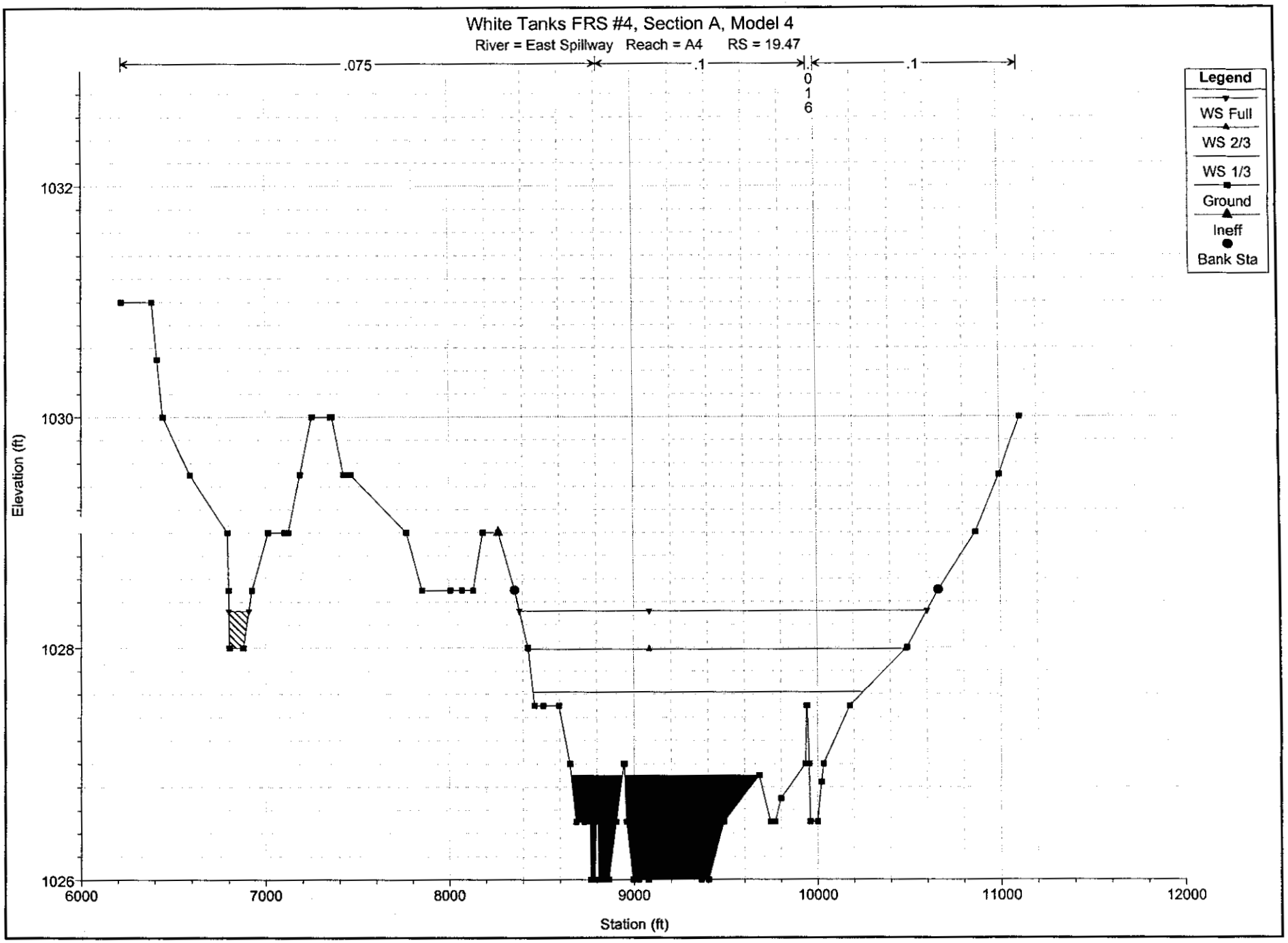
.045
0
1
6
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1038
1036
1034
1032
7000
8000
9000
10000
11000
12000
13000
Station (ft)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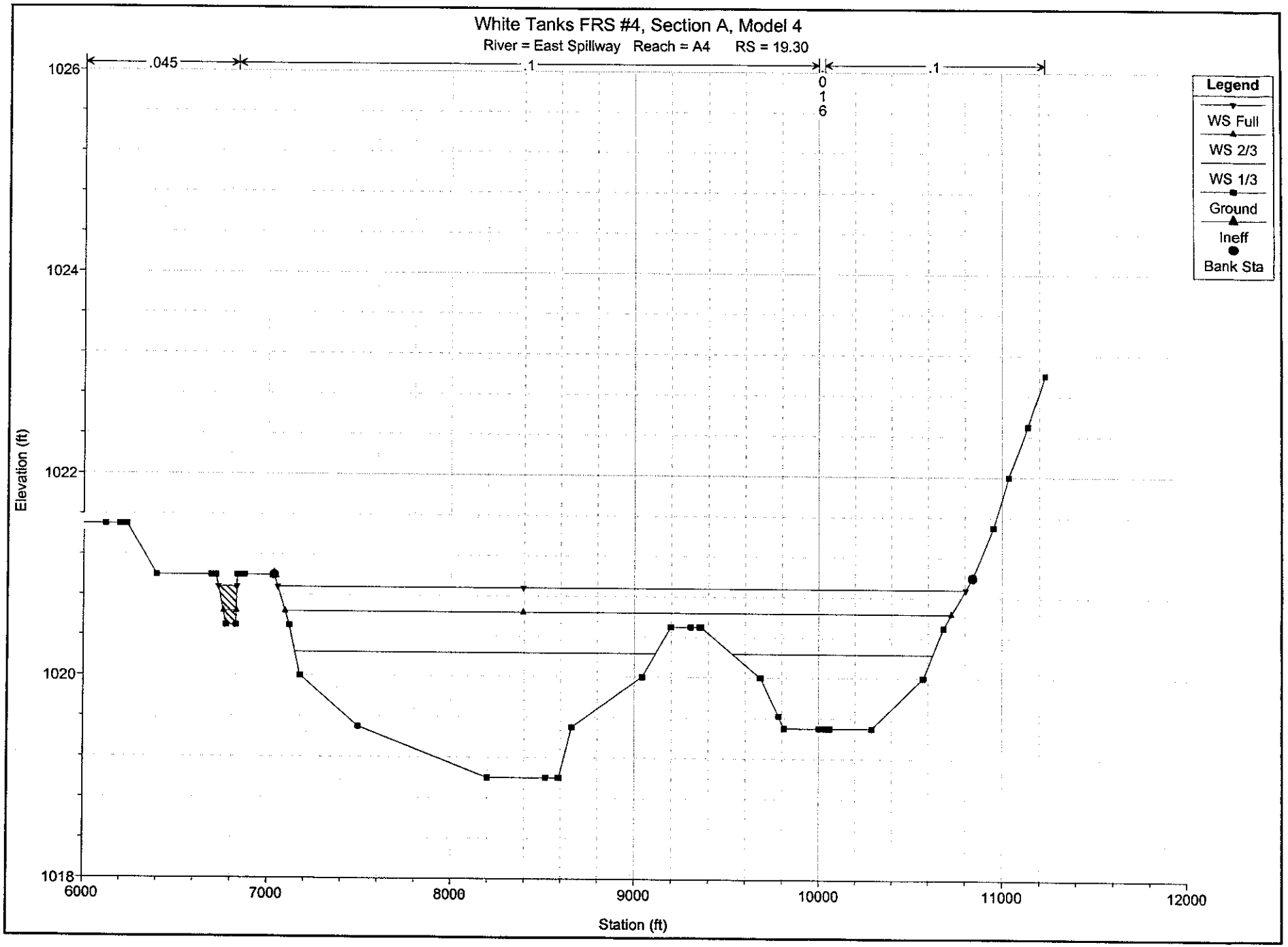
River = East Spillway Reach = A4 RS = 19.47
.075
.1
.016
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1032
1030
1028
1026
6000
7000
8000
9000
10000
11000
12000
Station (ft)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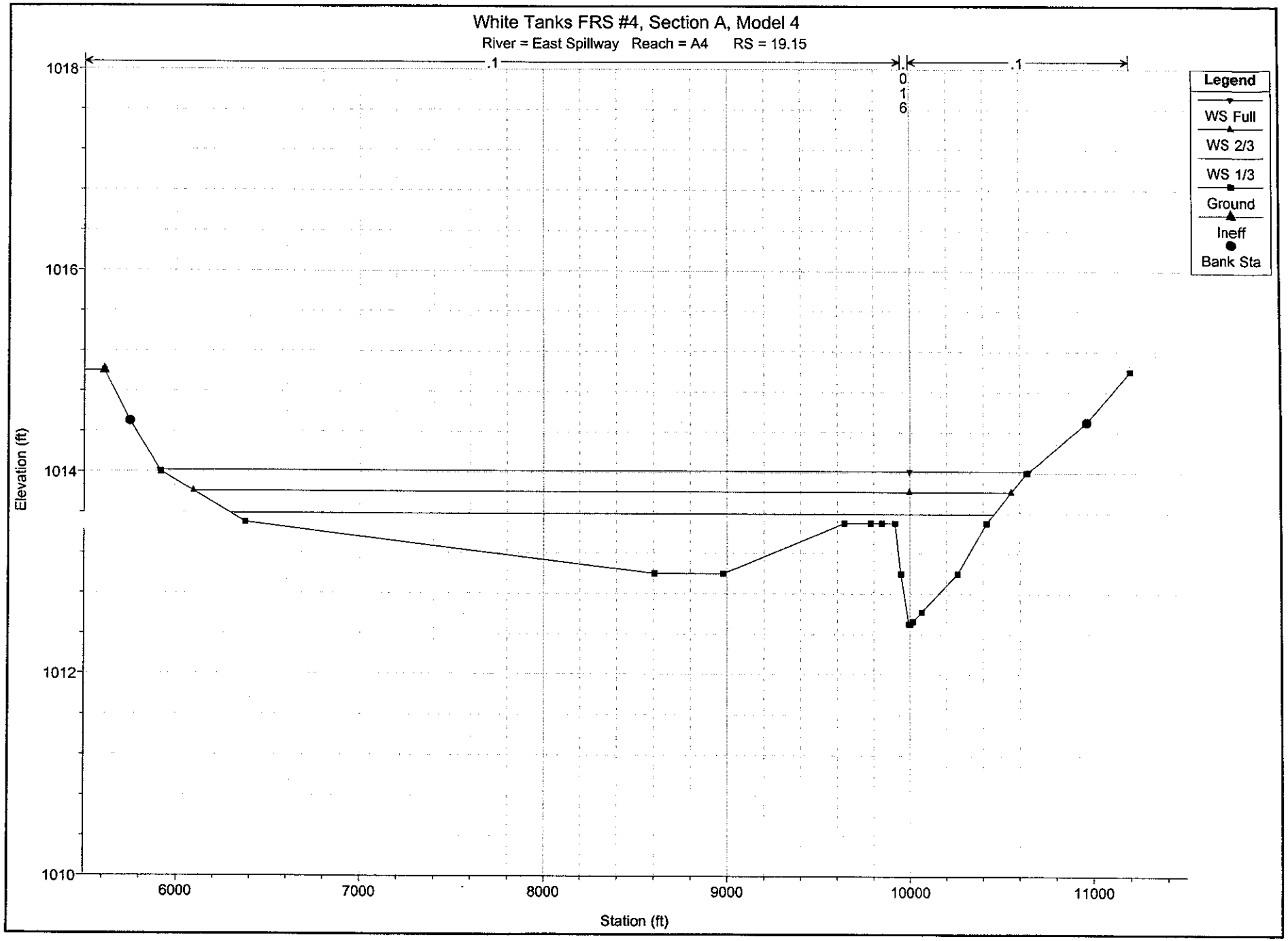
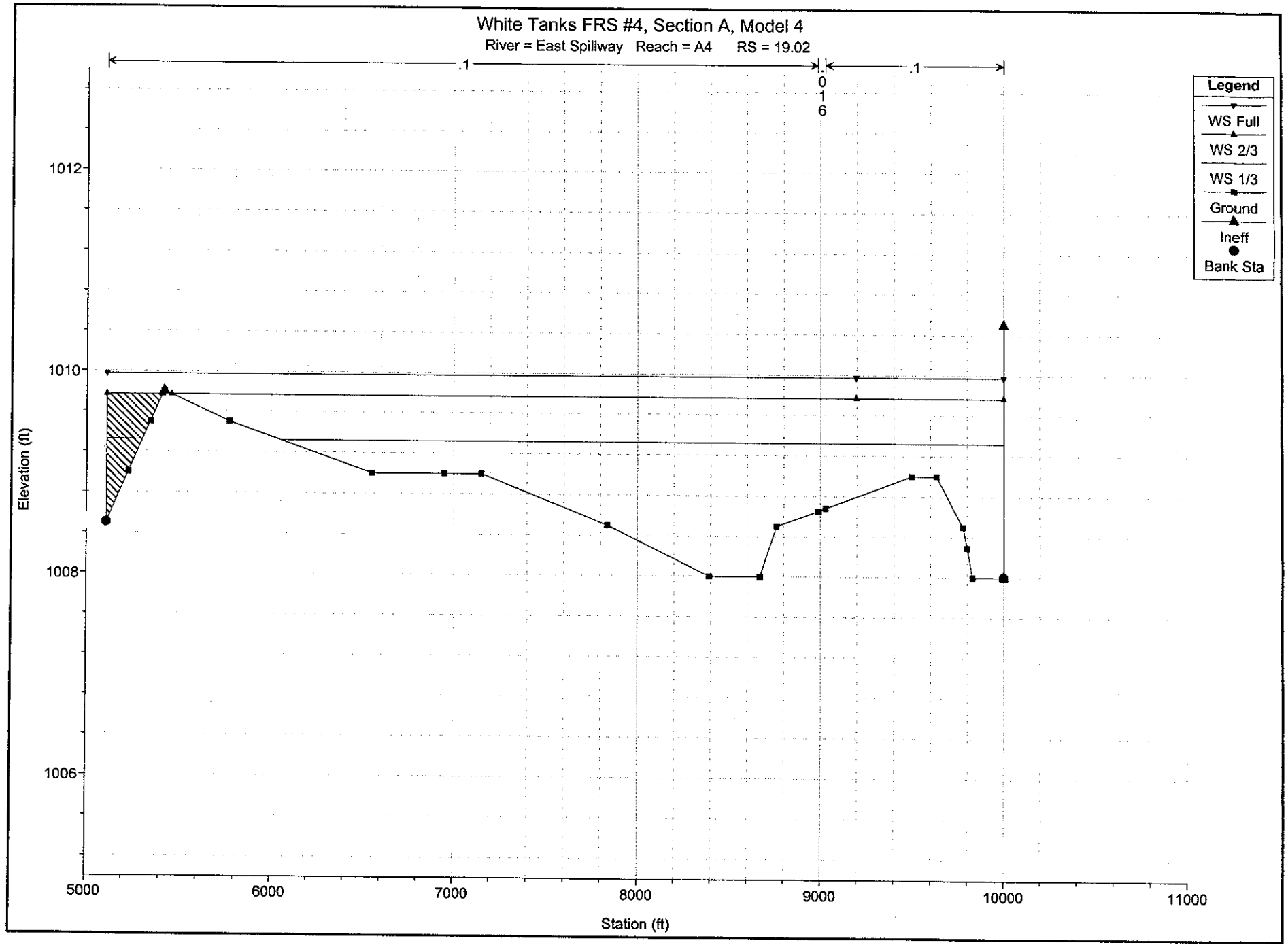
River = East Spillway Reach = A4 RS = 19.30
.045
.1
.1
0
1
6
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1026
1024
1022
1020
1018
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS #4, Section A, Model 4
River = East Spillway Reach = A4 RS = 19.15
.1
.1
0
1
6
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1018
1016
1014
1012
1010
6000
7000
8000
9000
10000
11000
Station (ft)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River = East Spillway Reach = A4 RS = 19.02
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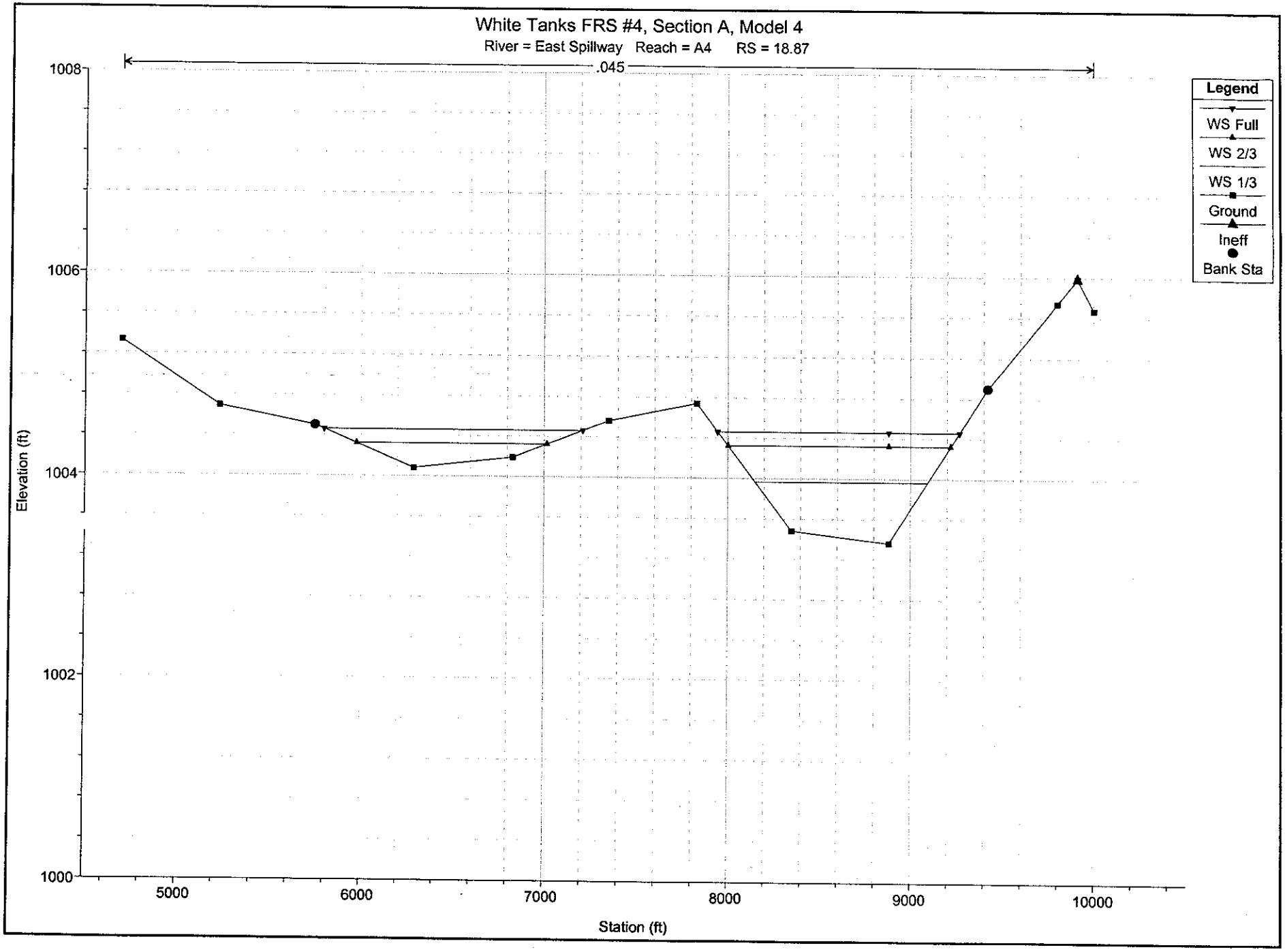
.016
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
1012
1010
1008
1006
Elevation (ft)
5000
6000
7000
8000
9000
10000
11000
Station (ft)


White Tanks FRS #4, Section A, Model 4
River = East Spillway Reach = A4 RS = 18.87
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1008
1006
1004
1002
1000
5000
6000
7000
8000
9000
10000
Station (ft)

4.2 Roosevelt Canal to Buckeye Canal

```
HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: White Tanks FRS#4, Section B, Model 1
Project File : WT4B1.prj
Run Date and Time: 06/26/2000 10:09:04 AM

Project in English units

Project Description:
Study Name: White Tanks FRS #4 Spillway Delineation Study
Contract No.: FCD 98-32
Purpose of Study: Delineation of the inundation limits of the 1/3, 2/3, and full spillway discharges for White Tanks Flood Retarding Structure #4.

Model Name: WT4B1
Model Description: Set up to model flow west of Tuthill Road, between the Roosevelt Irrigation District Canal and the Buckeye Canal.
HEC-RAS Version: Version 2.2, September 1998 with RASPATCH

Consultants: Hoskin Engineering Consultants, Inc.
323 W. Roosevelt Street, Suite 200
Phoenix, AZ 85003
(602)252-8384 Phone
(602)252-8385 Fax
HEC 990006

DEI Professional Services, LLC
6225 N. 24th St., Ste. 200
Phoenix, AZ 85016
(602)954-0038 Phone
(602)944-8605 Fax

PLAN DATA

Plan Title: Section B, West of Tuthill
Plan File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\rsvlt-bkeye\final models\WT4B1.p01

Geometry Title: Section B, West of Tuthill
Geometry File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\rsvlt-bkeye\final models\WT4B1.g01

Flow Title : Section B, West of Tuthill
Flow File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\rsvlt-bkeye\final models\WT4B1.f01

Plan Summary Information:
Number of: Cross Sections = 13 Mulitple Openings = 0
Culverts = 0 Inline Weirs = 0
Bridges = 0

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

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

FLOW DATA

Flow Title: Section B, West of Tuthill
Flow File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\rsvlt-bkeye\final models\WT4B1.f01

Flow Data (cfs)

River	Reach	RS	1/3	2/3	Full
West of Tuthill	B1	18.85	1000	1000	1000
West of Tuthill	B1	18.60	700	1000	1000
West of Tuthill	B1	18.39	700	1000	2320
West of Tuthill	B1	17.94	700	1500	2320
West of Tuthill	B1	17.37	700	1000	1000
East Spillway	B1	18.85	1000	1000	1000
East Spillway	B1	18.60	700	1000	1000
East Spillway	B1	18.39	700	1000	2320
East Spillway	B1	17.94	700	1500	2320
East Spillway	B1	17.37	700	1000	1000

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
East Spillway	B1	1/3		Critical
East Spillway	B1	2/3		Critical
East Spillway	B1	Full		Critical

GEOMETRY DATA

Geometry Title: Section B, West of Tuthill
Geometry File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\rsvlt-bkeye\final models\WT4B1.g01

CROSS SECTION RIVER: East Spillway
REACH: B1 RS: 18.85

INPUT
Description: 1/3 Q=1000 cfs
2/3 Q=1000 cfs
Full Q=1000 cfs
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4700	1003.3	5000	1002.9	5300	1002.7	5600	1002.6	5800	1002.5

5900	1002.4	6200	1002.1	6500	1002.1	6800	1002.2	7100	1002.4
7225	1002.5	7400	1002.6	7700	1002.7	7925	1002.5	8000	1002.3
8300	1001.6	8600	1001.4	8900	1001.5	9200	1002.3	9250	1002.4
9500	1003.1	9800	1003.8	10000	1003.8	10100	1003.4	10400	1002.5
10700	1001.8	10729	1001.7	11000	1001.1	11300	1000.9	11600	1000.9
11900	1001.2	12200	1001.7	12500	1002.5	12800	1002.2	13100	1001.7
13125	1001.6	13400	1001.2	13700	1000.9	14000	1001.1	14300	1000.9
14600	1000.4	14900	1000.2	15200	1000.1	15500	1000.3	15625	1000.4
15800	1000	16100	999.4	16400	999.3	16700	999.3	17000	999.1
17300	999	17600	999	17900	999	18200	999		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4700	.045	15625	.045	18200	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
15625	18200	871	10	10	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
4700	15625	1005

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	999.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.045	
W.S. Elev (ft)	999.29	Reach Len. (ft)	871.00	10.00	10.00
Crit W.S. (ft)	999.29	Flow Area (sq ft)		356.52	
E.G. Slope (ft/ft)	0.048213	Area (sq ft)		356.52	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	1481.42	Top Width (ft)		1481.42	
Vel Total (ft/s)	2.80	Avg. Vel. (ft/s)		2.80	
Max Chl Dpth (ft)	0.29	Hydr. Depth (ft)		0.24	
Conv. Total (cfs)	4554.2	Conv. (cfs)		4554.2	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		1481.70	
Min Ch El (ft)	999.00	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)		2.03	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	12546.01	235.37	1.29
C & E Loss (ft)	0.03	Cum SA (acres)	3399.75	385.90	8.35

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 cross-section end points had to be extended vertically for the computed water surface.
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 OUTPUT Profile #2/3

E.G. Elev (ft)	999.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.045	
W.S. Elev (ft)	999.29	Reach Len. (ft)	871.00	10.00	10.00
Crit W.S. (ft)	999.29	Flow Area (sq ft)		356.52	
E.G. Slope (ft/ft)	0.048213	Area (sq ft)		356.52	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	1481.42	Top Width (ft)		1481.42	
Vel Total (ft/s)	2.80	Avg. Vel. (ft/s)		2.80	
Max Chl Dpth (ft)	0.29	Hydr. Depth (ft)		0.24	
Conv. Total (cfs)	4554.2	Conv. (cfs)		4554.2	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		1481.70	
Min Ch El (ft)	999.00	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)		2.03	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	13235.16	318.02	3.05
C & E Loss (ft)	0.03	Cum SA (acres)	3453.00	421.64	12.81

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 cross-section end points had to be extended vertically for the computed water surface.
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 OUTPUT Profile #Full

E.G. Elev (ft)	999.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.045	
W.S. Elev (ft)	999.29	Reach Len. (ft)	871.00	10.00	10.00
Crit W.S. (ft)	999.29	Flow Area (sq ft)		356.52	
E.G. Slope (ft/ft)	0.048213	Area (sq ft)		356.52	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	1481.42	Top Width (ft)		1481.42	
Vel Total (ft/s)	2.80	Avg. Vel. (ft/s)		2.80	
Max Chl Dpth (ft)	0.29	Hydr. Depth (ft)		0.24	
Conv. Total (cfs)	4554.2	Conv. (cfs)		4554.2	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		1481.70	
Min Ch El (ft)	999.00	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)		2.03	
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	13681.50	374.53	3.05
C & E Loss (ft)	0.03	Cum SA (acres)	3494.91	434.96	12.81

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 cross-section end points had to be extended vertically for the computed water surface.
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: East Spillway
REACH: B1 RS: 18.60

INPUT
Description: 1/3 Q=700 cfs
2/3 Q=1000 cfs
Full Q=1000 cfs
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3509	994	3700	993	4125	992	4325	991.2	5125	993.5
5875	994	6475	993.5	7200	992	7725	993	8200	992.7
8500	992	8650	991.6	8800	992	9200	992.5	9500	992
9800	991.2	10000	992	10550	992	10750	993.1	11325	991.6
11750	992	12500	992	12825	992	12950	992.9	13125	992
14000	990.3	14400	992	14775	992.2	15075	992	15400	992.3
15600	992.9	16050	993.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3509	.1	14775	.1	16050	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
14775	16050	1028	1043	1042	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
3509	14775	997

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	993.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	993.15	Reach Len. (ft)	1028.00	1043.00	1042.00
Crit W.S. (ft)	992.47	Flow Area (sq ft)		814.18	
E.G. Slope (ft/ft)	0.006088	Area (sq ft)	10254.72	814.18	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	10735.09	Top Width (ft)	9460.09	1275.00	
Vel Total (ft/s)	0.86	Avg. Vel. (ft/s)		0.86	
Max Chl Dpth (ft)	2.85	Hydr. Depth (ft)		0.64	
Conv. Total (cfs)	8971.1	Conv. (cfs)		8971.1	
Length Wtd. (ft)	1043.00	Wetted Per. (ft)		1275.05	
Min Ch El (ft)	992.00	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)		0.21	
Frctn Loss (ft)	8.11	Cum Volume (acre-ft)	12443.49	235.24	1.29
C & E Loss (ft)	0.00	Cum SA (acres)	3305.17	385.59	8.35

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	993.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	993.25	Reach Len. (ft)	1028.00	1043.00	1042.00
Crit W.S. (ft)	992.55	Flow Area (sq ft)		940.56	
E.G. Slope (ft/ft)	0.007682	Area (sq ft)	11197.44	940.56	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	10836.40	Top Width (ft)	9561.40	1275.00	
Vel Total (ft/s)	1.06	Avg. Vel. (ft/s)		1.06	
Max Chl Dpth (ft)	2.95	Hydr. Depth (ft)		0.74	
Conv. Total (cfs)	11409.5	Conv. (cfs)		11409.5	
Length Wtd. (ft)	1043.00	Wetted Per. (ft)		1275.15	
Min Ch El (ft)	992.00	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)		0.38	
Frctn Loss (ft)	8.03	Cum Volume (acre-ft)	13123.21	317.87	3.05
C & E Loss (ft)	0.00	Cum SA (acres)	3357.41	421.32	12.81

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	993.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	993.19	Reach Len. (ft)	1028.00	1043.00	1042.00
Crit W.S. (ft)	992.55	Flow Area (sq ft)		865.70	
E.G. Slope (ft/ft)	0.010128	Area (sq ft)	10637.79	865.70	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	10776.39	Top Width (ft)	9501.39	1275.00	
Vel Total (ft/s)	1.16	Avg. Vel. (ft/s)		1.16	
Max Chl Dpth (ft)	2.89	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	9936.8	Conv. (cfs)		9936.8	
Length Wtd. (ft)	1043.00	Wetted Per. (ft)		1275.09	
Min Ch El (ft)	992.00	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		0.50	
Frctn Loss (ft)	7.43	Cum Volume (acre-ft)	13575.14	374.39	3.05
C & E Loss (ft)	0.00	Cum SA (acres)	3399.91	434.64	12.81

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

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.

CROSS SECTION RIVER: East Spillway
REACH: B1 RS: 18.39

INPUT
Description: 1/3 Q=700 cfs
2/3 Q=1000 cfs
Full Q=2320 cfs
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2519	985.7	3029	985.4	3649	984	3808	984.3	4167	984
4388	984.1	4714	984.2	5822	984.9	6658	984.9	7215	984
7575	984.3	7936	985.4	8305	984	8653	984.5	9286	984
9569	984.2	9787	984	9884	983	10000	982.3	10331	983.4
10858	984	11159	983.5	11216	984	11301	984.2	11408	984
11907	983.5	12399	984	12675	984.8	12830	984.9	13039	984.5
13224	984	13574	983.3	14004	984	14519	984.8	15019	984.7
15360	984	15628	984.3	16111	985.5	16877	990		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2519	.1	14519	.1	16877	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
14519	16877	1439	1090	1779	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
2519	14519	995

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	985.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	985.03	Reach Len. (ft)	1439.00	1090.00	1779.00
Crit W.S. (ft)	984.58	Flow Area (sq ft)		720.92	
E.G. Slope (ft/ft)	0.010390	Area (sq ft)	9548.18	720.92	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	12516.10	Top Width (ft)	11111.56	1404.53	
Vel Total (ft/s)	0.97	Avg. Vel. (ft/s)		0.97	
Max Chl Dpth (ft)	2.73	Hydr. Depth (ft)		0.51	
Conv. Total (cfs)	6867.3	Conv. (cfs)		6867.3	
Length Wtd. (ft)	1090.00	Wetted Per. (ft)		1404.54	
Min Ch El (ft)	984.00	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)		0.32	
Frctn Loss (ft)	8.14	Cum Volume (acre-ft)	12209.82	216.86	1.29
C & E Loss (ft)	0.00	Cum SA (acres)	3062.43	353.51	8.35

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	985.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	985.22	Reach Len. (ft)	1439.00	1090.00	1779.00
Crit W.S. (ft)	984.68	Flow Area (sq ft)		986.38	
E.G. Slope (ft/ft)	0.007986	Area (sq ft)	11611.84	986.38	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	12780.73	Top Width (ft)	11302.08	1478.65	
Vel Total (ft/s)	1.01	Avg. Vel. (ft/s)		1.01	
Max Chl Dpth (ft)	2.92	Hydr. Depth (ft)		0.67	
Conv. Total (cfs)	11189.9	Conv. (cfs)		11189.9	
Length Wtd. (ft)	1090.00	Wetted Per. (ft)		1478.65	

Min Ch El (ft)	984.00	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)		0.34	
Frctn Loss (ft)	8.19	Cum Volume (acre-ft)	12854.07	294.81	3.05
C & E Loss (ft)	0.00	Cum SA (acres)	3111.22	388.36	12.81

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

			Left OB	Channel	Right OB
E.G. Elev (ft)	985.78	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	985.76	Reach Len. (ft)	1439.00	1090.00	1779.00
Crit W.S. (ft)	984.95	Flow Area (sq ft)		1833.45	
E.G. Slope (ft/ft)	0.006228	Area (sq ft)	17888.53	1833.45	
Q Total (cfs)	2320.00	Flow (cfs)		2320.00	
Top Width (ft)	13635.74	Top Width (ft)	12000.00	1635.74	
Vel Total (ft/s)	1.27	Avg. Vel. (ft/s)		1.27	
Max Chl Dpth (ft)	3.46	Hydr. Depth (ft)		1.12	
Conv. Total (cfs)	29396.8	Conv. (cfs)		29396.8	
Length Wtd. (ft)	1090.00	Wetted Per. (ft)		1635.74	
Min Ch El (ft)	984.00	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)		0.55	
Frctn Loss (ft)	8.23	Cum Volume (acre-ft)	13238.54	342.08	3.05
C & E Loss (ft)	0.00	Cum SA (acres)	3146.20	399.79	12.81

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B1 RS: 18.14

INPUT
Description: 1/3 Q=700 cfs
2/3 Q=1000 cfs
Full Q=2320 cfs
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3951	977.7	4475	974	4700	975.6	4950	974	5450	975.2
5800	976	6450	977	7050	976	7500	974	7800	974
8050	974.8	8300	976	8575	975.6	8800	974.5	9450	974
9800	972.6	10000	973.4	10150	976	10900	976.5	11175	976.7
11675	978	12300	975.4	12875	974.5	13300	975.9	13650	975.9
13950	976.9	14100	976	14300	975.8	14670	976	14930	977
15110	978	15285	978.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3951	.1	13950	.1	15285	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
13950	15285	1046	959	1089	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
3951	13950	980

CROSS SECTION OUTPUT Profile #1/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	976.91	Element			
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	976.89	Reach Len. (ft)	1046.00	959.00	1089.00
Crit W.S. (ft)	976.26	Flow Area (sq ft)		737.18	
E.G. Slope (ft/ft)	0.005739	Area (sq ft)	14378.91	737.18	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	10011.01	Top Width (ft)	9059.53	951.48	

Vel Total (ft/s)	0.95	Avg. Vel. (ft/s)		0.95	
Max Chl Dpth (ft)	4.29	Hydr. Depth (ft)		0.77	
Conv. Total (cfs)	9240.3	Conv. (cfs)		9240.3	
Length Wtd. (ft)	959.00	Wetted Per. (ft)		951.48	
Min Ch El (ft)	975.80	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		0.26	
Frctn Loss (ft)	8.31	Cum Volume (acre-ft)	11814.61	198.62	1.29
C & E Loss (ft)	0.00	Cum SA (acres)	2729.26	324.03	8.35

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	977.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	977.02	Reach Len. (ft)	1046.00	959.00	1089.00
Crit W.S. (ft)	976.35	Flow Area (sq ft)		858.02	
E.G. Slope (ft/ft)	0.007379	Area (sq ft)	15524.83	858.02	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	10272.71	Top Width (ft)	9289.32	983.39	
Vel Total (ft/s)	1.17	Avg. Vel. (ft/s)		1.17	
Max Chl Dpth (ft)	4.42	Hydr. Depth (ft)		0.87	
Conv. Total (cfs)	11641.3	Conv. (cfs)		11641.3	
Length Wtd. (ft)	959.00	Wetted Per. (ft)		983.40	
Min Ch El (ft)	975.80	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)		0.47	
Frctn Loss (ft)	8.10	Cum Volume (acre-ft)	12405.84	271.73	3.05
C & E Loss (ft)	0.00	Cum SA (acres)	2771.11	357.55	12.81

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	977.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.100	
W.S. Elev (ft)	977.51	Reach Len. (ft)	1046.00	959.00	1089.00
Crit W.S. (ft)	976.65	Flow Area (sq ft)		1361.67	
E.G. Slope (ft/ft)	0.009553	Area (sq ft)	20170.30	1361.67	
Q Total (cfs)	2320.00	Flow (cfs)		2320.00	
Top Width (ft)	10736.72	Top Width (ft)	9665.10	1071.63	
Vel Total (ft/s)	1.70	Avg. Vel. (ft/s)		1.70	
Max Chl Dpth (ft)	4.91	Hydr. Depth (ft)		1.27	
Conv. Total (cfs)	23736.7	Conv. (cfs)		23736.7	
Length Wtd. (ft)	959.00	Wetted Per. (ft)		1071.63	
Min Ch El (ft)	975.80	Shear (lb/sq ft)		0.76	
Alpha	1.00	Stream Power (lb/ft s)		1.29	
Frctn Loss (ft)	8.37	Cum Volume (acre-ft)	12609.90	302.10	3.05
C & E Loss (ft)	0.01	Cum SA (acres)	2788.35	365.92	12.81

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: East Spillway
REACH: B1 RS: 17.94

INPUT
Description: 1/3 Q=700 cfs
2/3 Q=1500 cfs
Full Q=2320 cfs

Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4274	968	4369	967.1	4467	967.1	4614	965.8	4895	966
5316	966.9	5848	968	6427	967.4	7038	966.1	7352	966.7
7990	968.6	8222	967	8501	966	8613	968	9043	966.7
9884	966	10000	968.7	10228	968.7	10507	970	11012	968.8
11404	970	12254	968.5	12673	968	12934	967	13087	968
13270	968.9	13702	968	14010	968.8	14249	968	14386	968.3
14547	968	14702	967.7	14908	968	15245	968.8	15488	968
15552	971								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4274	.1	13270	.1	15552	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
13270	15552	1152	1032	1406	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
4274	13270	979

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	968.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	968.58	Reach Len. (ft)	1152.00	1032.00	1406.00
Crit W.S. (ft)	968.27	Flow Area (sq ft)		713.95	
E.G. Slope (ft/ft)	0.014586	Area (sq ft)	9823.33	713.95	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	8476.17	Top Width (ft)	6708.24	1767.94	
Vel Total (ft/s)	0.98	Avg. Vel. (ft/s)		0.98	
Max Chl Dpth (ft)	2.78	Hydr. Depth (ft)		0.40	
Conv. Total (cfs)	5796.0	Conv. (cfs)		5796.0	
Length Wtd. (ft)	1032.00	Wetted Per. (ft)		1767.95	
Min Ch El (ft)	967.70	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)		0.36	
Frctn Loss (ft)	7.79	Cum Volume (acre-ft)	11524.02	182.64	1.29
C & E Loss (ft)	0.00	Cum SA (acres)	2539.94	294.09	8.35

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	968.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	968.92	Reach Len. (ft)	1152.00	1032.00	1406.00
Crit W.S. (ft)	968.42	Flow Area (sq ft)		1418.31	
E.G. Slope (ft/ft)	0.009304	Area (sq ft)	12224.56	1418.31	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	9585.64	Top Width (ft)	7347.97	2237.67	
Vel Total (ft/s)	1.06	Avg. Vel. (ft/s)		1.06	
Max Chl Dpth (ft)	3.12	Hydr. Depth (ft)		0.63	
Conv. Total (cfs)	15550.5	Conv. (cfs)		15550.5	
Length Wtd. (ft)	1032.00	Wetted Per. (ft)		2237.70	
Min Ch El (ft)	967.70	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)		0.39	
Frctn Loss (ft)	7.63	Cum Volume (acre-ft)	12072.67	246.67	3.05
C & E Loss (ft)	0.00	Cum SA (acres)	2571.35	322.10	12.81

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	969.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	969.15	Reach Len. (ft)	1152.00	1032.00	1406.00
Crit W.S. (ft)	968.54	Flow Area (sq ft)		1931.17	
E.G. Slope (ft/ft)	0.007978	Area (sq ft)	13946.89	1931.17	
Q Total (cfs)	2320.00	Flow (cfs)		2320.00	
Top Width (ft)	9940.53	Top Width (ft)	7697.98	2242.55	
Vel Total (ft/s)	1.20	Avg. Vel. (ft/s)		1.20	
Max Chl Dpth (ft)	3.35	Hydr. Depth (ft)		0.86	
Conv. Total (cfs)	25973.4	Conv. (cfs)		25973.4	
Length Wtd. (ft)	1032.00	Wetted Per. (ft)		2242.59	
Min Ch El (ft)	967.70	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		0.52	
Frctn Loss (ft)	7.53	Cum Volume (acre-ft)	12200.28	265.86	3.05
C & E Loss (ft)	0.00	Cum SA (acres)	2579.88	329.44	12.81

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B1 RS: 17.69

INPUT
Description: 1/3 Q=700 cfs
2/3 Q=1500 cfs
Full Q=2320 cfs
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3550	960	4000	958.5	4200	958	4300	956.5	4350	957
4525	958.3	4750	958.8	5250	958	5840	959	6325	958
6775	958.4	7050	958	7540	959.8	7640	960	8125	960
8550	958	8950	957.4	9450	957.2	10000	962	10100	960
10340	958.3	10460	960	11075	961	11350	960	11600	960
12100	959.7	12375	960	12850	960.9	13050	962	13530	962
13730	960	13980	958	14020	960	14670	961	15340	962

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3550	.1	13530	.1	15340	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
13530	15340	1851	1491	1442	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
3550	13530	966

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	960.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	960.79	Reach Len. (ft)	1851.00	1491.00	1442.00
Crit W.S. (ft)	959.41	Flow Area (sq ft)		757.38	
E.G. Slope (ft/ft)	0.004770	Area (sq ft)	16240.30	757.38	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	9749.58	Top Width (ft)	8863.48	886.10	
Vel Total (ft/s)	0.92	Avg. Vel. (ft/s)		0.92	
Max Chl Dpth (ft)	4.29	Hydr. Depth (ft)		0.85	
Conv. Total (cfs)	10135.5	Conv. (cfs)		10135.5	
Length Wtd. (ft)	1491.00	Wetted Per. (ft)		886.16	
Min Ch El (ft)	958.00	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		0.24	
Frctn Loss (ft)	10.60	Cum Volume (acre-ft)	11179.38	165.21	1.29

C & E Loss (ft)	0.00	Cum SA (acres)	2334.03	262.65	8.35

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	961.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	961.29	Reach Len. (ft)	1851.00	1491.00	1442.00
Crit W.S. (ft)	959.91	Flow Area (sq ft)		1282.87	
E.G. Slope (ft/ft)	0.006043	Area (sq ft)	20714.97	1282.87	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	10511.94	Top Width (ft)	9252.37	1259.57	
Vel Total (ft/s)	1.17	Avg. Vel. (ft/s)		1.17	
Max Chl Dpth (ft)	4.79	Hydr. Depth (ft)		1.02	
Conv. Total (cfs)	19296.1	Conv. (cfs)		19296.1	
Length Wtd. (ft)	1491.00	Wetted Per. (ft)		1259.64	
Min Ch El (ft)	958.00	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)		0.45	
Frctn Loss (ft)	10.93	Cum Volume (acre-ft)	11637.10	214.67	3.05
C & E Loss (ft)	0.00	Cum SA (acres)	2351.84	280.67	12.81

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	961.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	961.61	Reach Len. (ft)	1851.00	1491.00	1442.00
Crit W.S. (ft)	960.38	Flow Area (sq ft)		1735.49	
E.G. Slope (ft/ft)	0.006730	Area (sq ft)	23756.40	1735.49	
Q Total (cfs)	2320.00	Flow (cfs)		2320.00	
Top Width (ft)	10876.70	Top Width (ft)	9365.55	1511.15	
Vel Total (ft/s)	1.34	Avg. Vel. (ft/s)		1.34	
Max Chl Dpth (ft)	5.11	Hydr. Depth (ft)		1.15	
Conv. Total (cfs)	28280.3	Conv. (cfs)		28280.3	
Length Wtd. (ft)	1491.00	Wetted Per. (ft)		1511.21	
Min Ch El (ft)	958.00	Shear (lb/sq ft)		0.48	
Alpha	1.00	Stream Power (lb/ft s)		0.65	
Frctn Loss (ft)	11.27	Cum Volume (acre-ft)	11701.72	222.42	3.05
C & E Loss (ft)	0.00	Cum SA (acres)	2354.25	284.97	12.81

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B1 RS: 17.37

INPUT
Description: 1/3 Q=700 cfs
2/3 Q=1000 cfs
Full Q=1000 cfs

Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1570	944	2020	940	2270	940	2445	939.8	2695	940
3020	941.6	3520	940	4120	939.1	4700	939.6	4800	941
5550	941.7	6000	941.3	6200	941.3	6460	942	6590	942.9
6740	944	6950	945.1	7040	946.2	7340	943.9	7865	945.7
8890	945.3	9365	947	9465	948.2	9645	948	9825	947
10000	948.3	10050	948	10375	948.9	10875	949.2	11175	950
11250	949.8	11350	949.5	11760	948.4	12150	948	12375	947.6
12525	946	12600	945.9	12675	948	12725	949.5	12875	949.6
13180	949.5	13405	950.2	13480	950	14230	949.26	14640	950
14750	951	14850	952	14950	952.3	15140	952		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1570	.1	13405	.1	15140	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
13405	15140	2108	1871	1913	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
1570	13405	955.8

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	950.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	950.20	Reach Len. (ft)	2108.00	1871.00	1913.00
Crit W.S. (ft)	949.81	Flow Area (sq ft)		665.01	
E.G. Slope (ft/ft)	0.011700	Area (sq ft)	67708.78	665.01	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	13088.21	Top Width (ft)	11833.49	1254.72	
Vel Total (ft/s)	1.05	Avg. Vel. (ft/s)		1.05	
Max Chl Dpth (ft)	11.10	Hydr. Depth (ft)		0.53	
Conv. Total (cfs)	6471.5	Conv. (cfs)		6471.5	
Length Wtd. (ft)	1871.00	Wetted Per. (ft)		1254.72	
Min Ch El (ft)	949.26	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)		0.41	
Frctn Loss (ft)	13.78	Cum Volume (acre-ft)	9395.75	140.87	1.29
C & E Loss (ft)	0.00	Cum SA (acres)	1894.30	226.02	8.35

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	950.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	950.35	Reach Len. (ft)	2108.00	1871.00	1913.00
Crit W.S. (ft)	949.89	Flow Area (sq ft)		862.67	
E.G. Slope (ft/ft)	0.010231	Area (sq ft)	69557.99	862.67	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	13108.67	Top Width (ft)	11835.00	1273.67	
Vel Total (ft/s)	1.16	Avg. Vel. (ft/s)		1.16	
Max Chl Dpth (ft)	11.25	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	9886.3	Conv. (cfs)		9886.3	
Length Wtd. (ft)	1871.00	Wetted Per. (ft)		1273.67	
Min Ch El (ft)	949.26	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		0.50	
Frctn Loss (ft)	13.78	Cum Volume (acre-ft)	9719.11	177.95	3.05
C & E Loss (ft)	0.00	Cum SA (acres)	1903.81	237.31	12.81

Warning: The cross-section end points had to be extended vertically for the computed water surface.

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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	950.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	950.35	Reach Len. (ft)	2108.00	1871.00	1913.00
Crit W.S. (ft)	949.89	Flow Area (sq ft)		862.67	
E.G. Slope (ft/ft)	0.010231	Area (sq ft)	69557.99	862.67	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	13108.67	Top Width (ft)	11835.00	1273.67	
Vel Total (ft/s)	1.16	Avg. Vel. (ft/s)		1.16	
Max Chl Dpth (ft)	11.25	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	9886.3	Conv. (cfs)		9886.3	
Length Wtd. (ft)	1871.00	Wetted Per. (ft)		1273.67	
Min Ch El (ft)	949.26	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		0.50	
Frctn Loss (ft)	13.78	Cum Volume (acre-ft)	9719.11	177.95	3.05
C & E Loss (ft)	0.00	Cum SA (acres)	1903.81	237.31	12.81

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B1 RS: 17.00

INPUT
Description: 1/3 Q=700 cfs
2/3 Q=1000 cfs
Full Q=1000 cfs
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2760	930	3060	928.3	3710	928	4310	927.6	4670	927.5
4770	928	4970	927.6	5170	928	5520	929	6320	930
6690	931.4	7020	931.5	7360	930	7485	931	7915	932
8345	931.3	8655	930	9055	933.4	9555	932	9675	931.7
9800	932	9900	934	10000	935	10050	934	10300	934
10600	935.4	10815	936	11025	936.5	11170	938	11400	936.8
11650	936	11750	934	12140	933.2	12375	934	12670	935.6
13100	935.5	13750	936	13950	937	14000	938	14560	939

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2760	.1	12670	.1	14560	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
12670	14560	1769	1400	1171	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
2760	12670	939

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	936.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	936.42	Reach Len. (ft)	1769.00	1400.00	1171.00
Crit W.S. (ft)	935.89	Flow Area (sq ft)		826.44	
E.G. Slope (ft/ft)	0.005129	Area (sq ft)	50138.39	826.44	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	10546.01	Top Width (ft)	9382.15	1163.86	
Vel Total (ft/s)	0.85	Avg. Vel. (ft/s)		0.85	
Max Chl Dpth (ft)	8.92	Hydr. Depth (ft)		0.71	
Conv. Total (cfs)	9774.2	Conv. (cfs)		9774.2	
Length Wtd. (ft)	1400.00	Wetted Per. (ft)		1163.86	
Min Ch El (ft)	935.50	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)		0.19	

Frctn Loss (ft)	9.81	Cum Volume (acre-ft)	6544.26	108.84	1.29
C & E Loss (ft)	0.00	Cum SA (acres)	1380.95	174.07	8.35

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	936.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	936.58	Reach Len. (ft)	1769.00	1400.00	1171.00
Crit W.S. (ft)	935.96	Flow Area (sq ft)		1010.88	
E.G. Slope (ft/ft)	0.005541	Area (sq ft)	51613.54	1010.88	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	10667.36	Top Width (ft)	9472.22	1195.14	
Vel Total (ft/s)	0.99	Avg. Vel. (ft/s)		0.99	
Max Chl Dpth (ft)	9.08	Hydr. Depth (ft)		0.85	
Conv. Total (cfs)	13434.4	Conv. (cfs)		13434.4	
Length Wtd. (ft)	1400.00	Wetted Per. (ft)		1195.14	
Min Ch El (ft)	935.50	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)		0.29	
Frctn Loss (ft)	9.75	Cum Volume (acre-ft)	6787.19	137.72	3.05
C & E Loss (ft)	0.00	Cum SA (acres)	1388.25	184.29	12.81

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	936.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	936.58	Reach Len. (ft)	1769.00	1400.00	1171.00
Crit W.S. (ft)	935.96	Flow Area (sq ft)		1010.88	
E.G. Slope (ft/ft)	0.005541	Area (sq ft)	51613.54	1010.88	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	10667.36	Top Width (ft)	9472.22	1195.14	
Vel Total (ft/s)	0.99	Avg. Vel. (ft/s)		0.99	
Max Chl Dpth (ft)	9.08	Hydr. Depth (ft)		0.85	
Conv. Total (cfs)	13434.4	Conv. (cfs)		13434.4	
Length Wtd. (ft)	1400.00	Wetted Per. (ft)		1195.14	
Min Ch El (ft)	935.50	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)		0.29	
Frctn Loss (ft)	9.75	Cum Volume (acre-ft)	6787.19	137.72	3.05
C & E Loss (ft)	0.00	Cum SA (acres)	1388.25	184.29	12.81

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B1 RS: 16.77

INPUT
Description: 1/3 Q=700 cfs
2/3 Q=1000 cfs
Full Q=1000 cfs
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1164	924	1409	923.9	2404	923.2	2694	922	2898	922

3219	921.2	3647	920.5	4557	920	4705	920.2	4964	920
5137	920.3	5370	920.3	5906	921.2	6318	922	6812	923.3
7355	924.2	7856	924.6	8653	926	8906	926.3	9144	926
9286	925	9489	924	9666	923.1	9896	924	10000	926.1
10135	926	10261	926	10681	926	10968	925.6	11166	930
11228	928	11548	926.9	11810	926	12120	925.4	12377	926
12645	927	12875	928	13265	929				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1164	.1	11166	.1	13265	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
11166	13265		1044	946	878	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
1164	11166	934

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	926.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	926.60	Reach Len. (ft)	1044.00	946.00	878.00
Crit W.S. (ft)	926.06	Flow Area (sq ft)		606.95	
E.G. Slope (ft/ft)	0.010186	Area (sq ft)	34505.33	606.95	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	10748.79	Top Width (ft)	9848.80	899.99	
Vel Total (ft/s)	1.15	Avg. Vel. (ft/s)		1.15	
Max Chl Dpth (ft)	6.60	Hydr. Depth (ft)		0.67	
Conv. Total (cfs)	6935.7	Conv. (cfs)		6935.7	
Length Wtd. (ft)	946.00	Wetted Per. (ft)		899.99	
Min Ch El (ft)	925.40	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		0.49	
Frctn Loss (ft)	4.12	Cum Volume (acre-ft)	4825.54	85.80	1.29
C & E Loss (ft)	0.00	Cum SA (acres)	990.46	140.91	8.35

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	926.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	926.82	Reach Len. (ft)	1044.00	946.00	878.00
Crit W.S. (ft)	926.16	Flow Area (sq ft)		820.76	
E.G. Slope (ft/ft)	0.009033	Area (sq ft)	36695.13	820.76	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	10883.04	Top Width (ft)	9858.80	1024.24	
Vel Total (ft/s)	1.22	Avg. Vel. (ft/s)		1.22	
Max Chl Dpth (ft)	6.82	Hydr. Depth (ft)		0.80	
Conv. Total (cfs)	10521.7	Conv. (cfs)		10521.7	
Length Wtd. (ft)	946.00	Wetted Per. (ft)		1024.24	
Min Ch El (ft)	925.40	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)		0.55	
Frctn Loss (ft)	4.16	Cum Volume (acre-ft)	4994.05	108.28	3.05
C & E Loss (ft)	0.00	Cum SA (acres)	995.73	148.63	12.81

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	926.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	926.82	Reach Len. (ft)	1044.00	946.00	878.00
Crit W.S. (ft)	926.16	Flow Area (sq ft)		820.76	
E.G. Slope (ft/ft)	0.009033	Area (sq ft)	36695.13	820.76	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	10883.04	Top Width (ft)	9858.80	1024.24	
Vel Total (ft/s)	1.22	Avg. Vel. (ft/s)		1.22	
Max Chl Dpth (ft)	6.82	Hydr. Depth (ft)		0.80	
Conv. Total (cfs)	10521.7	Conv. (cfs)		10521.7	
Length Wtd. (ft)	946.00	Wetted Per. (ft)		1024.24	
Min Ch El (ft)	925.40	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)		0.55	
Frctn Loss (ft)	4.16	Cum Volume (acre-ft)	4994.05	108.28	3.05
C & E Loss (ft)	0.00	Cum SA (acres)	995.73	148.63	12.81

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B1 RS: 16.55

INPUT
Description: 1/3 Q=700 cfs
2/3 Q=1000 cfs
Full Q=1000 cfs
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2495	916	2875	914.3	3135	914	3410	913.4	3740	912
4040	910.7	4270	910	4490	910	4565	911.4	4715	910
4995	910.8	5555	912	5695	912.3	5855	912	5955	911.5
6035	912	6085	912	6285	912	6385	913	6510	912.8
6785	914	7060	914.6	7360	914.4	7740	916	8140	917
8660	920	9060	918	9730	916	10000	919.6	10327	918.9
10613	920.9	10820	921.7	11158	922.3	11354	921.8	11520	921.4
11862	921.6	12106	921.3	12372	921.9	12645	923.4	13034	925.2
13430	925.9	13935	925.8	14341	925.8	14731	925.5	15130	925.9
15744	926.9	16366	927.3	16764	928.9	17465	929.7	17891	931.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2495	.1	11158	.1	13430	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
11158	13430	2613	1730	1309	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
2495	11158	932	13430	17891	932

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	922.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	922.49	Reach Len. (ft)	2613.00	1730.00	1309.00
Crit W.S. (ft)	921.77	Flow Area (sq ft)		1093.19	
E.G. Slope (ft/ft)	0.002391	Area (sq ft)	64523.98	1093.19	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	9984.16	Top Width (ft)	8663.00	1321.16	
Vel Total (ft/s)	0.64	Avg. Vel. (ft/s)		0.64	
Max Chl Dpth (ft)	12.49	Hydr. Depth (ft)		0.83	
Conv. Total (cfs)	14317.0	Conv. (cfs)		14317.0	

Length Wtd. (ft)	1730.00	Wetted Per. (ft)		1321.17	
Min Ch El (ft)	921.30	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)		0.08	
Frctn Loss (ft)	12.10	Cum Volume (acre-ft)	3638.83	67.34	1.29
C & E Loss (ft)	0.01	Cum SA (acres)	768.62	116.79	8.35

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	922.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	922.67	Reach Len. (ft)	2613.00	1730.00	1309.00
Crit W.S. (ft)	921.84	Flow Area (sq ft)		1334.93	
E.G. Slope (ft/ft)	0.002590	Area (sq ft)	66089.60	1334.93	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	10017.05	Top Width (ft)	8663.00	1354.05	
Vel Total (ft/s)	0.75	Avg. Vel. (ft/s)		0.75	
Max Chl Dpth (ft)	12.67	Hydr. Depth (ft)		0.99	
Conv. Total (cfs)	19648.8	Conv. (cfs)		19648.8	
Length Wtd. (ft)	1730.00	Wetted Per. (ft)		1354.06	
Min Ch El (ft)	921.30	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)		0.12	
Frctn Loss (ft)	12.12	Cum Volume (acre-ft)	3762.33	84.88	3.05
C & E Loss (ft)	0.01	Cum SA (acres)	773.77	122.80	12.81

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	922.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	922.67	Reach Len. (ft)	2613.00	1730.00	1309.00
Crit W.S. (ft)	921.84	Flow Area (sq ft)		1334.93	
E.G. Slope (ft/ft)	0.002590	Area (sq ft)	66089.60	1334.93	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	10017.05	Top Width (ft)	8663.00	1354.05	
Vel Total (ft/s)	0.75	Avg. Vel. (ft/s)		0.75	
Max Chl Dpth (ft)	12.67	Hydr. Depth (ft)		0.99	
Conv. Total (cfs)	19648.8	Conv. (cfs)		19648.8	
Length Wtd. (ft)	1730.00	Wetted Per. (ft)		1354.06	
Min Ch El (ft)	921.30	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)		0.12	
Frctn Loss (ft)	12.12	Cum Volume (acre-ft)	3762.33	84.88	3.05
C & E Loss (ft)	0.01	Cum SA (acres)	773.77	122.80	12.81

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B1 RS: 16.37

INPUT
Description: 1/3 Q=700 cfs
2/3 Q=1000 cfs

Full Q=1000 cfs
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2901	909.4	3340	908	3897	906.5	4355	906	4556	906
5370	904.9	6058	905	6387	905.3	6750	906	7041	907.2
7364	906.8	7635	907.2	8034	908	8326	908	8576	908
9091	907.4	9511	907.7	10000	910	10273	912	11008	913.1
11472	913.6	11807	914	12239	914.6	12682	914.3	12913	914.5
13651	913	13869	910	14317	909.8	14576	910	14993	911.5
15307	910.6	15560	910	15945	910.6	16333	912		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2901	.1	12239	.1	14993	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
12239	14993	814	791	898	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
2901	12239	916	14993	16333	916

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	910.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.100	
W.S. Elev (ft)	910.31	Reach Len. (ft)	814.00	791.00	898.00
Crit W.S. (ft)	910.21	Flow Area (sq ft)		306.62	
E.G. Slope (ft/ft)	0.087005	Area (sq ft)	24771.92	306.62	51.05
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	8286.48	Top Width (ft)	7141.30	815.66	329.51
Vel Total (ft/s)	2.28	Avg. Vel. (ft/s)		2.28	
Max Chl Dpth (ft)	5.41	Hydr. Depth (ft)		0.38	
Conv. Total (cfs)	2373.2	Conv. (cfs)		2373.2	
Length Wtd. (ft)	791.00	Wetted Per. (ft)		815.67	
Min Ch El (ft)	909.80	Shear (lb/sq ft)		2.04	
Alpha	1.00	Stream Power (lb/ft s)		4.66	
Frctn Loss (ft)	5.31	Cum Volume (acre-ft)	960.57	39.55	0.53
C & E Loss (ft)	0.02	Cum SA (acres)	294.60	74.36	3.40

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	910.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.100	
W.S. Elev (ft)	910.48	Reach Len. (ft)	814.00	791.00	898.00
Crit W.S. (ft)	910.29	Flow Area (sq ft)		446.60	
E.G. Slope (ft/ft)	0.055566	Area (sq ft)	25957.18	446.60	120.26
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	8543.42	Top Width (ft)	7163.92	873.77	505.73
Vel Total (ft/s)	2.24	Avg. Vel. (ft/s)		2.24	
Max Chl Dpth (ft)	5.58	Hydr. Depth (ft)		0.51	
Conv. Total (cfs)	4242.2	Conv. (cfs)		4242.2	
Length Wtd. (ft)	791.00	Wetted Per. (ft)		873.78	
Min Ch El (ft)	909.80	Shear (lb/sq ft)		1.77	
Alpha	1.00	Stream Power (lb/ft s)		3.97	
Frctn Loss (ft)	5.32	Cum Volume (acre-ft)	1001.56	49.50	1.24
C & E Loss (ft)	0.02	Cum SA (acres)	299.07	78.56	5.21

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less

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        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.
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CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	910.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.100	
W.S. Elev (ft)	910.48	Reach Len. (ft)	814.00	791.00	898.00
Crit W.S. (ft)	910.29	Flow Area (sq ft)		446.60	
E.G. Slope (ft/ft)	0.055566	Area (sq ft)	25957.18	446.60	120.26
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	8543.42	Top Width (ft)	7163.92	873.77	505.73
Vel Total (ft/s)	2.24	Avg. Vel. (ft/s)		2.24	
Max Chl Dpth (ft)	5.58	Hydr. Depth (ft)		0.51	
Conv. Total (cfs)	4242.2	Conv. (cfs)		4242.2	
Length Wtd. (ft)	791.00	Wetted Per. (ft)		873.78	
Min Ch El (ft)	909.80	Shear (lb/sq ft)		1.77	
Alpha	1.00	Stream Power (lb/ft s)		3.97	
Frctn Loss (ft)	5.32	Cum Volume (acre-ft)	1001.56	49.50	1.24
C & E Loss (ft)	0.02	Cum SA (acres)	299.07	78.56	5.21

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Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION          RIVER: East Spillway
REACH: B1                 RS: 16.22

INPUT
Description: 1/3 Q=700 cfs
2/3 Q=1000 cfs
Full Q=1000 cfs
Station Elevation Data    num=      35
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3305	904	3405	902	3930	900.8	4555	900.9	5180	902
5730	900.6	6080	902	6330	900	6730	901.7	7350	900
7750	900.6	8350	900	8575	899.4	8775	900	9325	900.7
10000	901.8	10200	903	10375	904	10635	904.9	10935	906
11235	906.9	11825	907.7	12335	907.3	12670	906	13020	904.6
13270	904	13660	904	14180	904.6	14715	904.6	15180	906
15250	906.7	15330	906	15600	906.2	16010	906.9	16350	908

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Manning's n Values        num=       3
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Sta	n Val	Sta	n Val	Sta	n Val
3305	.1	11825	.1	15250	.1

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Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         11825   15250             1295    1394    2714          .1          .3
Ineffective Flow     num=       2
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Sta L	Sta R	Elev	Sta L	Sta R	Elev
3305	11825	912	15250	16350	912

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	905.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.100	
W.S. Elev (ft)	905.06	Reach Len. (ft)	1295.00	1394.00	2714.00
Crit W.S. (ft)	904.37	Flow Area (sq ft)		1301.76	
E.G. Slope (ft/ft)	0.002262	Area (sq ft)	28858.42	1301.76	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	9334.44	Top Width (ft)	7373.00	1961.44	
Vel Total (ft/s)	0.54	Avg. Vel. (ft/s)		0.54	
Max Chl Dpth (ft)	5.66	Hydr. Depth (ft)		0.66	
Conv. Total (cfs)	14717.4	Conv. (cfs)		14717.4	

Length Wtd. (ft)	1394.00	Wetted Per. (ft)		1961.45
Min Ch El (ft)	904.00	Shear (lb/sq ft)		0.09
Alpha	1.00	Stream Power (lb/ft s)		0.05
Frctn Loss (ft)	8.82	Cum Volume (acre-ft)	459.47	24.94
C & E Loss (ft)	0.01	Cum SA (acres)	158.99	49.14

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	905.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	905.21	Reach Len. (ft)	1295.00	1394.00	2714.00
Crit W.S. (ft)	904.46	Flow Area (sq ft)		1599.08	
E.G. Slope (ft/ft)	0.002463	Area (sq ft)	29954.94	1599.08	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	9461.23	Top Width (ft)	7413.45	2047.78	
Vel Total (ft/s)	0.63	Avg. Vel. (ft/s)		0.63	
Max Chl Dpth (ft)	5.81	Hydr. Depth (ft)		0.78	
Conv. Total (cfs)	20149.1	Conv. (cfs)		20149.1	
Length Wtd. (ft)	1394.00	Wetted Per. (ft)		2047.79	
Min Ch El (ft)	904.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)		0.08	
Frctn Loss (ft)	8.88	Cum Volume (acre-ft)	479.15	30.93	
C & E Loss (ft)	0.01	Cum SA (acres)	162.87	52.04	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	905.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	905.21	Reach Len. (ft)	1295.00	1394.00	2714.00
Crit W.S. (ft)	904.46	Flow Area (sq ft)		1599.08	
E.G. Slope (ft/ft)	0.002463	Area (sq ft)	29954.94	1599.08	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	9461.23	Top Width (ft)	7413.45	2047.78	
Vel Total (ft/s)	0.63	Avg. Vel. (ft/s)		0.63	
Max Chl Dpth (ft)	5.81	Hydr. Depth (ft)		0.78	
Conv. Total (cfs)	20149.1	Conv. (cfs)		20149.1	
Length Wtd. (ft)	1394.00	Wetted Per. (ft)		2047.79	
Min Ch El (ft)	904.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)		0.08	
Frctn Loss (ft)	8.88	Cum Volume (acre-ft)	479.15	30.93	
C & E Loss (ft)	0.01	Cum SA (acres)	162.87	52.04	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B1 RS: 16.01

INPUT
Description: 1/3 Q=700 cfs
2/3 Q=1000 cfs
Full Q=1000 cfs
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2550	902.1	2800	901.7	3100	901.2	3400	900.4	3700	899.6
4000	898.9	4300	898.3	4600	897.7	4900	897.1	5200	896.6
5500	896.3	5800	896.2	6100	896.1	6400	896.1	6700	896
7000	895.8	7300	895.5	7600	895.3	7900	895.1	8200	895.1
8500	895	8800	895.1	9100	895.3	9400	896.2	9700	897
10000	898.6	10300	900	10600	901.1	10900	901.9	11200	902.4
11500	902.4	11800	902	12100	901.3	12400	900.1	12700	898.9
13000	897.5	13300	896.6	13600	895.9	13900	895.8	14200	895.8
14500	896	14800	896.3	15100	896.6	15400	897	15700	897.4
16000	897.9	16300	898.5	16600	899.4	16900	900.3	17200	901.2
17500	901.1	17800	901						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2550	.045	11200	.045	17800	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
11200	17800	0	0	0	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
2550	11200	905

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	896.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.045	
W.S. Elev (ft)	896.12	Reach Len. (ft)			
Crit W.S. (ft)	896.12	Flow Area (sq ft)		257.11	
E.G. Slope (ft/ft)	0.047782	Area (sq ft)	2052.33	257.11	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	4432.82	Top Width (ft)	3322.99	1109.83	
Vel Total (ft/s)	2.72	Avg. Vel. (ft/s)		2.72	
Max Chl Dpth (ft)	1.12	Hydr. Depth (ft)		0.23	
Conv. Total (cfs)	3202.3	Conv. (cfs)		3202.3	
Length Wtd. (ft)		Wetted Per. (ft)		1109.83	
Min Ch El (ft)	895.80	Shear (lb/sq ft)		0.69	
Alpha	1.00	Stream Power (lb/ft s)		1.88	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	896.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.045	
W.S. Elev (ft)	896.18	Reach Len. (ft)			
Crit W.S. (ft)	896.18	Flow Area (sq ft)		333.66	
E.G. Slope (ft/ft)	0.045612	Area (sq ft)	2279.48	333.66	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	4747.81	Top Width (ft)	3543.46	1204.35	
Vel Total (ft/s)	3.00	Avg. Vel. (ft/s)		3.00	
Max Chl Dpth (ft)	1.18	Hydr. Depth (ft)		0.28	
Conv. Total (cfs)	4682.3	Conv. (cfs)		4682.3	
Length Wtd. (ft)		Wetted Per. (ft)		1204.35	
Min Ch El (ft)	895.80	Shear (lb/sq ft)		0.79	
Alpha	1.00	Stream Power (lb/ft s)		2.36	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	896.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.045	
W.S. Elev (ft)	896.18	Reach Len. (ft)			
Crit W.S. (ft)	896.18	Flow Area (sq ft)		333.66	
E.G. Slope (ft/ft)	0.045612	Area (sq ft)	2279.48	333.66	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	4747.81	Top Width (ft)	3543.46	1204.35	
Vel Total (ft/s)	3.00	Avg. Vel. (ft/s)		3.00	
Max Chl Dpth (ft)	1.18	Hydr. Depth (ft)		0.28	
Conv. Total (cfs)	4682.3	Conv. (cfs)		4682.3	
Length Wtd. (ft)		Wetted Per. (ft)		1204.35	
Min Ch El (ft)	895.80	Shear (lb/sq ft)		0.79	
Alpha	1.00	Stream Power (lb/ft s)		2.36	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:East Spillway

Reach	River Sta.	n1	n2	n3
B1	18.85	.045	.045	.045
B1	18.60	.1	.1	.1
B1	18.39	.1	.1	.1
B1	18.14	.1	.1	.1
B1	17.94	.1	.1	.1
B1	17.69	.1	.1	.1
B1	17.37	.1	.1	.1
B1	17.00	.1	.1	.1
B1	16.77	.1	.1	.1
B1	16.55	.1	.1	.1
B1	16.37	.1	.1	.1
B1	16.22	.1	.1	.1
B1	16.01	.045	.045	.045

SUMMARY OF REACH LENGTHS

River: East Spillway

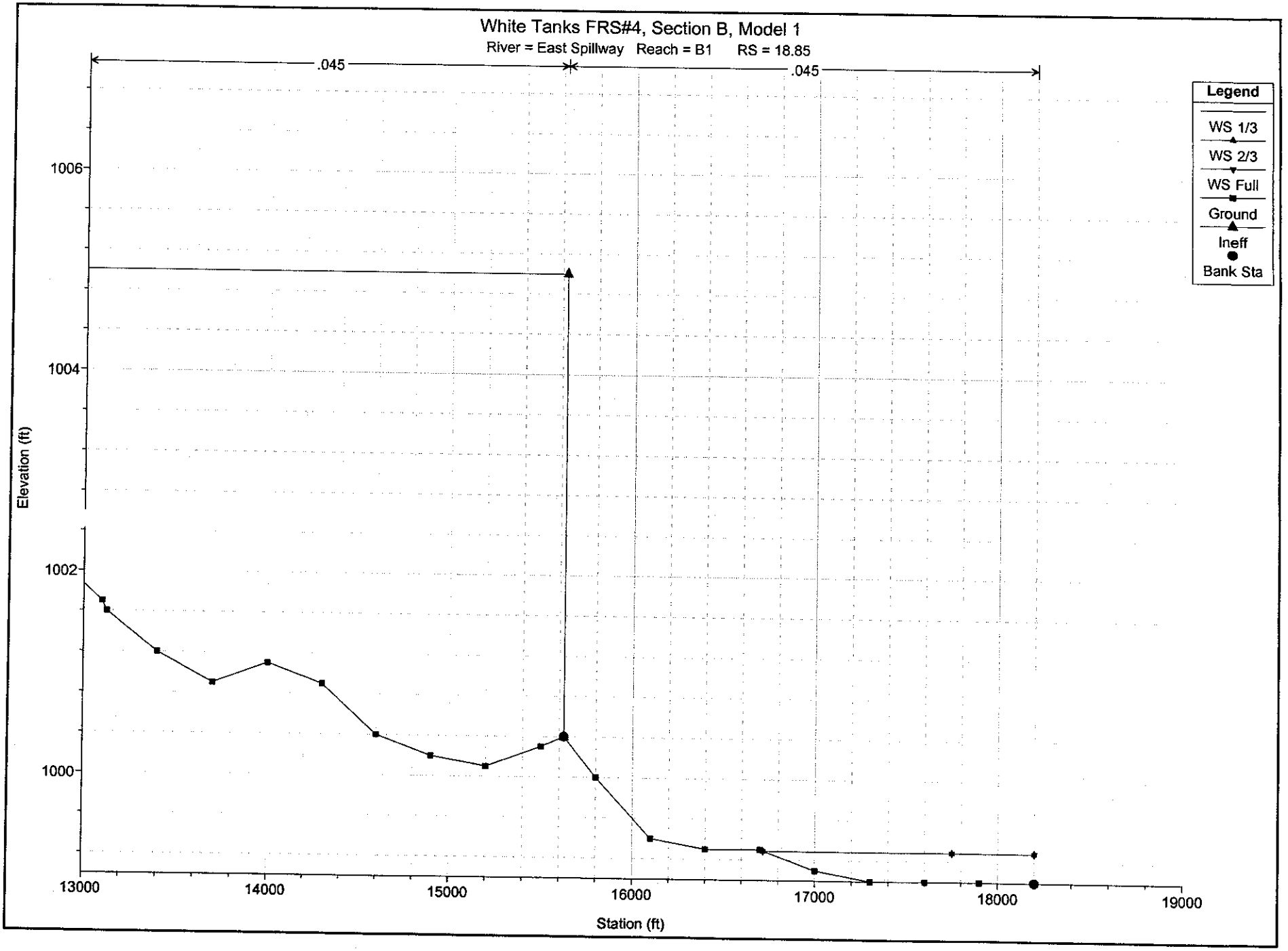
Reach	River Sta.	Left	Channel	Right
B1	18.85	871	10	10
B1	18.60	1028	1043	1042
B1	18.39	1439	1090	1779
B1	18.14	1046	959	1089
B1	17.94	1152	1032	1406
B1	17.69	1851	1491	1442
B1	17.37	2108	1871	1913
B1	17.00	1769	1400	1171
B1	16.77	1044	946	878
B1	16.55	2613	1730	1309
B1	16.37	814	791	898
B1	16.22	1295	1394	2714
B1	16.01	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: East Spillway

Reach	River Sta.	Contr.	Expan.
B1	18.85	.1	.3
B1	18.60	.1	.3
B1	18.39	.1	.3
B1	18.14	.1	.3
B1	17.94	.1	.3
B1	17.69	.1	.3
B1	17.37	.1	.3
B1	17.00	.1	.3
B1	16.77	.1	.3
B1	16.55	.1	.3
B1	16.37	.1	.3
B1	16.22	.1	.3
B1	16.01	.1	.3

HEC-RAS Plan: WT4B1 River: East Spillway Reach: B1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
B1	16.01	700.00	895.80	896.12	896.12	896.23	0.047782	2.72	257.11	4432.82	1.00
B1	16.01	1000.00	895.80	896.18	896.18	896.32	0.045612	3.00	333.66	4747.81	1.00
B1	16.01	1000.00	895.80	896.18	896.18	896.32	0.045612	3.00	333.66	4747.81	1.00
B1	16.22	700.00	904.00	905.06	904.37	905.06	0.002262	0.54	1301.76	9334.44	0.12
B1	16.22	1000.00	904.00	905.21	904.46	905.21	0.002463	0.63	1599.08	9461.23	0.12
B1	16.22	1000.00	904.00	905.21	904.46	905.21	0.002463	0.63	1599.08	9461.23	0.12
B1	16.37	700.00	909.80	910.31	910.21	910.39	0.087005	2.28	306.62	8286.48	0.66
B1	16.37	1000.00	909.80	910.48	910.29	910.55	0.055566	2.24	446.60	8543.42	0.55
B1	16.37	1000.00	909.80	910.48	910.29	910.55	0.055566	2.24	446.60	8543.42	0.55
B1	16.55	700.00	921.30	922.49	921.77	922.50	0.002391	0.64	1093.19	9984.16	0.12
B1	16.55	1000.00	921.30	922.67	921.84	922.68	0.002590	0.75	1334.93	10017.05	0.13
B1	16.55	1000.00	921.30	922.67	921.84	922.68	0.002590	0.75	1334.93	10017.05	0.13
B1	16.77	700.00	925.40	926.60	926.06	926.62	0.010186	1.15	606.95	10748.79	0.25
B1	16.77	1000.00	925.40	926.82	926.16	926.84	0.009033	1.22	820.76	10883.04	0.24
B1	16.77	1000.00	925.40	926.82	926.16	926.84	0.009033	1.22	820.76	10883.04	0.24
B1	17.00	700.00	935.50	936.42	935.89	936.43	0.005129	0.85	826.44	10546.01	0.18
B1	17.00	1000.00	935.50	936.58	935.96	936.59	0.005541	0.99	1010.88	10667.36	0.19
B1	17.00	1000.00	935.50	936.58	935.96	936.59	0.005541	0.99	1010.88	10667.36	0.19
B1	17.37	700.00	949.26	950.20	949.81	950.21	0.011700	1.05	665.01	13088.21	0.25
B1	17.37	1000.00	949.26	950.35	949.89	950.37	0.010231	1.16	862.67	13108.67	0.25
B1	17.37	1000.00	949.26	950.35	949.89	950.37	0.010231	1.16	862.67	13108.67	0.25
B1	17.69	700.00	958.00	960.79	959.41	960.81	0.004770	0.92	757.38	9749.58	0.18
B1	17.69	1500.00	958.00	961.29	959.91	961.31	0.006043	1.17	1282.87	10511.94	0.20
B1	17.69	2320.00	958.00	961.61	960.38	961.64	0.006730	1.34	1735.49	10876.70	0.22
B1	17.94	700.00	967.70	968.58	968.27	968.60	0.014586	0.98	713.95	8476.17	0.27
B1	17.94	1500.00	967.70	968.92	968.42	968.94	0.009304	1.06	1418.31	9585.64	0.23
B1	17.94	2320.00	967.70	969.15	968.54	969.17	0.007978	1.20	1931.17	9940.53	0.23
B1	18.14	700.00	975.80	976.89	976.26	976.91	0.005739	0.95	737.18	10011.01	0.19
B1	18.14	1000.00	975.80	977.02	976.35	977.04	0.007379	1.17	858.02	10272.71	0.22
B1	18.14	2320.00	975.80	977.51	976.65	977.55	0.009553	1.70	1361.67	10736.72	0.27
B1	18.39	700.00	984.00	985.03	984.58	985.05	0.010390	0.97	720.92	12516.10	0.24
B1	18.39	1000.00	984.00	985.22	984.68	985.23	0.007986	1.01	986.38	12780.73	0.22
B1	18.39	2320.00	984.00	985.76	984.95	985.78	0.006228	1.27	1833.45	13635.74	0.21
B1	18.60	700.00	992.00	993.15	992.47	993.16	0.006088	0.86	814.18	10735.09	0.19
B1	18.60	1000.00	992.00	993.25	992.55	993.26	0.007682	1.06	940.56	10836.40	0.22
B1	18.60	1000.00	992.00	993.19	992.55	993.21	0.010128	1.16	865.70	10776.39	0.25
B1	18.85	1000.00	999.00	999.29	999.29	999.41	0.048213	2.80	356.52	1481.42	1.01
B1	18.85	1000.00	999.00	999.29	999.29	999.41	0.048213	2.80	356.52	1481.42	1.01
B1	18.85	1000.00	999.00	999.29	999.29	999.41	0.048213	2.80	356.52	1481.42	1.01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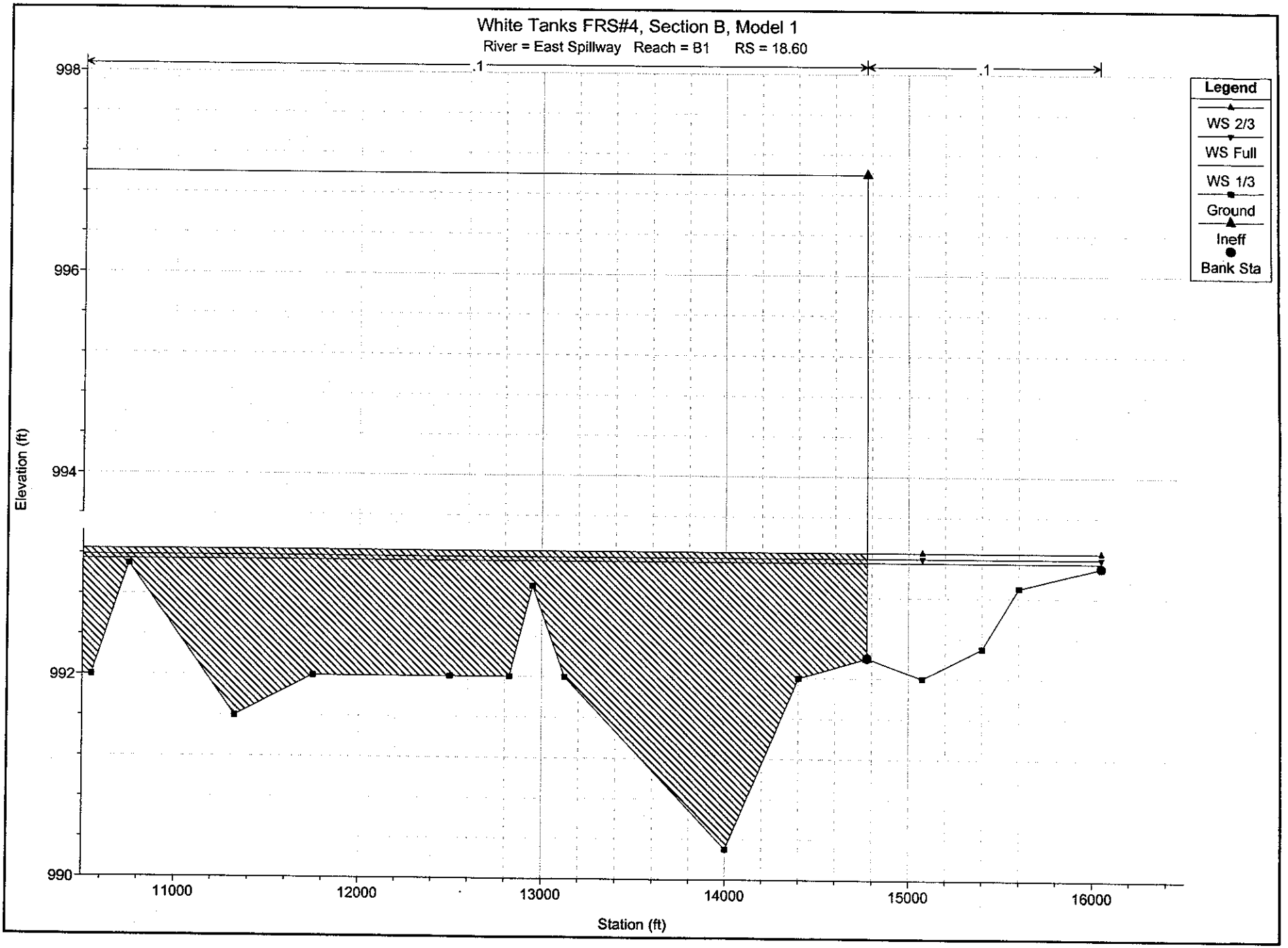
River = East Spillway Reach = B1 RS = 18.85
.045
.045
Legend
WS 1/3
WS 2/3
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
1006
1004
1002
1000
13000
14000
15000
16000
17000
18000
19000
Station (ft)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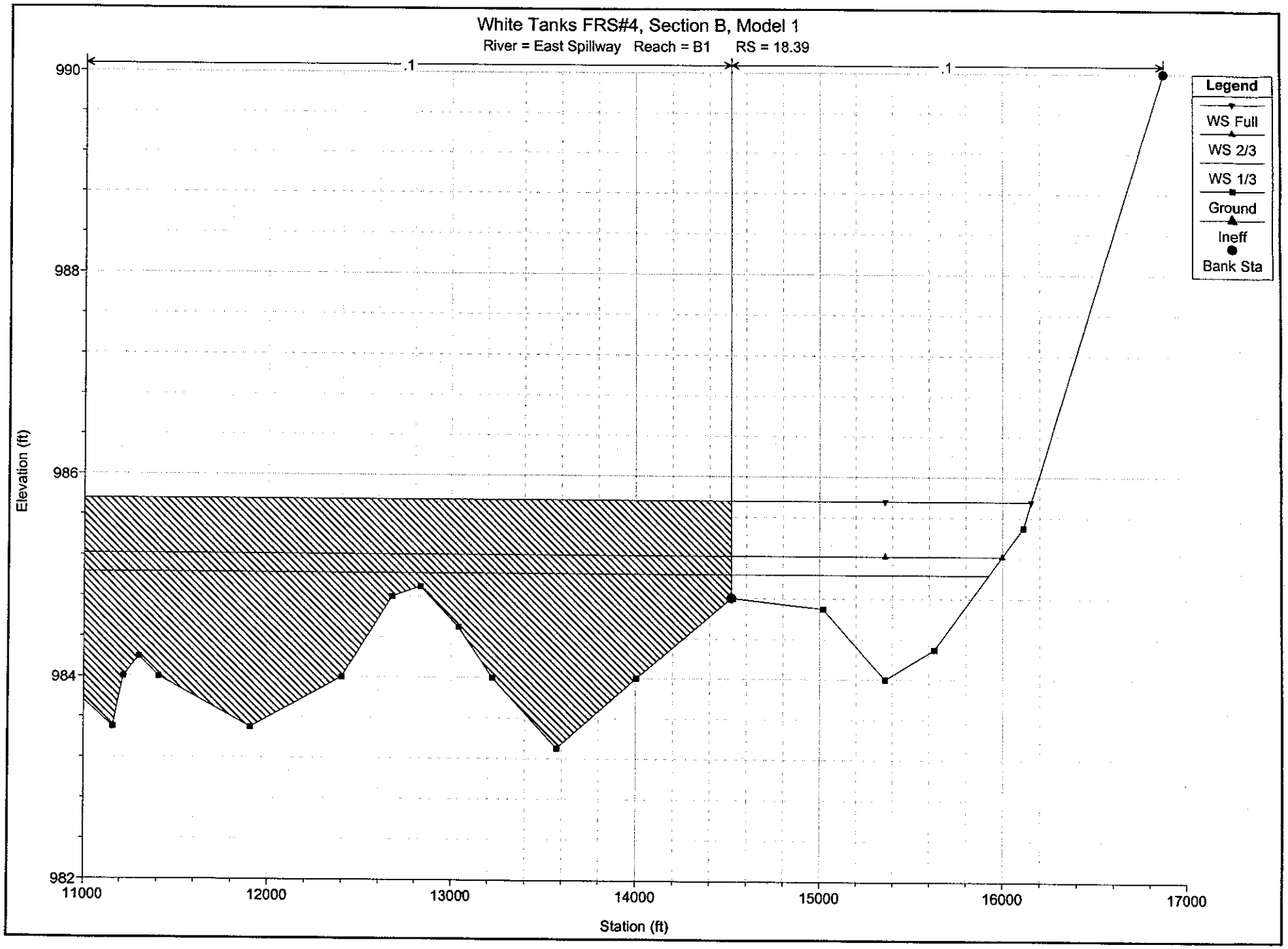
River = East Spillway Reach = B1 RS = 18.60
.1
.1
Legend
WS 2/3
WS Full
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
998
996
994
992
990
11000
12000
13000
14000
15000
16000
Station (ft)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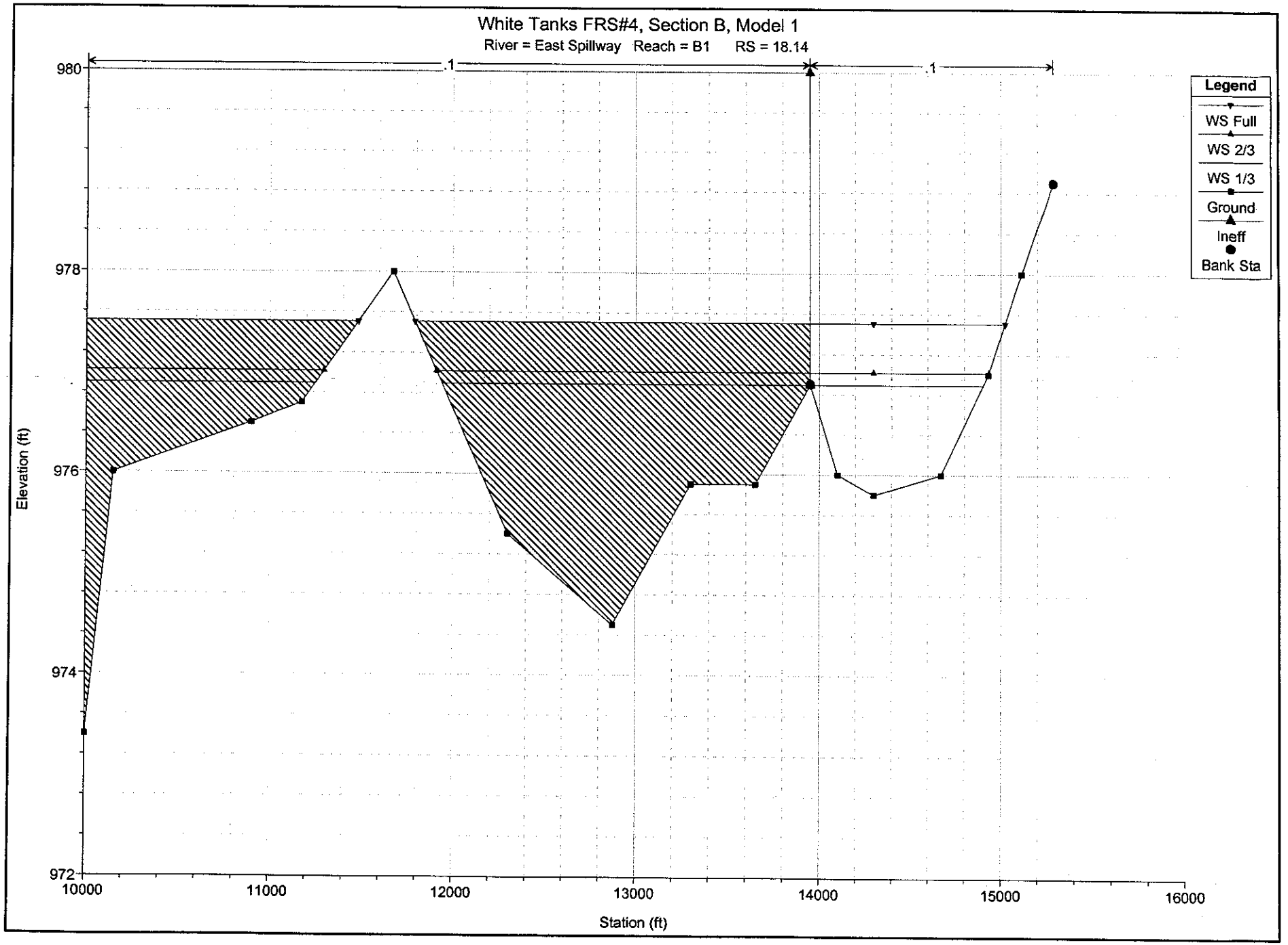
River = East Spillway Reach = B1 RS = 18.39
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
990
988
986
984
982
11000
12000
13000
14000
15000
16000
17000
Station (ft)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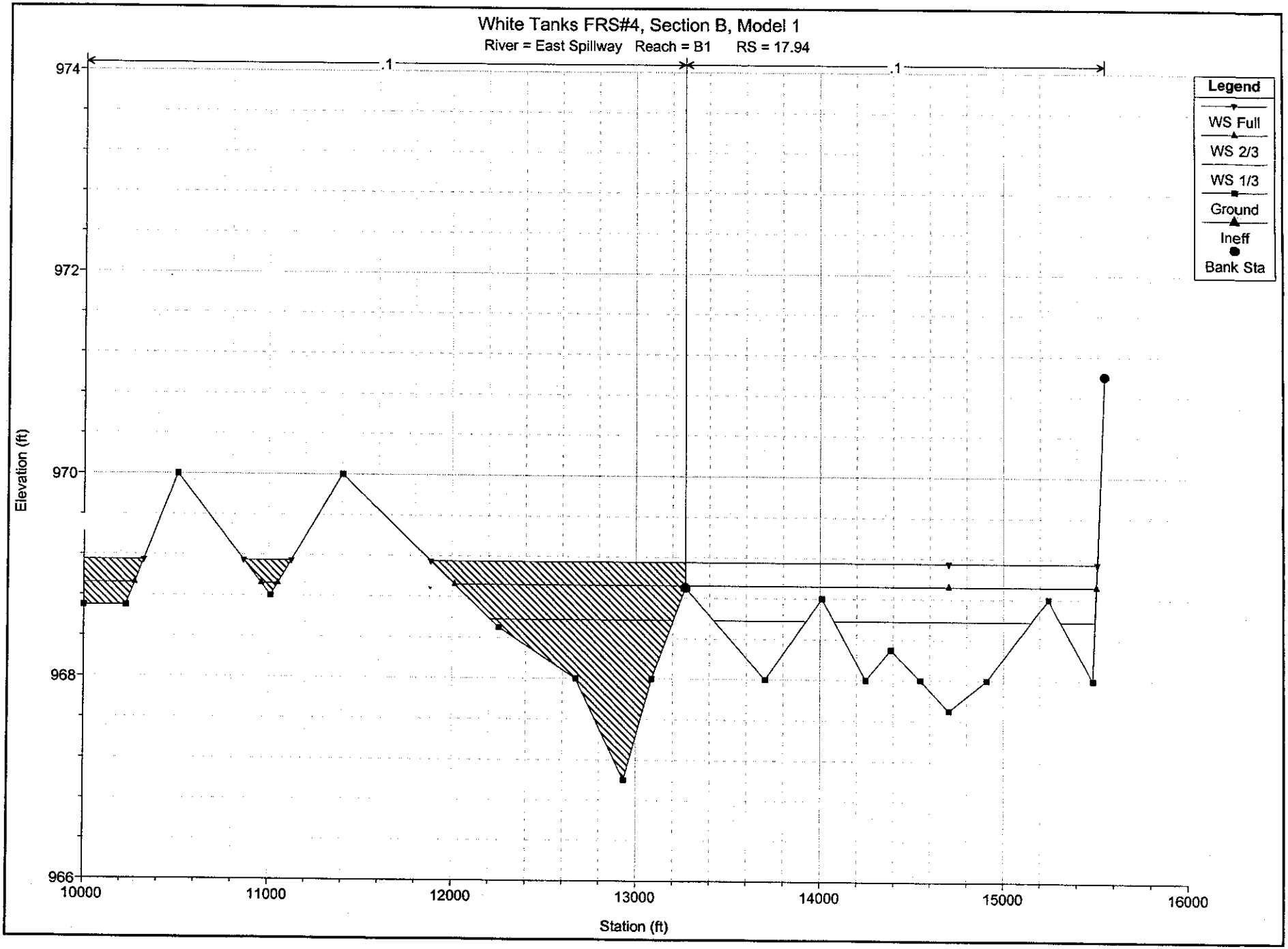
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
980
978
976
974
972
10000
11000
12000
13000
14000
15000
16000
Station (ft)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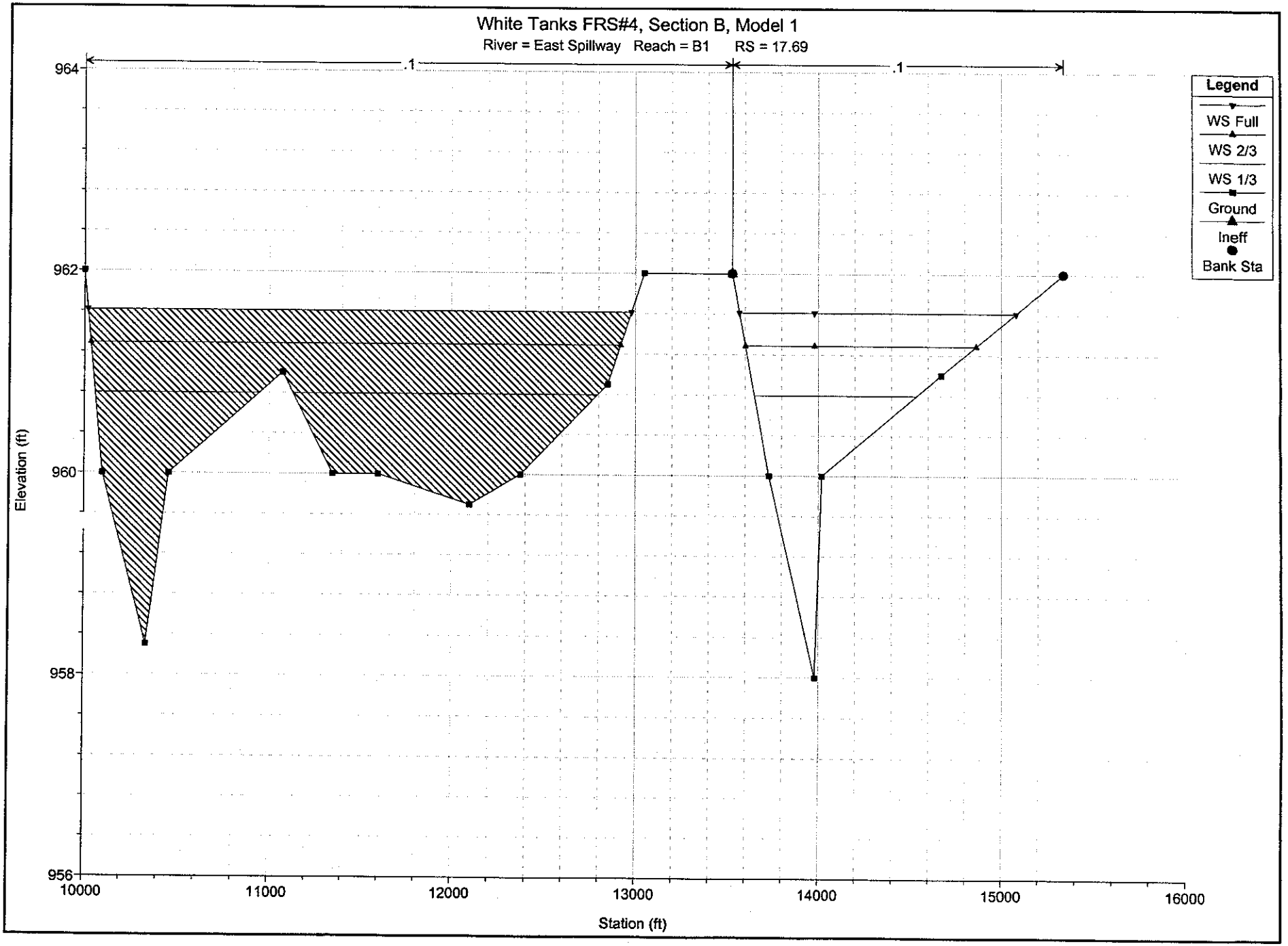
River = East Spillway Reach = B1 RS = 17.94
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
974
972
970
968
966
10000
11000
12000
13000
14000
15000
16000
Station (ft)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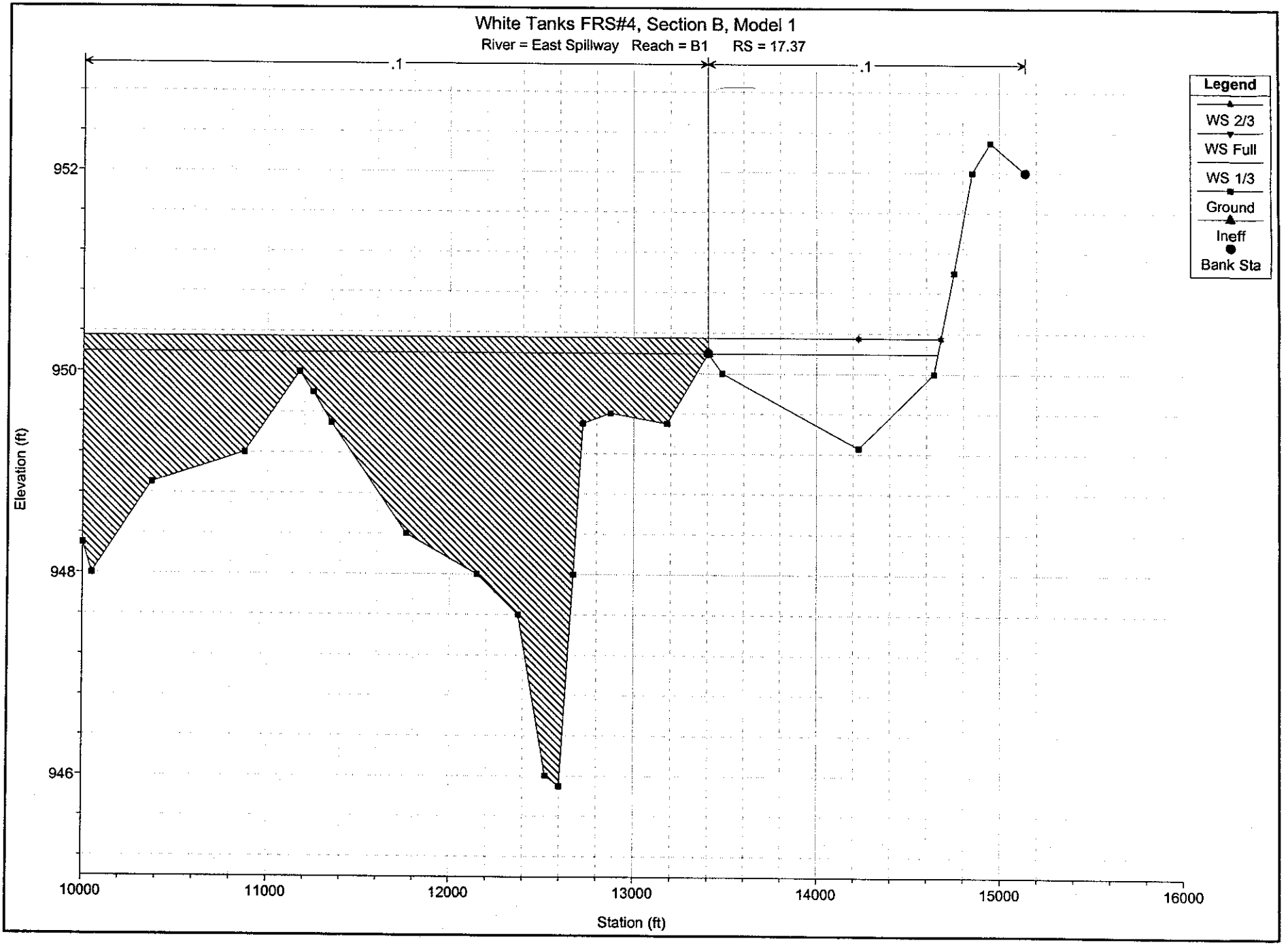
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
964
962
960
958
956
10000
11000
12000
13000
14000
15000
16000
Station (ft)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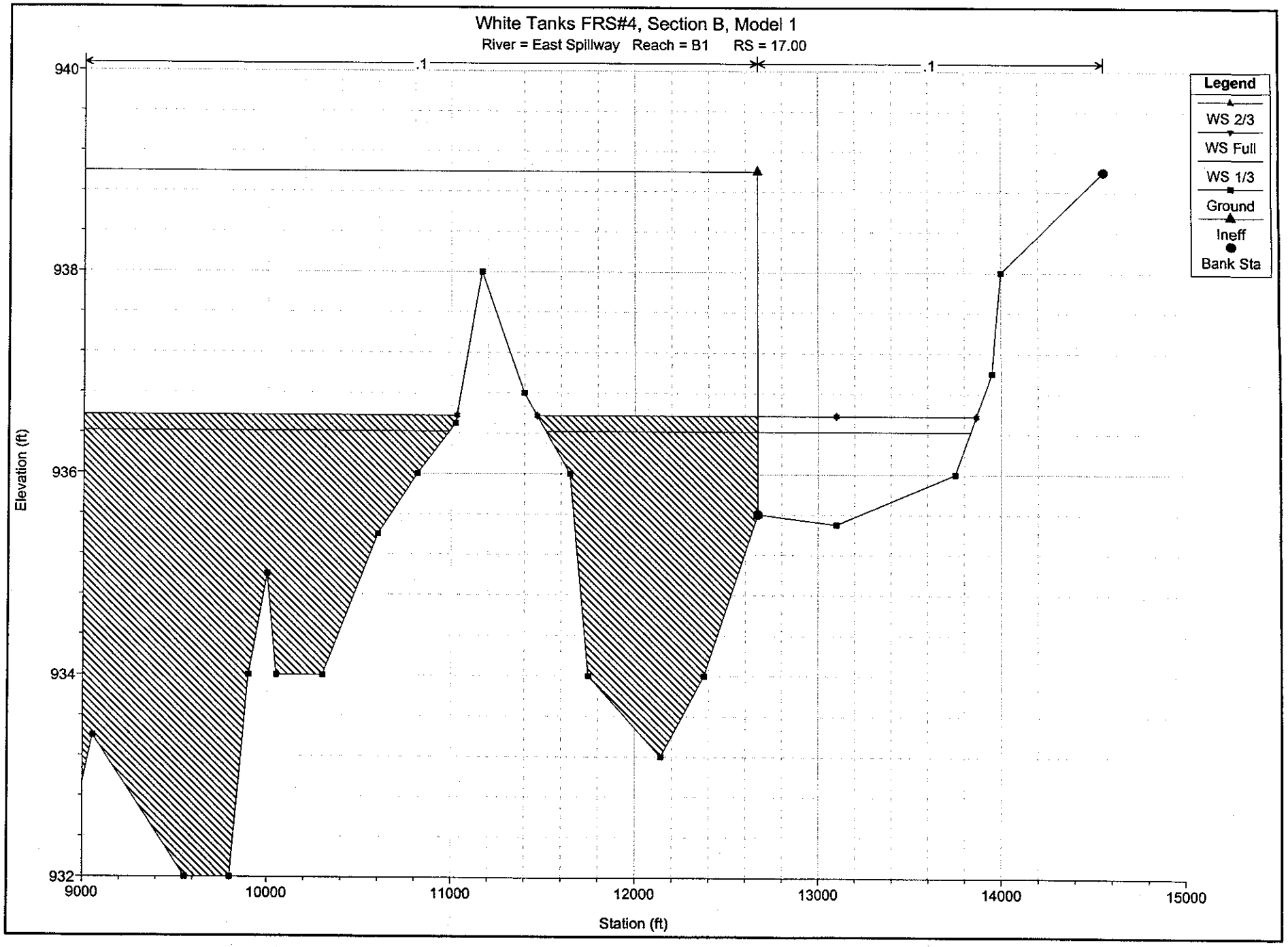
.1
.1
Legend
WS 2/3
WS Full
WS 1/3
Ground
Ineff
Bank Sta
952
950
948
946
Elevation (ft)
10000
11000
12000
13000
14000
15000
16000
Station (ft)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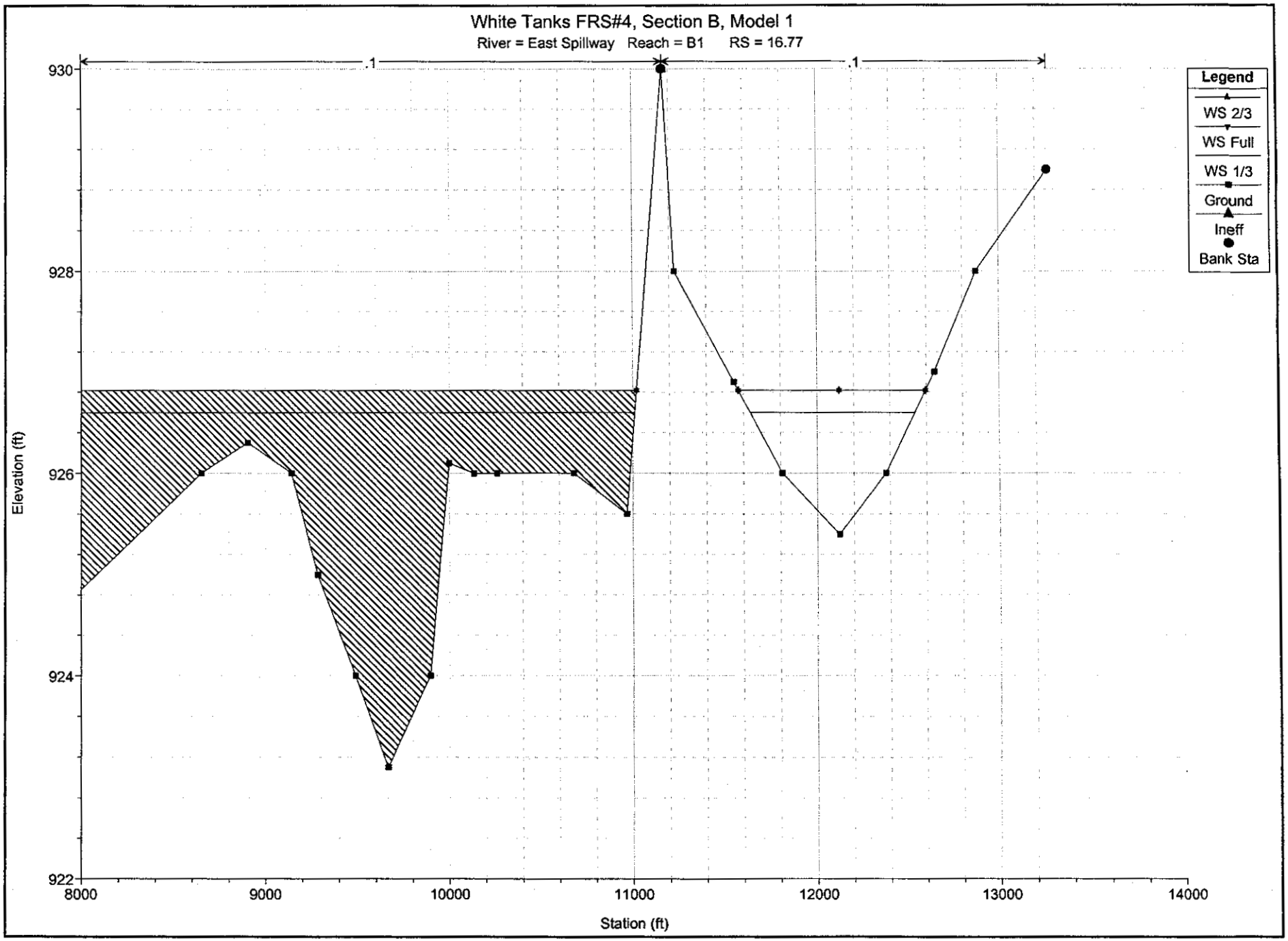
.1
.1
Legend
WS 2/3
WS Full
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
940
938
936
934
932
9000
10000
11000
12000
13000
14000
15000
Station (ft)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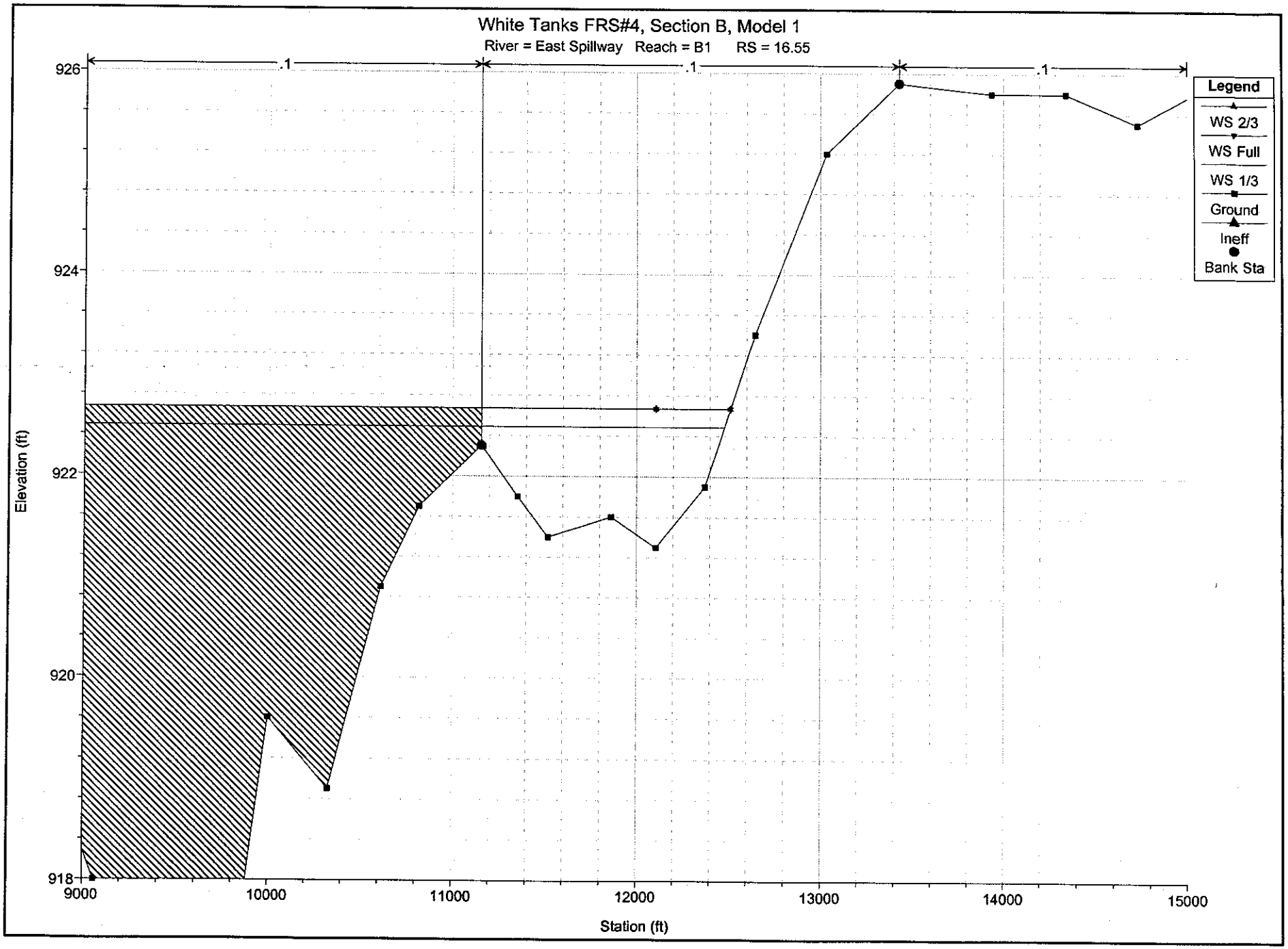
River = East Spillway Reach = B1 RS = 16.77
.1
.1
Legend
WS 2/3
WS Full
WS 1/3
Ground
Ineff
Bank Sta
930
928
926
924
922
Elevation (ft)
8000
9000
10000
11000
12000
13000
14000
Station (ft)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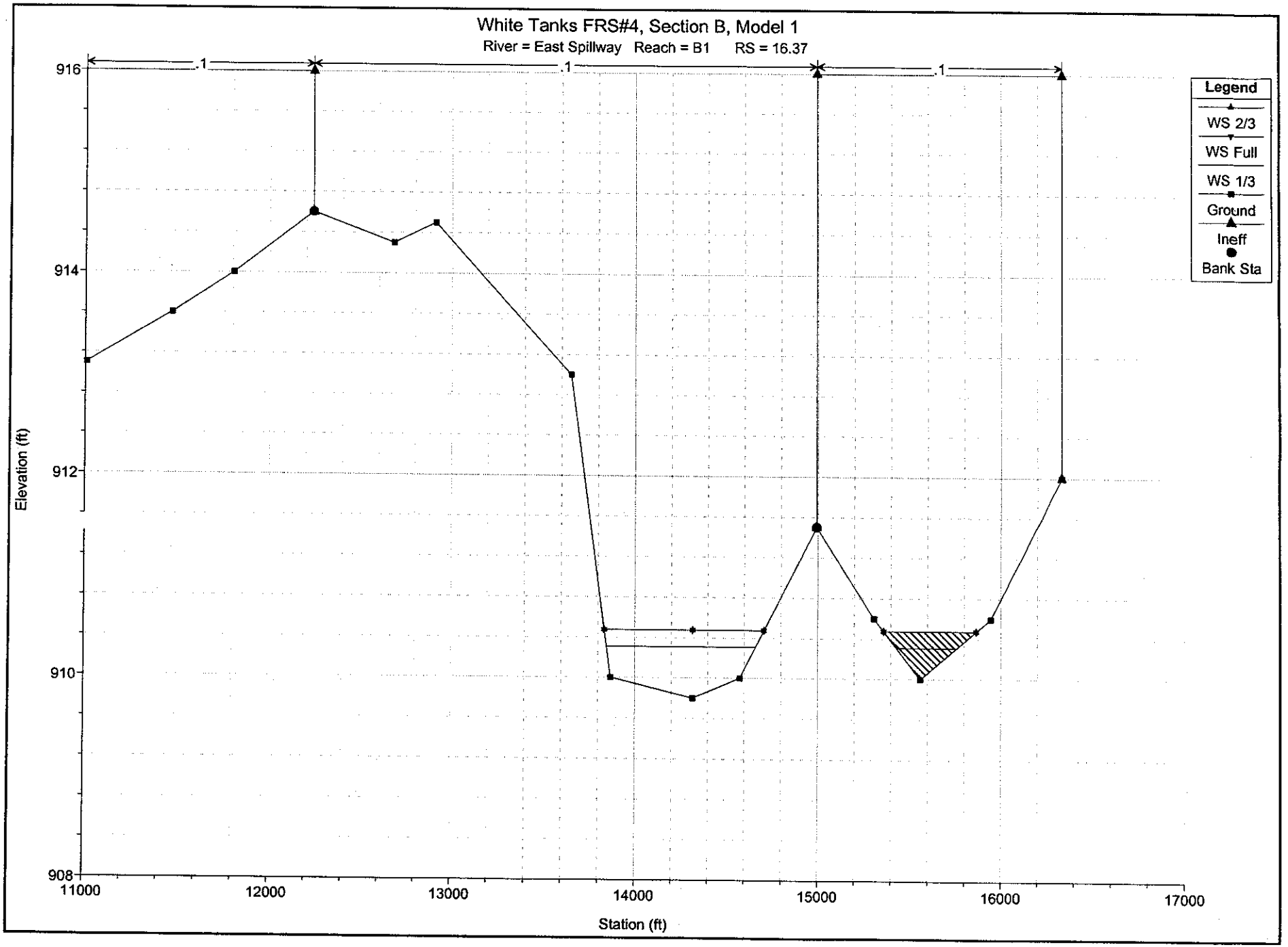
.1
.1
.1
Legend
WS 2/3
WS Full
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
926
924
922
920
918
9000
10000
11000
12000
13000
14000
15000
Station (ft)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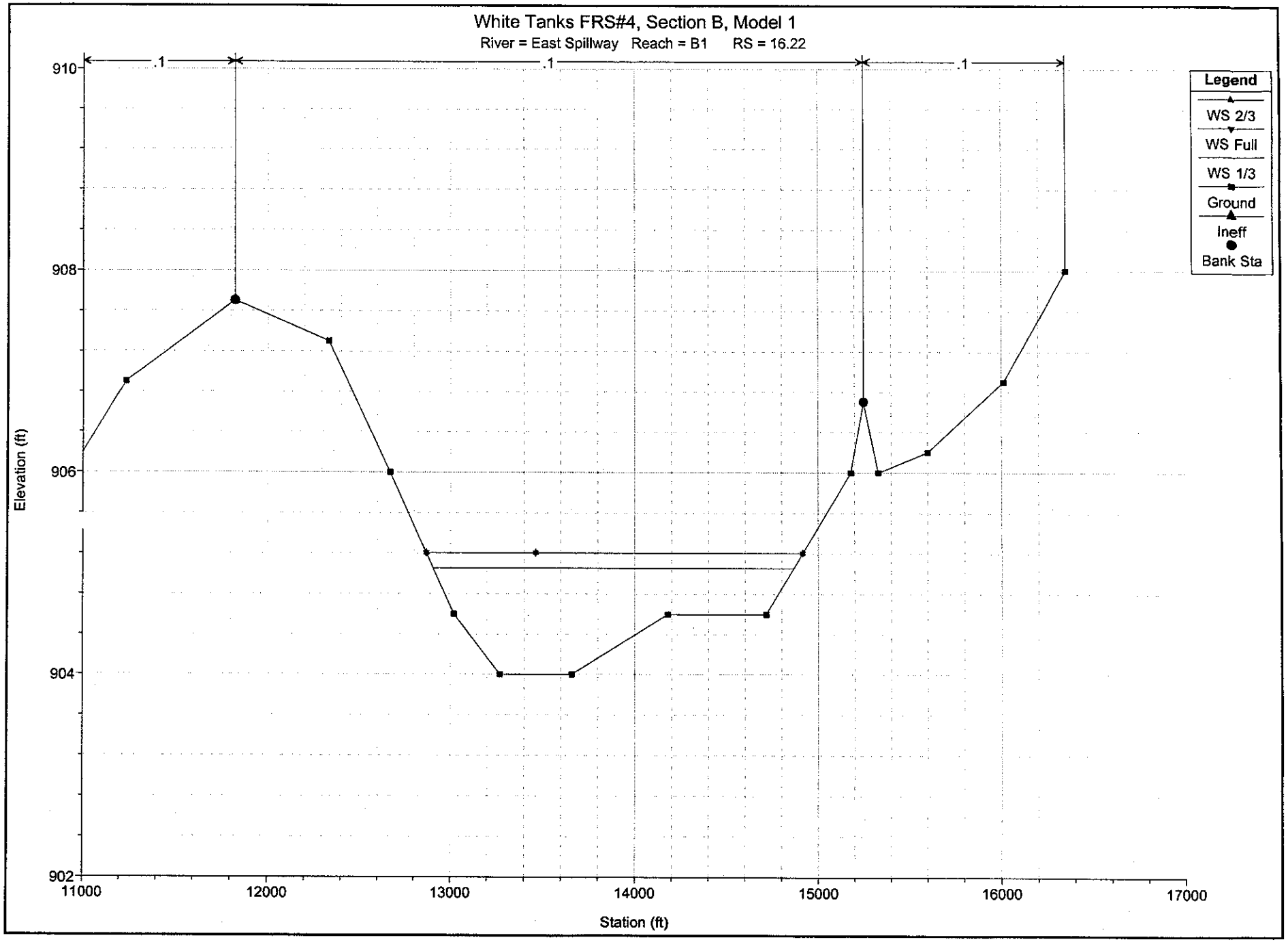
.1
.1
.1
Legend
WS 2/3
WS Full
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
916
914
912
910
908
11000
12000
13000
14000
15000
16000
17000
Station (ft)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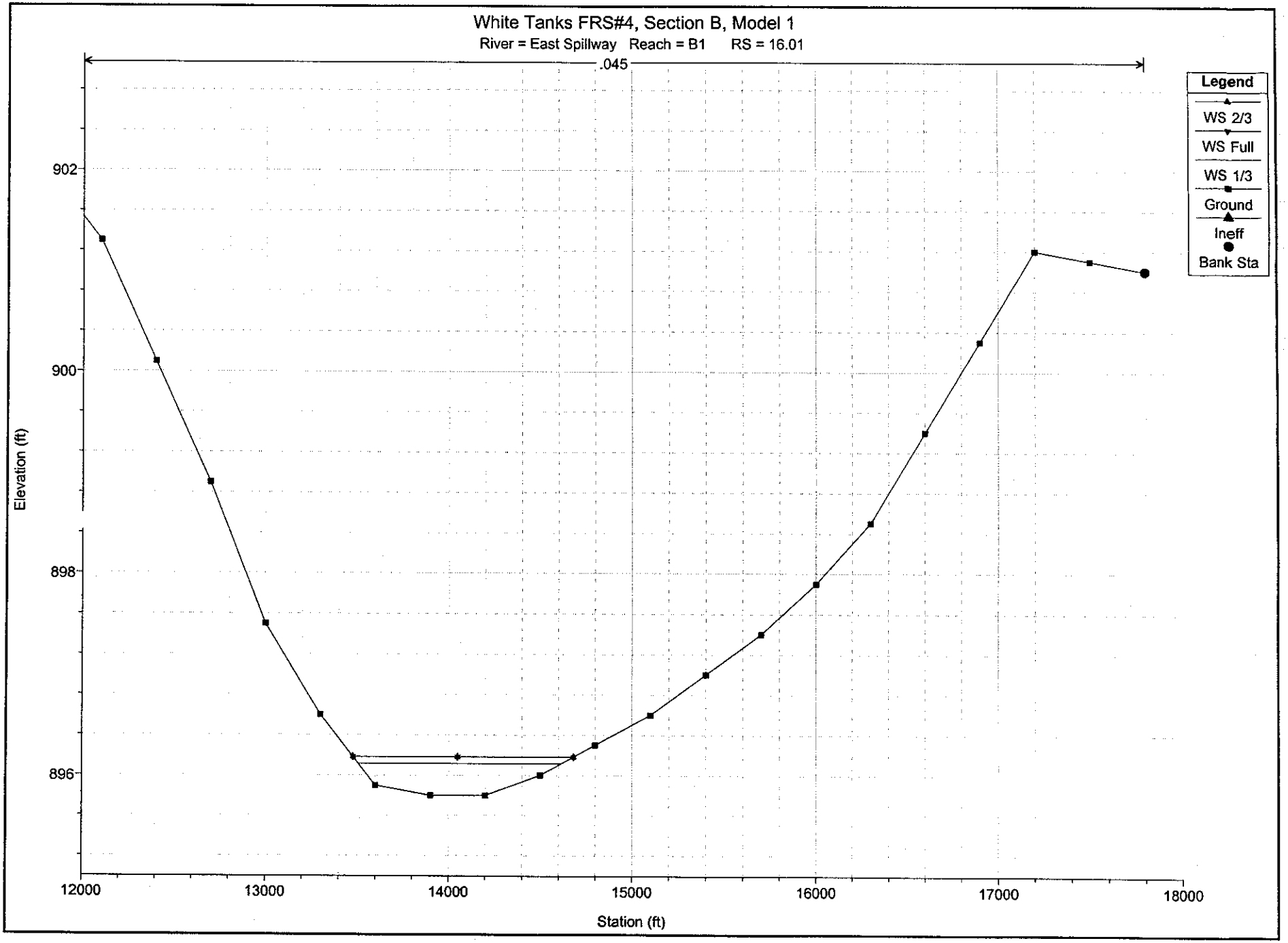
River = East Spillway Reach = B1 RS = 16.22
.1
.1
.1
910
908
906
904
902
Elevation (ft)
11000
12000
13000
14000
15000
16000
17000
Station (ft)
Legend
WS 2/3
WS Full
WS 1/3
Ground
Ineff
Bank Sta


White Tanks FRS#4, Section B, Model 1
River = East Spillway Reach = B1 RS = 16.01
.045
Legend
WS 2/3
WS Full
WS 1/3
Ground
Ineff
Bank Sta
902
900
898
896
Elevation (ft)
12000
13000
14000
15000
16000
17000
18000
Station (ft)

```
HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

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

PROJECT DATA
Project Title: White Tanks FRS #4, Section B, Model 2
Project File : WT4B2.prj
Run Date and Time: 06/26/2000 10:09:46 AM

Project in English units

Project Description:
Study Name: White Tanks FRS #4 Spillway Delineation Study
Contract No.: FCD 98-32
Purpose of Study: Delineation of the inundation limits of the 1/3, 2/3, and full spillway discharges for the White Tanks Flood Retarding Structure #4.

Model Name: WT4B2
Model Description: Set up to model flow between Tuthill Road and a flow split north of the Roosevelt Canal approximately 1800 east of Tuthill Road. Northern boundary is the Roosevelt Irrigation District Canal, southern boundary is the Buckeye Canal.
HEC-RAS Version: Version 2.2, September 1998 with RASPATCH

Consultants: Hoskin Engineering Consultants, Inc.
323 W. Roosevelt Street, Suite 200
Phoenix, AZ 85003
(602)252-8384 Phone
(602)252-8385 Fax
HEC 990006

DEI Professional Services, Inc.
6225 N. 24th St., Ste. 200
Phoenix, AZ 85016
(602)954-0038 Phone
(602)944-8605 Fax

PLAN DATA

Plan Title: Section B, Between Tuthill and Split
Plan File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\rsvlt-bkeye\final models\WT4B2.p01

Geometry Title: Section B, Between Tuthill and Split
Geometry File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\rsvlt-bkeye\final models\WT4B2.g01

Flow Title : Section B, Between Tuthill and Split
Flow File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\rsvlt-bkeye\final models\WT4B2.f01

Plan Summary Information:
Number of: Cross Sections = 13 Mulitple Openings = 0
Culverts = 0 Inline Weirs = 0
Bridges = 0

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

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

FLOW DATA

Flow Title: Section B, Between Tuthill and Split
Flow File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\rsvlt-bkeye\final models\WT4B2.f01

Flow Data (cfs)

River	Reach	RS	1/3	2/3	Full
Tuthill/Split	B2	18.85	2000	3500	5500
Tuthill/Split	B2	18.60	2300	3500	5500
Tuthill/Split	B2	18.39	2300	3500	4180
Tuthill/Split	B2	17.94	2300	3000	4180
Tuthill/Split	B2	17.69	2300	3000	3180
Tuthill/Split	B2	17.37	2300	3500	4500
Tuthill/Split	B2	16.77	1700	1700	2300
Tuthill/Split	B2	16.55	3800	4800	5800
Tuthill/Split	B2	16.22	3800	6500	11500
East Spillway	B2	18.85	2000	3500	5500
East Spillway	B2	18.60	2300	3500	5500
East Spillway	B2	18.39	2300	3500	4180
East Spillway	B2	17.94	2300	3000	4180
East Spillway	B2	17.69	2300	3000	3180
East Spillway	B2	17.37	2300	3500	4500
East Spillway	B2	16.77	1700	1700	2300
East Spillway	B2	16.55	3800	4800	5800
East Spillway	B2	16.22	3800	6500	11500

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
East Spillway	B2	1/3		Critical
East Spillway	B2	2/3		Critical
East Spillway	B2	Full		Critical

GEOMETRY DATA

Geometry Title: Section B, Between Tuthill and Split
Geometry File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\rsvlt-bkeye\final models\WT4B2.g01

CROSS SECTION RIVER: East Spillway

REACH: B2 RS: 18.85

INPUT
Description: 1/3 Q=2000 cfs
2/3 Q=3500 cfs
Full Q=5500 cfs
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4700	1003.3	5000	1002.9	5300	1002.7	5600	1002.6	5800	1002.5
5900	1002.4	6200	1002.1	6500	1002.1	6800	1002.2	7100	1002.4
7225	1002.5	7400	1002.6	7700	1002.7	7925	1002.5	8000	1002.3
8300	1001.6	8600	1001.4	8900	1001.5	9200	1002.3	9250	1002.4
9500	1003.1	9800	1003.8	10000	1003.8	10100	1003.4	10400	1002.5
10700	1001.8	10729	1001.7	11000	1001.1	11300	1000.9	11600	1000.9
11900	1001.2	12200	1001.7	12500	1002.5	12800	1002.2	13100	1001.7
13125	1001.6	13400	1001.2	13700	1000.9	14000	1001.1	14300	1000.9
14600	1000.4	14900	1000.2	15200	1000.1	15500	1000.3	15625	1000.4
15800	1000	16100	999.4	16400	999.3	16700	999.3	17000	999.1
17300	999	17600	999	17900	999	18200	999		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4700	.045	12500	.045	15625	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
12500	15625	1499	1376	871	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
4700	12500	1005	15625	18200	1005

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1001.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.045	
W.S. Elev (ft)	1001.08	Reach Len. (ft)	1499.00	1376.00	871.00
Crit W.S. (ft)	1000.72	Flow Area (sq ft)		1069.21	
E.G. Slope (ft/ft)	0.007688	Area (sq ft)	97.13	1069.21	4675.01
Q Total (cfs)	2000.00	Flow (cfs)		2000.00	
Top Width (ft)	5392.78	Top Width (ft)	758.75	2059.03	2575.00
Vel Total (ft/s)	1.87	Avg. Vel. (ft/s)		1.87	
Max Chl Dpth (ft)	2.08	Hydr. Depth (ft)		0.52	
Conv. Total (cfs)	22809.4	Conv. (cfs)		22809.4	
Length Wtd. (ft)	1376.00	Wetted Per. (ft)		2059.03	
Min Ch El (ft)	1000.10	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		0.47	
Frctn Loss (ft)	8.56	Cum Volume (acre-ft)	8781.87	637.95	223.17
C & E Loss (ft)	0.01	Cum SA (acres)	2638.11	564.99	292.08

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1001.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.045	
W.S. Elev (ft)	1001.36	Reach Len. (ft)	1499.00	1376.00	871.00
Crit W.S. (ft)	1000.95	Flow Area (sq ft)		1693.70	
E.G. Slope (ft/ft)	0.006017	Area (sq ft)	365.59	1693.70	5395.45
Q Total (cfs)	3500.00	Flow (cfs)		3500.00	
Top Width (ft)	6029.14	Top Width (ft)	1116.88	2337.26	2575.00
Vel Total (ft/s)	2.07	Avg. Vel. (ft/s)		2.07	
Max Chl Dpth (ft)	2.36	Hydr. Depth (ft)		0.72	
Conv. Total (cfs)	45120.5	Conv. (cfs)		45120.5	
Length Wtd. (ft)	1376.00	Wetted Per. (ft)		2337.26	
Min Ch El (ft)	1000.10	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)		0.56	

Frctn Loss (ft)	8.59	Cum Volume (acre-ft)	9581.61	822.18	304.55
C & E Loss (ft)	0.01	Cum SA (acres)	2773.04	600.65	321.72

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1001.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.045	
W.S. Elev (ft)	1001.62	Reach Len. (ft)	1499.00	1376.00	871.00
Crit W.S. (ft)	1001.17	Flow Area (sq ft)		2323.31	
E.G. Slope (ft/ft)	0.005685	Area (sq ft)	782.48	2323.31	6063.72
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	7126.34	Top Width (ft)	2045.64	2505.71	2575.00
Vel Total (ft/s)	2.37	Avg. Vel. (ft/s)		2.37	
Max Chl Dpth (ft)	2.62	Hydr. Depth (ft)		0.93	
Conv. Total (cfs)	72947.2	Conv. (cfs)		72947.2	
Length Wtd. (ft)	1376.00	Wetted Per. (ft)		2505.71	
Min Ch El (ft)	1000.10	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)		0.78	
Frctn Loss (ft)	8.46	Cum Volume (acre-ft)	10406.97	1032.39	397.88
C & E Loss (ft)	0.01	Cum SA (acres)	2867.23	651.21	386.30

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B2 RS: 18.60

INPUT
Description: 1/3 Q=2300 cfs
2/3 Q=3500 cfs
Full Q=5500 cfs
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3509	994	3700	993	4125	992	4325	991.2	5125	993.5
5875	994	6475	993.5	7200	992	7725	993	8200	992.7
8500	992	8650	991.6	8800	992	9200	992.5	9500	992
9800	991.2	10000	992	10550	992	10750	993.1	11325	991.6
11750	992	12500	992	12825	992	12950	992.9	13125	992
14000	990.3	14400	992	14775	992.2	15075	992	15400	992.3
15600	992.9	16050	993.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3509	.1	12950	.1	14775	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
12950	14775	1013	999	1028	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
3509	12950	997	14775	16050	997

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	992.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	992.54	Reach Len. (ft)	1013.00	999.00	1028.00
Crit W.S. (ft)	991.48	Flow Area (sq ft)		1969.42	
E.G. Slope (ft/ft)	0.005299	Area (sq ft)	3087.39	1969.42	269.88
Q Total (cfs)	2300.00	Flow (cfs)		2300.00	
Top Width (ft)	8222.52	Top Width (ft)	5761.37	1755.42	705.72

Vel Total (ft/s)	1.17	Avg. Vel. (ft/s)		1.17	
Max Chl Dpth (ft)	2.24	Hydr. Depth (ft)		1.12	
Conv. Total (cfs)	31596.5	Conv. (cfs)		31596.5	
Length Wtd. (ft)	999.00	Wetted Per. (ft)		1755.43	
Min Ch El (ft)	990.30	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)		0.43	
Frctn Loss (ft)	7.54	Cum Volume (acre-ft)	8727.08	589.96	173.74
C & E Loss (ft)	0.00	Cum SA (acres)	2525.92	504.75	259.28

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	992.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	992.79	Reach Len. (ft)	1013.00	999.00	1028.00
Crit W.S. (ft)	991.69	Flow Area (sq ft)		2419.20	
E.G. Slope (ft/ft)	0.006413	Area (sq ft)	4641.43	2419.20	458.85
Q Total (cfs)	3500.00	Flow (cfs)		3500.00	
Top Width (ft)	9201.67	Top Width (ft)	6607.17	1804.55	789.95
Vel Total (ft/s)	1.45	Avg. Vel. (ft/s)		1.45	
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)		1.34	
Conv. Total (cfs)	43705.3	Conv. (cfs)		43705.3	
Length Wtd. (ft)	999.00	Wetted Per. (ft)		1804.56	
Min Ch El (ft)	990.30	Shear (lb/sq ft)		0.54	
Alpha	1.00	Stream Power (lb/ft s)		0.78	
Frctn Loss (ft)	7.44	Cum Volume (acre-ft)	9495.46	757.22	246.02
C & E Loss (ft)	0.00	Cum SA (acres)	2640.14	535.24	288.08

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	993.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.100	
W.S. Elev (ft)	993.20	Reach Len. (ft)	1013.00	999.00	1028.00
Crit W.S. (ft)	991.97	Flow Area (sq ft)		3148.39	
E.G. Slope (ft/ft)	0.006680	Area (sq ft)	7557.86	3148.39	874.88
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	10783.75	Top Width (ft)	7683.75	1825.00	1275.00
Vel Total (ft/s)	1.75	Avg. Vel. (ft/s)		1.75	
Max Chl Dpth (ft)	2.90	Hydr. Depth (ft)		1.73	
Conv. Total (cfs)	67292.5	Conv. (cfs)		67292.5	
Length Wtd. (ft)	999.00	Wetted Per. (ft)		1825.01	
Min Ch El (ft)	990.30	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)		1.26	
Frctn Loss (ft)	7.74	Cum Volume (acre-ft)	10263.47	945.96	328.51
C & E Loss (ft)	0.00	Cum SA (acres)	2699.83	582.80	347.80

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B2 RS: 18.39

INPUT

Description: 1/3 Q=2300 cfs
2/3 Q=3500 cfs
Full Q=4180 cfs

Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2519	985.7	3029	985.4	3649	984	3808	984.3	4167	984
4388	984.1	4714	984.2	5822	984.9	6658	984.9	7215	984
7575	984.3	7936	983.1	8305	984	8653	984.5	9286	984
9569	984.2	9787	984	9884	983	10000	982.3	10331	983.4
10858	984	11159	983.5	11216	984	11301	984.2	11408	984
11907	983.5	12399	984	12675	984.8	12830	984.9	13039	984.5
13224	984	13574	983.3	14004	984	14519	984.8	15019	984.7
15360	984	15628	984.3	16111	985.5	16877	990		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2519	.1	12830	.1	14519	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
12830	14519	1381	1142	1439	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
2519	12830	995	14519	16877	995

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	985.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	984.99	Reach Len. (ft)	1381.00	1142.00	1439.00
Crit W.S. (ft)	984.30	Flow Area (sq ft)		1551.19	
E.G. Slope (ft/ft)	0.011154	Area (sq ft)	8327.15	1551.19	662.97
Q Total (cfs)	2300.00	Flow (cfs)		2300.00	
Top Width (ft)	12697.46	Top Width (ft)	9620.63	1689.00	1387.83
Vel Total (ft/s)	1.48	Avg. Vel. (ft/s)		1.48	
Max Chl Dpth (ft)	2.69	Hydr. Depth (ft)		0.92	
Conv. Total (cfs)	21777.9	Conv. (cfs)		21777.9	
Length Wtd. (ft)	1142.00	Wetted Per. (ft)		1689.00	
Min Ch El (ft)	983.30	Shear (lb/sq ft)		0.64	
Alpha	1.00	Stream Power (lb/ft s)		0.95	
Frctn Loss (ft)	8.41	Cum Volume (acre-ft)	8594.35	549.59	162.73
C & E Loss (ft)	0.00	Cum SA (acres)	2347.06	465.25	234.58

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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	985.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.100	
W.S. Elev (ft)	985.35	Reach Len. (ft)	1381.00	1142.00	1439.00
Crit W.S. (ft)	984.49	Flow Area (sq ft)		2147.76	
E.G. Slope (ft/ft)	0.008730	Area (sq ft)	11752.88	2147.76	1178.28
Q Total (cfs)	3500.00	Flow (cfs)		3500.00	
Top Width (ft)	12996.05	Top Width (ft)	9777.05	1689.00	1529.99
Vel Total (ft/s)	1.63	Avg. Vel. (ft/s)		1.63	
Max Chl Dpth (ft)	3.05	Hydr. Depth (ft)		1.27	
Conv. Total (cfs)	37458.6	Conv. (cfs)		37458.6	
Length Wtd. (ft)	1142.00	Wetted Per. (ft)		1689.00	
Min Ch El (ft)	983.30	Shear (lb/sq ft)		0.69	
Alpha	1.00	Stream Power (lb/ft s)		1.13	
Frctn Loss (ft)	8.50	Cum Volume (acre-ft)	9304.83	704.85	226.70
C & E Loss (ft)	0.00	Cum SA (acres)	2449.63	495.18	260.71

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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	985.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.100	
W.S. Elev (ft)	985.45	Reach Len. (ft)	1381.00	1142.00	1439.00
Crit W.S. (ft)	984.58	Flow Area (sq ft)		2327.55	
E.G. Slope (ft/ft)	0.009525	Area (sq ft)	12797.83	2327.55	1343.42
Q Total (cfs)	4180.00	Flow (cfs)		4180.00	
Top Width (ft)	13151.87	Top Width (ft)	9890.03	1689.00	1572.84
Vel Total (ft/s)	1.80	Avg. Vel. (ft/s)		1.80	
Max Chl Dpth (ft)	3.15	Hydr. Depth (ft)		1.38	
Conv. Total (cfs)	42829.1	Conv. (cfs)		42829.1	
Length Wtd. (ft)	1142.00	Wetted Per. (ft)		1689.00	
Min Ch El (ft)	983.30	Shear (lb/sq ft)		0.82	
Alpha	1.00	Stream Power (lb/ft s)		1.47	
Frctn Loss (ft)	8.42	Cum Volume (acre-ft)	10026.78	883.17	302.34
C & E Loss (ft)	0.01	Cum SA (acres)	2495.48	542.51	314.20

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.

CROSS SECTION RIVER: East Spillway
REACH: B2 RS: 18.14

INPUT
Description: 1/3 Q=2300 cfs
2/3 Q=3500 cfs
Full Q=4180 cfs
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3951	977.7	4475	974	4700	975.6	4950	974	5450	975.2
5800	976	6450	977	7050	976	7500	974	7800	974
8050	974.8	8300	976	8575	975.6	8800	974.5	9450	974
9800	972.6	10000	973.4	10150	976	10900	976.5	11175	976.7
11675	978	12300	975.4	12875	974.5	13300	975.9	13650	975.9
13950	976.9	14100	976	14300	975.8	14670	976	14930	977
15110	978	15285	978.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3951	.1	11675	.1	13950	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
11675	13950	1012	1016	1046	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
3951	11675	980	13950	15285	980

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	976.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	976.59	Reach Len. (ft)	1012.00	1016.00	1046.00
Crit W.S. (ft)	975.57	Flow Area (sq ft)		2018.58	
E.G. Slope (ft/ft)	0.005210	Area (sq ft)	9726.18	2018.58	468.34
Q Total (cfs)	2300.00	Flow (cfs)		2300.00	
Top Width (ft)	9071.34	Top Width (ft)	6405.65	1843.56	822.13
Vel Total (ft/s)	1.14	Avg. Vel. (ft/s)		1.14	
Max Chl Dpth (ft)	3.99	Hydr. Depth (ft)		1.09	
Conv. Total (cfs)	31863.8	Conv. (cfs)		31863.8	
Length Wtd. (ft)	1016.00	Wetted Per. (ft)		1843.56	
Min Ch El (ft)	974.50	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)		0.41	
Frctn Loss (ft)	7.29	Cum Volume (acre-ft)	8308.18	502.80	144.04
C & E Loss (ft)	0.00	Cum SA (acres)	2093.02	418.95	198.08

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	976.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	976.85	Reach Len. (ft)	1012.00	1016.00	1046.00
Crit W.S. (ft)	975.77	Flow Area (sq ft)		2519.21	
E.G. Slope (ft/ft)	0.006362	Area (sq ft)	11484.59	2519.21	697.95
Q Total (cfs)	3500.00	Flow (cfs)		3500.00	
Top Width (ft)	9896.82	Top Width (ft)	6978.21	1984.89	933.72
Vel Total (ft/s)	1.39	Avg. Vel. (ft/s)		1.39	
Max Chl Dpth (ft)	4.25	Hydr. Depth (ft)		1.27	
Conv. Total (cfs)	43881.2	Conv. (cfs)		43881.2	
Length Wtd. (ft)	1016.00	Wetted Per. (ft)		1984.89	
Min Ch El (ft)	974.50	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)		0.70	
Frctn Loss (ft)	7.26	Cum Volume (acre-ft)	8936.47	643.67	195.71
C & E Loss (ft)	0.00	Cum SA (acres)	2184.03	447.02	220.01

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	977.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	977.04	Reach Len. (ft)	1012.00	1016.00	1046.00
Crit W.S. (ft)	975.93	Flow Area (sq ft)		2907.30	
E.G. Slope (ft/ft)	0.005858	Area (sq ft)	12856.48	2907.30	883.34
Q Total (cfs)	4180.00	Flow (cfs)		4180.00	
Top Width (ft)	10297.03	Top Width (ft)	7263.69	2045.32	988.02
Vel Total (ft/s)	1.44	Avg. Vel. (ft/s)		1.44	
Max Chl Dpth (ft)	4.44	Hydr. Depth (ft)		1.42	
Conv. Total (cfs)	54613.8	Conv. (cfs)		54613.8	
Length Wtd. (ft)	1016.00	Wetted Per. (ft)		2045.33	
Min Ch El (ft)	974.50	Shear (lb/sq ft)		0.52	
Alpha	1.00	Stream Power (lb/ft s)		0.75	
Frctn Loss (ft)	7.16	Cum Volume (acre-ft)	9620.12	814.55	265.56
C & E Loss (ft)	0.00	Cum SA (acres)	2223.57	493.56	271.90

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: East Spillway
REACH: B2 RS: 17.94

INPUT
Description: 1/3 Q=2300 cfs
2/3 Q=3000 cfs
Full Q=4180 cfs
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4274	968	4369	967.1	4467	967.1	4614	965.8	4895	966
5316	966.9	5848	968	6427	967.4	7038	966.1	7352	966.7
7990	968.6	8222	967	8501	966	8613	968	9043	966.7
9884	966	10000	968.7	10228	968.7	10507	970	11012	968.8
11404	970	12254	968.5	12673	968	12934	967	13087	968
13270	968.9	13702	968	14010	968.8	14249	968	14386	968.3
14547	968	14702	967.7	14908	968	15245	968.8	15488	968
15552	971								

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Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4274      .1   11404      .1   13270      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         11404   13270             1238    1227    1152            .1        .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4274   11404     979   13270   15552     979

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)              969.32   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                 0.04   Wt. n-Val.                            0.100
  W.S. Elev (ft)              969.28   Reach Len. (ft)            1238.00   1227.00    1152.00
  Crit W.S. (ft)              968.48   Flow Area (sq ft)                    1489.86
  E.G. Slope (ft/ft)        0.010476   Area (sq ft)              13447.60   1489.86    2216.31
  Q Total (cfs)             2300.00   Flow (cfs)                           2300.00
  Top Width (ft)           10137.51   Top Width (ft)             6435.37   1456.88    2245.26
  Vel Total (ft/s)              1.54   Avg. Vel. (ft/s)                        1.54
  Max Chl Dpth (ft)             3.48   Hydr. Depth (ft)                        1.02
  Conv. Total (cfs)         22471.1   Conv. (cfs)                          22471.1
  Length Wtd. (ft)          1227.00   Wetted Per. (ft)                     1456.88
  Min Ch El (ft)             967.00   Shear (lb/sq ft)                        0.67
  Alpha                         1.00   Stream Power (lb/ft s)                  1.03
  Frctn Loss (ft)               7.97   Cum Volume (acre-ft)       8038.99    461.88     111.81
  C & E Loss (ft)               0.01   Cum SA (acres)             1943.86    380.46     161.25

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT    Profile #2/3

  E.G. Elev (ft)              969.62   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                 0.04   Wt. n-Val.                            0.100
  W.S. Elev (ft)              969.58   Reach Len. (ft)            1238.00   1227.00    1152.00
  Crit W.S. (ft)              968.61   Flow Area (sq ft)                    1961.85
  E.G. Slope (ft/ft)        0.008273   Area (sq ft)              15460.42   1961.85    2903.88
  Q Total (cfs)             3000.00   Flow (cfs)                           3000.00
  Top Width (ft)           10611.51   Top Width (ft)             6729.57   1630.15    2251.79
  Vel Total (ft/s)              1.53   Avg. Vel. (ft/s)                        1.53
  Max Chl Dpth (ft)             3.78   Hydr. Depth (ft)                        1.20
  Conv. Total (cfs)         32982.6   Conv. (cfs)                          32982.6
  Length Wtd. (ft)          1227.00   Wetted Per. (ft)                     1630.16
  Min Ch El (ft)             967.00   Shear (lb/sq ft)                        0.62
  Alpha                         1.00   Stream Power (lb/ft s)                  0.95
  Frctn Loss (ft)               8.15   Cum Volume (acre-ft)       8623.48    591.42     152.47
  C & E Loss (ft)               0.00   Cum SA (acres)             2024.80    404.86     181.77

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT    Profile #Full

  E.G. Elev (ft)              969.92   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                 0.04   Wt. n-Val.                            0.100
  W.S. Elev (ft)              969.87   Reach Len. (ft)            1238.00   1227.00    1152.00
  Crit W.S. (ft)              968.79   Flow Area (sq ft)                    2456.08
  E.G. Slope (ft/ft)        0.008628   Area (sq ft)              17443.32   2456.08    3554.85
  Q Total (cfs)             4180.00   Flow (cfs)                           4180.00
```

Top Width (ft)	11059.02	Top Width (ft)	7007.33	1793.75	2257.95
Vel Total (ft/s)	1.70	Avg. Vel. (ft/s)		1.70	
Max Chl Dpth (ft)	4.07	Hydr. Depth (ft)		1.37	
Conv. Total (cfs)	45001.3	Conv. (cfs)		45001.3	
Length Wtd. (ft)	1227.00	Wetted Per. (ft)		1793.76	
Min Ch El (ft)	967.00	Shear (lb/sq ft)		0.74	
Alpha	1.00	Stream Power (lb/ft s)		1.26	
Frctn Loss (ft)	8.38	Cum Volume (acre-ft)	9268.15	752.00	212.27
C & E Loss (ft)	0.01	Cum SA (acres)	2057.79	448.79	232.93

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B2 RS: 17.69

INPUT
Description: 1/3 Q=2300 cfs
2/3 Q=3000 cfs
Full Q=3180 cfs
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3550	960	4000	958.5	4200	958	4300	956.5	4350	957
4525	958.3	4750	958.8	5250	958	5840	959	6325	958
6775	958.4	7050	958	7540	959.8	7640	960	8125	960
8550	958	8950	957.4	9450	957.2	10000	962	10100	960
10340	958.3	10460	960	11075	961	11350	960	11600	960
12100	959.7	12375	960	12850	960.9	13050	962	13530	962
13730	960	13980	958	14020	960	14670	961	15340	962

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3550	.1	11075	.1	13530	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
11075	13530	1600	1518	1851	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
3550	11075	966	13530	15340	966

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	961.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	961.32	Reach Len. (ft)	1600.00	1518.00	1851.00
Crit W.S. (ft)	960.41	Flow Area (sq ft)		2121.33	
E.G. Slope (ft/ft)	0.004440	Area (sq ft)	18902.73	2121.33	1325.35
Q Total (cfs)	2300.00	Flow (cfs)		2300.00	
Top Width (ft)	10549.22	Top Width (ft)	7412.84	1851.10	1285.28
Vel Total (ft/s)	1.08	Avg. Vel. (ft/s)		1.08	
Max Chl Dpth (ft)	4.82	Hydr. Depth (ft)		1.15	
Conv. Total (cfs)	34518.7	Conv. (cfs)		34518.7	
Length Wtd. (ft)	1518.00	Wetted Per. (ft)		1851.10	
Min Ch El (ft)	959.70	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)		0.34	
Frctn Loss (ft)	12.53	Cum Volume (acre-ft)	7579.28	411.02	64.98
C & E Loss (ft)	0.01	Cum SA (acres)	1747.07	333.87	114.56

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	961.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	961.44	Reach Len. (ft)	1600.00	1518.00	1851.00
Crit W.S. (ft)	960.50	Flow Area (sq ft)		2351.05	
E.G. Slope (ft/ft)	0.005448	Area (sq ft)	19818.37	2351.05	1489.75
Q Total (cfs)	3000.00	Flow (cfs)		3000.00	
Top Width (ft)	10686.93	Top Width (ft)	7433.14	1873.52	1380.26
Vel Total (ft/s)	1.28	Avg. Vel. (ft/s)		1.28	
Max Chl Dpth (ft)	4.94	Hydr. Depth (ft)		1.25	
Conv. Total (cfs)	40643.4	Conv. (cfs)		40643.4	
Length Wtd. (ft)	1518.00	Wetted Per. (ft)		1873.53	
Min Ch El (ft)	959.70	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		0.54	
Frctn Loss (ft)	12.09	Cum Volume (acre-ft)	8122.15	530.67	94.37
C & E Loss (ft)	0.00	Cum SA (acres)	1823.54	355.51	133.74

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	961.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	961.51	Reach Len. (ft)	1600.00	1518.00	1851.00
Crit W.S. (ft)	960.52	Flow Area (sq ft)		2474.13	
E.G. Slope (ft/ft)	0.005208	Area (sq ft)	20305.53	2474.13	1581.79
Q Total (cfs)	3180.00	Flow (cfs)		3180.00	
Top Width (ft)	10760.04	Top Width (ft)	7443.92	1885.43	1430.69
Vel Total (ft/s)	1.29	Avg. Vel. (ft/s)		1.29	
Max Chl Dpth (ft)	5.01	Hydr. Depth (ft)		1.31	
Conv. Total (cfs)	44064.9	Conv. (cfs)		44064.9	
Length Wtd. (ft)	1518.00	Wetted Per. (ft)		1885.44	
Min Ch El (ft)	959.70	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		0.55	
Frctn Loss (ft)	11.72	Cum Volume (acre-ft)	8731.73	682.57	144.35
C & E Loss (ft)	0.00	Cum SA (acres)	1852.44	396.97	184.15

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B2 RS: 17.37

INPUT
Description: 1/3 Q=2300 cfs
2/3 Q=3500 cfs
Full Q=4500 cfs
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1570	944	2020	940	2270	940	2445	939.8	2695	940
3020	941.6	3520	940	4120	939.1	4700	939.6	4800	941
5550	941.7	6000	941.3	6200	941.3	6460	942	6590	942.9
6740	944	6950	945.1	7040	946.2	7340	943.9	7865	945.7
8890	945.3	9365	947	9465	948.2	9645	948	9825	947
10000	948.3	10050	948	10375	948.9	10875	949.2	11175	950
11250	949.8	11350	949.5	11760	948.4	12150	948	12375	947.6
12525	946	12600	945.9	12675	948	12725	949.5	12875	949.6
13180	949.5	13405	950.2	13480	950	14230	949.26	14640	950
14750	951	14850	952	14950	952.3	15140	952		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1570	.1	11175	.1	13405	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
11175	13405	2133	2112	2108	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
1570	11175	955.8	13405	15140	955.8

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	948.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.100	
W.S. Elev (ft)	948.73	Reach Len. (ft)	2133.00	2112.00	2108.00
Crit W.S. (ft)	947.95	Flow Area (sq ft)		1076.47	
E.G. Slope (ft/ft)	0.020314	Area (sq ft)	50640.41	1076.47	
Q Total (cfs)	2300.00	Flow (cfs)		2300.00	
Top Width (ft)	9805.82	Top Width (ft)	8743.55	1062.27	
Vel Total (ft/s)	2.14	Avg. Vel. (ft/s)		2.14	
Max Chl Dpth (ft)	9.63	Hydr. Depth (ft)		1.01	
Conv. Total (cfs)	16137.2	Conv. (cfs)		16137.2	
Length Wtd. (ft)	2112.00	Wetted Per. (ft)		1062.32	
Min Ch El (ft)	945.90	Shear (lb/sq ft)		1.29	
Alpha	1.00	Stream Power (lb/ft s)		2.75	
Frctn Loss (ft)	12.81	Cum Volume (acre-ft)	6302.09	355.30	36.82
C & E Loss (ft)	0.01	Cum SA (acres)	1450.35	283.10	87.26

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	949.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.100	
W.S. Elev (ft)	949.31	Reach Len. (ft)	2133.00	2112.00	2108.00
Crit W.S. (ft)	948.33	Flow Area (sq ft)		1760.91	
E.G. Slope (ft/ft)	0.011912	Area (sq ft)	55874.42	1760.91	1.95
Q Total (cfs)	3500.00	Flow (cfs)		3500.00	
Top Width (ft)	10722.16	Top Width (ft)	9346.20	1297.80	78.17
Vel Total (ft/s)	1.99	Avg. Vel. (ft/s)		1.99	
Max Chl Dpth (ft)	10.21	Hydr. Depth (ft)		1.36	
Conv. Total (cfs)	32068.1	Conv. (cfs)		32068.1	
Length Wtd. (ft)	2112.00	Wetted Per. (ft)		1297.86	
Min Ch El (ft)	945.90	Shear (lb/sq ft)		1.01	
Alpha	1.00	Stream Power (lb/ft s)		2.01	
Frctn Loss (ft)	12.95	Cum Volume (acre-ft)	6732.02	459.02	62.68
C & E Loss (ft)	0.01	Cum SA (acres)	1515.38	300.26	102.75

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	949.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.100	
W.S. Elev (ft)	949.76	Reach Len. (ft)	2133.00	2112.00	2108.00
Crit W.S. (ft)	948.51	Flow Area (sq ft)		2491.54	
E.G. Slope (ft/ft)	0.011027	Area (sq ft)	60125.84	2491.54	196.48
Q Total (cfs)	4500.00	Flow (cfs)		4500.00	

Top Width (ft)	12300.79	Top Width (ft)	9515.25	2000.69	784.85
Vel Total (ft/s)	1.81	Avg. Vel. (ft/s)		1.81	
Max Chl Dpth (ft)	10.66	Hydr. Depth (ft)		1.25	
Conv. Total (cfs)	42852.9	Conv. (cfs)		42852.9	
Length Wtd. (ft)	2112.00	Wetted Per. (ft)		2000.75	
Min Ch El (ft)	945.90	Shear (lb/sq ft)		0.86	
Alpha	1.00	Stream Power (lb/ft s)		1.55	
Frctn Loss (ft)	13.01	Cum Volume (acre-ft)	7254.57	596.04	106.56
C & E Loss (ft)	0.00	Cum SA (acres)	1540.98	329.26	137.08

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B2 RS: 17.00

INPUT
Description: 1/3 Q=2300 cfs
2/3 Q=3500 cfs
Full Q=4500 cfs
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2760	930	3060	928.3	3710	928	4310	927.6	4670	927.5
4770	928	4970	927.6	5170	928	5520	929	6320	930
6690	931.4	7020	931.5	7360	930	7485	931	7915	932
8345	931.3	8655	930	9055	933.4	9555	932	9675	931.7
9800	932	9900	934	10000	935	10050	934	10300	934
10600	935.4	10815	936	11025	936.5	11170	938	11400	936.8
11650	936	11750	934	12140	933.2	12375	934	12670	935.6
13100	935.5	13750	936	13950	937	14000	938	14560	939

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2760	.1	11170	.1	12670	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
11170	12670	1836	1552	1769	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
2760	11170	939	12670	14560	939

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	935.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	935.95	Reach Len. (ft)	1836.00	1552.00	1769.00
Crit W.S. (ft)	934.35	Flow Area (sq ft)		1902.52	
E.G. Slope (ft/ft)	0.002874	Area (sq ft)	43908.14	1902.52	303.09
Q Total (cfs)	2300.00	Flow (cfs)		2300.00	
Top Width (ft)	10068.66	Top Width (ft)	8036.89	1017.47	1014.30
Vel Total (ft/s)	1.21	Avg. Vel. (ft/s)		1.21	
Max Chl Dpth (ft)	8.45	Hydr. Depth (ft)		1.87	
Conv. Total (cfs)	42906.1	Conv. (cfs)		42906.1	
Length Wtd. (ft)	1552.00	Wetted Per. (ft)		1017.50	
Min Ch El (ft)	933.20	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)		0.41	
Frctn Loss (ft)	9.19	Cum Volume (acre-ft)	3987.21	283.08	29.48
C & E Loss (ft)	0.01	Cum SA (acres)	1039.51	232.68	62.71

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	936.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	936.38	Reach Len. (ft)	1836.00	1552.00	1769.00
Crit W.S. (ft)	934.59	Flow Area (sq ft)		2366.18	
E.G. Slope (ft/ft)	0.003740	Area (sq ft)	47420.56	2366.18	782.90
Q Total (cfs)	3500.00	Flow (cfs)		3500.00	
Top Width (ft)	10511.01	Top Width (ft)	8215.35	1139.31	1156.36
Vel Total (ft/s)	1.48	Avg. Vel. (ft/s)		1.48	
Max Chl Dpth (ft)	8.88	Hydr. Depth (ft)		2.08	
Conv. Total (cfs)	57232.4	Conv. (cfs)		57232.4	
Length Wtd. (ft)	1552.00	Wetted Per. (ft)		1139.33	
Min Ch El (ft)	933.20	Shear (lb/sq ft)		0.48	
Alpha	1.00	Stream Power (lb/ft s)		0.72	
Frctn Loss (ft)	9.65	Cum Volume (acre-ft)	4203.00	358.97	43.69
C & E Loss (ft)	0.01	Cum SA (acres)	1085.41	241.18	72.88

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	936.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.100	
W.S. Elev (ft)	936.76	Reach Len. (ft)	1836.00	1552.00	1769.00
Crit W.S. (ft)	934.76	Flow Area (sq ft)		2816.85	
E.G. Slope (ft/ft)	0.003941	Area (sq ft)	50529.80	2816.85	1232.02
Q Total (cfs)	4500.00	Flow (cfs)		4500.00	
Top Width (ft)	10778.38	Top Width (ft)	8289.93	1256.86	1231.59
Vel Total (ft/s)	1.60	Avg. Vel. (ft/s)		1.60	
Max Chl Dpth (ft)	9.26	Hydr. Depth (ft)		2.24	
Conv. Total (cfs)	71681.2	Conv. (cfs)		71681.2	
Length Wtd. (ft)	1552.00	Wetted Per. (ft)		1256.89	
Min Ch El (ft)	933.20	Shear (lb/sq ft)		0.55	
Alpha	1.00	Stream Power (lb/ft s)		0.88	
Frctn Loss (ft)	9.79	Cum Volume (acre-ft)	4545.33	467.36	72.00
C & E Loss (ft)	0.00	Cum SA (acres)	1105.04	250.29	88.29

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B2 RS: 16.77

INPUT
Description: 1/3 Q=1700 cfs
2/3 Q=1700 cfs
Full Q=2300 cfs
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1164	924	1409	923.9	2404	923.2	2694	922	2898	922
3219	921.2	3647	920.5	4557	920	4705	920.2	4964	920
5137	920.3	5370	920.3	5906	921.2	6318	922	6812	923.3
7355	924.2	7856	924.6	8653	926	8906	926.3	9144	926
9286	925	9489	924	9666	923.1	9896	924	10000	926.1

10135	926	10261	926	10681	926	10968	925.6	11166	930
11228	928	11548	926.9	11810	926	12120	925.4	12377	926
12645	927	12875	928	13265	929				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1164	.1	10000	.1	11166	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10000	11166	1696	1168	1044	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
1164	10000	934	11166	13265	934

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	926.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.100	
W.S. Elev (ft)	926.69	Reach Len. (ft)	1696.00	1168.00	1044.00
Crit W.S. (ft)	926.39	Flow Area (sq ft)		747.30	
E.G. Slope (ft/ft)	0.035354	Area (sq ft)	34707.42	747.30	696.28
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	10807.01	Top Width (ft)	8836.00	1017.14	953.88
Vel Total (ft/s)	2.27	Avg. Vel. (ft/s)		2.27	
Max Chl Dpth (ft)	6.69	Hydr. Depth (ft)		0.73	
Conv. Total (cfs)	9041.2	Conv. (cfs)		9041.2	
Length Wtd. (ft)	1168.00	Wetted Per. (ft)		1017.15	
Min Ch El (ft)	925.60	Shear (lb/sq ft)		1.62	
Alpha	1.00	Stream Power (lb/ft s)		3.69	
Frctn Loss (ft)	6.94	Cum Volume (acre-ft)	2330.43	235.88	9.19
C & E Loss (ft)	0.02	Cum SA (acres)	683.92	196.44	22.75

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	926.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.100	
W.S. Elev (ft)	926.67	Reach Len. (ft)	1696.00	1168.00	1044.00
Crit W.S. (ft)	926.39	Flow Area (sq ft)		729.86	
E.G. Slope (ft/ft)	0.038211	Area (sq ft)	34555.87	729.86	680.00
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	10796.65	Top Width (ft)	8836.00	1016.37	944.29
Vel Total (ft/s)	2.33	Avg. Vel. (ft/s)		2.33	
Max Chl Dpth (ft)	6.67	Hydr. Depth (ft)		0.72	
Conv. Total (cfs)	8696.7	Conv. (cfs)		8696.7	
Length Wtd. (ft)	1168.00	Wetted Per. (ft)		1016.38	
Min Ch El (ft)	925.60	Shear (lb/sq ft)		1.71	
Alpha	1.00	Stream Power (lb/ft s)		3.99	
Frctn Loss (ft)	6.66	Cum Volume (acre-ft)	2475.40	303.82	13.98
C & E Loss (ft)	0.02	Cum SA (acres)	726.07	202.77	30.23

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	927.00	Element	Left OB	Channel	Right OB

Vel Head (ft)	0.09	Wt. n-Val.		0.100	
W.S. Elev (ft)	926.91	Reach Len. (ft)	1696.00	1168.00	1044.00
Crit W.S. (ft)	926.49	Flow Area (sq ft)		974.45	
E.G. Slope (ft/ft)	0.027068	Area (sq ft)	36671.02	974.45	922.07
Q Total (cfs)	2300.00	Flow (cfs)		2300.00	
Top Width (ft)	10941.26	Top Width (ft)	8836.00	1027.14	1078.12
Vel Total (ft/s)	2.36	Avg. Vel. (ft/s)		2.36	
Max Chl Dpth (ft)	6.91	Hydr. Depth (ft)		0.95	
Conv. Total (cfs)	13979.8	Conv. (cfs)		13979.8	
Length Wtd. (ft)	1168.00	Wetted Per. (ft)		1027.15	
Min Ch El (ft)	925.60	Shear (lb/sq ft)		1.60	
Alpha	1.00	Stream Power (lb/ft s)		3.78	
Frctn Loss (ft)	6.67	Cum Volume (acre-ft)	2707.63	399.82	28.26
C & E Loss (ft)	0.02	Cum SA (acres)	744.12	209.60	41.39

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B2 RS: 16.55

INPUT
Description: 1/3 Q=3800 cfs
2/3 Q=4800 cfs
Full Q=5800 cfs
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2495	916	2875	914.3	3135	914	3410	913.4	3740	912
4040	910.7	4270	910	4490	910	4565	911.4	4715	910
4995	910.8	5555	912	5695	912.3	5855	912	5955	911.5
6035	912	6085	912	6285	912	6385	913	6510	912.8
6785	914	7060	914.6	7360	914.4	7740	916	8140	917
8660	920	9060	918	9730	916	10000	919.6	10327	918.9
10613	920.9	10820	921.7	11158	922.3	11354	921.8	11520	921.4
11862	921.6	12106	921.9	12372	921.9	12645	923.4	13034	925.2
13430	925.9	13935	925.8	14341	925.8	14731	925.5	15130	925.9
15744	926.9	16366	927.3	16764	928.9	17465	929.7	17891	931.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2495	.1	8660	.1	11158	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8660	11158	970	978	1610	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
2495	8660	932	11158	17891	932

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	919.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	919.79	Reach Len. (ft)	970.00	978.00	1610.00
Crit W.S. (ft)	917.83	Flow Area (sq ft)		2958.80	
E.G. Slope (ft/ft)	0.003715	Area (sq ft)	39334.66	2958.80	
Q Total (cfs)	3800.00	Flow (cfs)		3800.00	
Top Width (ft)	7880.45	Top Width (ft)	6128.46	1751.99	
Vel Total (ft/s)	1.28	Avg. Vel. (ft/s)		1.28	
Max Chl Dpth (ft)	9.79	Hydr. Depth (ft)		1.69	
Conv. Total (cfs)	62348.7	Conv. (cfs)		62348.7	
Length Wtd. (ft)	978.00	Wetted Per. (ft)		1752.02	
Min Ch El (ft)	916.00	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)		0.50	
Frctn Loss (ft)	11.09	Cum Volume (acre-ft)	889.03	186.19	0.85

C & E Loss (ft)	0.03	Cum SA (acres)	392.60	159.31	11.32

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	920.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	920.05	Reach Len. (ft)	970.00	978.00	1610.00
Crit W.S. (ft)	918.02	Flow Area (sq ft)		3428.59	
E.G. Slope (ft/ft)	0.003848	Area (sq ft)	40943.57	3428.59	
Q Total (cfs)	4800.00	Flow (cfs)		4800.00	
Top Width (ft)	7996.56	Top Width (ft)	6165.00	1831.56	
Vel Total (ft/s)	1.40	Avg. Vel. (ft/s)		1.40	
Max Chl Dpth (ft)	10.05	Hydr. Depth (ft)		1.87	
Conv. Total (cfs)	77381.0	Conv. (cfs)		77381.0	
Length Wtd. (ft)	978.00	Wetted Per. (ft)		1831.60	
Min Ch El (ft)	916.00	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)		0.63	
Frctn Loss (ft)	11.19	Cum Volume (acre-ft)	1005.62	248.07	5.83
C & E Loss (ft)	0.03	Cum SA (acres)	434.04	164.59	18.91

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	920.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.100	
W.S. Elev (ft)	920.29	Reach Len. (ft)	970.00	978.00	1610.00
Crit W.S. (ft)	918.16	Flow Area (sq ft)		3861.56	
E.G. Slope (ft/ft)	0.003872	Area (sq ft)	42387.74	3861.56	
Q Total (cfs)	5800.00	Flow (cfs)		5800.00	
Top Width (ft)	8030.06	Top Width (ft)	6165.00	1865.06	
Vel Total (ft/s)	1.50	Avg. Vel. (ft/s)		1.50	
Max Chl Dpth (ft)	10.29	Hydr. Depth (ft)		2.07	
Conv. Total (cfs)	93210.8	Conv. (cfs)		93210.8	
Length Wtd. (ft)	978.00	Wetted Per. (ft)		1865.09	
Min Ch El (ft)	916.00	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)		0.75	
Frctn Loss (ft)	11.28	Cum Volume (acre-ft)	1168.56	334.98	17.21
C & E Loss (ft)	0.04	Cum SA (acres)	452.09	170.82	28.47

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B2 RS: 16.37

INPUT
Description: 1/3 Q=3800 cfs
2/3 Q=4800 cfs
Full Q=5800 cfs
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

2901	909.4	3340	908	3897	906.5	4355	906	4556	906
5370	904.9	6058	905	6387	905.3	6750	906	7041	907.2
7364	906.8	7635	907.2	8034	908	8326	908	8576	908
9091	907.4	9511	907.7	10000	910	10273	912	11008	913.1
11472	913.6	11807	914	12239	914.6	12682	914.3	12913	914.5
13651	913	13869	910	14317	909.8	14576	910	14993	911.5
15307	910.6	15560	910	15945	910.6	16333	912		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2901	.1	8326	.1	12239	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8326	12239	1889	913	814	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
2901	8326	916	12239	16333	916

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	908.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.100	
W.S. Elev (ft)	908.38	Reach Len. (ft)	1889.00	913.00	814.00
Crit W.S. (ft)	908.38	Flow Area (sq ft)		837.35	
E.G. Slope (ft/ft)	0.172630	Area (sq ft)	10642.88	837.35	
Q Total (cfs)	3800.00	Flow (cfs)		3800.00	
Top Width (ft)	6432.51	Top Width (ft)	5103.84	1328.68	
Vel Total (ft/s)	4.54	Avg. Vel. (ft/s)		4.54	
Max Chl Dpth (ft)	3.48	Hydr. Depth (ft)		0.63	
Conv. Total (cfs)	9145.9	Conv. (cfs)		9145.9	
Length Wtd. (ft)	913.00	Wetted Per. (ft)		1328.68	
Min Ch El (ft)	907.40	Shear (lb/sq ft)		6.79	
Alpha	1.00	Stream Power (lb/ft s)		30.82	
Frctn Loss (ft)	5.38	Cum Volume (acre-ft)	332.57	143.58	0.85
C & E Loss (ft)	0.09	Cum SA (acres)	267.54	124.73	11.32

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 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 OUTPUT Profile #2/3

E.G. Elev (ft)	908.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.100	
W.S. Elev (ft)	908.49	Reach Len. (ft)	1889.00	913.00	814.00
Crit W.S. (ft)	908.49	Flow Area (sq ft)		986.01	
E.G. Slope (ft/ft)	0.163545	Area (sq ft)	11210.83	986.01	
Q Total (cfs)	4800.00	Flow (cfs)		4800.00	
Top Width (ft)	6490.87	Top Width (ft)	5138.61	1352.26	
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)		4.87	
Max Chl Dpth (ft)	3.59	Hydr. Depth (ft)		0.73	
Conv. Total (cfs)	11869.2	Conv. (cfs)		11869.2	
Length Wtd. (ft)	913.00	Wetted Per. (ft)		1352.26	
Min Ch El (ft)	907.40	Shear (lb/sq ft)		7.44	
Alpha	1.00	Stream Power (lb/ft s)		36.24	
Frctn Loss (ft)	4.29	Cum Volume (acre-ft)	424.93	198.51	5.83
C & E Loss (ft)	0.11	Cum SA (acres)	308.18	128.85	18.91

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

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        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 OUTPUT    Profile #Full

  E.G. Elev (ft)            909.00   Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.41   Wt. n-Val.                          0.100
  W.S. Elev (ft)            908.59   Reach Len. (ft)          1889.00    913.00     814.00
  Crit W.S. (ft)            908.59   Flow Area (sq ft)                  1128.64
  E.G. Slope (ft/ft)      0.155553   Area (sq ft)            11750.11   1128.64
  Q Total (cfs)            5800.00   Flow (cfs)                         5800.00
  Top Width (ft)           6545.91   Top Width (ft)           5171.41   1374.50
  Vel Total (ft/s)            5.14   Avg. Vel. (ft/s)                      5.14
  Max Chl Dpth (ft)           3.69   Hydr. Depth (ft)                      0.82
  Conv. Total (cfs)        14705.8   Conv. (cfs)                        14705.8
  Length Wtd. (ft)         913.00   Wetted Per. (ft)                   1374.50
  Min Ch El (ft)           907.40   Shear (lb/sq ft)                      7.97
  Alpha                       1.00   Stream Power (lb/ft s)               40.98
  Frctn Loss (ft)             3.48   Cum Volume (acre-ft)       565.78   278.96      17.21
  C & E Loss (ft)             0.12   Cum SA (acres)             325.87   134.46      28.47

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: East Spillway
REACH: B2                  RS: 16.22

INPUT
Description: 1/3 Q=3800 cfs
2/3 Q=6500 cfs
Full Q=11500 cfs
Station Elevation Data    num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    3305     904    3405     902    3930   900.8    4555   900.9    5180     902
    5730   900.6    6080     902    6330     900    6730   901.7    7350     900
    7750   900.6    8350     900    8575   899.4    8775     900    9325   900.7
   10000   901.8   10200     903   10375     904   10635   904.9   10935     906
   11235   906.9   11825   907.7   12335   907.3   12670     906   13020   904.6
   13270     904   13660     904   14180   904.6   14715   904.6   15180     906
   15250   906.7   15330     906   15600   906.2   16010   906.9   16350     908

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    3305      .1    6080      .1   11825      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          6080   11825             2324    1209    1295              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    3305    6080     912   11825   16350     912

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)            901.90   Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.01   Wt. n-Val.                          0.100
  W.S. Elev (ft)            901.89   Reach Len. (ft)          2324.00   1209.00    1295.00
  Crit W.S. (ft)            900.62   Flow Area (sq ft)                  5086.21
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E.G. Slope (ft/ft)	0.001787	Area (sq ft)	1724.33	5086.21	
Q Total (cfs)	3800.00	Flow (cfs)		3800.00	
Top Width (ft)	6415.77	Top Width (ft)	2494.39	3921.38	
Vel Total (ft/s)	0.75	Avg. Vel. (ft/s)		0.75	
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)		1.30	
Conv. Total (cfs)	89886.0	Conv. (cfs)		89886.0	
Length Wtd. (ft)	1209.00	Wetted Per. (ft)		3921.40	
Min Ch El (ft)	899.40	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)		0.11	
Frctn Loss (ft)	5.60	Cum Volume (acre-ft)	64.42	81.50	0.85
C & E Loss (ft)	0.04	Cum SA (acres)	102.79	69.71	11.32

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	902.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	902.39	Reach Len. (ft)	2324.00	1209.00	1295.00
Crit W.S. (ft)	900.81	Flow Area (sq ft)		7063.78	
E.G. Slope (ft/ft)	0.001807	Area (sq ft)	3049.00	7063.78	
Q Total (cfs)	6500.00	Flow (cfs)		6500.00	
Top Width (ft)	6712.39	Top Width (ft)	2694.40	4017.99	
Vel Total (ft/s)	0.92	Avg. Vel. (ft/s)		0.92	
Max Chl Dpth (ft)	2.99	Hydr. Depth (ft)		1.76	
Conv. Total (cfs)	152891.3	Conv. (cfs)		152891.3	
Length Wtd. (ft)	1209.00	Wetted Per. (ft)		4018.01	
Min Ch El (ft)	899.40	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)		0.18	
Frctn Loss (ft)	5.64	Cum Volume (acre-ft)	115.74	114.15	5.83
C & E Loss (ft)	0.05	Cum SA (acres)	138.34	72.57	18.91

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

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	903.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	903.10	Reach Len. (ft)	2324.00	1209.00	1295.00
Crit W.S. (ft)	901.10	Flow Area (sq ft)		9952.63	
E.G. Slope (ft/ft)	0.001876	Area (sq ft)	4970.69	9952.63	
Q Total (cfs)	11500.00	Flow (cfs)		11500.00	
Top Width (ft)	6866.71	Top Width (ft)	2729.82	4136.89	
Vel Total (ft/s)	1.16	Avg. Vel. (ft/s)		1.16	
Max Chl Dpth (ft)	3.70	Hydr. Depth (ft)		2.41	
Conv. Total (cfs)	265526.3	Conv. (cfs)		265526.3	
Length Wtd. (ft)	1209.00	Wetted Per. (ft)		4136.91	
Min Ch El (ft)	899.40	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		0.33	
Frctn Loss (ft)	5.70	Cum Volume (acre-ft)	203.23	162.83	17.21
C & E Loss (ft)	0.06	Cum SA (acres)	154.55	76.70	28.47

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 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.

CROSS SECTION RIVER: East Spillway
REACH: B2 RS: 16.01

INPUT
Description: 1/3 Q=3800 cfs
2/3 Q=6500 cfs
Full Q=11500 cfs
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2550	902.1	2800	901.7	3100	901.2	3400	900.4	3700	899.6
4000	898.9	4300	898.3	4600	897.7	4900	897.1	5200	896.6
5500	896.3	5800	896.2	6100	896.1	6400	896.1	6700	896
7000	895.8	7300	895.5	7600	895.3	7900	895.1	8200	895.1
8500	895	8800	895.1	9100	895.3	9400	896.2	9700	897
10000	898.6	10300	900	10600	901.1	10900	901.9	11200	902.4
11500	902.4	11800	902	12100	901.3	12400	900.1	12700	898.9
13000	897.5	13300	896.6	13600	895.9	13900	895.8	14200	895.8
14500	896	14800	896.3	15100	896.6	15400	897	15700	897.4
16000	897.9	16300	898.5	16600	899.4	16900	900.3	17200	901.2
17500	901.1	17800	901						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2550	.045	8200	.045	11200	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8200	11200	0	0	0	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
2550	8200	905	11200	17800	905

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	896.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.045	
W.S. Elev (ft)	895.91	Reach Len. (ft)			
Crit W.S. (ft)	895.91	Flow Area (sq ft)		786.56	
E.G. Slope (ft/ft)	0.033558	Area (sq ft)	690.57	786.56	57.00
Q Total (cfs)	3800.00	Flow (cfs)		3800.00	
Top Width (ft)	3222.37	Top Width (ft)	1358.93	1101.98	761.46
Vel Total (ft/s)	4.83	Avg. Vel. (ft/s)		4.83	
Max Chl Dpth (ft)	0.91	Hydr. Depth (ft)		0.71	
Conv. Total (cfs)	20743.7	Conv. (cfs)		20743.7	
Length Wtd. (ft)		Wetted Per. (ft)		1101.98	
Min Ch El (ft)	895.00	Shear (lb/sq ft)		1.50	
Alpha	1.00	Stream Power (lb/ft s)		7.22	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	896.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.		0.045	
W.S. Elev (ft)	896.23	Reach Len. (ft)			
Crit W.S. (ft)	896.23	Flow Area (sq ft)		1161.82	
E.G. Slope (ft/ft)	0.030353	Area (sq ft)	1289.70	1161.82	392.46
Q Total (cfs)	6500.00	Flow (cfs)		6500.00	
Top Width (ft)	4975.21	Top Width (ft)	2491.58	1211.44	1272.19
Vel Total (ft/s)	5.59	Avg. Vel. (ft/s)		5.59	
Max Chl Dpth (ft)	1.23	Hydr. Depth (ft)		0.96	
Conv. Total (cfs)	37309.0	Conv. (cfs)		37309.0	
Length Wtd. (ft)		Wetted Per. (ft)		1211.45	
Min Ch El (ft)	895.00	Shear (lb/sq ft)		1.82	
Alpha	1.00	Stream Power (lb/ft s)		10.17	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	897.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.		0.045	
W.S. Elev (ft)	896.71	Reach Len. (ft)			
Crit W.S. (ft)	896.71	Flow Area (sq ft)		1780.89	
E.G. Slope (ft/ft)	0.027481	Area (sq ft)	2647.89	1780.89	1157.82
Q Total (cfs)	11500.00	Flow (cfs)		11500.00	
Top Width (ft)	6369.21	Top Width (ft)	3063.90	1389.93	1915.38
Vel Total (ft/s)	6.46	Avg. Vel. (ft/s)		6.46	
Max Chl Dpth (ft)	1.71	Hydr. Depth (ft)		1.28	
Conv. Total (cfs)	69371.5	Conv. (cfs)		69371.5	
Length Wtd. (ft)		Wetted Per. (ft)		1389.93	
Min Ch El (ft)	895.00	Shear (lb/sq ft)		2.20	
Alpha	1.00	Stream Power (lb/ft s)		14.19	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:East Spillway

Reach	River Sta.	n1	n2	n3
B2	18.85	.045	.045	.045
B2	18.60	.1	.1	.1
B2	18.39	.1	.1	.1
B2	18.14	.1	.1	.1
B2	17.94	.1	.1	.1
B2	17.69	.1	.1	.1
B2	17.37	.1	.1	.1
B2	17.00	.1	.1	.1
B2	16.77	.1	.1	.1
B2	16.55	.1	.1	.1
B2	16.37	.1	.1	.1
B2	16.22	.1	.1	.1
B2	16.01	.045	.045	.045

SUMMARY OF REACH LENGTHS

River: East Spillway

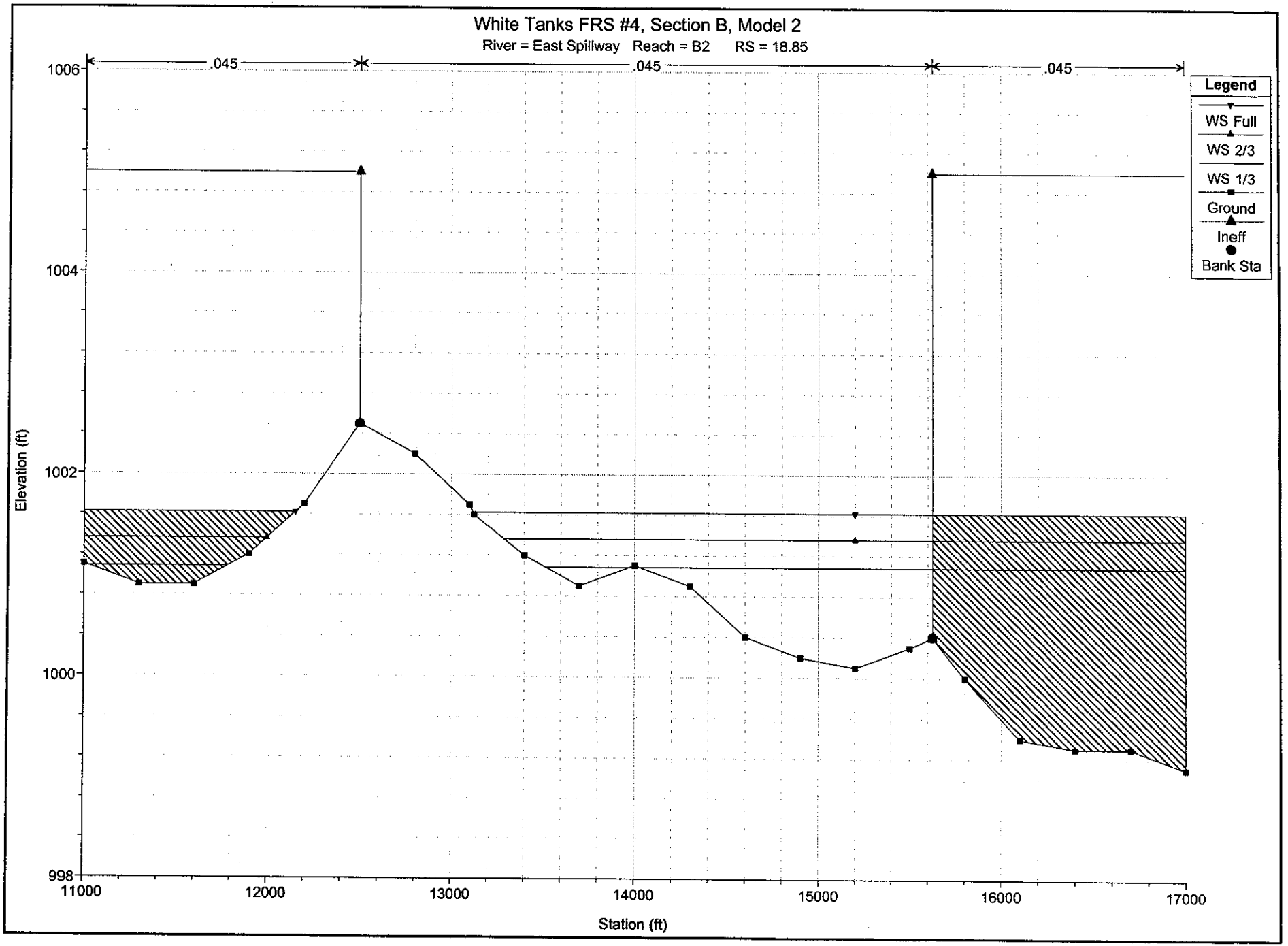
Reach	River Sta.	Left	Channel	Right
B2	18.85	1499	1376	871
B2	18.60	1013	999	1028
B2	18.39	1381	1142	1439
B2	18.14	1012	1016	1046
B2	17.94	1238	1227	1152
B2	17.69	1600	1518	1851
B2	17.37	2133	2112	2108
B2	17.00	1836	1552	1769
B2	16.77	1696	1168	1044
B2	16.55	970	978	1610
B2	16.37	1889	913	814
B2	16.22	2324	1209	1295
B2	16.01	0	0	0

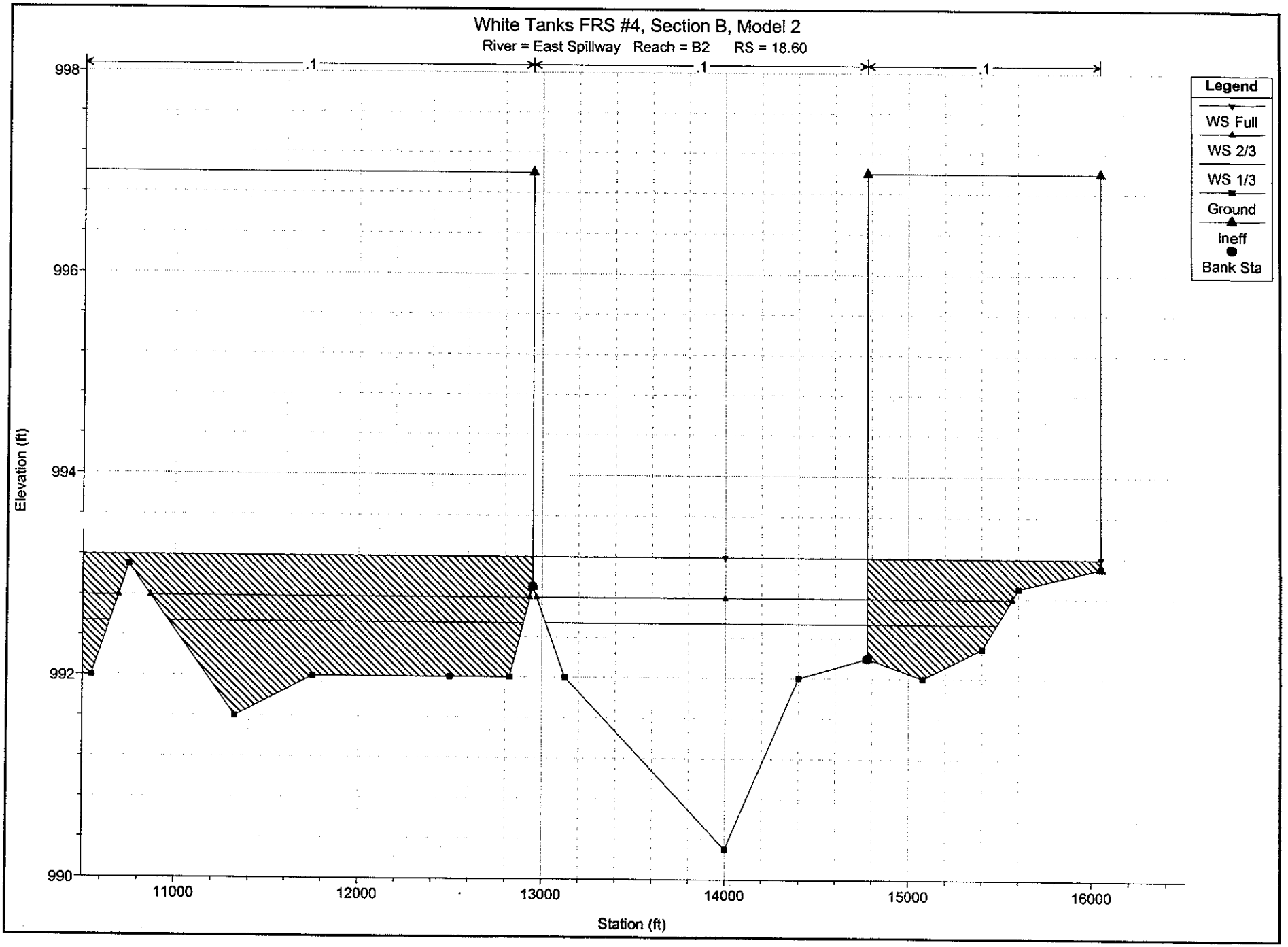
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: East Spillway

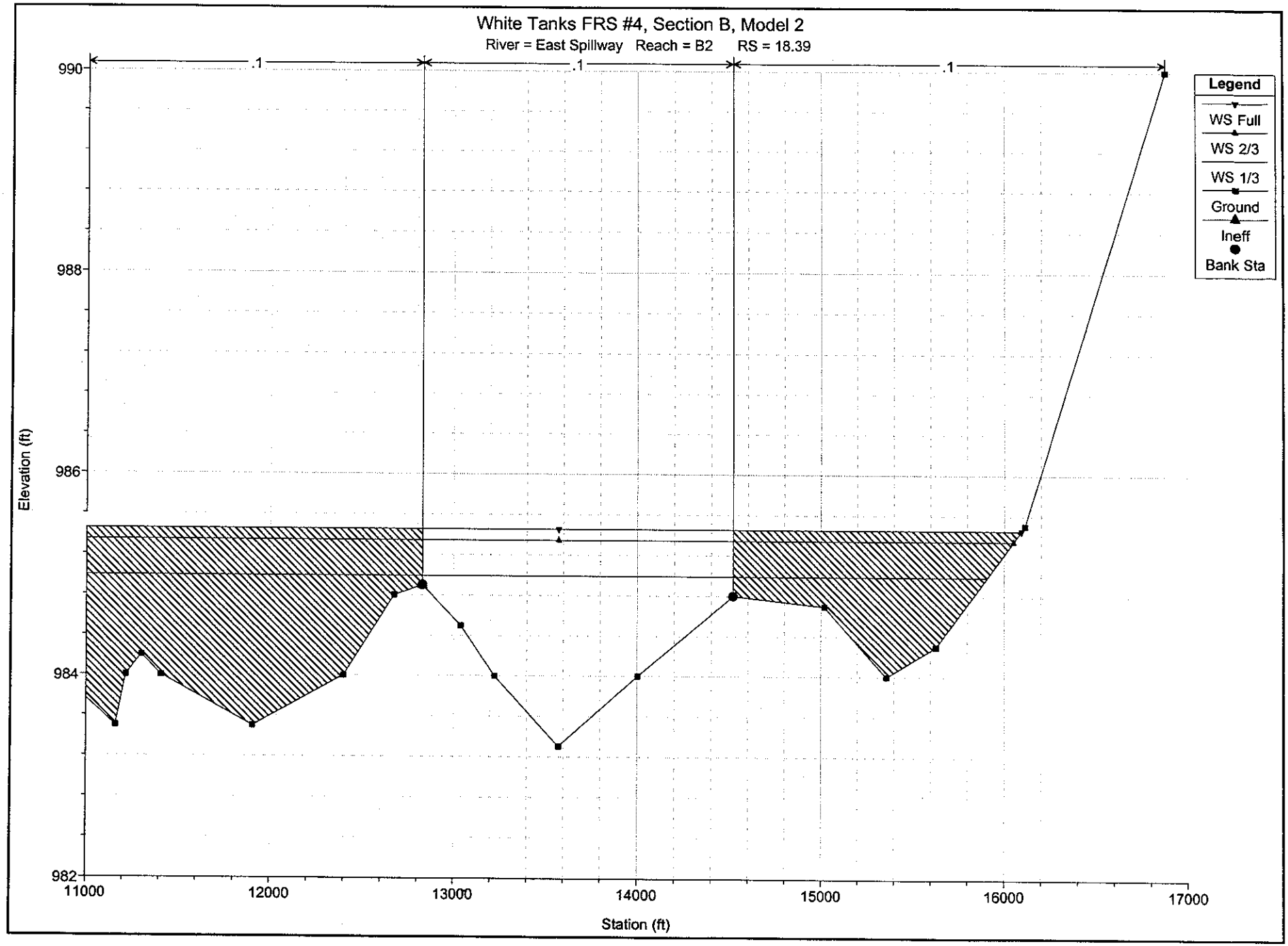
Reach	River Sta.	Contr.	Expan.
B2	18.85	.1	.3
B2	18.60	.1	.3
B2	18.39	.1	.3
B2	18.14	.1	.3
B2	17.94	.1	.3
B2	17.69	.1	.3
B2	17.37	.1	.3
B2	17.00	.1	.3
B2	16.77	.1	.3
B2	16.55	.1	.3
B2	16.37	.1	.3
B2	16.22	.1	.3
B2	16.01	.1	.3

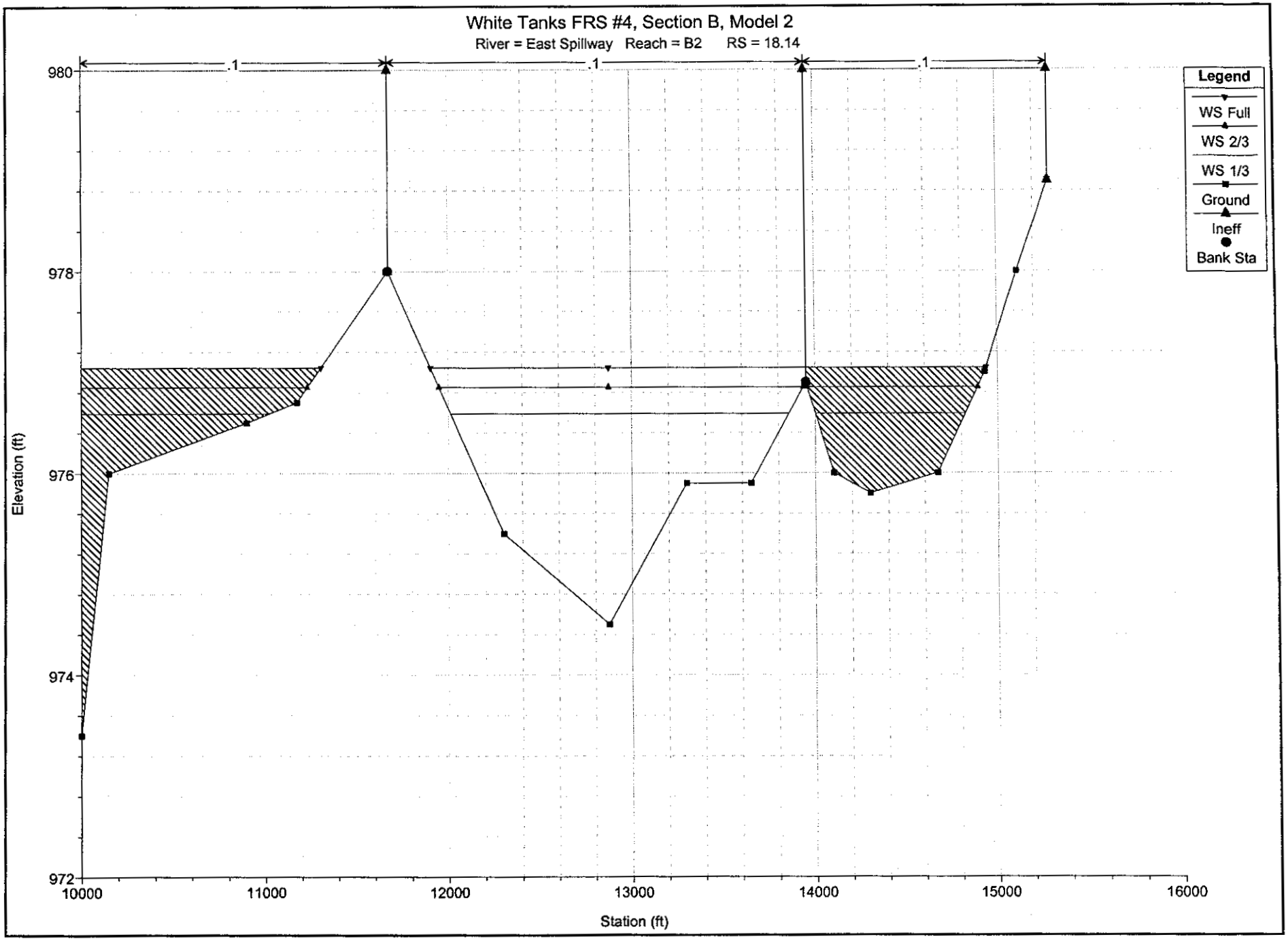
HEC-RAS Plan: WT4B2 River: East Spillway Reach: B2

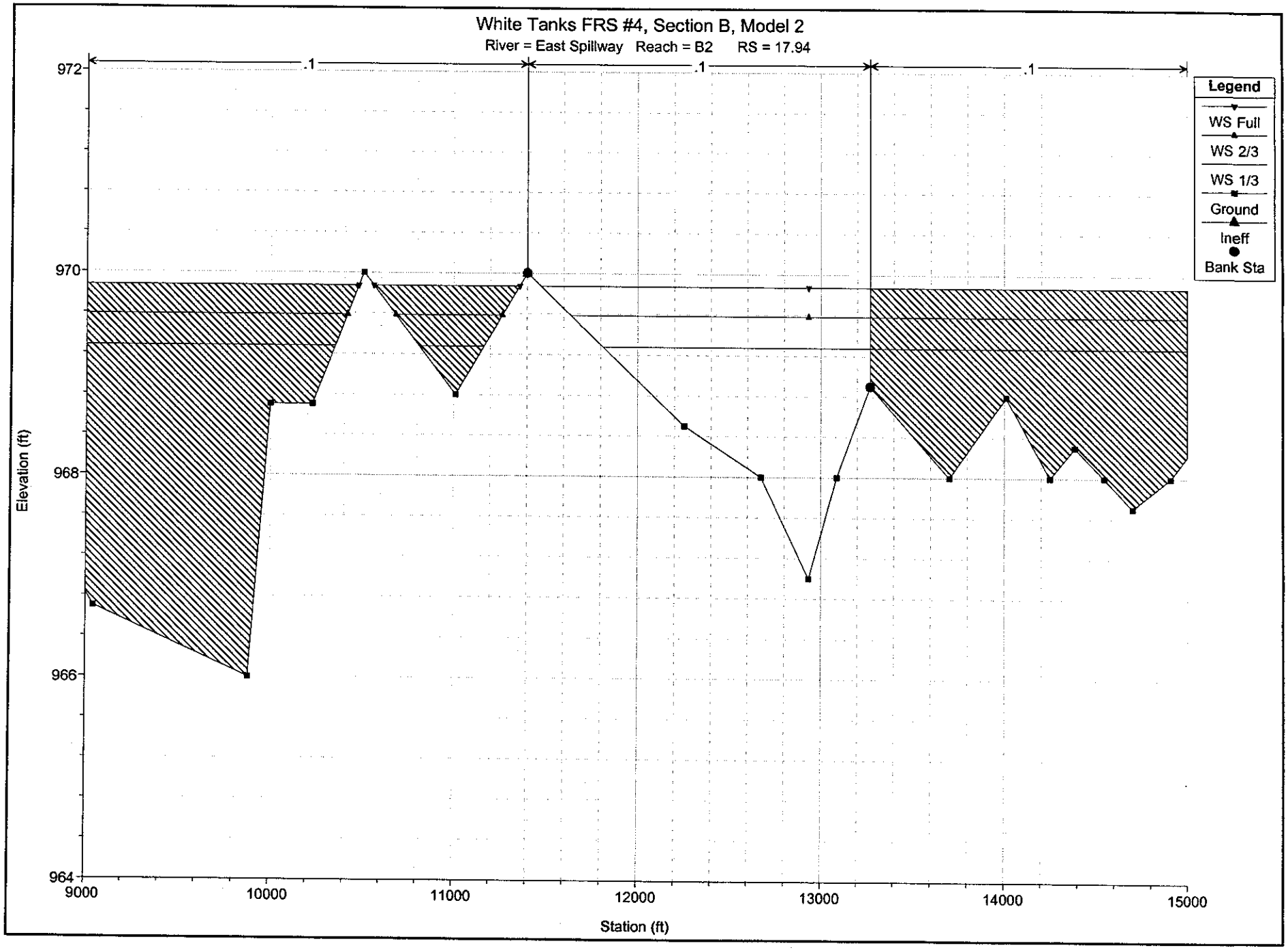
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
B2	16.01	3800.00	895.00	895.91	895.91	896.27	0.033558	4.83	786.56	3222.37	1.01
B2	16.01	6500.00	895.00	896.23	896.23	896.72	0.030353	5.59	1161.82	4975.21	1.01
B2	16.01	11500.00	895.00	896.71	896.71	897.35	0.027481	6.46	1780.89	6369.21	1.01
B2	16.22	3800.00	899.40	901.89	900.62	901.90	0.001787	0.75	5086.21	6415.77	0.12
B2	16.22	6500.00	899.40	902.39	900.81	902.40	0.001807	0.92	7063.78	6712.39	0.12
B2	16.22	11500.00	899.40	903.10	901.10	903.12	0.001876	1.16	9952.63	6866.71	0.13
B2	16.37	3800.00	907.40	908.38	908.38	908.70	0.172630	4.54	837.35	6432.51	1.01
B2	16.37	4800.00	907.40	908.49	908.49	908.85	0.163545	4.87	986.01	6490.87	1.00
B2	16.37	5800.00	907.40	908.59	908.59	909.00	0.155553	5.14	1128.64	6545.91	1.00
B2	16.55	3800.00	916.00	919.79	917.83	919.81	0.003715	1.28	2958.80	7880.45	0.17
B2	16.55	4800.00	916.00	920.05	918.02	920.08	0.003848	1.40	3428.59	7996.56	0.18
B2	16.55	5800.00	916.00	920.29	918.16	920.32	0.003872	1.50	3861.56	8030.06	0.18
B2	16.77	1700.00	925.60	926.69	926.39	926.77	0.035354	2.27	747.30	10807.01	0.47
B2	16.77	1700.00	925.60	926.67	926.39	926.76	0.038211	2.33	729.86	10796.65	0.48
B2	16.77	2300.00	925.60	926.91	926.49	927.00	0.027068	2.36	974.45	10941.26	0.43
B2	17.00	2300.00	933.20	935.95	934.35	935.97	0.002874	1.21	1902.52	10068.66	0.16
B2	17.00	3500.00	933.20	936.38	934.59	936.42	0.003740	1.48	2366.18	10511.01	0.18
B2	17.00	4500.00	933.20	936.76	934.76	936.80	0.003941	1.60	2816.85	10778.38	0.19
B2	17.37	2300.00	945.90	948.73	947.95	948.80	0.020314	2.14	1076.47	9805.82	0.37
B2	17.37	3500.00	945.90	949.31	948.33	949.37	0.011912	1.99	1760.91	10722.16	0.30
B2	17.37	4500.00	945.90	949.76	948.51	949.81	0.011027	1.81	2491.54	12300.79	0.29
B2	17.69	2300.00	959.70	961.32	960.41	961.34	0.004440	1.08	2121.33	10549.22	0.18
B2	17.69	3000.00	959.70	961.44	960.50	961.47	0.005448	1.28	2351.05	10686.93	0.20
B2	17.69	3180.00	959.70	961.51	960.52	961.53	0.005208	1.29	2474.13	10760.04	0.20
B2	17.94	2300.00	967.00	969.28	968.48	969.32	0.010476	1.54	1489.86	10137.51	0.27
B2	17.94	3000.00	967.00	969.58	968.61	969.62	0.008273	1.53	1961.85	10611.51	0.25
B2	17.94	4180.00	967.00	969.87	968.79	969.92	0.008628	1.70	2456.08	11059.02	0.26
B2	18.14	2300.00	974.50	976.59	975.57	976.61	0.005210	1.14	2018.58	9071.34	0.19
B2	18.14	3500.00	974.50	976.85	975.77	976.88	0.006362	1.39	2519.21	9896.82	0.22
B2	18.14	4180.00	974.50	977.04	975.93	977.08	0.005858	1.44	2907.30	10297.03	0.21
B2	18.39	2300.00	983.30	984.99	984.30	985.03	0.011154	1.48	1551.19	12697.46	0.27
B2	18.39	3500.00	983.30	985.35	984.49	985.39	0.008730	1.63	2147.76	12996.05	0.25
B2	18.39	4180.00	983.30	985.45	984.58	985.50	0.009525	1.80	2327.55	13151.87	0.27
B2	18.60	2300.00	990.30	992.54	991.48	992.56	0.005299	1.17	1969.42	8222.52	0.19
B2	18.60	3500.00	990.30	992.79	991.69	992.83	0.006413	1.45	2419.20	9201.67	0.22
B2	18.60	5500.00	990.30	993.20	991.97	993.24	0.006680	1.75	3148.39	10783.75	0.23
B2	18.85	2000.00	1000.10	1001.08	1000.72	1001.14	0.007688	1.87	1069.21	5392.78	0.46
B2	18.85	3500.00	1000.10	1001.36	1000.95	1001.43	0.006017	2.07	1693.70	6029.14	0.43
B2	18.85	5500.00	1000.10	1001.62	1001.17	1001.71	0.005685	2.37	2323.31	7126.34	0.43

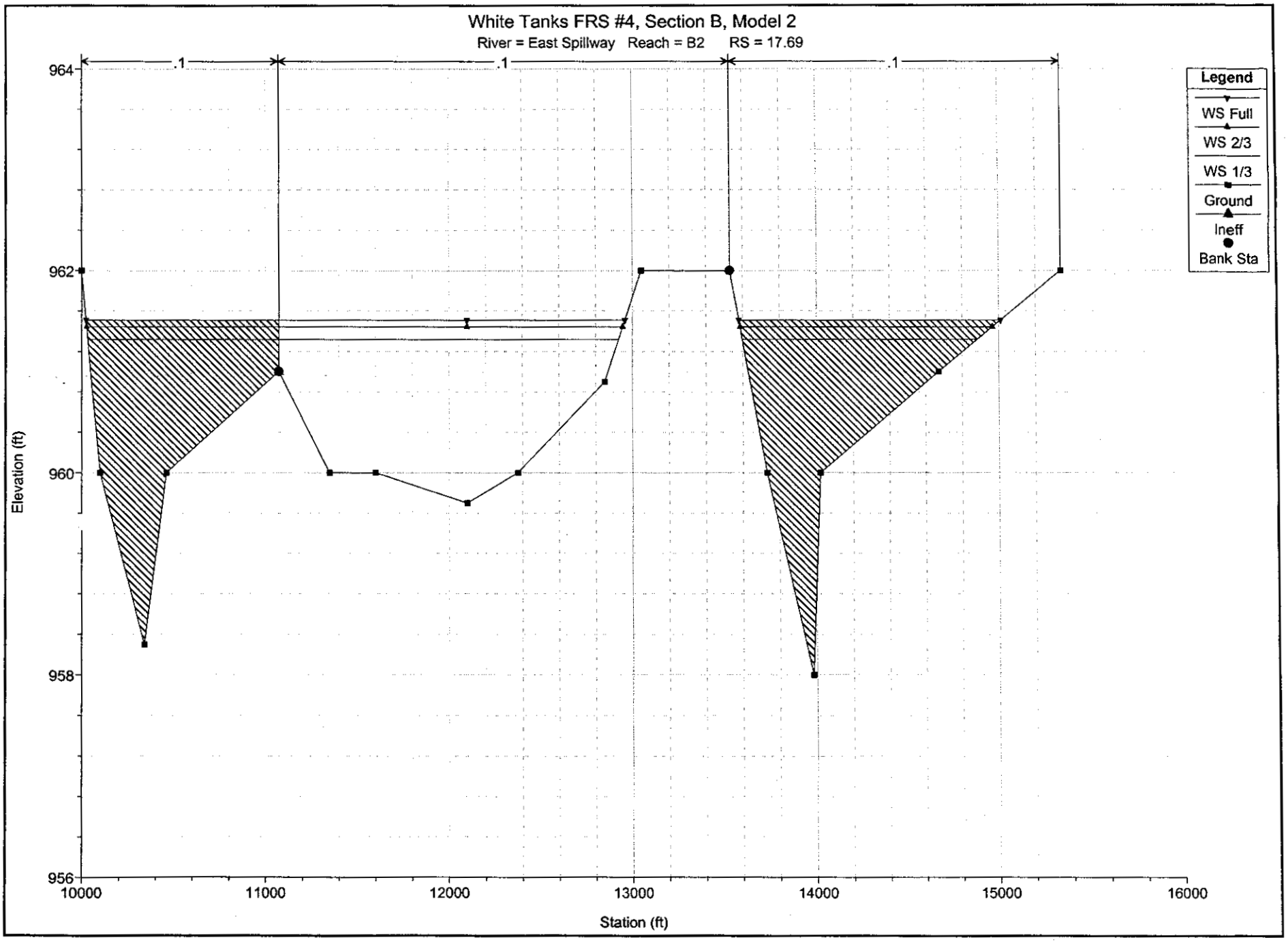

White Tanks FRS #4, Section B, Model 2
River = East Spillway Reach = B2 RS = 18.85
.045
.045
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1006
1004
1002
1000
998
11000
12000
13000
14000
15000
16000
17000
Station (ft)

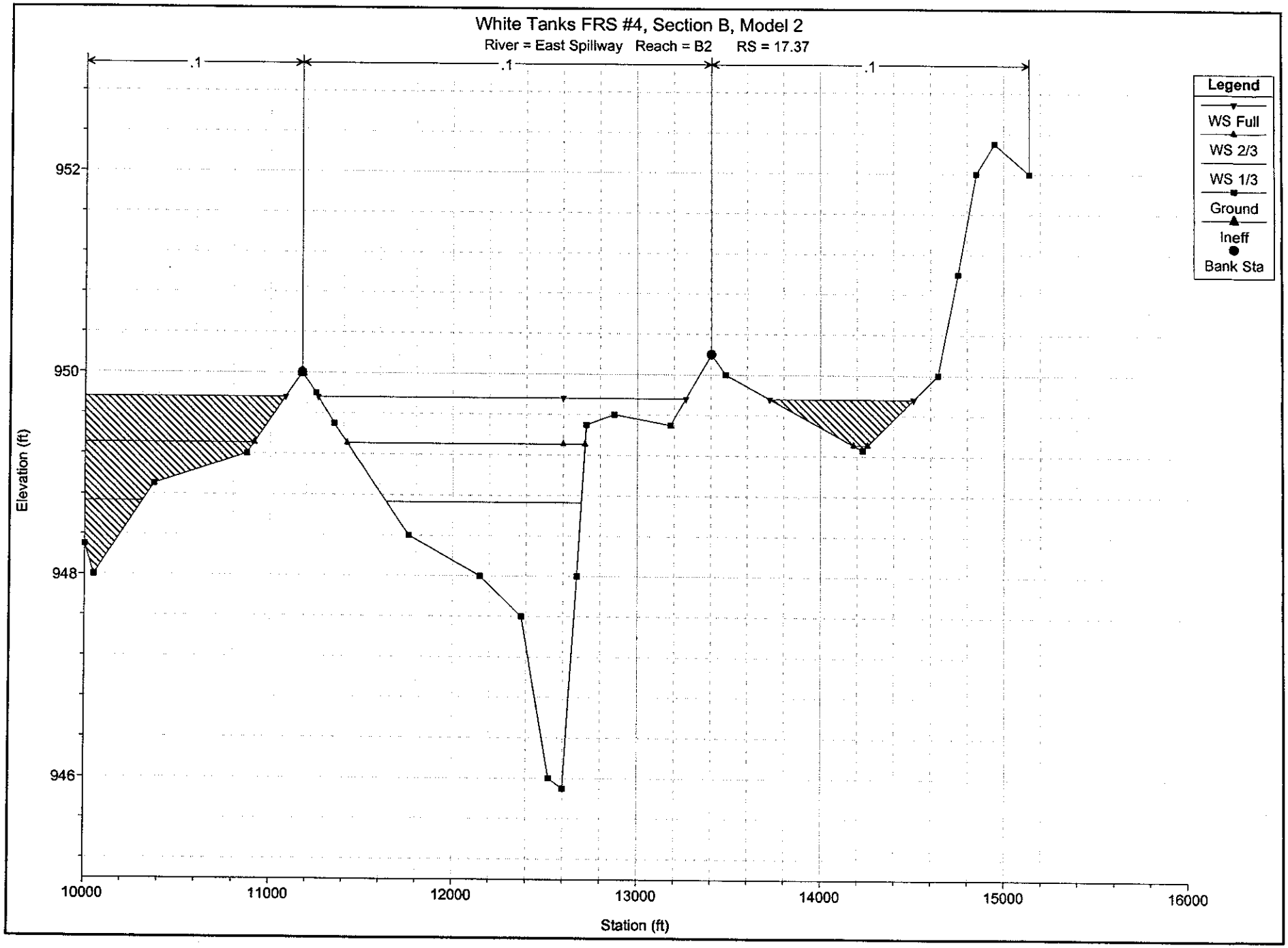

White Tanks FRS #4, Section B, Model 2
River = East Spillway Reach = B2 RS = 18.60
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
998
996
994
992
990
11000
12000
13000
14000
15000
16000
Station (ft)

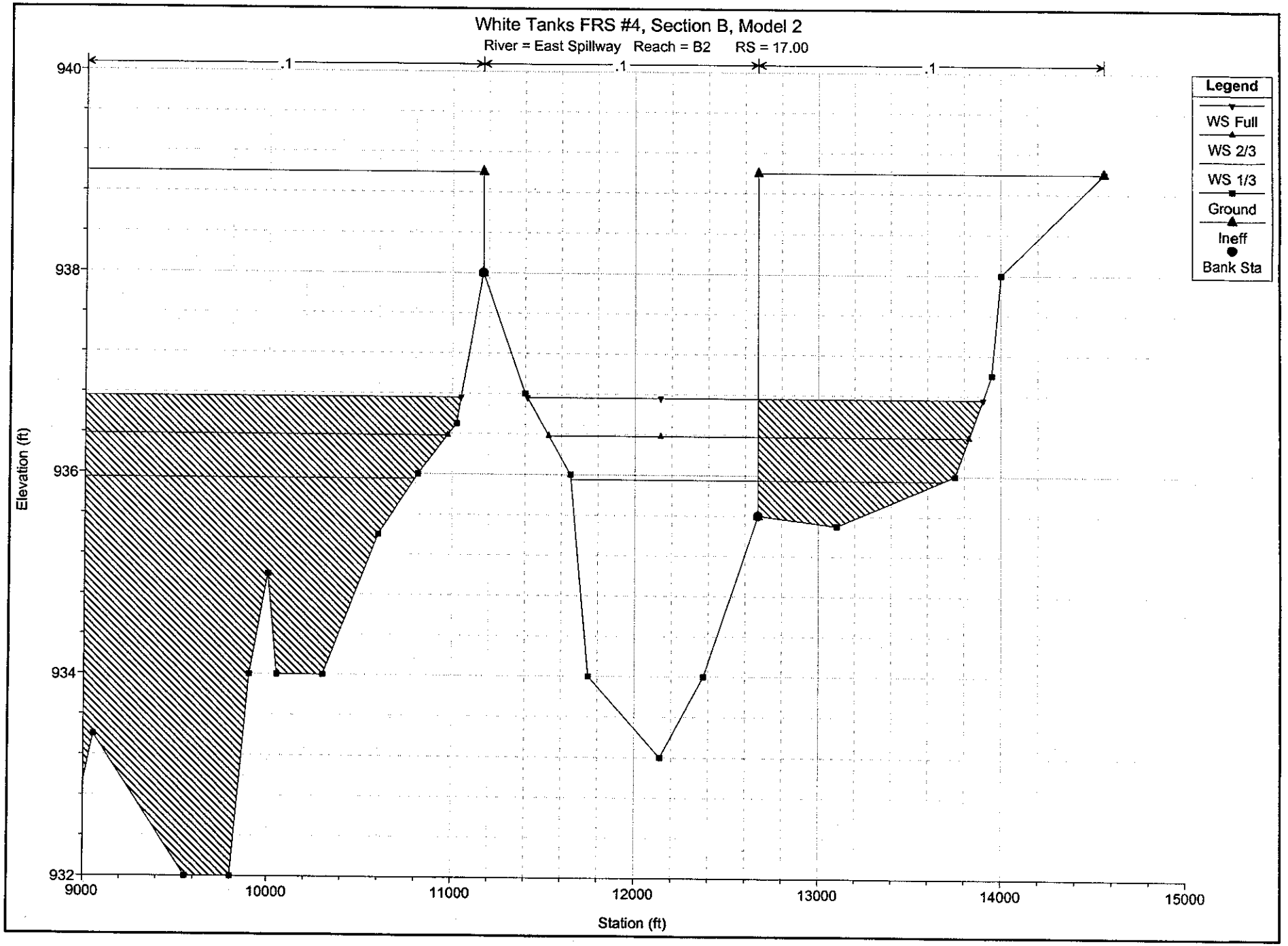

White Tanks FRS #4, Section B, Model 2
River = East Spillway Reach = B2 RS = 18.39
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
990
988
986
984
982
11000
12000
13000
14000
15000
16000
17000
Station (ft)

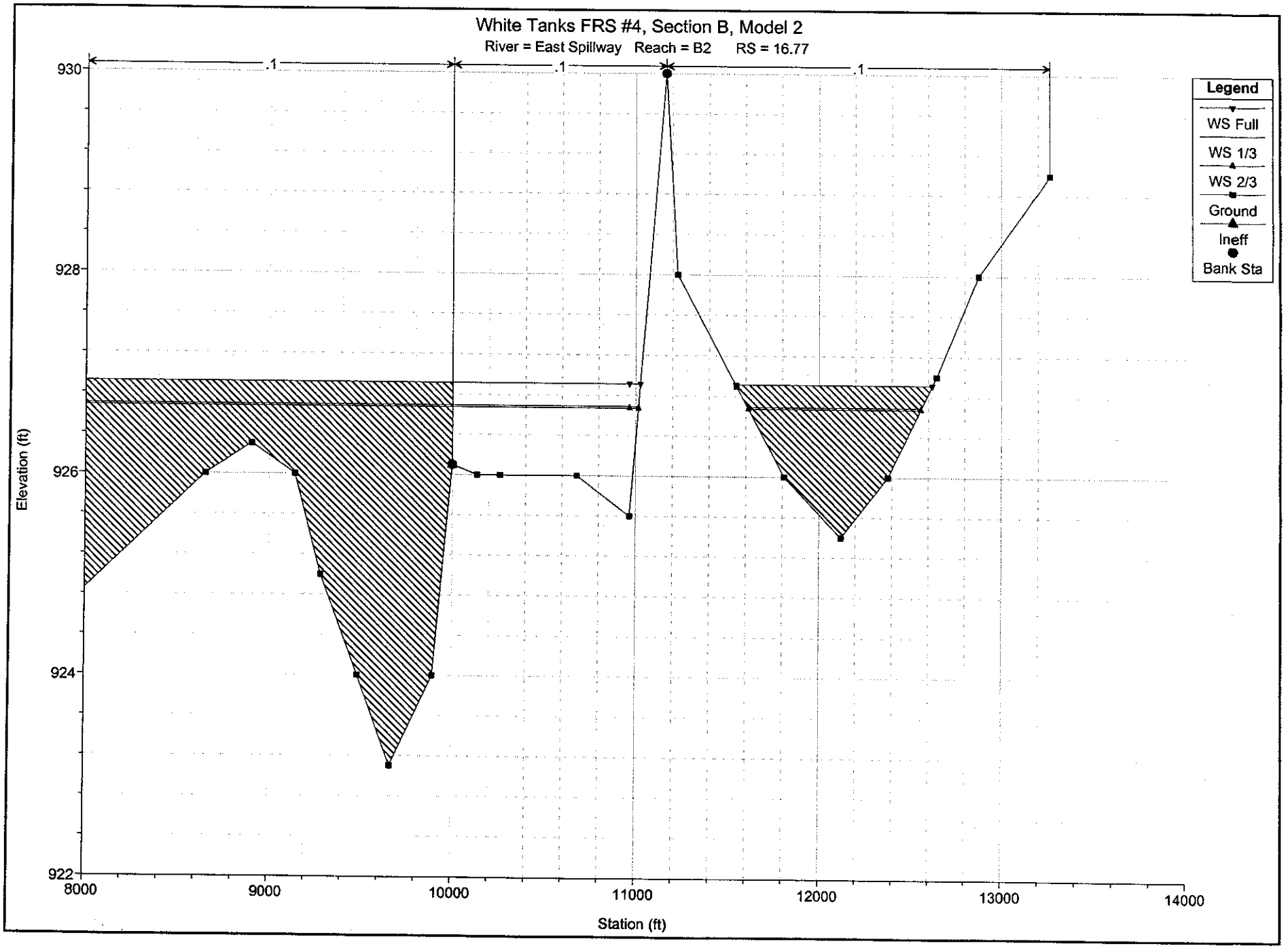

White Tanks FRS #4, Section B, Model 2
River = East Spillway Reach = B2 RS = 18.14
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
980
978
976
974
972
10000
11000
12000
13000
14000
15000
16000
Station (ft)

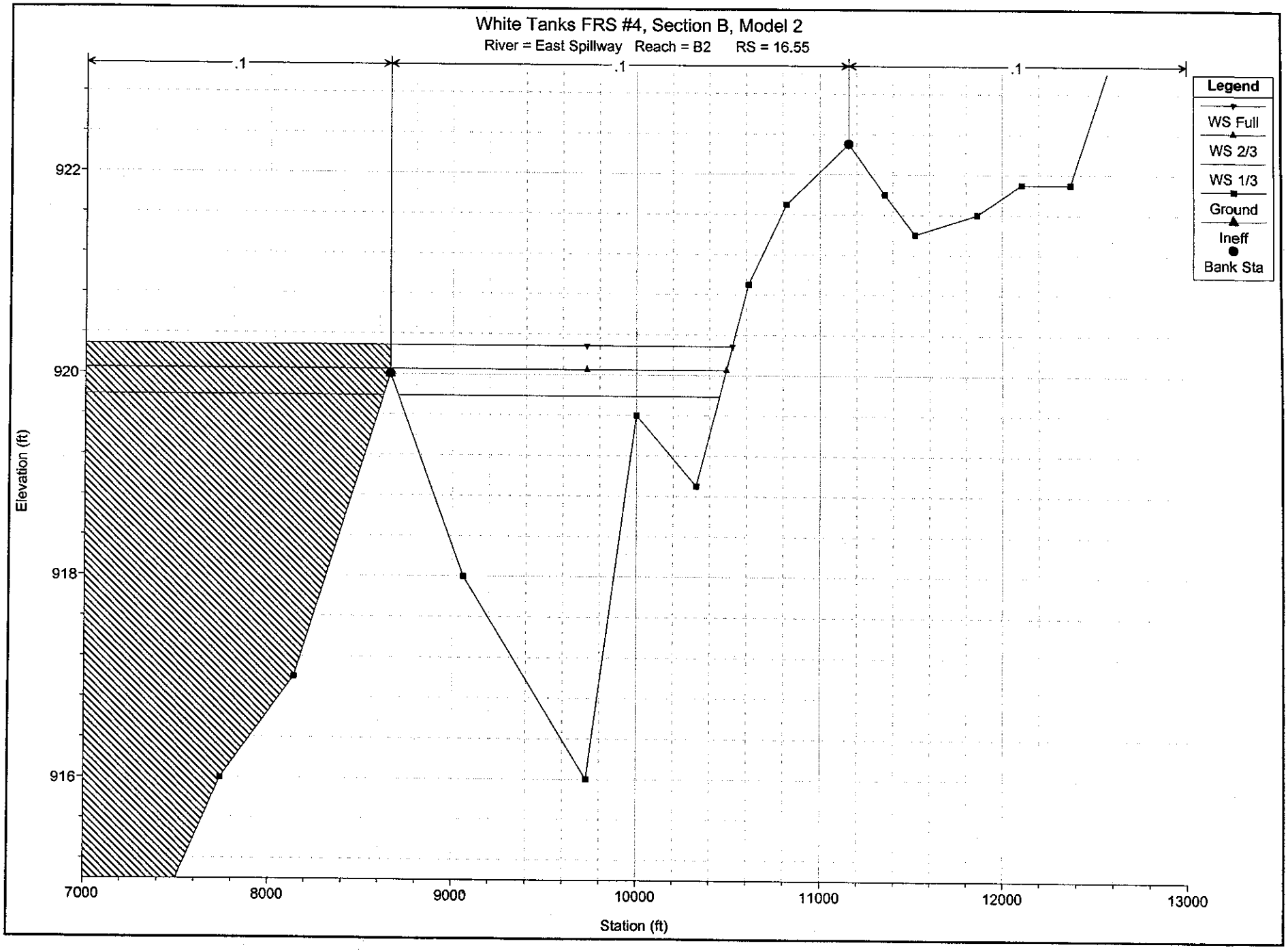

White Tanks FRS #4, Section B, Model 2
River = East Spillway Reach = B2 RS = 17.94
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
972
970
968
966
964
9000
10000
11000
12000
13000
14000
15000
Station (ft)

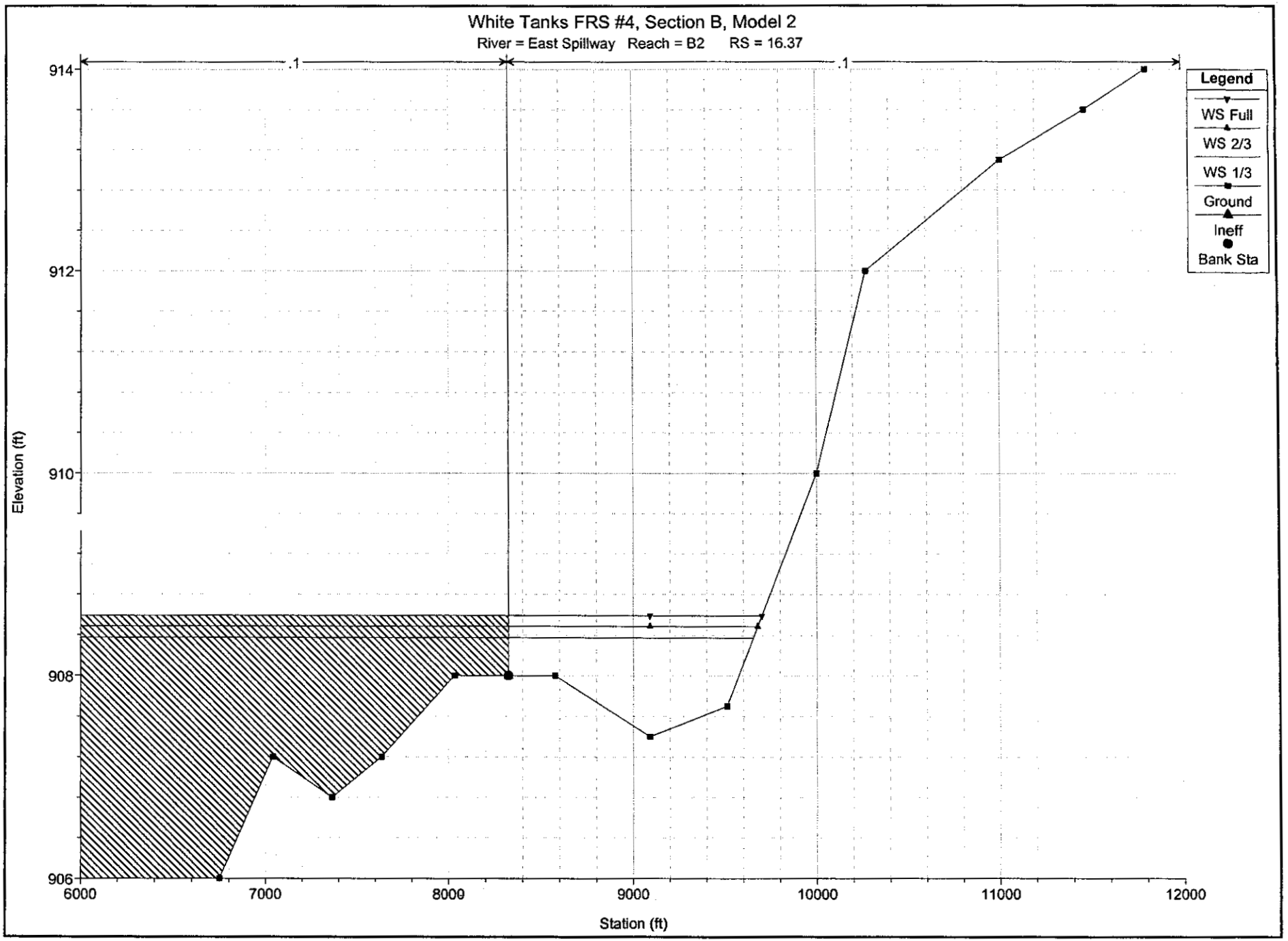

White Tanks FRS #4, Section B, Model 2
River = East Spillway Reach = B2 RS = 17.69
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
964
962
960
958
956
10000
11000
12000
13000
14000
15000
16000
Station (ft)

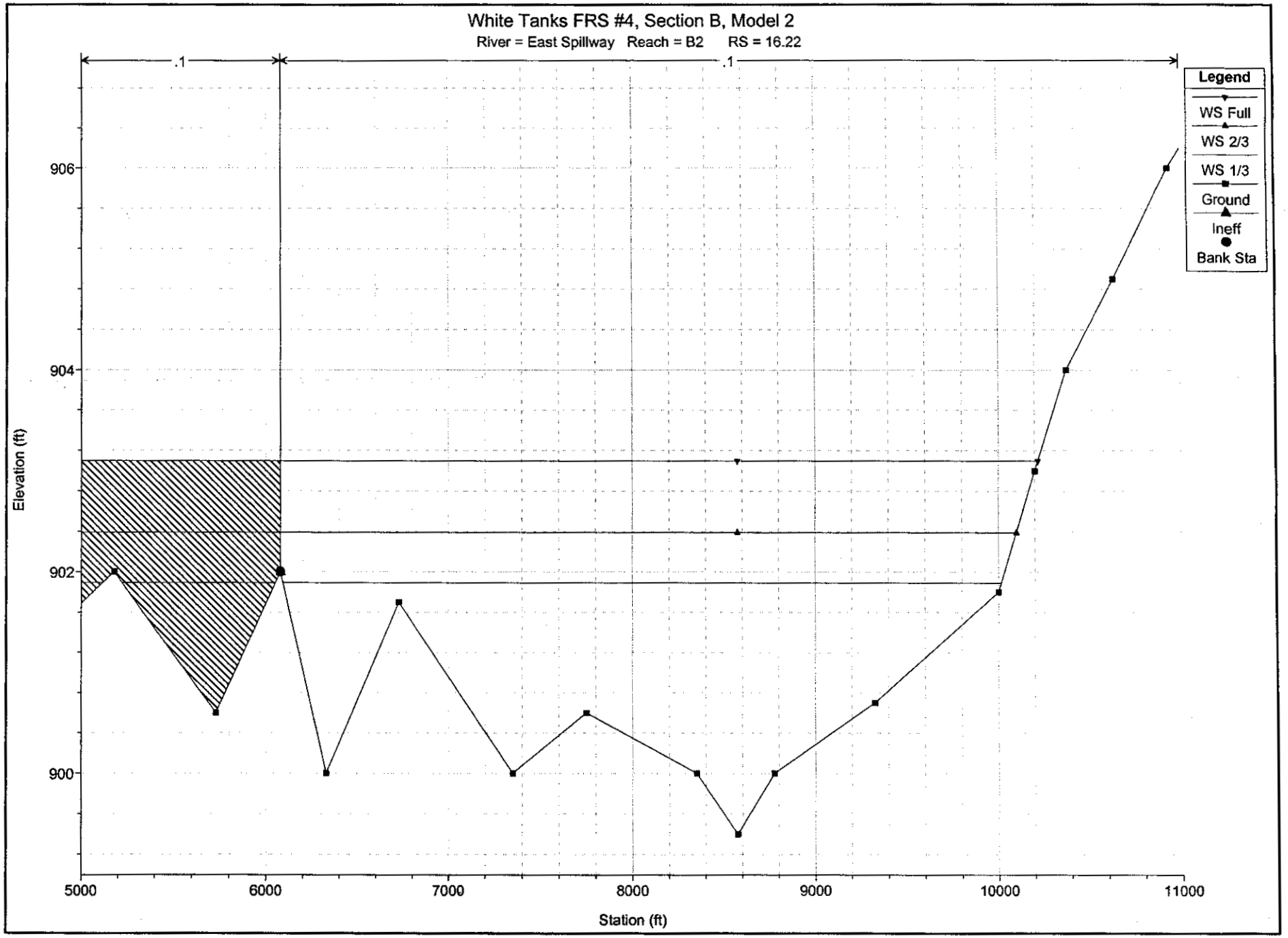

White Tanks FRS #4, Section B, Model 2
River = East Spillway Reach = B2 RS = 17.37
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
952
950
948
946
Elevation (ft)
10000
11000
12000
13000
14000
15000
16000
Station (ft)

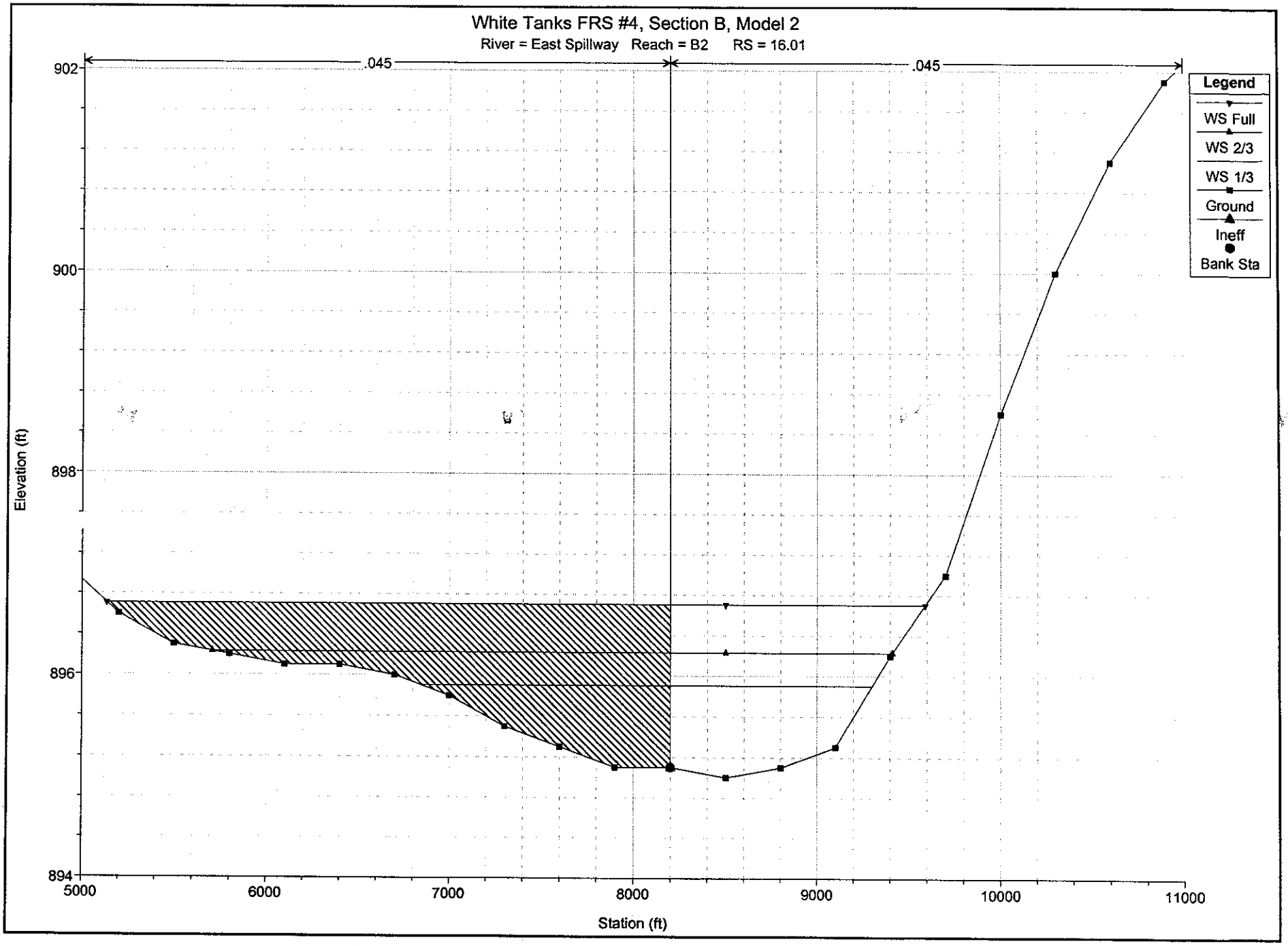

White Tanks FRS #4, Section B, Model 2
River = East Spillway Reach = B2 RS = 17.00
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
940
938
936
934
932
9000
10000
11000
12000
13000
14000
15000
Station (ft)


White Tanks FRS #4, Section B, Model 2
River = East Spillway Reach = B2 RS = 16.77
.1
.1
.1
930
928
926
924
922
Elevation (ft)
8000
9000
10000
11000
12000
13000
14000
Station (ft)
Legend
WS Full
WS 1/3
WS 2/3
Ground
Ineff
Bank Sta


White Tanks FRS #4, Section B, Model 2
River = East Spillway Reach = B2 RS = 16.55
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
922
920
918
916
Elevation (ft)
7000
8000
9000
10000
11000
12000
13000
Station (ft)


White Tanks FRS #4, Section B, Model 2
River = East Spillway Reach = B2 RS = 16.37
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
914
912
910
908
906
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS #4, Section B, Model 2
River = East Spillway Reach = B2 RS = 16.22
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
906
904
902
900
Elevation (ft)
5000
6000
7000
8000
9000
10000
11000
Station (ft)


White Tanks FRS #4, Section B, Model 2
River = East Spillway Reach = B2 RS = 16.01
.045
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
902
900
898
896
894
5000
6000
7000
8000
9000
10000
11000
Station (ft)

```
HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

X     X  XXXXXX    XXXX        XXXX        XX      XXXX
X     X  X        X    X      X   X      X  X    X
X     X  X        X           X   X     X    X   X
XXXXXXX  XXXX     X       XXX XXXX      XXXXXX    XXXX
X     X  X        X           X  X      X    X        X
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PROJECT DATA
Project Title: White Tanks FRS #4, Section B, Model 3
Project File : WT4B3.prj
Run Date and Time: 06/26/2000 10:10:32 AM

Project in English units

Project Description:
Study Name: White Tanks FRS #4 Spillway Delineation Study
Contract No.: FCD 98-32
Purpose of Study: Delineation of the inundation limits of the 1/3, 2/3, and full spillway discharges for the White Tanks Flood Retarding Structure #4.

Model Name: WT4B3
Model Description: Set up to model flow between Jackrabbit Trail and a flow split north of the Roosevelt Canal approximately 1800 east of Tuthill Road. Northern boundary is the Roosevelt Irrigation District Canal, southern boundary is the Buckeye Canal.
HEC-RAS Version: Version 2.2, September 1998 with RASPATCH

Consultants: Hoskin Engineering Consultants, Inc.
323 W. Roosevelt Street, Suite 200
Phoenix, AZ 85003
(602)252-8384 Phone
(602)252-8385 Fax
HEC 990006

DEI Professional Services, Inc.
6225 N. 24th St., Ste. 200
Phoenix, AZ 85016
(602)954-0038 Phone
(602)944-8605 Fax

PLAN DATA

Plan Title: Section B, Between Split and Jackrabbit
Plan File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\rsvlt-bkeye\final models\WT4B3.p01

Geometry Title: Section B, Between Split and Jackrabbit
Geometry File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\rsvlt-bkeye\final models\WT4B3.g01

Flow Title : Section B, Between Split and Jackrabbit
Flow File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\rsvlt-bkeye\final models\WT4B3.f01

2/3 Q=4000 cfs
Full Q=6500 cfs
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4700	1003.3	5000	1002.9	5300	1002.7	5600	1002.6	5800	1002.5
5900	1002.4	6200	1002.1	6500	1002.1	6800	1002.2	7100	1002.4
7225	1002.5	7400	1002.6	7700	1002.7	7925	1002.5	8000	1002.3
8300	1001.6	8600	1001.4	8900	1001.5	9200	1002.3	9250	1002.4
9500	1003.1	9800	1003.8	10000	1003.8	10100	1003.4	10400	1002.5
10700	1001.8	10729	1001.7	11000	1001.1	11300	1000.9	11600	1000.9
11900	1001.2	12200	1001.7	12500	1002.5	12800	1002.2	13100	1001.7
13125	1001.6	13400	1001.2	13700	1000.9	14000	1001.1	14300	1000.9
14600	1000.4	14900	1000.2	15200	1000.1	15500	1000.3	15625	1000.4
15800	1000	16100	999.4	16400	999.3	16700	999.3	17000	999.1
17300	999	17600	999	17900	999	18200	999		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4700	.045	10000	.045	12500	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10000	12500	1244	1193	1499	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
4700	10000	1005	12500	18200	1005

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1001.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.045	
W.S. Elev (ft)	1001.64	Reach Len. (ft)	1244.00	1193.00	1499.00
Crit W.S. (ft)	1001.42	Flow Area (sq ft)		716.06	
E.G. Slope (ft/ft)	0.009921	Area (sq ft)	103.56	716.06	8478.55
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	7164.25	Top Width (ft)	670.30	1408.74	5085.20
Vel Total (ft/s)	2.09	Avg. Vel. (ft/s)		2.09	
Max Chl Dpth (ft)	2.64	Hydr. Depth (ft)		0.51	
Conv. Total (cfs)	15059.4	Conv. (cfs)		15059.4	
Length Wtd. (ft)	1193.00	Wetted Per. (ft)		1408.74	
Min Ch El (ft)	1000.90	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		0.66	
Frctn Loss (ft)	9.16	Cum Volume (acre-ft)	4457.86	578.10	225.48
C & E Loss (ft)	0.02	Cum SA (acres)	1533.07	651.81	223.17

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1002.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.045	
W.S. Elev (ft)	1002.16	Reach Len. (ft)	1244.00	1193.00	1499.00
Crit W.S. (ft)	1001.77	Flow Area (sq ft)		1552.77	
E.G. Slope (ft/ft)	0.007548	Area (sq ft)	581.09	1552.77	11176.21
Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	8814.99	Top Width (ft)	1615.68	1824.80	5374.51
Vel Total (ft/s)	2.58	Avg. Vel. (ft/s)		2.58	
Max Chl Dpth (ft)	3.16	Hydr. Depth (ft)		0.85	
Conv. Total (cfs)	46041.8	Conv. (cfs)		46041.8	
Length Wtd. (ft)	1193.00	Wetted Per. (ft)		1824.81	
Min Ch El (ft)	1000.90	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)		1.03	
Frctn Loss (ft)	9.31	Cum Volume (acre-ft)	5157.65	915.14	369.11
C & E Loss (ft)	0.02	Cum SA (acres)	1754.34	738.26	374.62

Min Ch El (ft)	991.20	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)		0.17	
Frctn Loss (ft)	8.36	Cum Volume (acre-ft)	4441.23	542.33	42.02
C & E Loss (ft)	0.00	Cum SA (acres)	1490.28	586.39	93.53

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	992.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	992.90	Reach Len. (ft)	1079.00	1005.00	1013.00
Crit W.S. (ft)	992.30	Flow Area (sq ft)		3230.68	
E.G. Slope (ft/ft)	0.008132	Area (sq ft)	2131.51	3230.68	3155.11
Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	9688.06	Top Width (ft)	3399.69	3637.27	2651.10
Vel Total (ft/s)	1.24	Avg. Vel. (ft/s)		1.24	
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)		0.89	
Conv. Total (cfs)	44357.5	Conv. (cfs)		44357.5	
Length Wtd. (ft)	1005.00	Wetted Per. (ft)		3637.28	
Min Ch El (ft)	991.20	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)		0.56	
Frctn Loss (ft)	8.26	Cum Volume (acre-ft)	5118.91	849.64	122.52
C & E Loss (ft)	0.00	Cum SA (acres)	1682.73	663.46	236.53

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	993.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.100	
W.S. Elev (ft)	993.11	Reach Len. (ft)	1079.00	1005.00	1013.00
Crit W.S. (ft)	992.43	Flow Area (sq ft)		4021.67	
E.G. Slope (ft/ft)	0.010778	Area (sq ft)	2920.45	4021.67	3773.52
Q Total (cfs)	6500.00	Flow (cfs)		6500.00	
Top Width (ft)	10701.40	Top Width (ft)	3851.40	3750.00	3100.00
Vel Total (ft/s)	1.62	Avg. Vel. (ft/s)		1.62	
Max Chl Dpth (ft)	2.81	Hydr. Depth (ft)		1.07	
Conv. Total (cfs)	62611.0	Conv. (cfs)		62611.0	
Length Wtd. (ft)	1005.00	Wetted Per. (ft)		3750.01	
Min Ch El (ft)	991.20	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)		1.17	
Frctn Loss (ft)	8.09	Cum Volume (acre-ft)	5739.09	1165.03	275.96
C & E Loss (ft)	0.00	Cum SA (acres)	1775.70	741.02	430.34

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B3 RS: 18.39

INPUT
Description: 1/3 Q=1500 cfs
2/3 Q=4000 cfs
Full Q=6500 cfs
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2519	985.7	3029	985.4	3649	984	3808	984.3	4167	984

Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	985.04	Reach Len. (ft)	1260.00	1254.00	1381.00
Crit W.S. (ft)	984.20	Flow Area (sq ft)		4936.77	
E.G. Slope (ft/ft)	0.006283	Area (sq ft)	3802.41	4936.77	2346.17
Q Total (cfs)	6500.00	Flow (cfs)		6500.00	
Top Width (ft)	12733.63	Top Width (ft)	5462.58	4177.00	3094.05
Vel Total (ft/s)	1.32	Avg. Vel. (ft/s)		1.32	
Max Chl Dpth (ft)	2.74	Hydr. Depth (ft)		1.18	
Conv. Total (cfs)	82001.5	Conv. (cfs)		82001.5	
Length Wtd. (ft)	1254.00	Wetted Per. (ft)		4177.01	
Min Ch El (ft)	982.30	Shear (lb/sq ft)		0.46	
Alpha	1.00	Stream Power (lb/ft s)		0.61	
Frctn Loss (ft)	8.82	Cum Volume (acre-ft)	5655.82	1061.68	204.80
C & E Loss (ft)	0.00	Cum SA (acres)	1660.35	649.58	358.32

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.

CROSS SECTION RIVER: East Spillway
REACH: B3 RS: 18.14

INPUT
Description: 1/3 Q=1500 cfs
2/3 Q=4000 cfs
Full Q=6500 cfs
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6450	977	7050	976	7500	974	7800	974	8050	974.8
8300	976	8575	975.6	8800	974.5	9450	974	9800	972.6
10000	973.4	10150	976	10900	976.5	11175	976.7	11675	978
12300	975.4	12875	974.5	13300	975.9	13650	975.9	13950	976.9
14100	976	14300	975.8	14670	976	14930	977	15110	978
15285	978.9								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
6450	.1	8300	.1	11675	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8300	11675	1094	1021	1013	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
6450	8300	980	11675	15285	980

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	974.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	974.87	Reach Len. (ft)	1094.00	1021.00	1013.00
Crit W.S. (ft)	973.77	Flow Area (sq ft)		1408.65	
E.G. Slope (ft/ft)	0.004908	Area (sq ft)	467.41	1408.65	66.01
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	2476.52	Top Width (ft)	762.18	1361.61	352.72
Vel Total (ft/s)	1.06	Avg. Vel. (ft/s)		1.06	
Max Chl Dpth (ft)	2.27	Hydr. Depth (ft)		1.03	
Conv. Total (cfs)	21410.5	Conv. (cfs)		21410.5	
Length Wtd. (ft)	1021.00	Wetted Per. (ft)		1361.63	
Min Ch El (ft)	972.60	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)		0.34	
Frctn Loss (ft)	7.62	Cum Volume (acre-ft)	4408.88	461.39	4.18
C & E Loss (ft)	0.00	Cum SA (acres)	1403.23	445.64	28.26

Warning: Divided flow computed for this cross-section.
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.

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
7990	11404	1243	1281	1238	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
4274	7990	979	11404	15552	979

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	967.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	967.24	Reach Len. (ft)	1243.00	1281.00	1238.00
Crit W.S. (ft)	966.73	Flow Area (sq ft)		1087.42	
E.G. Slope (ft/ft)	0.012738	Area (sq ft)	1492.00	1087.42	12.20
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	3719.34	Top Width (ft)	2161.14	1457.70	100.49
Vel Total (ft/s)	1.38	Avg. Vel. (ft/s)		1.38	
Max Chl Dpth (ft)	1.44	Hydr. Depth (ft)		0.75	
Conv. Total (cfs)	13290.3	Conv. (cfs)		13290.3	
Length Wtd. (ft)	1281.00	Wetted Per. (ft)		1457.73	
Min Ch El (ft)	966.00	Shear (lb/sq ft)		0.59	
Alpha	1.00	Stream Power (lb/ft s)		0.82	
Frctn Loss (ft)	8.39	Cum Volume (acre-ft)	4384.27	432.13	3.27
C & E Loss (ft)	0.00	Cum SA (acres)	1366.52	412.60	22.99

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	968.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.100	
W.S. Elev (ft)	968.04	Reach Len. (ft)	1243.00	1281.00	1238.00
Crit W.S. (ft)	967.09	Flow Area (sq ft)		2430.85	
E.G. Slope (ft/ft)	0.008832	Area (sq ft)	3756.47	2430.85	294.77
Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	6358.65	Top Width (ft)	3527.77	1900.34	930.54
Vel Total (ft/s)	1.65	Avg. Vel. (ft/s)		1.65	
Max Chl Dpth (ft)	2.24	Hydr. Depth (ft)		1.28	
Conv. Total (cfs)	42562.8	Conv. (cfs)		42562.8	
Length Wtd. (ft)	1281.00	Wetted Per. (ft)		1900.39	
Min Ch El (ft)	966.00	Shear (lb/sq ft)		0.71	
Alpha	1.00	Stream Power (lb/ft s)		1.16	
Frctn Loss (ft)	8.37	Cum Volume (acre-ft)	4961.33	632.66	32.55
C & E Loss (ft)	0.00	Cum SA (acres)	1462.87	455.53	108.78

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	968.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.100	
W.S. Elev (ft)	968.63	Reach Len. (ft)	1243.00	1281.00	1238.00
Crit W.S. (ft)	967.35	Flow Area (sq ft)		3576.92	
E.G. Slope (ft/ft)	0.006921	Area (sq ft)	5881.74	3576.92	1462.99
Q Total (cfs)	6500.00	Flow (cfs)		6500.00	
Top Width (ft)	8607.99	Top Width (ft)	3716.00	2006.80	2885.19
Vel Total (ft/s)	1.82	Avg. Vel. (ft/s)		1.82	
Max Chl Dpth (ft)	2.83	Hydr. Depth (ft)		1.78	
Conv. Total (cfs)	78132.6	Conv. (cfs)		78132.6	
Length Wtd. (ft)	1281.00	Wetted Per. (ft)		2006.86	
Min Ch El (ft)	966.00	Shear (lb/sq ft)		0.77	

Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	5940.63	Top Width (ft)	3862.38	1834.38	243.86
Vel Total (ft/s)	1.41	Avg. Vel. (ft/s)		1.41	
Max Chl Dpth (ft)	3.18	Hydr. Depth (ft)		1.55	
Conv. Total (cfs)	56449.7	Conv. (cfs)		56449.7	
Length Wtd. (ft)	1746.00	Wetted Per. (ft)		1834.41	
Min Ch El (ft)	957.20	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)		0.68	
Frctn Loss (ft)	13.30	Cum Volume (acre-ft)	4838.30	555.17	25.45
C & E Loss (ft)	0.00	Cum SA (acres)	1357.43	400.61	92.09

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	960.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.100	
W.S. Elev (ft)	960.47	Reach Len. (ft)	1958.00	1746.00	1600.00
Crit W.S. (ft)	958.71	Flow Area (sq ft)		4692.75	
E.G. Slope (ft/ft)	0.005959	Area (sq ft)	8030.96	4692.75	1185.65
Q Total (cfs)	7500.00	Flow (cfs)		7500.00	
Top Width (ft)	8980.44	Top Width (ft)	4090.00	2853.36	2037.08
Vel Total (ft/s)	1.60	Avg. Vel. (ft/s)		1.60	
Max Chl Dpth (ft)	3.97	Hydr. Depth (ft)		1.64	
Conv. Total (cfs)	97155.0	Conv. (cfs)		97155.0	
Length Wtd. (ft)	1746.00	Wetted Per. (ft)		2853.40	
Min Ch El (ft)	957.20	Shear (lb/sq ft)		0.61	
Alpha	1.00	Stream Power (lb/ft s)		0.98	
Frctn Loss (ft)	13.65	Cum Volume (acre-ft)	5278.84	735.53	72.38
C & E Loss (ft)	0.00	Cum SA (acres)	1386.59	439.05	143.41

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B3 RS: 17.37

INPUT
Description: 1/3 Q=1500 cfs
2/3 Q=4000 cfs
Full Q=6400 cfs
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1570	944	2020	940	2270	940	2445	939.8	2695	940
3020	941.6	3520	940	4120	939.1	4700	939.6	4800	941
5550	941.7	6000	941.3	6200	941.3	6460	942	6590	942.9
6740	944	6950	945.1	7040	946.2	7340	943.9	7865	945.7
8890	945.3	9365	947	9465	948.2	9645	948	9825	947
10000	948.3	10050	948	10375	948.9	10875	949.2	11175	950
11250	949.8	11350	949.5	11760	948.4	12150	948	12375	947.6
12525	946	12600	945.9	12675	948	12725	949.5	12875	949.6
13180	949.5	13405	950.2	13480	950	14230	949.26	14640	950
14750	951	14850	952	14950	952.3	15140	952		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1570	.1	7040	.1	11175	.1

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

Alpha	1.00	Stream Power (lb/ft s)		2.01	
Frctn Loss (ft)	14.09	Cum Volume (acre-ft)	4388.65	577.26	48.65
C & E Loss (ft)	0.02	Cum SA (acres)	1171.73	336.43	102.67

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B3 RS: 17.00

INPUT
Description: 1/3 Q=1500 cfs
2/3 Q=1300 cfs
Full Q=1300 cfs
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2760	930	3060	928.3	3710	928	4310	927.6	4670	927.5
4770	928	4970	927.6	5170	928	5520	929	6320	930
6690	931.4	7020	931.5	7360	930	7485	931	7915	932
8345	931.3	8655	930	9055	933.4	9555	932	9675	931.7
9800	932	9900	934	10000	935	10050	934	10300	934
10600	935.4	10815	936	11025	936.5	11170	938	11400	936.8
11650	936	11750	934	12140	933.2	12375	934	12670	935.6
13100	935.5	13750	936	13950	937	14000	938	14560	939

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2760	.1	7915	.1	11170	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
7915	11170	1677	1237	1836	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
2760	7915	939	11170	14560	939

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	932.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	932.60	Reach Len. (ft)	1677.00	1237.00	1836.00
Crit W.S. (ft)	931.35	Flow Area (sq ft)		1670.93	
E.G. Slope (ft/ft)	0.003263	Area (sq ft)	17403.40	1670.93	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	6691.27	Top Width (ft)	5155.00	1536.27	
Vel Total (ft/s)	0.90	Avg. Vel. (ft/s)		0.90	
Max Chl Dpth (ft)	5.10	Hydr. Depth (ft)		1.09	
Conv. Total (cfs)	26258.8	Conv. (cfs)		26258.8	
Length Wtd. (ft)	1237.00	Wetted Per. (ft)		1536.29	
Min Ch El (ft)	930.00	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		0.20	
Frctn Loss (ft)	6.99	Cum Volume (acre-ft)	2546.06	280.44	1.35
C & E Loss (ft)	0.00	Cum SA (acres)	811.19	225.80	17.50

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	932.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	932.66	Reach Len. (ft)	1677.00	1237.00	1836.00

1164 8906 934 10000 13265 934

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	925.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.100	
W.S. Elev (ft)	925.56	Reach Len. (ft)	1173.00	1168.00	1670.00
Crit W.S. (ft)	924.51	Flow Area (sq ft)		1117.84	
E.G. Slope (ft/ft)	0.009679	Area (sq ft)	24222.87	1117.84	12.50
Q Total (cfs)	2100.00	Flow (cfs)		2100.00	
Top Width (ft)	8161.06	Top Width (ft)	7240.05	767.29	153.72
Vel Total (ft/s)	1.88	Avg. Vel. (ft/s)		1.88	
Max Chl Dpth (ft)	5.56	Hydr. Depth (ft)		1.46	
Conv. Total (cfs)	21345.8	Conv. (cfs)		21345.8	
Length Wtd. (ft)	1168.00	Wetted Per. (ft)		767.32	
Min Ch El (ft)	923.10	Shear (lb/sq ft)		0.88	
Alpha	1.00	Stream Power (lb/ft s)		1.65	
Frctn Loss (ft)	5.79	Cum Volume (acre-ft)	1744.78	240.85	1.09
C & E Loss (ft)	0.01	Cum SA (acres)	572.60	193.09	14.27

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	926.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.100	
W.S. Elev (ft)	926.08	Reach Len. (ft)	1173.00	1168.00	1670.00
Crit W.S. (ft)	924.75	Flow Area (sq ft)		1541.55	
E.G. Slope (ft/ft)	0.009172	Area (sq ft)	28037.61	1541.55	349.19
Q Total (cfs)	3100.00	Flow (cfs)		3100.00	
Top Width (ft)	10045.59	Top Width (ft)	7555.61	917.62	1572.36
Vel Total (ft/s)	2.01	Avg. Vel. (ft/s)		2.01	
Max Chl Dpth (ft)	6.08	Hydr. Depth (ft)		1.68	
Conv. Total (cfs)	32369.7	Conv. (cfs)		32369.7	
Length Wtd. (ft)	1168.00	Wetted Per. (ft)		917.65	
Min Ch El (ft)	923.10	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)		1.93	
Frctn Loss (ft)	6.05	Cum Volume (acre-ft)	1934.47	314.72	12.55
C & E Loss (ft)	0.01	Cum SA (acres)	618.86	201.45	49.07

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	926.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.100	
W.S. Elev (ft)	926.30	Reach Len. (ft)	1173.00	1168.00	1670.00
Crit W.S. (ft)	924.84	Flow Area (sq ft)		1764.14	
E.G. Slope (ft/ft)	0.009428	Area (sq ft)	29729.48	1764.14	717.73
Q Total (cfs)	3500.00	Flow (cfs)		3500.00	
Top Width (ft)	10570.33	Top Width (ft)	7742.00	1094.00	1734.33
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)		1.98	
Max Chl Dpth (ft)	6.30	Hydr. Depth (ft)		1.61	
Conv. Total (cfs)	36046.7	Conv. (cfs)		36046.7	
Length Wtd. (ft)	1168.00	Wetted Per. (ft)		1094.03	
Min Ch El (ft)	923.10	Shear (lb/sq ft)		0.95	
Alpha	1.00	Stream Power (lb/ft s)		1.88	

E.G. Elev (ft)	920.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	920.05	Reach Len. (ft)	970.00	978.00	1610.00
Crit W.S. (ft)	918.02	Flow Area (sq ft)		3428.59	
E.G. Slope (ft/ft)	0.003848	Area (sq ft)	40943.57	3428.59	
Q Total (cfs)	4800.00	Flow (cfs)		4800.00	
Top Width (ft)	7996.56	Top Width (ft)	6165.00	1831.56	
Vel Total (ft/s)	1.40	Avg. Vel. (ft/s)		1.40	
Max Chl Dpth (ft)	10.05	Hydr. Depth (ft)		1.87	
Conv. Total (cfs)	77381.0	Conv. (cfs)		77381.0	
Length Wtd. (ft)	978.00	Wetted Per. (ft)		1831.60	
Min Ch El (ft)	916.00	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)		0.63	
Frctn Loss (ft)	11.19	Cum Volume (acre-ft)	1005.69	248.09	5.85
C & E Loss (ft)	0.03	Cum SA (acres)	434.12	164.60	18.93

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	920.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.100	
W.S. Elev (ft)	920.29	Reach Len. (ft)	970.00	978.00	1610.00
Crit W.S. (ft)	918.16	Flow Area (sq ft)		3861.56	
E.G. Slope (ft/ft)	0.003872	Area (sq ft)	42387.74	3861.56	
Q Total (cfs)	5800.00	Flow (cfs)		5800.00	
Top Width (ft)	8030.06	Top Width (ft)	6165.00	1865.06	
Vel Total (ft/s)	1.50	Avg. Vel. (ft/s)		1.50	
Max Chl Dpth (ft)	10.29	Hydr. Depth (ft)		2.07	
Conv. Total (cfs)	93210.8	Conv. (cfs)		93210.8	
Length Wtd. (ft)	978.00	Wetted Per. (ft)		1865.09	
Min Ch El (ft)	916.00	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)		0.75	
Frctn Loss (ft)	11.28	Cum Volume (acre-ft)	1168.51	335.04	17.15
C & E Loss (ft)	0.04	Cum SA (acres)	452.06	170.82	28.44

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B3 RS: 16.37

INPUT
Description: 1/3 Q=3800 cfs
2/3 Q=4800 cfs
Full Q=5800 cfs
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2901	909.4	3340	908	3897	906.5	4355	906	4556	906
5370	904.9	6058	905	6387	905.3	6750	906	7041	907.2
7364	906.8	7635	907.2	8034	908	8326	908	8576	908
9091	907.4	9511	907.7	10000	910	10273	912	11008	913.1
11472	913.6	11807	914	12239	914.6	12682	914.3	12913	914.5
13651	913	13869	910	14317	909.8	14576	910	14993	911.5
15307	910.6	15560	910	15945	910.6	16333	912		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2901	.1	8326	.1	12239	.1

Crit W.S. (ft)	908.59	Flow Area (sq ft)		1128.64	
E.G. Slope (ft/ft)	0.155553	Area (sq ft)	11750.11	1128.64	
Q Total (cfs)	5800.00	Flow (cfs)		5800.00	
Top Width (ft)	6545.91	Top Width (ft)	5171.41	1374.50	
Vel Total (ft/s)	5.14	Avg. Vel. (ft/s)		5.14	
Max Chl Dpth (ft)	3.69	Hydr. Depth (ft)		0.82	
Conv. Total (cfs)	14705.8	Conv. (cfs)		14705.8	
Length Wtd. (ft)	913.00	Wetted Per. (ft)		1374.50	
Min Ch El (ft)	907.40	Shear (lb/sq ft)		7.97	
Alpha	1.00	Stream Power (lb/ft s)		40.98	
Frctn Loss (ft)	3.48	Cum Volume (acre-ft)	565.73	279.02	17.15
C & E Loss (ft)	0.12	Cum SA (acres)	325.84	134.45	28.44

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: East Spillway
REACH: B3 RS: 16.22

INPUT
Description: 1/3 Q=3800 cfs
2/3 Q=6500 cfs
Full Q=11500 cfs
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3305	904	3405	902	3930	900.8	4555	900.9	5180	902
5730	900.6	6080	902	6330	900	6730	901.7	7350	900
7750	900.6	8350	900	8575	899.4	8775	900	9325	900.7
10000	901.8	10200	903	10375	904	10635	904.9	10935	906
11235	906.9	11825	907.7	12335	907.3	12670	906	13020	904.6
13270	904	13660	904	14180	904.6	14715	904.6	15180	906
15250	906.7	15330	906	15600	906.2	16010	906.9	16350	908

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3305	.1	6080	.1	11825	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
6080	11825	2324	1209	1295	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
3305	6080	912	11825	16350	912

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	901.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	901.89	Reach Len. (ft)	2324.00	1209.00	1295.00
Crit W.S. (ft)	900.62	Flow Area (sq ft)		5086.21	
E.G. Slope (ft/ft)	0.001787	Area (sq ft)	1724.33	5086.21	
Q Total (cfs)	3800.00	Flow (cfs)		3800.00	
Top Width (ft)	6415.77	Top Width (ft)	2494.39	3921.38	
Vel Total (ft/s)	0.75	Avg. Vel. (ft/s)		0.75	
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)		1.30	
Conv. Total (cfs)	89886.0	Conv. (cfs)		89886.0	
Length Wtd. (ft)	1209.00	Wetted Per. (ft)		3921.40	
Min Ch El (ft)	899.40	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)		0.11	
Frctn Loss (ft)	5.60	Cum Volume (acre-ft)	64.42	81.50	0.85
C & E Loss (ft)	0.04	Cum SA (acres)	102.79	69.71	11.32

7000	895.8	7300	895.5	7600	895.3	7900	895.1	8200	895.1
8500	895	8800	895.1	9100	895.3	9400	896.2	9700	897
10000	898.6	10300	900	10600	901.1	10900	901.9	11200	902.4
11500	902.4	11800	902	12100	901.3	12400	900.1	12700	898.9
13000	897.5	13300	896.6	13600	895.9	13900	895.8	14200	895.8
14500	896	14800	896.3	15100	896.6	15400	897	15700	897.4
16000	897.9	16300	898.5	16600	899.4	16900	900.3	17200	901.2
17500	901.1	17800	901						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2550	.045	8200	.045	11200	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8200	11200	0	0	0	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
2550	8200	905	11200	17800	905

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	896.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.045	
W.S. Elev (ft)	895.91	Reach Len. (ft)			
Crit W.S. (ft)	895.91	Flow Area (sq ft)		786.56	
E.G. Slope (ft/ft)	0.033558	Area (sq ft)	690.57	786.56	57.00
Q Total (cfs)	3800.00	Flow (cfs)		3800.00	
Top Width (ft)	3222.37	Top Width (ft)	1358.93	1101.98	761.46
Vel Total (ft/s)	4.83	Avg. Vel. (ft/s)		4.83	
Max Chl Dpth (ft)	0.91	Hydr. Depth (ft)		0.71	
Conv. Total (cfs)	20743.7	Conv. (cfs)		20743.7	
Length Wtd. (ft)		Wetted Per. (ft)		1101.98	
Min Ch El (ft)	895.00	Shear (lb/sq ft)		1.50	
Alpha	1.00	Stream Power (lb/ft s)		7.22	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	896.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.		0.045	
W.S. Elev (ft)	896.23	Reach Len. (ft)			
Crit W.S. (ft)	896.23	Flow Area (sq ft)		1163.08	
E.G. Slope (ft/ft)	0.030257	Area (sq ft)	1292.29	1163.08	393.78
Q Total (cfs)	6500.00	Flow (cfs)		6500.00	
Top Width (ft)	4980.20	Top Width (ft)	2494.69	1211.83	1273.68
Vel Total (ft/s)	5.59	Avg. Vel. (ft/s)		5.59	
Max Chl Dpth (ft)	1.23	Hydr. Depth (ft)		0.96	
Conv. Total (cfs)	37368.3	Conv. (cfs)		37368.3	
Length Wtd. (ft)		Wetted Per. (ft)		1211.83	
Min Ch El (ft)	895.00	Shear (lb/sq ft)		1.81	
Alpha	1.00	Stream Power (lb/ft s)		10.13	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

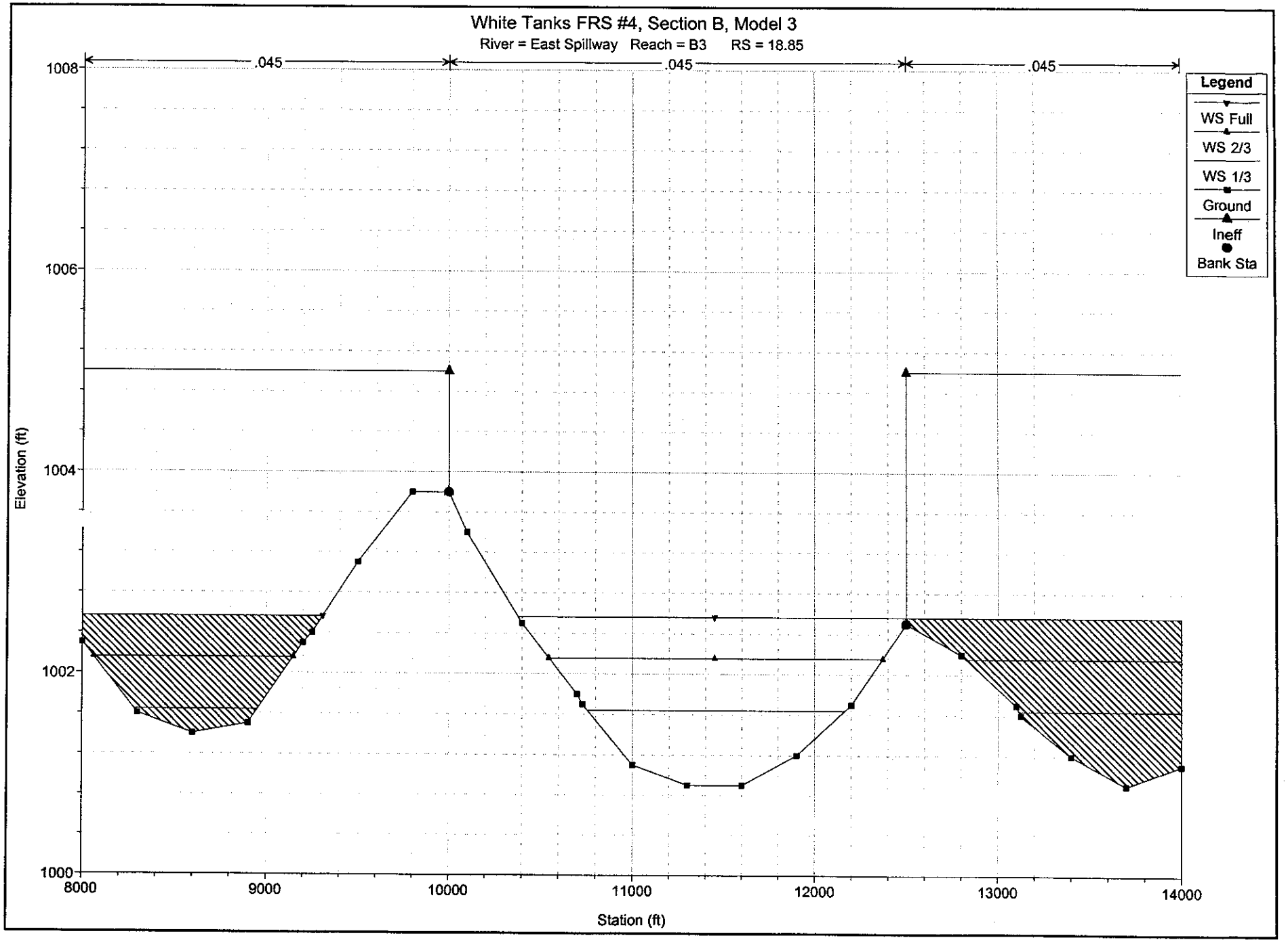
CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	897.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.		0.045	
W.S. Elev (ft)	896.70	Reach Len. (ft)			
Crit W.S. (ft)	896.70	Flow Area (sq ft)		1777.83	
E.G. Slope (ft/ft)	0.027617	Area (sq ft)	2641.15	1777.83	1153.62
Q Total (cfs)	11500.00	Flow (cfs)		11500.00	

B3	18.39	.1	.3
B3	18.14	.1	.3
B3	17.94	.1	.3
B3	17.69	.1	.3
B3	17.37	.1	.3
B3	17.00	.1	.3
B3	16.77	.1	.3
B3	16.55	.1	.3
B3	16.37	.1	.3
B3	16.22	.1	.3
B3	16.01	.1	.3

HEC-RAS Plan: WT4B3 River: East Spillway Reach: B3

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
B3	16.01	3800.00	895.00	895.91	895.91	896.27	0.033558	4.83	786.56	3222.37	1.01
B3	16.01	6500.00	895.00	896.23	896.23	896.72	0.030257	5.59	1163.08	4980.20	1.01
B3	16.01	11500.00	895.00	896.70	896.70	897.35	0.027617	6.47	1777.83	6364.69	1.01
B3	16.22	3800.00	899.40	901.89	900.62	901.90	0.001787	0.75	5086.21	6415.77	0.12
B3	16.22	6500.00	899.40	902.39	900.81	902.40	0.001807	0.92	7063.78	6712.39	0.12
B3	16.22	11500.00	899.40	903.10	901.10	903.12	0.001873	1.16	9956.67	6866.93	0.13
B3	16.37	3800.00	907.40	908.38	908.38	908.70	0.172630	4.54	837.35	6432.51	1.01
B3	16.37	4800.00	907.40	908.49	908.49	908.85	0.163545	4.87	986.01	6490.87	1.00
B3	16.37	5800.00	907.40	908.59	908.59	909.00	0.155553	5.14	1128.64	6545.91	1.00
B3	16.55	3800.00	916.00	919.79	917.83	919.81	0.003715	1.28	2958.80	7880.45	0.17
B3	16.55	4800.00	916.00	920.05	918.02	920.08	0.003848	1.40	3428.59	7996.56	0.18
B3	16.55	5800.00	916.00	920.29	918.16	920.32	0.003872	1.50	3861.56	8030.06	0.18
B3	16.77	2100.00	923.10	925.56	924.51	925.62	0.009679	1.88	1117.84	8161.06	0.27
B3	16.77	3100.00	923.10	926.08	924.75	926.14	0.009172	2.01	1541.55	10045.59	0.27
B3	16.77	3500.00	923.10	926.30	924.84	926.36	0.009428	1.98	1764.14	10570.33	0.28
B3	17.00	1500.00	930.00	932.60	931.35	932.61	0.003263	0.90	1670.93	6691.27	0.15
B3	17.00	1300.00	930.00	932.66	931.26	932.67	0.002093	0.74	1766.53	6723.59	0.12
B3	17.00	1300.00	930.00	932.74	931.26	932.74	0.001749	0.69	1882.33	6761.87	0.11
B3	17.37	1500.00	943.90	945.78	945.15	945.81	0.019959	1.41	1063.06	7364.69	0.33
B3	17.37	4000.00	943.90	946.37	945.74	946.42	0.013152	1.77	2265.50	7744.22	0.30
B3	17.37	6400.00	943.90	946.79	945.91	946.85	0.011388	2.00	3204.49	7918.14	0.30
B3	17.69	1500.00	957.20	958.86	957.88	958.87	0.003980	0.99	1513.12	4756.97	0.17
B3	17.69	4000.00	957.20	959.68	958.29	959.71	0.005021	1.41	2839.22	5940.63	0.20
B3	17.69	7500.00	957.20	960.47	958.71	960.50	0.005959	1.60	4692.75	8980.44	0.22
B3	17.94	1500.00	966.00	967.24	966.73	967.27	0.012738	1.38	1087.42	3719.34	0.28
B3	17.94	4000.00	966.00	968.04	967.09	968.08	0.008832	1.65	2430.85	6358.65	0.26
B3	17.94	6500.00	966.00	968.63	967.35	968.68	0.006921	1.82	3576.92	8607.99	0.24
B3	18.14	1500.00	972.60	974.87	973.77	974.89	0.004908	1.06	1408.65	2476.52	0.18
B3	18.14	4000.00	972.60	975.62	974.43	975.66	0.006278	1.61	2491.13	3613.52	0.22
B3	18.14	6500.00	972.60	976.18	974.71	976.23	0.007965	1.85	3506.91	5751.13	0.25
B3	18.39	1500.00	982.30	984.15	983.60	984.16	0.012404	1.00	1496.23	6067.53	0.26
B3	18.39	4000.00	982.30	984.64	984.00	984.66	0.008309	1.20	3323.15	10014.42	0.23
B3	18.39	6500.00	982.30	985.04	984.20	985.06	0.006283	1.32	4936.77	12733.63	0.21
B3	18.60	1500.00	991.20	992.52	992.09	992.53	0.006101	0.79	1896.02	8144.59	0.19
B3	18.60	4000.00	991.20	992.90	992.30	992.92	0.008132	1.24	3230.68	9688.06	0.23
B3	18.60	6500.00	991.20	993.11	992.43	993.16	0.010778	1.62	4021.67	10701.40	0.28
B3	18.85	1500.00	1000.90	1001.64	1001.42	1001.71	0.009921	2.09	716.06	7164.25	0.52
B3	18.85	4000.00	1000.90	1002.16	1001.77	1002.26	0.007548	2.58	1552.77	8814.99	0.49
B3	18.85	6500.00	1000.90	1002.56	1002.02	1002.68	0.006049	2.76	2358.29	10937.68	0.46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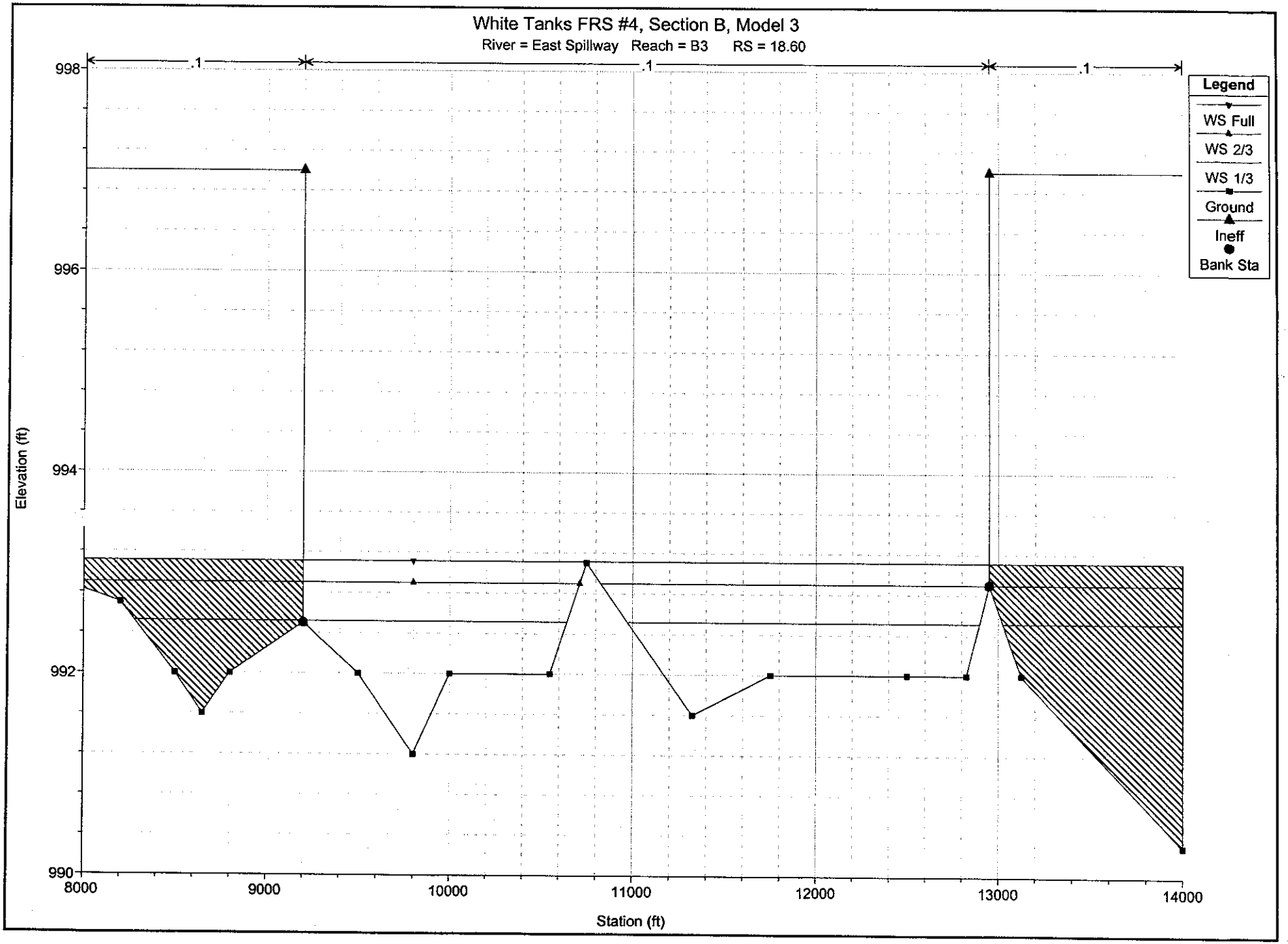
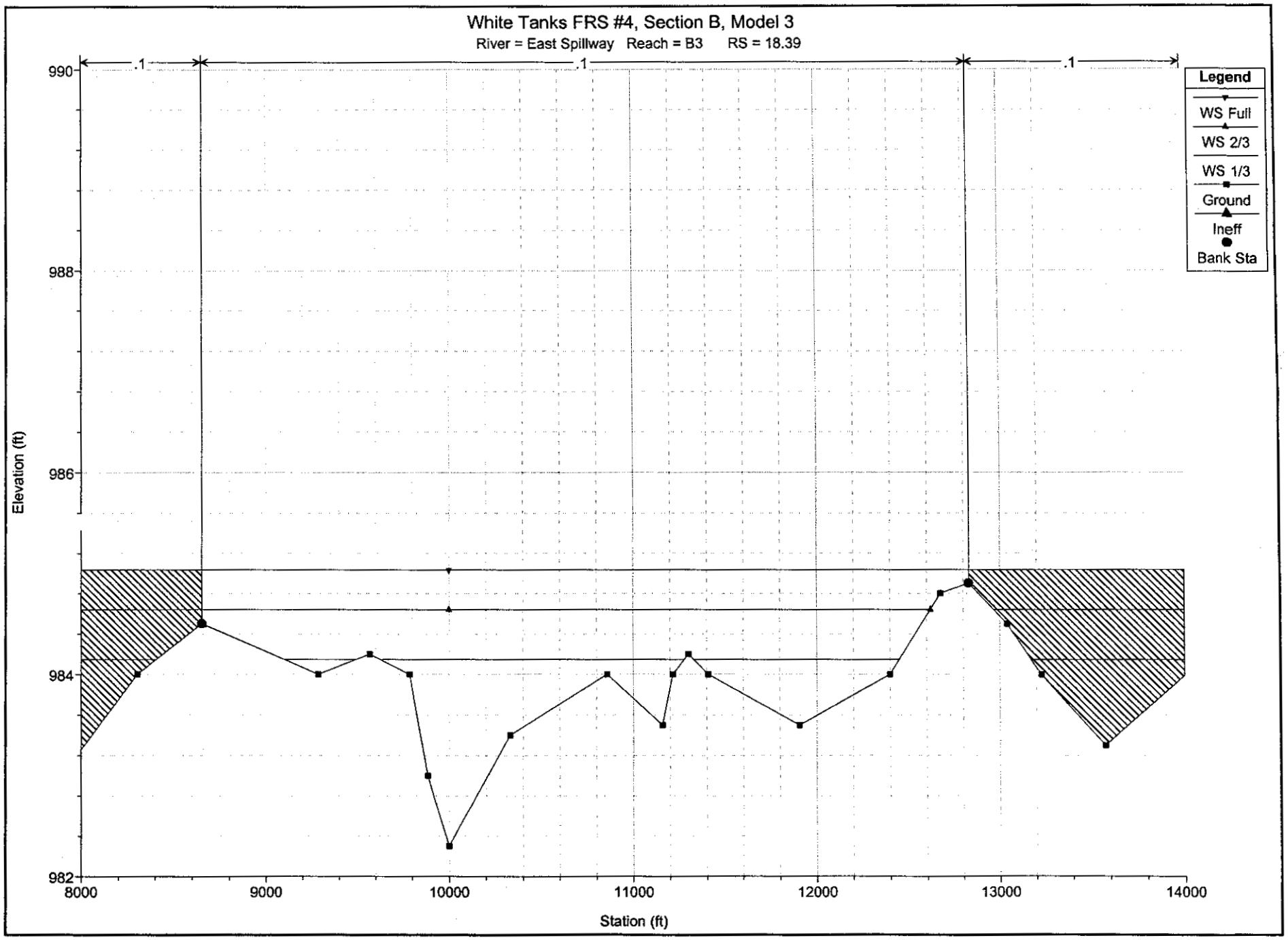
River = East Spillway Reach = B3 RS = 18.85
.045
.045
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
1008
1006
1004
1002
1000
8000
9000
10000
11000
12000
13000
14000
Station (ft)


White Tanks FRS #4, Section B, Model 3
River = East Spillway Reach = B3 RS = 18.60
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
998
996
994
992
990
8000
9000
10000
11000
12000
13000
14000
Station (ft)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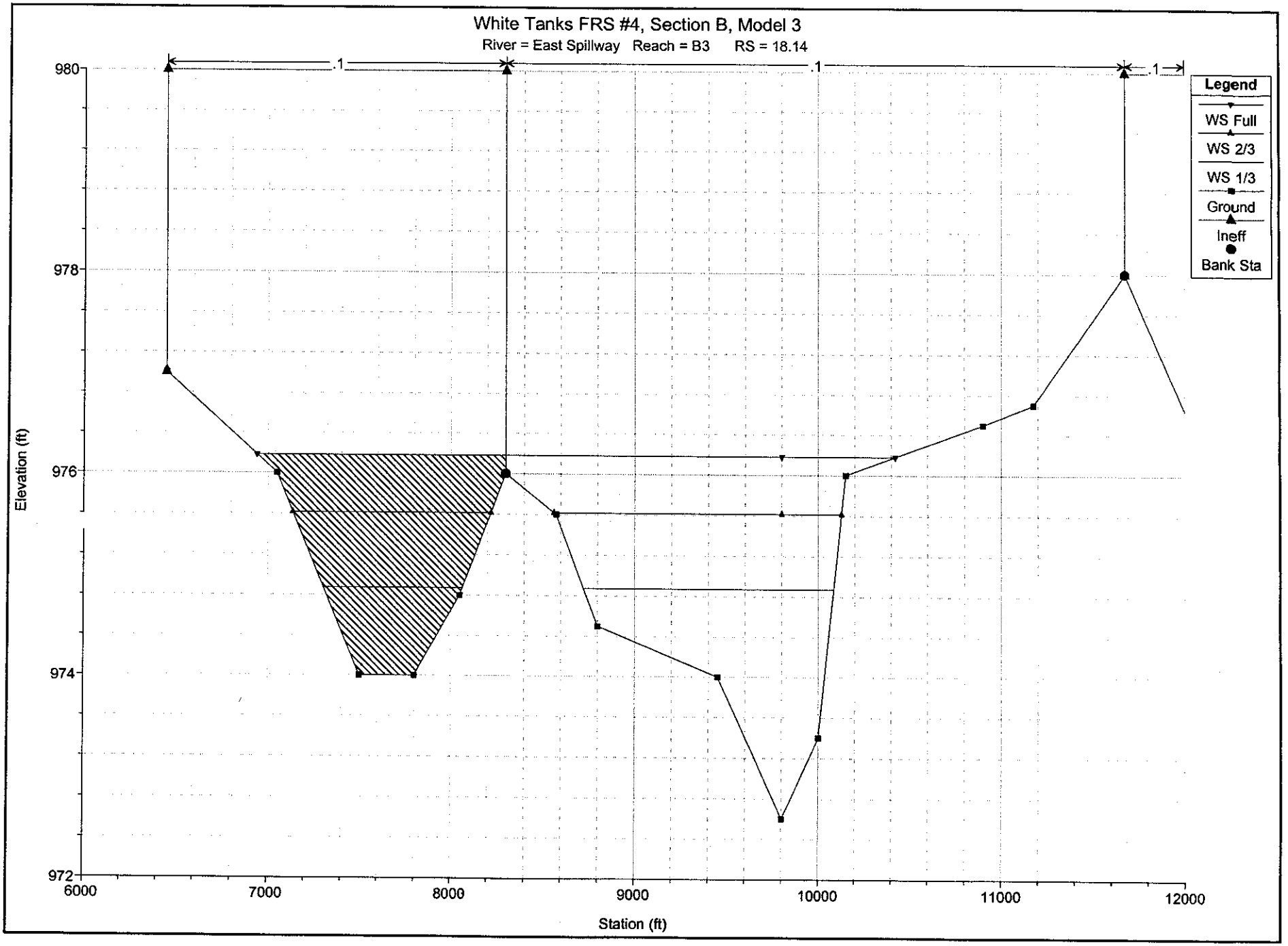
River = East Spillway Reach = B3 RS = 18.39
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
990
988
986
984
982
8000
9000
10000
11000
12000
13000
14000
Station (ft)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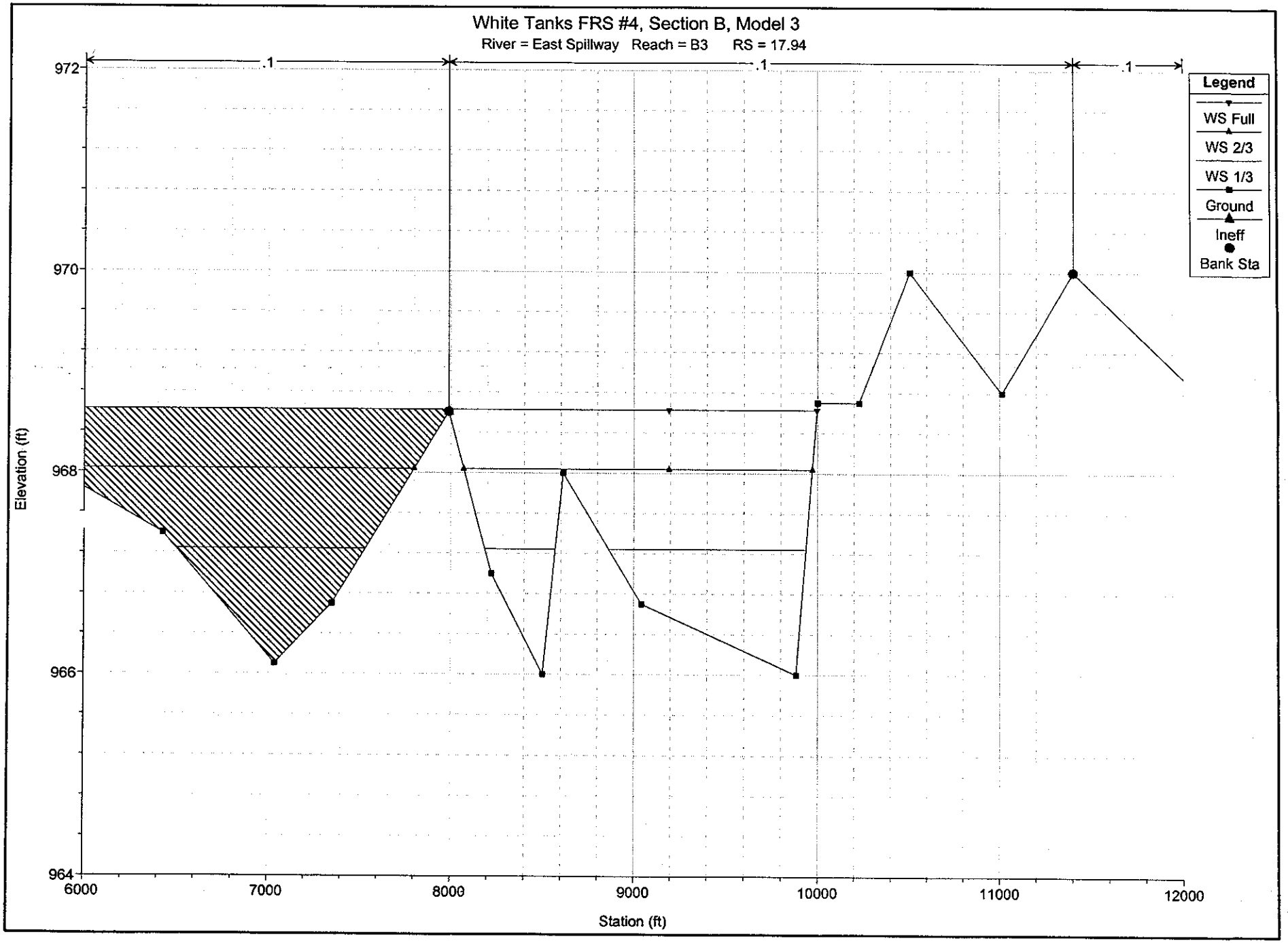
River = East Spillway Reach = B3 RS = 18.14
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
980
978
976
974
972
6000
7000
8000
9000
10000
11000
12000
Station (ft)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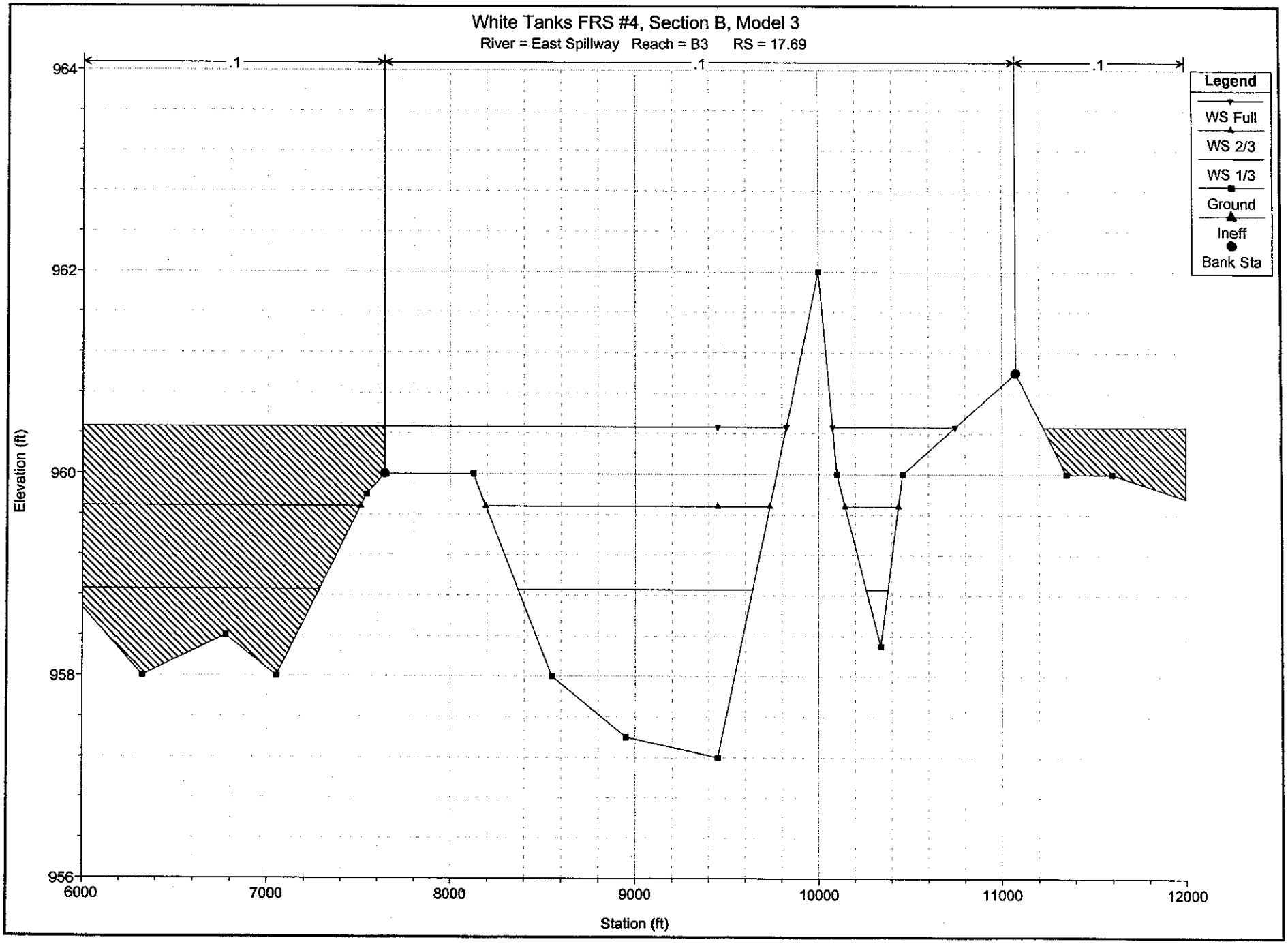
River = East Spillway Reach = B3 RS = 17.94
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
972
970
968
966
964
6000
7000
8000
9000
10000
11000
12000
Station (ft)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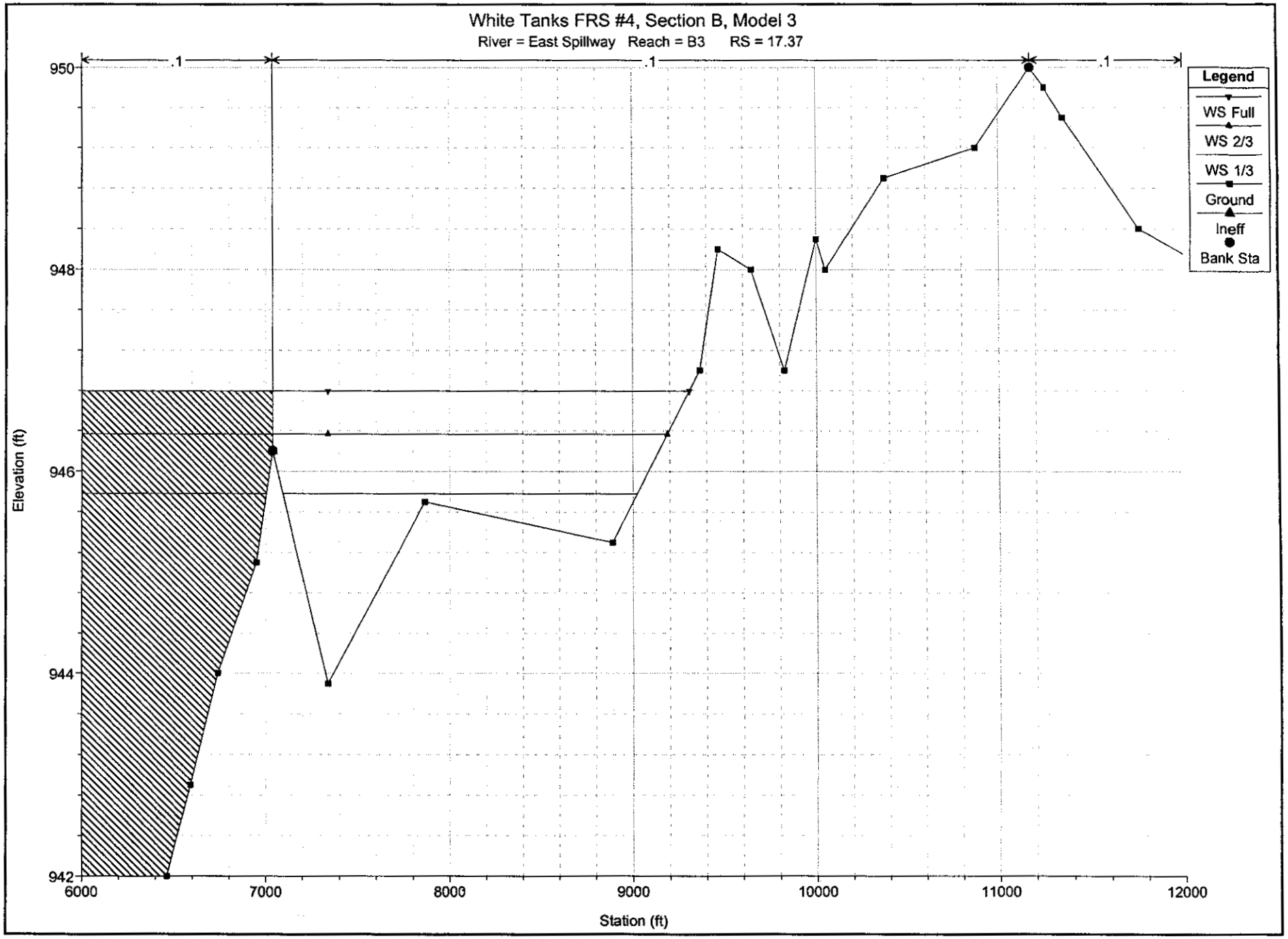
River = East Spillway Reach = B3 RS = 17.69
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
964
962
960
958
956
6000
7000
8000
9000
10000
11000
12000
Station (ft)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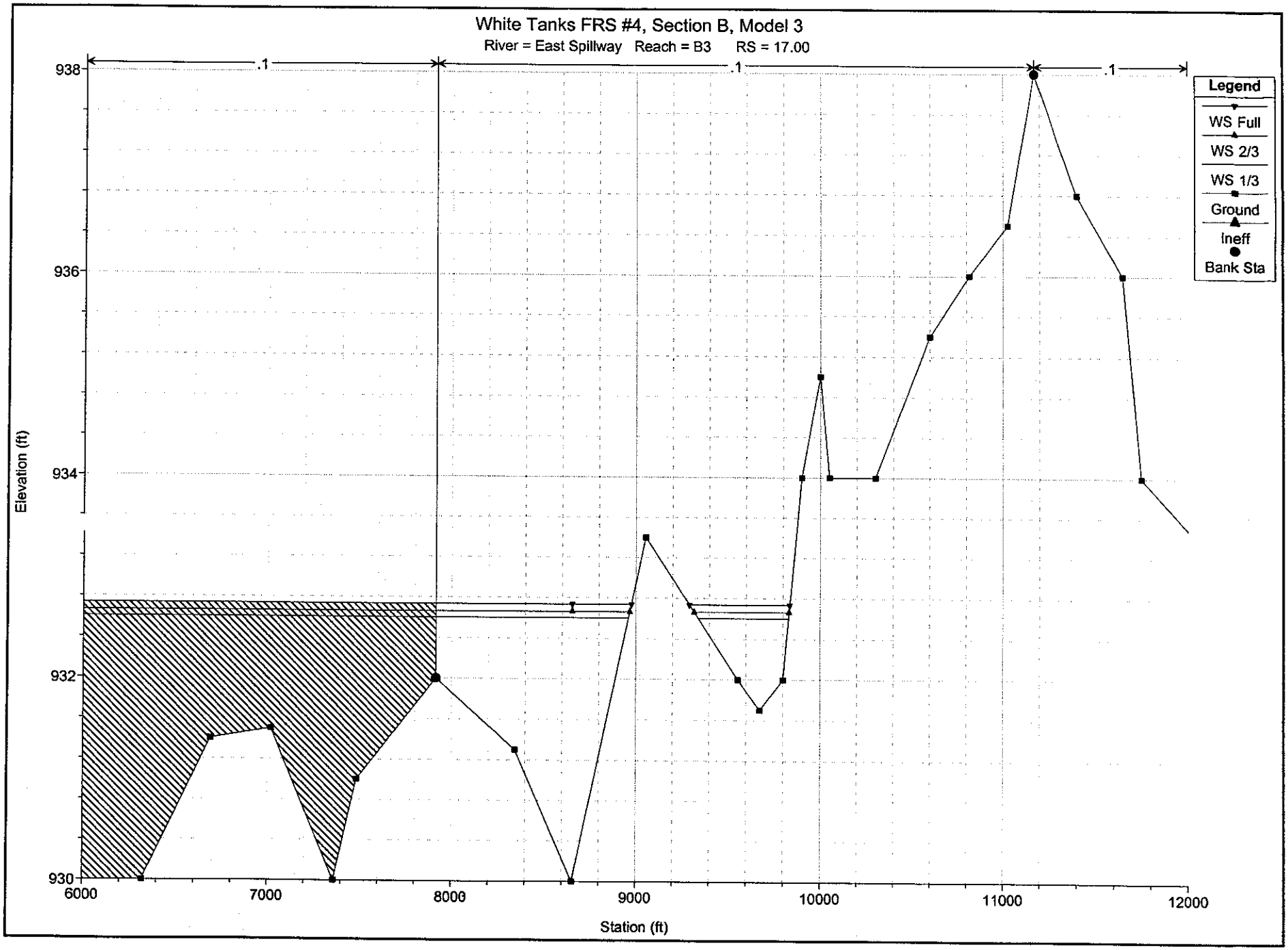
River = East Spillway Reach = B3 RS = 17.37
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
950
948
946
944
942
6000
7000
8000
9000
10000
11000
12000
Station (ft)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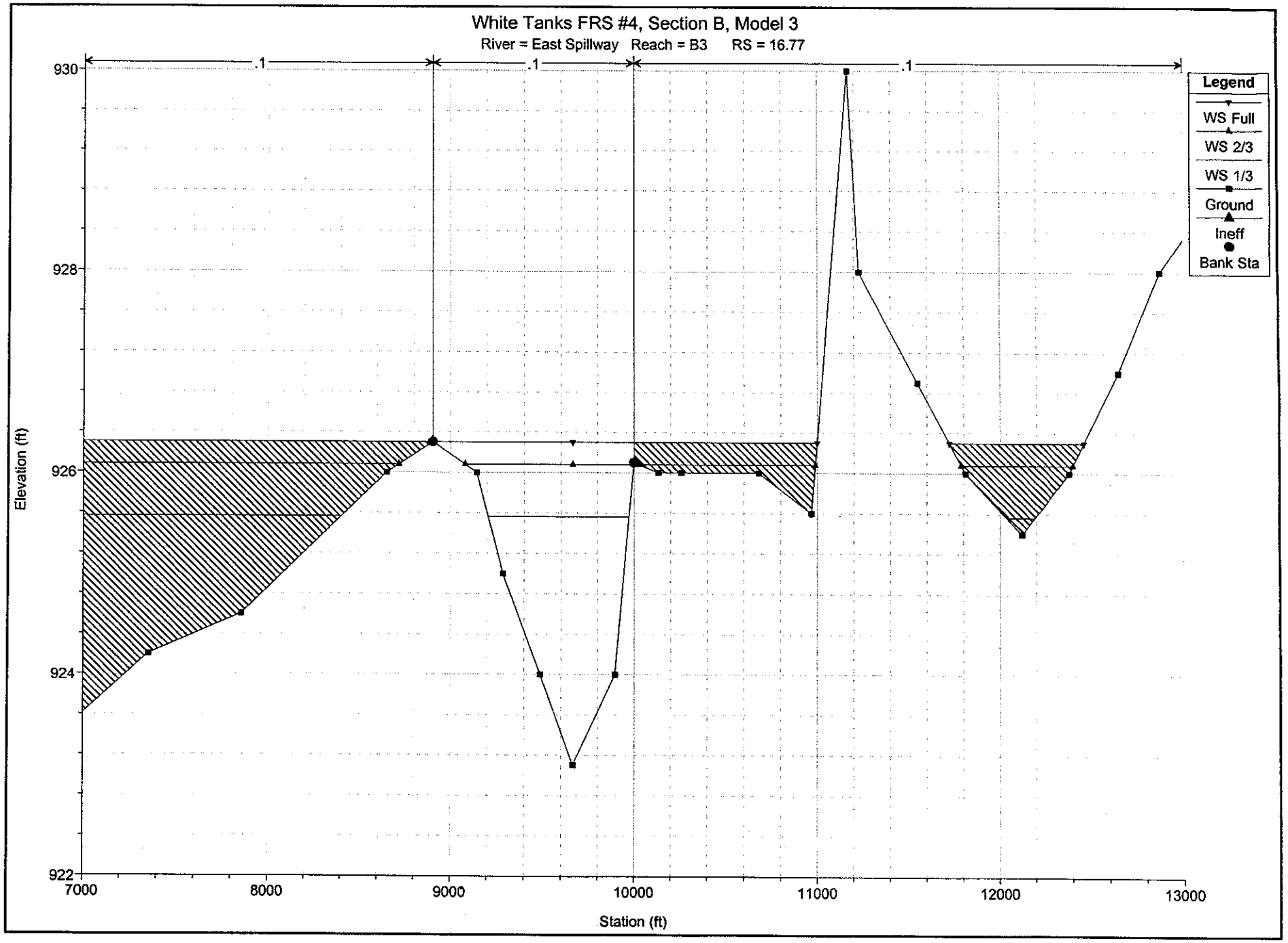
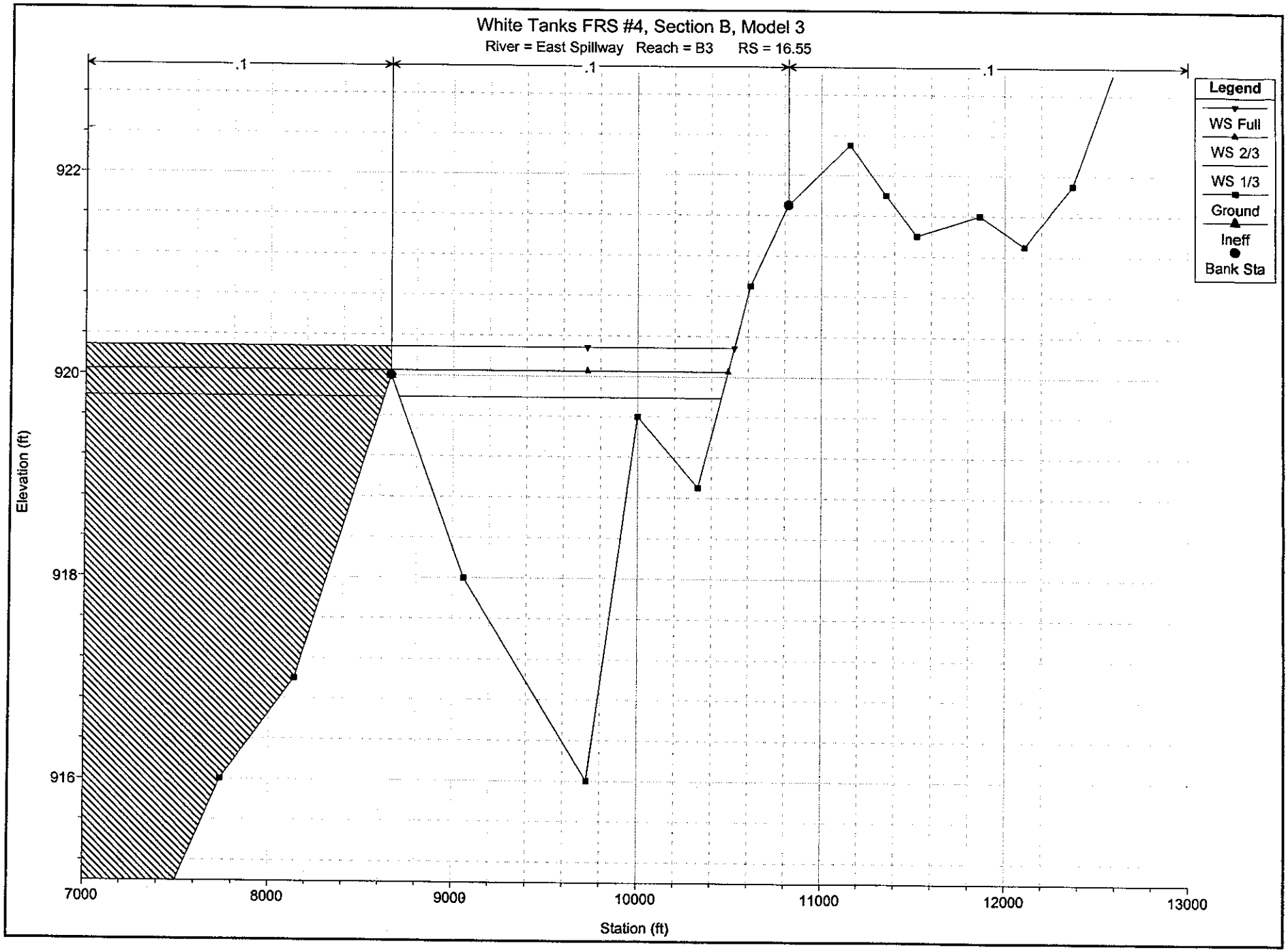
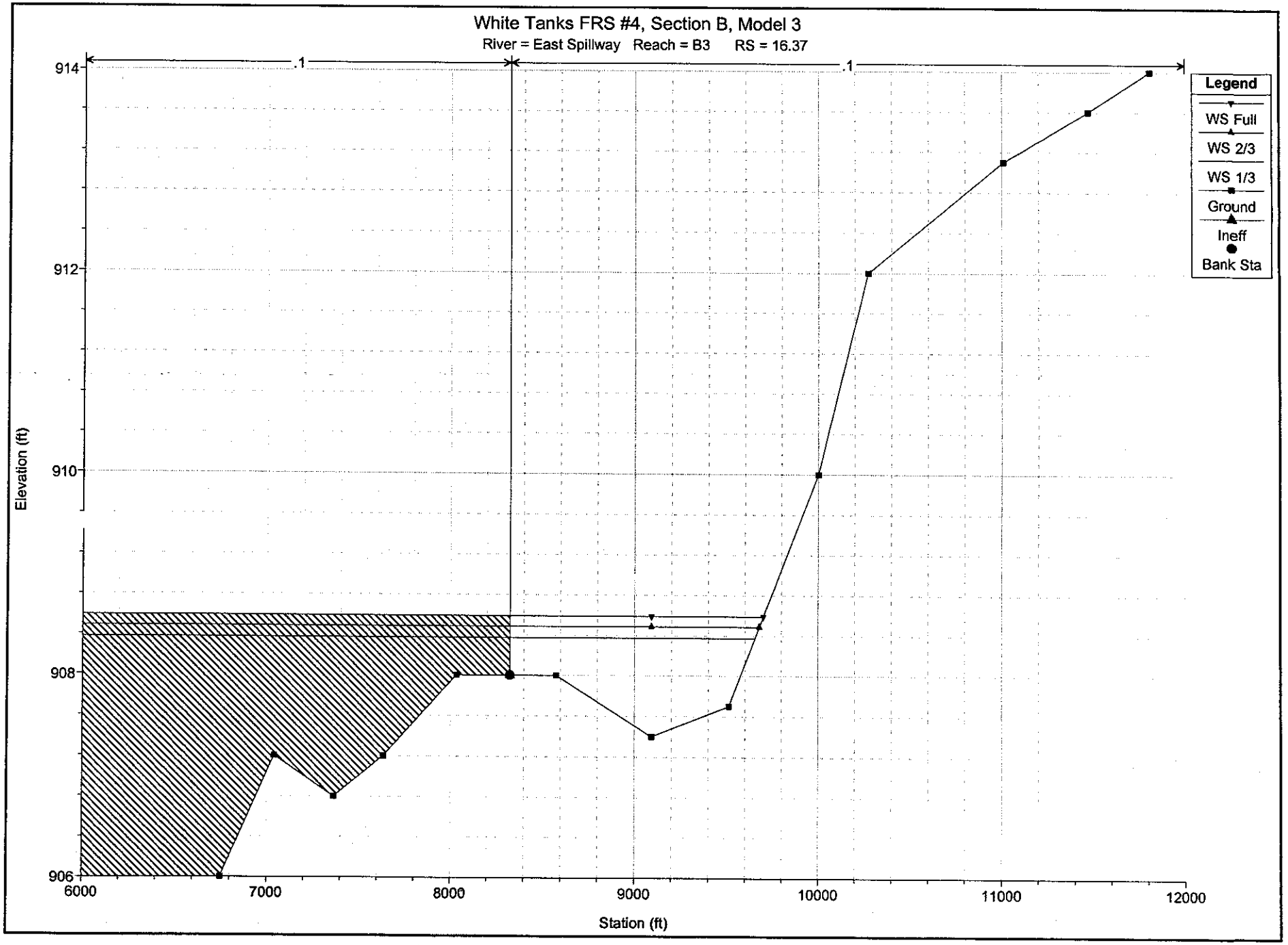
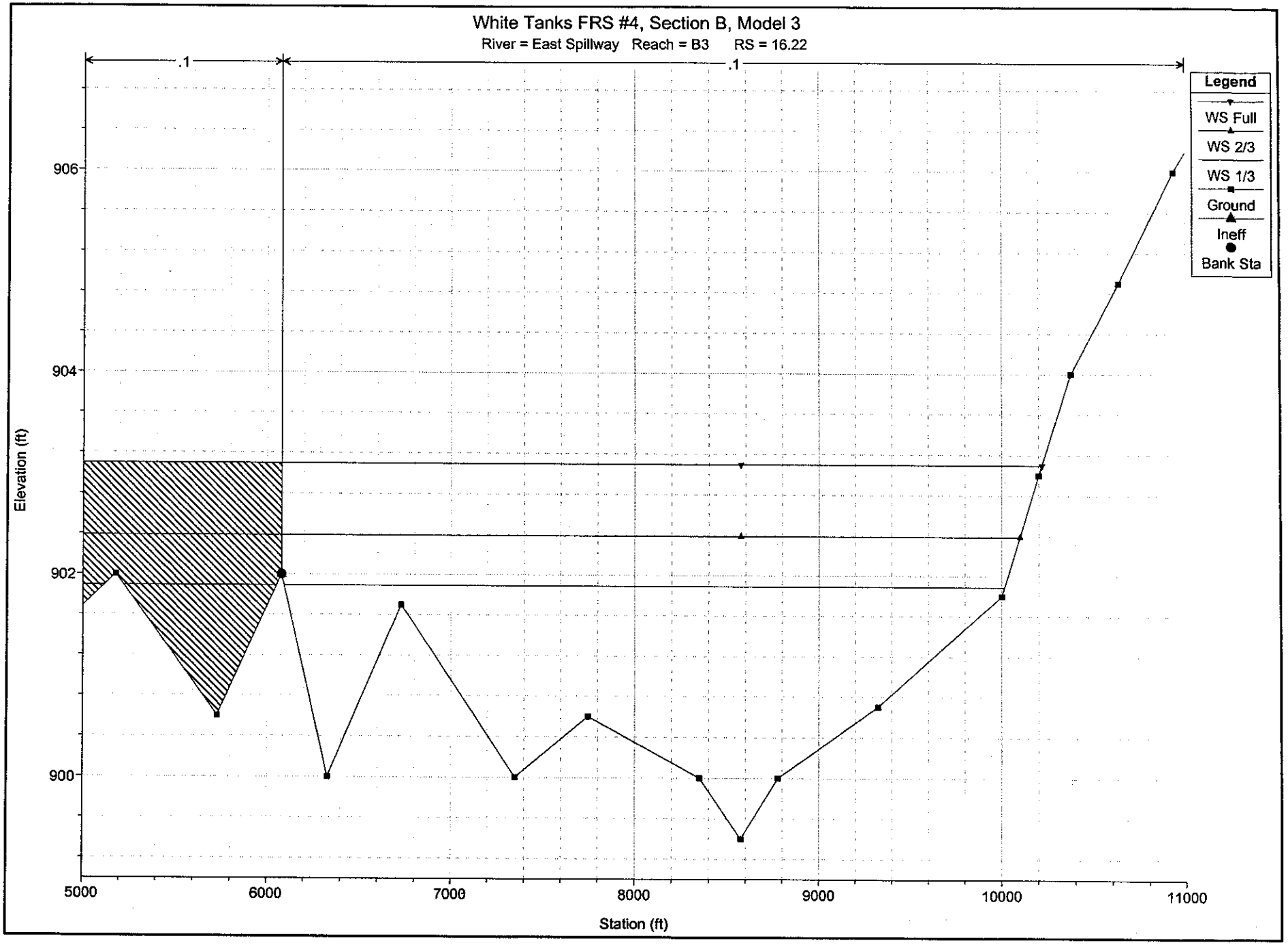
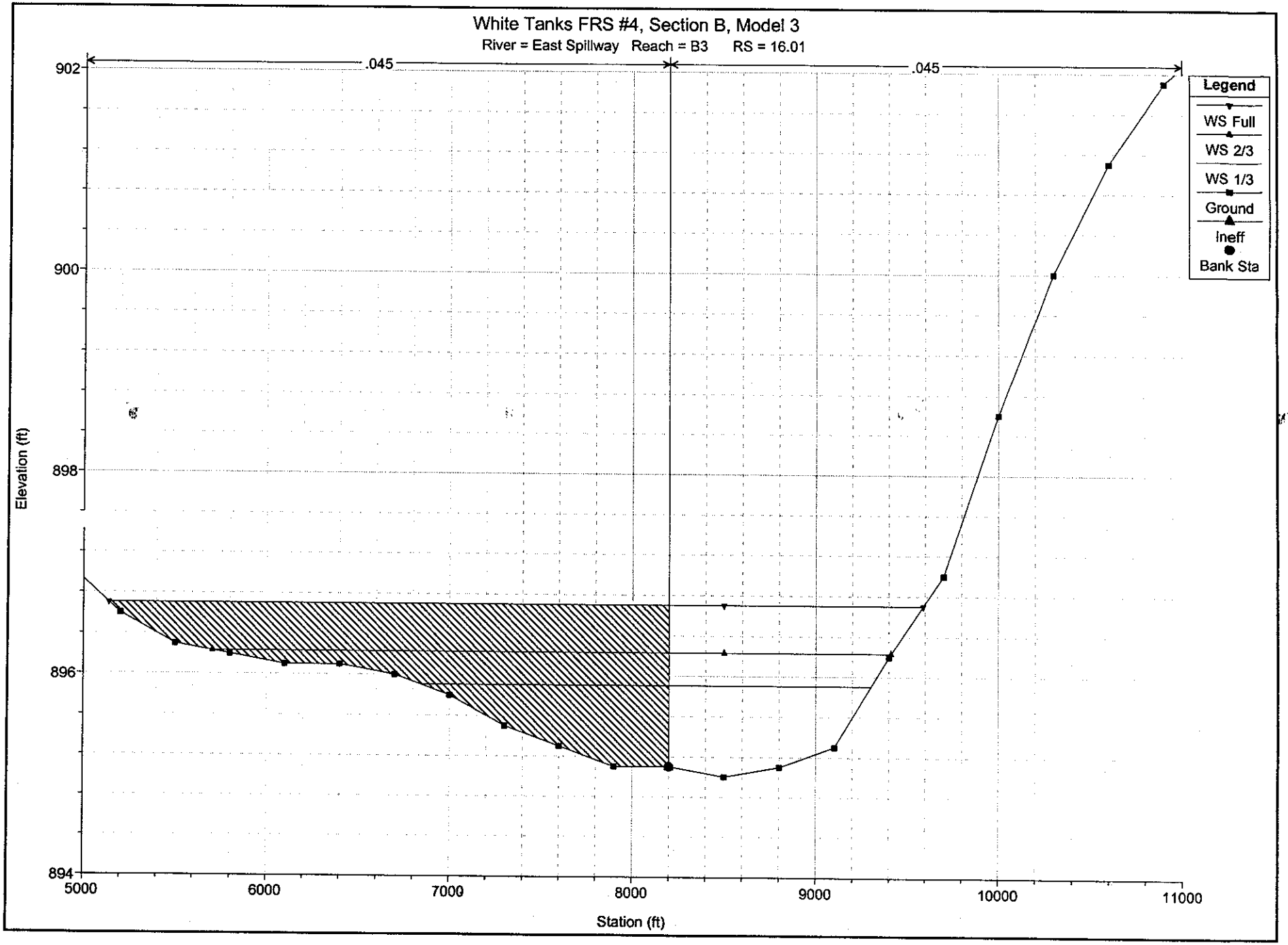
River = East Spillway Reach = B3 RS = 17.00
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
938
936
934
932
930
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS #4, Section B, Model 3
River = East Spillway Reach = B3 RS = 16.77
.1
.1
.1
930
928
926
924
922
Elevation (ft)
7000
8000
9000
10000
11000
12000
13000
Station (ft)
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta


White Tanks FRS #4, Section B, Model 3
River = East Spillway Reach = B3 RS = 16.55
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
922
920
918
916
Elevation (ft)
7000
8000
9000
10000
11000
12000
13000
Station (ft)


White Tanks FRS #4, Section B, Model 3
River = East Spillway Reach = B3 RS = 16.37
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
914
912
910
908
906
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS #4, Section B, Model 3
River = East Spillway Reach = B3 RS = 16.22
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
906
904
902
900
Elevation (ft)
5000
6000
7000
8000
9000
10000
11000
Station (ft)


White Tanks FRS #4, Section B, Model 3
River = East Spillway Reach = B3 RS = 16.01
.045
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
902
900
898
896
894
5000
6000
7000
8000
9000
10000
11000
Station (ft)

```
                    HEC-RAS September 1998 Version 2.2
                      U.S. Army Corp of Engineers
                     Hydrologic Engineering Center
                       609 Second Street, Suite D
                      Davis, California 95616-4687
                             (916) 756-1104

X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
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PROJECT DATA
Project Title: White Tanks FRS #4, Section B, Model 4
Project File : WT4B4.prj
Run Date and Time: 06/26/2000 10:11:06 AM

Project in English units

Project Description:
Study Name: White Tanks FRS #4 Spillway Delineation Study
Contract No.: FCD 98-32
Purpose of Study: Delineation of the inundation limits of the 1/3, 2/3, and full spillway discharges for the White Tanks Flood Retarding Structure #4.

Model Name: WT4B4
Model Description: Set up to model flow east of Jackrabbit Trail. Northern boundary is the Roosevelt Irrigation District Canal, southern boundary is the Buckeye Canal.
HEC-RAS Version: Version 2.2, September 1998 with RASPATCH

Consultants: Hoskin Engineering Consultants, Inc.
323 W. Roosevelt Street, Suite 200
Phoenix, AZ 85003
(602)252-8384 Phone
(602)252-8385 Fax
HEC 990006

DEI Professional Services, Inc.
6225 N. 24th St., Ste. 200
Phoenix, AZ 85016
(602)954-0038 Phone
(602)944-8605 Fax

PLAN DATA

Plan Title: Section B, East of Jackrabbit
Plan File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\rsvlt-bkeye\final models\WT4B4.p01

Geometry Title: Section B, East of Jackrabbit
Geometry File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\rsvlt-bkeye\final models\WT4B4.g01

Flow Title : Section B, East of Jackrabbit
Flow File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\rsvlt-bkeye\final models\WT4B4.f01

8300	1001.6	8600	1001.4	8900	1001.5	9200	1002.3	9250	1002.4
9500	1003.1	9800	1003.8	10000	1003.8	10100	1003.4	10400	1002.5
10700	1001.8	10729	1001.7	11000	1001.1	11300	1000.9	11600	1000.9
11900	1001.2	12200	1001.7	12500	1002.5	12800	1002.2	13100	1001.7
13125	1001.6	13400	1001.2	13700	1000.9	14000	1001.1	14300	1000.9
14600	1000.4	14900	1000.2	15200	1000.1	15500	1000.3	15625	1000.4
15800	1000	16100	999.4	16400	999.3	16700	999.3	17000	999.1
17300	999	17600	999	17900	999	18200	999		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4700	.045	4700	.045	10000	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4700	10000	1397	1284	1244	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
10000	18200	1005

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	1002.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.045	
W.S. Elev (ft)	1002.36	Reach Len. (ft)	1397.00	1284.00	1244.00
Crit W.S. (ft)	1002.01	Flow Area (sq ft)		977.10	
E.G. Slope (ft/ft)	0.006915	Area (sq ft)		977.10	14186.78
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	9876.79	Top Width (ft)		2337.36	7539.43
Vel Total (ft/s)	1.54	Avg. Vel. (ft/s)		1.54	
Max Chl Dpth (ft)	3.36	Hydr. Depth (ft)		0.42	
Conv. Total (cfs)	18038.4	Conv. (cfs)		18038.4	
Length Wtd. (ft)	1284.00	Wetted Per. (ft)		2337.36	
Min Ch El (ft)	1001.40	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)		0.28	
Frctn Loss (ft)	9.64	Cum Volume (acre-ft)		628.43	919.43
C & E Loss (ft)	0.01	Cum SA (acres)		957.12	808.20

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	1002.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.045	
W.S. Elev (ft)	1002.73	Reach Len. (ft)	1397.00	1284.00	1244.00
Crit W.S. (ft)	1002.34	Flow Area (sq ft)		2160.38	
E.G. Slope (ft/ft)	0.005694	Area (sq ft)		2160.38	17129.70
Q Total (cfs)	3500.00	Flow (cfs)		3500.00	
Top Width (ft)	11998.42	Top Width (ft)		4120.39	7878.02
Vel Total (ft/s)	1.62	Avg. Vel. (ft/s)		1.62	
Max Chl Dpth (ft)	3.73	Hydr. Depth (ft)		0.52	
Conv. Total (cfs)	46384.7	Conv. (cfs)		46384.7	
Length Wtd. (ft)	1284.00	Wetted Per. (ft)		4120.40	
Min Ch El (ft)	1001.40	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.30	
Frctn Loss (ft)	9.65	Cum Volume (acre-ft)		1341.87	1363.52
C & E Loss (ft)	0.01	Cum SA (acres)		1287.31	951.22

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	993.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	993.10	Reach Len. (ft)	1171.00	1097.00	1079.00
Crit W.S. (ft)	992.46	Flow Area (sq ft)		2850.80	
E.G. Slope (ft/ft)	0.010130	Area (sq ft)		2850.80	7671.04
Q Total (cfs)	3500.00	Flow (cfs)		3500.00	
Top Width (ft)	10672.55	Top Width (ft)		3832.87	6839.69
Vel Total (ft/s)	1.23	Avg. Vel. (ft/s)		1.23	
Max Chl Dpth (ft)	2.80	Hydr. Depth (ft)		0.74	
Conv. Total (cfs)	34774.2	Conv. (cfs)		34774.2	
Length Wtd. (ft)	1097.00	Wetted Per. (ft)		3832.88	
Min Ch El (ft)	991.20	Shear (lb/sq ft)		0.47	
Alpha	1.00	Stream Power (lb/ft s)		0.58	
Frctn Loss (ft)	8.04	Cum Volume (acre-ft)		1268.01	1009.39
C & E Loss (ft)	0.00	Cum SA (acres)		1170.09	741.06

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	993.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	993.26	Reach Len. (ft)	1171.00	1097.00	1079.00
Crit W.S. (ft)	992.58	Flow Area (sq ft)		3480.21	
E.G. Slope (ft/ft)	0.011245	Area (sq ft)		3480.21	8772.27
Q Total (cfs)	5000.00	Flow (cfs)		5000.00	
Top Width (ft)	10847.20	Top Width (ft)		3997.20	6850.00
Vel Total (ft/s)	1.44	Avg. Vel. (ft/s)		1.44	
Max Chl Dpth (ft)	2.96	Hydr. Depth (ft)		0.87	
Conv. Total (cfs)	47152.0	Conv. (cfs)		47152.0	
Length Wtd. (ft)	1097.00	Wetted Per. (ft)		3997.21	
Min Ch El (ft)	991.20	Shear (lb/sq ft)		0.61	
Alpha	1.00	Stream Power (lb/ft s)		0.88	
Frctn Loss (ft)	8.01	Cum Volume (acre-ft)		1801.05	1163.84
C & E Loss (ft)	0.01	Cum SA (acres)		1366.36	836.47

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: B4 RS: 18.39

INPUT
Description: 1/3 Q=1500 cfs
2/3 Q=3500 cfs
Full Q=5000 cfs
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2519	985.7	3029	985.4	3649	984	3808	984.3	4167	984
4388	984.1	4714	984.2	5822	984.9	6658	984.9	7215	984
7575	984.3	7936	983.1	8305	984	8653	984.5	9286	984
9569	984.2	9787	984	9884	983	10000	982.3	10331	983.4
10858	984	11159	983.5	11216	984	11301	984.2	11408	984
11907	983.5	12399	984	12675	984.8	12830	984.9	13039	984.5

Conv. Total (cfs)	69880.2	Conv. (cfs)	69880.2	
Length Wtd. (ft)	1392.00	Wetted Per. (ft)	5561.14	
Min Ch El (ft)	983.10	Shear (lb/sq ft)	0.29	
Alpha	1.00	Stream Power (lb/ft s)	0.29	
Frctn Loss (ft)	9.25	Cum Volume (acre-ft)	1693.90	944.83
C & E Loss (ft)	0.00	Cum SA (acres)	1246.00	660.47

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.

CROSS SECTION RIVER: East Spillway
REACH: B4 RS: 18.14

INPUT
Description: 1/3 Q=1500 cfs
2/3 Q=3500 cfs
Full Q=5000 cfs
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3951	977.7	4475	974	4700	975.6	4950	974	5450	975.2
5800	976	6450	977	7050	976	7500	974	7800	974
8050	974.8	8300	976	8575	975.6	8800	974.5	9450	974
9800	972.6	10000	973.4	10150	976	10900	976.5	11175	976.7
11675	978	12300	975.4	12875	974.5	13300	975.9	13650	975.9
13950	976.9	14100	976	14300	975.8	14670	976	14930	977
15110	978	15285	978.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3951	.1	3951	.1	8300	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3951	8300	2062	1226	1094	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
8300	15285	980

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	975.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	975.28	Reach Len. (ft)	2062.00	1226.00	1094.00
Crit W.S. (ft)	974.60	Flow Area (sq ft)		1506.05	
E.G. Slope (ft/ft)	0.006689	Area (sq ft)		1506.05	2261.91
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	4228.87	Top Width (ft)		2029.84	2199.03
Vel Total (ft/s)	1.00	Avg. Vel. (ft/s)		1.00	
Max Chl Dpth (ft)	2.68	Hydr. Depth (ft)		0.74	
Conv. Total (cfs)	18340.8	Conv. (cfs)		18340.8	
Length Wtd. (ft)	1226.00	Wetted Per. (ft)		2029.86	
Min Ch El (ft)	974.00	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		0.31	
Frctn Loss (ft)	7.99	Cum Volume (acre-ft)		490.46	420.13
C & E Loss (ft)	0.00	Cum SA (acres)		702.34	342.34

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	975.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	975.75	Reach Len. (ft)	2062.00	1226.00	1094.00
Crit W.S. (ft)	974.90	Flow Area (sq ft)		2612.87	
E.G. Slope (ft/ft)	0.008099	Area (sq ft)		2612.87	3421.56
Q Total (cfs)	3500.00	Flow (cfs)		3500.00	

Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	967.29	Reach Len. (ft)	1397.00	1236.00	1243.00
Crit W.S. (ft)	966.59	Flow Area (sq ft)		1585.88	
E.G. Slope (ft/ft)	0.006348	Area (sq ft)		1585.88	1167.28
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	3821.47	Top Width (ft)		2220.91	1600.56
Vel Total (ft/s)	0.95	Avg. Vel. (ft/s)		0.95	
Max Chl Dpth (ft)	1.49	Hydr. Depth (ft)		0.71	
Conv. Total (cfs)	18826.0	Conv. (cfs)		18826.0	
Length Wtd. (ft)	1236.00	Wetted Per. (ft)		2220.92	
Min Ch El (ft)	965.80	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		0.27	
Frctn Loss (ft)	8.48	Cum Volume (acre-ft)		446.95	377.07
C & E Loss (ft)	0.00	Cum SA (acres)		642.52	294.63

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	967.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	967.91	Reach Len. (ft)	1397.00	1236.00	1243.00
Crit W.S. (ft)	966.89	Flow Area (sq ft)		3295.43	
E.G. Slope (ft/ft)	0.005194	Area (sq ft)		3295.43	2375.98
Q Total (cfs)	3500.00	Flow (cfs)		3500.00	
Top Width (ft)	5798.51	Top Width (ft)		3336.76	2461.75
Vel Total (ft/s)	1.06	Avg. Vel. (ft/s)		1.06	
Max Chl Dpth (ft)	2.11	Hydr. Depth (ft)		0.99	
Conv. Total (cfs)	48562.1	Conv. (cfs)		48562.1	
Length Wtd. (ft)	1236.00	Wetted Per. (ft)		3336.78	
Min Ch El (ft)	965.80	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)		0.34	
Frctn Loss (ft)	8.78	Cum Volume (acre-ft)		994.83	591.86
C & E Loss (ft)	0.00	Cum SA (acres)		840.19	356.91

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	968.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	968.19	Reach Len. (ft)	1397.00	1236.00	1243.00
Crit W.S. (ft)	967.05	Flow Area (sq ft)		4306.32	
E.G. Slope (ft/ft)	0.004773	Area (sq ft)		4306.32	3213.09
Q Total (cfs)	5000.00	Flow (cfs)		5000.00	
Top Width (ft)	7050.04	Top Width (ft)		3579.73	3470.31
Vel Total (ft/s)	1.16	Avg. Vel. (ft/s)		1.16	
Max Chl Dpth (ft)	2.39	Hydr. Depth (ft)		1.20	
Conv. Total (cfs)	72375.0	Conv. (cfs)		72375.0	
Length Wtd. (ft)	1236.00	Wetted Per. (ft)		3579.94	
Min Ch El (ft)	965.80	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)		0.42	
Frctn Loss (ft)	8.91	Cum Volume (acre-ft)		1455.07	662.73
C & E Loss (ft)	0.00	Cum SA (acres)		1021.26	405.27

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	959.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.100	
W.S. Elev (ft)	959.26	Reach Len. (ft)	3336.00	2610.00	1958.00
Crit W.S. (ft)	958.65	Flow Area (sq ft)		3303.74	
E.G. Slope (ft/ft)	0.011734	Area (sq ft)		3303.74	2236.14
Q Total (cfs)	5000.00	Flow (cfs)		5000.00	
Top Width (ft)	5416.17	Top Width (ft)		3623.45	1792.71
Vel Total (ft/s)	1.51	Avg. Vel. (ft/s)		1.51	
Max Chl Dpth (ft)	2.76	Hydr. Depth (ft)		0.91	
Conv. Total (cfs)	46158.8	Conv. (cfs)		46158.8	
Length Wtd. (ft)	2610.00	Wetted Per. (ft)		3623.48	
Min Ch El (ft)	956.50	Shear (lb/sq ft)		0.67	
Alpha	1.00	Stream Power (lb/ft s)		1.01	
Frctn Loss (ft)	17.54	Cum Volume (acre-ft)		1347.10	584.98
C & E Loss (ft)	0.00	Cum SA (acres)		919.07	330.18

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: East Spillway
REACH: B4 RS: 17.37

INPUT
Description: 1/3 Q=1500 cfs
2/3 Q=3500 cfs
Full Q=6400 cfs
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1570	944	2020	940	2270	940	2445	939.8	2695	940
3020	941.6	3520	940	4120	939.1	4700	939.6	4800	941
5550	941.7	6000	941.3	6200	941.3	6460	942	6590	942.9
6740	944	6950	945.1	7040	946.2	7340	943.9	7865	945.7
8890	945.3	9365	947	9465	948.2	9645	948	9825	947
10000	948.3	10050	948	10375	948.9	10875	949.2	11175	950
11250	949.8	11350	949.5	11760	948.4	12150	948	12375	947.6
12525	946	12600	945.9	12675	948	12725	949.5	12875	949.6
13180	949.5	13405	950.2	13480	950	14230	949.26	14640	950
14750	951	14850	952	14950	952.3	15140	952		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1570	.1	1570	.1	7040	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1570	7040	2148	2200	2330	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
7040	15140	955.8

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	940.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	940.42	Reach Len. (ft)	2148.00	2200.00	2330.00
Crit W.S. (ft)	939.79	Flow Area (sq ft)		1546.54	
E.G. Slope (ft/ft)	0.006721	Area (sq ft)		1546.54	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	2176.91	Top Width (ft)		2176.91	
Vel Total (ft/s)	0.97	Avg. Vel. (ft/s)		0.97	

```
Station Elevation Data     num=      40
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    2760     930    3060   928.3    3710     928    4310   927.6    4670   927.5
    4770     928    4970   927.6    5170     928    5520     929    6320     930
    6690   931.4    7020   931.5    7360     930    7485     931    7915     932
    8345   931.3    8655     930    9055   933.4    9555     932    9675   931.7
    9800     932    9900     934   10000     935   10050     934   10300     934
   10600   935.4   10815     936   11025   936.5   11170     938   11400   936.8
   11650     936   11750     934   12140   933.2   12375     934   12670   935.6
   13100   935.5   13750     936   13950     937   14000     938   14560     939

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    2760      .1    2760      .1    7915      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          2760    7915             1226    1323    1677             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
    7915   14560     939

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)            928.70   Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.01   Wt. n-Val.                           0.100
  W.S. Elev (ft)            928.69   Reach Len. (ft)          1226.00   1323.00    1677.00
  Crit W.S. (ft)            928.06   Flow Area (sq ft)                  1838.77
  E.G. Slope (ft/ft)       0.004346  Area (sq ft)                       1838.77
  Q Total (cfs)            1500.00   Flow (cfs)                         1500.00
  Top Width (ft)           2419.59   Top Width (ft)                     2419.59
  Vel Total (ft/s)            0.82   Avg. Vel. (ft/s)                      0.82
  Max Chl Dpth (ft)           1.19   Hydr. Depth (ft)                      0.76
  Conv. Total (cfs)        22753.3   Conv. (cfs)                        22753.3
  Length Wtd. (ft)         1323.00   Wetted Per. (ft)                   2419.59
  Min Ch El (ft)            927.50   Shear (lb/sq ft)                      0.21
  Alpha                       1.00   Stream Power (lb/ft s)                0.17
  Frctn Loss (ft)             7.70   Cum Volume (acre-ft)               215.72     305.48
  C & E Loss (ft)             0.00   Cum SA (acres)                     290.11     217.29

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.

CROSS SECTION OUTPUT    Profile #2/3

  E.G. Elev (ft)            929.70   Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03   Wt. n-Val.                           0.100
  W.S. Elev (ft)            929.67   Reach Len. (ft)          1226.00   1323.00    1677.00
  Crit W.S. (ft)            928.50   Flow Area (sq ft)                  4563.88
  E.G. Slope (ft/ft)       0.005286  Area (sq ft)                       4563.88
  Q Total (cfs)            6200.00   Flow (cfs)                         6200.00
  Top Width (ft)           3236.56   Top Width (ft)                     3236.56
  Vel Total (ft/s)            1.36   Avg. Vel. (ft/s)                      1.36
  Max Chl Dpth (ft)           2.17   Hydr. Depth (ft)                      1.41
  Conv. Total (cfs)        85276.6   Conv. (cfs)                        85276.6
  Length Wtd. (ft)         1323.00   Wetted Per. (ft)                   3236.56
  Min Ch El (ft)            927.50   Shear (lb/sq ft)                      0.47
  Alpha                       1.00   Stream Power (lb/ft s)                0.63
  Frctn Loss (ft)             7.72   Cum Volume (acre-ft)               543.33     485.46
  C & E Loss (ft)             0.00   Cum SA (acres)                     408.57     259.71

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.

CROSS SECTION OUTPUT    Profile #Full

  E.G. Elev (ft)            930.36   Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04   Wt. n-Val.                           0.100
```

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	921.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	921.95	Reach Len. (ft)	1486.00	1310.00	1186.00
Crit W.S. (ft)	920.93	Flow Area (sq ft)		4358.88	
E.G. Slope (ft/ft)	0.006507	Area (sq ft)		4358.88	
Q Total (cfs)	6200.00	Flow (cfs)		6200.00	
Top Width (ft)	3371.85	Top Width (ft)		3371.85	
Vel Total (ft/s)	1.42	Avg. Vel. (ft/s)		1.42	
Max Chl Dpth (ft)	1.95	Hydr. Depth (ft)		1.29	
Conv. Total (cfs)	76861.4	Conv. (cfs)		76861.4	
Length Wtd. (ft)	1310.00	Wetted Per. (ft)		3371.85	
Min Ch El (ft)	920.00	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)		0.75	
Frctn Loss (ft)	9.29	Cum Volume (acre-ft)		407.83	485.46
C & E Loss (ft)	0.00	Cum SA (acres)		308.21	259.71

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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	922.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.100	
W.S. Elev (ft)	922.57	Reach Len. (ft)	1486.00	1310.00	1186.00
Crit W.S. (ft)	921.23	Flow Area (sq ft)		6709.39	
E.G. Slope (ft/ft)	0.006289	Area (sq ft)		6709.39	
Q Total (cfs)	11200.00	Flow (cfs)		11200.00	
Top Width (ft)	3979.19	Top Width (ft)		3979.19	
Vel Total (ft/s)	1.67	Avg. Vel. (ft/s)		1.67	
Max Chl Dpth (ft)	2.57	Hydr. Depth (ft)		1.69	
Conv. Total (cfs)	141233.0	Conv. (cfs)		141233.0	
Length Wtd. (ft)	1310.00	Wetted Per. (ft)		3979.20	
Min Ch El (ft)	920.00	Shear (lb/sq ft)		0.66	
Alpha	1.00	Stream Power (lb/ft s)		1.11	
Frctn Loss (ft)	9.26	Cum Volume (acre-ft)		565.99	533.92
C & E Loss (ft)	0.00	Cum SA (acres)		347.87	284.74

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.

CROSS SECTION RIVER: East Spillway
REACH: B4 RS: 16.55

INPUT
Description: 1/3 Q=1500 cfs
2/3 Q=6200 cfs
Full Q=11200 cfs
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2495	916	2875	914.3	3135	914	3410	913.4	3740	912
4040	910.7	4270	910	4490	910	4565	911.4	4715	910
4995	910.8	5555	912	5695	912.3	5855	912	5955	911.5
6035	912	6085	912	6285	912	6385	913	6510	912.8
6785	914	7060	914.6	7360	914.4	7740	916	8140	917
8660	920	9060	918	9730	916	10000	919.6	10327	918.9
10613	920.9	10820	921.7	11158	922.3	11354	921.8	11520	921.4
11862	921.6	12106	921.3	12372	921.9	12645	923.4	13034	925.2
13430	925.9	13935	925.8	14341	925.8	14731	925.5	15130	925.9
15744	926.9	16366	927.3	16764	928.9	17465	929.7	17891	931.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2495	.1	2495	.1	8660	.1

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.

CROSS SECTION RIVER: East Spillway
REACH: B4 RS: 16.37

INPUT
Description: 1/3 Q=1500 cfs
2/3 Q=6200 cfs
Full Q=11200 cfs
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2901	909.4	3340	908	3897	906.5	4355	906	4556	906
5370	904.9	6058	905	6387	905.3	6750	906	7041	907.2
7364	906.8	7635	907.2	8034	908	8326	908	8576	908
9091	907.4	9511	907.7	10000	910	10273	912	11008	913.1
11472	913.6	11807	914	12239	914.6	12682	914.3	12913	914.5
13651	913	13869	910	14317	909.8	14576	910	14993	911.5
15307	910.6	15560	910	15945	910.6	16333	912		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2901	.1	2901	.1	8326	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2901	8326	758	1161	1792	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
8326	16333	916

CROSS SECTION OUTPUT Profile #1/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	906.04	Element			
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	906.03	Reach Len. (ft)	758.00	1161.00	1792.00
Crit W.S. (ft)	905.38	Flow Area (sq ft)		1640.49	
E.G. Slope (ft/ft)	0.006378	Area (sq ft)		1640.49	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	2425.62	Top Width (ft)		2425.62	
Vel Total (ft/s)	0.91	Avg. Vel. (ft/s)		0.91	
Max Chl Dpth (ft)	1.13	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	18781.7	Conv. (cfs)		18781.7	
Length Wtd. (ft)	1161.00	Wetted Per. (ft)		2425.62	
Min Ch El (ft)	904.90	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)		0.25	
Frctn Loss (ft)	3.88	Cum Volume (acre-ft)		91.77	305.48
C & E Loss (ft)	0.00	Cum SA (acres)		118.62	217.29

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.

CROSS SECTION OUTPUT Profile #2/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	907.09	Element			
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	907.06	Reach Len. (ft)	758.00	1161.00	1792.00
Crit W.S. (ft)	905.89	Flow Area (sq ft)		4726.59	
E.G. Slope (ft/ft)	0.005625	Area (sq ft)		4726.59	
Q Total (cfs)	6200.00	Flow (cfs)		6200.00	
Top Width (ft)	3701.52	Top Width (ft)		3701.52	
Vel Total (ft/s)	1.31	Avg. Vel. (ft/s)		1.31	
Max Chl Dpth (ft)	2.16	Hydr. Depth (ft)		1.28	
Conv. Total (cfs)	82664.9	Conv. (cfs)		82664.9	
Length Wtd. (ft)	1161.00	Wetted Per. (ft)		3701.53	
Min Ch El (ft)	904.90	Shear (lb/sq ft)		0.45	

Max Chl Dpth (ft)	2.75	Hydr. Depth (ft)	0.90	
Conv. Total (cfs)	33159.5	Conv. (cfs)	33159.5	
Length Wtd. (ft)	1170.00	Wetted Per. (ft)	2682.37	
Min Ch El (ft)	900.60	Shear (lb/sq ft)	0.11	
Alpha	1.00	Stream Power (lb/ft s)	0.07	
Frctn Loss (ft)	6.25	Cum Volume (acre-ft)	37.90	179.97
C & E Loss (ft)	0.02	Cum SA (acres)	50.55	135.47

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.

CROSS SECTION OUTPUT Profile #2/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	902.98	Element			
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	902.96	Reach Len. (ft)	1187.00	1170.00	2358.00
Crit W.S. (ft)	901.60	Flow Area (sq ft)		4610.40	
E.G. Slope (ft/ft)	0.002138	Area (sq ft)		4610.40	9407.50
Q Total (cfs)	4500.00	Flow (cfs)		4500.00	
Top Width (ft)	6837.28	Top Width (ft)		2723.22	4114.06
Vel Total (ft/s)	0.98	Avg. Vel. (ft/s)		0.98	
Max Chl Dpth (ft)	3.56	Hydr. Depth (ft)		1.69	
Conv. Total (cfs)	97312.8	Conv. (cfs)		97312.8	
Length Wtd. (ft)	1170.00	Wetted Per. (ft)		2723.23	
Min Ch El (ft)	900.60	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)		0.22	
Frctn Loss (ft)	6.55	Cum Volume (acre-ft)		76.92	291.96
C & E Loss (ft)	0.02	Cum SA (acres)		67.12	175.09

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.

CROSS SECTION OUTPUT Profile #Full

			Left OB	Channel	Right OB
E.G. Elev (ft)	903.19	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	903.17	Reach Len. (ft)	1187.00	1170.00	2358.00
Crit W.S. (ft)	901.69	Flow Area (sq ft)		5166.59	
E.G. Slope (ft/ft)	0.002196	Area (sq ft)		5166.59	10249.76
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	6882.85	Top Width (ft)		2733.41	4149.44
Vel Total (ft/s)	1.06	Avg. Vel. (ft/s)		1.06	
Max Chl Dpth (ft)	3.77	Hydr. Depth (ft)		1.89	
Conv. Total (cfs)	117362.7	Conv. (cfs)		117362.7	
Length Wtd. (ft)	1170.00	Wetted Per. (ft)		2733.43	
Min Ch El (ft)	900.60	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)		0.28	
Frctn Loss (ft)	6.65	Cum Volume (acre-ft)		87.24	320.56
C & E Loss (ft)	0.02	Cum SA (acres)		70.81	180.30

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.

CROSS SECTION RIVER: East Spillway
REACH: B4 RS: 16.01

INPUT
Description: 1/3 Q=1500 cfs
2/3 Q=4500 cfs
Full Q=5500 cfs

Crit W.S. (ft)	896.25	Flow Area (sq ft)	1329.46	
E.G. Slope (ft/ft)	0.037193	Area (sq ft)	1329.46	1593.77
Q Total (cfs)	5500.00	Flow (cfs)	5500.00	
Top Width (ft)	5051.16	Top Width (ft)	2539.01	2512.15
Vel Total (ft/s)	4.14	Avg. Vel. (ft/s)	4.14	
Max Chl Dpth (ft)	1.25	Hydr. Depth (ft)	0.52	
Conv. Total (cfs)	28518.9	Conv. (cfs)	28518.9	
Length Wtd. (ft)		Wetted Per. (ft)	2539.01	
Min Ch El (ft)	895.10	Shear (lb/sq ft)	1.22	
Alpha	1.00	Stream Power (lb/ft s)	5.03	
Frctn Loss (ft)		Cum Volume (acre-ft)		
C & E Loss (ft)		Cum SA (acres)		

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:East Spillway

Reach	River Sta.	n1	n2	n3
B4	18.85	.045	.045	.045
B4	18.60	.1	.1	.1
B4	18.39	.1	.1	.1
B4	18.14	.1	.1	.1
B4	17.94	.1	.1	.1
B4	17.69	.1	.1	.1
B4	17.37	.1	.1	.1
B4	17.00	.1	.1	.1
B4	16.77	.1	.1	.1
B4	16.55	.1	.1	.1
B4	16.37	.1	.1	.1
B4	16.22	.1	.1	.1
B4	16.01	.045	.045	.045

SUMMARY OF REACH LENGTHS

River: East Spillway

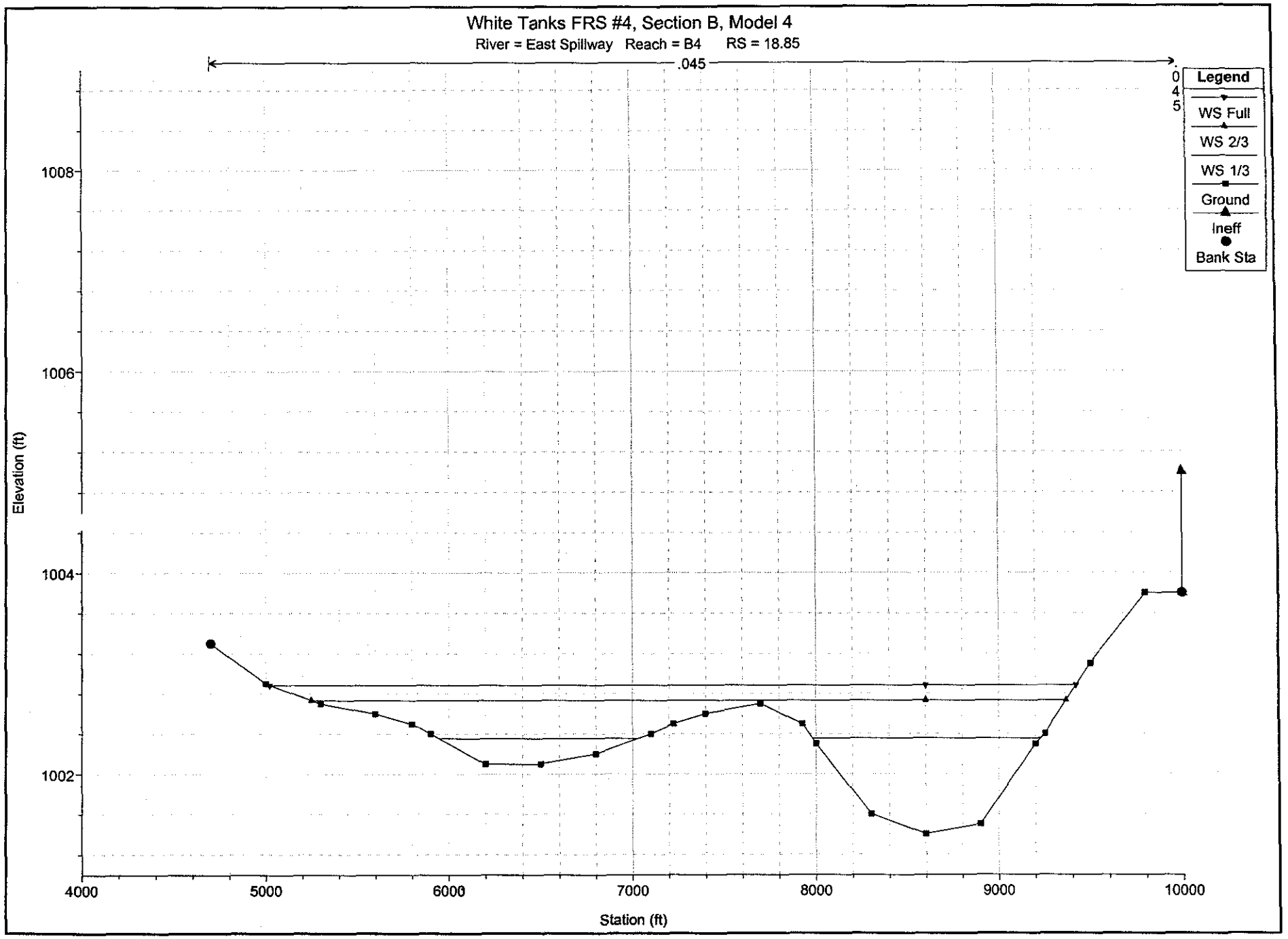
Reach	River Sta.	Left	Channel	Right
B4	18.85	1397	1284	1244
B4	18.60	1171	1097	1079
B4	18.39	1602	1392	1260
B4	18.14	2062	1226	1094
B4	17.94	1397	1236	1243
B4	17.69	3336	2610	1958
B4	17.37	2148	2200	2330
B4	17.00	1226	1323	1677
B4	16.77	1486	1310	1186
B4	16.55	683	852	988
B4	16.37	758	1161	1792
B4	16.22	1187	1170	2358
B4	16.01	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: East Spillway

Reach	River Sta.	Contr.	Expan.

HEC-RAS Plan: WT4B4 River: East Spillway Reach: B4

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
B4	16.01	1500.00	895.10	895.68	895.68	895.88	0.041299	3.57	419.99	2108.86	1.01
B4	16.01	4500.00	895.10	896.16	896.16	896.41	0.038381	4.03	1117.34	4629.55	1.01
B4	16.01	5500.00	895.10	896.25	896.25	896.51	0.037193	4.14	1329.46	5051.16	1.01
B4	16.22	1500.00	900.60	902.15	901.25	902.15	0.002046	0.62	2402.01	6660.24	0.12
B4	16.22	4500.00	900.60	902.96	901.60	902.98	0.002138	0.98	4610.40	6837.28	0.13
B4	16.22	5500.00	900.60	903.17	901.69	903.19	0.002196	1.06	5166.59	6882.85	0.14
B4	16.37	1500.00	904.90	906.03	905.38	906.04	0.006378	0.91	1640.49	2425.62	0.20
B4	16.37	6200.00	904.90	907.06	905.89	907.09	0.005625	1.31	4726.59	3701.52	0.20
B4	16.37	11200.00	904.90	907.66	906.23	907.70	0.005627	1.55	7223.00	5000.69	0.21
B4	16.55	1500.00	910.00	911.55	910.73	911.57	0.006596	1.11	1347.34	1520.56	0.21
B4	16.55	6200.00	910.00	912.65	911.44	912.69	0.007772	1.62	3816.41	2763.24	0.24
B4	16.55	11200.00	910.00	913.29	911.89	913.35	0.007929	1.96	5726.73	3186.55	0.26
B4	16.77	1500.00	920.00	920.98	920.50	921.00	0.007873	0.97	1539.97	2425.11	0.22
B4	16.77	6200.00	920.00	921.95	920.93	921.98	0.006507	1.42	4358.88	3371.85	0.22
B4	16.77	11200.00	920.00	922.57	921.23	922.61	0.006289	1.67	6709.39	3979.19	0.23
B4	17.00	1500.00	927.50	928.69	928.06	928.70	0.004346	0.82	1838.77	2419.59	0.16
B4	17.00	6200.00	927.50	929.67	928.50	929.70	0.005286	1.36	4563.88	3236.56	0.20
B4	17.00	11200.00	927.50	930.31	928.80	930.36	0.005461	1.64	6838.28	3865.37	0.21
B4	17.37	1500.00	939.10	940.42	939.79	940.43	0.006721	0.97	1546.54	2176.91	0.20
B4	17.37	3500.00	939.10	941.04	940.10	941.06	0.005035	1.15	3034.19	2651.70	0.19
B4	17.37	6400.00	939.10	941.73	940.34	941.75	0.004740	1.16	5500.98	4535.93	0.19
B4	17.69	1500.00	956.50	958.81	958.28	958.82	0.007433	0.86	1742.29	4645.85	0.20
B4	17.69	3500.00	956.50	959.11	958.52	959.14	0.010100	1.27	2763.12	5226.50	0.25
B4	17.69	5000.00	956.50	959.26	958.65	959.30	0.011734	1.51	3303.74	5416.17	0.28
B4	17.94	1500.00	965.80	967.29	966.59	967.30	0.006348	0.95	1585.88	3821.47	0.20
B4	17.94	3500.00	965.80	967.91	966.89	967.92	0.005194	1.06	3295.43	5798.51	0.19
B4	17.94	5000.00	965.80	968.19	967.05	968.22	0.004773	1.16	4306.32	7050.04	0.19
B4	18.14	1500.00	974.00	975.28	974.60	975.29	0.006689	1.00	1506.05	4228.87	0.20
B4	18.14	3500.00	974.00	975.75	974.90	975.78	0.008099	1.34	2612.87	5309.67	0.24
B4	18.14	5000.00	974.00	975.99	975.06	976.02	0.008913	1.54	3257.22	6737.42	0.25
B4	18.39	1500.00	983.10	984.63	984.17	984.64	0.006775	0.77	1940.01	9975.62	0.19
B4	18.39	3500.00	983.10	985.06	984.37	985.07	0.005568	0.89	3933.90	12753.96	0.18
B4	18.39	5000.00	983.10	985.26	984.47	985.27	0.005120	0.99	5028.99	12921.75	0.18
B4	18.60	1500.00	991.20	992.73	992.18	992.75	0.008332	0.93	1612.78	8923.10	0.22
B4	18.60	3500.00	991.20	993.10	992.46	993.12	0.010130	1.23	2850.80	10672.55	0.25
B4	18.60	5000.00	991.20	993.26	992.58	993.29	0.011245	1.44	3480.21	10847.20	0.27
B4	18.85	1500.00	1001.40	1002.36	1002.01	1002.39	0.006915	1.54	977.10	9876.79	0.42
B4	18.85	3500.00	1001.40	1002.73	1002.34	1002.77	0.005694	1.62	2160.38	11998.42	0.39
B4	18.85	5000.00	1001.40	1002.89	1002.47	1002.93	0.005315	1.78	2804.81	12329.70	0.39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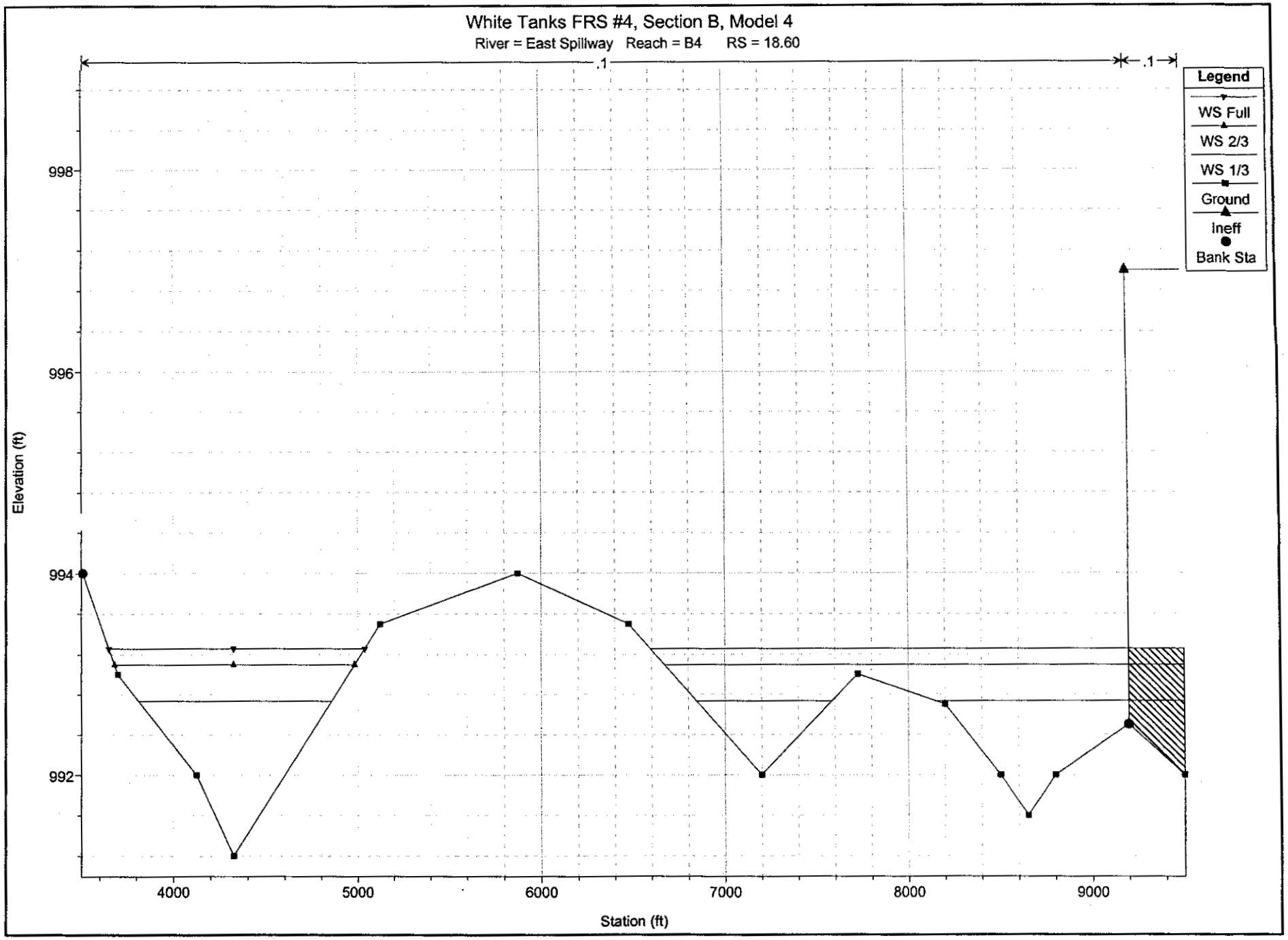
River = East Spillway Reach = B4 RS = 18.85
.045
0
4
5
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
1008
1006
1004
1002
Elevation (ft)
4000
5000
6000
7000
8000
9000
10000
Station (ft)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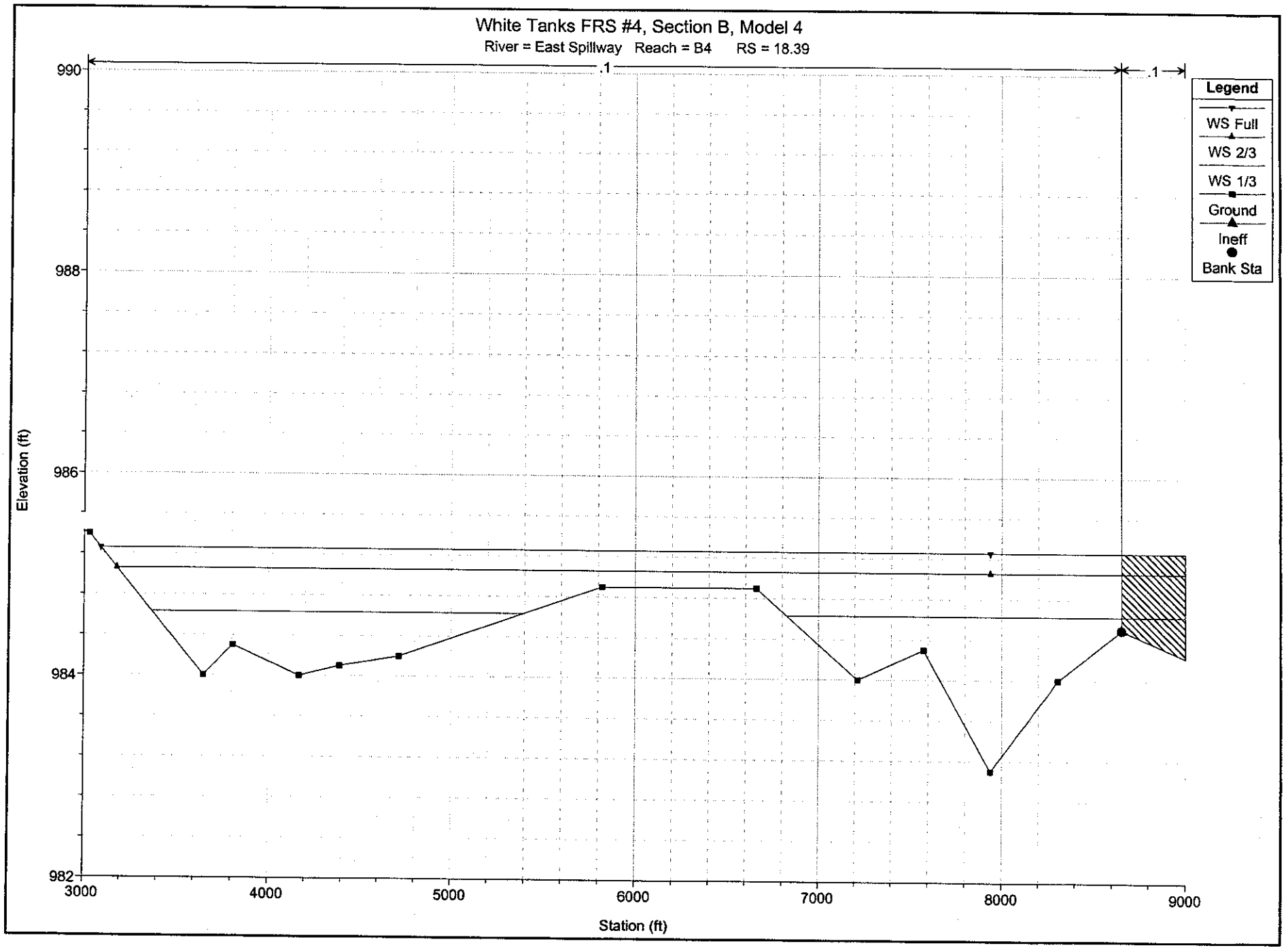
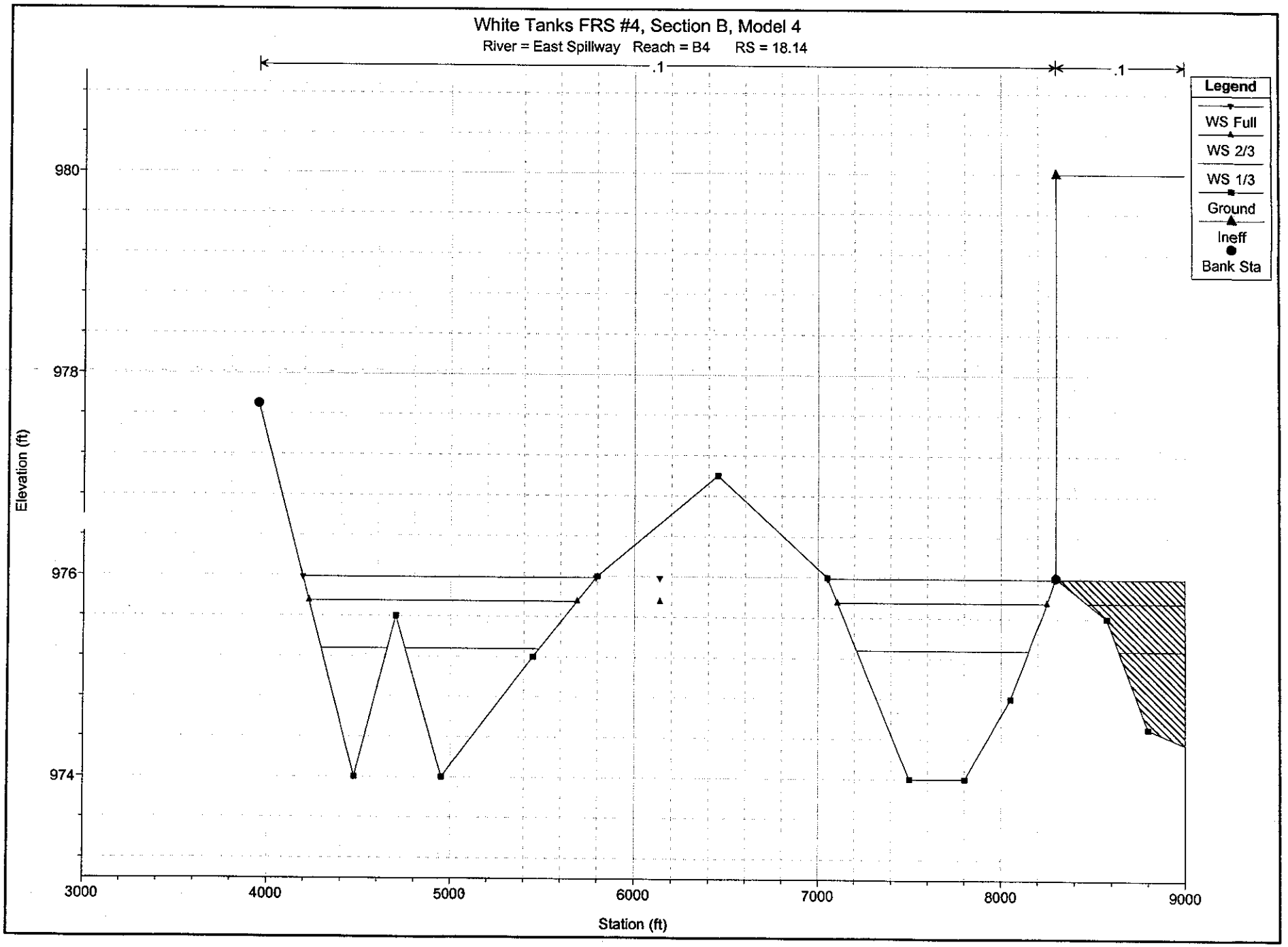
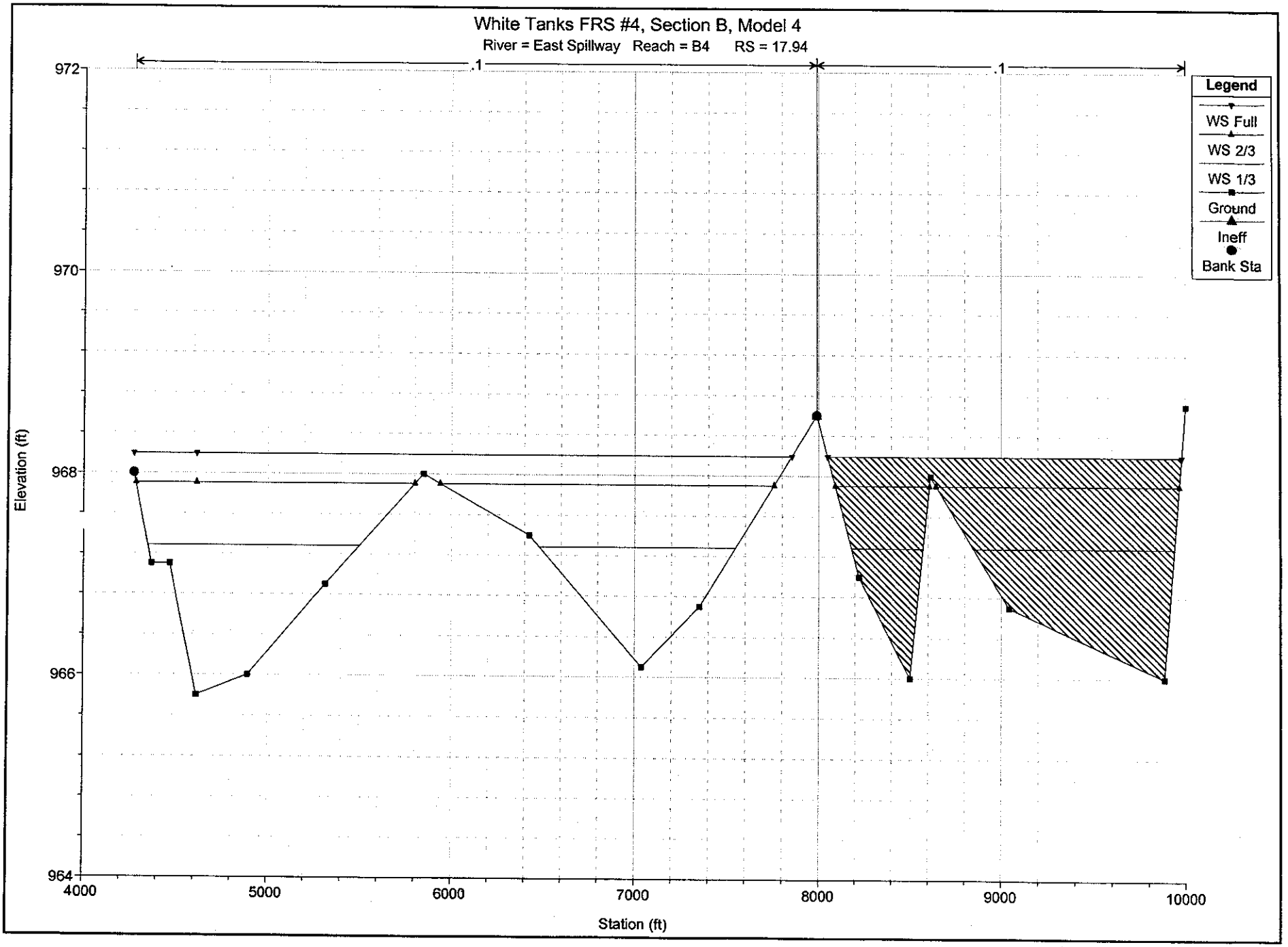
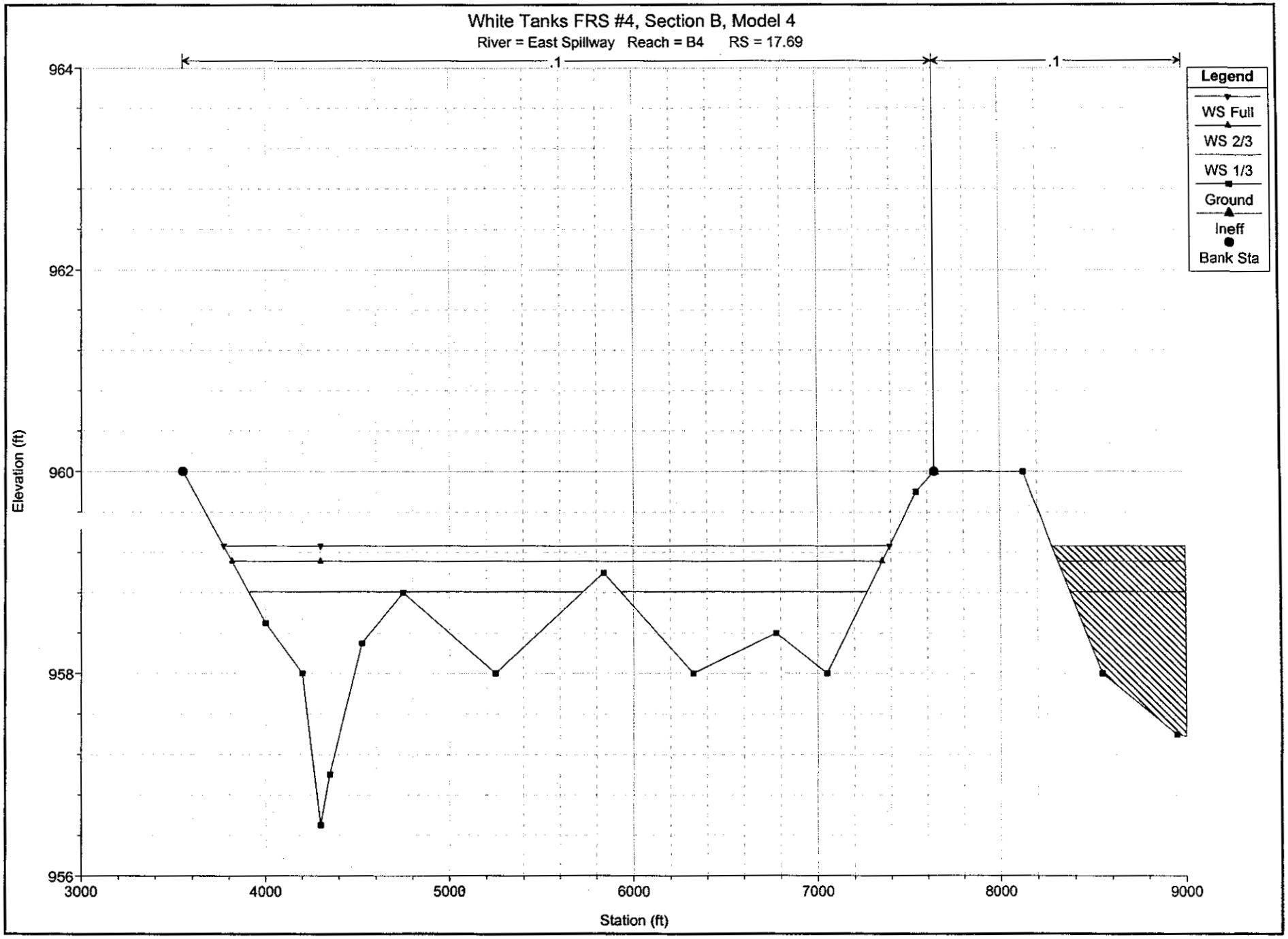
River = East Spillway Reach = B4 RS = 18.60
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
998
996
994
992
Elevation (ft)
4000
5000
6000
7000
8000
9000
Station (ft)


White Tanks FRS #4, Section B, Model 4
River = East Spillway Reach = B4 RS = 18.39
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
990
988
986
984
982
3000
4000
5000
6000
7000
8000
9000
Station (ft)


White Tanks FRS #4, Section B, Model 4
River = East Spillway Reach = B4 RS = 18.14
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
980
978
976
974
3000
4000
5000
6000
7000
8000
9000
Station (ft)


White Tanks FRS #4, Section B, Model 4
River = East Spillway Reach = B4 RS = 17.94
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
972
970
968
966
964
4000
5000
6000
7000
8000
9000
10000
Station (ft)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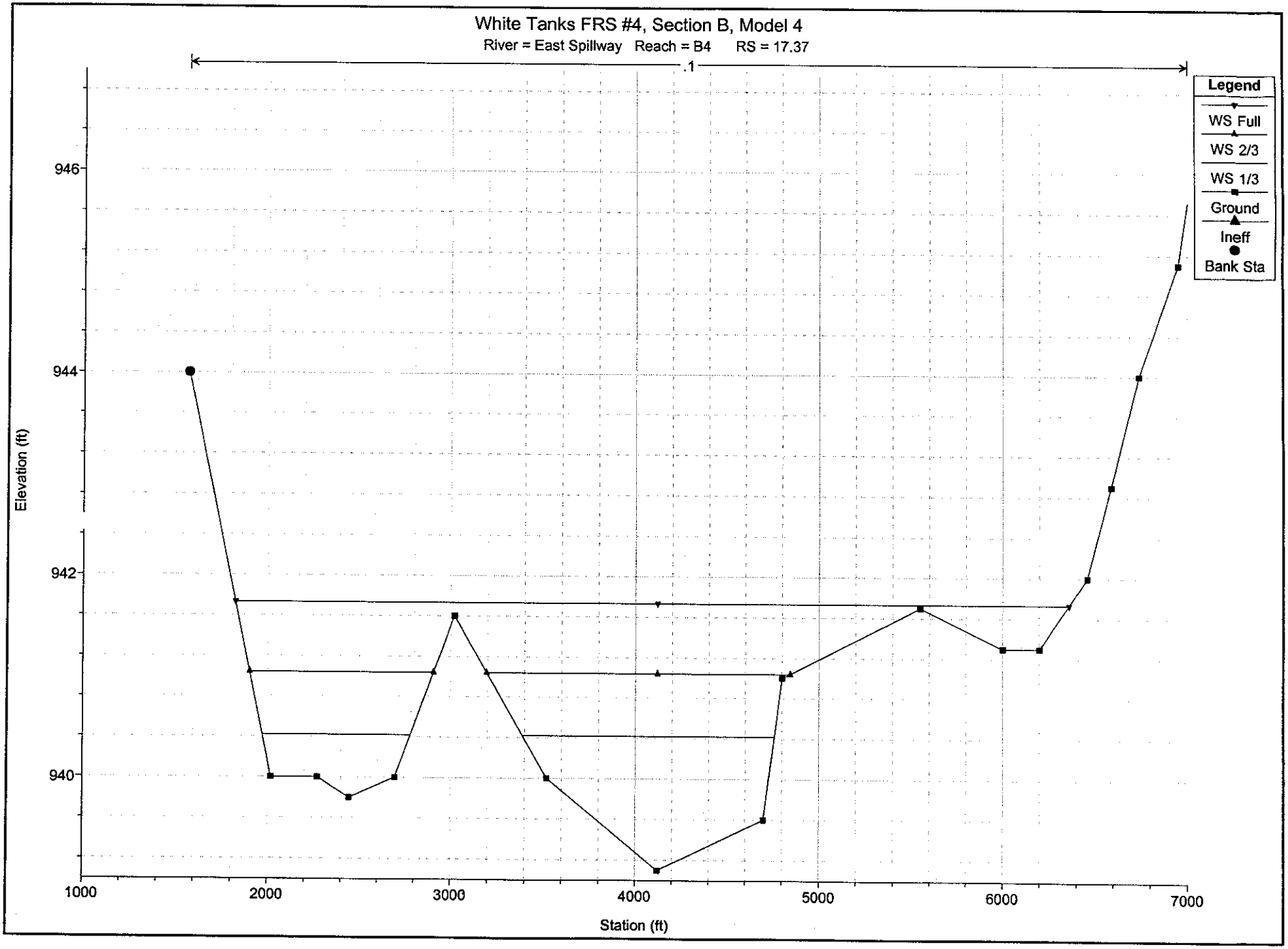
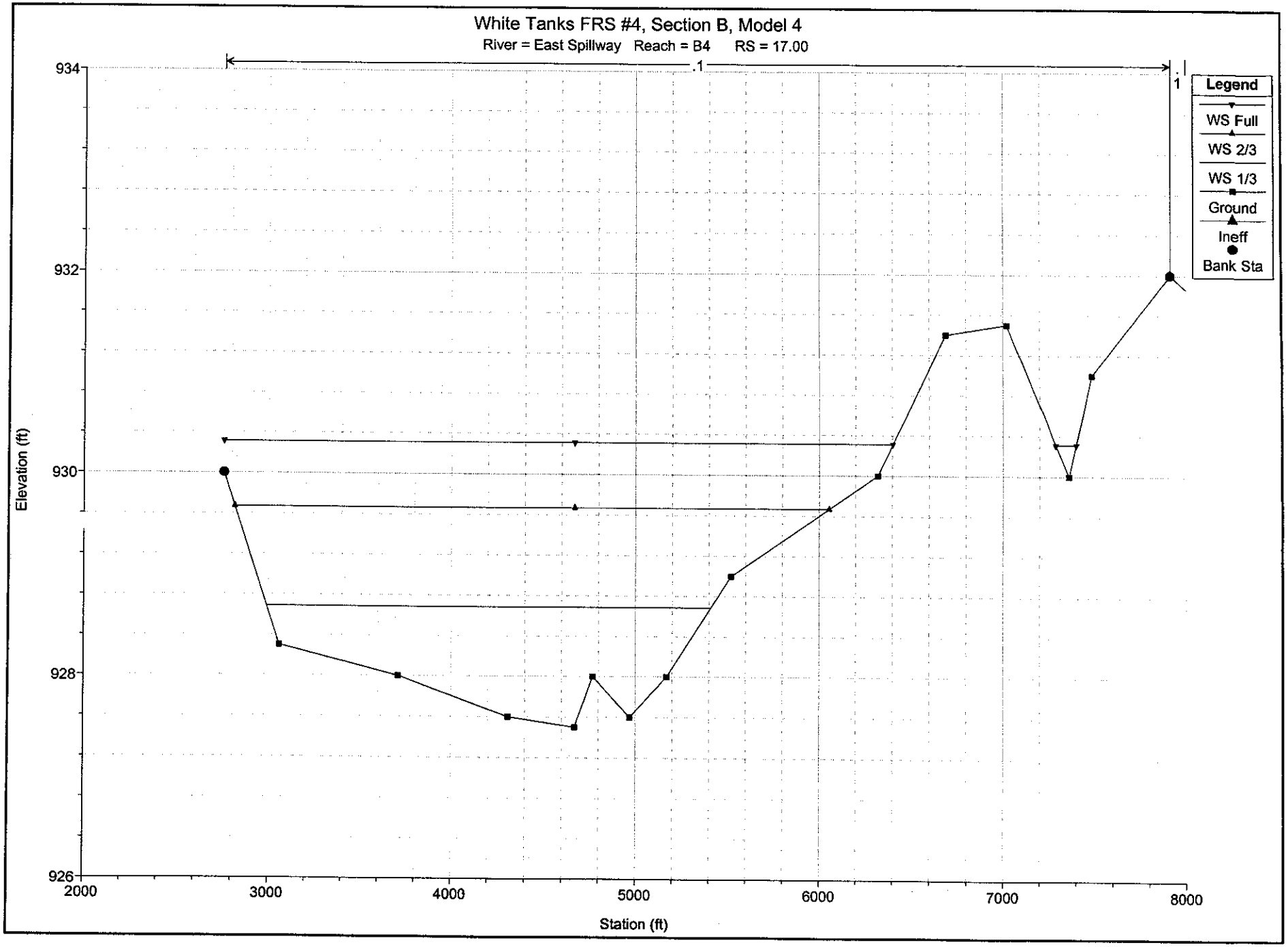
River = East Spillway Reach = B4 RS = 17.69
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
964
962
960
958
956
3000
4000
5000
6000
7000
8000
9000
Station (ft)


White Tanks FRS #4, Section B, Model 4
River = East Spillway Reach = B4 RS = 17.37
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
946
944
942
940
1000
2000
3000
4000
5000
6000
7000
Station (ft)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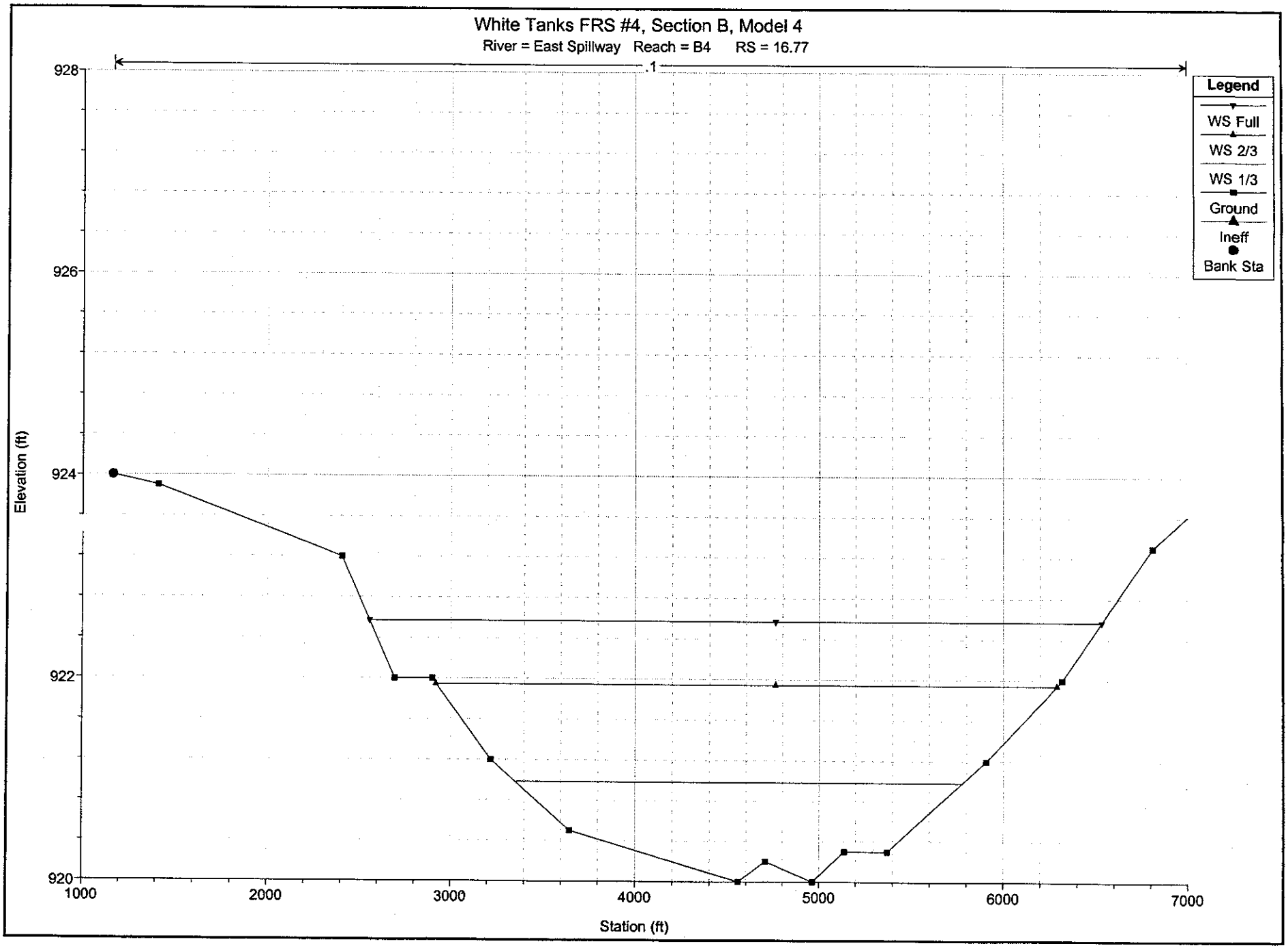
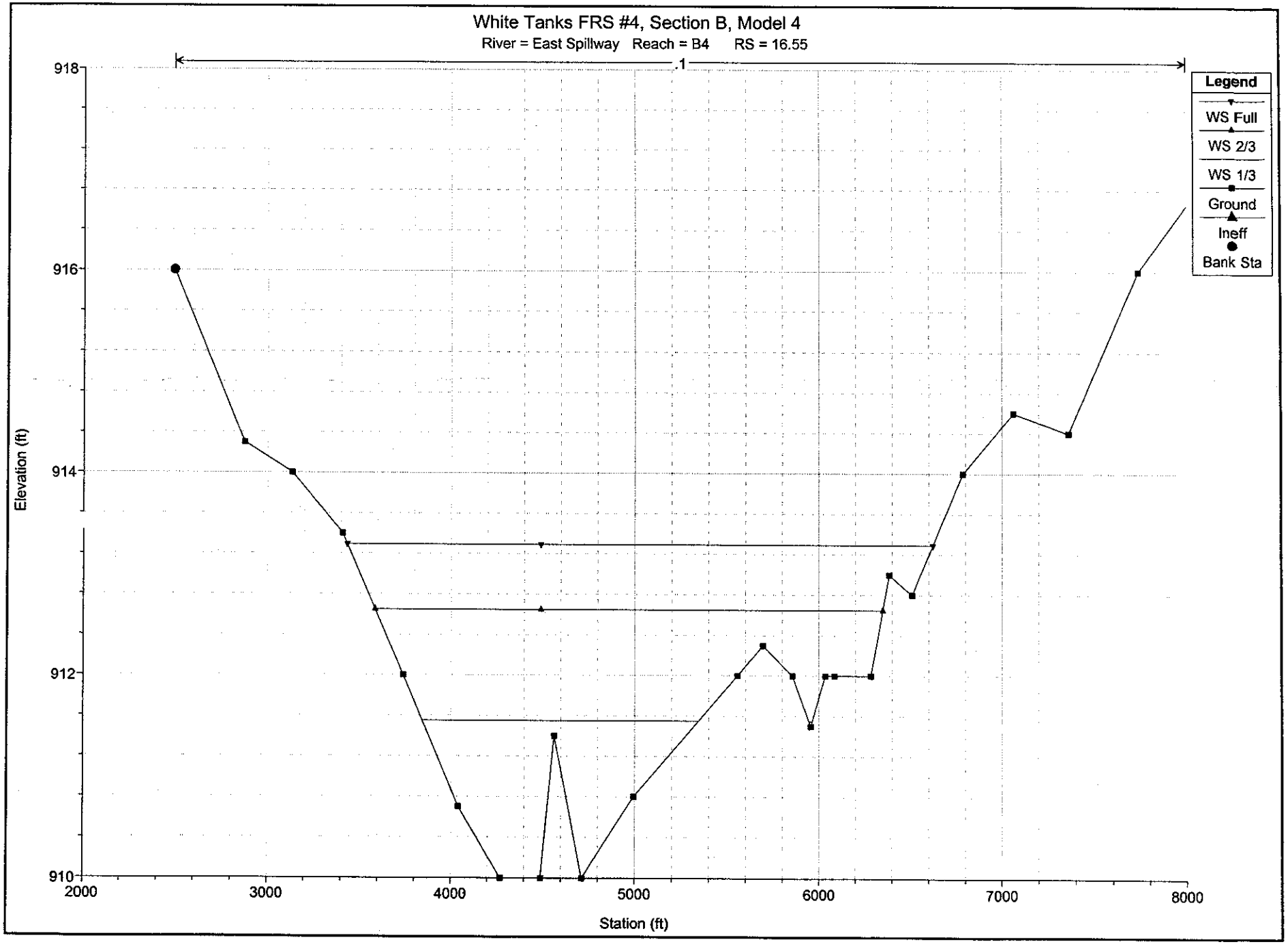
River = East Spillway Reach = B4 RS = 17.00
.1
1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
934
932
930
928
926
2000
3000
4000
5000
6000
7000
8000
Station (ft)


White Tanks FRS #4, Section B, Model 4
River = East Spillway Reach = B4 RS = 16.77
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
928
926
924
922
920
1000
2000
3000
4000
5000
6000
7000
Station (ft)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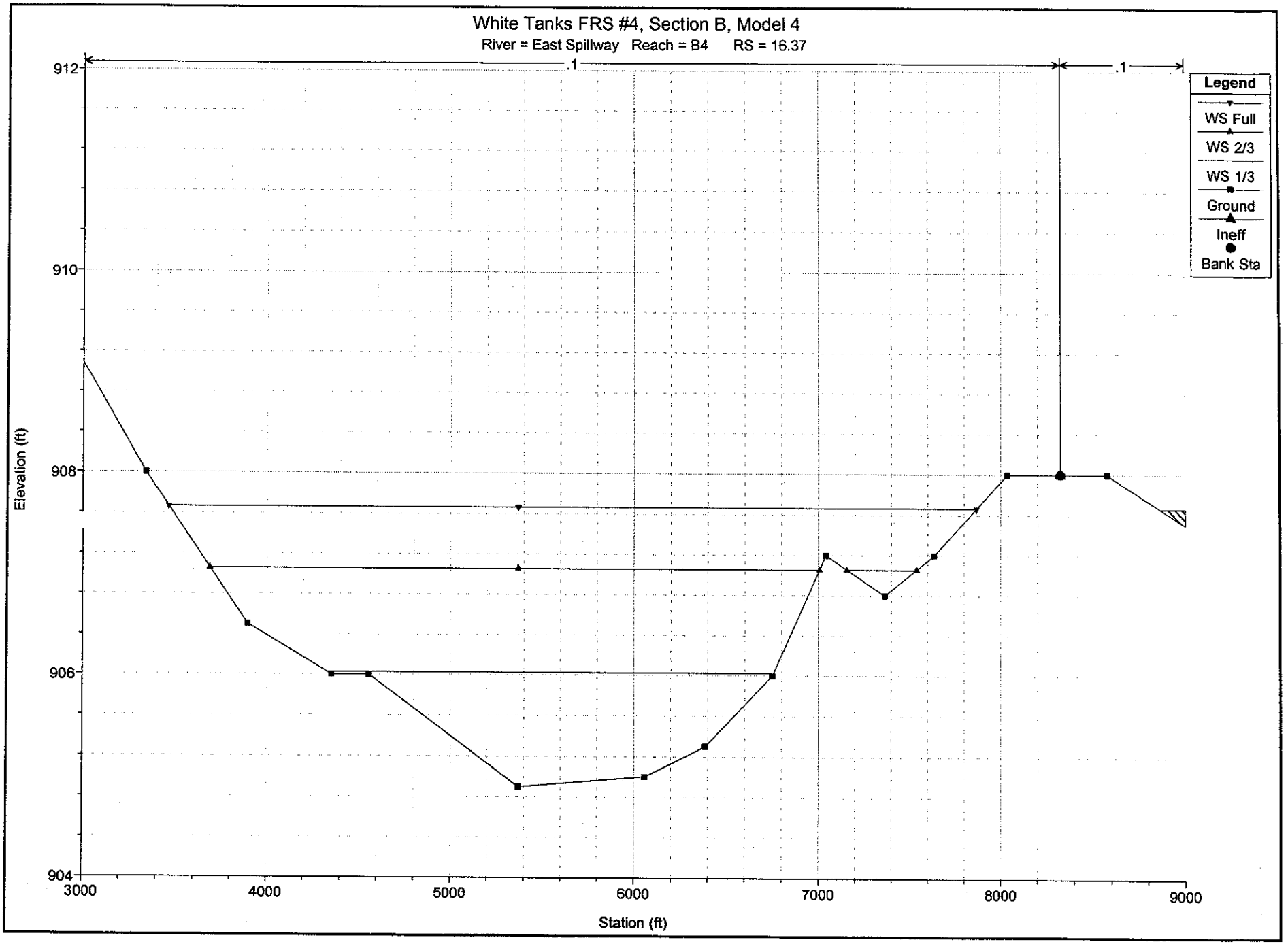
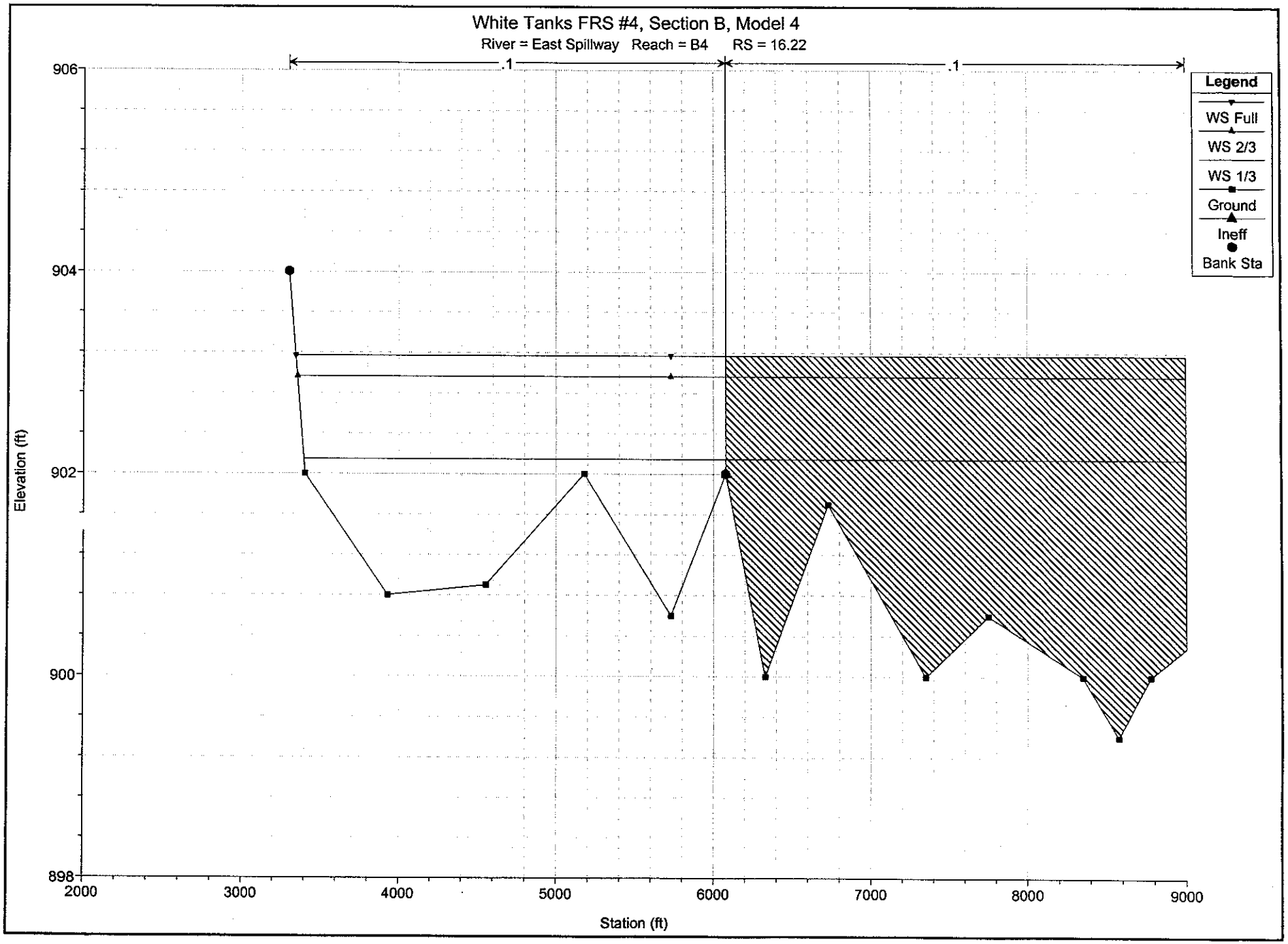
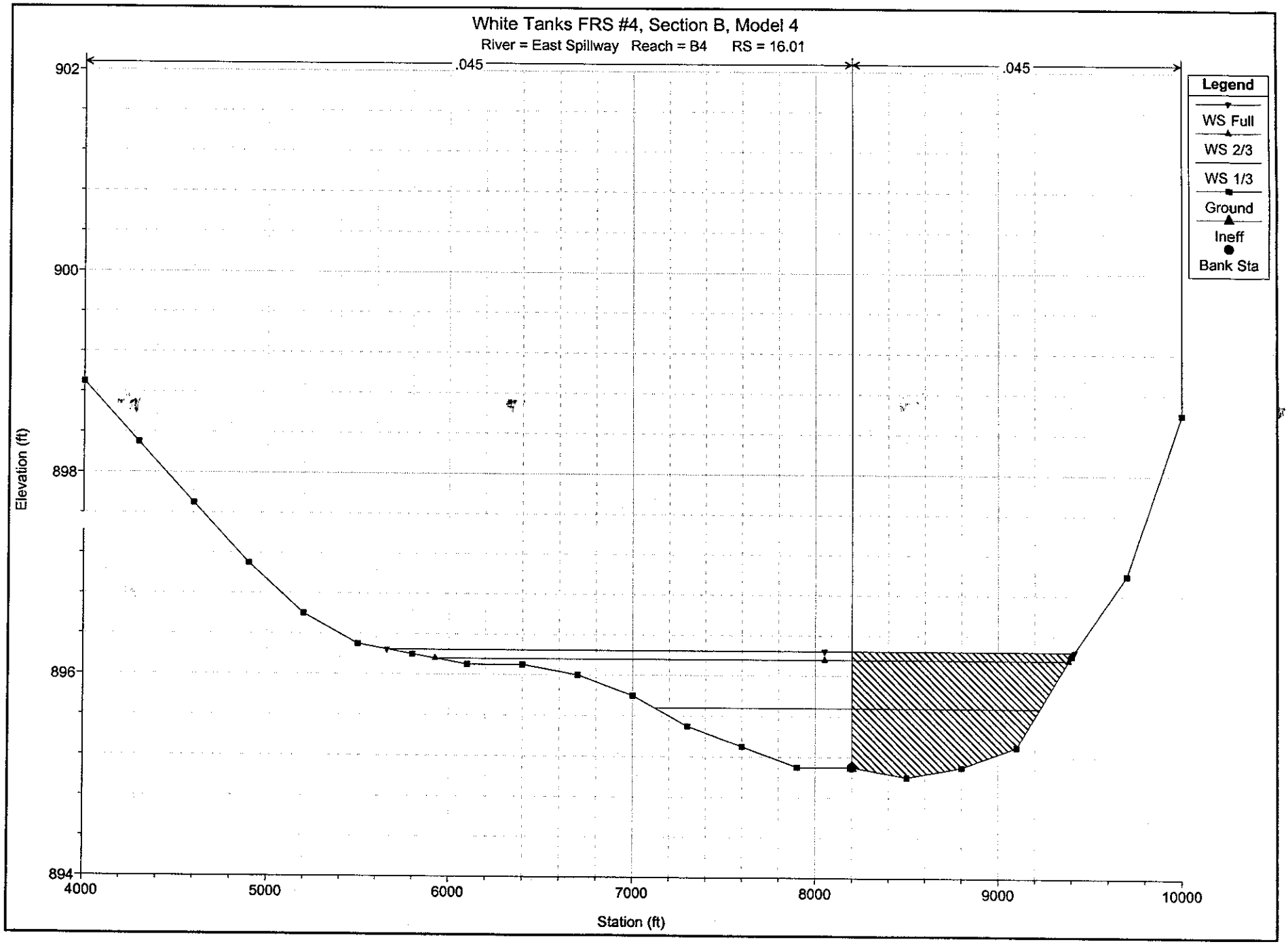
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
918
916
914
912
910
2000
3000
4000
5000
6000
7000
8000
Station (ft)


White Tanks FRS #4, Section B, Model 4
River = East Spillway Reach = B4 RS = 16.37
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
912
910
908
906
904
3000
4000
5000
6000
7000
8000
9000
Station (ft)


White Tanks FRS #4, Section B, Model 4
River = East Spillway Reach = B4 RS = 16.22
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
906
904
902
900
898
Elevation (ft)
2000
3000
4000
5000
6000
7000
8000
9000
Station (ft)


White Tanks FRS #4, Section B, Model 4
River = East Spillway Reach = B4 RS = 16.01
.045
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
902
900
898
896
894
4000
5000
6000
7000
8000
9000
10000
Station (ft)

4.3 Buckeye Canal to Gila River

```
                    HEC-RAS September 1998 Version 2.2
                      U.S. Army Corp of Engineers
                     Hydrologic Engineering Center
                       609 Second Street, Suite D
                      Davis, California 95616-4687
                            (916) 756-1104

X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
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PROJECT DATA
Project Title: White Tanks FRS#4, Section C, Model #1
Project File : WT4C1.prj
Run Date and Time: 06/27/2000 2:29:54 PM

Project in English units

Project Description:
Study Name: White Tanks FRS #4 Spillway Delineation Study
Contract No.: FCD 98-32
Purpose of Study: Delineation of the inundation limits of the 1/3, 2/3, and full spillway discharges for the spillway of the White Tanks Flood Retarding Structure #4.

Model Name: WT4C1
Model Description: Set up to model flow between the Buckeye Canal and the Gila River 100-year floodplain. The model consists of two flowpaths, the main flowpath over the east weir location at the Buckeye Canal, and a tributary flowpath over the west weir location at the Buckeye Canal.
Flow Profile: Profile #1, 1/3 spillway discharge for the 1/2 PMF
Sections 15.94 to 14.43, Q=5300 cfs
Sections 13.86 to 13.26, Q=6000 cfs
Profile #2, 2/3 spillway discharge for the 1/2 PMF
Sections 15.94 to 14.43, Q=11,000 cfs
Sections 13.86 to 13.26, Q=12,000 cfs
Profile #3, Full spillway discharge for the 1/2 PMF
Sections 15.94 to 14.43, Q=17,000 cfs
Sections 13.86 to 13.26, Q=18,000 cfs
HEC-RAS Version: Version 2.2, September 1998 with RASPATCH

Consultants: Hoskin Engineering Consultants, Inc.
323 W. Roosevelt Street, Suite 200
Phoenix, AZ 85003
(602)252-8384 Phone
(602)252-8385 Fax
HEC 990006

DEI Professional Services, LLC
6225 N. 24th St., Ste. 200
Phoenix, AZ 85016
(602)954-0038 Phone
(602)944-8605 Fax

PLAN DATA

Plan Title: Section C
Plan File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\bkeye-gila\WT4C1.P01

```
          Geometry Title: Section C
          Geometry File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White
Tanks\hecras\bkeye-gila\WT4C1.G01

          Flow Title    : Section C
          Flow File     : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White
Tanks\hecras\bkeye-gila\WT4C1.F01

Plan Summary Information:
Number of:  Cross Sections =   16    Mulitple Openings =    0
            Culverts       =    0    Inline Weirs      =    0
            Bridges        =    0

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

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: Between every coordinate point (HEC2 Style)
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow


FLOW DATA

Flow Title: Section C
Flow File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\bkeye-
gila\WT4C1.F01

Flow Data (cfs)

  River          Reach          RS                 1/3            2/3            Full
  East Weir      C1             15.93             5300          11000           17000
  East Weir      E2             14.10             6000          12000           18000
  West Weir      C2             15.93000           700           1000            1000


Boundary Conditions

  River          Reach          Profile                     Upstream              Downstream

  East Weir      E2             1/3                                               Normal S = .001
  East Weir      E2             2/3                                               Normal S = .001
  East Weir      E2             Full                                              Normal S = .001


GEOMETRY DATA

Geometry Title: Section C
Geometry File : G:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\bkeye-
gila\WT4C1.G01

Reach Connection Table

  River          Reach          Upstream Boundary    Downstream Boundary

  East Weir      E2             J1
  East Weir      C1                                  J1
  West Weir      C2                                  J1
```

JUNCTION INFORMATION

Name: J1
Description:
Energy computation Method

Length across Junction River	Reach	Tributary River	Reach	Length	Angle
East Weir	C1	to East Weir	E2	1660	0
West Weir	C2	to East Weir	E2	0	0

CROSS SECTION RIVER: East Weir
REACH: E2 RS: 14.10

INPUT
Description: 1/3 Q=6000 cfs
2/3 Q=12,000 cfs
Full Q=18,000 cfs
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7340	879.3	7410	878	7470	876	8040	875	8540	875.3
8910	877	8980	877	9210	872.1	9410	872.3	10000	872.7
10120	873	10230	872	10250	867.6	10280	867.7	10300	872
10400	871.7	10680	871.9	11320	872	11600	873	11660	872
11870	873.1	12180	873.2	12660	874	13310	876	13490	877.0552
13600	877.7								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
7340	.1	8980	.1	13490	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8980	13490	1380	1330	1260	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
7340	8980	877

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	874.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	874.22	Reach Len. (ft)	1380.00	1330.00	1260.00
Crit W.S. (ft)	872.61	Flow Area (sq ft)		6177.92	
E.G. Slope (ft/ft)	0.002095	Area (sq ft)		6177.92	
Q Total (cfs)	6000.00	Flow (cfs)		6000.00	
Top Width (ft)	3619.68	Top Width (ft)		3619.68	
Vel Total (ft/s)	0.97	Avg. Vel. (ft/s)		0.97	
Max Chl Dpth (ft)	6.62	Hydr. Depth (ft)		1.71	
Conv. Total (cfs)	131081.1	Conv. (cfs)		131081.1	
Length Wtd. (ft)	1330.00	Wetted Per. (ft)		3620.66	
Min Ch El (ft)	867.60	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		0.22	
Frctn Loss (ft)	1.34	Cum Volume (acre-ft)	24.55	865.83	
C & E Loss (ft)	0.00	Cum SA (acres)	55.39	477.54	

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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	875.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	875.25	Reach Len. (ft)	1380.00	1330.00	1260.00
Crit W.S. (ft)	873.03	Flow Area (sq ft)		10126.33	
E.G. Slope (ft/ft)	0.001847	Area (sq ft)	71.10	10126.33	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	

Top Width (ft)	4568.86	Top Width (ft)	563.96	4004.90
Vel Total (ft/s)	1.19	Avg. Vel. (ft/s)		1.19
Max Chl Dpth (ft)	7.65	Hydr. Depth (ft)		2.53
Conv. Total (cfs)	279221.6	Conv. (cfs)		279221.6
Length Wtd. (ft)	1332.81	Wetted Per. (ft)		4005.89
Min Ch El (ft)	867.60	Shear (lb/sq ft)		0.29
Alpha	1.00	Stream Power (lb/ft s)		0.35
Frctn Loss (ft)	1.37	Cum Volume (acre-ft)	97.01	1362.72
C & E Loss (ft)	0.00	Cum SA (acres)	89.38	575.33

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	876.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	876.02	Reach Len. (ft)	1380.00	1330.00	1260.00
Crit W.S. (ft)	873.32	Flow Area (sq ft)		13316.22	
E.G. Slope (ft/ft)	0.001827	Area (sq ft)	789.27	13316.22	
Q Total (cfs)	18000.00	Flow (cfs)		18000.00	
Top Width (ft)	5515.27	Top Width (ft)	1227.60	4287.67	
Vel Total (ft/s)	1.35	Avg. Vel. (ft/s)		1.35	
Max Chl Dpth (ft)	8.42	Hydr. Depth (ft)		3.11	
Conv. Total (cfs)	421129.2	Conv. (cfs)		421129.2	
Length Wtd. (ft)	1334.05	Wetted Per. (ft)		4288.67	
Min Ch El (ft)	867.60	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)		0.48	
Frctn Loss (ft)	1.46	Cum Volume (acre-ft)	163.83	1744.57	
C & E Loss (ft)	0.00	Cum SA (acres)	101.70	605.54	

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8980.00	9280.67	203.87	252.19	170.03	3.40	1.48	0.81
9280.67	9581.33	550.06	574.62	300.67	9.17	1.91	0.96
9581.33	9882.00	451.82	510.64	300.67	7.53	1.70	0.88
9882.00	10182.67	354.81	441.71	300.67	5.91	1.47	0.80
10182.67	10483.33	1183.74	911.24	301.60	19.73	3.03	1.30
10483.33	10784.00	781.56	709.44	300.67	13.03	2.36	1.10
10784.00	11084.67	736.34	684.52	300.67	12.27	2.28	1.08
11084.67	11385.33	698.35	663.11	300.67	11.64	2.21	1.05
11385.33	11686.00	439.51	502.26	300.68	7.33	1.67	0.88
11686.00	11986.67	329.02	422.15	300.67	5.48	1.40	0.78
11986.67	12287.33	188.30	302.03	300.67	3.14	1.00	0.62
12287.33	12588.00	76.90	176.48	300.67	1.28	0.59	0.44
12588.00	12888.67	5.72	27.51	142.34	0.10	0.19	0.21

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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta	Right Sta	Flow	Area	W.P.	% Conv.	Hydr D.	Velocity

(ft)	(ft)	(cfs)	(sq ft)	(ft)		(ft)	(ft/s)
LB 8980.00	9280.67	437.90	453.45	218.66	3.65	2.07	0.97
9280.67	9581.33	1081.49	886.02	300.67	9.01	2.95	1.22
9581.33	9882.00	954.49	822.04	300.67	7.95	2.73	1.16
9882.00	10182.67	824.85	753.11	300.67	6.87	2.50	1.10
10182.67	10483.33	1845.91	1222.64	301.60	15.38	4.07	1.51
10483.33	10784.00	1369.44	1020.84	300.67	11.41	3.40	1.34
10784.00	11084.67	1314.18	995.92	300.67	10.95	3.31	1.32
11084.67	11385.33	1267.42	974.51	300.67	10.56	3.24	1.30
11385.33	11686.00	938.30	813.66	300.68	7.82	2.71	1.15
11686.00	11986.67	789.46	733.56	300.67	6.58	2.44	1.08
11986.67	12287.33	585.99	613.43	300.67	4.88	2.04	0.96
12287.33	12588.00	400.08	487.89	300.67	3.33	1.62	0.82
12588.00	12888.67	178.23	300.35	300.67	1.49	1.00	0.59
12888.67	13189.33	12.26	48.89	178.28	0.10	0.27	0.25

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8980.00	9280.67	689.82	635.46	254.76	3.83	2.49	1.09
9280.67	9581.33	1582.00	1117.25	300.67	8.79	3.72	1.42
9581.33	9882.00	1433.91	1053.27	300.67	7.97	3.50	1.36
9882.00	10182.67	1280.93	984.34	300.67	7.12	3.27	1.30
10182.67	10483.33	2448.66	1453.87	301.60	13.60	4.84	1.68
10483.33	10784.00	1912.79	1252.07	300.67	10.63	4.16	1.53
10784.00	11084.67	1849.77	1227.15	300.67	10.28	4.08	1.51
11084.67	11385.33	1796.28	1205.73	300.67	9.98	4.01	1.49
11385.33	11686.00	1414.91	1044.89	300.68	7.86	3.48	1.35
11686.00	11986.67	1238.80	964.78	300.67	6.88	3.21	1.28
11986.67	12287.33	992.56	844.66	300.67	5.51	2.81	1.18
12287.33	12588.00	759.07	719.11	300.67	4.22	2.39	1.06
12588.00	12888.67	458.74	531.58	300.67	2.55	1.77	0.86
12888.67	13189.33	136.68	257.07	300.67	0.76	0.86	0.53
13189.33	RB 13490.00	5.06	24.99	124.28	0.03	0.20	0.20

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: East Weir
REACH: E2 RS: 13.85

INPUT
Description: 1/3 Q=6000 cfs
2/3 Q=12,000 cfs
Full Q=18,000 cfs
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6570	880	6600	880	6640	877	6710	876	6820	874
6930	873.5	7400	873	7860	872.2	8420	872.5	8750	872.4
9070	872.4	9270	873.3	9280	873.3	9330	873.3	9380	872
9440	870	9730	869.5	10000	869.6	10110	869.7	10240	869.8
10390	869.9	10480	869.9	10570	870	10610	870	10630	865.5
10650	865.5	10890	870	11250	870.2	11600	870.3	11960	870.5
11980	871.7	12300	871.7	12600	872	13230	874	13650	876
13800	877	13950	878	13970	878	14060	878	14150	878.4
14340	878.9	14430	880						

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Manning's n Values          num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
    6570      .1     9330      .1    13650      .1

Bank Sta: Left    Right     Lengths: Left Channel    Right      Coeff Contr.    Expan.
          9330    13650              1440    1410     1370              .1        .3
Ineffective Flow      num=       1
   Sta L    Sta R     Elev
    6570     9330    873.3
```

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	872.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	872.88	Reach Len. (ft)	1440.00	1410.00	1370.00
Crit W.S. (ft)	870.16	Flow Area (sq ft)		8953.49	
E.G. Slope (ft/ft)	0.000589	Area (sq ft)	758.34	8953.49	
Q Total (cfs)	6000.00	Flow (cfs)		6000.00	
Top Width (ft)	5243.77	Top Width (ft)	1711.17	3532.60	
Vel Total (ft/s)	0.67	Avg. Vel. (ft/s)		0.67	
Max Chl Dpth (ft)	7.38	Hydr. Depth (ft)		2.53	
Conv. Total (cfs)	247287.2	Conv. (cfs)		247287.2	
Length Wtd. (ft)	1410.00	Wetted Per. (ft)		3533.23	
Min Ch El (ft)	865.50	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.06	
Frctn Loss (ft)	1.18	Cum Volume (acre-ft)	12.53	634.83	
C & E Loss (ft)	0.00	Cum SA (acres)	28.28	368.35	

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	873.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.100	0.100	
W.S. Elev (ft)	873.89	Reach Len. (ft)	1440.00	1410.00	1370.00
Crit W.S. (ft)	870.57	Flow Area (sq ft)	2962.23	12667.81	
E.G. Slope (ft/ft)	0.000658	Area (sq ft)	2962.23	12667.81	
Q Total (cfs)	12000.00	Flow (cfs)	1347.85	10652.15	
Top Width (ft)	6349.75	Top Width (ft)	2485.23	3864.53	
Vel Total (ft/s)	0.77	Avg. Vel. (ft/s)	0.46	0.84	
Max Chl Dpth (ft)	8.39	Hydr. Depth (ft)	1.19	3.28	
Conv. Total (cfs)	467875.3	Conv. (cfs)	52552.0	415323.3	
Length Wtd. (ft)	1411.69	Wetted Per. (ft)	2485.23	3865.16	
Min Ch El (ft)	865.50	Shear (lb/sq ft)	0.05	0.13	
Alpha	1.10	Stream Power (lb/ft s)	0.02	0.11	
Frctn Loss (ft)	1.27	Cum Volume (acre-ft)	48.96	1014.74	
C & E Loss (ft)	0.00	Cum SA (acres)	41.08	455.19	

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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	874.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.100	0.100	
W.S. Elev (ft)	874.57	Reach Len. (ft)	1440.00	1410.00	1370.00
Crit W.S. (ft)	870.85	Flow Area (sq ft)	4674.91	15349.14	
E.G. Slope (ft/ft)	0.000733	Area (sq ft)	4674.91	15349.14	
Q Total (cfs)	18000.00	Flow (cfs)	2916.42	15083.58	
Top Width (ft)	6560.19	Top Width (ft)	2541.17	4019.02	
Vel Total (ft/s)	0.90	Avg. Vel. (ft/s)	0.62	0.98	

Max Chl Dpth (ft)	9.07	Hydr. Depth (ft)	1.84	3.82
Conv. Total (cfs)	664932.1	Conv. (cfs)	107734.7	557197.4
Length Wtd. (ft)	1412.43	Wetted Per. (ft)	2541.18	4019.66
Min Ch El (ft)	865.50	Shear (lb/sq ft)	0.08	0.17
Alpha	1.08	Stream Power (lb/ft s)	0.05	0.17
Frctn Loss (ft)	1.34	Cum Volume (acre-ft)	77.27	1306.96
C & E Loss (ft)	0.00	Cum SA (acres)	42.00	478.73

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9330.00	9618.00	394.75	668.84	272.06	6.58	2.46	0.59
9618.00	9906.00	691.87	958.16	288.00	11.53	3.33	0.72
9906.00	10194.00	659.42	930.93	288.00	10.99	3.23	0.71
10194.00	10482.00	591.79	872.42	288.00	9.86	3.03	0.68
10482.00	10770.00	1261.68	1375.01	288.52	21.03	4.77	0.92
10770.00	11058.00	691.49	957.87	288.02	11.52	3.33	0.72
11058.00	11346.00	493.18	782.03	288.00	8.22	2.72	0.63
11346.00	11634.00	463.25	753.21	288.00	7.72	2.62	0.62
11634.00	11922.00	425.58	715.83	288.00	7.09	2.49	0.59
11922.00	12210.00	160.72	399.11	288.04	2.68	1.39	0.40
12210.00	12498.00	112.10	321.50	288.00	1.87	1.12	0.35
12498.00	12786.00	52.95	205.00	288.00	0.88	0.71	0.26
12786.00	13074.00	1.23	13.61	92.59	0.02	0.15	0.09

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
6754.00	6938.00	2.64	19.64	93.23	0.02	0.21	0.13
6938.00	7122.00	21.51	90.85	184.00	0.18	0.49	0.24
7122.00	7306.00	37.53	126.88	184.00	0.31	0.69	0.30
7306.00	7490.00	58.51	165.62	184.00	0.49	0.90	0.35
7490.00	7674.00	94.99	221.52	184.00	0.79	1.20	0.43
7674.00	7858.00	140.71	280.40	184.00	1.17	1.52	0.50
7858.00	8042.00	158.89	301.60	184.00	1.32	1.64	0.53
8042.00	8226.00	143.29	283.47	184.00	1.19	1.54	0.51
8226.00	8410.00	128.34	265.34	184.00	1.07	1.44	0.48
8410.00	8594.00	123.98	259.89	184.00	1.03	1.41	0.48
8594.00	8778.00	132.11	269.99	184.00	1.10	1.47	0.49
8778.00	8962.00	135.13	273.68	184.00	1.13	1.49	0.49
8962.00	9146.00	124.61	260.68	184.00	1.04	1.42	0.48
9146.00	9330.00	45.63	142.68	184.00	0.38	0.78	0.32
LB 9330.00	9618.00	735.12	954.38	288.05	6.13	3.31	0.77
9618.00	9906.00	1148.14	1247.02	288.00	9.57	4.33	0.92
9906.00	10194.00	1106.67	1219.79	288.00	9.22	4.24	0.91
10194.00	10482.00	1019.61	1161.28	288.00	8.50	4.03	0.88
10482.00	10770.00	1854.46	1663.87	288.52	15.45	5.78	1.11
10770.00	11058.00	1147.64	1246.73	288.02	9.56	4.33	0.92
11058.00	11346.00	890.81	1070.89	288.00	7.42	3.72	0.83
11346.00	11634.00	851.21	1042.07	288.00	7.09	3.62	0.82
11634.00	11922.00	800.94	1004.70	288.00	6.67	3.49	0.80
11922.00	12210.00	426.04	687.97	288.04	3.55	2.39	0.62
12210.00	12498.00	349.02	610.36	288.00	2.91	2.12	0.57
12498.00	12786.00	245.21	493.86	288.00	2.04	1.71	0.50
12786.00	13074.00	74.61	241.86	288.00	0.62	0.84	0.31
13074.00	13362.00	2.65	23.06	120.53	0.02	0.19	0.12

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
6754.00	6938.00	34.56	107.25	149.18	0.19	0.72	0.32
6938.00	7122.00	96.42	215.86	184.00	0.54	1.17	0.45
7122.00	7306.00	124.70	251.88	184.00	0.69	1.37	0.50
7306.00	7490.00	158.29	290.63	184.00	0.88	1.58	0.54
7490.00	7674.00	212.21	346.52	184.00	1.18	1.88	0.61
7674.00	7858.00	275.65	405.40	184.00	1.53	2.20	0.68
7858.00	8042.00	300.10	426.61	184.00	1.67	2.32	0.70
8042.00	8226.00	279.15	408.48	184.00	1.55	2.22	0.68
8226.00	8410.00	258.80	390.34	184.00	1.44	2.12	0.66
8410.00	8594.00	252.81	384.90	184.00	1.40	2.09	0.66
8594.00	8778.00	263.96	395.00	184.00	1.47	2.15	0.67
8778.00	8962.00	268.08	398.68	184.00	1.49	2.17	0.67
8962.00	9146.00	253.67	385.69	184.00	1.41	2.10	0.66
9146.00	9330.00	138.01	267.68	184.00	0.77	1.45	0.52
LB 9330.00	9618.00	1068.53	1150.04	288.05	5.94	3.99	0.93
9618.00	9906.00	1559.30	1442.68	288.00	8.66	5.01	1.08
9906.00	10194.00	1510.57	1415.46	288.00	8.39	4.91	1.07
10194.00	10482.00	1407.93	1356.94	288.00	7.82	4.71	1.04
10482.00	10770.00	2377.56	1859.53	288.52	13.21	6.46	1.28
10770.00	11058.00	1558.71	1442.39	288.02	8.66	5.01	1.08
11058.00	11346.00	1255.13	1266.55	288.00	6.97	4.40	0.99
11346.00	11634.00	1207.88	1237.73	288.00	6.71	4.30	0.98
11634.00	11922.00	1147.71	1200.36	288.00	6.38	4.17	0.96
11922.00	12210.00	688.75	883.63	288.04	3.83	3.07	0.78
12210.00	12498.00	590.97	806.03	288.00	3.28	2.80	0.73
12498.00	12786.00	455.57	689.52	288.00	2.53	2.39	0.66
12786.00	13074.00	213.46	437.52	288.00	1.19	1.52	0.49
13074.00	13362.00	41.50	160.77	275.02	0.23	0.58	0.26

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.

CROSS SECTION RIVER: East Weir
REACH: E2 RS: 13.58

INPUT
Description: 1/3 Q=6000 cfs
2/3 Q=12,000 cfs
Full Q=18,000 cfs
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5690	875.5	5800	874	5810	874	5970	873	6320	872.5
6420	872.1	6460	872.3	6530	872	6560	872	6600	872.2
6680	872	6750	872.2	6820	872.2	6900	872.3	6950	872.2
7050	872.1	7400	872.1	7450	872	7500	872.1	7580	872
7950	871.2	8370	870.8	8740	870.6	9100	870	9130	869.7
9160	869.7	9190	870	9220	869.5	9250	869.5	9300	870
9350	869.2	9560	869.4	9660	871	9700	871	10000	868
10020	868	10060	867.9	10090	868	10540	869.7	10700	869.8
10770	870.5	10900	870	10940	870	10990	866.8	11010	866.8
11030	870	11340	870.4	11770	870.5	12080	870.2	12340	870.2
12360	870	12450	869.8	12590	870	13140	872	13650	874

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5690	.1	5810	.1	13650	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5810	13650	1770	1740	1680	.1	.3

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	871.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	871.70	Reach Len. (ft)	1770.00	1740.00	1680.00
Crit W.S. (ft)		Flow Area (sq ft)		8367.73	
E.G. Slope (ft/ft)	0.001280	Area (sq ft)		8367.73	
Q Total (cfs)	6000.00	Flow (cfs)		6000.00	
Top Width (ft)	5341.86	Top Width (ft)		5341.86	
Vel Total (ft/s)	0.72	Avg. Vel. (ft/s)		0.72	
Max Chl Dpth (ft)	4.90	Hydr. Depth (ft)		1.57	
Conv. Total (cfs)	167696.4	Conv. (cfs)		167696.4	
Length Wtd. (ft)	1740.00	Wetted Per. (ft)		5342.28	
Min Ch El (ft)	866.80	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)		0.09	
Frctn Loss (ft)	1.96	Cum Volume (acre-ft)		354.50	
C & E Loss (ft)	0.00	Cum SA (acres)		224.72	

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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	872.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	872.61	Reach Len. (ft)	1770.00	1740.00	1680.00
Crit W.S. (ft)		Flow Area (sq ft)		14044.61	
E.G. Slope (ft/ft)	0.001321	Area (sq ft)		14044.61	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	7056.03	Top Width (ft)		7056.03	
Vel Total (ft/s)	0.85	Avg. Vel. (ft/s)		0.85	
Max Chl Dpth (ft)	5.81	Hydr. Depth (ft)		1.99	
Conv. Total (cfs)	330207.3	Conv. (cfs)		330207.3	
Length Wtd. (ft)	1740.00	Wetted Per. (ft)		7056.45	
Min Ch El (ft)	866.80	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)		0.14	
Frctn Loss (ft)	1.99	Cum Volume (acre-ft)		582.41	
C & E Loss (ft)	0.00	Cum SA (acres)		278.44	

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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	873.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	873.22	Reach Len. (ft)	1770.00	1740.00	1680.00
Crit W.S. (ft)		Flow Area (sq ft)		18493.58	
E.G. Slope (ft/ft)	0.001292	Area (sq ft)		18493.58	
Q Total (cfs)	18000.00	Flow (cfs)		18000.00	
Top Width (ft)	7516.74	Top Width (ft)		7516.74	
Vel Total (ft/s)	0.97	Avg. Vel. (ft/s)		0.97	
Max Chl Dpth (ft)	6.42	Hydr. Depth (ft)		2.46	
Conv. Total (cfs)	500795.8	Conv. (cfs)		500795.8	
Length Wtd. (ft)	1740.00	Wetted Per. (ft)		7517.17	
Min Ch El (ft)	866.80	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)		0.19	
Frctn Loss (ft)	1.97	Cum Volume (acre-ft)		759.23	
C & E Loss (ft)	0.00	Cum SA (acres)		292.03	

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
7378.00	7900.67	5.96	36.55	183.87	0.10	0.20	0.16
7900.67	8423.33	138.88	367.01	522.67	2.31	0.70	0.38
8423.33	8946.00	302.41	585.41	522.67	5.04	1.12	0.52
8946.00	9468.67	778.21	1032.20	522.68	12.97	1.97	0.75
9468.67	9991.33	766.11	1022.55	522.69	12.77	1.96	0.75
9991.33	10514.00	1615.07	1599.62	522.67	26.92	3.06	1.01
10514.00	11036.67	829.51	1072.79	523.03	13.83	2.05	0.77
11036.67	11559.33	442.32	735.43	522.67	7.37	1.41	0.60
11559.33	12082.00	389.75	681.66	522.67	6.50	1.30	0.57
12082.00	12604.67	573.83	859.75	522.67	9.56	1.64	0.67
12604.67	13127.33	157.95	374.74	454.00	2.63	0.83	0.42

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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 5810.00	6332.67	0.49	6.28	92.22	0.00	0.07	0.08
6332.67	6855.33	65.38	237.40	522.67	0.54	0.45	0.28
6855.33	7378.00	70.45	248.29	522.67	0.59	0.48	0.28
7378.00	7900.67	169.66	420.69	522.67	1.41	0.80	0.40
7900.67	8423.33	539.64	842.34	522.67	4.50	1.61	0.64
8423.33	8946.00	792.46	1060.73	522.67	6.60	2.03	0.75
8946.00	9468.67	1423.63	1507.53	522.68	11.86	2.88	0.94
9468.67	9991.33	1408.45	1497.87	522.69	11.74	2.87	0.94
9991.33	10514.00	2424.59	2074.94	522.67	20.20	3.97	1.17
10514.00	11036.67	1487.43	1548.12	523.03	12.40	2.96	0.96
11036.67	11559.33	987.93	1210.75	522.67	8.23	2.32	0.82
11559.33	12082.00	915.90	1156.99	522.67	7.63	2.21	0.79
12082.00	12604.67	1162.71	1335.07	522.67	9.69	2.55	0.87
12604.67	13127.33	538.75	841.50	522.67	4.49	1.61	0.64
13127.33	RB 13650.00	12.52	56.08	169.15	0.10	0.33	0.22

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 5810.00	6332.67	49.58	178.24	398.04	0.28	0.45	0.28
6332.67	6855.33	274.42	554.88	522.67	1.52	1.06	0.49
6855.33	7378.00	283.45	565.77	522.67	1.57	1.08	0.50
7378.00	7900.67	441.58	738.17	522.67	2.45	1.41	0.60
7900.67	8423.33	937.70	1159.82	522.67	5.21	2.22	0.81
8423.33	8946.00	1250.09	1378.21	522.67	6.94	2.64	0.91
8946.00	9468.67	1996.09	1825.01	522.68	11.09	3.49	1.09
9468.67	9991.33	1978.49	1815.35	522.69	10.99	3.47	1.09
9991.33	10514.00	3134.30	2392.42	522.67	17.41	4.58	1.31
10514.00	11036.67	2069.71	1865.60	523.03	11.50	3.57	1.11
11036.67	11559.33	1485.01	1528.23	522.67	8.25	2.92	0.97
11559.33	12082.00	1398.96	1474.47	522.67	7.77	2.82	0.95
12082.00	12604.67	1691.76	1652.55	522.67	9.40	3.16	1.02
12604.67	13127.33	936.57	1158.98	522.67	5.20	2.22	0.81
13127.33	RB 13650.00	72.30	205.86	324.04	0.40	0.64	0.35

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.

CROSS SECTION RIVER: East Weir

REACH: E2 RS: 13.25

INPUT
Description: Downstream end of Section C HEC-RAS model.
1/3 Q=6000 cfs
2/3
Q=12,000 cfs
Full Q=18,000 cfs
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5890	873.3	5910	873.3	5940	872	6220	870.2	6260	870.3
6350	870.1	6410	870.3	6450	870	6480	870	6510	870.1
6540	870	6570	869.8	6610	870	6660	869.8	6740	869.9
7000	868.7	7420	868.9	7840	868.4	8240	868.2	8760	868.1
9230	868	9810	867.3	10000	867.3	10040	868	10060	868
10080	868.5	10100	868.8	10160	868	10260	868	10320	868.4
10450	868	10770	866.7	11000	866.5	11300	868	11330	868.2
11400	868.2	11430	867.5	11450	867.5	11570	868.2	11970	868.8
12410	868.7	12750	870	12920	870	13130	871.1	13310	872
13680	872.9								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5890	.1	5940	.1	13310	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5940	13310	0	0	0	.1	.3

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	869.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	869.74	Reach Len. (ft)			
Crit W.S. (ft)	868.13	Flow Area (sq ft)		9381.50	
E.G. Slope (ft/ft)	0.001000	Area (sq ft)		9381.50	
Q Total (cfs)	6000.00	Flow (cfs)		6000.00	
Top Width (ft)	5909.72	Top Width (ft)		5909.72	
Vel Total (ft/s)	0.64	Avg. Vel. (ft/s)		0.64	
Max Chl Dpth (ft)	3.24	Hydr. Depth (ft)		1.59	
Conv. Total (cfs)	189700.9	Conv. (cfs)		189700.9	
Length Wtd. (ft)		Wetted Per. (ft)		5909.76	
Min Ch El (ft)	866.50	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)		0.06	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	870.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	870.62	Reach Len. (ft)			
Crit W.S. (ft)	868.47	Flow Area (sq ft)		15115.98	
E.G. Slope (ft/ft)	0.001000	Area (sq ft)		15115.98	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	6885.39	Top Width (ft)		6885.39	
Vel Total (ft/s)	0.79	Avg. Vel. (ft/s)		0.79	
Max Chl Dpth (ft)	4.12	Hydr. Depth (ft)		2.20	
Conv. Total (cfs)	379403.2	Conv. (cfs)		379403.2	
Length Wtd. (ft)		Wetted Per. (ft)		6885.44	
Min Ch El (ft)	866.50	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)		0.11	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	871.27	Element	Left OB	Channel	Right OB

Vel Head (ft)	0.01	Wt. n-Val.	0.100
W.S. Elev (ft)	871.25	Reach Len. (ft)	
Crit W.S. (ft)	868.69	Flow Area (sq ft)	19520.07
E.G. Slope (ft/ft)	0.001001	Area (sq ft)	19520.07
Q Total (cfs)	18000.00	Flow (cfs)	18000.00
Top Width (ft)	7104.94	Top Width (ft)	7104.94
Vel Total (ft/s)	0.92	Avg. Vel. (ft/s)	0.92
Max Chl Dpth (ft)	4.75	Hydr. Depth (ft)	2.75
Conv. Total (cfs)	568968.4	Conv. (cfs)	568968.4
Length Wtd. (ft)		Wetted Per. (ft)	7105.00
Min Ch El (ft)	866.50	Shear (lb/sq ft)	0.17
Alpha	1.00	Stream Power (lb/ft s)	0.16
Frctn Loss (ft)		Cum Volume (acre-ft)	
C & E Loss (ft)		Cum SA (acres)	

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
6431.33	6922.67	10.97	51.29	149.08	0.18	0.34	0.21
6922.67	7414.00	190.92	458.82	491.33	3.18	0.93	0.42
7414.00	7905.33	261.31	553.90	491.33	4.36	1.13	0.47
7905.33	8396.67	417.25	733.46	491.33	6.95	1.49	0.57
8396.67	8888.00	479.52	797.30	491.33	7.99	1.62	0.60
8888.00	9379.33	542.31	858.39	491.33	9.04	1.75	0.63
9379.33	9870.67	806.76	1089.39	491.33	13.45	2.22	0.74
9870.67	10362.00	580.11	893.82	491.35	9.67	1.82	0.65
10362.00	10853.33	901.97	1164.81	491.34	15.03	2.37	0.77
10853.33	11344.67	1065.24	1287.09	491.34	17.75	2.62	0.83
11344.67	11836.00	454.95	772.54	491.34	7.58	1.57	0.59
11836.00	12327.33	214.68	492.28	491.33	3.58	1.00	0.44
12327.33	12818.67	74.01	228.41	355.97	1.23	0.64	0.32

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 5940.00	6431.33	22.37	101.41	277.43	0.19	0.37	0.22
6431.33	6922.67	164.52	421.98	491.34	1.37	0.86	0.39
6922.67	7414.00	571.88	891.14	491.33	4.77	1.81	0.64
7414.00	7905.33	677.15	986.22	491.33	5.64	2.01	0.69
7905.33	8396.67	894.86	1165.78	491.33	7.46	2.37	0.77
8396.67	8888.00	978.02	1229.61	491.33	8.15	2.50	0.80
8888.00	9379.33	1060.34	1290.71	491.33	8.84	2.63	0.82
9379.33	9870.67	1395.13	1521.71	491.33	11.63	3.10	0.92
9870.67	10362.00	1109.26	1326.14	491.35	9.24	2.70	0.84
10362.00	10853.33	1512.26	1597.12	491.34	12.60	3.25	0.95
10853.33	11344.67	1710.11	1719.40	491.34	14.25	3.50	0.99
11344.67	11836.00	945.40	1204.85	491.34	7.88	2.45	0.78
11836.00	12327.33	608.12	924.60	491.33	5.07	1.88	0.66
12327.33	12818.67	324.86	634.71	491.34	2.71	1.29	0.51
12818.67	RB 13310.00	25.71	100.59	220.63	0.21	0.46	0.26

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 5940.00	6431.33	118.06	306.92	375.37	0.66	0.82	0.38
6431.33	6922.67	419.43	731.34	491.34	2.33	1.49	0.57
6922.67	7414.00	958.08	1200.50	491.33	5.32	2.44	0.80
7414.00	7905.33	1087.85	1295.58	491.33	6.04	2.64	0.84
7905.33	8396.67	1350.57	1475.14	491.33	7.50	3.00	0.92
8396.67	8888.00	1449.38	1538.98	491.33	8.05	3.13	0.94
8888.00	9379.33	1546.53	1600.07	491.33	8.59	3.26	0.97
9379.33	9870.67	1936.29	1831.07	491.33	10.76	3.73	1.06
9870.67	10362.00	1603.98	1635.50	491.35	8.91	3.33	0.98

10362.00	10853.33	2071.01	1906.48	491.34	11.51	3.88	1.09
10853.33	11344.67	2297.09	2028.77	491.34	12.76	4.13	1.13
11344.67	11836.00	1410.70	1514.21	491.34	7.84	3.08	0.93
11836.00	12327.33	1002.99	1233.96	491.33	5.57	2.51	0.81
12327.33	12818.67	641.90	944.07	491.34	3.57	1.92	0.68
12818.67	RB 13310.00	106.13	277.46	342.24	0.59	0.81	0.38

CROSS SECTION RIVER: East Weir
REACH: C1 RS: 15.93

INPUT
Description: South bank of Buckeye Canal.
Upstream end of Section C HEC-RAS
model.
1/3 Q=5300 cfs
2/3 Q=11,000 cfs
Full Q=17,000 cfs
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5040	898.1	5290	897.7	5590	897.2	5890	896.4	6190	895.6
6490	894.9	6790	894.3	7090	893.7	7390	893.1	7690	892.6
7990	892.3	8290	892.2	8590	892.1	8890	892.1	9190	892
9490	891.8	9790	891.5	10000	891.36	10090	891.3	10390	891.1
10690	891.1	10990	891	11290	891.1	11590	891.3	11890	892.2
12190	893	12300	893.6	12490	894.6	12790	896	13090	897.1
13390	897.9	13690	898.4	13840	898.4				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5040	.045	7090	.045	12300	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
7090	12300	480	580	540	.1	.3

CROSS SECTION OUTPUT Profile #1/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	892.19	Element			
Vel Head (ft)	0.12	Wt. n-Val.		0.045	
W.S. Elev (ft)	892.07	Reach Len. (ft)	480.00	580.00	540.00
Crit W.S. (ft)	891.81	Flow Area (sq ft)		1917.81	
E.G. Slope (ft/ft)	0.012027	Area (sq ft)		1917.81	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	2876.71	Top Width (ft)		2876.71	
Vel Total (ft/s)	2.76	Avg. Vel. (ft/s)		2.76	
Max Chl Dpth (ft)	1.07	Hydr. Depth (ft)		0.67	
Conv. Total (cfs)	48327.5	Conv. (cfs)		48327.5	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		2876.71	
Min Ch El (ft)	891.00	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)		1.38	
Frctn Loss (ft)	2.74	Cum Volume (acre-ft)	26.10	1318.81	3.02
C & E Loss (ft)	0.03	Cum SA (acres)	44.21	636.59	5.65

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

CROSS SECTION OUTPUT Profile #2/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	892.76	Element			
Vel Head (ft)	0.11	Wt. n-Val.		0.045	
W.S. Elev (ft)	892.66	Reach Len. (ft)	480.00	580.00	540.00
Crit W.S. (ft)		Flow Area (sq ft)		4215.15	
E.G. Slope (ft/ft)	0.006627	Area (sq ft)		4215.15	
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	4406.82	Top Width (ft)		4406.82	
Vel Total (ft/s)	2.61	Avg. Vel. (ft/s)		2.61	

Max Chl Dpth (ft)	1.66	Hydr. Depth (ft)		0.96	
Conv. Total (cfs)	135120.5	Conv. (cfs)		135120.5	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		4406.82	
Min Ch El (ft)	891.00	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)		1.03	
Frctn Loss (ft)	2.45	Cum Volume (acre-ft)	116.66	2142.80	10.46
C & E Loss (ft)	0.02	Cum SA (acres)	112.12	721.06	13.34

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.

CROSS SECTION OUTPUT Profile #Full

			Left OB	Channel	Right OB
E.G. Elev (ft)	893.22	Element			
Vel Head (ft)	0.11	Wt. n-Val.		0.045	
W.S. Elev (ft)	893.10	Reach Len. (ft)	480.00	580.00	540.00
Crit W.S. (ft)		Flow Area (sq ft)		6262.33	
E.G. Slope (ft/ft)	0.004766	Area (sq ft)		6262.33	
Q Total (cfs)	17000.00	Flow (cfs)		17000.00	
Top Width (ft)	4819.25	Top Width (ft)		4819.25	
Vel Total (ft/s)	2.71	Avg. Vel. (ft/s)		2.71	
Max Chl Dpth (ft)	2.10	Hydr. Depth (ft)		1.30	
Conv. Total (cfs)	246238.3	Conv. (cfs)		246238.3	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		4819.25	
Min Ch El (ft)	891.00	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)		1.05	
Frctn Loss (ft)	2.22	Cum Volume (acre-ft)	241.72	2830.11	19.48
C & E Loss (ft)	0.02	Cum SA (acres)	145.65	759.63	13.34

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
8826.67	9174.00	2.26	6.87	203.05	0.04	0.03	0.33
9174.00	9521.33	61.95	62.07	347.33	1.17	0.18	1.00
9521.33	9868.67	316.00	164.99	347.33	5.96	0.48	1.92
9868.67	10216.00	663.35	257.45	347.33	12.52	0.74	2.58
10216.00	10563.33	992.54	327.87	347.33	18.73	0.94	3.03
10563.33	10910.67	1086.11	346.08	347.33	20.49	1.00	3.14
10910.67	11258.00	1158.15	359.67	347.33	21.85	1.04	3.22
11258.00	11605.33	878.48	304.71	347.33	16.58	0.88	2.88
11605.33	11952.67	141.14	88.09	242.33	2.66	0.36	1.60

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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
7437.33	7784.67	4.98	11.02	129.64	0.05	0.08	0.45
7784.67	8132.00	113.57	106.72	347.33	1.03	0.31	1.06
8132.00	8479.33	225.31	160.98	347.33	2.05	0.46	1.40
8479.33	8826.67	301.89	191.87	347.33	2.74	0.55	1.57
8826.67	9174.00	343.58	207.35	347.33	3.12	0.60	1.66
9174.00	9521.33	518.26	265.35	347.33	4.71	0.76	1.95
9521.33	9868.67	894.93	368.27	347.33	8.14	1.06	2.43
9868.67	10216.00	1299.94	460.73	347.33	11.82	1.33	2.82
10216.00	10563.33	1647.67	531.15	347.33	14.98	1.53	3.10

10563.33	10910.67	1742.89	549.36	347.33	15.84	1.58	3.17
10910.67	11258.00	1815.36	562.96	347.33	16.50	1.62	3.22
11258.00	11605.33	1529.69	507.99	347.33	13.91	1.46	3.01
11605.33	11952.67	551.65	275.48	347.34	5.01	0.79	2.00
11952.67	RB 12300.00	10.28	15.89	109.18	0.09	0.15	0.65

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

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 7090.00	7437.33	0.47	1.93	48.00	0.00	0.04	0.24
7437.33	7784.67	130.58	125.42	347.33	0.77	0.36	1.04
7784.67	8132.00	441.83	260.61	347.33	2.60	0.75	1.70
8132.00	8479.33	605.56	314.87	347.33	3.56	0.91	1.92
8479.33	8826.67	707.78	345.76	347.33	4.16	1.00	2.05
8826.67	9174.00	761.40	361.24	347.33	4.48	1.04	2.11
9174.00	9521.33	975.86	419.24	347.33	5.74	1.21	2.33
9521.33	9868.67	1406.99	522.16	347.33	8.28	1.50	2.69
9868.67	10216.00	1846.27	614.62	347.33	10.86	1.77	3.00
10216.00	10563.33	2212.10	685.04	347.33	13.01	1.97	3.23
10563.33	10910.67	2310.98	703.25	347.33	13.59	2.02	3.29
10910.67	11258.00	2385.92	716.84	347.33	14.03	2.06	3.33
11258.00	11605.33	2088.89	661.88	347.33	12.29	1.91	3.16
11605.33	11952.67	1015.47	429.37	347.34	5.97	1.24	2.37
11952.67	RB 12300.00	109.91	100.09	255.91	0.65	0.39	1.10

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.

CROSS SECTION RIVER: East Weir
REACH: C1 RS: 15.82

INPUT
Description: 1/3 Q=5300 cfs
2/3 Q=11,000 cfs
Full Q=17,000 cfs
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7650	892	7665	891.25	7670	891	7690	890	7750	889.6
7930	889.3	8100	888.7	8240	888	8510	887.8	8820	887.6
9150	887.6	9310	887.6	9520	887.4	9780	887.2	10000	887.2
10230	887.2	10490	887.3	10725	888	10835	888.5	11030	889.3
11220	890	11350	890.1	11610	890.5	439 11760	890.7	11783	890.8
11900	891								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
7650	.1	7670	.1	11900	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
7670	11900	660	650	650	.1	.3

CROSS SECTION OUTPUT Profile #1/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	889.42	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	889.40	Reach Len. (ft)	660.00	650.00	650.00
Crit W.S. (ft)		Flow Area (sq ft)		5161.72	
E.G. Slope (ft/ft)	0.002510	Area (sq ft)		5161.72	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	3186.91	Top Width (ft)		3186.91	
Vel Total (ft/s)	1.03	Avg. Vel. (ft/s)		1.03	

Max Chl Dpth (ft)	2.20	Hydr. Depth (ft)		1.62	
Conv. Total (cfs)	105780.6	Conv. (cfs)		105780.6	
Length Wtd. (ft)	650.00	Wetted Per. (ft)		3186.92	
Min Ch El (ft)	887.20	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		0.26	
Frctn Loss (ft)	1.86	Cum Volume (acre-ft)	26.10	1271.68	3.02
C & E Loss (ft)	0.00	Cum SA (acres)	44.21	596.22	5.65

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.

CROSS SECTION OUTPUT Profile #2/3

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	890.29				
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	890.26	Reach Len. (ft)	660.00	650.00	650.00
Crit W.S. (ft)		Flow Area (sq ft)		8165.38	
E.G. Slope (ft/ft)	0.002924	Area (sq ft)		8165.38	
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	3761.56	Top Width (ft)		3761.56	
Vel Total (ft/s)	1.35	Avg. Vel. (ft/s)		1.35	
Max Chl Dpth (ft)	3.06	Hydr. Depth (ft)		2.17	
Conv. Total (cfs)	203411.5	Conv. (cfs)		203411.5	
Length Wtd. (ft)	650.00	Wetted Per. (ft)		3761.58	
Min Ch El (ft)	887.20	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)		0.53	
Frctn Loss (ft)	2.03	Cum Volume (acre-ft)	116.66	2060.38	10.46
C & E Loss (ft)	0.00	Cum SA (acres)	112.12	666.68	13.34

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.

CROSS SECTION OUTPUT Profile #Full

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	890.97				
Vel Head (ft)	0.04	Wt. n-Val.		0.100	
W.S. Elev (ft)	890.93	Reach Len. (ft)	660.00	650.00	650.00
Crit W.S. (ft)		Flow Area (sq ft)		10835.53	
E.G. Slope (ft/ft)	0.003141	Area (sq ft)		10835.53	
Q Total (cfs)	17000.00	Flow (cfs)		17000.00	
Top Width (ft)	4190.60	Top Width (ft)		4190.60	
Vel Total (ft/s)	1.57	Avg. Vel. (ft/s)		1.57	
Max Chl Dpth (ft)	3.73	Hydr. Depth (ft)		2.59	
Conv. Total (cfs)	303313.8	Conv. (cfs)		303313.8	
Length Wtd. (ft)	650.00	Wetted Per. (ft)		4190.64	
Min Ch El (ft)	887.20	Shear (lb/sq ft)		0.51	
Alpha	1.00	Stream Power (lb/ft s)		0.80	
Frctn Loss (ft)	2.15	Cum Volume (acre-ft)	241.72	2716.28	19.48
C & E Loss (ft)	0.00	Cum SA (acres)	145.65	699.65	13.34

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 7670.00	7952.00	0.73	6.03	81.84	0.01	0.07	0.12
7952.00	8234.00	113.43	203.55	282.00	2.14	0.72	0.56
8234.00	8516.00	383.61	422.84	282.00	7.24	1.50	0.91
8516.00	8798.00	470.36	477.86	282.00	8.87	1.69	0.98
8798.00	9080.00	519.76	507.37	282.00	9.81	1.80	1.02
9080.00	9362.00	522.23	508.81	282.00	9.85	1.80	1.03
9362.00	9644.00	608.94	557.94	282.00	11.49	1.98	1.09
9644.00	9926.00	712.75	613.20	282.00	13.45	2.17	1.16
9926.00	10208.00	726.58	620.32	282.00	13.71	2.20	1.17

10208.00	10490.00	701.39	607.32	282.00	13.23	2.15	1.15
10490.00	10772.00	460.70	471.95	282.00	8.69	1.67	0.98
10772.00	11054.00	79.52	164.48	282.00	1.50	0.58	0.48
11054.00	11336.00	0.00	0.02	3.07	0.00	0.01	0.02

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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 7670.00	7952.00	117.10	197.22	267.30	1.06	0.74	0.59
7952.00	8234.00	442.51	447.38	282.00	4.02	1.59	0.99
8234.00	8516.00	860.31	666.67	282.00	7.82	2.36	1.29
8516.00	8798.00	981.87	721.69	282.00	8.93	2.56	1.36
8798.00	9080.00	1049.69	751.20	282.00	9.54	2.66	1.40
9080.00	9362.00	1053.05	752.64	282.00	9.57	2.67	1.40
9362.00	9644.00	1170.09	801.77	282.00	10.64	2.84	1.46
9644.00	9926.00	1307.56	857.03	282.00	11.89	3.04	1.53
9926.00	10208.00	1325.70	864.14	282.00	12.05	3.06	1.53
10208.00	10490.00	1292.64	851.14	282.00	11.75	3.02	1.52
10490.00	10772.00	968.50	715.78	282.00	8.80	2.54	1.35
10772.00	11054.00	380.00	408.31	282.00	3.45	1.45	0.93
11054.00	11336.00	49.46	120.13	282.00	0.45	0.43	0.41
11336.00	11618.00	1.54	10.29	110.27	0.01	0.09	0.15

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 7670.00	7952.00	348.25	380.94	280.72	2.05	1.36	0.91
7952.00	8234.00	816.79	636.47	282.00	4.80	2.26	1.28
8234.00	8516.00	1337.85	855.76	282.00	7.87	3.03	1.56
8516.00	8798.00	1484.26	910.78	282.00	8.73	3.23	1.63
8798.00	9080.00	1565.27	940.29	282.00	9.21	3.33	1.66
9080.00	9362.00	1569.27	941.73	282.00	9.23	3.34	1.67
9362.00	9644.00	1708.08	990.86	282.00	10.05	3.51	1.72
9644.00	9926.00	1869.78	1046.12	282.00	11.00	3.71	1.79
9926.00	10208.00	1891.02	1053.23	282.00	11.12	3.73	1.80
10208.00	10490.00	1852.28	1040.23	282.00	10.90	3.69	1.78
10490.00	10772.00	1468.23	904.87	282.00	8.64	3.21	1.62
10772.00	11054.00	734.95	597.40	282.00	4.32	2.12	1.23
11054.00	11336.00	245.24	309.22	282.00	1.44	1.10	0.79
11336.00	11618.00	94.26	174.22	282.00	0.55	0.62	0.54
11618.00	RB 11900.00	14.48	53.42	243.90	0.09	0.22	0.27

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.

CROSS SECTION RIVER: East Weir
REACH: C1 RS: 15.71

INPUT
Description: 1/3 Q=5300 cfs
2/3 Q=11,000 cfs
Full Q=17,000 cfs
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4245	890	4690	889	4850	888.6	5240	888.2	5280	888.1
5330	887.8	5370	888.2	5400	888	5440	888.2	5480	887.9
5510	888.3	5560	887.7	5600	888	5700	886.4	5830	886.2
6120	887.5	6310	887.7	6480	887	6550	886.8	6780	887.5

6860	887.7	6880	887.7	7130	887.2	7200	887.1	7310	887.2
7540	887.5	7775	887.3	7970	887	8110	886.7	8280	886.7
8420	886.8	8890	886.4	9120	886	9170	885.7	9320	885
9450	885.1	9740	885.3	10000	885.3	10300	885.4	10560	885.5
10820	886	11260	887.6	11340	888	11500	888.6	11570	889

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4245	.1	6880	.1	11570	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
6880	11570	970	875	820	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
4245	6880	

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	887.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	887.54	Reach Len. (ft)	970.00	875.00	820.00
Crit W.S. (ft)		Flow Area (sq ft)		5326.35	
E.G. Slope (ft/ft)	0.003351	Area (sq ft)	569.49	5326.35	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	5251.38	Top Width (ft)	970.59	4280.79	
Vel Total (ft/s)	1.00	Avg. Vel. (ft/s)		1.00	
Max Chl Dpth (ft)	2.54	Hydr. Depth (ft)		1.24	
Conv. Total (cfs)	91557.9	Conv. (cfs)		91557.9	
Length Wtd. (ft)	875.00	Wetted Per. (ft)		4280.79	
Min Ch El (ft)	885.00	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)		0.26	
Frctn Loss (ft)	2.44	Cum Volume (acre-ft)	21.78	1193.43	3.02
C & E Loss (ft)	0.00	Cum SA (acres)	36.86	540.50	5.65

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	888.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	888.23	Reach Len. (ft)	970.00	875.00	820.00
Crit W.S. (ft)		Flow Area (sq ft)		8405.47	
E.G. Slope (ft/ft)	0.003394	Area (sq ft)	1502.72	8405.47	
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	6181.77	Top Width (ft)	1660.00	4521.77	
Vel Total (ft/s)	1.31	Avg. Vel. (ft/s)		1.31	
Max Chl Dpth (ft)	3.23	Hydr. Depth (ft)		1.86	
Conv. Total (cfs)	188824.6	Conv. (cfs)		188824.6	
Length Wtd. (ft)	873.92	Wetted Per. (ft)		4521.78	
Min Ch El (ft)	885.00	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)		0.52	
Frctn Loss (ft)	2.45	Cum Volume (acre-ft)	105.28	1936.74	10.46
C & E Loss (ft)	0.00	Cum SA (acres)	99.55	604.88	13.34

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	888.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.100	
W.S. Elev (ft)	888.78	Reach Len. (ft)	970.00	875.00	820.00
Crit W.S. (ft)		Flow Area (sq ft)		10945.12	
E.G. Slope (ft/ft)	0.003492	Area (sq ft)	2565.56	10945.12	

Q Total (cfs)	17000.00	Flow (cfs)		17000.00	
Top Width (ft)	6756.16	Top Width (ft)	2103.85	4652.31	
Vel Total (ft/s)	1.55	Avg. Vel. (ft/s)		1.55	
Max Chl Dpth (ft)	3.78	Hydr. Depth (ft)		2.35	
Conv. Total (cfs)	287684.4	Conv. (cfs)		287684.4	
Length Wtd. (ft)	873.33	Wetted Per. (ft)		4652.32	
Min Ch El (ft)	885.00	Shear (lb/sq ft)		0.51	
Alpha	1.00	Stream Power (lb/ft s)		0.80	
Frctn Loss (ft)	2.33	Cum Volume (acre-ft)	222.28	2553.77	19.48
C & E Loss (ft)	0.00	Cum SA (acres)	129.71	633.67	13.34

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 6880.00	7192.67	13.51	52.20	230.91	0.25	0.23	0.26
7192.67	7505.33	25.63	86.52	312.67	0.48	0.28	0.30
7505.33	7818.00	8.85	45.72	312.67	0.17	0.15	0.19
7818.00	8130.67	84.62	177.17	312.67	1.60	0.57	0.48
8130.67	8443.33	152.67	252.44	312.67	2.88	0.81	0.60
8443.33	8756.00	179.39	278.09	312.67	3.38	0.89	0.65
8756.00	9068.67	295.86	375.46	312.67	5.58	1.20	0.79
9068.67	9381.33	725.28	643.00	312.67	13.68	2.06	1.13
9381.33	9694.00	923.07	743.10	312.67	17.42	2.38	1.24
9694.00	10006.67	835.58	700.01	312.67	15.77	2.24	1.19
10006.67	10319.33	800.62	682.28	312.67	15.11	2.18	1.17
10319.33	10632.00	725.08	642.89	312.67	13.68	2.06	1.13
10632.00	10944.67	455.08	486.14	312.67	8.59	1.55	0.94
10944.67	11257.33	74.77	161.33	297.88	1.41	0.54	0.46

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 6880.00	7192.67	181.51	262.86	312.67	1.65	0.84	0.69
7192.67	7505.33	231.12	303.87	312.67	2.10	0.97	0.76
7505.33	7818.00	181.74	263.06	312.67	1.65	0.84	0.69
7818.00	8130.67	357.11	394.52	312.67	3.25	1.26	0.91
8130.67	8443.33	477.74	469.79	312.67	4.34	1.50	1.02
8443.33	8756.00	521.99	495.43	312.67	4.75	1.58	1.05
8756.00	9068.67	703.95	592.80	312.67	6.40	1.90	1.19
9068.67	9381.33	1309.62	860.35	312.67	11.91	2.75	1.52
9381.33	9694.00	1573.30	960.45	312.67	14.30	3.07	1.64
9694.00	10006.67	1457.41	917.35	312.67	13.25	2.93	1.59
10006.67	10319.33	1410.78	899.62	312.67	12.83	2.88	1.57
10319.33	10632.00	1309.35	860.24	312.67	11.90	2.75	1.52
10632.00	10944.67	936.36	703.48	312.67	8.51	2.25	1.33
10944.67	11257.33	332.94	378.28	312.67	3.03	1.21	0.88
11257.33	RB 11570.00	15.08	43.38	144.44	0.14	0.30	0.35

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 6880.00	7192.67	440.78	435.76	312.67	2.59	1.39	1.01

7192.67	7505.33	512.07	476.77	312.67	3.01	1.52	1.07
7505.33	7818.00	441.13	435.96	312.67	2.59	1.39	1.01
7818.00	8130.67	684.42	567.41	312.67	4.03	1.81	1.21
8130.67	8443.33	842.33	642.68	312.67	4.95	2.06	1.31
8443.33	8756.00	899.10	668.33	312.67	5.29	2.14	1.35
8756.00	9068.67	1127.85	765.70	312.67	6.63	2.45	1.47
9068.67	9381.33	1858.48	1033.24	312.67	10.93	3.30	1.80
9381.33	9694.00	2168.16	1133.35	312.67	12.75	3.62	1.91
9694.00	10006.67	2032.50	1090.25	312.67	11.96	3.49	1.86
10006.67	10319.33	1977.72	1072.52	312.67	11.63	3.43	1.84
10319.33	10632.00	1858.17	1033.14	312.67	10.93	3.30	1.80
10632.00	10944.67	1412.46	876.38	312.67	8.31	2.80	1.61
10944.67	11257.33	652.08	551.17	312.67	3.84	1.76	1.18
11257.33	RB 11570.00	92.74	162.46	274.98	0.55	0.59	0.57

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.

CROSS SECTION RIVER: East Weir
REACH: C1 RS: 15.53

INPUT
Description: 1/3 Q=5300 cfs
2/3 Q=11,000 cfs
Full Q=17,000 cfs
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5570	888	5580	886	6150	884.2	6250	884.1	6650	884
6810	886.8	6830	886.8	6860	884	6890	883.5	6910	884
6980	884.2	7130	884.1	7260	884.1	7680	883.5	7870	883.5
8140	883.6	8310	883.6	8950	883.3	9240	883.4	9430	883.5
9730	883.7	10000	883.8	10350	883.8	10570	883.8	10970	884
11330	885.3	11420	885.3	11530	885.4	11610	885.3	11720	885.4
11800	885	11940	884.6	12080	884	12110	884.8		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5570	.1	6830	.1	11330	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
6830	11330	990	780	670	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5570	6830		11330	12110	885.3

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	885.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	885.10	Reach Len. (ft)	990.00	780.00	670.00
Crit W.S. (ft)	884.03	Flow Area (sq ft)		6024.00	
E.G. Slope (ft/ft)	0.002325	Area (sq ft)	678.58	6024.00	176.30
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	5605.03	Top Width (ft)	848.19	4426.66	330.18
Vel Total (ft/s)	0.88	Avg. Vel. (ft/s)		0.88	
Max Chl Dpth (ft)	1.80	Hydr. Depth (ft)		1.36	
Conv. Total (cfs)	109921.2	Conv. (cfs)		109921.2	
Length Wtd. (ft)	780.00	Wetted Per. (ft)		4426.73	
Min Ch El (ft)	883.30	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)		0.17	
Frctn Loss (ft)	2.03	Cum Volume (acre-ft)	7.89	1079.43	1.36
C & E Loss (ft)	0.00	Cum SA (acres)	16.61	453.05	2.54

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	885.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	0.100
W.S. Elev (ft)	885.79	Reach Len. (ft)	990.00	780.00	670.00
Crit W.S. (ft)	884.28	Flow Area (sq ft)		9107.21	611.80
E.G. Slope (ft/ft)	0.002375	Area (sq ft)	1351.27	9107.21	611.80
Q Total (cfs)	11000.00	Flow (cfs)		10567.69	432.31
Top Width (ft)	6374.77	Top Width (ft)	1105.59	4489.17	780.00
Vel Total (ft/s)	1.13	Avg. Vel. (ft/s)		1.16	0.71
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)		2.03	0.78
Conv. Total (cfs)	225735.3	Conv. (cfs)		216863.7	8871.6
Length Wtd. (ft)	777.82	Wetted Per. (ft)		4489.27	781.00
Min Ch El (ft)	883.30	Shear (lb/sq ft)		0.30	0.12
Alpha	1.03	Stream Power (lb/ft s)		0.35	0.08
Frctn Loss (ft)	1.62	Cum Volume (acre-ft)	73.50	1760.85	4.71
C & E Loss (ft)	0.00	Cum SA (acres)	68.75	514.38	6.00

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	886.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	0.100
W.S. Elev (ft)	886.47	Reach Len. (ft)	990.00	780.00	670.00
Crit W.S. (ft)	884.48	Flow Area (sq ft)		12142.81	1138.82
E.G. Slope (ft/ft)	0.002082	Area (sq ft)	2149.88	12142.81	1138.82
Q Total (cfs)	17000.00	Flow (cfs)		15965.38	1034.62
Top Width (ft)	6489.60	Top Width (ft)	1213.19	4496.41	780.00
Vel Total (ft/s)	1.28	Avg. Vel. (ft/s)		1.31	0.91
Max Chl Dpth (ft)	3.17	Hydr. Depth (ft)		2.70	1.46
Conv. Total (cfs)	372572.5	Conv. (cfs)		349897.8	22674.7
Length Wtd. (ft)	776.65	Wetted Per. (ft)		4496.54	781.68
Min Ch El (ft)	883.30	Shear (lb/sq ft)		0.35	0.19
Alpha	1.02	Stream Power (lb/ft s)		0.46	0.17
Frctn Loss (ft)	1.48	Cum Volume (acre-ft)	169.78	2321.89	8.76
C & E Loss (ft)	0.00	Cum SA (acres)	92.78	541.78	6.00

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 6830.00	7130.00	201.62	286.73	281.86	3.80	1.02	0.70
7130.00	7430.00	233.35	320.92	300.00	4.40	1.07	0.73
7430.00	7730.00	388.33	435.63	300.00	7.33	1.45	0.89
7730.00	8030.00	449.40	475.53	300.00	8.48	1.59	0.95
8030.00	8330.00	413.88	452.61	300.00	7.81	1.51	0.91
8330.00	8630.00	447.30	474.19	300.00	8.44	1.58	0.94
8630.00	8930.00	515.55	516.37	300.00	9.73	1.72	1.00
8930.00	9230.00	532.79	526.66	300.00	10.05	1.76	1.01
9230.00	9530.00	468.34	487.45	300.00	8.84	1.62	0.96
9530.00	9830.00	382.58	431.75	300.00	7.22	1.44	0.89
9830.00	10130.00	330.73	395.62	300.00	6.24	1.32	0.84
10130.00	10430.00	323.31	390.27	300.00	6.10	1.30	0.83
10430.00	10730.00	314.52	383.87	300.00	5.93	1.28	0.82
10730.00	11030.00	254.62	338.17	300.00	4.80	1.13	0.75
11030.00	RB 11330.00	43.67	108.26	244.87	0.82	0.44	0.40

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 6830.00	7130.00	484.59	483.32	289.27	4.41	1.67	1.00
7130.00	7430.00	547.19	527.50	300.00	4.97	1.76	1.04
7430.00	7730.00	759.56	642.21	300.00	6.91	2.14	1.18
7730.00	8030.00	839.83	682.11	300.00	7.63	2.27	1.23
8030.00	8330.00	793.33	659.19	300.00	7.21	2.20	1.20
8330.00	8630.00	837.09	680.77	300.00	7.61	2.27	1.23
8630.00	8930.00	925.30	722.95	300.00	8.41	2.41	1.28
8930.00	9230.00	947.36	733.24	300.00	8.61	2.44	1.29
9230.00	9530.00	864.44	694.03	300.00	7.86	2.31	1.25
9530.00	9830.00	751.93	638.33	300.00	6.84	2.13	1.18
9830.00	10130.00	682.35	602.20	300.00	6.20	2.01	1.13
10130.00	10430.00	672.28	596.85	300.00	6.11	1.99	1.13
10430.00	10730.00	660.30	590.45	300.00	6.00	1.97	1.12
10730.00	11030.00	577.34	544.75	300.00	5.25	1.82	1.06
11030.00	RB 11330.00	224.83	309.35	300.00	2.04	1.03	0.73
11330.00	11382.00	11.38	25.45	52.00	0.10	0.49	0.45
11382.00	11434.00	11.32	25.36	52.00	0.10	0.49	0.45
11434.00	11486.00	10.01	23.56	52.00	0.09	0.45	0.42
11486.00	11538.00	8.38	21.17	52.00	0.08	0.41	0.40
11538.00	11590.00	9.24	22.46	52.00	0.08	0.43	0.41
11590.00	11642.00	10.86	24.74	52.00	0.10	0.48	0.44
11642.00	11694.00	9.41	22.71	52.00	0.09	0.44	0.41
11694.00	11746.00	9.10	22.25	52.00	0.08	0.43	0.41
11746.00	11798.00	18.24	33.77	52.00	0.17	0.65	0.54
11798.00	11850.00	29.01	44.62	52.00	0.26	0.86	0.65
11850.00	11902.00	37.86	52.35	52.00	0.34	1.01	0.72
11902.00	11954.00	47.81	60.21	52.00	0.43	1.16	0.79
11954.00	12006.00	62.58	70.77	52.00	0.57	1.36	0.88
12006.00	12058.00	80.58	82.36	52.00	0.73	1.58	0.98
12058.00	12110.00	76.53	80.02	53.00	0.70	1.54	0.96

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 6830.00	7130.00	796.32	681.15	296.54	4.68	2.30	1.17
7130.00	7430.00	887.27	730.20	300.00	5.22	2.43	1.22
7430.00	7730.00	1131.55	844.91	300.00	6.66	2.82	1.34
7730.00	8030.00	1222.00	884.80	300.00	7.19	2.95	1.38
8030.00	8330.00	1169.70	861.89	300.00	6.88	2.87	1.36
8330.00	8630.00	1218.92	883.47	300.00	7.17	2.94	1.38
8630.00	8930.00	1317.45	925.64	300.00	7.75	3.09	1.42
8930.00	9230.00	1341.95	935.94	300.00	7.89	3.12	1.43
9230.00	9530.00	1249.57	896.73	300.00	7.35	2.99	1.39
9530.00	9830.00	1122.90	841.02	300.00	6.61	2.80	1.34
9830.00	10130.00	1043.66	804.90	300.00	6.14	2.68	1.30
10130.00	10430.00	1032.13	799.55	300.00	6.07	2.67	1.29
10430.00	10730.00	1018.39	793.15	300.00	5.99	2.64	1.28
10730.00	11030.00	922.48	747.44	300.00	5.43	2.49	1.23
11030.00	RB 11330.00	491.10	512.05	300.00	2.89	1.71	0.96
11330.00	11382.00	45.40	60.59	52.00	0.27	1.17	0.75
11382.00	11434.00	45.29	60.50	52.00	0.27	1.16	0.75
11434.00	11486.00	43.06	58.70	52.00	0.25	1.13	0.73

11486.00	11538.00	40.18	56.31	52.00	0.24	1.08	0.71
11538.00	11590.00	41.73	57.60	52.00	0.25	1.11	0.72
11590.00	11642.00	44.51	59.87	52.00	0.26	1.15	0.74
11642.00	11694.00	42.03	57.84	52.00	0.25	1.11	0.73
11694.00	11746.00	41.47	57.38	52.00	0.24	1.10	0.72
11746.00	11798.00	56.26	68.91	52.00	0.33	1.33	0.82
11798.00	11850.00	71.78	79.75	52.00	0.42	1.53	0.90
11850.00	11902.00	83.74	87.48	52.00	0.49	1.68	0.96
11902.00	11954.00	96.66	95.35	52.00	0.57	1.83	1.01
11954.00	12006.00	115.15	105.90	52.00	0.68	2.04	1.09
12006.00	12058.00	136.91	117.49	52.00	0.81	2.26	1.17
12058.00	12110.00	130.43	115.15	53.68	0.77	2.21	1.13

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Weir
REACH: C1 RS: 15.38

INPUT
Description: 1/3 Q=5300 cfs
2/3 Q=11,000 cfs
Full Q=17,000 cfs
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7330	886	7500	885.4333	7630	885	8010	884.1	8030	884
8340	882.4	8730	882.5	9080	882.6	9300	882	9320	882.2
9340	882.2	9370	882	9470	881	9570	881.1	9810	881.3
10000	881	10270	881.4	10450	881	10590	880.9	10810	881.2
11610	881.7	11970	881.7	11990	881.3	12010	882.5	12030	882.5
12040	881.8	12050	882	12110	882.7	12290	884	12510	884.5
12615	885.55	12660	886						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
7330	.1	7500	.1	12615	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
7500	12615	1500	1220	1000	.1	.3

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	883.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	883.07	Reach Len. (ft)	1500.00	1220.00	1000.00
Crit W.S. (ft)		Flow Area (sq ft)		5374.34	
E.G. Slope (ft/ft)	0.002922	Area (sq ft)		5374.34	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	3949.99	Top Width (ft)		3949.99	
Vel Total (ft/s)	0.99	Avg. Vel. (ft/s)		0.99	
Max Chl Dpth (ft)	2.17	Hydr. Depth (ft)		1.36	
Conv. Total (cfs)	98054.3	Conv. (cfs)		98054.3	
Length Wtd. (ft)	1220.00	Wetted Per. (ft)		3950.07	
Min Ch El (ft)	880.90	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		0.24	
Frctn Loss (ft)	1.70	Cum Volume (acre-ft)	0.18	977.38	
C & E Loss (ft)	0.00	Cum SA (acres)	6.97	378.05	

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 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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	884.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	884.17	Reach Len. (ft)	1500.00	1220.00	1000.00
Crit W.S. (ft)		Flow Area (sq ft)		9932.47	
E.G. Slope (ft/ft)	0.001866	Area (sq ft)		9932.47	
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	4383.09	Top Width (ft)		4383.09	
Vel Total (ft/s)	1.11	Avg. Vel. (ft/s)		1.11	
Max Chl Dpth (ft)	3.27	Hydr. Depth (ft)		2.27	
Conv. Total (cfs)	254623.4	Conv. (cfs)		254623.4	
Length Wtd. (ft)	1220.00	Wetted Per. (ft)		4383.18	
Min Ch El (ft)	880.90	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)		0.29	
Frctn Loss (ft)	1.56	Cum Volume (acre-ft)	58.15	1590.39	
C & E Loss (ft)	0.00	Cum SA (acres)	56.19	434.94	

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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	885.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	884.99	Reach Len. (ft)	1500.00	1220.00	1000.00
Crit W.S. (ft)		Flow Area (sq ft)		13763.33	
E.G. Slope (ft/ft)	0.001754	Area (sq ft)		13763.33	
Q Total (cfs)	17000.00	Flow (cfs)		17000.00	
Top Width (ft)	4922.67	Top Width (ft)		4922.67	
Vel Total (ft/s)	1.24	Avg. Vel. (ft/s)		1.24	
Max Chl Dpth (ft)	4.09	Hydr. Depth (ft)		2.80	
Conv. Total (cfs)	405877.4	Conv. (cfs)		405877.4	
Length Wtd. (ft)	1220.00	Wetted Per. (ft)		4922.76	
Min Ch El (ft)	880.90	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		0.38	
Frctn Loss (ft)	1.52	Cum Volume (acre-ft)	145.35	2089.95	
C & E Loss (ft)	0.00	Cum SA (acres)	78.99	457.45	

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
8182.00	8523.00	75.84	160.81	312.20	1.43	0.52	0.47
8523.00	8864.00	99.64	196.22	341.00	1.88	0.58	0.51
8864.00	9205.00	92.10	187.17	341.00	1.74	0.55	0.49
9205.00	9546.00	420.60	465.60	341.01	7.94	1.37	0.90
9546.00	9887.00	707.82	636.26	341.00	13.36	1.87	1.11
9887.00	10228.00	745.18	656.20	341.00	14.06	1.92	1.14
10228.00	10569.00	749.24	658.35	341.00	14.14	1.93	1.14
10569.00	10910.00	776.47	672.60	341.00	14.65	1.97	1.15
10910.00	11251.00	604.75	578.93	341.00	11.41	1.70	1.04
11251.00	11592.00	483.59	506.26	341.00	9.12	1.48	0.96
11592.00	11933.00	421.50	466.19	341.00	7.95	1.37	0.90
11933.00	12274.00	123.27	189.74	227.86	2.33	0.83	0.65

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

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)

7841.00	8182.00	30.82	88.60	200.94	0.28	0.44	0.35
8182.00	8523.00	432.90	534.34	341.00	3.94	1.57	0.81
8523.00	8864.00	484.78	571.89	341.00	4.41	1.68	0.85
8864.00	9205.00	472.07	562.84	341.00	4.29	1.65	0.84
9205.00	9546.00	922.38	841.27	341.01	8.39	2.47	1.10
9546.00	9887.00	1254.92	1011.94	341.00	11.41	2.97	1.24
9887.00	10228.00	1296.40	1031.88	341.00	11.79	3.03	1.26
10228.00	10569.00	1300.90	1034.02	341.00	11.83	3.03	1.26
10569.00	10910.00	1330.92	1048.28	341.00	12.10	3.07	1.27
10910.00	11251.00	1138.68	954.61	341.00	10.35	2.80	1.19
11251.00	11592.00	997.89	881.93	341.00	9.07	2.59	1.13
11592.00	11933.00	923.48	841.86	341.00	8.40	2.47	1.10
11933.00	12274.00	412.51	519.14	341.07	3.75	1.52	0.79
12274.00	RB 12615.00	1.36	9.87	90.15	0.01	0.11	0.14

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 7500.00	7841.00	11.05	49.80	205.07	0.07	0.24	0.22
7841.00	8182.00	197.42	344.12	341.00	1.16	1.01	0.57
8182.00	8523.00	827.51	813.09	341.00	4.87	2.38	1.02
8523.00	8864.00	892.18	850.64	341.00	5.25	2.49	1.05
8864.00	9205.00	876.42	841.59	341.00	5.16	2.47	1.04
9205.00	9546.00	1411.18	1120.02	341.01	8.30	3.28	1.26
9546.00	9887.00	1787.51	1290.69	341.00	10.51	3.79	1.38
9887.00	10228.00	1833.77	1310.63	341.00	10.79	3.84	1.40
10228.00	10569.00	1838.77	1312.77	341.00	10.82	3.85	1.40
10569.00	10910.00	1872.16	1327.02	341.00	11.01	3.89	1.41
10910.00	11251.00	1657.14	1233.36	341.00	9.75	3.62	1.34
11251.00	11592.00	1497.61	1160.68	341.00	8.81	3.40	1.29
11592.00	11933.00	1412.44	1120.61	341.00	8.31	3.29	1.26
11933.00	12274.00	801.77	797.89	341.07	4.72	2.34	1.00
12274.00	RB 12615.00	83.06	190.42	284.60	0.49	0.67	0.44

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.

CROSS SECTION RIVER: East Weir
REACH: C1 RS: 15.15

INPUT
Description: 1/3 Q=5300 cfs
2/3 Q=11,000 cfs
Full Q=17,000 cfs
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7120	884.5	7150	884.5	7160	884	7360	883.8	7610	884.1
7840	883.8	8030	884	8060	882.5	8080	882	8390	882.4
8590	882	8700	879.5	8720	880.5	8750	880.5	8770	880
9040	879.3	9340	879.5	9630	879	10000	878.4	10310	878.8
10480	880	10540	880	10640	879	10790	879	10930	878.8
11080	878.5	11390	878.7	11450	878.8	11650	879.5	11760	879.1
11850	879	11890	880	11910	880.5	11940	880.5	11950	880.4
12010	881.2	12330	882	12520	882.8	12690	884		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
7120	.1	8030	.1	12690	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8030	12690	1900	1590	1250	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev

7120 8030

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	881.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	881.37	Reach Len. (ft)	1900.00	1590.00	1250.00
Crit W.S. (ft)		Flow Area (sq ft)		7467.32	
E.G. Slope (ft/ft)	0.000819	Area (sq ft)		7467.32	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	3462.25	Top Width (ft)		3462.25	
Vel Total (ft/s)	0.71	Avg. Vel. (ft/s)		0.71	
Max Chl Dpth (ft)	2.97	Hydr. Depth (ft)		2.16	
Conv. Total (cfs)	185220.6	Conv. (cfs)		185220.6	
Length Wtd. (ft)	1590.00	Wetted Per. (ft)		3462.34	
Min Ch El (ft)	878.40	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)		0.08	
Frctn Loss (ft)	1.72	Cum Volume (acre-ft)	0.18	797.55	
C & E Loss (ft)	0.00	Cum SA (acres)	6.97	274.25	

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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	882.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	882.61	Reach Len. (ft)	1900.00	1590.00	1250.00
Crit W.S. (ft)		Flow Area (sq ft)		12282.70	
E.G. Slope (ft/ft)	0.000929	Area (sq ft)		12282.70	
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	4418.28	Top Width (ft)		4418.28	
Vel Total (ft/s)	0.90	Avg. Vel. (ft/s)		0.90	
Max Chl Dpth (ft)	4.21	Hydr. Depth (ft)		2.78	
Conv. Total (cfs)	360834.8	Conv. (cfs)		360834.8	
Length Wtd. (ft)	1590.00	Wetted Per. (ft)		4418.39	
Min Ch El (ft)	878.40	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)		0.14	
Frctn Loss (ft)	1.86	Cum Volume (acre-ft)	58.15	1279.29	
C & E Loss (ft)	0.00	Cum SA (acres)	56.19	311.69	

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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	883.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	883.48	Reach Len. (ft)	1900.00	1590.00	1250.00
Crit W.S. (ft)		Flow Area (sq ft)		16157.72	
E.G. Slope (ft/ft)	0.000932	Area (sq ft)		16157.72	
Q Total (cfs)	17000.00	Flow (cfs)		17000.00	
Top Width (ft)	4575.14	Top Width (ft)		4575.14	
Vel Total (ft/s)	1.05	Avg. Vel. (ft/s)		1.05	
Max Chl Dpth (ft)	5.08	Hydr. Depth (ft)		3.53	
Conv. Total (cfs)	556780.1	Conv. (cfs)		556780.1	
Length Wtd. (ft)	1590.00	Wetted Per. (ft)		4575.28	
Min Ch El (ft)	878.40	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)		0.22	
Frctn Loss (ft)	1.88	Cum Volume (acre-ft)	145.35	1670.94	
C & E Loss (ft)	0.00	Cum SA (acres)	78.99	324.45	

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
8340.67	8651.33	2.82	12.99	33.82	0.05	0.38	0.22
8651.33	8962.00	238.68	452.20	310.71	4.50	1.46	0.53
8962.00	9272.67	402.32	618.54	310.67	7.59	1.99	0.65
9272.67	9583.33	420.20	634.89	310.67	7.93	2.04	0.66
9583.33	9894.00	607.82	792.30	310.67	11.47	2.55	0.77
9894.00	10204.67	734.95	887.93	310.67	13.87	2.86	0.83
10204.67	10515.33	451.16	662.56	310.67	8.51	2.13	0.68
10515.33	10826.00	452.71	663.92	310.67	8.54	2.14	0.68
10826.00	11136.67	657.50	830.54	310.67	12.41	2.67	0.79
11136.67	11447.33	681.80	848.82	310.67	12.86	2.73	0.80
11447.33	11758.00	465.85	675.41	310.67	8.79	2.17	0.69
11758.00	12068.67	184.20	387.09	310.69	3.48	1.25	0.48
12068.67	12379.33	0.00	0.15	11.11	0.00	0.01	0.02

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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8030.00	8340.67	28.76	123.81	282.97	0.26	0.44	0.23
8340.67	8651.33	48.35	175.54	310.68	0.44	0.57	0.28
8651.33	8962.00	653.70	837.50	310.71	5.94	2.70	0.78
8962.00	9272.67	884.19	1003.84	310.67	8.04	3.23	0.88
9272.67	9583.33	908.32	1020.19	310.67	8.26	3.28	0.89
9583.33	9894.00	1153.72	1177.60	310.67	10.49	3.79	0.98
9894.00	10204.67	1314.06	1273.23	310.67	11.95	4.10	1.03
10204.67	10515.33	949.74	1047.85	310.67	8.63	3.37	0.91
10515.33	10826.00	951.80	1049.22	310.67	8.65	3.38	0.91
10826.00	11136.67	1216.84	1215.84	310.67	11.06	3.91	1.00
11136.67	11447.33	1247.49	1234.12	310.67	11.34	3.97	1.01
11447.33	11758.00	969.25	1060.71	310.67	8.81	3.41	0.91
11758.00	12068.67	571.22	772.39	310.69	5.19	2.49	0.74
12068.67	12379.33	99.83	271.21	310.67	0.91	0.87	0.37
12379.33	RB 12690.00	2.74	19.67	96.66	0.02	0.20	0.14

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8030.00	8340.67	181.11	374.68	300.20	1.07	1.25	0.48
8340.67	8651.33	233.87	442.84	310.68	1.38	1.43	0.53
8651.33	8962.00	1073.19	1104.81	310.71	6.31	3.56	0.97
8962.00	9272.67	1355.91	1271.14	310.67	7.98	4.09	1.07
9272.67	9583.33	1385.09	1287.49	310.67	8.15	4.14	1.08
9583.33	9894.00	1678.68	1444.90	310.67	9.87	4.65	1.16
9894.00	10204.67	1867.91	1540.53	310.67	10.99	4.96	1.21
10204.67	10515.33	1435.05	1315.16	310.67	8.44	4.23	1.09
10515.33	10826.00	1437.53	1316.52	310.67	8.46	4.24	1.09
10826.00	11136.67	1753.39	1483.14	310.67	10.31	4.77	1.18
11136.67	11447.33	1789.56	1501.42	310.67	10.53	4.83	1.19
11447.33	11758.00	1458.51	1328.01	310.67	8.58	4.27	1.10
11758.00	12068.67	969.89	1039.69	310.69	5.71	3.35	0.93
12068.67	12379.33	324.01	538.51	310.67	1.91	1.73	0.60
12379.33	RB 12690.00	56.30	168.91	236.31	0.33	0.71	0.33

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.

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CROSS SECTION          RIVER: East Weir
REACH: C1                 RS: 14.85

INPUT
Description: 1/3 Q=5300 cfs
2/3 Q=11,000 cfs
Full Q=17,000 cfs
Station Elevation Data     num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    7050   880.6    7070     880    7530   879.6    8080   879.8    8120   879.8
    8510     880    8550     881    8570     881    8760     880    8970     879
    9380   878.2    9430     878    9650   877.8    9790   877.8    9930     878
   10000   878.4   10050     878   10070   878.5   10090   878.5   10320   876.5
   10700     877   10910   877.2   10960   877.2   11090   877.5   11370     877
   11550   877.1   11770     878   12100     880   12290     881   12450     882
   12710   882.9   12940     884

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    7050      .1    8570      .1   12450      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          8570   12450             1300    1200    1100              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
    7050    8570

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)            879.66   Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.01   Wt. n-Val.                          0.100
  W.S. Elev (ft)            879.65   Reach Len. (ft)          1300.00   1200.00    1100.00
  Crit W.S. (ft)                     Flow Area (sq ft)                  6042.04
  E.G. Slope (ft/ft)       0.001498  Area (sq ft)                4.61   6042.04
  Q Total (cfs)             5300.00  Flow (cfs)                         5300.00
  Top Width (ft)            3397.94  Top Width (ft)            189.70   3208.23
  Vel Total (ft/s)             0.88  Avg. Vel. (ft/s)                      0.88
  Max Chl Dpth (ft)            3.15  Hydr. Depth (ft)                      1.88
  Conv. Total (cfs)        136916.3  Conv. (cfs)                       136916.3
  Length Wtd. (ft)          1200.00  Wetted Per. (ft)                  3208.26
  Min Ch El (ft)             876.50  Shear (lb/sq ft)                      0.18
  Alpha                        1.00  Stream Power (lb/ft s)                0.15
  Frctn Loss (ft)              1.39  Cum Volume (acre-ft)        0.07    550.99
  C & E Loss (ft)              0.00  Cum SA (acres)              2.84    152.51


Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT    Profile #2/3

  E.G. Elev (ft)            880.76   Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02   Wt. n-Val.                          0.100
  W.S. Elev (ft)            880.74   Reach Len. (ft)          1300.00   1200.00    1100.00
  Crit W.S. (ft)                     Flow Area (sq ft)                  9779.38
  E.G. Slope (ft/ft)       0.001524  Area (sq ft)             1393.99   9779.38
  Q Total (cfs)            11000.00  Flow (cfs)                        11000.00
  Top Width (ft)            5112.10  Top Width (ft)           1489.72   3622.38
  Vel Total (ft/s)             1.12  Avg. Vel. (ft/s)                      1.12
  Max Chl Dpth (ft)            4.24  Hydr. Depth (ft)                      2.70
  Conv. Total (cfs)        281740.3  Conv. (cfs)                       281740.3
  Length Wtd. (ft)          1200.00  Wetted Per. (ft)                  3622.41
  Min Ch El (ft)             876.50  Shear (lb/sq ft)                      0.26
  Alpha                        1.00  Stream Power (lb/ft s)                0.29
  Frctn Loss (ft)              1.46  Cum Volume (acre-ft)       27.75    876.65
  C & E Loss (ft)              0.00  Cum SA (acres)             23.70    164.94
```

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	881.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.100	
W.S. Elev (ft)	881.58	Reach Len. (ft)	1300.00	1200.00	1100.00
Crit W.S. (ft)		Flow Area (sq ft)		12911.03	
E.G. Slope (ft/ft)	0.001544	Area (sq ft)	2661.22	12911.03	
Q Total (cfs)	17000.00	Flow (cfs)		17000.00	
Top Width (ft)	5332.97	Top Width (ft)	1520.00	3812.97	
Vel Total (ft/s)	1.32	Avg. Vel. (ft/s)		1.32	
Max Chl Dpth (ft)	5.08	Hydr. Depth (ft)		3.39	
Conv. Total (cfs)	432598.7	Conv. (cfs)		432598.7	
Length Wtd. (ft)	1200.00	Wetted Per. (ft)		3813.01	
Min Ch El (ft)	876.50	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)		0.43	
Frctn Loss (ft)	1.52	Cum Volume (acre-ft)	87.31	1140.42	
C & E Loss (ft)	0.00	Cum SA (acres)	45.84	171.36	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
8828.67	9087.33	46.20	133.71	253.54	0.87	0.53	0.35
9087.33	9346.00	167.83	292.27	258.67	3.17	1.13	0.57
9346.00	9604.67	316.18	427.38	258.67	5.97	1.65	0.74
9604.67	9863.33	374.93	473.40	258.67	7.07	1.83	0.79
9863.33	10122.00	258.87	379.07	258.68	4.88	1.47	0.68
10122.00	10380.67	622.25	641.57	258.67	11.74	2.48	0.97
10380.67	10639.33	806.83	749.77	258.67	15.22	2.90	1.08
10639.33	10898.00	667.00	668.86	258.67	12.58	2.59	1.00
10898.00	11156.67	553.30	597.91	258.67	10.44	2.31	0.93
11156.67	11415.33	626.03	643.90	258.67	11.81	2.49	0.97
11415.33	11674.00	608.20	632.83	258.67	11.48	2.45	0.96
11674.00	11932.67	243.19	365.11	258.67	4.59	1.41	0.67
11932.67	12191.33	9.19	36.24	109.36	0.17	0.33	0.25

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8570.00	8828.67	40.98	114.71	209.86	0.37	0.55	0.36
8828.67	9087.33	306.08	416.75	258.67	2.78	1.61	0.73
9087.33	9346.00	523.95	575.38	258.67	4.76	2.22	0.91
9346.00	9604.67	744.68	710.49	258.67	6.77	2.75	1.05
9604.67	9863.33	826.79	756.51	258.67	7.52	2.92	1.09
9863.33	10122.00	662.18	662.17	258.68	6.02	2.56	1.00
10122.00	10380.67	1155.25	924.68	258.67	10.50	3.57	1.25
10380.67	10639.33	1389.27	1032.88	258.67	12.63	3.99	1.35
10639.33	10898.00	1212.66	951.97	258.67	11.02	3.68	1.27
10898.00	11156.67	1065.80	881.02	258.67	9.69	3.41	1.21
11156.67	11415.33	1160.13	927.00	258.67	10.55	3.58	1.25
11415.33	11674.00	1137.14	915.94	258.67	10.34	3.54	1.24
11674.00	11932.67	639.10	648.22	258.67	5.81	2.51	0.99
11932.67	12191.33	135.08	255.11	258.67	1.23	0.99	0.53

12191.33	RB 12450.00	0.90	6.54	49.86	0.01	0.13	0.14

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8570.00	8828.67	206.04	325.19	258.67	1.21	1.26	0.63
8828.67	9087.33	626.07	633.50	258.67	3.68	2.45	0.99
9087.33	9346.00	908.60	792.13	258.67	5.34	3.06	1.15
9346.00	9604.67	1181.32	927.24	258.67	6.95	3.58	1.27
9604.67	9863.33	1280.64	973.26	258.67	7.53	3.76	1.32
9863.33	10122.00	1080.49	878.93	258.68	6.36	3.40	1.23
10122.00	10380.67	1670.26	1141.43	258.67	9.83	4.41	1.46
10380.67	10639.33	1942.45	1249.63	258.67	11.43	4.83	1.55
10639.33	10898.00	1737.38	1168.72	258.67	10.22	4.52	1.49
10898.00	11156.67	1565.18	1097.77	258.67	9.21	4.24	1.43
11156.67	11415.33	1675.98	1143.75	258.67	9.86	4.42	1.47
11415.33	11674.00	1649.04	1132.69	258.67	9.70	4.38	1.46
11674.00	11932.67	1052.07	864.97	258.67	6.19	3.34	1.22
11932.67	12191.33	383.18	471.86	258.67	2.25	1.82	0.81
12191.33	RB 12450.00	41.30	109.96	191.64	0.24	0.57	0.38

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Weir
REACH: C1 RS: 14.62

INPUT
Description: 1/3 Q=5300 cfs
2/3 Q=11,000 cfs
Full Q=17,000 cfs
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6560	884.4	6580	884	6600	884	7140	879.2	7510	880
7850	879.45	7910	878	8010	877.5	8090	876.9	8260	878
8400	878	8540	877.5	9210	877.7	9240	877.8	9250	877.7
9500	876.6	9760	876	10000	875.8	10170	875.2	10350	875.2
10570	874.9	10670	874	10690	873.5	10710	873.5	10720	874
10880	875	11030	875.3	11360	875.4	11500	876	11670	876.3
11800	876.5	11970	878.3	12020	878.6	12120	879.1	12200	879.2
12330	880	12670	881	12950	882				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
6560	.1	7850	.1	12670	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
7850	12670	1200	1100	1050	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6560	7850	

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	878.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	878.26	Reach Len. (ft)	1200.00	1100.00	1050.00
Crit W.S. (ft)		Flow Area (sq ft)		7681.28	
E.G. Slope (ft/ft)	0.000924	Area (sq ft)		7681.28	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	

Top Width (ft)	4067.36	Top Width (ft)		4067.36
Vel Total (ft/s)	0.69	Avg. Vel. (ft/s)		0.69
Max Chl Dpth (ft)	4.76	Hydr. Depth (ft)		1.89
Conv. Total (cfs)	174383.5	Conv. (cfs)		174383.5
Length Wtd. (ft)	1100.00	Wetted Per. (ft)		4067.41
Min Ch El (ft)	873.50	Shear (lb/sq ft)		0.11
Alpha	1.00	Stream Power (lb/ft s)		0.08
Frctn Loss (ft)	1.23	Cum Volume (acre-ft)	0.01	361.97
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	52.30

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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	879.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	879.29	Reach Len. (ft)	1200.00	1100.00	1050.00
Crit W.S. (ft)		Flow Area (sq ft)		11979.13	
E.G. Slope (ft/ft)	0.000992	Area (sq ft)	2.29	11979.13	
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	4409.11	Top Width (ft)	51.27	4357.84	
Vel Total (ft/s)	0.92	Avg. Vel. (ft/s)		0.92	
Max Chl Dpth (ft)	5.79	Hydr. Depth (ft)		2.75	
Conv. Total (cfs)	349289.3	Conv. (cfs)		349289.3	
Length Wtd. (ft)	1100.00	Wetted Per. (ft)		4357.91	
Min Ch El (ft)	873.50	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)		0.16	
Frctn Loss (ft)	1.30	Cum Volume (acre-ft)	6.91	576.94	
C & E Loss (ft)	0.00	Cum SA (acres)	0.71	55.02	

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	880.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	880.06	Reach Len. (ft)	1200.00	1100.00	1050.00
Crit W.S. (ft)		Flow Area (sq ft)		15405.13	
E.G. Slope (ft/ft)	0.001069	Area (sq ft)	328.16	15405.13	
Q Total (cfs)	17000.00	Flow (cfs)		17000.00	
Top Width (ft)	5308.53	Top Width (ft)	807.09	4501.44	
Vel Total (ft/s)	1.10	Avg. Vel. (ft/s)		1.10	
Max Chl Dpth (ft)	6.56	Hydr. Depth (ft)		3.42	
Conv. Total (cfs)	519834.8	Conv. (cfs)		519834.8	
Length Wtd. (ft)	1101.67	Wetted Per. (ft)		4501.51	
Min Ch El (ft)	873.50	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)		0.25	
Frctn Loss (ft)	1.35	Cum Volume (acre-ft)	42.71	750.39	
C & E Loss (ft)	0.00	Cum SA (acres)	11.12	56.84	

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 7850.00	8171.33	75.98	227.16	272.21	1.43	0.83	0.33
8171.33	8492.67	25.21	125.20	321.34	0.48	0.39	0.20
8492.67	8814.00	69.40	229.89	321.33	1.31	0.72	0.30
8814.00	9135.33	56.59	203.40	321.33	1.07	0.63	0.28
9135.33	9456.67	92.77	273.63	321.34	1.75	0.85	0.34
9456.67	9778.00	361.76	619.11	321.33	6.83	1.93	0.58

9778.00	10099.33	541.06	788.25	321.33	10.21	2.45	0.69
10099.33	10420.67	776.13	978.76	321.33	14.64	3.05	0.79
10420.67	10742.00	1076.63	1191.14	321.36	20.31	3.71	0.90
10742.00	11063.33	907.84	1075.28	321.34	17.13	3.35	0.84
11063.33	11384.67	715.23	931.93	321.33	13.49	2.90	0.77
11384.67	11706.00	463.44	718.31	321.33	8.74	2.24	0.65
11706.00	12027.33	137.96	319.23	260.49	2.60	1.23	0.43

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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 7850.00	8171.33	313.70	528.36	314.70	2.85	1.68	0.59
8171.33	8492.67	241.17	455.03	321.34	2.19	1.42	0.53
8492.67	8814.00	340.58	559.72	321.33	3.10	1.74	0.61
8814.00	9135.33	314.14	533.23	321.33	2.86	1.66	0.59
9135.33	9456.67	386.08	603.45	321.34	3.51	1.88	0.64
9456.67	9778.00	820.97	948.93	321.33	7.46	2.95	0.87
9778.00	10099.33	1079.07	1118.07	321.33	9.81	3.48	0.97
10099.33	10420.67	1402.61	1308.58	321.33	12.75	4.07	1.07
10420.67	10742.00	1802.11	1520.97	321.36	16.38	4.73	1.18
10742.00	11063.33	1579.23	1405.10	321.34	14.36	4.37	1.12
11063.33	11384.67	1319.95	1261.75	321.33	12.00	3.93	1.05
11384.67	11706.00	968.93	1048.13	321.33	8.81	3.26	0.92
11706.00	12027.33	422.52	637.02	321.34	3.84	1.98	0.66
12027.33	12348.67	8.95	50.78	187.16	0.08	0.27	0.18

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 7850.00	8171.33	625.97	776.49	321.36	3.68	2.42	0.81
8171.33	8492.67	531.27	703.70	321.34	3.13	2.19	0.75
8492.67	8814.00	669.44	808.39	321.33	3.94	2.52	0.83
8814.00	9135.33	633.28	781.90	321.33	3.73	2.43	0.81
9135.33	9456.67	730.88	852.12	321.34	4.30	2.65	0.86
9456.67	9778.00	1288.84	1197.60	321.33	7.58	3.73	1.08
9778.00	10099.33	1606.29	1366.74	321.33	9.45	4.25	1.18
10099.33	10420.67	1996.54	1557.25	321.33	11.74	4.85	1.28
10420.67	10742.00	2470.59	1769.64	321.36	14.53	5.51	1.40
10742.00	11063.33	2207.00	1653.77	321.34	12.98	5.15	1.33
11063.33	11384.67	1897.47	1510.42	321.33	11.16	4.70	1.26
11384.67	11706.00	1471.64	1296.80	321.33	8.66	4.04	1.13
11706.00	12027.33	779.49	885.69	321.34	4.59	2.76	0.88
12027.33	12348.67	91.30	244.62	321.34	0.54	0.76	0.37
12348.67	RB 12670.00	0.00	0.01	2.77	0.00	0.00	0.01

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.

CROSS SECTION RIVER: East Weir
REACH: C1 RS: 14.42

INPUT
Description: 1/3 Q=5300 cfs
2/3 Q=11,000 cfs
Full Q=17,000 cfs
Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

6850	881.7	6880	881.7	6910	880	7070	879	7310	878.2
7750	878	8120	877	8360	878.2	8400	878.2	8570	877
8790	876	8890	875.8	9160	875.7	9440	875	9710	875.9
9730	875.9	9760	873	9780	874.5	9870	874.6	10000	874.4
10140	874.4	10480	874.3	10830	874.5	11100	876	11120	876
11460	875	11980	875.8	12300	876	12640	878	12820	879
12990	879.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
6850	.1	8400	.1	12820	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8400	12820	1670	1660	1610	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6850	8400	878.2

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	877.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	877.03	Reach Len. (ft)	1660.00	1660.00	1660.00
Crit W.S. (ft)	875.32	Flow Area (sq ft)		6723.88	
E.G. Slope (ft/ft)	0.001366	Area (sq ft)	0.32	6723.88	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	3929.44	Top Width (ft)	19.03	3910.41	
Vel Total (ft/s)	0.79	Avg. Vel. (ft/s)		0.79	
Max Chl Dpth (ft)	4.03	Hydr. Depth (ft)		1.72	
Conv. Total (cfs)	143394.1	Conv. (cfs)		143394.1	
Length Wtd. (ft)	1660.00	Wetted Per. (ft)		3910.62	
Min Ch El (ft)	873.00	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)		0.12	
Frctn Loss (ft)	2.81	Cum Volume (acre-ft)	0.01	186.98	
C & E Loss (ft)	0.00	Cum SA (acres)			

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	878.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.100	
W.S. Elev (ft)	877.98	Reach Len. (ft)	1660.00	1660.00	1660.00
Crit W.S. (ft)	875.78	Flow Area (sq ft)		10567.64	
E.G. Slope (ft/ft)	0.001437	Area (sq ft)	274.04	10567.64	
Q Total (cfs)	11000.00	Flow (cfs)		11000.00	
Top Width (ft)	4764.55	Top Width (ft)	558.93	4205.62	
Vel Total (ft/s)	1.04	Avg. Vel. (ft/s)		1.04	
Max Chl Dpth (ft)	4.98	Hydr. Depth (ft)		2.51	
Conv. Total (cfs)	290217.8	Conv. (cfs)		290217.8	
Length Wtd. (ft)	1660.00	Wetted Per. (ft)		4205.83	
Min Ch El (ft)	873.00	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)		0.23	
Frctn Loss (ft)	2.72	Cum Volume (acre-ft)	5.90	297.83	
C & E Loss (ft)	0.00	Cum SA (acres)			

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	878.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.100	0.100	
W.S. Elev (ft)	878.71	Reach Len. (ft)	1660.00	1660.00	1660.00

Crit W.S. (ft)	876.07	Flow Area (sq ft)	1038.83	13691.43
E.G. Slope (ft/ft)	0.001422	Area (sq ft)	1038.83	13691.43
Q Total (cfs)	17000.00	Flow (cfs)	566.70	16433.30
Top Width (ft)	5609.61	Top Width (ft)	1242.25	4367.35
Vel Total (ft/s)	1.15	Avg. Vel. (ft/s)	0.55	1.20
Max Chl Dpth (ft)	5.71	Hydr. Depth (ft)	0.84	3.13
Conv. Total (cfs)	450789.5	Conv. (cfs)	15027.1	435762.4
Length Wtd. (ft)	1660.00	Wetted Per. (ft)	1242.26	4367.57
Min Ch El (ft)	873.00	Shear (lb/sq ft)	0.07	0.28
Alpha	1.05	Stream Power (lb/ft s)	0.04	0.33
Frctn Loss (ft)	2.68	Cum Volume (acre-ft)	27.31	387.74
C & E Loss (ft)	0.00	Cum SA (acres)		

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8400.00	8694.67	9.12	39.56	129.40	0.17	0.31	0.23
8694.67	8989.33	167.78	315.54	294.67	3.17	1.07	0.53
8989.33	9284.00	256.15	406.73	294.67	4.83	1.38	0.63
9284.00	9578.67	406.63	536.70	294.67	7.67	1.82	0.76
9578.67	9873.33	456.00	575.06	294.86	8.60	1.95	0.79
9873.33	10168.00	732.07	763.74	294.67	13.81	2.59	0.96
10168.00	10462.67	776.40	791.16	294.67	14.65	2.68	0.98
10462.67	10757.33	763.77	783.42	294.67	14.41	2.66	0.97
10757.33	11052.00	504.86	611.11	294.67	9.53	2.07	0.83
11052.00	11346.67	235.23	386.46	294.67	4.44	1.31	0.61
11346.67	11641.33	429.98	554.99	294.67	8.11	1.88	0.77
11641.33	11936.00	303.35	450.17	294.67	5.72	1.53	0.67
11936.00	12230.67	194.97	345.29	294.67	3.68	1.17	0.56
12230.67	12525.33	63.70	163.92	245.01	1.20	0.67	0.39

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8400.00	8694.67	107.75	225.68	263.59	0.98	0.86	0.48
8694.67	8989.33	502.83	594.65	294.67	4.57	2.02	0.85
8989.33	9284.00	637.81	685.84	294.67	5.80	2.33	0.93
9284.00	9578.67	851.73	815.81	294.67	7.74	2.77	1.04
9578.67	9873.33	919.11	854.17	294.86	8.36	2.90	1.08
9873.33	10168.00	1282.40	1042.85	294.67	11.66	3.54	1.23
10168.00	10462.67	1339.09	1070.27	294.67	12.17	3.63	1.25
10462.67	10757.33	1322.98	1062.52	294.67	12.03	3.61	1.25
10757.33	11052.00	985.10	890.22	294.67	8.96	3.02	1.11
11052.00	11346.67	606.70	665.57	294.67	5.52	2.26	0.91
11346.67	11641.33	883.79	834.10	294.67	8.03	2.83	1.06
11641.33	11936.00	706.56	729.28	294.67	6.42	2.47	0.97
11936.00	12230.67	545.46	624.40	294.67	4.96	2.12	0.87
12230.67	12525.33	299.52	435.78	294.67	2.72	1.48	0.69
12525.33	RB 12820.00	9.18	36.48	111.37	0.08	0.33	0.25

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta	Right Sta	Flow	Area	W.P.	% Conv.	Hydr D.	Velocity

(ft)	(ft)	(cfs)	(sq ft)	(ft)		(ft)	(ft/s)
7056.67	7160.00	0.00	0.01	2.25	0.00	0.00	0.01
7160.00	7263.33	3.22	18.57	103.33	0.02	0.18	0.17
7263.33	7366.67	16.51	49.54	103.33	0.10	0.48	0.33
7366.67	7470.00	21.18	57.53	103.33	0.12	0.56	0.37
7470.00	7573.33	24.24	62.39	103.33	0.14	0.60	0.39
7573.33	7676.67	27.46	67.24	103.33	0.16	0.65	0.41
7676.67	7780.00	31.57	73.10	103.33	0.19	0.71	0.43
7780.00	7883.33	49.64	95.92	103.33	0.29	0.93	0.52
7883.33	7986.67	76.96	124.78	103.33	0.45	1.21	0.62
7986.67	8090.00	108.86	153.64	103.33	0.64	1.49	0.71
8090.00	8193.33	118.64	161.78	103.33	0.70	1.57	0.73
8193.33	8296.67	64.14	111.86	103.34	0.38	1.08	0.57
8296.67	8400.00	24.29	62.47	103.33	0.14	0.60	0.39
LB 8400.00	8694.67	301.02	436.47	294.67	1.77	1.48	0.69
8694.67	8989.33	841.63	808.85	294.67	4.95	2.74	1.04
8989.33	9284.00	1005.64	900.04	294.67	5.92	3.05	1.12
9284.00	9578.67	1259.14	1030.02	294.67	7.41	3.50	1.22
9578.67	9873.33	1337.66	1068.37	294.86	7.87	3.63	1.25
9873.33	10168.00	1754.93	1257.05	294.67	10.32	4.27	1.40
10168.00	10462.67	1819.20	1284.47	294.67	10.70	4.36	1.42
10462.67	10757.33	1800.95	1276.73	294.67	10.59	4.33	1.41
10757.33	11052.00	1414.36	1104.42	294.67	8.32	3.75	1.28
11052.00	11346.67	968.18	879.77	294.67	5.70	2.99	1.10
11346.67	11641.33	1296.62	1048.30	294.67	7.63	3.56	1.24
11641.33	11936.00	1087.84	943.49	294.67	6.40	3.20	1.15
11936.00	12230.67	893.86	838.61	294.67	5.26	2.85	1.07
12230.67	12525.33	584.56	649.98	294.67	3.44	2.21	0.90
12525.33	RB 12820.00	67.74	164.85	242.02	0.40	0.68	0.41

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.

CROSS SECTION RIVER: West Weir
REACH: C2 RS: 15.93000

INPUT
Description: South Bank of Buckeye Canal.
Upstream end of short tributary
flow.
1/3 Q=700 cfs
2/3 Q=1000 cfs
Full Q=1000 cfs
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8800	894.9	9100	893.5	9400	892.6	9500	892.3666	9700	891.9
10000	891.8	10300	891.8	10600	892	10900	892.3	11060	892.46
11200	892.6	11500	893						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
8800	.045	9500	.045	10900	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9500	10900	1000	1080	1000	.1	.3

CROSS SECTION OUTPUT Profile #1/3

			Left OB	Channel	Right OB
E.G. Elev (ft)	892.23	Element			
Vel Head (ft)	0.12	Wt. n-Val.		0.045	
W.S. Elev (ft)	892.12	Reach Len. (ft)	1000.00	1080.00	1000.00
Crit W.S. (ft)	892.12	Flow Area (sq ft)		257.11	
E.G. Slope (ft/ft)	0.047782	Area (sq ft)		257.11	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	1109.85	Top Width (ft)		1109.85	
Vel Total (ft/s)	2.72	Avg. Vel. (ft/s)		2.72	
Max Chl Dpth (ft)	0.32	Hydr. Depth (ft)		0.23	
Conv. Total (cfs)	3202.3	Conv. (cfs)		3202.3	

Length Wtd. (ft)	1080.00	Wetted Per. (ft)	1109.85
Min Ch El (ft)	891.80	Shear (lb/sq ft)	0.69
Alpha	1.00	Stream Power (lb/ft s)	1.88
Frctn Loss (ft)	4.52	Cum Volume (acre-ft)	116.92
C & E Loss (ft)	0.03	Cum SA (acres)	57.91

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 OUTPUT Profile #2/3

E.G. Elev (ft)	892.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.045	
W.S. Elev (ft)	892.18	Reach Len. (ft)	1000.00	1080.00	1000.00
Crit W.S. (ft)	892.18	Flow Area (sq ft)		330.58	
E.G. Slope (ft/ft)	0.046855	Area (sq ft)		330.58	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	1200.71	Top Width (ft)		1200.71	
Vel Total (ft/s)	3.02	Avg. Vel. (ft/s)		3.02	
Max Chl Dpth (ft)	0.38	Hydr. Depth (ft)		0.28	
Conv. Total (cfs)	4619.8	Conv. (cfs)		4619.8	
Length Wtd. (ft)	1080.00	Wetted Per. (ft)		1200.71	
Min Ch El (ft)	891.80	Shear (lb/sq ft)		0.81	
Alpha	1.00	Stream Power (lb/ft s)		2.44	
Frctn Loss (ft)	4.63	Cum Volume (acre-ft)	0.90	177.35	
C & E Loss (ft)	0.04	Cum SA (acres)		63.02	

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 OUTPUT Profile #Full

E.G. Elev (ft)	892.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.045	
W.S. Elev (ft)	892.18	Reach Len. (ft)	1000.00	1080.00	1000.00
Crit W.S. (ft)	892.18	Flow Area (sq ft)		330.58	
E.G. Slope (ft/ft)	0.046855	Area (sq ft)		330.58	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	1200.71	Top Width (ft)		1200.71	
Vel Total (ft/s)	3.02	Avg. Vel. (ft/s)		3.02	
Max Chl Dpth (ft)	0.38	Hydr. Depth (ft)		0.28	
Conv. Total (cfs)	4619.8	Conv. (cfs)		4619.8	
Length Wtd. (ft)	1080.00	Wetted Per. (ft)		1200.71	
Min Ch El (ft)	891.80	Shear (lb/sq ft)		0.81	
Alpha	1.00	Stream Power (lb/ft s)		2.44	
Frctn Loss (ft)	4.63	Cum Volume (acre-ft)	9.97	217.62	
C & E Loss (ft)	0.04	Cum SA (acres)		63.02	

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9593.33	9686.67	10.07	7.39	79.63	1.44	0.09	1.36
9686.67	9780.00	51.98	21.10	93.33	7.43	0.23	2.46
9780.00	9873.33	65.24	24.18	93.33	9.32	0.26	2.70
9873.33	9966.67	78.82	27.09	93.33	11.26	0.29	2.91
9966.67	10060.00	90.31	29.39	93.33	12.90	0.31	3.07
10060.00	10153.33	91.26	29.58	93.33	13.04	0.32	3.09
10153.33	10246.67	91.26	29.58	93.33	13.04	0.32	3.09
10246.67	10340.00	88.54	29.04	93.33	12.65	0.31	3.05
10340.00	10433.33	65.26	24.18	93.33	9.32	0.26	2.70
10433.33	10526.67	41.29	18.38	93.33	5.90	0.20	2.25
10526.67	10620.00	21.73	12.50	93.33	3.10	0.13	1.74
10620.00	10713.33	4.23	4.69	93.33	0.60	0.05	0.90
10713.33	10806.67	0.00	0.01	3.55	0.00	0.00	0.10

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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9500.00	9593.33	0.09	0.21	13.56	0.01	0.02	0.41
9593.33	9686.67	23.14	13.11	93.33	2.31	0.14	1.76
9686.67	9780.00	77.30	27.04	93.33	7.73	0.29	2.86
9780.00	9873.33	92.54	30.12	93.33	9.25	0.32	3.07
9873.33	9966.67	107.89	33.02	93.33	10.79	0.35	3.27
9966.67	10060.00	120.73	35.33	93.33	12.07	0.38	3.42
10060.00	10153.33	121.79	35.51	93.33	12.18	0.38	3.43
10153.33	10246.67	121.79	35.51	93.33	12.18	0.38	3.43
10246.67	10340.00	118.75	34.98	93.33	11.88	0.37	3.39
10340.00	10433.33	92.56	30.12	93.33	9.26	0.32	3.07
10433.33	10526.67	64.77	24.31	93.33	6.48	0.26	2.66
10526.67	10620.00	40.84	18.44	93.33	4.08	0.20	2.22
10620.00	10713.33	16.29	10.62	93.33	1.63	0.11	1.53
10713.33	10806.67	1.53	2.25	67.16	0.15	0.03	0.68

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)

LB 9500.00	9593.33	0.09	0.21	13.56	0.01	0.02	0.41
9593.33	9686.67	23.14	13.11	93.33	2.31	0.14	1.76
9686.67	9780.00	77.30	27.04	93.33	7.73	0.29	2.86
9780.00	9873.33	92.54	30.12	93.33	9.25	0.32	3.07
9873.33	9966.67	107.89	33.02	93.33	10.79	0.35	3.27
9966.67	10060.00	120.73	35.33	93.33	12.07	0.38	3.42
10060.00	10153.33	121.79	35.51	93.33	12.18	0.38	3.43
10153.33	10246.67	121.79	35.51	93.33	12.18	0.38	3.43
10246.67	10340.00	118.75	34.98	93.33	11.88	0.37	3.39
10340.00	10433.33	92.56	30.12	93.33	9.26	0.32	3.07
10433.33	10526.67	64.77	24.31	93.33	6.48	0.26	2.66
10526.67	10620.00	40.84	18.44	93.33	4.08	0.20	2.22
10620.00	10713.33	16.29	10.62	93.33	1.63	0.11	1.53
10713.33	10806.67	1.53	2.25	67.16	0.15	0.03	0.68

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: West Weir
REACH: C2 RS: 15.72

INPUT
Description: 1/3 Q=700 cfs
2/3 Q=1000 cfs
Full Q=1000 cfs
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8790	886	9120	884	9640	883	10000	882.3	10270	882.4
10510	882.5	10670	882.3	10720	882.7	11000	883	11240	884
11280	886								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
8790	.1	9120	.1	11240	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9120	11240	1100	1100	1100	.1	.3

CROSS SECTION OUTPUT Profile #1/3

E.G. Elev (ft)	883.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.100	
W.S. Elev (ft)	883.53	Reach Len. (ft)	1100.00	1100.00	1100.00
Crit W.S. (ft)	882.68	Flow Area (sq ft)		1427.97	
E.G. Slope (ft/ft)	0.001443	Area (sq ft)		1427.97	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	1764.49	Top Width (ft)		1764.49	
Vel Total (ft/s)	0.49	Avg. Vel. (ft/s)		0.49	
Max Chl Dpth (ft)	1.23	Hydr. Depth (ft)		0.81	
Conv. Total (cfs)	18426.6	Conv. (cfs)		18426.6	
Length Wtd. (ft)	1100.00	Wetted Per. (ft)		1764.50	
Min Ch El (ft)	882.30	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.04	
Frctn Loss (ft)	5.50	Cum Volume (acre-ft)		96.03	
C & E Loss (ft)	0.01	Cum SA (acres)		22.28	

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.

CROSS SECTION OUTPUT Profile #2/3

E.G. Elev (ft)	883.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.100	
W.S. Elev (ft)	883.74	Reach Len. (ft)	1100.00	1100.00	1100.00
Crit W.S. (ft)	882.77	Flow Area (sq ft)		1814.02	
E.G. Slope (ft/ft)	0.001488	Area (sq ft)		1814.02	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	1923.60	Top Width (ft)		1923.60	
Vel Total (ft/s)	0.55	Avg. Vel. (ft/s)		0.55	
Max Chl Dpth (ft)	1.44	Hydr. Depth (ft)		0.94	
Conv. Total (cfs)	25921.1	Conv. (cfs)		25921.1	
Length Wtd. (ft)	1100.00	Wetted Per. (ft)		1923.60	
Min Ch El (ft)	882.30	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.05	
Frctn Loss (ft)	5.64	Cum Volume (acre-ft)	0.90	150.76	
C & E Loss (ft)	0.01	Cum SA (acres)		24.29	

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.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	883.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.100	
W.S. Elev (ft)	883.74	Reach Len. (ft)	1100.00	1100.00	1100.00
Crit W.S. (ft)	882.77	Flow Area (sq ft)		1814.02	
E.G. Slope (ft/ft)	0.001488	Area (sq ft)		1814.02	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	1923.60	Top Width (ft)		1923.60	
Vel Total (ft/s)	0.55	Avg. Vel. (ft/s)		0.55	
Max Chl Dpth (ft)	1.44	Hydr. Depth (ft)		0.94	
Conv. Total (cfs)	25921.1	Conv. (cfs)		25921.1	
Length Wtd. (ft)	1100.00	Wetted Per. (ft)		1923.60	
Min Ch El (ft)	882.30	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.05	
Frctn Loss (ft)	5.64	Cum Volume (acre-ft)	9.97	191.04	
C & E Loss (ft)	0.01	Cum SA (acres)		24.29	

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.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9261.33	9402.67	0.09	1.49	39.42	0.01	0.04	0.06
9402.67	9544.00	5.40	29.92	141.33	0.77	0.21	0.18
9544.00	9685.33	21.40	68.36	141.33	3.06	0.48	0.31
9685.33	9826.67	45.24	107.10	141.33	6.46	0.76	0.42
9826.67	9968.00	75.77	145.94	141.33	10.82	1.03	0.52
9968.00	10109.33	98.61	170.95	141.33	14.09	1.21	0.58
10109.33	10250.67	92.71	164.73	141.33	13.24	1.17	0.56
10250.67	10392.00	85.56	156.99	141.33	12.22	1.11	0.55
10392.00	10533.33	78.54	149.13	141.33	11.22	1.06	0.53
10533.33	10674.67	90.53	162.40	141.33	12.93	1.15	0.56
10674.67	10816.00	55.36	120.90	141.33	7.91	0.86	0.46
10816.00	10957.33	35.36	92.38	141.33	5.05	0.65	0.38
10957.33	11098.67	15.31	55.91	141.33	2.19	0.40	0.27
11098.67	RB 11240.00	0.14	1.76	29.07	0.02	0.06	0.08

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.

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9120.00	9261.33	0.00	0.05	6.95	0.00	0.01	0.02
9261.33	9402.67	3.05	21.10	141.33	0.30	0.15	0.14
9402.67	9544.00	17.16	59.51	141.33	1.72	0.42	0.29
9544.00	9685.33	39.38	97.94	141.33	3.94	0.69	0.40
9685.33	9826.67	68.64	136.69	141.33	6.86	0.97	0.50
9826.67	9968.00	104.14	175.53	141.33	10.41	1.24	0.59
9968.00	10109.33	130.01	200.53	141.33	13.00	1.42	0.65
10109.33	10250.67	123.36	194.32	141.33	12.34	1.37	0.63
10250.67	10392.00	115.28	186.57	141.33	11.53	1.32	0.62
10392.00	10533.33	107.30	178.72	141.33	10.73	1.26	0.60
10533.33	10674.67	120.91	191.98	141.33	12.09	1.36	0.63
10674.67	10816.00	80.57	150.49	141.33	8.06	1.06	0.54
10816.00	10957.33	56.77	121.97	141.33	5.68	0.86	0.47
10957.33	11098.67	31.40	85.50	141.33	3.14	0.60	0.37
11098.67	RB 11240.00	2.03	13.10	79.31	0.20	0.17	0.15

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9120.00	9261.33	0.00	0.05	6.95	0.00	0.01	0.02
9261.33	9402.67	3.05	21.10	141.33	0.30	0.15	0.14
9402.67	9544.00	17.16	59.51	141.33	1.72	0.42	0.29
9544.00	9685.33	39.38	97.94	141.33	3.94	0.69	0.40
9685.33	9826.67	68.64	136.69	141.33	6.86	0.97	0.50
9826.67	9968.00	104.14	175.53	141.33	10.41	1.24	0.59
9968.00	10109.33	130.01	200.53	141.33	13.00	1.42	0.65
10109.33	10250.67	123.36	194.32	141.33	12.34	1.37	0.63
10250.67	10392.00	115.28	186.57	141.33	11.53	1.32	0.62
10392.00	10533.33	107.30	178.72	141.33	10.73	1.26	0.60
10533.33	10674.67	120.91	191.98	141.33	12.09	1.36	0.63
10674.67	10816.00	80.57	150.49	141.33	8.06	1.06	0.54
10816.00	10957.33	56.77	121.97	141.33	5.68	0.86	0.47
10957.33	11098.67	31.40	85.50	141.33	3.14	0.60	0.37
11098.67	RB 11240.00	2.03	13.10	79.31	0.20	0.17	0.15

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.

CROSS SECTION RIVER: West Weir
REACH: C2 RS: 15.52

INPUT
Description: Last section of short tributary flow.
1/3 Q=700 cfs
2/3 Q=1000
cfs
Full Q=1000 cfs
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8520	879.3	8540	879.3	8557	878.195	8560	878	8810	877.9

```
    9080   877.8    9360   877.8    9700   877.7   10000   877.7   10380   877.8
   10690     878   10765   878.2   10880   878.5   10960   878.5   11150   877.8
   11210   877.7   11240   877.7   11650     878

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    8520      .1    8557      .1   10765      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          8557   10765              400     400     400            .1        .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
   10880   11650   878.5

CROSS SECTION OUTPUT    Profile #1/3

  E.G. Elev (ft)            878.03   Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.08   Wt. n-Val.                          0.100
  W.S. Elev (ft)            877.95   Reach Len. (ft)             0.00      0.00      0.00
  Crit W.S. (ft)            877.95   Flow Area (sq ft)                   311.29
  E.G. Slope (ft/ft)       0.261423  Area (sq ft)                        311.29     65.93
  Q Total (cfs)             700.00   Flow (cfs)                          700.00
  Top Width (ft)           2407.91   Top Width (ft)                     1933.21    474.70
  Vel Total (ft/s)            2.25   Avg. Vel. (ft/s)                      2.25
  Max Chl Dpth (ft)           0.25   Hydr. Depth (ft)                      0.16
  Conv. Total (cfs)         1369.1   Conv. (cfs)                        1369.1
  Length Wtd. (ft)            0.00   Wetted Per. (ft)                   1933.21
  Min Ch El (ft)            877.70   Shear (lb/sq ft)                      2.63
  Alpha                       1.00   Stream Power (lb/ft s)                5.91
  Frctn Loss (ft)             0.00   Cum Volume (acre-ft)
  C & E Loss (ft)             0.02   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: Divided flow computed for this cross-section.
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.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid,
         water surface was used.

CROSS SECTION OUTPUT    Profile #2/3

  E.G. Elev (ft)            878.09   Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.10   Wt. n-Val.                          0.100
  W.S. Elev (ft)            878.00   Reach Len. (ft)             0.00      0.00      0.00
  Crit W.S. (ft)            878.00   Flow Area (sq ft)                   403.90
  E.G. Slope (ft/ft)       0.252982  Area (sq ft)                        403.90     89.34
  Q Total (cfs)            1000.00   Flow (cfs)                         1000.00
  Top Width (ft)           2667.97   Top Width (ft)                     2118.38    549.59
  Vel Total (ft/s)            2.48   Avg. Vel. (ft/s)                      2.48
  Max Chl Dpth (ft)           0.30   Hydr. Depth (ft)                      0.19
  Conv. Total (cfs)         1988.2   Conv. (cfs)                        1988.2
  Length Wtd. (ft)            0.00   Wetted Per. (ft)                   2118.38
  Min Ch El (ft)            877.70   Shear (lb/sq ft)                      3.01
  Alpha                       1.00   Stream Power (lb/ft s)                7.46
  Frctn Loss (ft)             0.00   Cum Volume (acre-ft)
  C & E Loss (ft)             0.02   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: Divided flow computed for this cross-section.
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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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	878.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.100	
W.S. Elev (ft)	878.00	Reach Len. (ft)	0.00	0.00	0.00
Crit W.S. (ft)	878.00	Flow Area (sq ft)		403.90	
E.G. Slope (ft/ft)	0.252982	Area (sq ft)		403.90	89.34
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	2667.97	Top Width (ft)		2118.38	549.59
Vel Total (ft/s)	2.48	Avg. Vel. (ft/s)		2.48	
Max Chl Dpth (ft)	0.30	Hydr. Depth (ft)		0.19	
Conv. Total (cfs)	1988.2	Conv. (cfs)		1988.2	
Length Wtd. (ft)	0.00	Wetted Per. (ft)		2118.38	
Min Ch El (ft)	877.70	Shear (lb/sq ft)		3.01	
Alpha	1.00	Stream Power (lb/ft s)		7.46	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)			
C & E Loss (ft)	0.02	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: Divided flow computed for this cross-section.
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #1/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8557.00	8704.20	0.02	0.10	22.71	0.00	0.00	0.19
8704.20	8851.40	4.39	5.64	147.20	0.63	0.04	0.78
8851.40	8998.60	19.56	13.84	147.20	2.79	0.09	1.41
8998.60	9145.80	39.40	21.06	147.20	5.63	0.14	1.87
9145.80	9293.00	43.30	22.29	147.20	6.19	0.15	1.94
9293.00	9440.20	46.40	23.24	147.20	6.63	0.16	2.00
9440.20	9587.40	66.93	28.95	147.20	9.56	0.20	2.31
9587.40	9734.60	92.48	35.14	147.20	13.21	0.24	2.63
9734.60	9881.80	100.79	37.01	147.20	14.40	0.25	2.72
9881.80	10029.00	100.29	36.90	147.20	14.33	0.25	2.72
10029.00	10176.20	83.40	33.03	147.20	11.91	0.22	2.52
10176.20	10323.40	60.82	27.33	147.20	8.69	0.19	2.23
10323.40	10470.60	36.33	20.06	147.20	5.19	0.14	1.81
10470.60	10617.80	5.92	6.70	144.10	0.85	0.05	0.88

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

FLOW DISTRIBUTION OUTPUT Profile #2/3

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8557.00	8704.20	2.29	3.76	137.03	0.23	0.03	0.61
8704.20	8851.40	15.90	12.37	147.20	1.59	0.08	1.28
8851.40	8998.60	37.08	20.57	147.20	3.71	0.14	1.80
8998.60	9145.80	61.25	27.79	147.20	6.12	0.19	2.20
9145.80	9293.00	65.82	29.02	147.20	6.58	0.20	2.27
9293.00	9440.20	69.43	29.96	147.20	6.94	0.20	2.32
9440.20	9587.40	92.87	35.68	147.20	9.29	0.24	2.60
9587.40	9734.60	121.28	41.87	147.20	12.13	0.28	2.90
9734.60	9881.80	130.40	43.74	147.20	13.04	0.30	2.98
9881.80	10029.00	129.86	43.63	147.20	12.99	0.30	2.98
10029.00	10176.20	111.25	39.76	147.20	11.13	0.27	2.80
10176.20	10323.40	85.96	34.06	147.20	8.60	0.23	2.52
10323.40	10470.60	57.62	26.79	147.20	5.76	0.18	2.15
10470.60	10617.80	18.21	13.42	147.20	1.82	0.09	1.36
10617.80	RB 10765.00	0.77	1.48	67.75	0.08	0.02	0.52

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

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8557.00	8704.20	2.29	3.76	137.03	0.23	0.03	0.61
8704.20	8851.40	15.90	12.37	147.20	1.59	0.08	1.28
8851.40	8998.60	37.08	20.57	147.20	3.71	0.14	1.80
8998.60	9145.80	61.25	27.79	147.20	6.12	0.19	2.20
9145.80	9293.00	65.82	29.02	147.20	6.58	0.20	2.27
9293.00	9440.20	69.43	29.96	147.20	6.94	0.20	2.32
9440.20	9587.40	92.87	35.68	147.20	9.29	0.24	2.60
9587.40	9734.60	121.28	41.87	147.20	12.13	0.28	2.90
9734.60	9881.80	130.40	43.74	147.20	13.04	0.30	2.98
9881.80	10029.00	129.86	43.63	147.20	12.99	0.30	2.98
10029.00	10176.20	111.25	39.76	147.20	11.13	0.27	2.80
10176.20	10323.40	85.96	34.06	147.20	8.60	0.23	2.52
10323.40	10470.60	57.62	26.79	147.20	5.76	0.18	2.15
10470.60	10617.80	18.21	13.42	147.20	1.82	0.09	1.36
10617.80	RB 10765.00	0.77	1.48	67.75	0.08	0.02	0.52

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

SUMMARY OF MANNING'S N VALUES

River:East Weir

Reach	River Sta.	n1	n2	n3
E2	14.10	.1	.1	.1
E2	13.85	.1	.1	.1
E2	13.58	.1	.1	.1
E2	13.25	.1	.1	.1
C1	15.93	.045	.045	.045
C1	15.82	.1	.1	.1
C1	15.71	.1	.1	.1
C1	15.53	.1	.1	.1
C1	15.38	.1	.1	.1
C1	15.15	.1	.1	.1
C1	14.85	.1	.1	.1
C1	14.62	.1	.1	.1
C1	14.42	.1	.1	.1

River:West Weir

Reach	River Sta.	n1	n2	n3
C2	15.93000	.045	.045	.045
C2	15.72	.1	.1	.1
C2	15.52	.1	.1	.1

SUMMARY OF REACH LENGTHS

River: East Weir

Reach	River Sta.	Left	Channel	Right
E2	14.10	1380	1330	1260
E2	13.85	1440	1410	1370
E2	13.58	1770	1740	1680
E2	13.25	0	0	0
C1	15.93	480	580	540
C1	15.82	660	650	650
C1	15.71	970	875	820
C1	15.53	990	780	670
C1	15.38	1500	1220	1000
C1	15.15	1900	1590	1250
C1	14.85	1300	1200	1100
C1	14.62	1200	1100	1050
C1	14.42	1670	1660	1610

River: West Weir

Reach	River Sta.	Left	Channel	Right

C2	15.93000	1000	1080	1000
C2	15.72	1100	1100	1100
C2	15.52	400	400	400

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: East Weir

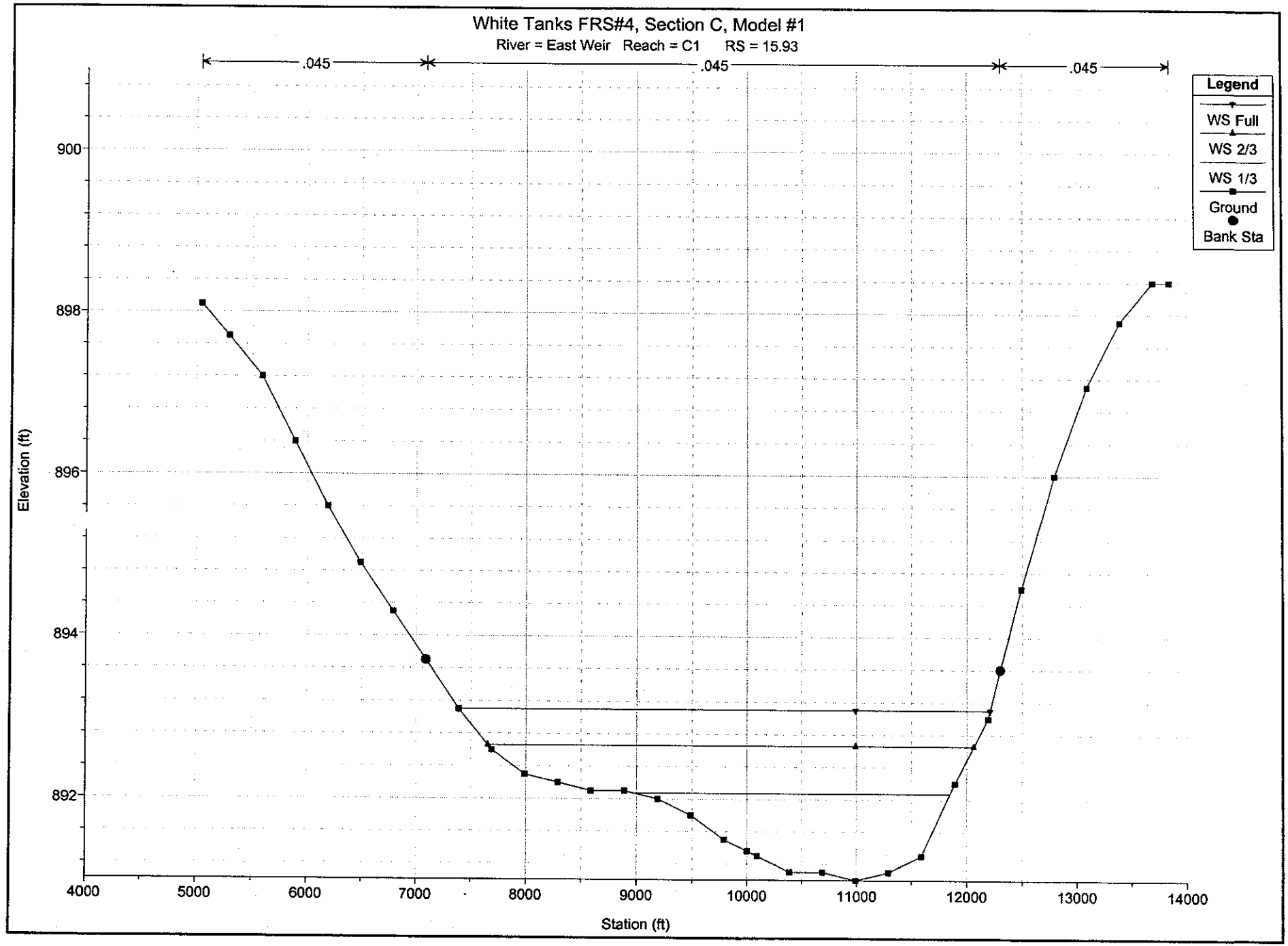
Reach	River Sta.	Contr.	Expan.
E2	14.10	.1	.3
E2	13.85	.1	.3
E2	13.58	.1	.3
E2	13.25	.1	.3
C1	15.93	.1	.3
C1	15.82	.1	.3
C1	15.71	.1	.3
C1	15.53	.1	.3
C1	15.38	.1	.3
C1	15.15	.1	.3
C1	14.85	.1	.3
C1	14.62	.1	.3
C1	14.42	.1	.3

River: West Weir

Reach	River Sta.	Contr.	Expan.
C2	15.93000	.1	.3
C2	15.72	.1	.3
C2	15.52	.1	.3

HEC-RAS Plan: WT4C1

River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
East Weir	E2	13.25	6000.00	866.50	869.74	868.13	869.75	0.001000	0.64	9381.50	5909.72	0.09
East Weir	E2	13.25	12000.00	866.50	870.62	868.47	870.63	0.001000	0.79	15115.98	6885.39	0.09
East Weir	E2	13.25	18000.00	866.50	871.25	868.69	871.27	0.001001	0.92	19520.07	7104.94	0.10
East Weir	E2	13.58	6000.00	866.80	871.70		871.71	0.001280	0.72	8367.73	5341.86	0.10
East Weir	E2	13.58	12000.00	866.80	872.61		872.63	0.001321	0.85	14044.61	7056.03	0.11
East Weir	E2	13.58	18000.00	866.80	873.22		873.24	0.001292	0.97	18493.58	7516.74	0.11
East Weir	E2	13.85	6000.00	865.50	872.88	870.16	872.89	0.000589	0.67	8953.49	5243.77	0.07
East Weir	E2	13.85	12000.00	865.50	873.89	870.57	873.90	0.000658	0.84	15630.04	6349.75	0.08
East Weir	E2	13.85	18000.00	865.50	874.57	870.85	874.58	0.000733	0.98	20024.05	6560.19	0.09
East Weir	E2	14.10	6000.00	867.60	874.22	872.61	874.23	0.002095	0.97	6177.92	3619.68	0.13
East Weir	E2	14.10	12000.00	867.60	875.25	873.03	875.27	0.001847	1.19	10126.33	4568.86	0.13
East Weir	E2	14.10	18000.00	867.60	876.02	873.32	876.05	0.001827	1.35	13316.22	5515.27	0.14
East Weir	C1	14.42	5300.00	873.00	877.03	875.32	877.04	0.001366	0.79	6723.88	3929.44	0.11
East Weir	C1	14.42	11000.00	873.00	877.98	875.78	878.00	0.001437	1.04	10567.64	4764.55	0.12
East Weir	C1	14.42	17000.00	873.00	878.71	876.07	878.73	0.001422	1.20	14730.26	5609.61	0.12
East Weir	C1	14.62	5300.00	873.50	878.26		878.27	0.000924	0.69	7681.28	4067.36	0.09
East Weir	C1	14.62	11000.00	873.50	879.29		879.30	0.000992	0.92	11979.13	4409.11	0.10
East Weir	C1	14.62	17000.00	873.50	880.06		880.08	0.001069	1.10	15405.13	5308.53	0.11
East Weir	C1	14.85	5300.00	876.50	879.65		879.66	0.001498	0.88	6042.04	3397.94	0.11
East Weir	C1	14.85	11000.00	876.50	880.74		880.76	0.001524	1.12	9779.38	5112.10	0.12
East Weir	C1	14.85	17000.00	876.50	881.58		881.61	0.001544	1.32	12911.03	5332.97	0.13
East Weir	C1	15.15	5300.00	878.40	881.37		881.38	0.000819	0.71	7467.32	3462.25	0.09
East Weir	C1	15.15	11000.00	878.40	882.61		882.63	0.000929	0.90	12282.70	4418.28	0.09
East Weir	C1	15.15	17000.00	878.40	883.48		883.49	0.000932	1.05	16157.72	4575.14	0.10
East Weir	C1	15.38	5300.00	880.90	883.07		883.08	0.002922	0.99	5374.34	3949.99	0.15
East Weir	C1	15.38	11000.00	880.90	884.17		884.19	0.001866	1.11	9932.47	4383.09	0.13
East Weir	C1	15.38	17000.00	880.90	884.99		885.01	0.001754	1.24	13763.33	4922.67	0.13
East Weir	C1	15.53	5300.00	883.30	885.10	884.03	885.11	0.002325	0.88	6024.00	5605.03	0.13
East Weir	C1	15.53	11000.00	883.30	885.79	884.28	885.81	0.002375	1.16	9719.01	6374.77	0.14
East Weir	C1	15.53	17000.00	883.30	886.47	884.48	886.49	0.002082	1.31	13281.62	6489.60	0.14
East Weir	C1	15.71	5300.00	885.00	887.54		887.55	0.003351	1.00	5326.35	5251.38	0.16
East Weir	C1	15.71	11000.00	885.00	888.23		888.26	0.003394	1.31	8405.47	6181.77	0.17
East Weir	C1	15.71	17000.00	885.00	888.78		888.82	0.003492	1.55	10945.12	6756.16	0.18
East Weir	C1	15.82	5300.00	887.20	889.40		889.42	0.002510	1.03	5161.72	3186.91	0.14
East Weir	C1	15.82	11000.00	887.20	890.26		890.29	0.002924	1.35	8165.38	3761.56	0.16
East Weir	C1	15.82	17000.00	887.20	890.93		890.97	0.003141	1.57	10835.53	4190.60	0.17
East Weir	C1	15.93	5300.00	891.00	892.07	891.81	892.19	0.012027	2.76	1917.81	2876.71	0.60
East Weir	C1	15.93	11000.00	891.00	892.66		892.76	0.006627	2.61	4215.15	4406.82	0.47
East Weir	C1	15.93	17000.00	891.00	893.10		893.22	0.004766	2.71	6262.33	4819.25	0.42
West Weir	C2	15.52	700.00	877.70	877.95	877.95	878.03	0.261423	2.25	311.29	2407.91	0.99
West Weir	C2	15.52	1000.00	877.70	878.00	878.00	878.09	0.252982	2.48	403.90	2667.97	1.00
West Weir	C2	15.52	1000.00	877.70	878.00	878.00	878.09	0.252982	2.48	403.90	2667.97	1.00
West Weir	C2	15.72	700.00	882.30	883.53	882.68	883.54	0.001443	0.49	1427.97	1764.49	0.10
West Weir	C2	15.72	1000.00	882.30	883.74	882.77	883.75	0.001488	0.55	1814.02	1923.60	0.10
West Weir	C2	15.72	1000.00	882.30	883.74	882.77	883.75	0.001488	0.55	1814.02	1923.60	0.10
West Weir	C2	15.93000	700.00	891.80	892.12	892.12	892.23	0.047782	2.72	257.11	1109.85	1.00
West Weir	C2	15.93000	1000.00	891.80	892.18	892.18	892.32	0.046855	3.02	330.58	1200.71	1.02
West Weir	C2	15.93000	1000.00	891.80	892.18	892.18	892.32	0.046855	3.02	330.58	1200.71	1.02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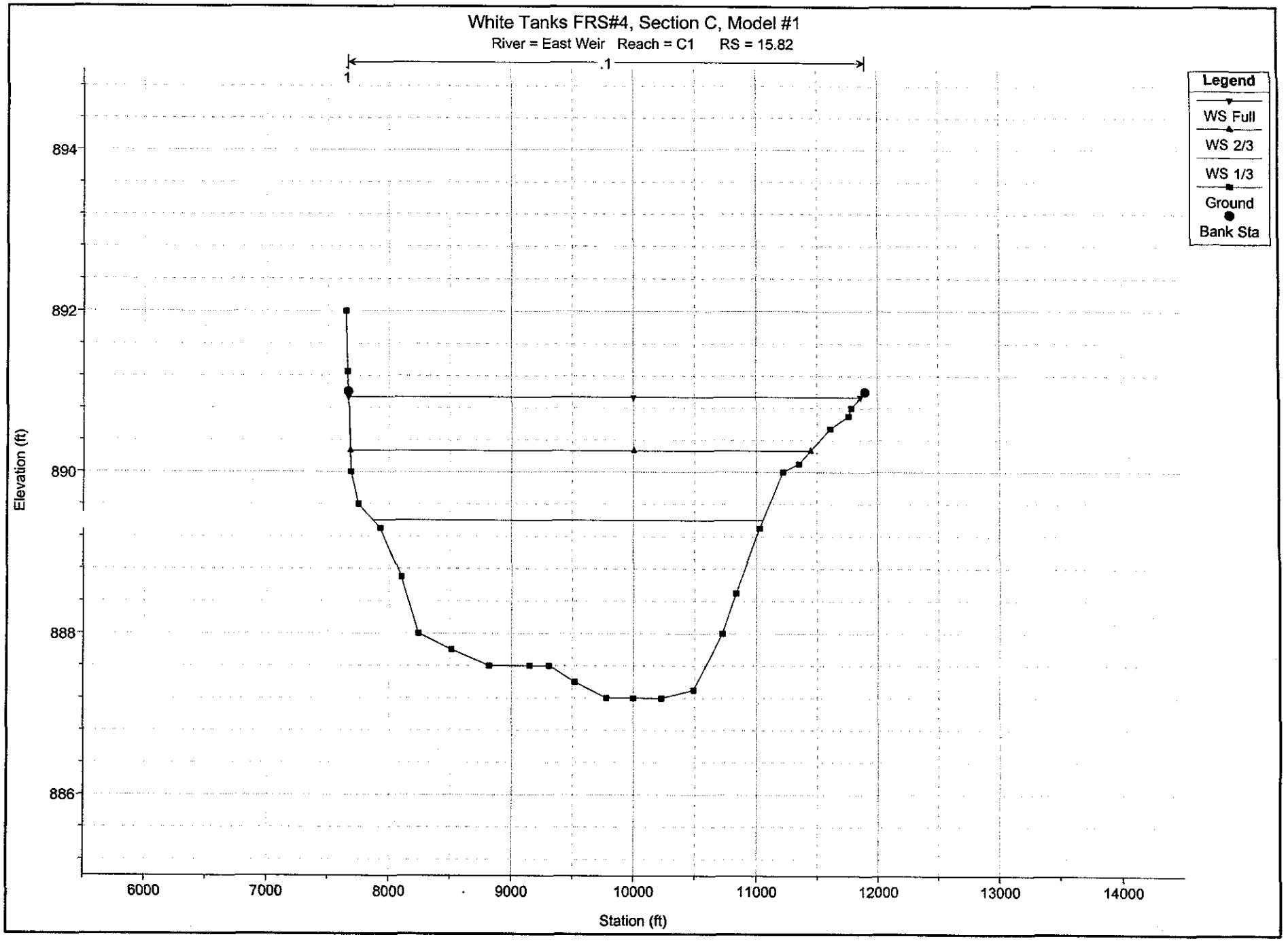
River = East Weir Reach = C1 RS = 15.93
.045
.045
.045
Legend
WS Full
WS 2/3
WS 1/3
Ground
Bank Sta
Elevation (ft)
900
898
896
894
892
4000
5000
6000
7000
8000
9000
10000
11000
12000
13000
14000
Station (ft)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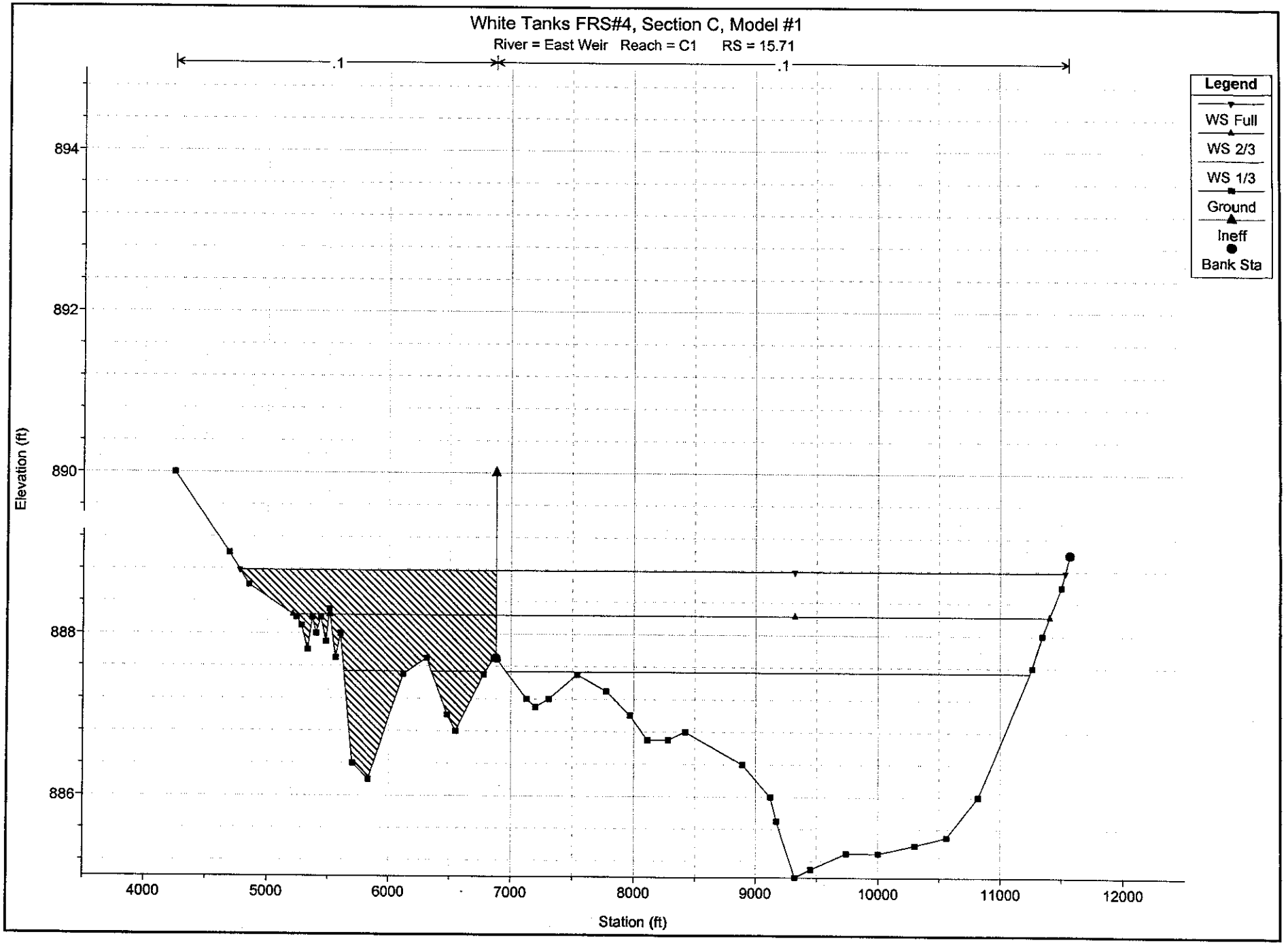
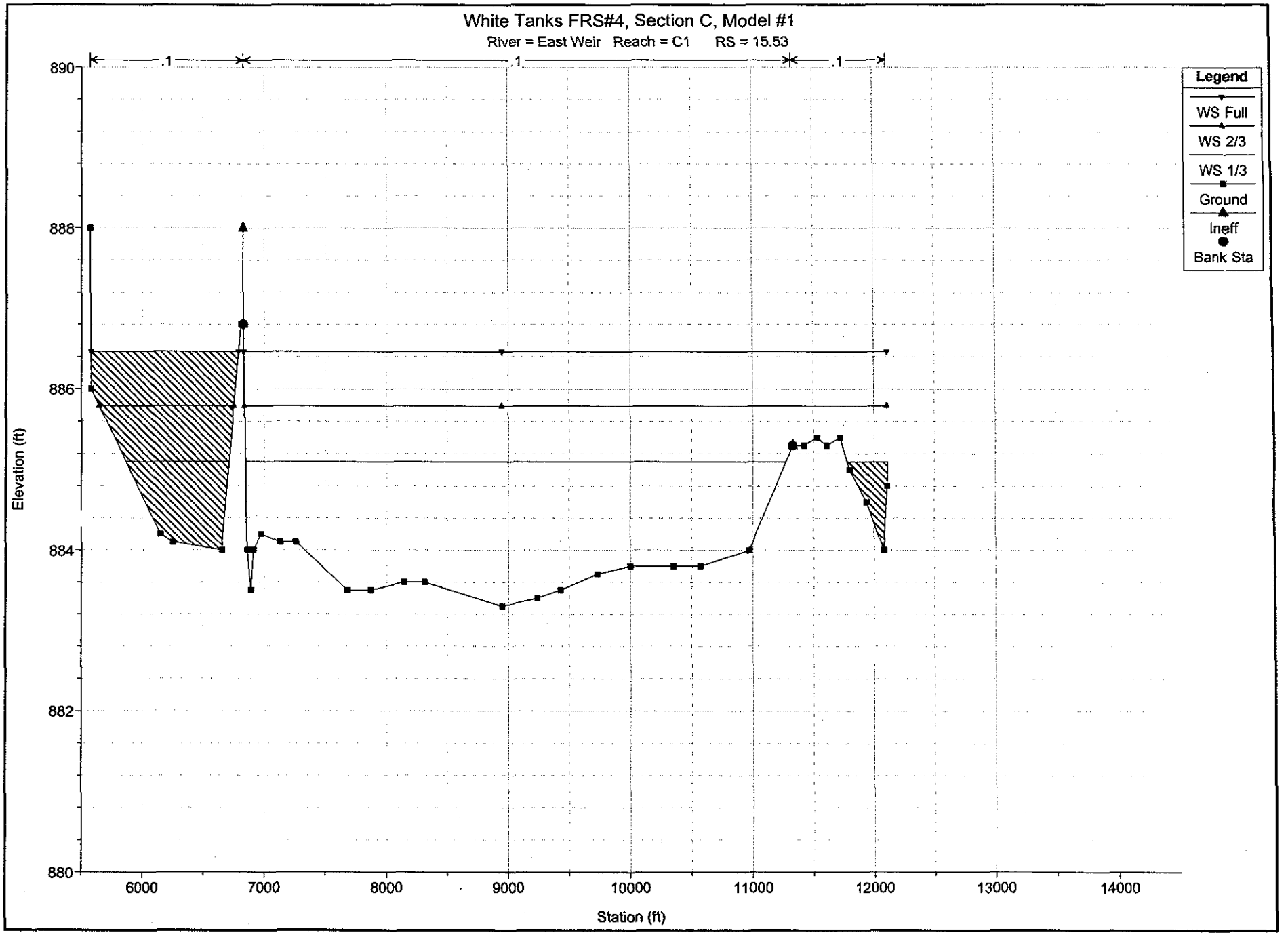
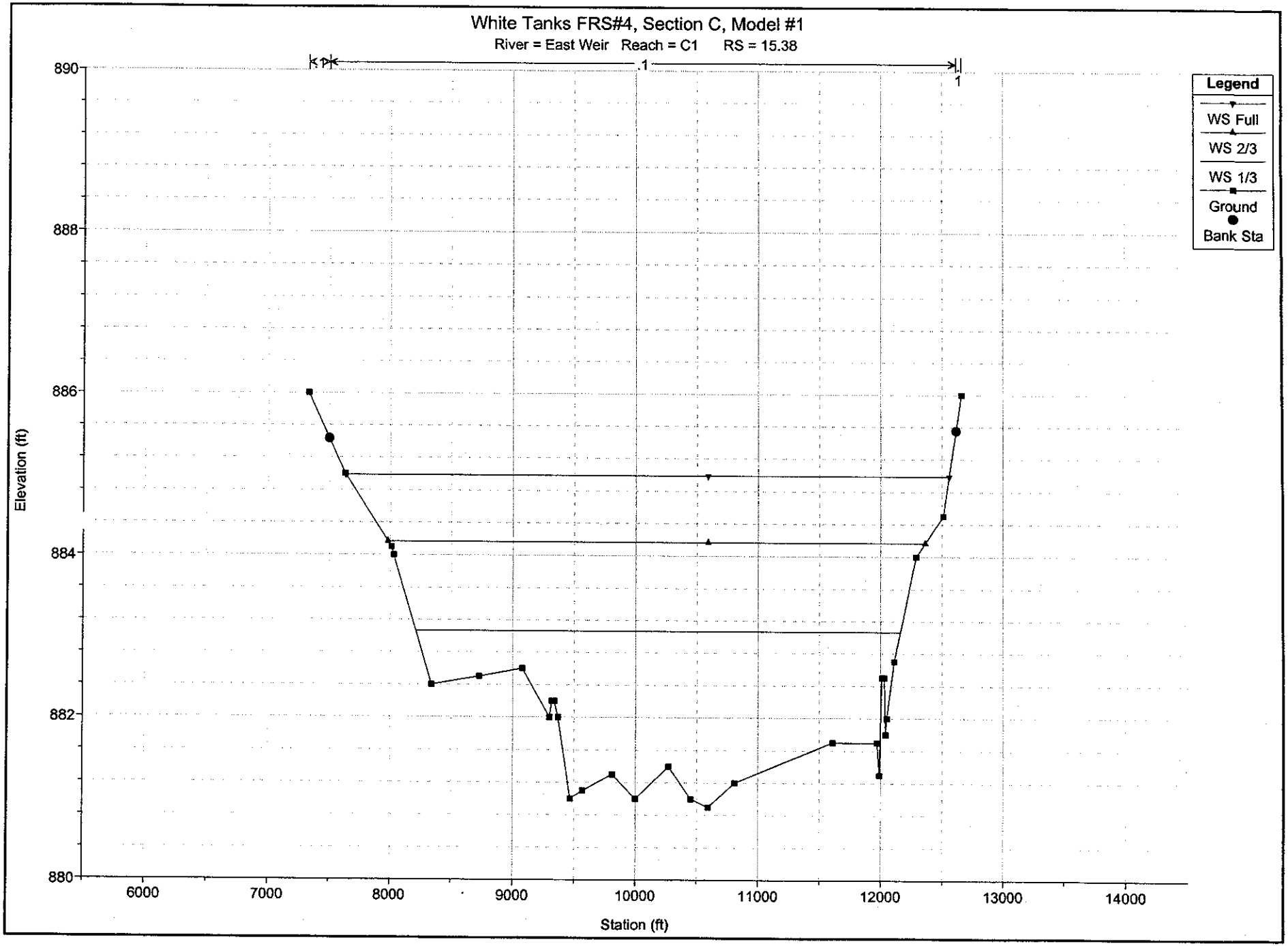
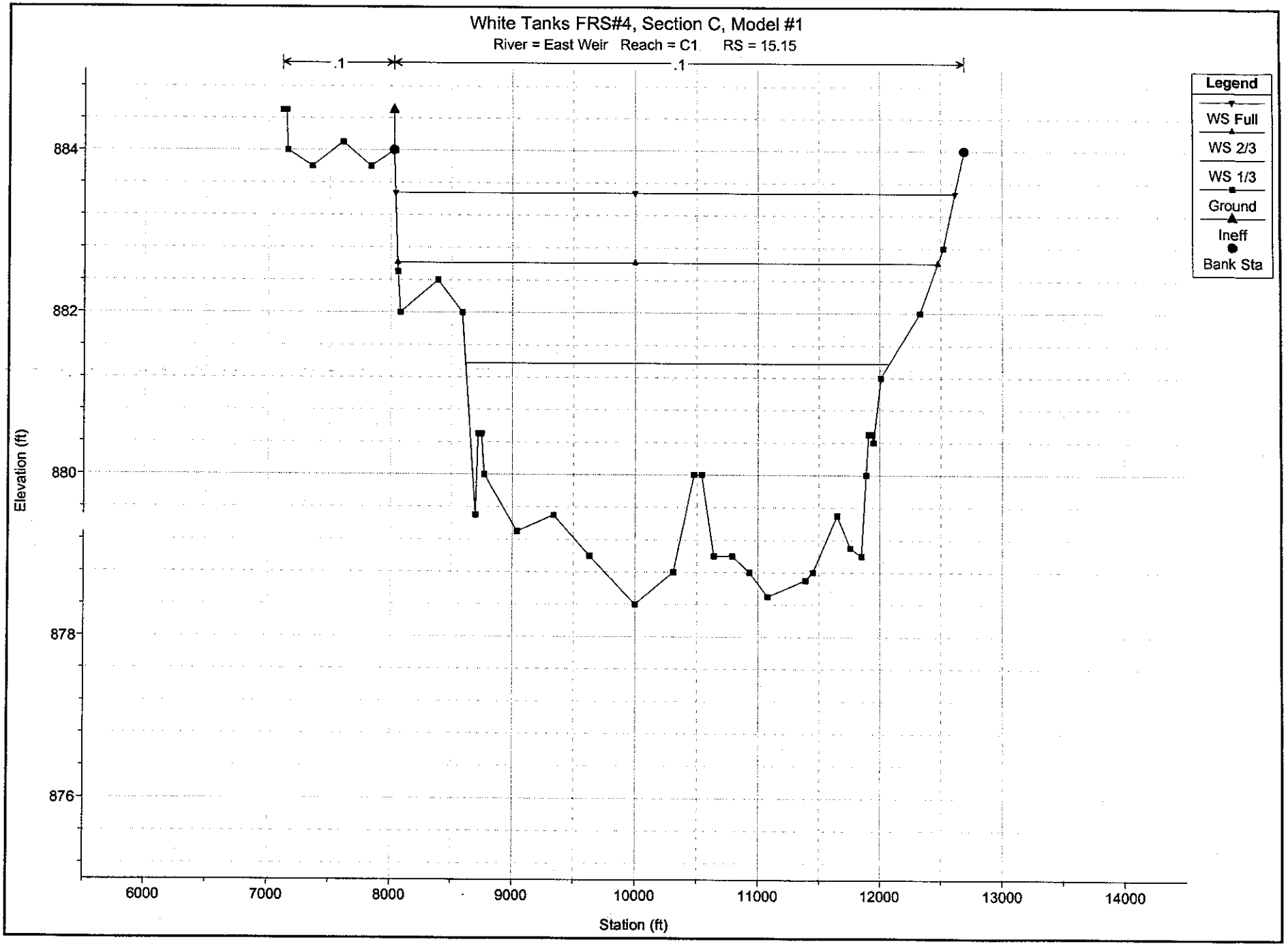
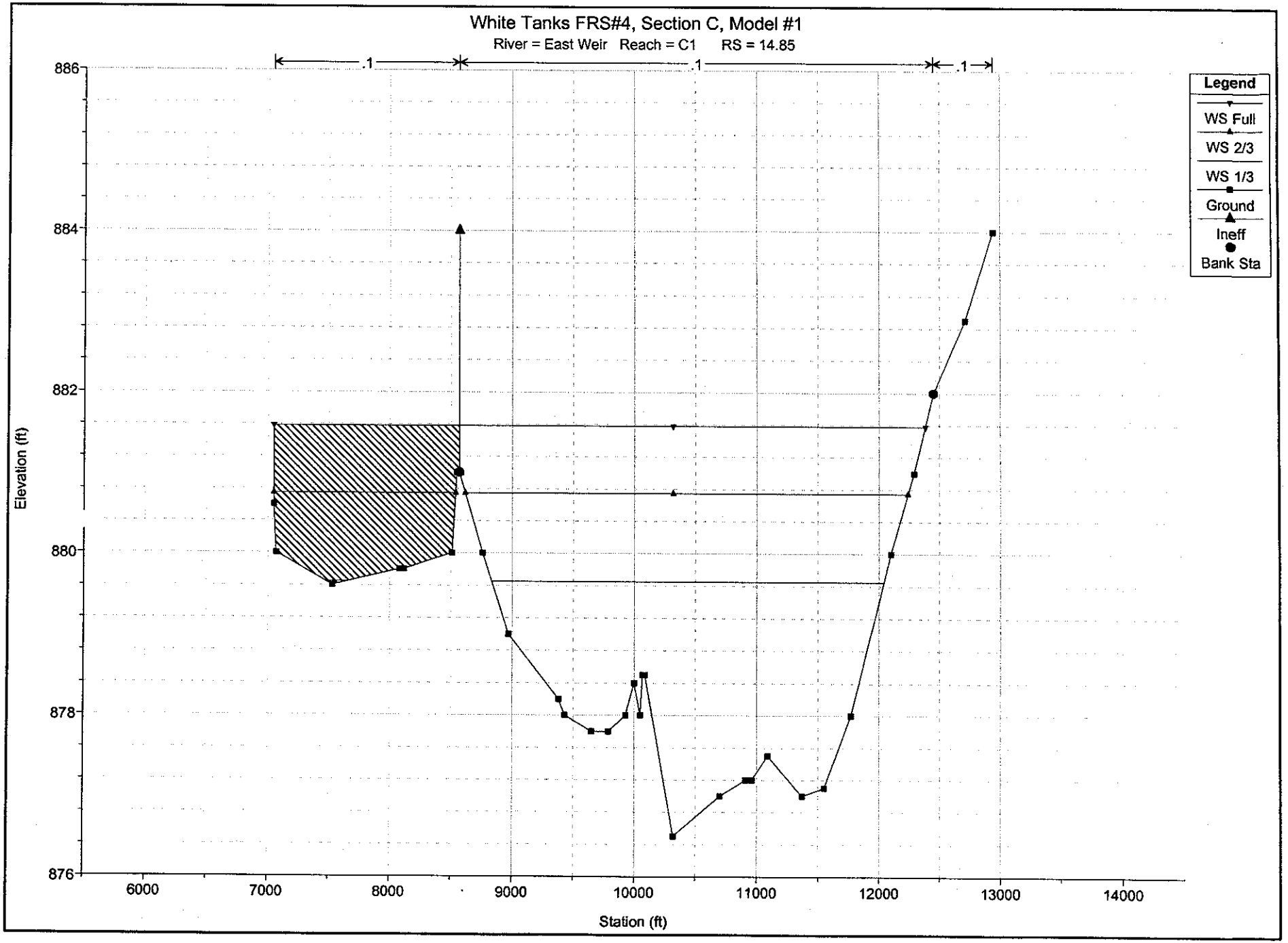
River = East Weir Reach = C1 RS = 15.82
.1
1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Bank Sta
Elevation (ft)
894
892
890
888
886
6000
7000
8000
9000
10000
11000
12000
13000
14000
Station (ft)

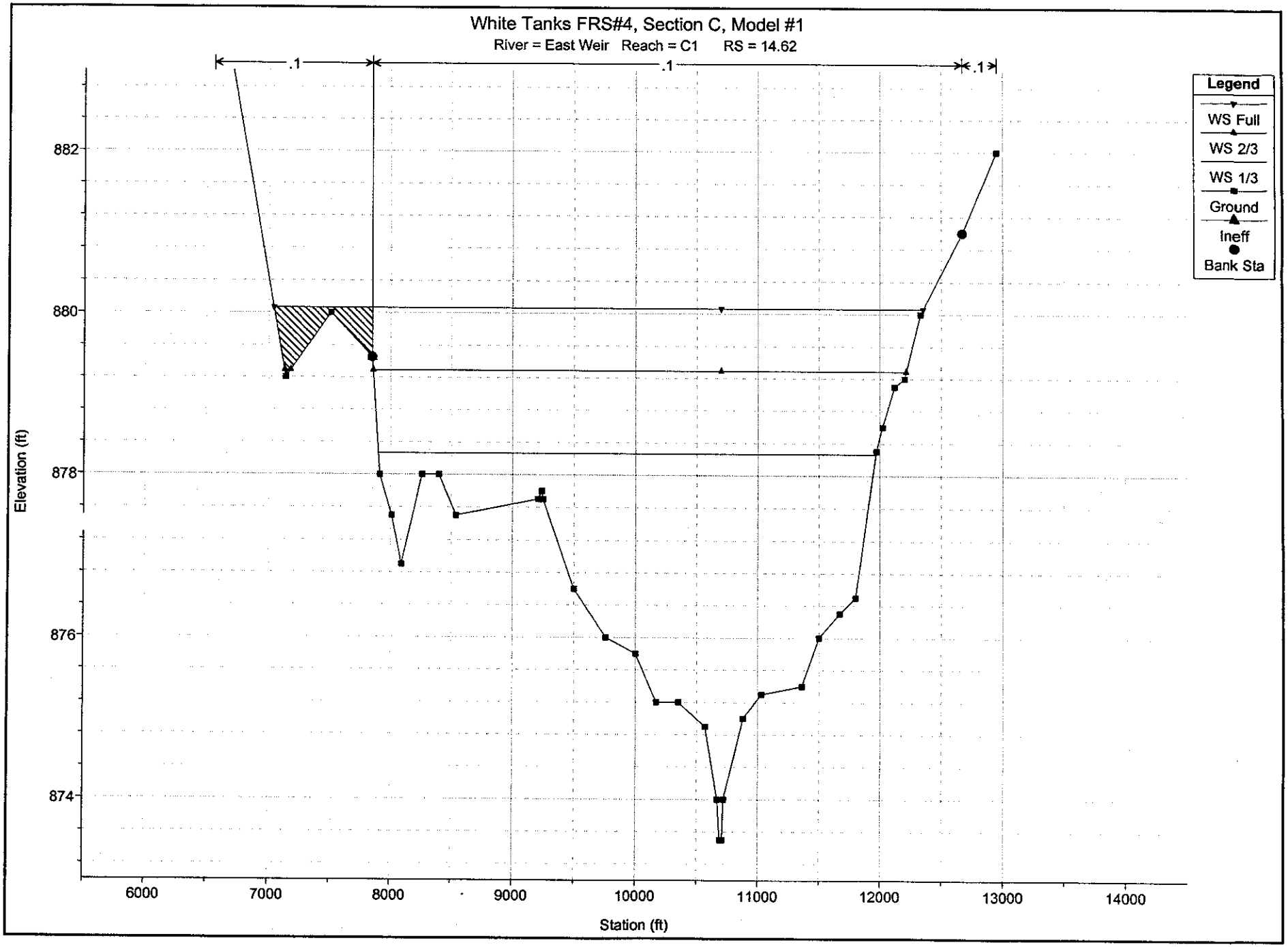

White Tanks FRS#4, Section C, Model #1
River = East Weir Reach = C1 RS = 15.71
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
894
892
890
888
886
4000
5000
6000
7000
8000
9000
10000
11000
12000
Station (ft)

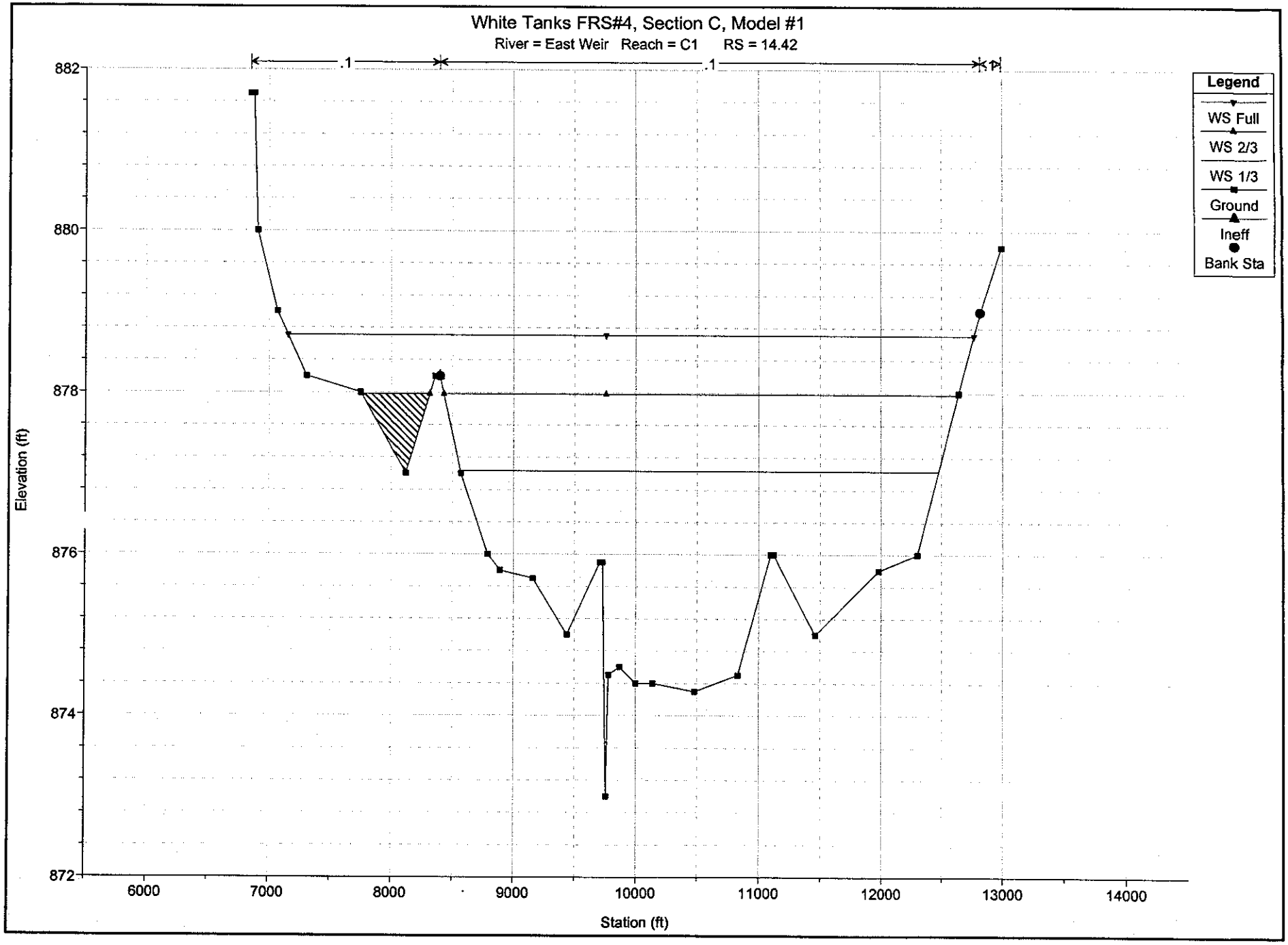

White Tanks FRS#4, Section C, Model #1
River = East Weir Reach = C1 RS = 15.53
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
890
888
886
884
882
880
6000
7000
8000
9000
10000
11000
12000
13000
14000
Station (ft)

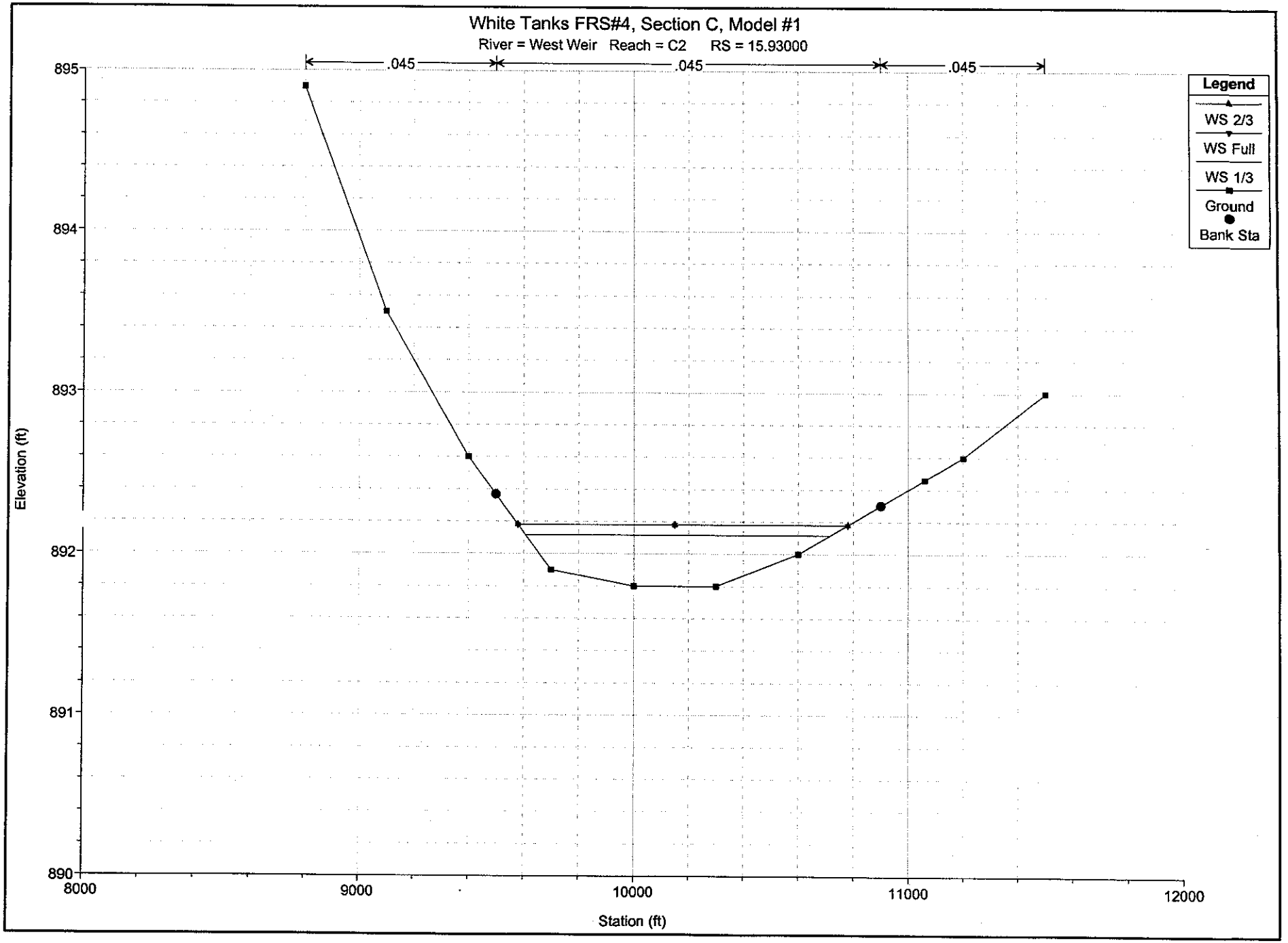

White Tanks FRS#4, Section C, Model #1
River = East Weir Reach = C1 RS = 15.38
Legend
WS Full
WS 2/3
WS 1/3
Ground
Bank Sta
Elevation (ft)
Station (ft)
890
888
886
884
882
880
6000
7000
8000
9000
10000
11000
12000
13000
14000

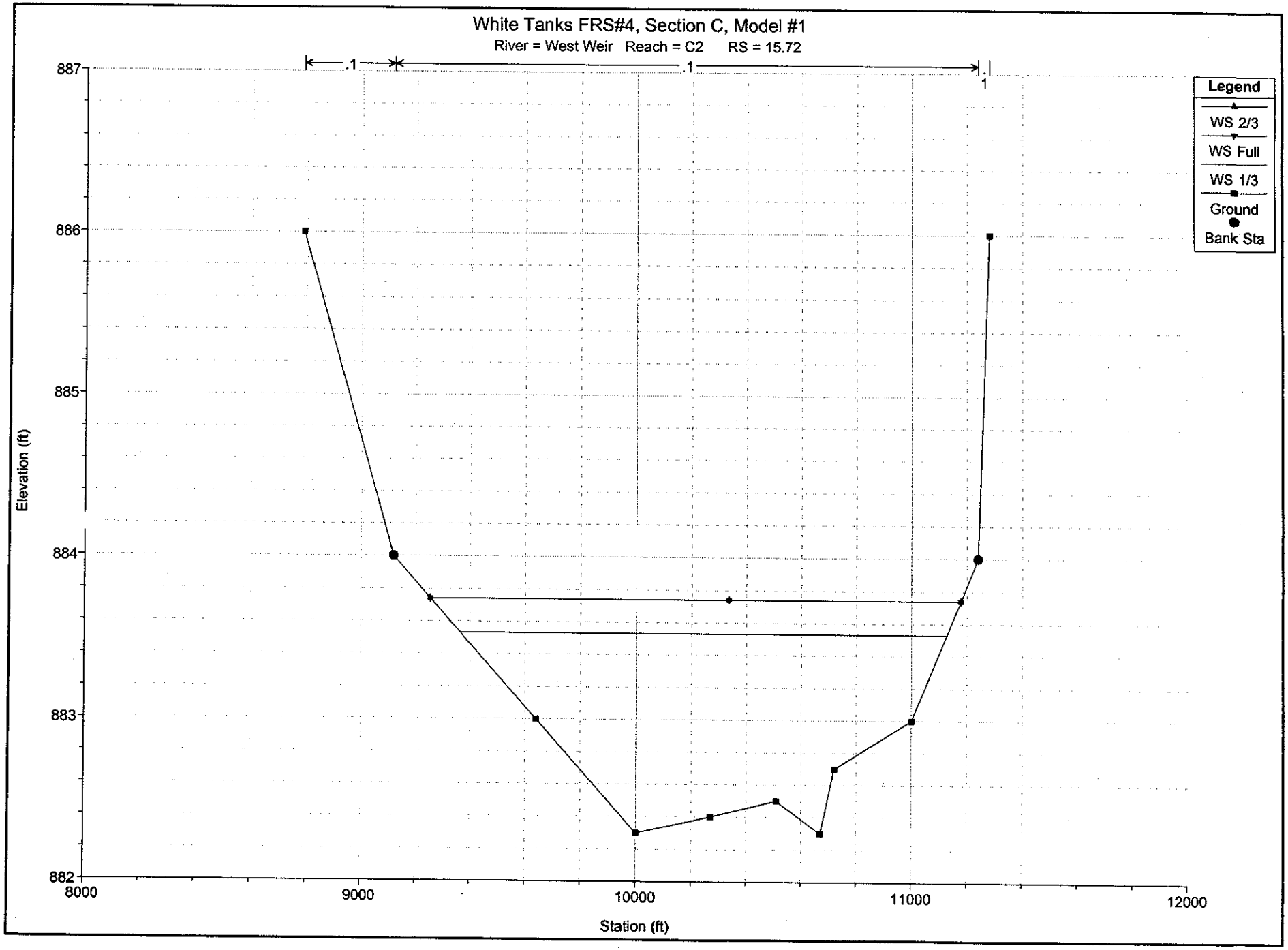

White Tanks FRS#4, Section C, Model #1
River = East Weir Reach = C1 RS = 15.15
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
884
882
880
878
876
6000
7000
8000
9000
10000
11000
12000
13000
14000
Station (ft)

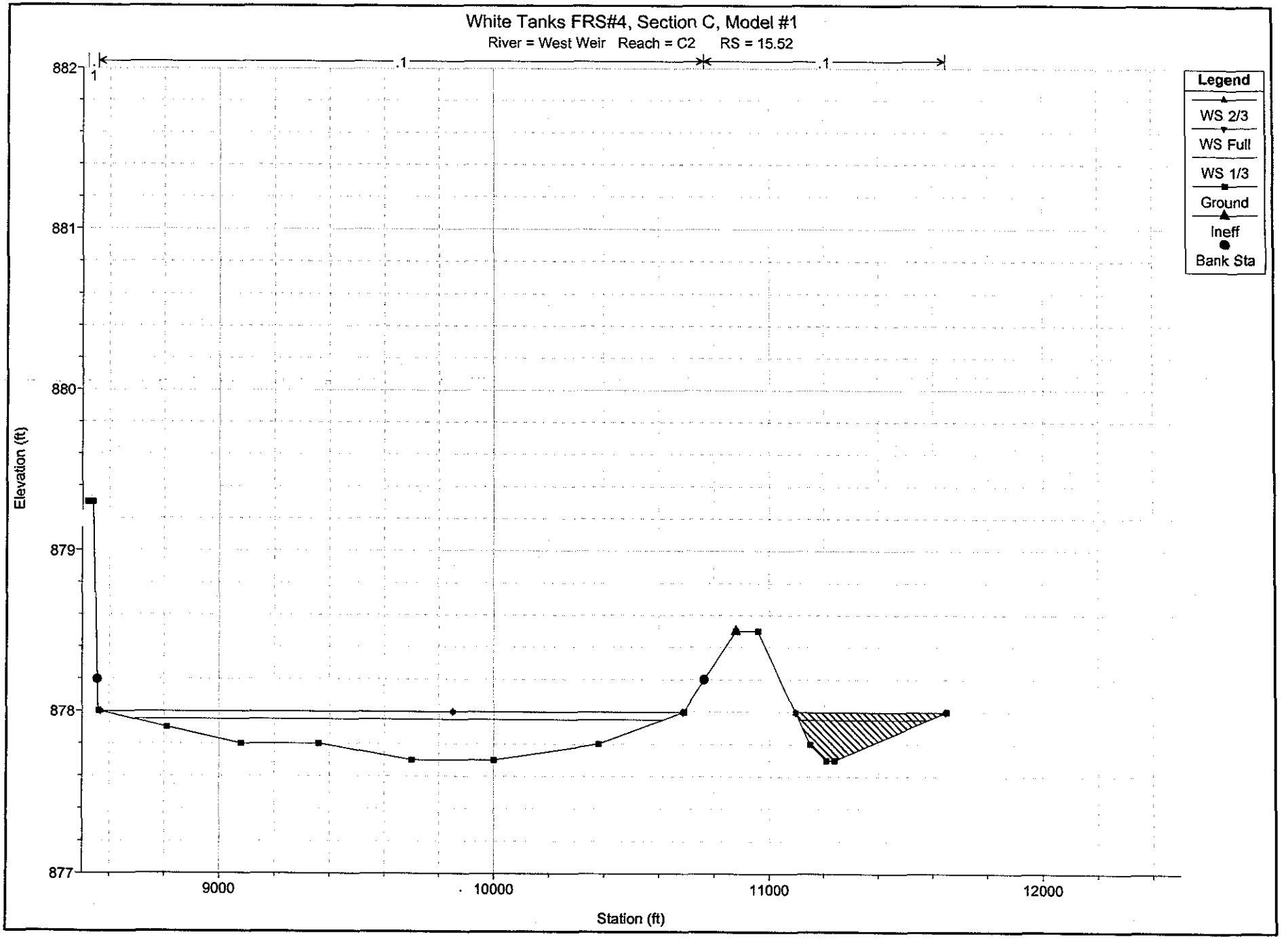

White Tanks FRS#4, Section C, Model #1
River = East Weir Reach = C1 RS = 14.85
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
886
884
882
880
878
876
6000
7000
8000
9000
10000
11000
12000
13000
14000
Station (ft)

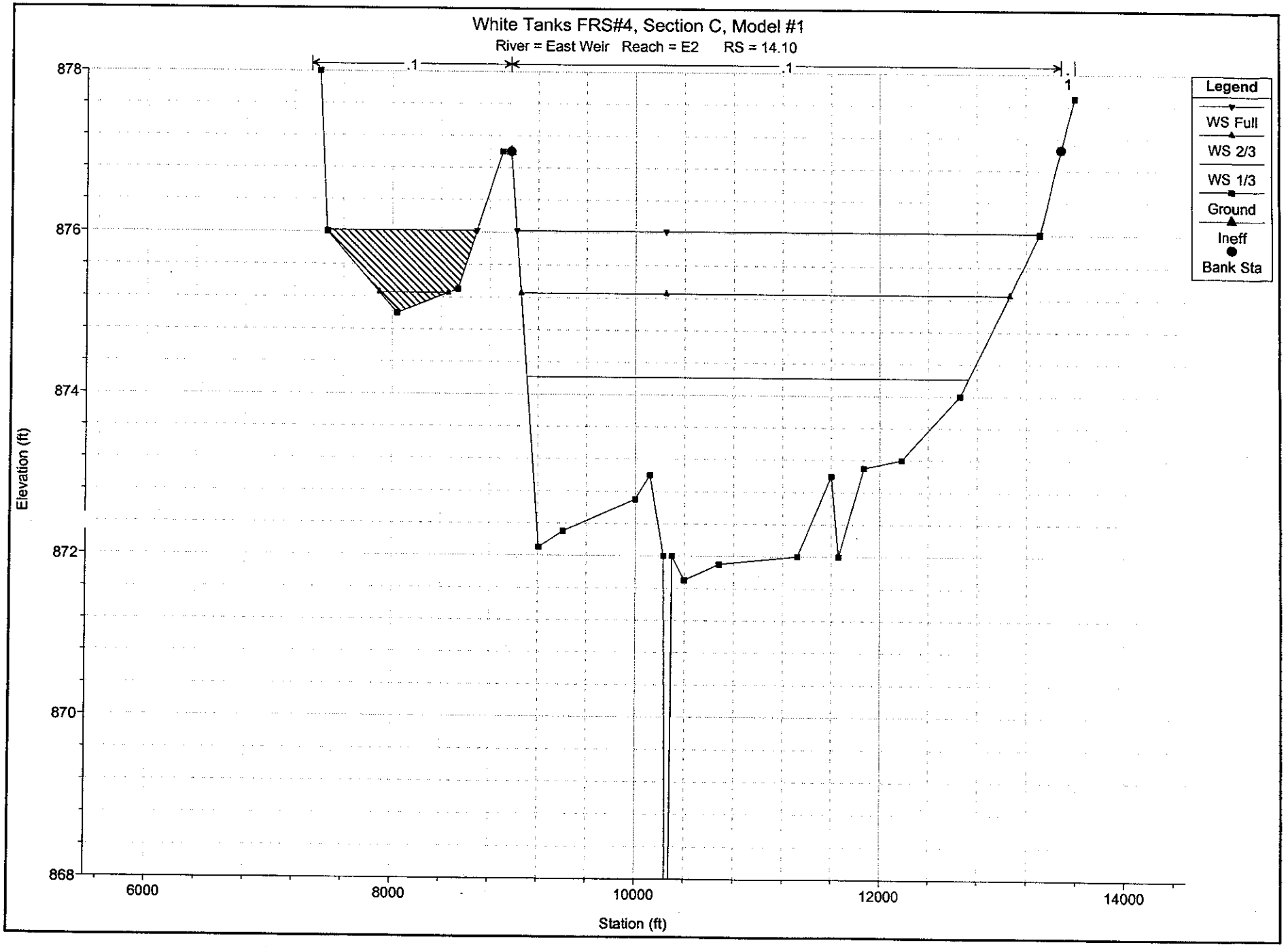

White Tanks FRS#4, Section C, Model #1
River = East Weir Reach = C1 RS = 14.62
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
882
880
878
876
874
6000
7000
8000
9000
10000
11000
12000
13000
14000
Station (ft)

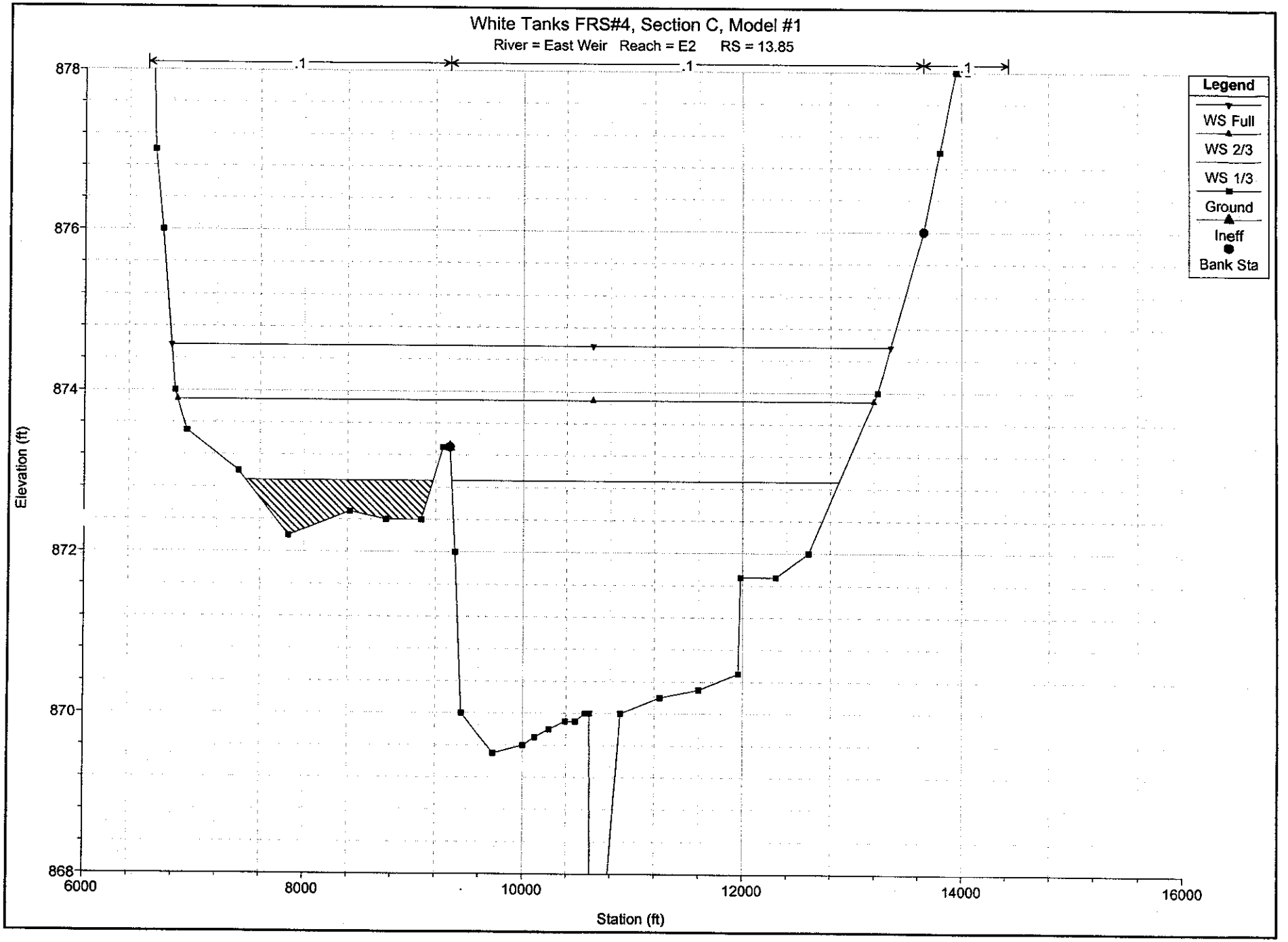

White Tanks FRS#4, Section C, Model #1
River = East Weir Reach = C1 RS = 14.42
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
882
880
878
876
874
872
6000
7000
8000
9000
10000
11000
12000
13000
14000
Station (ft)

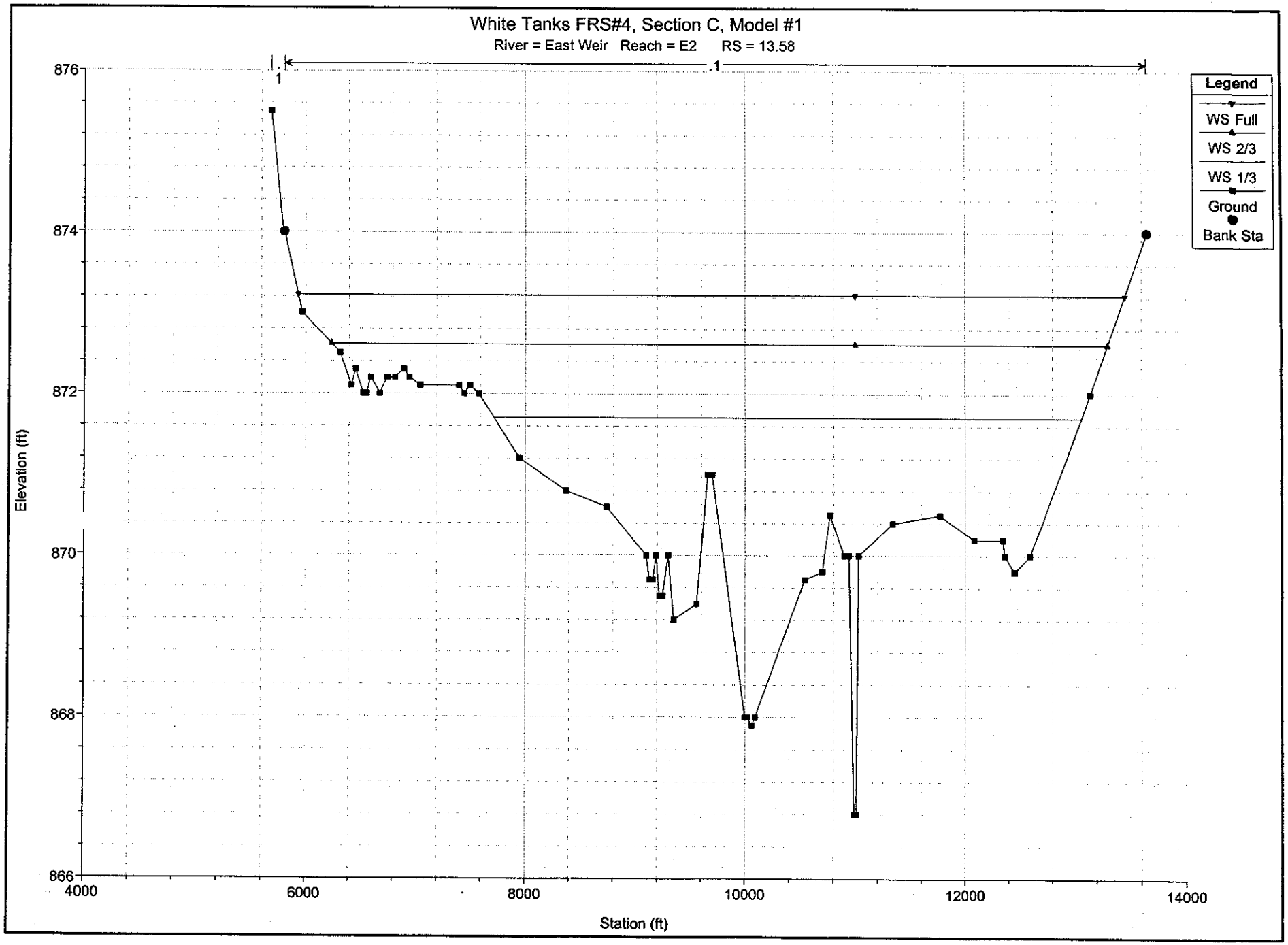

White Tanks FRS#4, Section C, Model #1
River = West Weir Reach = C2 RS = 15.93000
.045
.045
.045
Legend
WS 2/3
WS Full
WS 1/3
Ground
Bank Sta
Elevation (ft)
895
894
893
892
891
890
8000
9000
10000
11000
12000
Station (ft)

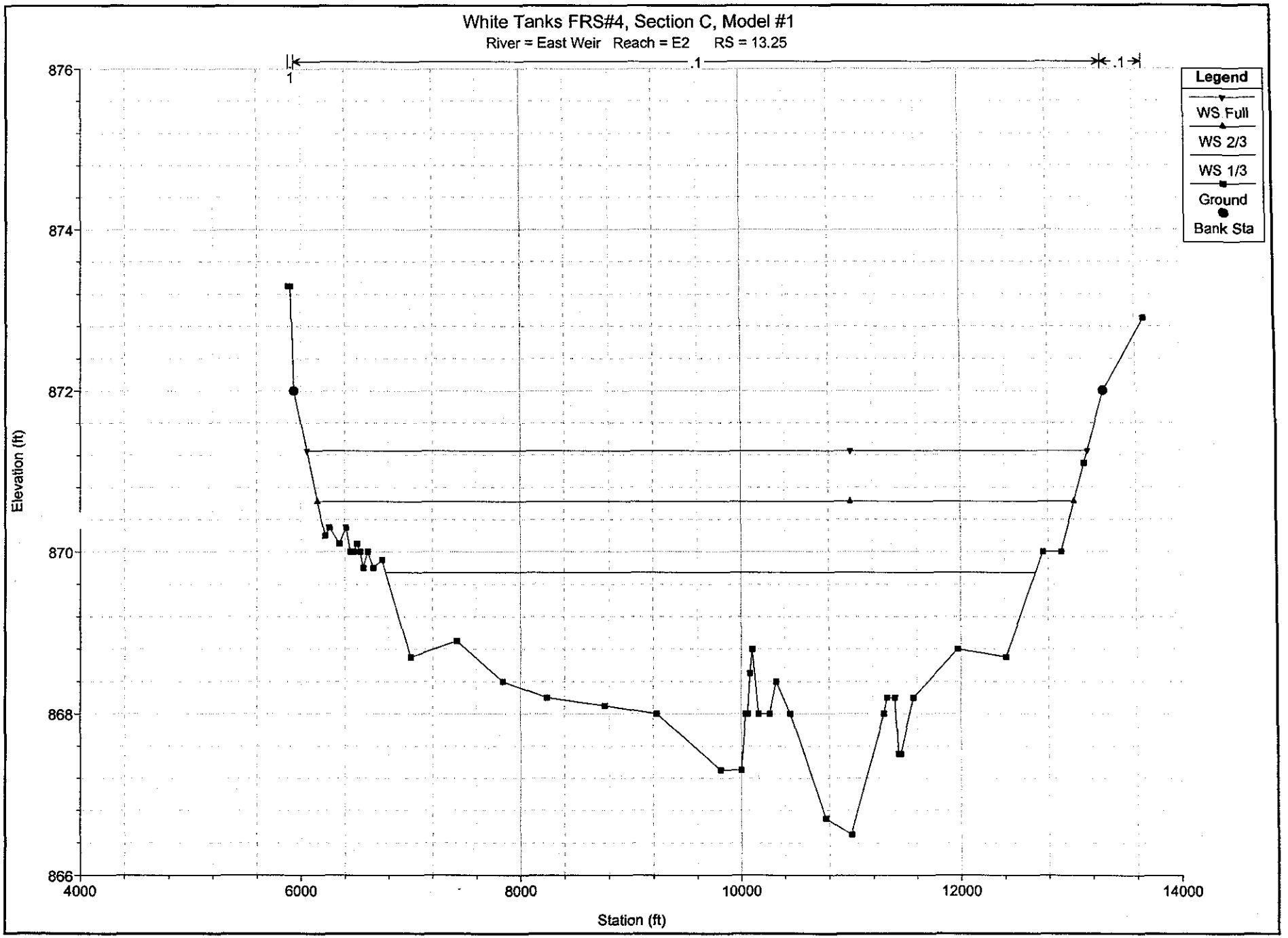

White Tanks FRS#4, Section C, Model #1
River = West Weir Reach = C2 RS = 15.72
.1
.1
.1
Legend
WS 2/3
WS Full
WS 1/3
Ground
Bank Sta
Elevation (ft)
887
886
885
884
883
882
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS#4, Section C, Model #1
River = West Weir Reach = C2 RS = 15.52
.1
.1
1
Legend
WS 2/3
WS Full
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
882
881
880
879
878
877
9000
10000
11000
12000
Station (ft)


White Tanks FRS#4, Section C, Model #1
River = East Weir Reach = E2 RS = 14.10
.1
.1
.1
1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
Elevation (ft)
878
876
874
872
870
868
6000
8000
10000
12000
14000
Station (ft)


White Tanks FRS#4, Section C, Model #1
River = East Weir Reach = E2 RS = 13.85
.1
.1
.1
Legend
WS Full
WS 2/3
WS 1/3
Ground
Ineff
Bank Sta
878
876
874
872
870
868
Elevation (ft)
6000
8000
10000
12000
14000
16000
Station (ft)


White Tanks FRS#4, Section C, Model #1
River = East Weir Reach = E2 RS = 13.58
Legend
WS Full
WS 2/3
WS 1/3
Ground
Bank Sta
Elevation (ft)
Station (ft)
876
874
872
870
868
866
4000
6000
8000
10000
12000
14000


White Tanks FRS#4, Section C, Model #1
River = East Weir Reach = E2 RS = 13.25
Legend
WS Full
WS 2/3
WS 1/3
Ground
Bank Sta
Elevation (ft)
Station (ft)
876
874
872
870
868
866
4000
6000
8000
10000
12000
14000
1
.1
.1

5 HEC-RAS Model Printouts for Full 50/50 Flow

```
                    HEC-RAS September 1998 Version 2.2
                      U.S. Army Corp of Engineers
                     Hydrologic Engineering Center
                       609 Second Street, Suite D
                      Davis, California 95616-4687
                             (916) 756-1104

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

PROJECT DATA
Project Title: White Tanks FRS#4, Section A, Model 1_50
Project File : WT4A1_50.prj
Run Date and Time: 06/26/2000 10:15:16 AM

Project in English units

Project Description:
Study Name: White Tanks FRS #4 Spillway Delineation Study
Contract No.: FCD 98-32
Purpose of Study: Delineation of the inundation limits of the 1/3, 2/3, and full spillway discharges for the western spillway of the White Tanks Flood Retarding Structure #4.

Model Name: WT4A1_50
Model Description: Set up to model flow in the channel just west of Tuthill Road between the West spillway and the Roosevelt Irrigation District Canal. Cross-section data east of the channel is set as ineffective flow area.
Flow Profile: Profile #1, Full spillway discharge for the 1/2 PMF, split 50/50 between the east and west spillways
Sections 20.09 to 20.04, Q=9000 cfs
Sections 19.84 to 18.87, Q=1000 cfs, the capacity of the channel.

HEC-RAS Version: Version 2.2, September 1998 with RASPATCH

Consultants: Hoskin Engineering Consultants, Inc.
323 W. Roosevelt Street, Suite 200
Phoenix, AZ 85003
(602)252-8384 Phone
(602)252-8385 Fax
HEC 990006

DEI Professional Services, LLC
6225 N. 24th St., Ste. 200
Phoenix, AZ 85016
(602)954-0038 Phone
(602)944-8605 Fax

PLAN DATA

Plan Title: Section A, West of Tuthill
Plan File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final models\50-50\WT4A1_50.P01

Geometry Title: Section A, West of Tuthill
Geometry File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final models\50-50\WT4A1_50.G01

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          Flow Title     : Section A, West of Tuthill
          Flow File      : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White
Tanks\hecras\i10-rsvlt\final models\50-50\WT4A1_50.F01

Plan Summary Information:
Number of:  Cross Sections =   10    Mulitple Openings =    0
            Culverts       =    0    Inline Weirs      =    0
            Bridges        =    0

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

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: Between every coordinate point (HEC2 Style)
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow


FLOW DATA

Flow Title: Section A, West of Tuthill
Flow File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final
models\50-50\WT4A1_50.F01

Flow Data (cfs)

  River          Reach          RS            Full 50/50
  West           W1             20.09               9000
  West           W1             19.84               1000
  West Spillway  A1             20.09               9000
  West Spillway  A1             19.84               1000


Boundary Conditions

  River          Reach          Profile                      Upstream                Downstream

  West Spillway  A1             Full 50/50                                             Critical


GEOMETRY DATA

Geometry Title: Section A, West of Tuthill
Geometry File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-
rsvlt\final models\50-50\WT4A1_50.G01

CROSS SECTION          RIVER: West Spillway
REACH: A1                 RS: 20.09

INPUT
Description: Northern Boundary of HEC-RAS Model
Q=9000 cfs
Station Elevation Data    num=      17
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
   10000     1054   10110     1054   10210     1054   10330     1054   10400     1054
   10440     1052   10460     1050   10520   1048.2   10550     1049   10600   1049.2
   10630   1049.7   10650     1050   10750   1051.5   10910     1054   11120     1056
   11340     1058   11570     1060

Manning's n Values        num=       3
```

Sta	n Val	Sta	n Val	Sta	n Val
10000	.045	10400	.02	10750	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10400	10910	500	580	620	.1	.3

CROSS SECTION OUTPUT Profile #Full 50/50

			Left OB	Channel	Right OB
E.G. Elev (ft)	1054.07	Element			
Vel Head (ft)	1.23	Wt. n-Val.		0.020	
W.S. Elev (ft)	1052.84	Reach Len. (ft)	500.00	580.00	620.00
Crit W.S. (ft)	1052.84	Flow Area (sq ft)		1012.12	
E.G. Slope (ft/ft)	0.003788	Area (sq ft)		1012.12	
Q Total (cfs)	9000.00	Flow (cfs)		9000.00	
Top Width (ft)	412.91	Top Width (ft)		412.91	
Vel Total (ft/s)	8.89	Avg. Vel. (ft/s)		8.89	
Max Chl Dpth (ft)	4.64	Hydr. Depth (ft)		2.45	
Conv. Total (cfs)	146239.8	Conv. (cfs)		146239.8	
Length Wtd. (ft)		Wetted Per. (ft)		413.09	
Min Ch El (ft)	1048.20	Shear (lb/sq ft)		0.58	
Alpha	1.00	Stream Power (lb/ft s)		5.15	
Frctn Loss (ft)		Cum Volume (acre-ft)	708.52	77.67	14.14
C & E Loss (ft)		Cum SA (acres)	341.89	76.84	23.07

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.

FLOW DISTRIBUTION OUTPUT Profile #Full 50/50

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10400.00	10434.00	5.30	2.96	10.90	0.06	0.27	1.79
10434.00	10468.00	423.46	64.76	34.11	4.71	1.90	6.54
10468.00	10502.00	1222.45	122.20	34.02	13.58	3.59	10.00
10502.00	10536.00	1713.22	149.63	34.01	19.04	4.40	11.45
10536.00	10570.00	1399.49	132.51	34.01	15.55	3.90	10.56
10570.00	10604.00	1279.48	125.57	34.00	14.22	3.69	10.19
10604.00	10638.00	1058.25	112.06	34.00	11.76	3.30	9.44
10638.00	10672.00	791.74	94.15	34.00	8.80	2.77	8.41
10672.00	10706.00	563.96	76.81	34.00	6.27	2.26	7.34
10706.00	10740.00	368.17	59.47	34.00	4.09	1.75	6.19
10740.00	10774.00	134.39	41.95	34.00	1.49	1.23	3.20
10774.00	10808.00	35.86	23.92	34.00	0.40	0.70	1.50
10808.00	10842.00	4.22	6.14	28.03	0.05	0.22	0.69

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.

CROSS SECTION RIVER: West Spillway
REACH: A1 RS: 20.04

INPUT
Description: Q = 9000 cfs
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9920	1045	9960	1044.8	10000	1045	10060	1044	10070	1043.8
10080	1044	10200	1045.8	10300	1046	10360	1048	10380	1050
10390	1050.5	10400	1050	10470	1047	10580	1046.4	10610	1047
10625	1048	10630	1050	10650	1050.2	10660	1050	10670	1048

10690	1047.7	10710	1048	10750	1048.2	10790	1048.6	10830	1048.5
10910	1048	10960	1047.3	10990	1048	11030	1050	11050	1052

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9920	.045	10390	.02	10630	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10400	11030	1200	1150	1150	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
9920	10390	

CROSS SECTION OUTPUT Profile #Full 50/50

E.G. Elev (ft)	1050.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.97	Wt. n-Val.		0.026	
W.S. Elev (ft)	1049.78	Reach Len. (ft)	1200.00	1150.00	1150.00
Crit W.S. (ft)	1049.78	Flow Area (sq ft)		1138.95	
E.G. Slope (ft/ft)	0.007736	Area (sq ft)	1979.65	1138.95	
Q Total (cfs)	9000.00	Flow (cfs)		9000.00	
Top Width (ft)	1046.43	Top Width (ft)	457.77	588.66	
Vel Total (ft/s)	7.90	Avg. Vel. (ft/s)		7.90	
Max Chl Dpth (ft)	5.98	Hydr. Depth (ft)		1.93	
Conv. Total (cfs)	102324.2	Conv. (cfs)		102324.2	
Length Wtd. (ft)	1150.00	Wetted Per. (ft)		589.35	
Min Ch El (ft)	1046.40	Shear (lb/sq ft)		0.93	
Alpha	1.00	Stream Power (lb/ft s)		7.38	
Frctn Loss (ft)	9.18	Cum Volume (acre-ft)	697.16	63.34	14.14
C & E Loss (ft)	0.24	Cum SA (acres)	339.26	70.18	23.07

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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 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.

FLOW DISTRIBUTION OUTPUT Profile #Full 50/50

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10400.00	10442.00	152.71	29.01	36.83	1.70	0.79	5.26
10442.00	10484.00	1106.57	100.37	42.03	12.30	2.39	11.03
10484.00	10526.00	1588.49	124.65	42.00	17.65	2.97	12.74
10526.00	10568.00	1798.04	134.27	42.00	19.98	3.20	13.39
10568.00	10610.00	1757.17	132.44	42.01	19.52	3.15	13.27
10610.00	10652.00	363.52	38.10	19.82	4.04	1.96	9.54
10652.00	10694.00	209.34	54.62	33.06	2.33	1.66	3.83
10694.00	10736.00	301.81	74.86	42.00	3.35	1.78	4.03
10736.00	10778.00	225.22	62.80	42.00	2.50	1.50	3.59
10778.00	10820.00	160.64	51.28	42.00	1.78	1.22	3.13
10820.00	10862.00	189.98	56.71	42.00	2.11	1.35	3.35
10862.00	10904.00	254.27	67.55	42.00	2.83	1.61	3.76
10904.00	10946.00	362.70	83.59	42.00	4.03	1.99	4.34
10946.00	10988.00	437.22	93.51	42.01	4.86	2.23	4.68
10988.00	RB 11030.00	92.31	35.18	37.58	1.03	0.94	2.62

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.

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Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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 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: West Spillway
REACH: A1                 RS: 19.84

INPUT
Description: Q=1000 cfs
Ineffective flow area east of channel along Tuthill
            Road
Station Elevation Data    num=      73
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    8790    1041    8810    1040    8840  1039.5    8870    1040    8950  1040.1
 9031.92    1040 9154.47    1040 9343.33  1039.5 9492.37    1039  9567.8  1038.5
  9636.2    1038 9657.55    1038 9661.34    1038 9792.72  1037.5    9940 1037.37
   10000 1037.0410020.48    103710067.24  1036.510078.84  1036.5   10140  1036.9
 10155.1    103710160.59  1037.510166.09    103810166.19    103810179.88  1038.5
10193.36    103910206.84  1039.5 10218.1    104010220.32    104010230.71    1040
10236.59  1039.510242.46    103910248.34  1038.510254.31    103810263.83    1038
 10287.5    103810297.37  1038.510307.24    103910317.17  1039.5 10327.1    1040
10346.11    104010485.18  1040.510560.46    104110617.79    104110697.96    1041
10735.37  1041.510771.87    104210773.79    1042 10851.1    104210853.58    1042
11007.45    104211008.85    104211105.31  1042.511110.67  1042.511117.75    1042
11122.71    104211141.01    104211145.15    104211180.08  1042.511215.01    1043
11315.24  1043.511340.66    104411345.91    104411420.74  1044.511581.66  1044.5
11620.79    104411640.15    104411640.69    104411668.31  1044.511722.97  1044.5
11766.55  1044.511781.65  1044.511790.42  1044.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    8790      .1   10000    .01610067.24    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      10230.7110560.46              870     870     870              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
    879010230.71  1044.5

CROSS SECTION OUTPUT    Profile #Full 50/50

  E.G. Elev (ft)          1040.94   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.18   Wt. n-Val.                          0.045
  W.S. Elev (ft)          1040.75   Reach Len. (ft)           870.00    870.00     870.00
  Crit W.S. (ft)          1040.35   Flow Area (sq ft)                   291.09
  E.G. Slope (ft/ft)     0.010899   Area (sq ft)             2928.80    291.09
  Q Total (cfs)           1000.00   Flow (cfs)                         1000.00
  Top Width (ft)          1728.24   Top Width (ft)           1435.76    292.48
  Vel Total (ft/s)           3.44   Avg. Vel. (ft/s)                      3.44
  Max Chl Dpth (ft)          4.25   Hydr. Depth (ft)                      1.00
  Conv. Total (cfs)         9578.7  Conv. (cfs)                        9578.7
  Length Wtd. (ft)          870.00  Wetted Per. (ft)                   292.61
  Min Ch El (ft)          1038.00   Shear (lb/sq ft)                      0.68
  Alpha                      1.00   Stream Power (lb/ft s)                2.33
  Frctn Loss (ft)            6.42   Cum Volume (acre-ft)      629.55    44.47      14.14
  C & E Loss (ft)            0.02   Cum SA (acres)            313.18    58.54      23.07

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
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section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #Full 50/50

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10230.71	10252.69	129.50	37.09	22.06	12.95	1.69	3.49
10252.69	10274.68	292.57	60.40	21.99	29.26	2.75	4.84
10274.68	10296.66	276.43	58.38	22.00	27.64	2.66	4.73
10296.66	10318.64	135.57	38.09	22.01	13.56	1.73	3.56
10318.64	10340.63	40.13	18.34	21.99	4.01	0.83	2.19
10340.63	10362.61	32.15	16.05	21.98	3.21	0.73	2.00
10362.61	10384.59	26.73	14.37	21.98	2.67	0.65	1.86
10384.59	10406.58	21.56	12.63	21.98	2.16	0.57	1.71
10406.58	10428.56	16.85	10.89	21.98	1.68	0.50	1.55
10428.56	10450.54	12.61	9.16	21.98	1.26	0.42	1.38
10450.54	10472.53	8.88	7.42	21.98	0.89	0.34	1.20
10472.53	10494.51	5.47	5.55	21.98	0.55	0.25	0.99
10494.51	10516.49	1.53	2.58	21.98	0.15	0.12	0.59
10516.49	10538.48	0.03	0.15	6.69	0.00	0.02	0.20

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.

CROSS SECTION RIVER: West Spillway
REACH: A1 RS: 19.68

INPUT
Description: Q=1000 cfs
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7930	1036.5	8003.47	1036.5	8131.84	1036	8134.04	1036	8235.56	1035.5
8365.92	1035	8556.26	1034.5	8852.66	1034	8853.02	1034	8942.87	1033.5
9034.3	1033	9092.75	1033	9098.12	1033	9199.34	1032.5	9255.69	1032
9258.21	1032	9352.24	1031.5	9497.86	1031.5	9498.53	1032	9504.07	1032
9561.24	1031.5	9614.69	1031	9675.88	1031	9892.54	1031.5	9915	1031.5
9957.38	1031.5	10000	1031.510052.04		1031.510073.96		1031.510075.36		1031.5
10116.44	103210116.63		1032	10130	1032.510149.48		1033	10165.8	1033.5
10182.12	103410194.38		103410196.14		103410197.72		1033.510200.27		1033
10202.81	1032.510205.35		103210207.94		103210246.51		103210247.83		1032
10289.29	1032.510330.89		103310372.51		1033.5	10413.2	103410433.85		1034
10511.86	1034.510688.91		1034.510693.04		1034.510748.12		103510844.75		1035.5
10927.31	1035.510985.54		103510987.38		103511016.74		1035.511042.81		1036
11043.01	103611110.42		1036.511158.28		1037				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
7930	.1	10000	.01610073.96		.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10196.1410511.86		490	570	480	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
793010196.14		1037

CROSS SECTION OUTPUT Profile #Full 50/50

E.G. Elev (ft)	1034.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.045	
W.S. Elev (ft)	1034.38	Reach Len. (ft)	490.00	570.00	480.00
Crit W.S. (ft)	1033.58	Flow Area (sq ft)		363.33	
E.G. Slope (ft/ft)	0.005327	Area (sq ft)	3200.29	363.33	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	1868.03	Top Width (ft)	1570.56	297.47	
Vel Total (ft/s)	2.75	Avg. Vel. (ft/s)		2.75	
Max Chl Dpth (ft)	3.38	Hydr. Depth (ft)		1.22	

Conv. Total (cfs)	13701.3	Conv. (cfs)		13701.3	
Length Wtd. (ft)	570.00	Wetted Per. (ft)		297.71	
Min Ch El (ft)	1032.00	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)		1.12	
Frctn Loss (ft)	3.76	Cum Volume (acre-ft)	568.34	37.93	14.14
C & E Loss (ft)	0.00	Cum SA (acres)	283.15	52.65	23.07

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.

FLOW DISTRIBUTION OUTPUT Profile #Full 50/50

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10196.14	10217.19	126.30	41.67	21.27	12.63	1.98	3.03
10217.19	10238.24	173.27	50.16	21.05	17.33	2.38	3.45
10238.24	10259.28	168.74	49.37	21.05	16.87	2.35	3.42
10259.28	10280.33	142.35	44.58	21.05	14.24	2.12	3.19
10280.33	10301.38	115.09	39.24	21.05	11.51	1.86	2.93
10301.38	10322.43	90.25	33.91	21.05	9.02	1.61	2.66
10322.43	10343.48	67.89	28.59	21.05	6.79	1.36	2.37
10343.48	10364.52	48.16	23.27	21.05	4.82	1.11	2.07
10364.52	10385.57	31.17	17.92	21.05	3.12	0.85	1.74
10385.57	10406.62	17.07	12.49	21.05	1.71	0.59	1.37
10406.62	10427.67	8.69	8.33	21.05	0.87	0.40	1.04
10427.67	10448.72	7.06	7.35	21.05	0.71	0.35	0.96
10448.72	10469.76	3.27	4.64	21.05	0.33	0.22	0.71
10469.76	10490.81	0.67	1.80	21.05	0.07	0.09	0.38
10490.81	RB 10511.86	0.00	0.03	2.80	0.00	0.01	0.08

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.

CROSS SECTION RIVER: West Spillway
REACH: A1 RS: 19.57

INPUT
Description: Q=1000 cfs
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7235	1034	7242.01	1034	7346.11	1033.5	7458.14	1033	7540.92	1032.5
7686.16	1032	7686.76	1032	7837.1	1031.5	8017.52	1031	8148.59	1030.5
8207.12	1030	8212.25	1030	8370.34	1029.5	8396.37	1029	8422.4	1028.5
8448.34	1028	8448.43	1028	8672.26	1027.5	9141.26	1027.5	9195.07	1027.5
9221.67	1027.5	9342.23	1027.5	9647.59	1028	9656.13	1028	9870.84	1028
9890	1028	9903.75	1028	9971.98	1028	9973.2	1028	9982.66	1028
10000	1028	10047.96	1028	10049.24	1028	10067.55	1028.5	10086.68	1029
10101.4	1030	10105.81	1029.5	10123.97	1030	10127.94	1029.5	10132.17	1029
10135	1028.5	10136.4	1028.5	10140.63	1028	10140.77	1028	10143.57	1027.5
10146.51	1027	10156.65	1027	10160.96	1027.5	10165.28	1028	10166.56	1028
10184.33	1028.5	10203.51	1029	10237.65	1029.5	10282.87	1030	10283.53	1030
10536.89	1030.5	10736.17	1031	10794.79	1031.5	10861.15	1032	10861.67	1032
10892.16	1032.5	10940.83	1033	10997.98	1033.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
7235	.1	10000	.01	10067.55	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10123.97	10736.17	570	690	690	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
7235	10123.97	1034

CROSS SECTION OUTPUT Profile #Full 50/50

E.G. Elev (ft)	1030.74	Element	Left OB	Channel	Right OB

Vel Head (ft)	0.11	Wt. n-Val.		0.045	
W.S. Elev (ft)	1030.63	Reach Len. (ft)	570.00	690.00	690.00
Crit W.S. (ft)	1029.92	Flow Area (sq ft)		379.60	
E.G. Slope (ft/ft)	0.008364	Area (sq ft)	5111.52	379.60	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	2475.65	Top Width (ft)	2010.04	465.61	
Vel Total (ft/s)	2.63	Avg. Vel. (ft/s)		2.63	
Max Chl Dpth (ft)	3.63	Hydr. Depth (ft)		0.82	
Conv. Total (cfs)	10934.2	Conv. (cfs)		10934.2	
Length Wtd. (ft)	690.00	Wetted Per. (ft)		465.91	
Min Ch El (ft)	1027.00	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		1.12	
Frctn Loss (ft)	5.12	Cum Volume (acre-ft)	521.59	33.07	14.14
C & E Loss (ft)	0.00	Cum SA (acres)	263.02	47.66	23.07

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.

FLOW DISTRIBUTION OUTPUT Profile #Full 50/50

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10123.97	10164.78	418.17	108.66	41.09	41.82	2.66	3.85
10164.78	10205.60	287.13	86.50	40.83	28.71	2.12	3.32
10205.60	10246.41	128.19	53.31	40.82	12.82	1.31	2.40
10246.41	10287.22	58.04	33.14	40.81	5.80	0.81	1.75
10287.22	10328.04	33.57	23.86	40.81	3.36	0.58	1.41
10328.04	10368.85	26.22	20.57	40.81	2.62	0.50	1.27
10368.85	10409.66	19.62	17.29	40.81	1.96	0.42	1.14
10409.66	10450.48	13.81	14.00	40.81	1.38	0.34	0.99
10450.48	10491.29	8.84	10.71	40.81	0.88	0.26	0.82
10491.29	10532.10	4.80	7.42	40.81	0.48	0.18	0.65
10532.10	10572.92	1.56	3.79	40.81	0.16	0.09	0.41
10572.92	10613.73	0.05	0.35	16.66	0.01	0.02	0.15

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.

CROSS SECTION RIVER: West Spillway
REACH: A1 RS: 19.44

INPUT
Description: Q=1000 cfs
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6540	1029.8	6585	1029.6	6655	1029.5	6732	1029	7000	1028
7245	1026	7475	1025.5	7890	1024	8223.69	1023	8957.17	1023
9151.16	1023	9209.42	1023	9280.28	1023.5	9373.66	1023.5	9880.43	1023.03
9910.73	1023	9935.52	1022.5	9960.02	1022	9961.4	1022	9967.8	1022
10000	102210014.14		102210022.18		1022	10041.4	102210041.73		1022
10046.88	1022.510054.87		102310062.85		1023.510068.13		102410070.95		1024
10089.85	1024.5	10094.3	102510098.75		1025.510103.21		102610103.55		1026
10112.82	102610116.14		102610117.93		1025.510122.69		102510126.19		1024.5
10129.41	102410129.69		102410132.81		1023.510135.93		102310139.05		1022.5
10140.43	1022.510143.87		102210144.21		102210147.71		1021.510156.08		1021.5
10160.61	102210161.38		102210164.03		1022.510166.68		102310170.09		1023.5
10173.65	102410173.81		1024	10214.5	1024.510429.21		102510486.12		1025.5
10565.94	102610566.76		102610669.56		1026.5	10786	102710839.07		1027.5
10878.66	102810878.84		102810922.29		1028.510942.25		1028.511024.11		1028
11024.51	102811025.35		102811034.92		102811080.52		1028.511120.92		1029
11240.61	1029.511298.72		1029.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
6540	.1	10000	.01610062.85		.045

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

```
     10116.1410565.94              540     580     570            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
    654010116.14    1030
```

CROSS SECTION OUTPUT Profile #Full 50/50

			Left OB	Channel	Right OB
E.G. Elev (ft)	1025.63	Element			
Vel Head (ft)	0.11	Wt. n-Val.		0.045	
W.S. Elev (ft)	1025.52	Reach Len. (ft)	540.00	580.00	570.00
Crit W.S. (ft)	1025.02	Flow Area (sq ft)		374.10	
E.G. Slope (ft/ft)	0.006487	Area (sq ft)	5570.44	374.10	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	3001.90	Top Width (ft)	2631.13	370.76	
Vel Total (ft/s)	2.67	Avg. Vel. (ft/s)		2.67	
Max Chl Dpth (ft)	4.02	Hydr. Depth (ft)		1.01	
Conv. Total (cfs)	12416.1	Conv. (cfs)		12416.1	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		371.25	
Min Ch El (ft)	1021.50	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)		1.09	
Frctn Loss (ft)	4.41	Cum Volume (acre-ft)	451.70	27.10	14.14
C & E Loss (ft)	0.01	Cum SA (acres)	232.65	41.04	23.07

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full 50/50

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10116.14	10146.13	167.51	53.24	28.53	16.75	1.88	3.15
10146.13	10176.11	410.49	93.26	30.20	41.05	3.11	4.40
10176.11	10206.10	96.77	39.08	29.99	9.68	1.30	2.48
10206.10	10236.09	63.50	30.35	29.99	6.35	1.01	2.09
10236.09	10266.07	55.20	27.90	29.99	5.52	0.93	1.98
10266.07	10296.06	48.47	25.81	29.99	4.85	0.86	1.88
10296.06	10326.05	42.10	23.72	29.99	4.21	0.79	1.78
10326.05	10356.03	36.09	21.62	29.99	3.61	0.72	1.67
10356.03	10386.02	30.45	19.53	29.99	3.05	0.65	1.56
10386.02	10416.01	25.21	17.43	29.99	2.52	0.58	1.45
10416.01	10445.99	18.39	14.43	29.99	1.84	0.48	1.27
10445.99	10475.98	5.63	7.09	29.99	0.56	0.24	0.79
10475.98	10505.97	0.18	0.63	12.65	0.02	0.05	0.28

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: West Spillway
REACH: A1 RS: 19.33

INPUT
Description: Q=1000 cfs
Station Elevation Data num= 84

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5940	1023.6	6355	1022.6	6490	1022.3	6700	1022	6810	1022
6830	1021.6	6850	1022	6915	1020.8	7325	1020	7837.35	1019
7979.84	1018.5	8120.6	1018	8130.79	1018	8170.37	1018	8175.25	1018
8189.19	1018	8203.94	1018	8342.78	1018	8342.97	1018	8496.11	1018
8525.44	1018	8710.51	1018.5	9008.7	1019	9208.91	1019	9213.94	1019
9428.44	1019	9496.09	1019	9820.57	1019	9972.54	1018.5	10000	1018
10013.98	101810061.41		1018.510077.12		101910092.82		1019.510108.52		1020
10109.23	1020	10114.8	1020.510119.08		102110126.03		102110128.26		1020.5
10130.27	102010130.49		102010136.15		1019.510141.57		101910147.06		1018.5
10152.5	1018	10153.6	101810155.89		1017.510159.27		101710165.11		1017
10167.37	1017.510169.62		101810170.38		101810173.25		1018.510193.95		1019

```
10211.28  1019.510228.79    102010231.76    102010279.59  1020.510330.63    1021
10382.02  1021.510537.17  1021.510625.66    102110664.16    102110734.74  1021.5
10760.22    102210760.91    102210841.54  1022.5 11070.4    102311336.24  1023.5
 11383.6    102411384.52    102411391.11  1024.511398.62    102511406.13  1025.5
 11413.7    102611413.76    102611478.93    102611480.22    102611493.05  1025.5
11507.16    102511521.27  1024.511591.99  1024.511596.97  1024.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    5940      .1   10000    .01610061.41    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      10126.0310382.02              700     650     660              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
    594010126.03    1026

CROSS SECTION OUTPUT    Profile #Full 50/50

  E.G. Elev (ft)            1021.21   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.22   Wt. n-Val.                            0.045
  W.S. Elev (ft)            1020.99   Reach Len. (ft)             700.00    650.00     660.00
  Crit W.S. (ft)            1020.38   Flow Area (sq ft)                     266.81
  E.G. Slope (ft/ft)       0.008994   Area (sq ft)               6380.61    266.81
  Q Total (cfs)             1000.00   Flow (cfs)                           1000.00
  Top Width (ft)            3417.46   Top Width (ft)             3214.15    203.31
  Vel Total (ft/s)             3.75   Avg. Vel. (ft/s)                       3.75
  Max Chl Dpth (ft)            3.99   Hydr. Depth (ft)                       1.31
  Conv. Total (cfs)         10544.2   Conv. (cfs)                          10544.2
  Length Wtd. (ft)           650.00   Wetted Per. (ft)                     203.78
  Min Ch El (ft)            1017.00   Shear (lb/sq ft)                       0.74
  Alpha                        1.00   Stream Power (lb/ft s)                 2.76
  Frctn Loss (ft)              5.23   Cum Volume (acre-ft)        377.63     22.84      14.14
  C & E Loss (ft)              0.04   Cum SA (acres)              196.42     37.21      23.07

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT    Profile #Full 50/50

  Left Sta      Right Sta       Flow       Area       W.P.     % Conv.    Hydr D.   Velocity
  (ft)          (ft)            (cfs)    (sq ft)      (ft)                 (ft)     (ft/s)
  LB 10126.03   10143.10        60.97      21.80     17.18       6.10      1.28       2.80
  10143.10      10160.16       250.70      50.93     17.20      25.07      2.98       4.92
  10160.16      10177.23       287.26      55.30     17.22      28.73      3.24       5.19
  10177.23      10194.29       149.89      37.30     17.07      14.99      2.19       4.02
  10194.29      10211.36       101.69      29.55     17.07      10.17      1.73       3.44
  10211.36      10228.43        58.42      21.19     17.07       5.84      1.24       2.76
  10228.43      10245.49        36.10      15.88     17.07       3.61      0.93       2.27
  10245.49      10262.56        25.50      12.89     17.07       2.55      0.76       1.98
  10262.56      10279.62        16.27       9.84     17.07       1.63      0.58       1.65
  10279.62      10296.69         8.99       6.89     17.07       0.90      0.40       1.30
  10296.69      10313.76         3.69       4.04     17.07       0.37      0.24       0.91
  10313.76      10330.82         0.52       1.20     15.63       0.05      0.08       0.43

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION          RIVER: West Spillway
REACH: A1                 RS: 19.21

INPUT
Description: Q=1000 cfs
Station Elevation Data    num=      77
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
```

```
    5500    1015    5815    1014    6160  1013.5    6280  1012.9    6490  1013.1
    6850    1014    7035  1014.2    7165    1014    7770    1012    8020  1011.5
 8152.84    1012 8156.63    1012 8428.92  1012.5 8672.76    1013 8851.81  1013.5
 9019.45    1014 9071.55    1014 9081.91    1014 9087.94    1014 9228.32  1013.5
 9547.69    1013 9765.05  1012.5 9779.24  1012.5 9800.11  1012.7 9838.55    1013
 9864.95    1013 9889.89  1012.5 9908.12  1012.5 9926.88    1013 9937.05  1013.5
 9946.78    1014 9947.21    1014   10000  1014.510008.63    101510012.83  1015.5
10017.57  1015.510022.55    101510027.53  1014.510036.46    101410036.47    1014
10042.09  1013.510043.32    101310044.54  1012.510047.46  1012.510059.26    1013
10072.01  1013.510082.38    101410085.42    101410112.12  1014.510138.92    1015
   10140    101510140.11    101510161.37  1015.510180.66    101610181.19    1016
 10218.8  1016.510276.09  1016.510299.08    101610299.75    101610309.41  1015.5
10317.27    101510325.13  1014.510333.06    101410333.29    101410459.63    1014
10462.16    101410533.03  1014.510654.91    101510745.15  1015.511035.98    1016
 11038.2    101611107.29  1016.511204.13    101711284.48  1017.5 11366.8    1018
11366.93    101811453.71  1018.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    5500      .1   10000    .01610059.26    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      10017.5710161.37              770     770     780              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    550010017.57  1018.5 10218.811453.71  1016.5

CROSS SECTION OUTPUT    Profile #Full 50/50

  E.G. Elev (ft)            1015.93   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.60   Wt. n-Val.                            0.024
  W.S. Elev (ft)            1015.34   Reach Len. (ft)             770.00    770.00     780.00
  Crit W.S. (ft)            1015.34   Flow Area (sq ft)                     161.12
  E.G. Slope (ft/ft)       0.007247   Area (sq ft)               9556.93    161.12     344.84
  Q Total (cfs)             1000.00   Flow (cfs)                           1000.00
  Top Width (ft)            5050.00   Top Width (ft)             4511.45    135.15     403.41
  Vel Total (ft/s)             6.21   Avg. Vel. (ft/s)                        6.21
  Max Chl Dpth (ft)            3.84   Hydr. Depth (ft)                        1.19
  Conv. Total (cfs)         11746.7   Conv. (cfs)                          11746.7
  Length Wtd. (ft)           770.00   Wetted Per. (ft)                      135.47
  Min Ch El (ft)            1012.50   Shear (lb/sq ft)                        0.54
  Alpha                        1.00   Stream Power (lb/ft s)                  3.34
  Frctn Loss (ft)              3.29   Cum Volume (acre-ft)        249.57     19.64      11.53
  C & E Loss (ft)              0.17   Cum SA (acres)              134.34     34.69      20.01


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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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 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.

FLOW DISTRIBUTION OUTPUT    Profile #Full 50/50

  Left Sta      Right Sta        Flow       Area       W.P.    % Conv.    Hydr D.   Velocity
  (ft)          (ft)             (cfs)    (sq ft)      (ft)                (ft)      (ft/s)
  LB 10017.57   10027.16         11.61       3.17      7.99       1.16      0.40       3.66
  10027.16      10036.74         74.12      10.38      9.60       7.41      1.08       7.14
```

10036.74	10046.33	206.25	19.33	9.80	20.62	2.02	10.67
10046.33	10055.92	335.48	25.67	9.59	33.55	2.68	13.07
10055.92	10065.50	154.46	21.86	9.59	15.45	2.28	7.07
10065.50	10075.09	67.22	18.19	9.59	6.72	1.90	3.69
10075.09	10084.68	43.86	14.08	9.60	4.39	1.47	3.11
10084.68	10094.26	33.93	12.07	9.59	3.39	1.26	2.81
10094.26	10103.85	26.28	10.35	9.59	2.63	1.08	2.54
10103.85	10113.44	19.40	8.63	9.59	1.94	0.90	2.25
10113.44	10123.02	13.41	6.91	9.59	1.34	0.72	1.94
10123.02	10132.61	8.34	5.20	9.59	0.83	0.54	1.60
10132.61	10142.20	4.38	3.53	9.59	0.44	0.37	1.24
10142.20	10151.78	1.25	1.66	9.59	0.12	0.17	0.75
10151.78	RB 10161.37	0.02	0.08	2.58	0.00	0.03	0.23

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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 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: West Spillway
REACH: A1 RS: 19.06

INPUT
Description: Q=1000 cfs
Station Elevation Data num= 113

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4297.71	1008	4304.11	1007.5	4309.62	1007	4315.41	1006.5	4319.8	1006.5
4360.15	1007	4409.68	1007.5	4495.05	1007.5	4649.13	1007	4693.79	1007
4783.86	1007.5	4844.95	1008	4897.25	1008	5317.5	1008	5317.51	1008
5345.37	1007.5	5369.35	1007	5393.33	1006.5	5417.32	1006	5419.58	1006
5491.84	1005.5	5547.94	1005.5	5620.4	1006	5624.39	1006	5645.97	1006
5657.78	1006	5841.53	1005.5	5945.17	1005.5	6047.79	1006	6073	1006
6190.08	1006.5	6372.85	1007	6504.78	1007.5	6617.64	1008	6626.52	1008
7056.33	1008	7059.8	1008	7226.24	1007.5	7548.83	1007	7748.09	1007
7794.17	1007.5	7838.17	1008	7844.21	1008.5	7856.62	1009	7860.46	1009.5
7880.31	1009.5	7881.4	1009	7882.5	1008.5	7883.6	1008	7884.69	1007.5
7885.79	1007	7886.89	1006.5	7887.99	1006	7889.09	1005.5	7890.19	1005
7891.29	1004.5	7892.39	1004	7893.49	1003.5	7894.59	1003	7895.69	1002.5
7896.79	1002	7897.89	1001.5	7898.99	1001	7900.09	1000.5	7900.83	1000
7901.19	1000	7911.95	999.5	7919.89	999	7922.05	998.5	7924.21	998
7926.36	997.5	7927.07	997.5	7928.22	998	7929.36	998.5	7930.51	999
7980	1008	8000	1009	8010	1009	8030	1008	8050	1006.5
8130	1006.7	8320	1007.4	8800	1007.6	8940	1007.4	9280	1007.3
9590	1007.5	9800	1007.6	10000	1008	10010	1008.5	10050	1008.5
10060	1008	10070	1007.5	10080	1008	10120	1008.4	10230	1008.3
10270	1008	10290	1007.9	10410	1007.8	10470	1008	10555	1008.4
10590	1008.3	10680	1008.9	10815	1008	10845	1007.8	10855	1008
10890	1008.4	11065	1009.2	11085	1009	11195	1010	11260	1010.3
11315	1010.3	11330	1010	11435	1008.3				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4297.71	.1	10000	.016	10050	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10050	11065	700	1019	1300	.1	.3

```
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 4297.71   10050  1010.3   11065   11435  1009.2
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  7881.4    8000    1009
```

CROSS SECTION OUTPUT Profile #Full 50/50

E.G. Elev (ft)	1009.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.045	
W.S. Elev (ft)	1009.00	Reach Len. (ft)	700.00	1019.00	1300.00
Crit W.S. (ft)	1008.53	Flow Area (sq ft)		706.06	
E.G. Slope (ft/ft)	0.002814	Area (sq ft)	9784.74	706.06	15.07
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	6612.96	Top Width (ft)	5598.85	970.95	43.15
Vel Total (ft/s)	1.42	Avg. Vel. (ft/s)		1.42	
Max Chl Dpth (ft)	3.50	Hydr. Depth (ft)		0.73	
Conv. Total (cfs)	18852.7	Conv. (cfs)		18852.7	
Length Wtd. (ft)	1030.89	Wetted Per. (ft)		971.01	
Min Ch El (ft)	1007.50	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)		0.18	
Frctn Loss (ft)	7.34	Cum Volume (acre-ft)	78.62	11.98	8.31
C & E Loss (ft)	0.01	Cum SA (acres)	44.99	24.91	16.01

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full 50/50

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10050.00	10117.67	95.35	62.98	67.71	9.54	0.93	1.51
10117.67	10185.33	49.47	42.47	67.67	4.95	0.63	1.16
10185.33	10253.00	61.40	48.35	67.67	6.14	0.71	1.27
10253.00	10320.67	116.34	70.95	67.67	11.63	1.05	1.64
10320.67	10388.33	136.18	77.98	67.67	13.62	1.15	1.75
10388.33	10456.00	134.46	77.39	67.67	13.45	1.14	1.74
10456.00	10523.67	90.75	61.13	67.67	9.08	0.90	1.48
10523.67	10591.33	53.86	44.70	67.67	5.39	0.66	1.21
10591.33	10659.00	29.92	31.41	67.67	2.99	0.46	0.95
10659.00	10726.67	9.12	15.40	67.67	0.91	0.23	0.59
10726.67	10794.33	50.48	42.99	67.67	5.05	0.64	1.17
10794.33	10862.00	113.41	69.87	67.67	11.34	1.03	1.62
10862.00	10929.67	47.39	41.39	67.67	4.74	0.61	1.14
10929.67	10997.33	11.58	17.77	67.67	1.16	0.26	0.65
10997.33	RB 11065.00	0.29	1.28	23.62	0.03	0.05	0.23

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: West Spillway
REACH: A1 RS: 18.87

INPUT
Description: North Bank, Roosevelt Canal
Q=1000 cfs
Survey Date 12/15/99
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4660	1004.32	5220	1003.04	5710	1002.76	6230	1003.31	6770	1004.68
7330	1003.63	7820	1002.88	8350	1003.21	8880	1002.24	9390	1002.06
9830	1002.4	101201001.774		10330	1001.32	10890	1001.3	11390	1001.04
11930	1001	12420	1000.99						

Manning's n Values num= 1

Sta	n Val
4660	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10120	11390	0	0	0	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
4660	9830	1004.68	11430	12420	

CROSS SECTION OUTPUT Profile #Full 50/50

E.G. Elev (ft)	1001.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.045	0.045
W.S. Elev (ft)	1001.53	Reach Len. (ft)			
Crit W.S. (ft)	1001.53	Flow Area (sq ft)		318.04	19.82
E.G. Slope (ft/ft)	0.042609	Area (sq ft)		318.04	541.68
Q Total (cfs)	1000.00	Flow (cfs)		915.40	84.60
Top Width (ft)	2188.99	Top Width (ft)		1158.99	1030.00
Vel Total (ft/s)	2.96	Avg. Vel. (ft/s)		2.88	4.27
Max Chl Dpth (ft)	0.54	Hydr. Depth (ft)		0.27	0.50
Conv. Total (cfs)	4844.5	Conv. (cfs)		4434.7	409.8
Length Wtd. (ft)		Wetted Per. (ft)		1158.99	40.00
Min Ch El (ft)	1001.04	Shear (lb/sq ft)		0.73	1.32
Alpha	1.04	Stream Power (lb/ft s)		2.10	5.63
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

FLOW DISTRIBUTION OUTPUT Profile #Full 50/50

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
10204.67	10289.33	3.71	3.68	58.32	0.37	0.06	1.01
10289.33	10374.00	34.81	16.37	84.67	3.48	0.19	2.13
10374.00	10458.67	42.24	18.38	84.67	4.22	0.22	2.30
10458.67	10543.33	43.22	18.63	84.67	4.32	0.22	2.32
10543.33	10628.00	44.22	18.89	84.67	4.42	0.22	2.34
10628.00	10712.67	45.23	19.15	84.67	4.52	0.23	2.36
10712.67	10797.33	46.24	19.40	84.67	4.62	0.23	2.38
10797.33	10882.00	47.26	19.66	84.67	4.73	0.23	2.40
10882.00	10966.67	54.17	21.34	84.67	5.42	0.25	2.54
10966.67	11051.33	70.78	25.05	84.67	7.08	0.30	2.83
11051.33	11136.00	89.19	28.78	84.67	8.92	0.34	3.10
11136.00	11220.67	109.26	32.51	84.67	10.93	0.38	3.36
11220.67	11305.33	130.93	36.24	84.67	13.09	0.43	3.61
11305.33	RB 11390.00	154.15	39.96	84.67	15.41	0.47	3.86
11390.00	11458.67	84.59	19.82	40.00	8.46	0.50	4.27

SUMMARY OF MANNING'S N VALUES

River:West Spillway

Reach	River Sta.	n1	n2	n3
A1	20.09	.045	.02	.045
A1	20.04	.045	.02	.045
A1	19.84	.1	.016	.045
A1	19.68	.1	.016	.045
A1	19.57	.1	.016	.045

SUMMARY OF REACH LENGTHS

River: West Spillway

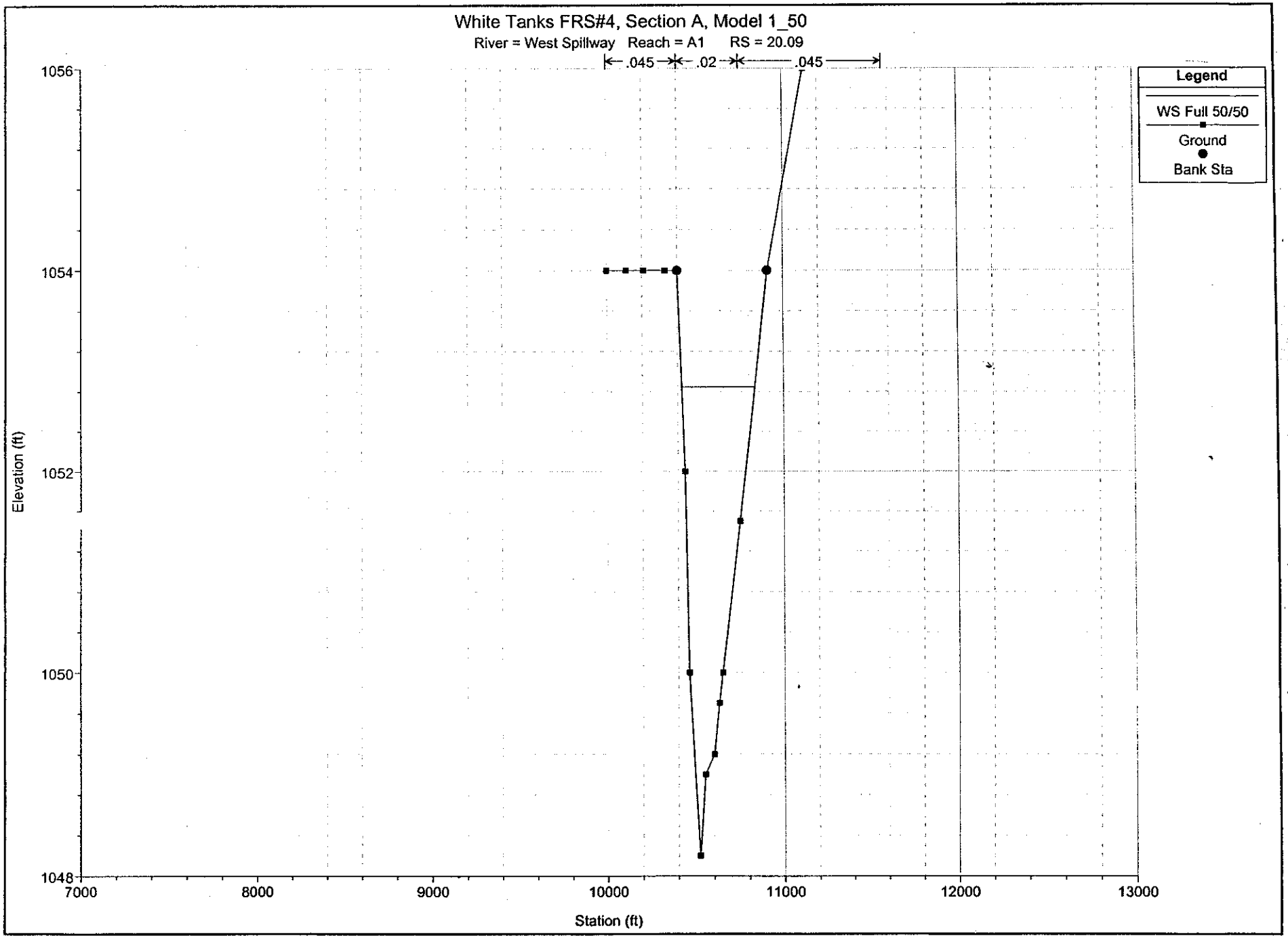
Reach	River Sta.	Left	Channel	Right
A2	20.09	500	580	620
A2	20.04	1200	1150	1150
A2	19.84	870	870	870
A2	19.68	490	570	480
A2	19.57	570	690	690
A2	19.44	540	580	570
A2	19.33	700	650	660
A2	19.21	770	770	780
A2	19.06	700	1019	1300
A2	18.87	0	0	0

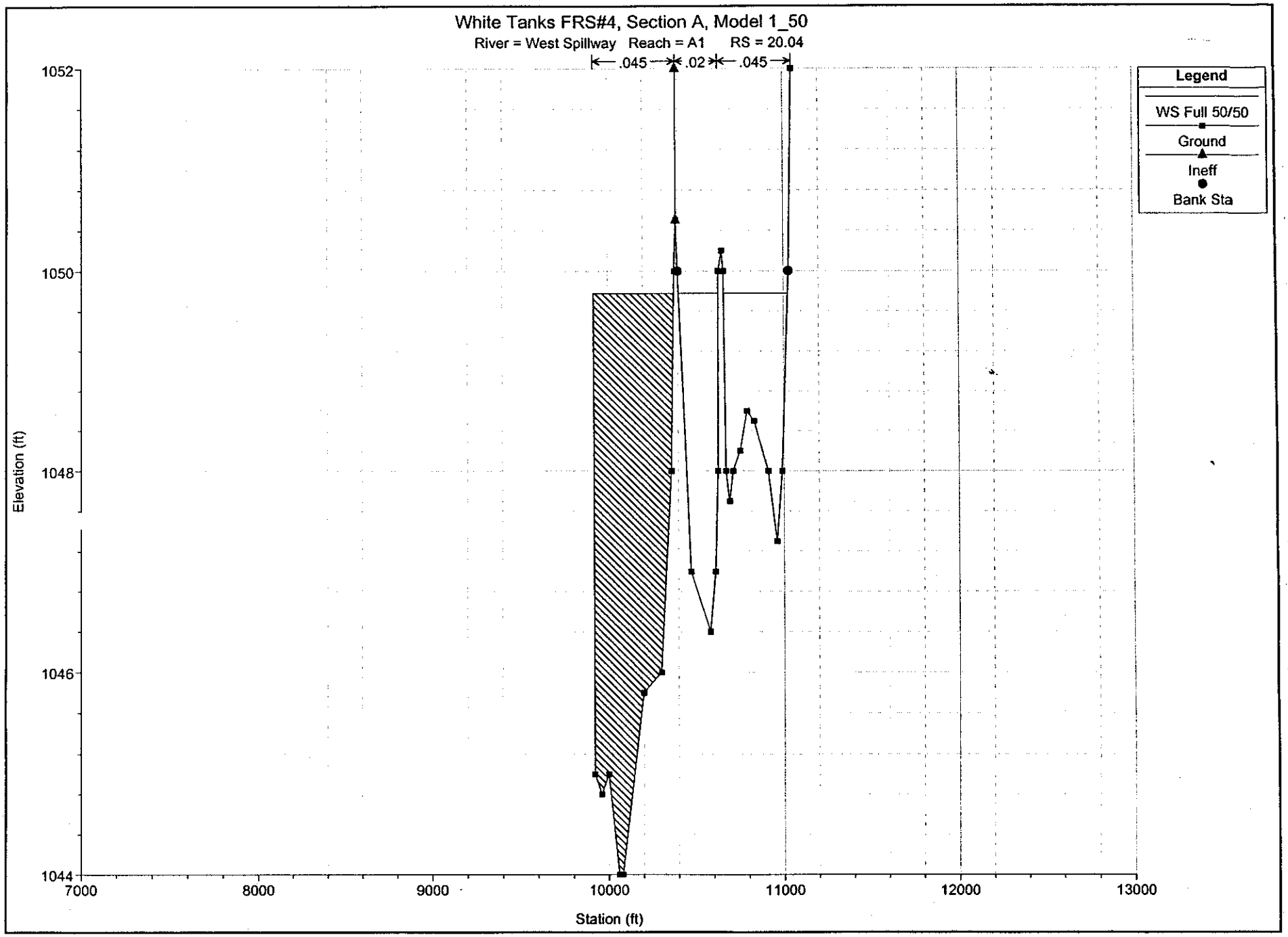
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: West Spillway

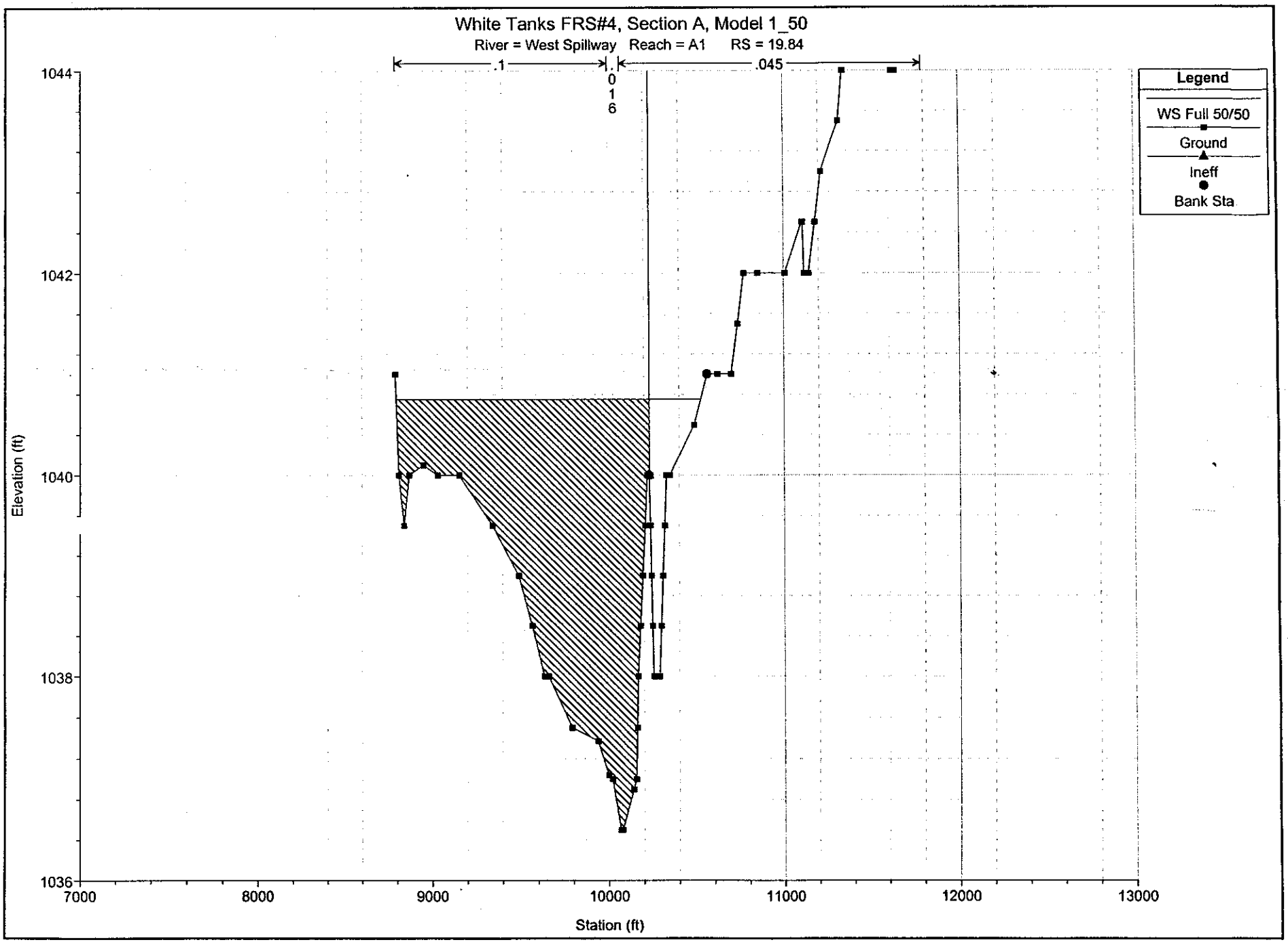
Reach	River Sta.	Contr.	Expan.
A2	20.09	.1	.3
A2	20.04	.1	.3
A2	19.84	.1	.3
A2	19.68	.1	.3
A2	19.57	.1	.3
A2	19.44	.1	.3
A2	19.33	.1	.3
A2	19.21	.1	.3
A2	19.06	.1	.3
A2	18.87	.1	.3

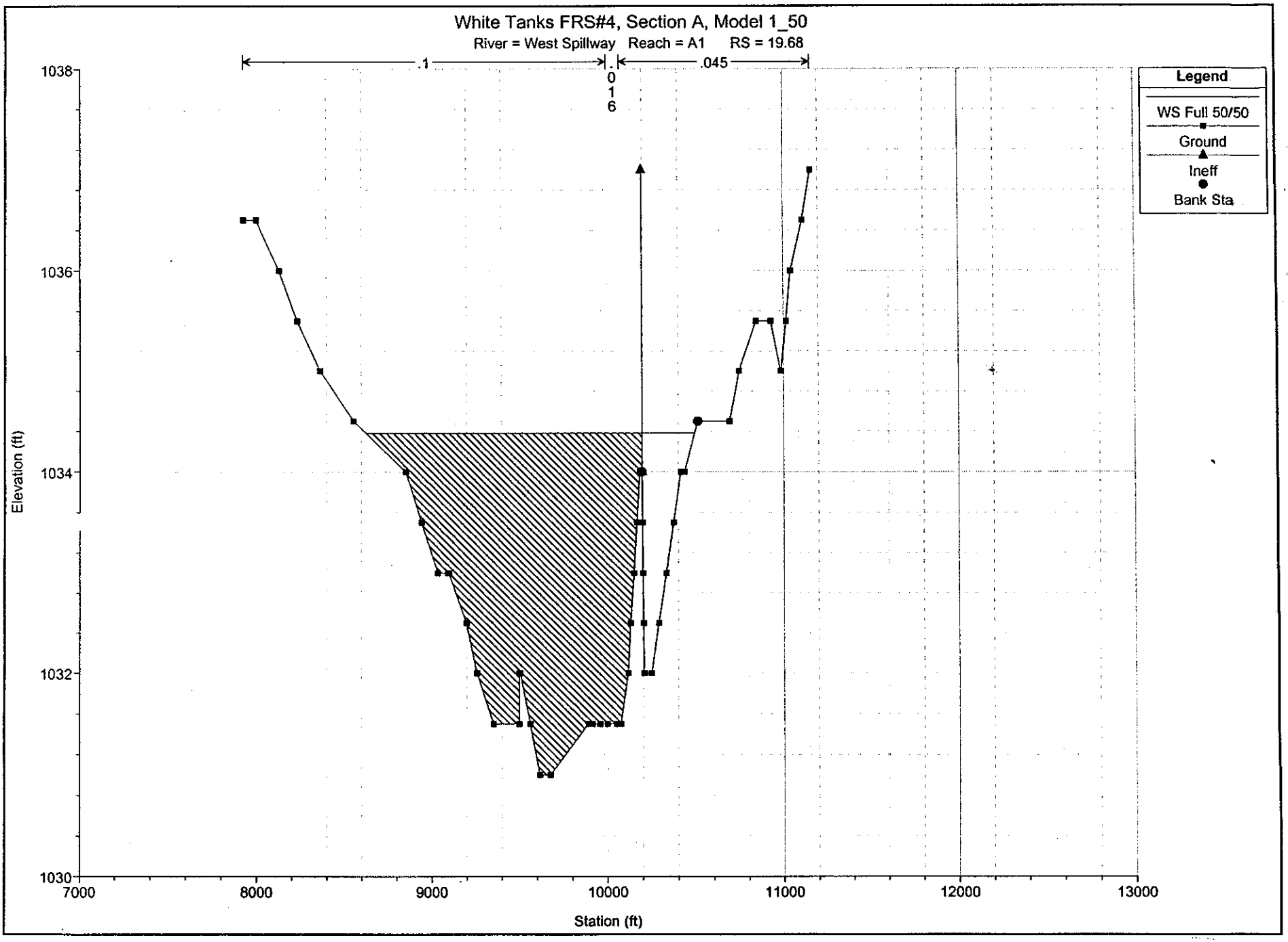
HEC-RAS Plan: WT4A1_50 River: West Spillway Reach: A1

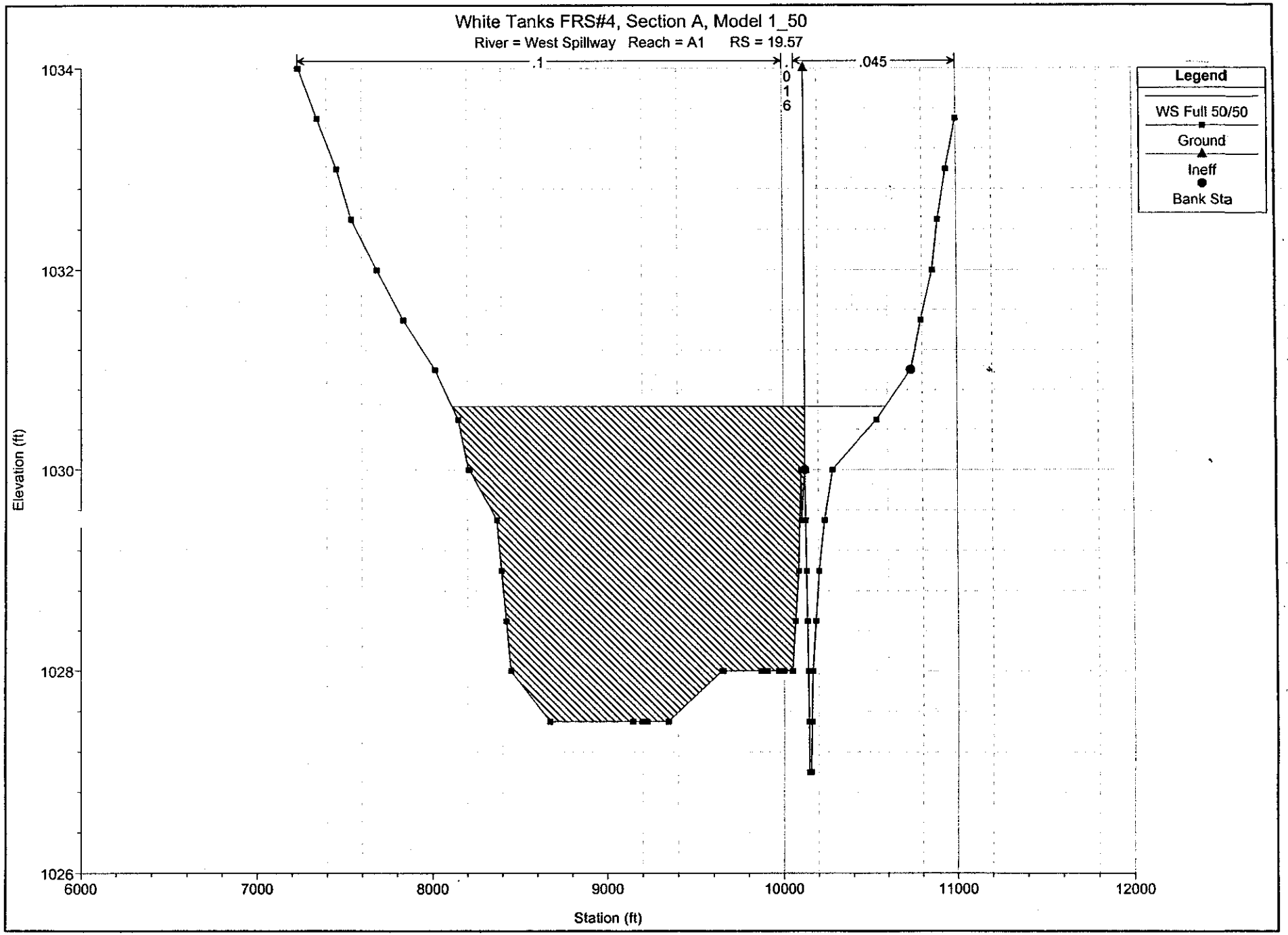
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
A1	18.87	1000.00	1001.04	1001.53	1001.53	1001.68	0.042609	2.88	337.86	2188.99	0.97
A1	19.06	1000.00	1007.50	1009.00	1008.53	1009.03	0.002814	1.42	706.06	6612.96	0.29
A1	19.21	1000.00	1012.50	1015.34	1015.34	1015.93	0.007247	6.21	161.12	5050.00	1.00
A1	19.33	1000.00	1017.00	1020.99	1020.38	1021.21	0.008994	3.75	266.81	3417.46	0.58
A1	19.44	1000.00	1021.50	1025.52	1025.02	1025.63	0.006487	2.67	374.10	3001.90	0.47
A1	19.57	1000.00	1027.00	1030.63	1029.92	1030.74	0.008364	2.63	379.60	2475.65	0.51
A1	19.68	1000.00	1032.00	1034.38	1033.58	1034.50	0.005327	2.75	363.33	1868.03	0.44
A1	19.84	1000.00	1038.00	1040.75	1040.35	1040.94	0.010899	3.44	291.09	1728.24	0.61
A1	20.04	9000.00	1046.40	1049.78	1049.78	1050.75	0.007736	7.90	1138.95	1046.43	1.00
A1	20.09	9000.00	1048.20	1052.84	1052.84	1054.07	0.003788	8.89	1012.12	412.91	1.00

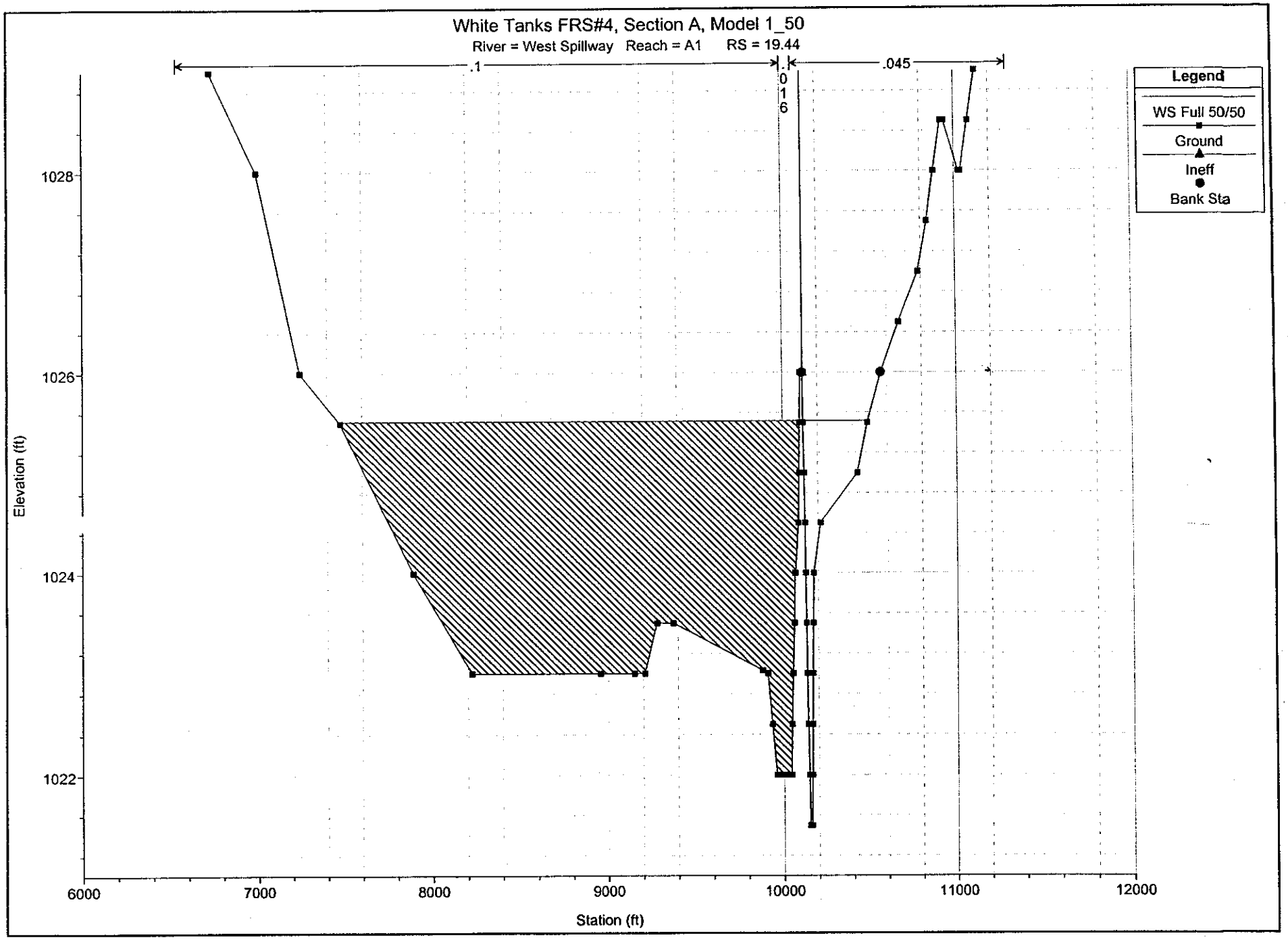

White Tanks FRS#4, Section A, Model 1_50
River = West Spillway Reach = A1 RS = 20.09
.045
.02
.045
Legend
WS Full 50/50
Ground
Bank Sta
Elevation (ft)
1056
1054
1052
1050
1048
7000
8000
9000
10000
11000
12000
13000
Station (ft)

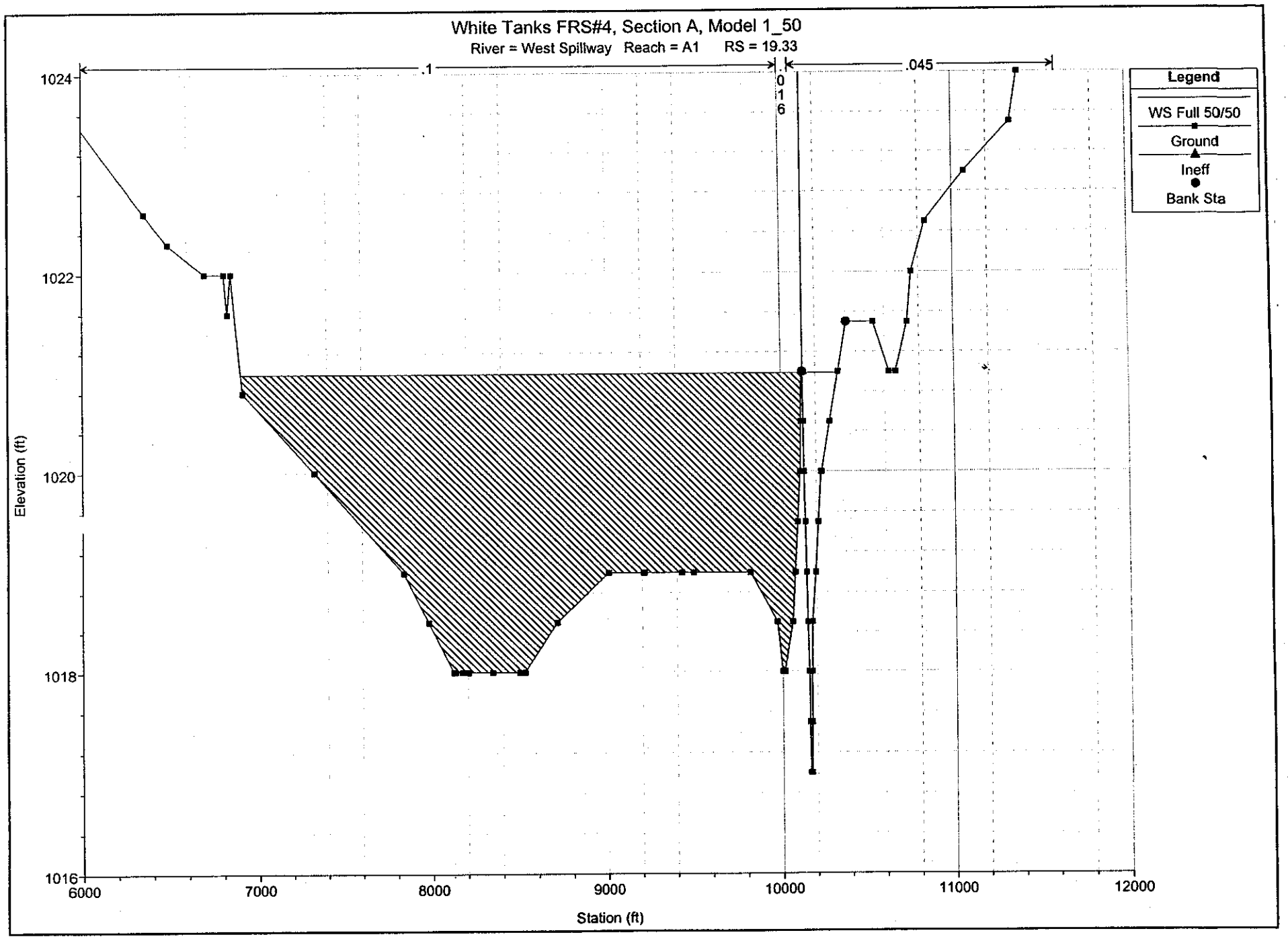

White Tanks FRS#4, Section A, Model 1_50
River = West Spillway Reach = A1 RS = 20.04
.045
.02
.045
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1052
1050
1048
1046
1044
7000
8000
9000
10000
11000
12000
13000
Station (ft)

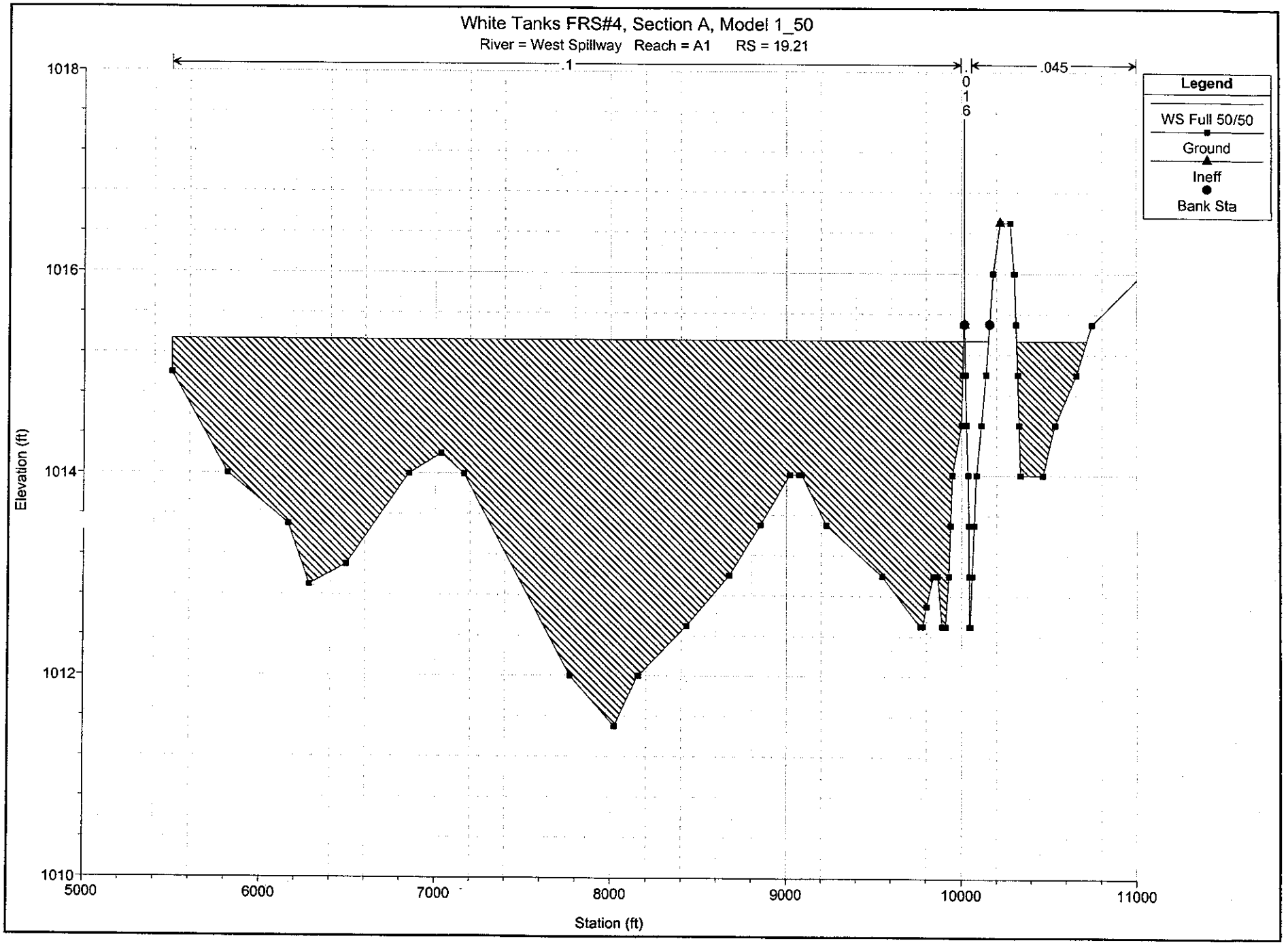

White Tanks FRS#4, Section A, Model 1_50
River = West Spillway Reach = A1 RS = 19.84
.1
.016
.045
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1044
1042
1040
1038
1036
7000
8000
9000
10000
11000
12000
13000
Station (ft)

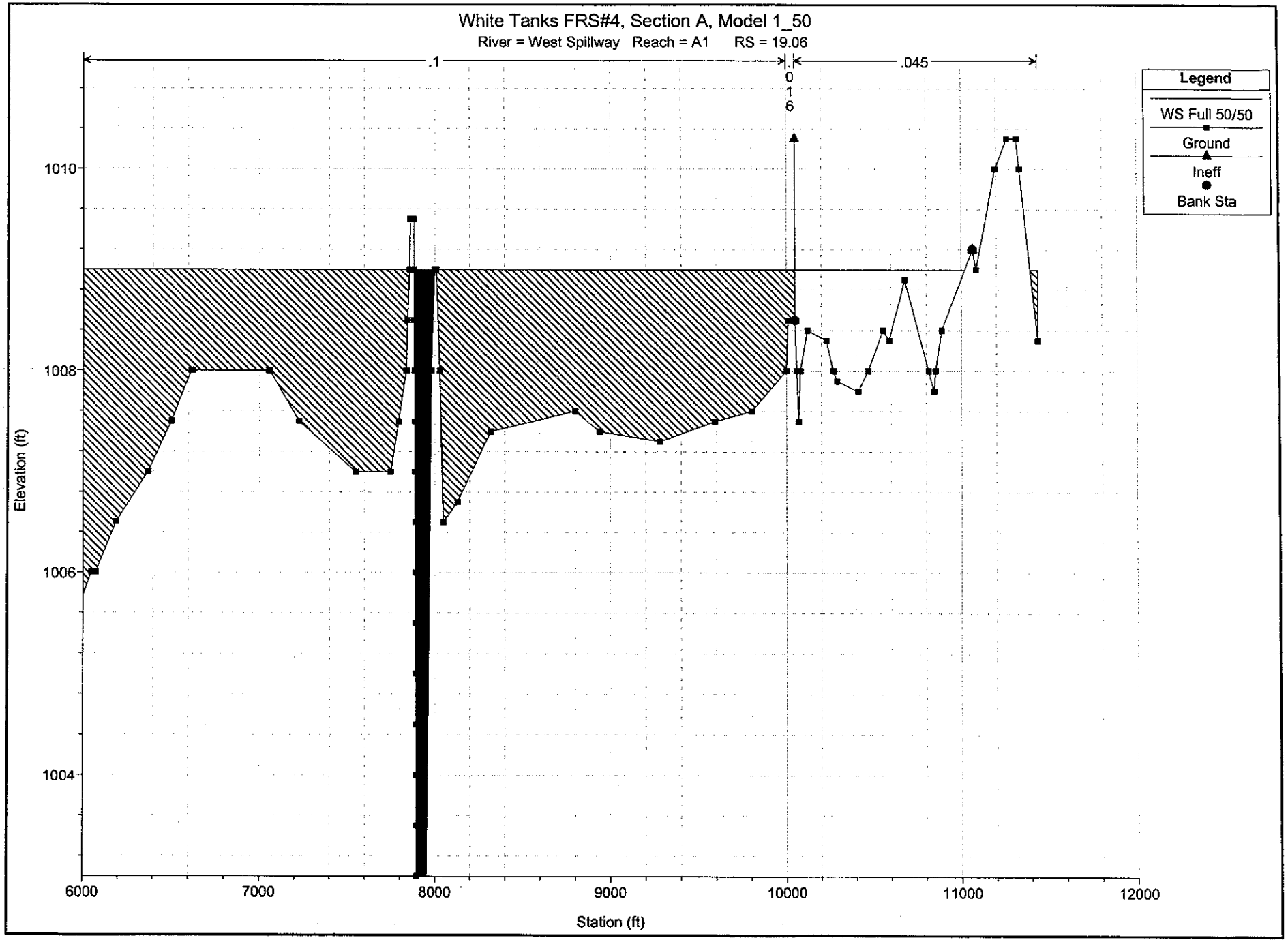

White Tanks FRS#4, Section A, Model 1_50
River = West Spillway Reach = A1 RS = 19.68
.1
.016
.045
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1038
1036
1034
1032
1030
7000
8000
9000
10000
11000
12000
13000
Station (ft)

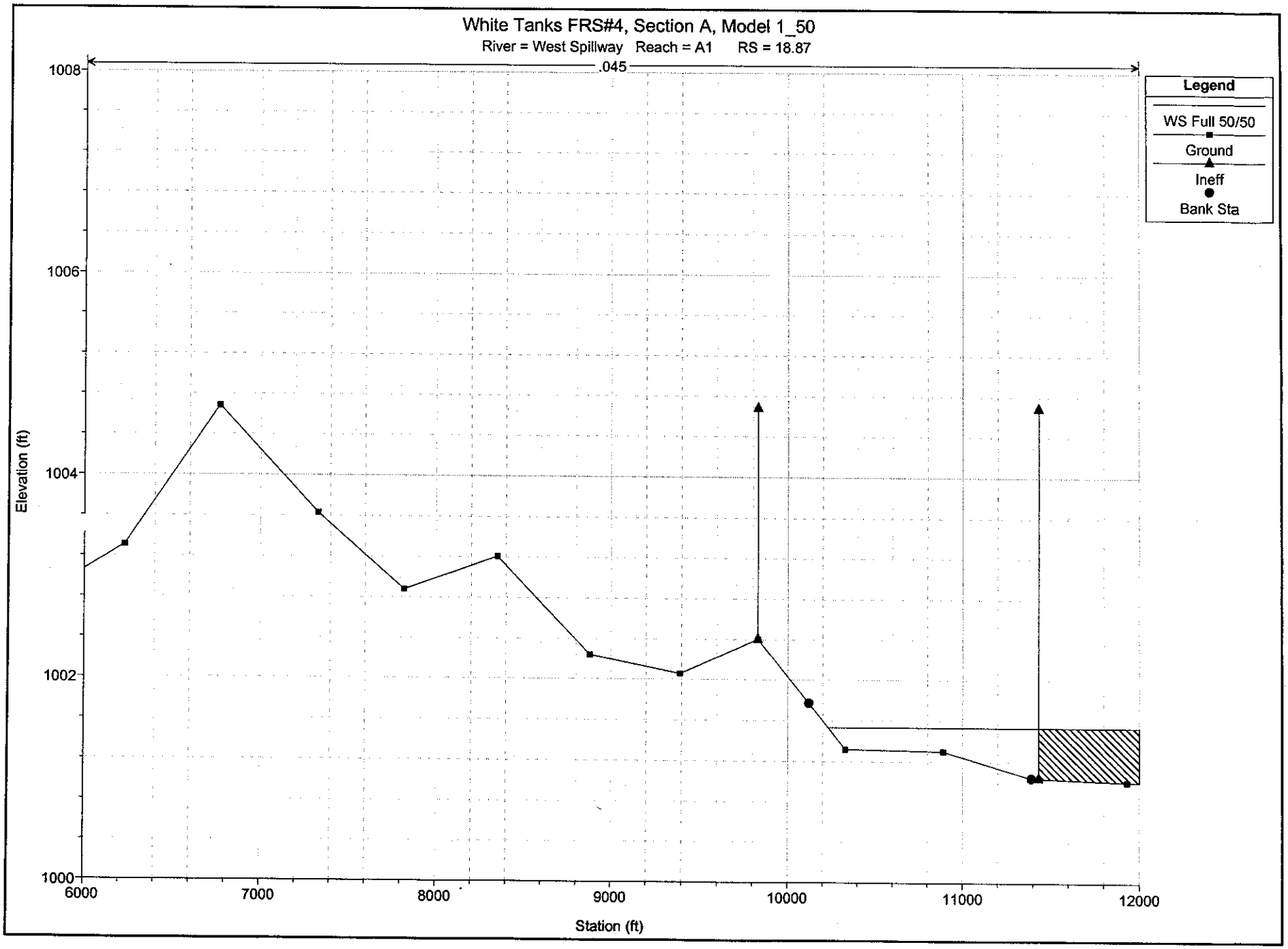

White Tanks FRS#4, Section A, Model 1_50
River = West Spillway Reach = A1 RS = 19.57
.1
.016
.045
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1032
1030
1028
1026
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS#4, Section A, Model 1_50
River = West Spillway Reach = A1 RS = 19.44
.1
.0
1
6
.045
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1028
1026
1024
1022
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS#4, Section A, Model 1_50
River = West Spillway Reach = A1 RS = 19.33
.1
.016
.045
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1024
1022
1020
1018
1016
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS#4, Section A, Model 1_50
River = West Spillway Reach = A1 RS = 19.21
.1
.045
0
1
6
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1018
1016
1014
1012
1010
5000
6000
7000
8000
9000
10000
11000
Station (ft)


White Tanks FRS#4, Section A, Model 1_50
River = West Spillway Reach = A1 RS = 19.06
.1
.0
1
6
.045
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1010
1008
1006
1004
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS#4, Section A, Model 1_50
River = West Spillway Reach = A1 RS = 18.87
.045
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1008
1006
1004
1002
1000
6000
7000
8000
9000
10000
11000
12000
Station (ft)

```
                    HEC-RAS September 1998 Version 2.2
                      U.S. Army Corp of Engineers
                     Hydrologic Engineering Center
                       609 Second Street, Suite D
                      Davis, California 95616-4687
                             (916) 756-1104

X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
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PROJECT DATA
Project Title: White Tanks FRS #4, Section A, Model 2_50
Project File : WT4A2_50.prj
Run Date and Time: 06/26/2000 10:15:56 AM

Project in English units

Project Description:
Study Name: White Tanks FRS #4 Spillway Delineation Study
Contract No.: FCD 98-32
Purpose of Study: Delineation of the inundation limits of the 1/3, 2/3, and full spillway discharges for the western spillway of the White Tanks Flood Retarding Structure #4.

Model Name: WT4A2_50
Model Description: Set up to model the portion of west spillway flow which weirs over the Roosevelt Canal between Tuthill Road and a point of flow split approximately 1800 feet west of Tuthill Road. Northern boundary is the west spillway, southern boundary is the Roosevelt Irrigation District Canal. Cross-section data west of Tuthill Road is set as ineffective flow on all cross-sections. Cross-section data east of the flow split is set as ineffective flow area on sections 19.06 and 18.87.
Flow Profiles: *Profile #1, Full spillway discharge for the 1/2 PMF, 50/50*
Sections 20.09 to 20.04, Q=9000 cfs
Sections 19.84 to 19.21, Q=8000 cfs
Sections 19.06 to 18.87, Q=4000 cfs.

HEC-RAS Version: Version 2.2, September 1998 with RASPATCH

Consultants: Hoskin Engineering Consultants, Inc.
323 W. Roosevelt Street, Suite 200
Phoenix, AZ 85003
(602)252-8384 Phone
(602)252-8385 Fax
HEC 990006

DEI Professional Services, LLC
6225 N. 24th St., Ste. 200
Phoenix, AZ 85016
(602)954-0038 Phone
(602)944-8605 Fax

PLAN DATA

Plan Title: Section A, Between Tuthill and Split
Plan File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final models\50-50\WT4A2_50.P01

Geometry Title: Section A, Between Tuthill and Split

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          Geometry File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White
Tanks\hecras\i10-rsvlt\final models\50-50\WT4A2_50.G01

          Flow Title    : Section A, Between Tuthill and Split
          Flow File     : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White
Tanks\hecras\i10-rsvlt\final models\50-50\WT4A2_50.F01

Plan Summary Information:
Number of:  Cross Sections =   10    Mulitple Openings =    0
            Culverts       =    0    Inline Weirs      =    0
            Bridges        =    0

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

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: Between every coordinate point (HEC2 Style)
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow


FLOW DATA

Flow Title: Section A, Between Tuthill and Split
Flow File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final
models\50-50\WT4A2_50.F01

Flow Data (cfs)

  River          Reach          RS             Full 50/50
  West           W1             20.09               9000
  West           W1             19.84               8000
  West           W1             19.06               4000
  West Spillway  A2             20.09               9000
  West Spillway  A2             19.84               8000
  West Spillway  A2             19.06               4000


Boundary Conditions

  River          Reach          Profile                      Upstream                 Downstream

  West Spillway  A2             Full 50/50                                              Critical


GEOMETRY DATA

Geometry Title: Section A, Between Tuthill and Split
Geometry File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-
rsvlt\final models\50-50\WT4A2_50.G01

CROSS SECTION          RIVER: West Spillway
REACH: A2                 RS: 20.09

INPUT
Description: Northern Boundary of HEC-RAS Model
Full 50/50 Q=9000 cfs
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
   10000    1054   10110    1054   10210    1054   10330    1054   10400    1054
```

10440	1052	10460	1050	10520	1048.2	10550	1049	10600	1049.2
10630	1049.7	10650	1050	10750	1051.5	10910	1054	11120	1056
11340	1058	11570	1060						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
10000	.045	10400	.02	10750	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10400	10910	500	580	620	.1	.3

CROSS SECTION OUTPUT Profile #Full 50/50

			Left OB	Channel	Right OB
E.G. Elev (ft)	1054.07	Element			
Vel Head (ft)	1.23	Wt. n-Val.		0.020	
W.S. Elev (ft)	1052.84	Reach Len. (ft)	500.00	580.00	620.00
Crit W.S. (ft)	1052.84	Flow Area (sq ft)		1012.12	
E.G. Slope (ft/ft)	0.003788	Area (sq ft)		1012.12	
Q Total (cfs)	9000.00	Flow (cfs)		9000.00	
Top Width (ft)	412.91	Top Width (ft)		412.91	
Vel Total (ft/s)	8.89	Avg. Vel. (ft/s)		8.89	
Max Chl Dpth (ft)	4.64	Hydr. Depth (ft)		2.45	
Conv. Total (cfs)	146239.8	Conv. (cfs)		146239.8	
Length Wtd. (ft)		Wetted Per. (ft)		413.09	
Min Ch El (ft)	1048.20	Shear (lb/sq ft)		0.58	
Alpha	1.00	Stream Power (lb/ft s)		5.15	
Frctn Loss (ft)		Cum Volume (acre-ft)	165.96	439.83	103.22
C & E Loss (ft)		Cum SA (acres)	76.57	297.29	82.29

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.

FLOW DISTRIBUTION OUTPUT Profile #Full 50/50

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10400.00	10434.00	5.30	2.96	10.90	0.06	0.27	1.79
10434.00	10468.00	423.46	64.76	34.11	4.71	1.90	6.54
10468.00	10502.00	1222.45	122.20	34.02	13.58	3.59	10.00
10502.00	10536.00	1713.22	149.63	34.01	19.04	4.40	11.45
10536.00	10570.00	1399.49	132.51	34.01	15.55	3.90	10.56
10570.00	10604.00	1279.48	125.57	34.00	14.22	3.69	10.19
10604.00	10638.00	1058.25	112.06	34.00	11.76	3.30	9.44
10638.00	10672.00	791.74	94.15	34.00	8.80	2.77	8.41
10672.00	10706.00	563.96	76.81	34.00	6.27	2.26	7.34
10706.00	10740.00	368.17	59.47	34.00	4.09	1.75	6.19
10740.00	10774.00	134.39	41.95	34.00	1.49	1.23	3.20
10774.00	10808.00	35.86	23.92	34.00	0.40	0.70	1.50
10808.00	10842.00	4.22	6.14	28.03	0.05	0.22	0.69

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.

CROSS SECTION RIVER: West Spillway
REACH: A2 RS: 20.04

INPUT
Description: Full 50/50 Q=9000 cfs
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9920	1045	9960	1044.8	10000	1045	10060	1044	10070	1043.8
10080	1044	10200	1045.8	10300	1046	10360	1048	10380	1050
10390	1050.5	10400	1050	10470	1047	10580	1046.4	10610	1047
10625	1048	10630	1050	10650	1050.2	10660	1050	10670	1048
10690	1047.7	10710	1048	10750	1048.2	10790	1048.6	10830	1048.5
10910	1048	10960	1047.3	10990	1048	11030	1050	11050	1052

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9920	.045	10400	.02	10630	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10400	11030	1200	1150	1150	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
9920	10400	

CROSS SECTION OUTPUT Profile #Full 50/50

E.G. Elev (ft)	1050.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.97	Wt. n-Val.		0.026	
W.S. Elev (ft)	1049.78	Reach Len. (ft)	1200.00	1150.00	1150.00
Crit W.S. (ft)	1049.78	Flow Area (sq ft)		1137.95	
E.G. Slope (ft/ft)	0.007755	Area (sq ft)	1978.87	1137.95	
Q Total (cfs)	9000.00	Flow (cfs)		9000.00	
Top Width (ft)	1046.33	Top Width (ft)	457.75	588.58	
Vel Total (ft/s)	7.91	Avg. Vel. (ft/s)		7.91	
Max Chl Dpth (ft)	5.98	Hydr. Depth (ft)		1.93	
Conv. Total (cfs)	102202.5	Conv. (cfs)		102202.5	
Length Wtd. (ft)	1150.00	Wetted Per. (ft)		589.26	
Min Ch El (ft)	1046.40	Shear (lb/sq ft)		0.93	
Alpha	1.00	Stream Power (lb/ft s)		7.39	
Frctn Loss (ft)	8.21	Cum Volume (acre-ft)	154.61	425.52	103.22
C & E Loss (ft)	0.23	Cum SA (acres)	73.94	290.63	82.29

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full 50/50

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10400.00	10442.00	152.45	28.95	36.79	1.69	0.79	5.27
10442.00	10484.00	1106.56	100.30	42.03	12.30	2.39	11.03
10484.00	10526.00	1588.86	124.58	42.00	17.65	2.97	12.75
10526.00	10568.00	1798.58	134.20	42.00	19.98	3.20	13.40
10568.00	10610.00	1757.68	132.37	42.01	19.53	3.15	13.28
10610.00	10652.00	363.48	38.07	19.81	4.04	1.96	9.55
10652.00	10694.00	209.27	54.57	33.05	2.33	1.66	3.84
10694.00	10736.00	301.69	74.79	42.00	3.35	1.78	4.03
10736.00	10778.00	225.06	62.73	42.00	2.50	1.49	3.59
10778.00	10820.00	160.46	51.21	42.00	1.78	1.22	3.13
10820.00	10862.00	189.80	56.64	42.00	2.11	1.35	3.35
10862.00	10904.00	254.12	67.47	42.00	2.82	1.61	3.77
10904.00	10946.00	362.61	83.52	42.00	4.03	1.99	4.34
10946.00	10988.00	437.18	93.44	42.01	4.86	2.22	4.68
10988.00	RB 11030.00	92.19	35.11	37.55	1.02	0.94	2.63

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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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION          RIVER: West Spillway
REACH: A2                 RS: 19.84

INPUT
Description: Flow decreases due to 1000 cfs contained within channel west of
             Tuthill Road.
Full 50/50 Q=8000 cfs
Station Elevation Data    num=      73
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    8790    1041    8810    1040    8840  1039.5    8870    1040    8950  1040.1
 9031.92    1040 9154.47    1040 9343.33  1039.5 9492.37    1039  9567.8  1038.5
  9636.2    1038 9657.55    1038 9661.34    1038 9792.72  1037.5    9940 1037.37
   10000 1037.0410020.48    103710067.24  1036.510078.84  1036.5   10140  1036.9
 10155.1    103710160.59  1037.510166.09    103810166.19    103810179.88  1038.5
10193.36    103910206.84  1039.5 10218.1    104010220.32    104010230.71    1040
10236.59  1039.510242.46    103910248.34  1038.510254.31    103810263.83    1038
 10287.5    103810297.37  1038.510307.24    103910317.17  1039.5 10327.1    1040
10346.11    104010485.18  1040.510560.46    104110617.79    104110697.96    1041
10735.37  1041.510771.87    104210773.79    1042 10851.1    104210853.58    1042
11007.45    104211008.85    104211105.31  1042.511110.67  1042.511117.75    1042
11122.71    104211141.01    104211145.15    104211180.08  1042.511215.01    1043
11315.24  1043.511340.66    104411345.91    104411420.74  1044.511581.66  1044.5
11620.79    104411640.15    104411640.69    104411668.31  1044.511722.97  1044.5
11766.55  1044.511781.65  1044.511790.42  1044.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    8790      .1   10000    .01610067.24    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          879010230.71              870     870     870              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    8790    8950  1040.110230.7111790.42  1044.5

CROSS SECTION OUTPUT    Profile #Full 50/50

  E.G. Elev (ft)            1040.43   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.21   Wt. n-Val.                            0.046
  W.S. Elev (ft)            1040.22   Reach Len. (ft)            870.00     870.00     870.00
  Crit W.S. (ft)            1039.23   Flow Area (sq ft)                    2163.83
  E.G. Slope (ft/ft)       0.006527   Area (sq ft)                         2163.83     161.30
  Q Total (cfs)             8000.00   Flow (cfs)                           8000.00
  Top Width (ft)            1601.00   Top Width (ft)                       1425.06     175.94
  Vel Total (ft/s)             3.70   Avg. Vel. (ft/s)                        3.70
  Max Chl Dpth (ft)            3.72   Hydr. Depth (ft)                        1.52
  Conv. Total (cfs)         99023.6   Conv. (cfs)                         99023.6
  Length Wtd. (ft)           870.00   Wetted Per. (ft)                    1425.17
  Min Ch El (ft)            1036.50   Shear (lb/sq ft)                        0.62
  Alpha                        1.00   Stream Power (lb/ft s)                  2.29
  Frctn Loss (ft)              6.32   Cum Volume (acre-ft)       127.35     381.93     101.09
  C & E Loss (ft)              0.02   Cum SA (acres)              67.64     264.05      79.97

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.
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FLOW DISTRIBUTION OUTPUT Profile #Full 50/50

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8790.00	8886.05	18.47	31.86	80.41	0.23	0.40	0.58
8886.05	8982.09	4.41	14.49	96.05	0.06	0.15	0.30
8982.09	9078.14	7.17	19.39	96.05	0.09	0.20	0.37
9078.14	9174.19	8.47	21.42	96.05	0.11	0.22	0.40
9174.19	9270.24	22.14	38.13	96.05	0.28	0.40	0.58
9270.24	9366.28	50.76	62.74	96.05	0.63	0.65	0.81
9366.28	9462.33	95.72	91.80	96.05	1.20	0.96	1.04
9462.33	9558.38	170.67	129.88	96.05	2.13	1.35	1.31
9558.38	9654.43	324.28	190.89	96.05	4.05	1.99	1.70
9654.43	9750.47	436.39	228.12	96.05	5.45	2.38	1.91
9750.47	9846.52	538.90	258.90	96.05	6.74	2.70	2.08
9846.52	9942.57	576.77	269.67	96.05	7.21	2.81	2.14
9942.57	10038.62	2241.25	299.03	96.05	28.02	3.11	7.50
10038.62	10134.66	2939.69	342.50	96.05	36.75	3.57	8.58
10134.66	RB 10230.71	564.89	165.00	96.13	7.06	1.72	3.42

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.

CROSS SECTION RIVER: West Spillway
REACH: A2 RS: 19.68

INPUT
Description: Full 50/50 Q=8000 cfs
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7930	1036.5	8003.47	1036.5	8131.84	1036	8134.04	1036	8235.56	1035.5
8365.92	1035	8556.26	1034.5	8852.66	1034	8853.02	1034	8942.87	1033.5
9034.3	1033	9092.75	1033	9098.12	1033	9199.34	1032.5	9255.69	1032
9258.21	1032	9352.24	1031.5	9497.86	1031.5	9498.53	1032	9504.07	1032
9561.24	1031.5	9614.69	1031	9675.88	1031	9892.54	1031.5	9915	1031.5
9957.38	1031.5	10000	1031.510052.04		1031.510073.96		1031.510075.36		1031.5
10116.44	103210116.63		1032	10130	1032.510149.48		1033	10165.8	1033.5
10182.12	103410194.38		103410196.14		103410197.72		1033.510200.27		1033
10202.81	1032.510205.35		103210207.94		103210246.51		103210247.83		1032
10289.29	1032.510330.89		103310372.51		1033.5	10413.2	103410433.85		1034
10511.86	1034.510688.91		1034.510693.04		1034.510748.12		103510844.75		1035.5
10927.31	1035.510985.54		103510987.38		103511016.74		1035.511042.81		1036
11043.01	103611110.42		1036.511158.28		1037				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
7930	.1	10000	.01610073.96		.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8852.6	10196.14	490	570	480	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
10196.14	11158.28	1037

CROSS SECTION OUTPUT Profile #Full 50/50

			Left OB	Channel	Right OB
E.G. Elev (ft)	1034.09	Element			
Vel Head (ft)	0.15	Wt. n-Val.		0.067	
W.S. Elev (ft)	1033.94	Reach Len. (ft)	490.00	570.00	480.00
Crit W.S. (ft)	1032.84	Flow Area (sq ft)		2559.84	
E.G. Slope (ft/ft)	0.008150	Area (sq ft)		2559.84	247.48
Q Total (cfs)	8000.00	Flow (cfs)		8000.00	
Top Width (ft)	1527.68	Top Width (ft)		1315.88	211.80
Vel Total (ft/s)	3.13	Avg. Vel. (ft/s)		3.13	
Max Chl Dpth (ft)	2.94	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	88613.4	Conv. (cfs)		88613.4	
Length Wtd. (ft)	570.00	Wetted Per. (ft)		1316.09	

Min Ch El (ft)	1031.00	Shear (lb/sq ft)		0.99	
Alpha	1.00	Stream Power (lb/ft s)		3.09	
Frctn Loss (ft)	4.12	Cum Volume (acre-ft)	127.35	334.76	97.01
C & E Loss (ft)	0.02	Cum SA (acres)	67.64	236.67	76.10

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full 50/50

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8852.66	8942.23	7.69	16.94	78.02	0.10	0.22	0.45
8942.23	9031.79	59.05	60.83	89.57	0.74	0.68	0.97
9031.79	9121.36	103.76	85.31	89.57	1.30	0.95	1.22
9121.36	9210.92	169.07	114.34	89.57	2.11	1.28	1.48
9210.92	9300.49	325.57	169.42	89.57	4.07	1.89	1.92
9300.49	9390.05	470.19	211.22	89.57	5.88	2.36	2.23
9390.05	9479.62	496.90	218.34	89.57	6.21	2.44	2.28
9479.62	9569.18	433.80	201.40	89.73	5.42	2.25	2.15
9569.18	9658.75	637.03	253.43	89.57	7.96	2.83	2.51
9658.75	9748.31	652.33	257.07	89.57	8.15	2.87	2.54
9748.31	9837.88	577.28	238.89	89.57	7.22	2.67	2.42
9837.88	9927.44	510.03	221.78	89.56	6.38	2.48	2.30
9927.44	10017.01	992.31	218.34	89.57	12.40	2.44	4.54
10017.01	10106.57	2328.10	212.41	89.57	29.10	2.37	10.96
10106.57	RB 10196.14	236.91	80.13	73.54	2.96	1.09	2.96

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: West Spillway
REACH: A2 RS: 19.57

INPUT
Description: Full 50/50 Q=8000 cfs
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7235	1034	7242.01	1034	7346.11	1033.5	7458.14	1033	7540.92	1032.5
7686.16	1032	7686.76	1032	7837.1	1031.5	8017.52	1031	8148.59	1030.5
8207.12	1030	8212.25	1030	8370.34	1029.5	8396.37	1029	8422.4	1028.5
8448.34	1028	8448.43	1028	8672.26	1027.5	9141.26	1027.5	9195.07	1027.5
9221.67	1027.5	9342.23	1027.5	9647.59	1028	9656.13	1028	9870.84	1028
9890	1028	9903.75	1028	9971.98	1028	9973.2	1028	9982.66	1028
10000	1028	10047.96	1028	10049.24	1028	10067.55	1028.5	10086.68	1029
10101.4	1030	10105.81	1029.5	10123.97	1030	10127.94	1029.5	10132.17	1029
10135	1028.5	10136.4	1028.5	10140.63	1028	10140.77	1028	10143.57	1027.5
10146.51	1027	10156.65	1027	10160.96	1027.5	10165.28	1028	10166.56	1028
10184.33	1028.5	10203.51	1029	10237.65	1029.5	10282.87	1030	10283.53	1030
10536.89	1030.5	10736.17	1031	10794.79	1031.5	10861.15	1032	10861.67	1032
10892.16	1032.5	10940.83	1033	10997.98	1033.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
7235	.1	10000	.01	10067.55	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8212.25	10123.97	570	690	690	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
10123.97	10997.98	1034

CROSS SECTION OUTPUT Profile #Full 50/50

E.G. Elev (ft)	1029.94	Element	Left OB	Channel	Right OB

Vel Head (ft)	0.08	Wt. n-Val.		0.085	
W.S. Elev (ft)	1029.86	Reach Len. (ft)	570.00	690.00	690.00
Crit W.S. (ft)	1028.62	Flow Area (sq ft)		3620.12	
E.G. Slope (ft/ft)	0.006547	Area (sq ft)		3620.12	157.83
Q Total (cfs)	8000.00	Flow (cfs)		8000.00	
Top Width (ft)	2006.51	Top Width (ft)		1860.91	145.61
Vel Total (ft/s)	2.21	Avg. Vel. (ft/s)		2.21	
Max Chl Dpth (ft)	2.86	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	98867.6	Conv. (cfs)		98867.6	
Length Wtd. (ft)	690.00	Wetted Per. (ft)		1860.99	
Min Ch El (ft)	1027.50	Shear (lb/sq ft)		0.80	
Alpha	1.00	Stream Power (lb/ft s)		1.76	
Frctn Loss (ft)	5.21	Cum Volume (acre-ft)	127.35	294.33	94.78
C & E Loss (ft)	0.00	Cum SA (acres)	67.64	215.89	74.13

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full 50/50

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8212.25	8339.70	3.44	11.35	84.72	0.04	0.13	0.30
8339.70	8467.15	156.58	132.07	127.46	1.96	1.04	1.19
8467.15	8594.59	487.77	261.14	127.45	6.10	2.05	1.87
8594.59	8722.04	596.52	294.66	127.45	7.46	2.31	2.02
8722.04	8849.49	619.42	301.40	127.45	7.74	2.36	2.06
8849.49	8976.94	619.41	301.40	127.45	7.74	2.36	2.06
8976.94	9104.39	619.42	301.40	127.45	7.74	2.36	2.06
9104.39	9231.83	619.42	301.40	127.45	7.74	2.36	2.06
9231.83	9359.28	618.60	301.16	127.45	7.73	2.36	2.05
9359.28	9486.73	562.76	284.54	127.45	7.03	2.23	1.98
9486.73	9614.18	477.86	257.95	127.45	5.97	2.02	1.85
9614.18	9741.63	419.59	238.59	127.45	5.24	1.87	1.76
9741.63	9869.07	416.92	237.67	127.45	5.21	1.86	1.75
9869.07	9996.52	416.92	237.67	127.45	5.21	1.86	1.75
9996.52	RB 10123.97	1365.38	157.72	119.43	17.07	1.32	8.66

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: West Spillway
REACH: A2 RS: 19.44

INPUT
Description: Full 50/50 Q=8000 cfs
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6540	1029.8	6585	1029.6	6655	1029.5	6732	1029	7000	1028
7245	1026	7475	1025.5	7890	1024	8223.69	1023	8957.17	1023
9151.16	1023	9209.42	1023	9280.28	1023.5	9373.66	1023.5	9880.43	1023.03
9910.73	1023	9935.52	1022.5	9960.02	1022	9961.4	1022	9967.8	1022
10000	102210014.14		102210022.18		1022	10041.4	102210041.73		1022
10046.88	1022.510054.87		102310062.85		1023.510068.13		102410070.95		1024
10089.85	1024.5	10094.3	102510098.75		1025.510103.21		102610103.55		1026
10112.82	102610116.14		102610117.93		1025.510122.69		102510126.19		1024.5
10129.41	102410129.69		102410132.81		1023.510135.93		102310139.05		1022.5
10140.43	1022.510143.87		102210144.21		102210147.71		1021.510156.08		1021.5
10160.61	102210161.38		102210164.03		1022.510166.68		102310170.09		1023.5
10173.65	102410173.81		1024	10214.5	1024.510429.21		102510486.12		1025.5
10565.94	102610566.76		102610669.56		1026.5	10786	102710839.07		1027.5
10878.66	102810878.84		102810922.29		1028.510942.25		1028.511024.11		1028
11024.51	102811025.35		102811034.92		102811080.52		1028.511120.92		1029
11240.61	1029.511298.72		1029.5						

```
Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    6540      .1   10000    .01610062.85    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          7475 10094.3               540     580     570            .1        .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
10116.1411298.72    1030

CROSS SECTION OUTPUT    Profile #Full 50/50
```

			Left OB	Channel	Right OB
E.G. Elev (ft)	1024.73	Element			
Vel Head (ft)	0.09	Wt. n-Val.		0.076	
W.S. Elev (ft)	1024.65	Reach Len. (ft)	540.00	580.00	570.00
Crit W.S. (ft)	1023.87	Flow Area (sq ft)		3399.19	
E.G. Slope (ft/ft)	0.008755	Area (sq ft)		3399.19	118.87
Q Total (cfs)	8000.00	Flow (cfs)		8000.00	
Top Width (ft)	2533.93	Top Width (ft)		2380.68	153.25
Vel Total (ft/s)	2.35	Avg. Vel. (ft/s)		2.35	
Max Chl Dpth (ft)	3.15	Hydr. Depth (ft)		1.43	
Conv. Total (cfs)	85496.9	Conv. (cfs)		85496.9	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		2380.79	
Min Ch El (ft)	1022.00	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)		1.84	
Frctn Loss (ft)	4.37	Cum Volume (acre-ft)	127.35	238.73	92.59
C & E Loss (ft)	0.01	Cum SA (acres)	67.64	182.30	71.76

```
Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT    Profile #Full 50/50
```

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
7649.62	7824.24	10.91	23.38	113.74	0.14	0.21	0.47
7824.24	7998.86	130.87	123.24	174.62	1.64	0.71	1.06
7998.86	8173.48	333.33	215.95	174.62	4.17	1.24	1.54
8173.48	8348.10	526.62	284.14	174.62	6.58	1.63	1.85
8348.10	8522.72	538.34	287.91	174.62	6.73	1.65	1.87
8522.72	8697.34	538.34	287.91	174.62	6.73	1.65	1.87
8697.34	8871.96	538.34	287.91	174.62	6.73	1.65	1.87
8871.96	9046.58	538.34	287.91	174.62	6.73	1.65	1.87
9046.58	9221.20	536.82	287.42	174.62	6.71	1.65	1.87
9221.20	9395.82	326.15	213.15	174.62	4.08	1.22	1.53
9395.82	9570.44	339.48	218.33	174.62	4.24	1.25	1.55
9570.44	9745.06	415.88	246.61	174.62	5.20	1.41	1.69
9745.06	9919.68	500.83	275.70	174.62	6.26	1.58	1.82
9919.68	RB 10094.30	2725.74	359.61	171.60	34.07	2.10	7.58

```
Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION          RIVER: West Spillway
REACH: A2                 RS: 19.33

INPUT
Description: Full 50/50 Q=8000 cfs
Station Elevation Data    num=      84
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    5940  1023.6    6355  1022.6    6490  1022.3    6700    1022    6810    1022
    6830  1021.6    6850    1022    6915  1020.8    7325    1020 7837.35    1019
 7979.84  1018.5  8120.6    1018 8130.79    1018 8170.37    1018 8175.25    1018
 8189.19    1018 8203.94    1018 8342.78    1018 8342.97    1018 8496.11    1018
 8525.44    1018 8710.51  1018.5  9008.7    1019 9208.91    1019 9213.94    1019
```

```
 9428.44    1019 9496.09    1019 9820.57    1019 9972.54  1018.5   10000    1018
10013.98    101810061.41  1018.510077.12    101910092.82  1019.510108.52    1020
10109.23    1020 10114.8  1020.510119.08    102110126.03    102110128.26  1020.5
10130.27    102010130.49    102010136.15  1019.510141.57    101910147.06  1018.5
 10152.5    1018 10153.6    101810155.89  1017.510159.27    101710165.11    1017
10167.37  1017.510169.62    101810170.38    101810173.25  1018.510193.95    1019
10211.28  1019.510228.79    102010231.76    102010279.59  1020.510330.63    1021
10382.02  1021.510537.17  1021.510625.66    102110664.16    102110734.74  1021.5
10760.22    102210760.91    102210841.54  1022.5 11070.4    102311336.24  1023.5
 11383.6    102411384.52    102411391.11  1024.511398.62    102511406.13  1025.5
 11413.7    102611413.76    102611478.93    102611480.22    102611493.05  1025.5
11507.16    102511521.27  1024.511591.99  1024.511596.97  1024.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    5940      .1   10000    .01610061.41    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          6915 10114.8              700     650     660              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
10126.0311596.97    1026

CROSS SECTION OUTPUT    Profile #Full 50/50

  E.G. Elev (ft)            1020.35   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.06   Wt. n-Val.                            0.082
  W.S. Elev (ft)            1020.30   Reach Len. (ft)            700.00     650.00     660.00
  Crit W.S. (ft)            1019.34   Flow Area (sq ft)                    4236.87
  E.G. Slope (ft/ft)       0.006657   Area (sq ft)                         4236.87     151.81
  Q Total (cfs)             8000.00   Flow (cfs)                           8000.00
  Top Width (ft)            3071.65   Top Width (ft)                       2940.42     131.22
  Vel Total (ft/s)             1.89   Avg. Vel. (ft/s)                        1.89
  Max Chl Dpth (ft)            3.30   Hydr. Depth (ft)                        1.44
  Conv. Total (cfs)         98049.4   Conv. (cfs)                          98049.4
  Length Wtd. (ft)           650.00   Wetted Per. (ft)                     2940.47
  Min Ch El (ft)            1018.00   Shear (lb/sq ft)                        0.60
  Alpha                        1.00   Stream Power (lb/ft s)                  1.13
  Frctn Loss (ft)              6.15   Cum Volume (acre-ft)       127.35     187.90      90.82
  C & E Loss (ft)              0.00   Cum SA (acres)              67.64     146.87      69.90


Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT    Profile #Full 50/50

  Left Sta     Right Sta       Flow       Area       W.P.    % Conv.    Hydr D.   Velocity
  (ft)         (ft)            (cfs)    (sq ft)      (ft)                (ft)      (ft/s)
  7128.32      7341.64          9.54      28.03    169.51       0.12       0.17       0.34
  7341.64      7554.96         85.98     114.97    213.32       1.07       0.54       0.75
  7554.96      7768.28        223.22     203.78    213.32       2.79       0.96       1.10
  7768.28      7981.60        446.25     308.80    213.32       5.58       1.45       1.45
  7981.60      8194.92        854.38     455.95    213.32      10.68       2.14       1.87
  8194.92      8408.24        964.22     490.27    213.32      12.05       2.30       1.97
  8408.24      8621.56        923.65     477.79    213.32      11.55       2.24       1.93
  8621.56      8834.88        634.28     381.33    213.32       7.93       1.79       1.66
  8834.88      9048.20        430.66     302.28    213.32       5.38       1.42       1.42
  9048.20      9261.52        372.21     276.95    213.32       4.65       1.30       1.34
  9261.52      9474.84        372.21     276.95    213.32       4.65       1.30       1.34
  9474.84      9688.16        372.21     276.95    213.32       4.65       1.30       1.34
  9688.16      9901.48        396.64     287.72    213.32       4.96       1.35       1.38
  9901.48      RB 10114.80   1914.56     355.10    211.12      23.93       1.68       5.39

Warning: Divided flow computed for this cross-section.
```

```
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.

CROSS SECTION          RIVER: West Spillway
REACH: A2                 RS: 19.21

INPUT
Description: Full 50/50 Q=8000 cfs
Station Elevation Data    num=      77
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    5500    1015    5815    1014    6160  1013.5    6280  1012.9    6490  1013.1
    6850    1014    7035  1014.2    7165    1014    7770    1012    8020  1011.5
 8152.84    1012 8156.63    1012 8428.92  1012.5 8672.76    1013 8851.81  1013.5
 9019.45    1014 9071.55    1014 9081.91    1014 9087.94    1014 9228.32  1013.5
 9547.69    1013 9765.05  1012.5 9779.24  1012.5 9800.11  1012.7 9838.55    1013
 9864.95    1013 9889.89  1012.5 9908.12  1012.5 9926.88    1013 9937.05  1013.5
 9946.78    1014 9947.21    1014   10000  1014.510008.63    101510012.83  1015.5
10017.57  1015.510022.55    101510027.53  1014.510036.46    101410036.47    1014
10042.09  1013.510043.32    101310044.54  1012.510047.46  1012.510059.26    1013
10072.01  1013.510082.38    101410085.42    101410112.12  1014.510138.92    1015
   10140    101510140.11    101510161.37  1015.510180.66    101610181.19    1016
 10218.8  1016.510276.09  1016.510299.08    101610299.75    101610309.41  1015.5
10317.27    101510325.13  1014.510333.06    101410333.29    101410459.63    1014
10462.16    101410533.03  1014.510654.91    101510745.15  1015.511035.98    1016
 11038.2    101611107.29  1016.511204.13    101711284.48  1017.5 11366.8    1018
11366.93    101811453.71  1018.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    5500      .1   10000    .01610059.26    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          5500   10000              770     770     780              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
10017.5711453.71  1018.5

CROSS SECTION OUTPUT    Profile #Full 50/50

  E.G. Elev (ft)            1014.20   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.05   Wt. n-Val.                            0.100
  W.S. Elev (ft)            1014.15   Reach Len. (ft)            770.00    770.00     780.00
  Crit W.S. (ft)            1013.32   Flow Area (sq ft)                   4348.36
  E.G. Slope (ft/ft)       0.014268   Area (sq ft)                        4348.36      64.84
  Q Total (cfs)             8000.00   Flow (cfs)                          8000.00
  Top Width (ft)            4333.32   Top Width (ft)                      4120.48     212.84
  Vel Total (ft/s)             1.84   Avg. Vel. (ft/s)                       1.84
  Max Chl Dpth (ft)            2.65   Hydr. Depth (ft)                       1.06
  Conv. Total (cfs)         66973.4   Conv. (cfs)                        66973.4
  Length Wtd. (ft)           770.00   Wetted Per. (ft)                   4120.53
  Min Ch El (ft)            1011.50   Shear (lb/sq ft)                       0.94
  Alpha                        1.00   Stream Power (lb/ft s)                 1.73
  Frctn Loss (ft)              4.93   Cum Volume (acre-ft)       127.35    123.84      89.18
  C & E Loss (ft)              0.01   Cum SA (acres)              67.64     94.19      67.29


Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT    Profile #Full 50/50

  Left Sta      Right Sta        Flow       Area       W.P.    % Conv.    Hydr D.   Velocity
  (ft)          (ft)            (cfs)    (sq ft)      (ft)                 (ft)     (ft/s)
  LB 5500.00    5800.00          0.35       1.72     32.87       0.00       0.05       0.20
  5800.00       6100.00         75.16     104.09    300.00       0.94       0.35       0.72
  6100.00       6400.00        424.48     294.12    300.00       5.31       0.98       1.44
```

6400.00	6700.00	355.26	264.33	300.00	4.44	0.88	1.34
6700.00	7000.00	32.03	61.60	290.57	0.40	0.21	0.52
7000.00	7300.00	33.63	58.15	233.78	0.42	0.25	0.58
7300.00	7600.00	509.66	328.23	300.00	6.37	1.09	1.55
7600.00	7900.00	1450.23	614.72	300.00	18.13	2.05	2.36
7900.00	8200.00	1899.08	722.68	300.00	23.74	2.41	2.63
8200.00	8500.00	1163.19	538.53	300.00	14.54	1.80	2.16
8500.00	8800.00	576.94	353.59	300.00	7.21	1.18	1.63
8800.00	9100.00	91.87	117.41	300.00	1.15	0.39	0.78
9100.00	9400.00	203.73	189.34	300.00	2.55	0.63	1.08
9400.00	9700.00	581.34	355.20	300.00	7.27	1.18	1.64
9700.00	RB 10000.00	603.06	344.64	263.30	7.54	1.31	1.75

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: West Spillway
REACH: A2 RS: 19.06

INPUT
Description: Flow modeled only in portion of cross-section between Tuthill Road and a split approximately 1800 west of Tuthill Road.
Full 50/50
Q=4000 cfs
Station Elevation Data num= 112

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4297.71	1008	4304.11	1007.5	4309.62	1007	4315.41	1006.5	4319.8	1006.5
4360.15	1007	4409.68	1007.5	4495.05	1007.5	4649.13	1007	4693.79	1007
4783.86	1007.5	4844.95	1008	4897.25	1008	5317.5	1008	5345.37	1007.5
5369.35	1007	5393.33	1006.5	5417.32	1006	5419.58	1006	5491.84	1005.5
5547.94	1005.5	5620.4	1006	5624.39	1006	5645.97	1006	5657.78	1006
5841.53	1005.5	5945.17	1005.5	6047.79	1006	6073	1006	6190.08	1006.5
6372.85	1007	6504.78	1007.5	6617.64	1008	6626.52	1008	7056.33	1008
7059.8	1008	7226.24	1007.5	7548.83	1007	7748.09	1007	7794.17	1007.5
7838.17	1008	7844.21	1008.5	7856.62	1009	7860.46	1009.5	7880.31	1009.5
7881.4	1009	7882.5	1008.5	7883.6	1008	7884.69	1007.5	7885.79	1007
7886.89	1006.5	7887.99	1006	7889.09	1005.5	7890.19	1005	7891.29	1004.5
7892.39	1004	7893.49	1003.5	7894.59	1003	7895.69	1002.5	7896.79	1002
7897.89	1001.5	7898.99	1001	7900.09	1000.5	7900.83	1000	7901.19	1000
7911.95	999.5	7919.89	999	7922.05	998.5	7924.21	998	7926.36	997.5
7927.07	997.5	7928.22	998	7929.36	998.5	7930.51	999	7980	1008
8000	1009	8010	1009	8030	1008	8050	1006.5	8130	1006.7
8320	1007.4	8800	1007.6	8940	1007.4	9280	1007.3	9590	1007.5
9800	1007.6	10000	1008	10010	1008.5	10050	1008.5	10060	1008
10070	1007.5	10080	1008	10120	1008.4	10230	1008.3	10270	1008
10290	1007.9	10410	1007.8	10470	1008	10555	1008.4	10590	1008.3
10680	1008.9	10815	1008	10845	1007.8	10855	1008	10890	1008.4
11065	1009.2	11085	1009	11195	1010	11260	1010.3	11315	1010.3
11330	1010	11435	1008.3						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4297.71	.1	10000	.016	10050	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8000	10050	700	1019	1300	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
4297.71	8000		10050	11435	

Blocked Obstructions num= 1

Sta L	Sta R	Elev
7881.4	8000	1009

CROSS SECTION OUTPUT Profile #Full 50/50

E.G. Elev (ft)	1009.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.097	

W.S. Elev (ft)	1009.24	Reach Len. (ft)	700.00	1019.00	1300.00
Crit W.S. (ft)	1007.91	Flow Area (sq ft)		3664.99	
E.G. Slope (ft/ft)	0.002309	Area (sq ft)	7520.29	3664.99	983.39
Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	6849.91	Top Width (ft)	3679.91	2050.00	1120.00
Vel Total (ft/s)	1.09	Avg. Vel. (ft/s)		1.09	
Max Chl Dpth (ft)	3.74	Hydr. Depth (ft)		1.79	
Conv. Total (cfs)	83238.7	Conv. (cfs)		83238.7	
Length Wtd. (ft)	1019.00	Wetted Per. (ft)		2050.10	
Min Ch El (ft)	1006.50	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)		0.28	
Frctn Loss (ft)	5.95	Cum Volume (acre-ft)	60.88	53.02	79.79
C & E Loss (ft)	0.03	Cum SA (acres)	35.11	39.65	55.36

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full 50/50

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8000.00	8136.67	330.85	285.48	136.75	8.27	2.09	1.16
8136.67	8273.33	379.30	309.80	136.67	9.48	2.27	1.22
8273.33	8410.00	272.81	254.22	136.67	6.82	1.86	1.07
8410.00	8546.67	252.83	242.88	136.67	6.32	1.78	1.04
8546.67	8683.33	239.47	235.10	136.67	5.99	1.72	1.02
8683.33	8820.00	227.03	227.69	136.67	5.68	1.67	1.00
8820.00	8956.67	250.70	241.65	136.67	6.27	1.77	1.04
8956.67	9093.33	274.76	255.31	136.67	6.87	1.87	1.08
9093.33	9230.00	284.69	260.81	136.67	7.12	1.91	1.09
9230.00	9366.67	288.28	262.78	136.67	7.21	1.92	1.10
9366.67	9503.33	268.67	251.90	136.67	6.72	1.84	1.07
9503.33	9640.00	247.96	240.06	136.67	6.20	1.76	1.03
9640.00	9776.67	231.77	230.53	136.67	5.79	1.69	1.01
9776.67	9913.33	201.32	211.85	136.67	5.03	1.55	0.95
9913.33	RB 10050.00	249.54	154.91	136.68	6.24	1.13	1.61

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: West Spillway
REACH: A2 RS: 18.87

INPUT
Description: North Bank, Roosevelt Canal
Full 50/50 Q=4000 cfs
Survey Date
12/15/99
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4660	1004.32	5220	1003.04	5710	1002.76	6230	1003.31	6770	1004.68
7330	1003.63	7820	1002.88	8350	1003.21	8880	1002.24	9390	1002.06
9830	1002.4	10120	1001.774	10330	1001.32	10890	1001.3	11390	1001.04
11930	1001	12420	1000.99						

Manning's n Values num= 1

Sta	n Val
4660	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8350	9830	0	0	0	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
4660	8350		9830	12420	

CROSS SECTION OUTPUT Profile #Full 50/50

E.G. Elev (ft)	1003.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.		0.045	
W.S. Elev (ft)	1002.95	Reach Len. (ft)			
Crit W.S. (ft)	1002.95	Flow Area (sq ft)		867.84	
E.G. Slope (ft/ft)	0.034775	Area (sq ft)	56.89	867.84	4363.77
Q Total (cfs)	4000.00	Flow (cfs)		4000.00	
Top Width (ft)	4620.12	Top Width (ft)	690.01	1340.11	2590.00
Vel Total (ft/s)	4.61	Avg. Vel. (ft/s)		4.61	
Max Chl Dpth (ft)	1.96	Hydr. Depth (ft)		0.65	
Conv. Total (cfs)	21449.9	Conv. (cfs)		21449.9	
Length Wtd. (ft)		Wetted Per. (ft)		1340.11	
Min Ch El (ft)	1002.06	Shear (lb/sq ft)		1.41	
Alpha	1.00	Stream Power (lb/ft s)		6.48	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #Full 50/50

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
8448.67	8547.33	2.43	3.02	57.44	0.06	0.05	0.80
8547.33	8646.00	37.24	19.28	98.67	0.93	0.20	1.93
8646.00	8744.67	110.86	37.10	98.67	2.77	0.38	2.99
8744.67	8843.33	213.14	54.92	98.67	5.33	0.56	3.88
8843.33	8942.00	318.60	69.90	98.67	7.97	0.71	4.56
8942.00	9040.67	352.96	74.33	98.67	8.82	0.75	4.75
9040.67	9139.33	380.57	77.76	98.67	9.51	0.79	4.89
9139.33	9238.00	409.00	81.20	98.67	10.23	0.82	5.04
9238.00	9336.67	438.25	84.63	98.67	10.96	0.86	5.18
9336.67	9435.33	458.09	86.91	98.67	11.45	0.88	5.27
9435.33	9534.00	407.26	80.99	98.67	10.18	0.82	5.03
9534.00	9632.67	346.19	73.47	98.67	8.65	0.74	4.71
9632.67	9731.33	289.14	65.94	98.67	7.23	0.67	4.38
9731.33	RB 9830.00	236.27	58.42	98.67	5.91	0.59	4.04

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:West Spillway

Reach	River Sta.	n1	n2	n3
A2	20.09	.045	.02	.045
A2	20.04	.045	.02	.045
A2	19.84	.1	.016	.045
A2	19.68	.1	.016	.045
A2	19.57	.1	.016	.045
A2	19.44	.1	.016	.045
A2	19.33	.1	.016	.045
A2	19.21	.1	.016	.045
A2	19.06	.1	.016	.045
A2	18.87	.045		

SUMMARY OF REACH LENGTHS

River: West Spillway

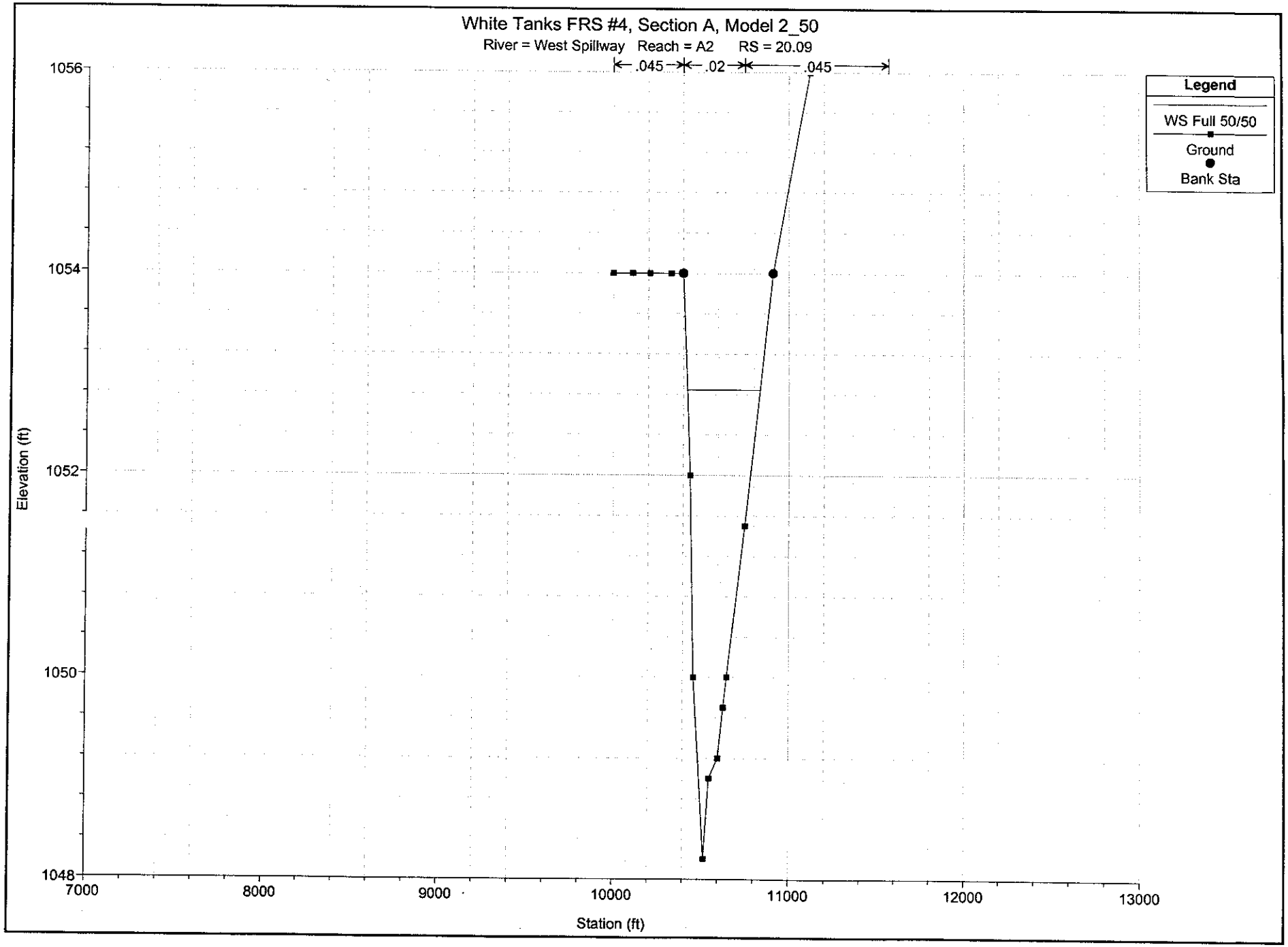
Reach	River Sta.	Left	Channel	Right
A2	20.09	500	580	620
A2	20.04	1200	1150	1150
A2	19.84	870	870	870
A2	19.68	490	570	480
A2	19.57	570	690	690
A2	19.44	540	580	570
A2	19.33	700	650	660
A2	19.21	770	770	780
A2	19.06	700	1019	1300
A2	18.87	0	0	0

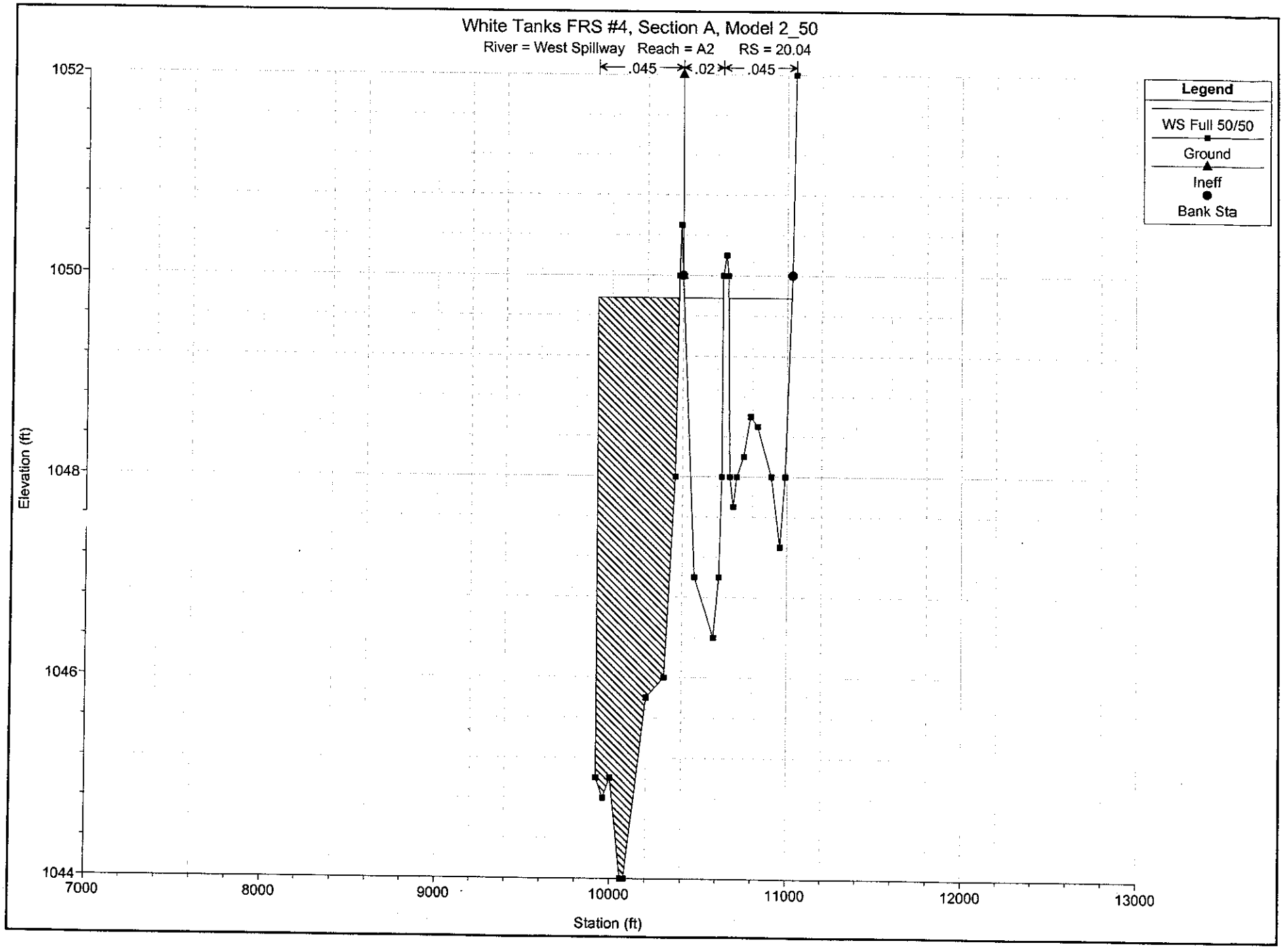
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: West Spillway

Reach	River Sta.	Contr.	Expan.
A2	20.09	.1	.3
A2	20.04	.1	.3
A2	19.84	.1	.3
A2	19.68	.1	.3
A2	19.57	.1	.3
A2	19.44	.1	.3
A2	19.33	.1	.3
A2	19.21	.1	.3
A2	19.06	.1	.3
A2	18.87	.1	.3

HEC-RAS Plan: WT4A2_50 River: West Spillway Reach: A2

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
A2	18.87	4000.00	1002.06	1002.95	1002.95	1003.28	0.034775	4.61	867.84	4620.12	1.01
A2	19.06	4000.00	1006.50	1009.24	1007.91	1009.26	0.002309	1.09	3664.99	6849.91	0.14
A2	19.21	8000.00	1011.50	1014.15	1013.32	1014.20	0.014268	1.84	4348.36	4333.32	0.32
A2	19.33	8000.00	1018.00	1020.30	1019.34	1020.35	0.006657	1.89	4236.87	3071.65	0.28
A2	19.44	8000.00	1022.00	1024.65	1023.87	1024.73	0.008755	2.35	3399.19	2533.93	0.35
A2	19.57	8000.00	1027.50	1029.86	1028.62	1029.94	0.006547	2.21	3620.12	2006.51	0.28
A2	19.68	8000.00	1031.00	1033.94	1032.84	1034.09	0.008150	3.13	2559.84	1527.68	0.39
A2	19.84	8000.00	1036.50	1040.22	1039.23	1040.43	0.006527	3.70	2163.83	1601.00	0.53
A2	20.04	9000.00	1046.40	1049.78	1049.78	1050.75	0.007755	7.91	1137.95	1046.33	1.00
A2	20.09	9000.00	1048.20	1052.84	1052.84	1054.07	0.003788	8.89	1012.12	412.91	1.00


White Tanks FRS #4, Section A, Model 2_50
River = West Spillway Reach = A2 RS = 20.09
.045
.02
.045
Legend
WS Full 50/50
Ground
Bank Sta
Elevation (ft)
1056
1054
1052
1050
1048
7000
8000
9000
10000
11000
12000
13000
Station (ft)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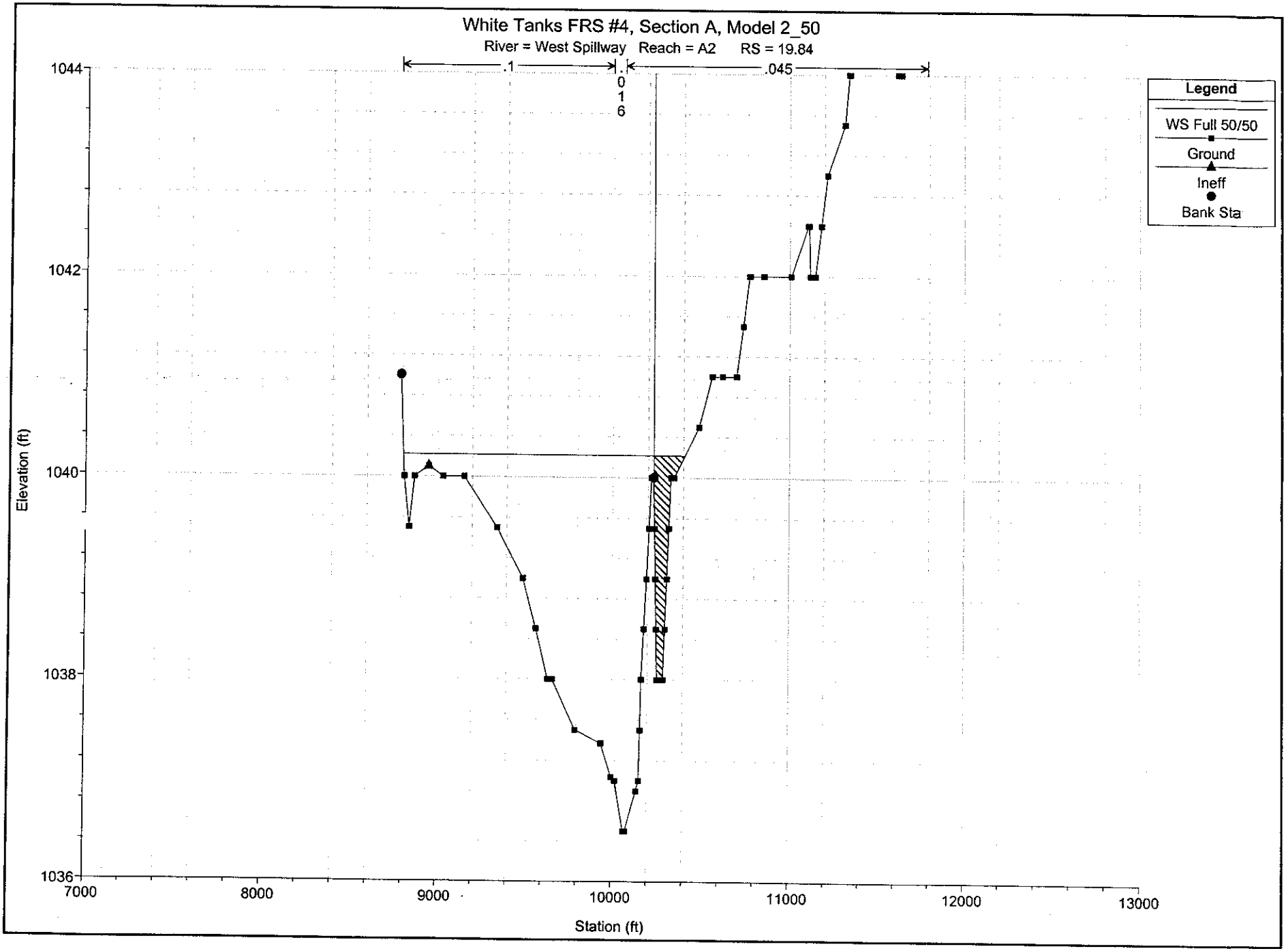
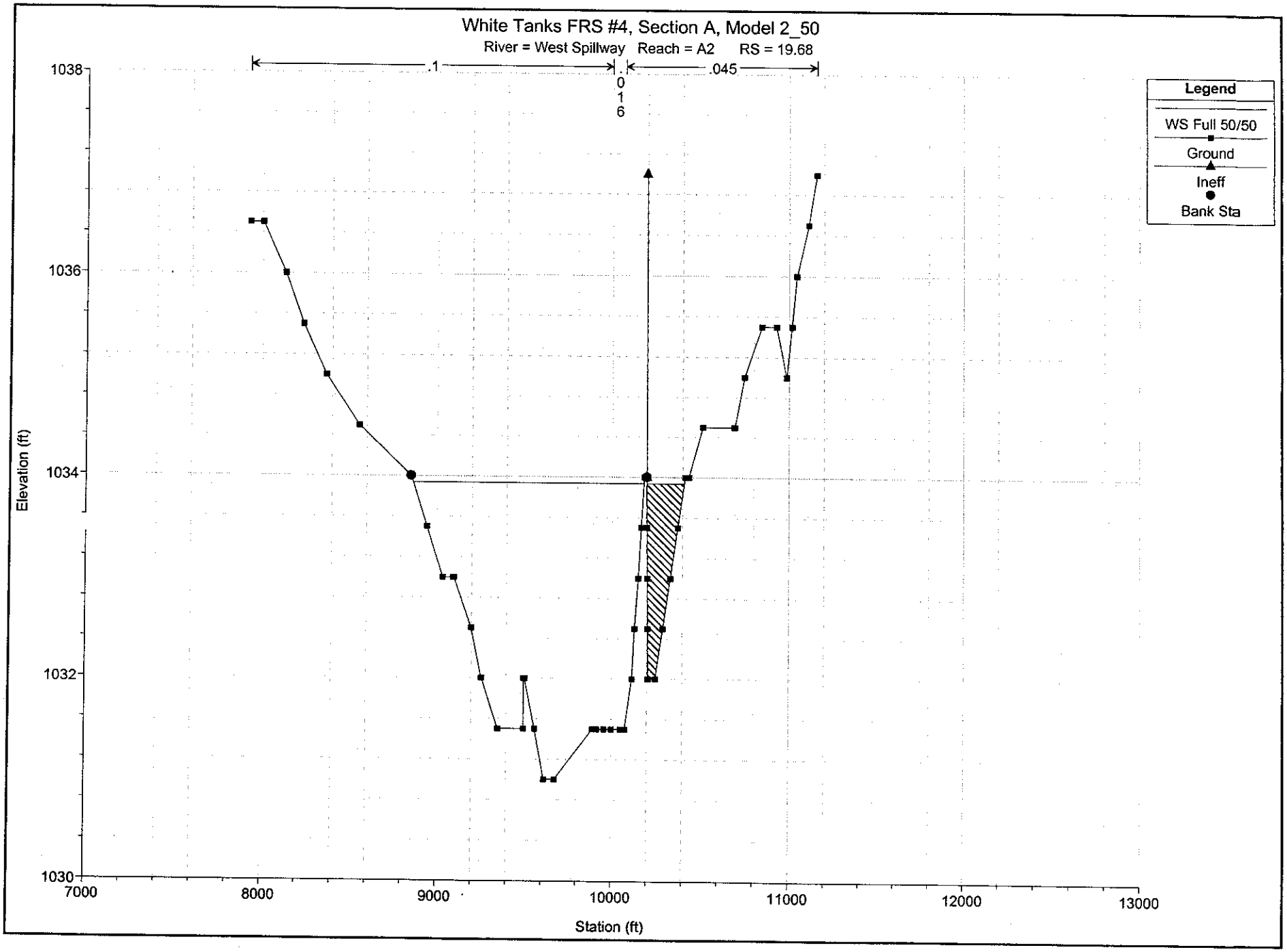
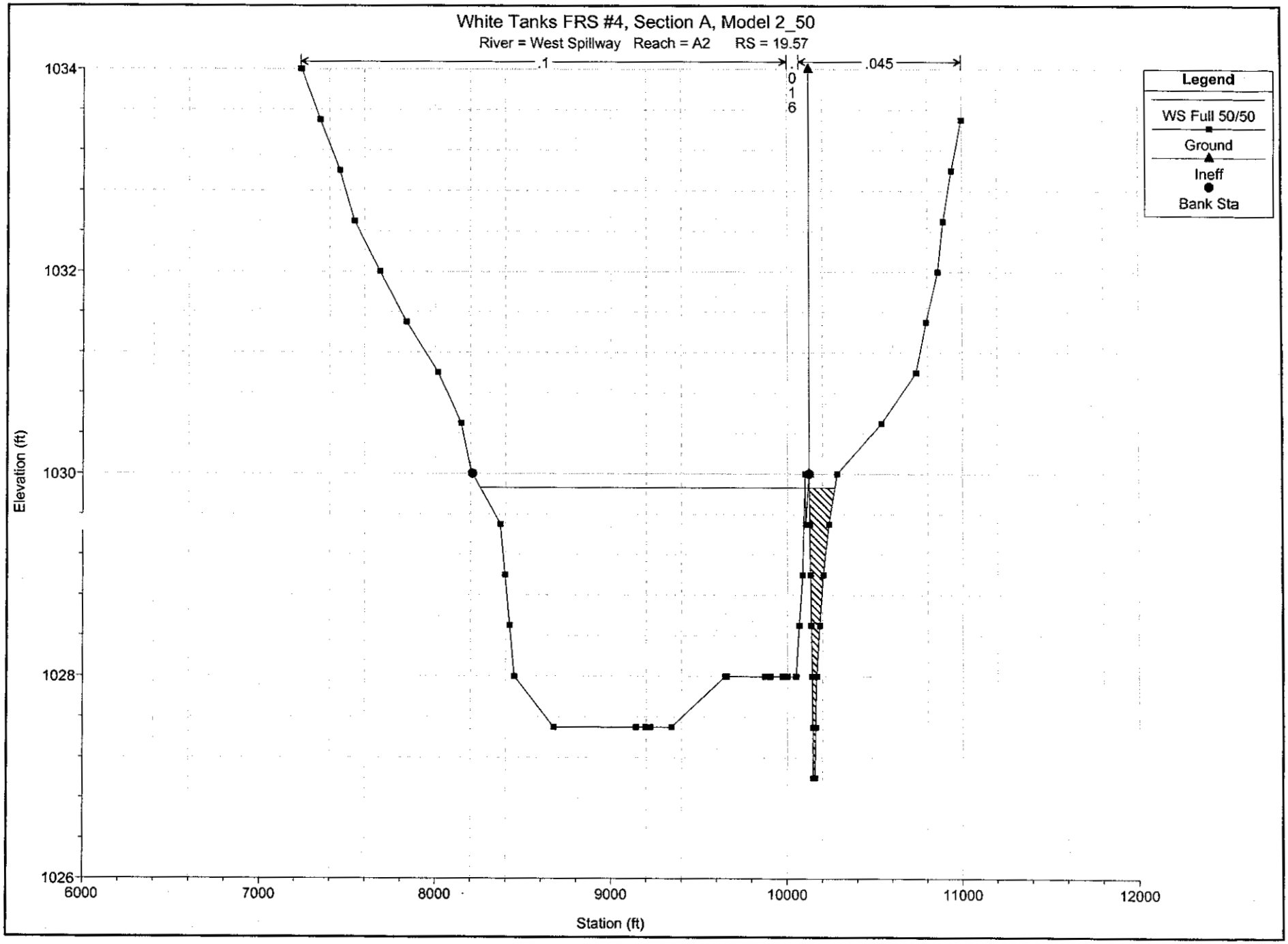
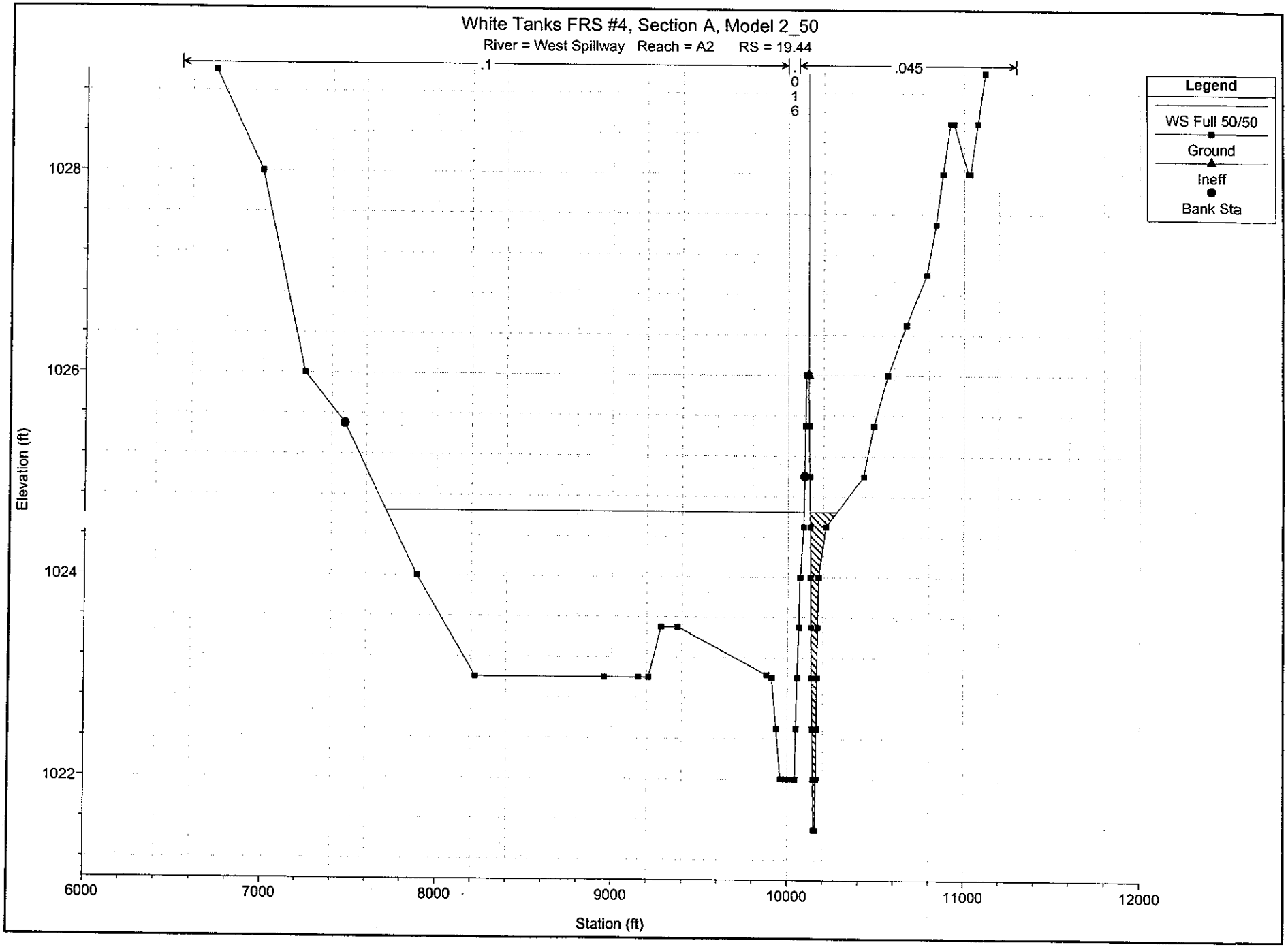
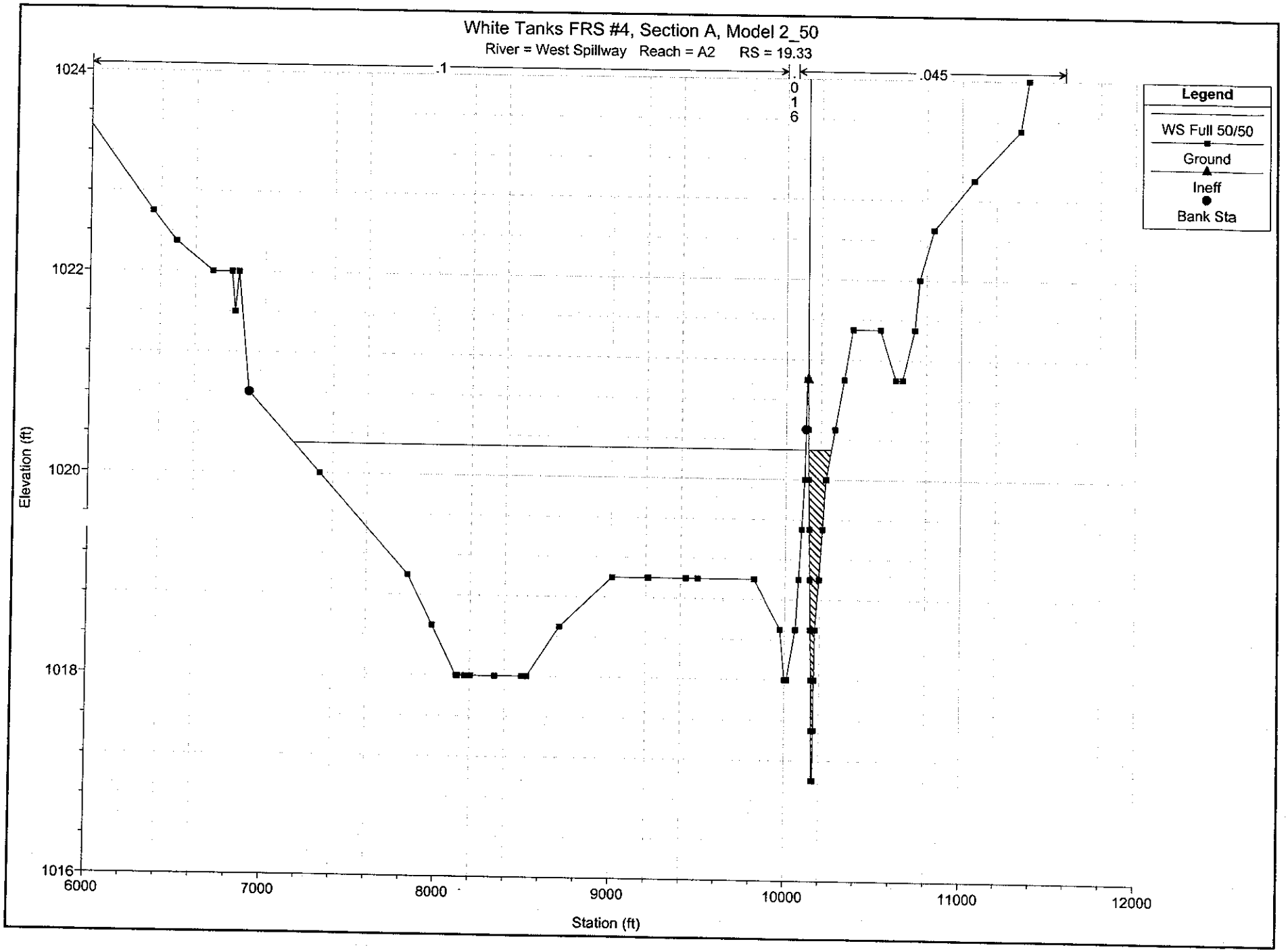
River = West Spillway Reach = A2 RS = 20.04
.045
.02
.045
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1052
1050
1048
1046
1044
7000
8000
9000
10000
11000
12000
13000
Station (ft)

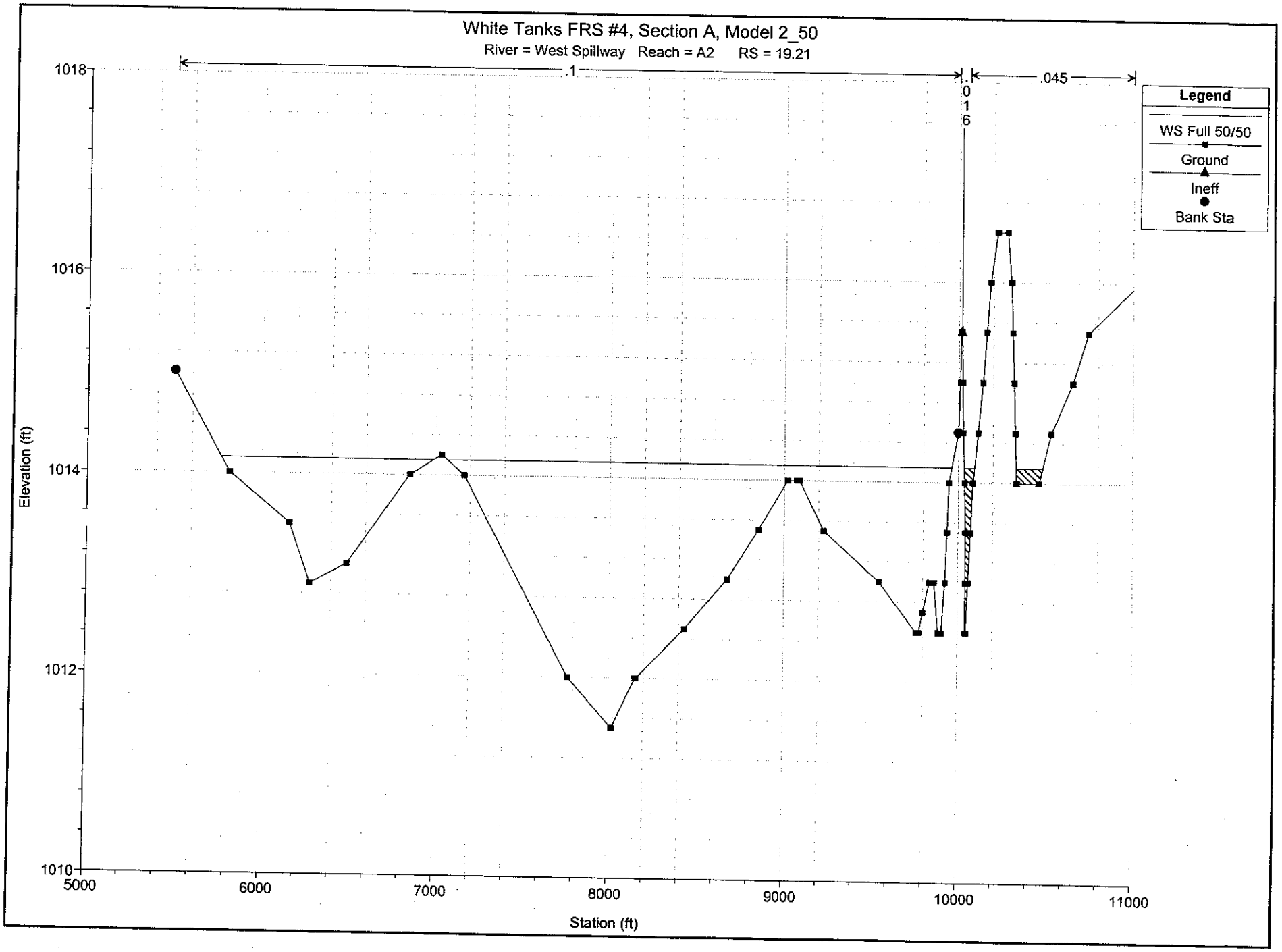

White Tanks FRS #4, Section A, Model 2_50
River = West Spillway Reach = A2 RS = 19.84
.1
.016
.045
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1044
1042
1040
1038
1036
7000
8000
9000
10000
11000
12000
13000
Station (ft)

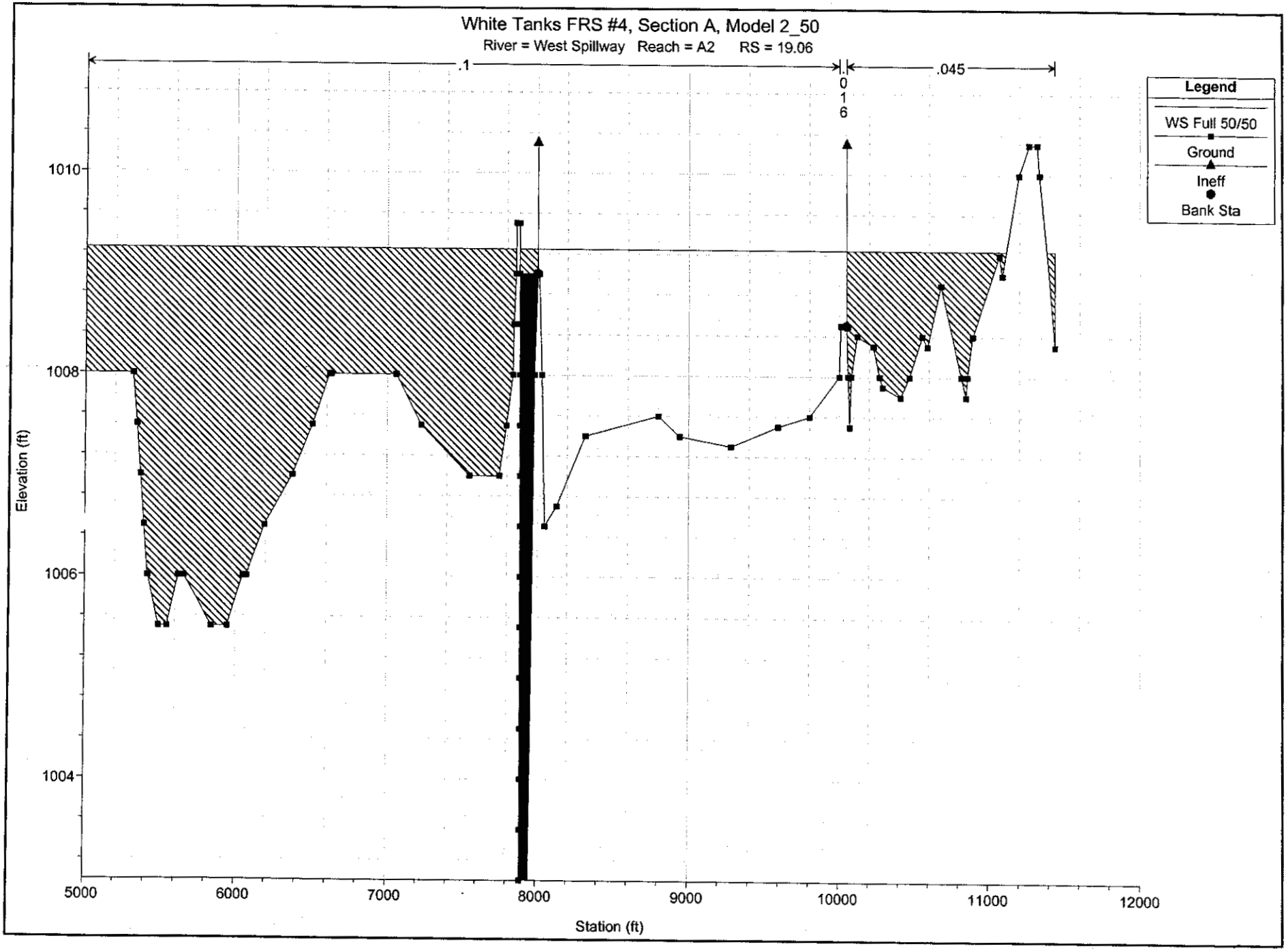

White Tanks FRS #4, Section A, Model 2_50
River = West Spillway Reach = A2 RS = 19.68
.1
.016
.045
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1038
1036
1034
1032
1030
7000
8000
9000
10000
11000
12000
13000
Station (ft)

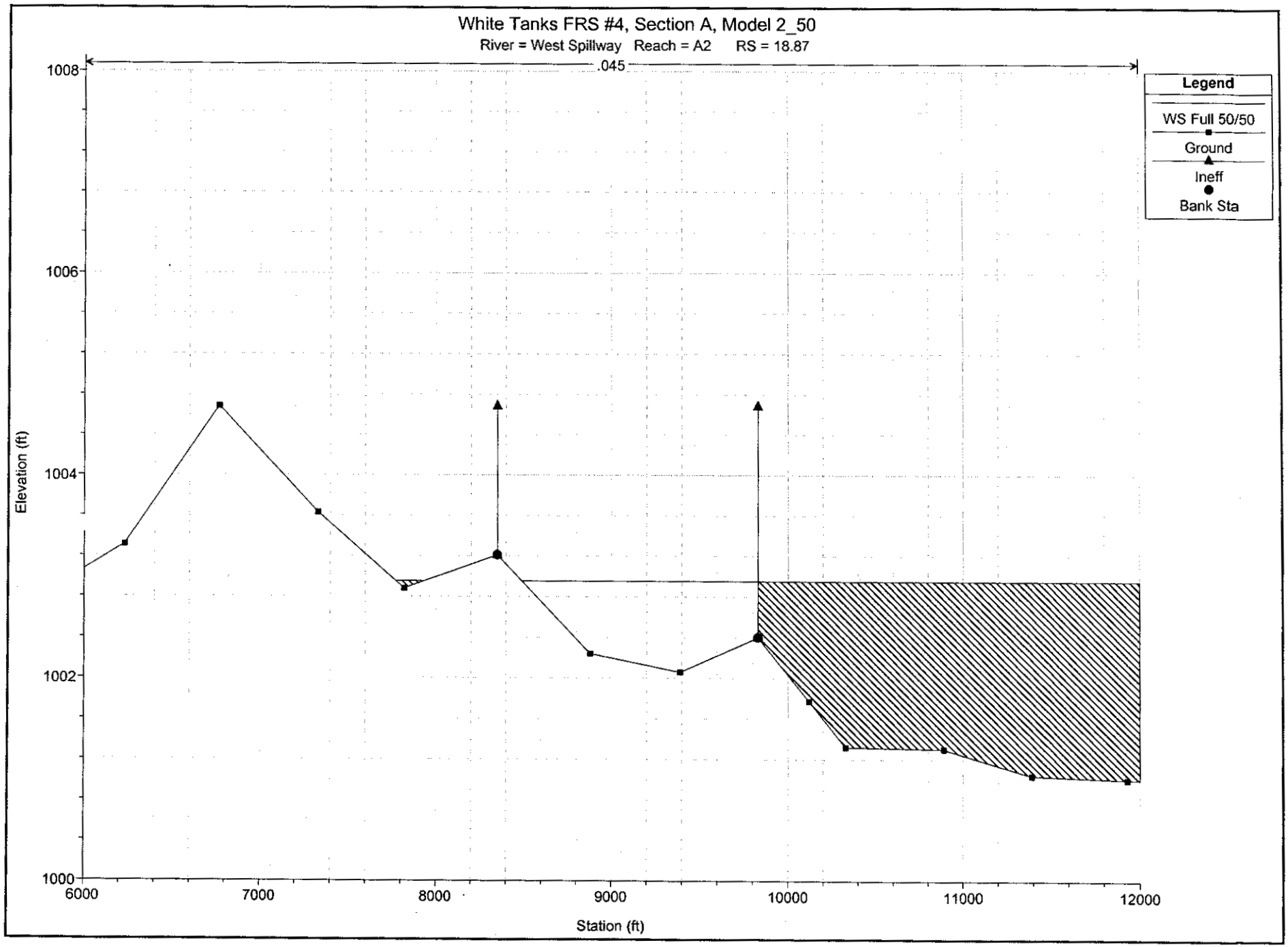

White Tanks FRS #4, Section A, Model 2_50
River = West Spillway Reach = A2 RS = 19.57
.1
.016
.045
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1032
1030
1028
1026
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS #4, Section A, Model 2_50
River = West Spillway Reach = A2 RS = 19.44
.1
.016
.045
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1028
1026
1024
1022
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS #4, Section A, Model 2_50
River = West Spillway Reach = A2 RS = 19.33
.1
.016
.045
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1024
1022
1020
1018
1016
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS #4, Section A, Model 2_50
River = West Spillway Reach = A2 RS = 19.21
.1
.016
.045
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1018
1016
1014
1012
1010
5000
6000
7000
8000
9000
10000
11000
Station (ft)


White Tanks FRS #4, Section A, Model 2_50
River = West Spillway Reach = A2 RS = 19.06
.1
.016
.045
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1010
1008
1006
1004
5000
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS #4, Section A, Model 2_50
River = West Spillway Reach = A2 RS = 18.87
.045
Legend
WS Full 50/50
Ground
Ineff
Bank Sta
Elevation (ft)
1008
1006
1004
1002
1000
6000
7000
8000
9000
10000
11000
12000
Station (ft)

```
                    HEC-RAS September 1998 Version 2.2
                      U.S. Army Corp of Engineers
                     Hydrologic Engineering Center
                       609 Second Street, Suite D
                      Davis, California 95616-4687
                            (916) 756-1104

X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
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PROJECT DATA
Project Title: White Tanks FRS #4, Section A, Model 3_50
Project File : WT4A3_50.prj
Run Date and Time: 06/26/2000 10:16:34 AM

Project in English units

Project Description:
Study Name: White Tanks FRS #4 Spillway Delineation Study
Contract No.: FCD 98-32
Purpose of Study: Delineation of the inundation limits of the 1/3, 2/3, and full spillway discharges for the western spillway of the White Tanks Flood Retarding Structure #4.

Model Name: WT4A3_50
Model Description: Set up to model the portion of west spillway flow which weirs over the Roosevelt Canal between Jackrabbit Trail and a point of flow split approximately 1800 feet west of Tuthill Road. Northern Boundary is the west spillway, southern boundary is the Roosevelt Irrigation District Canal. Cross-section data west of Tuthill Road is set as ineffective flow on all cross-sections.
Cross-section data west of the flow split is set as ineffective flow area on sections 19.06 and 18.87.
Flow Profiles: Profile #1, Full spillway discharge for the 1/2 PMF
Sections 20.09 to 20.04, Q=9000 cfs
Sections 19.84 to 19.21, Q=8000 cfs
Sections 19.06 to 18.87, Q=5500 cfs.

HEC-RAS Version: Version 2.2, September 1998 with RASPATCH

Consultants: Hoskin Engineering Consultants, Inc.
323 W. Roosevelt Street, Suite 200
Phoenix, AZ 85003
(602)252-8384 Phone
(602)252-8385 Fax
HEC 990006

DEI Professional Services, LLC
6225 N. 24th St., Ste. 200
Phoenix, AZ 85016
(602)954-0038 Phone
(602)944-8605 Fax

PLAN DATA

Plan Title: Section A, Between Split and Jackrabbit
Plan File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final models\50-50\WT4A3_50.P01

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          Geometry Title: Section A, Between Split and Jackrabbit
          Geometry File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White
Tanks\hecras\i10-rsvlt\final models\50-50\WT4A3_50.G01

          Flow Title    : Section A, Between Split and Jackrabbit
          Flow File     : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White
Tanks\hecras\i10-rsvlt\final models\50-50\WT4A3_50.F01

Plan Summary Information:
Number of:  Cross Sections =   10    Mulitple Openings =    0
            Culverts       =    0    Inline Weirs      =    0
            Bridges        =    0

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

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: Between every coordinate point (HEC2 Style)
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow


FLOW DATA

Flow Title: Section A, Between Split and Jackrabbit
Flow File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final
models\50-50\WT4A3_50.F01

Flow Data (cfs)

  River          Reach          RS                 Full
  West           W1             20.09              9000
  West           W1             19.84              8000
  West           W1             19.06              5500
  West Spillway  A3             20.09              9000
  West Spillway  A3             19.84              8000
  West Spillway  A3             19.06              5500


Boundary Conditions

  River          Reach          Profile                      Upstream                Downstream

  West Spillway  A3             Full                                                   Critical


GEOMETRY DATA

Geometry Title: Section A, Between Split and Jackrabbit
Geometry File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-
rsvlt\final models\50-50\WT4A3_50.G01

CROSS SECTION          RIVER: West Spillway
REACH: A3                 RS: 20.09

INPUT
Description: Northern Boundary of HEC-RAS Model
Full 50/50 Q=9000 cfs
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

10000	1054	10110	1054	10210	1054	10330	1054	10400	1054
10440	1052	10460	1050	10520	1048.2	10550	1049	10600	1049.2
10630	1049.7	10650	1050	10750	1051.5	10910	1054	11120	1056
11340	1058	11570	1060						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
10000	.045	10400	.02	10910	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10400	10910	500	580	620	.1	.3

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1054.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.020	
W.S. Elev (ft)	1052.86	Reach Len. (ft)	500.00	580.00	620.00
Crit W.S. (ft)	1052.84	Flow Area (sq ft)		1018.23	
E.G. Slope (ft/ft)	0.004268	Area (sq ft)		1018.23	
Q Total (cfs)	9000.00	Flow (cfs)		9000.00	
Top Width (ft)	414.15	Top Width (ft)		414.15	
Vel Total (ft/s)	8.84	Avg. Vel. (ft/s)		8.84	
Max Chl Dpth (ft)	4.66	Hydr. Depth (ft)		2.46	
Conv. Total (cfs)	137765.2	Conv. (cfs)		137765.2	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		414.33	
Min Ch El (ft)	1048.20	Shear (lb/sq ft)		0.65	
Alpha	1.00	Stream Power (lb/ft s)		5.79	
Frctn Loss (ft)	3.25	Cum Volume (acre-ft)	31.00	476.15	215.96
C & E Loss (ft)	0.07	Cum SA (acres)	7.37	327.78	145.83

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10400.00	10434.00	5.57	3.12	11.19	0.06	0.28	1.78
10434.00	10468.00	419.76	65.26	34.11	4.66	1.92	6.43
10468.00	10502.00	1204.48	122.70	34.02	13.38	3.61	9.82
10502.00	10536.00	1685.93	150.13	34.01	18.73	4.42	11.23
10536.00	10570.00	1378.19	133.02	34.01	15.31	3.91	10.36
10570.00	10604.00	1260.45	126.07	34.00	14.00	3.71	10.00
10604.00	10638.00	1043.34	112.56	34.00	11.59	3.31	9.27
10638.00	10672.00	781.69	94.65	34.00	8.69	2.78	8.26
10672.00	10706.00	557.92	77.31	34.00	6.20	2.27	7.22
10706.00	10740.00	365.37	59.97	34.00	4.06	1.76	6.09
10740.00	10774.00	205.42	42.45	34.00	2.28	1.25	4.84
10774.00	10808.00	81.74	24.42	34.00	0.91	0.72	3.35
10808.00	10842.00	10.16	6.56	28.97	0.11	0.23	1.55

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.

CROSS SECTION RIVER: West Spillway
REACH: A3 RS: 20.04

INPUT
Description: Full 50/50 Q=9000 cfs
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
10000	1045	10060	1044	10070	1043.8	10080	1044	10200	1045.8
10300	1046	10360	1048	10380	1050	10390	1050.5	10400	1050
10470	1047	10580	1046.4	10610	1047	10625	1048	10630	1050
10650	1050.2	10660	1050	10670	1048	10690	1047.7	10710	1048
10750	1048.2	10790	1048.6	10830	1048.5	10910	1048	10960	1047.3
10990	1048	11030	1050	11050	1052				

```
Manning's n Values          num=        3
     Sta    n Val      Sta    n Val      Sta    n Val
   10000     .045    10400      .02    10630     .045

Bank Sta: Left    Right     Lengths: Left Channel    Right      Coeff Contr.    Expan.
         10400    11030              1200    1150     1150              .1        .3
Ineffective Flow      num=        1
   Sta L    Sta R     Elev
   10000    10390
```

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1050.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.97	Wt. n-Val.		0.026	
W.S. Elev (ft)	1049.78	Reach Len. (ft)	1200.00	1150.00	1150.00
Crit W.S. (ft)	1049.78	Flow Area (sq ft)		1138.02	
E.G. Slope (ft/ft)	0.007753	Area (sq ft)	1588.89	1138.02	
Q Total (cfs)	9000.00	Flow (cfs)		9000.00	
Top Width (ft)	966.34	Top Width (ft)	377.75	588.58	
Vel Total (ft/s)	7.91	Avg. Vel. (ft/s)		7.91	
Max Chl Dpth (ft)	5.98	Hydr. Depth (ft)		1.93	
Conv. Total (cfs)	102211.2	Conv. (cfs)		102211.2	
Length Wtd. (ft)	1150.00	Wetted Per. (ft)		589.27	
Min Ch El (ft)	1046.40	Shear (lb/sq ft)		0.93	
Alpha	1.00	Stream Power (lb/ft s)		7.39	
Frctn Loss (ft)	7.94	Cum Volume (acre-ft)	21.89	461.80	215.96
C & E Loss (ft)	0.23	Cum SA (acres)	5.20	321.11	145.83

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 10400.00	10442.00	152.47	28.96	36.79	1.69	0.79	5.27
10442.00	10484.00	1106.56	100.30	42.03	12.30	2.39	11.03
10484.00	10526.00	1588.83	124.58	42.00	17.65	2.97	12.75
10526.00	10568.00	1798.54	134.21	42.00	19.98	3.20	13.40
10568.00	10610.00	1757.64	132.37	42.01	19.53	3.15	13.28
10610.00	10652.00	363.48	38.07	19.81	4.04	1.96	9.55
10652.00	10694.00	209.27	54.57	33.06	2.33	1.66	3.83
10694.00	10736.00	301.70	74.80	42.00	3.35	1.78	4.03
10736.00	10778.00	225.07	62.74	42.00	2.50	1.49	3.59
10778.00	10820.00	160.47	51.21	42.00	1.78	1.22	3.13
10820.00	10862.00	189.82	56.64	42.00	2.11	1.35	3.35
10862.00	10904.00	254.13	67.48	42.00	2.82	1.61	3.77
10904.00	10946.00	362.62	83.52	42.00	4.03	1.99	4.34
10946.00	10988.00	437.18	93.45	42.01	4.86	2.22	4.68
10988.00	RB 11030.00	92.20	35.12	37.55	1.02	0.94	2.63

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: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: West Spillway
REACH: A3 RS: 19.84

INPUT
Description: Flow decreases due to 1000 cfs contained within channel west of Tuthill Road.
Full 50/50 Q=8000 cfs
Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8790	1041	8810	1040	8840	1039.5	8870	1040	8950	1040.1
9031.92	1040	9154.47	1040	9343.33	1039.5	9492.37	1039	9567.8	1038.5
9636.2	1038	9657.55	1038	9661.34	1038	9792.72	1037.5	9940	1037.37
10000	1037.04	10020.48	1037	10067.24	1036.51	10078.84	1036.5	10140	1036.9
10155.1	1037	10160.59	1037.51	10166.09	1038	10166.19	1038	10179.88	1038.5
10193.36	1039	10206.84	1039.5	10218.1	1040	10220.32	1040	10230.71	1040
10236.59	1039.51	10242.46	1039	10248.34	1038.51	10254.31	1038	10263.83	1038
10287.5	1038	10297.37	1038.51	10307.24	1039	10317.17	1039.5	10327.1	1040
10346.11	1040	10485.18	1040.51	10560.46	1041	10617.79	1041	10697.96	1041
10735.37	1041.51	10771.87	1042	10773.79	1042	10851.1	1042	10853.58	1042
11007.45	1042	11008.85	1042	11105.31	1042.51	11110.67	1042.51	11117.75	1042
11122.71	1042	11141.01	1042	11145.15	1042	11180.08	1042.51	11215.01	1043
11315.24	1043.51	11340.66	1044	11345.91	1044	11420.74	1044.51	11581.66	1044.5
11620.79	1044	11640.15	1044	11640.69	1044	11668.31	1044.51	11722.97	1044.5
11766.55	1044.51	11781.65	1044.51	11790.42	1044.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
8790	.1	10000	.01	10067.24	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8790	10230.71	870	870	870	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
8790	8950	1040.11	10230.71	11790.42	1046

CROSS SECTION OUTPUT Profile #Full

			Left OB	Channel	Right OB
E.G. Elev (ft)	1040.46	Element			
Vel Head (ft)	0.20	Wt. n-Val.		0.046	
W.S. Elev (ft)	1040.26	Reach Len. (ft)	870.00	870.00	870.00
Crit W.S. (ft)	1039.24	Flow Area (sq ft)		2227.69	
E.G. Slope (ft/ft)	0.006105	Area (sq ft)		2227.69	169.46
Q Total (cfs)	8000.00	Flow (cfs)		8000.00	
Top Width (ft)	1614.36	Top Width (ft)		1425.96	188.40
Vel Total (ft/s)	3.59	Avg. Vel. (ft/s)		3.59	
Max Chl Dpth (ft)	3.76	Hydr. Depth (ft)		1.56	
Conv. Total (cfs)	102390.1	Conv. (cfs)		102390.1	
Length Wtd. (ft)	870.00	Wetted Per. (ft)		1426.07	
Min Ch El (ft)	1036.50	Shear (lb/sq ft)		0.60	
Alpha	1.00	Stream Power (lb/ft s)		2.14	
Frctn Loss (ft)	6.42	Cum Volume (acre-ft)		417.37	213.72
C & E Loss (ft)	0.01	Cum SA (acres)		294.52	143.34

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8790.00	8886.05	21.32	35.49	81.31	0.27	0.44	0.60
8886.05	8982.09	6.61	18.79	96.05	0.08	0.20	0.35

8982.09	9078.14	9.73	23.69	96.05	0.12	0.25	0.41
9078.14	9174.19	11.16	25.72	96.05	0.14	0.27	0.43
9174.19	9270.24	25.70	42.44	96.05	0.32	0.44	0.61
9270.24	9366.28	55.08	67.04	96.05	0.69	0.70	0.82
9366.28	9462.33	100.37	96.10	96.05	1.25	1.00	1.04
9462.33	9558.38	175.07	134.18	96.05	2.19	1.40	1.30
9558.38	9654.43	326.97	195.20	96.05	4.09	2.03	1.68
9654.43	9750.47	437.38	232.42	96.05	5.47	2.42	1.88
9750.47	9846.52	538.13	263.21	96.05	6.73	2.74	2.04
9846.52	9942.57	575.32	273.98	96.05	7.19	2.85	2.10
9942.57	10038.62	2228.30	303.33	96.05	27.85	3.16	7.35
10038.62	10134.66	2916.01	346.80	96.05	36.45	3.61	8.41
10134.66	RB 10230.71	572.85	169.30	96.13	7.16	1.76	3.38

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.

CROSS SECTION RIVER: West Spillway
REACH: A3 RS: 19.68

INPUT
Description: Full 50/50 Q=8000 cfs
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7930	1036.5	8003.47	1036.5	8131.84	1036	8134.04	1036	8235.56	1035.5
8365.92	1035	8556.26	1034.5	8852.66	1034	8853.02	1034	8942.87	1033.5
9034.3	1033	9092.75	1033	9098.12	1033	9199.34	1032.5	9255.69	1032
9258.21	1032	9352.24	1031.5	9497.86	1031.5	9498.53	1032	9504.07	1032
9561.24	1031.5	9614.69	1031	9675.88	1031	9892.54	1031.5	9915	1031.5
9957.38	1031.5	10000	1031.510052.04		1031.510073.96		1031.510075.36		1031.5
10116.44	103210116.63		1032	10130	1032.510149.48		1033	10165.8	1033.5
10182.12	103410194.38		103410196.14		103410197.72		1033.510200.27		1033
10202.81	1032.510205.35		103210207.94		103210246.51		103210247.83		1032
10289.29	1032.510330.89		103310372.51		1033.5 10413.2		103410433.85		1034
10511.86	1034.510688.91		1034.510693.04		1034.510748.12		103510844.75		1035.5
10927.31	1035.510985.54		103510987.38		103511016.74		1035.511042.81		1036
11043.01	103611110.42		1036.511158.28		1037				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
7930	.1	10000	.01610073.96		.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8853.0210196.14		490	570	480	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
10196.1411158.28		1037

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1034.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.067	
W.S. Elev (ft)	1033.87	Reach Len. (ft)	490.00	570.00	480.00
Crit W.S. (ft)	1032.84	Flow Area (sq ft)		2473.72	
E.G. Slope (ft/ft)	0.008994	Area (sq ft)		2473.72	233.73
Q Total (cfs)	8000.00	Flow (cfs)		8000.00	
Top Width (ft)	1508.15	Top Width (ft)		1301.91	206.24
Vel Total (ft/s)	3.23	Avg. Vel. (ft/s)		3.23	
Max Chl Dpth (ft)	2.87	Hydr. Depth (ft)		1.90	
Conv. Total (cfs)	84356.4	Conv. (cfs)		84356.4	
Length Wtd. (ft)	570.00	Wetted Per. (ft)		1302.12	
Min Ch El (ft)	1031.00	Shear (lb/sq ft)		1.07	
Alpha	1.00	Stream Power (lb/ft s)		3.45	
Frctn Loss (ft)	3.97	Cum Volume (acre-ft)		370.42	209.70
C & E Loss (ft)	0.03	Cum SA (acres)		267.27	139.40

Warning: Divided flow computed for this cross-section.

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8853.02	8942.56	5.28	12.32	66.53	0.07	0.19	0.43
8942.56	9032.10	52.58	55.08	89.54	0.66	0.62	0.95
9032.10	9121.64	96.79	79.43	89.54	1.21	0.89	1.22
9121.64	9211.18	162.91	108.56	89.54	2.04	1.21	1.50
9211.18	9300.73	322.83	163.64	89.54	4.04	1.83	1.97
9300.73	9390.27	471.28	205.33	89.54	5.89	2.29	2.30
9390.27	9479.81	498.58	212.39	89.54	6.23	2.37	2.35
9479.81	9569.35	433.61	195.47	89.71	5.42	2.18	2.22
9569.35	9658.89	643.58	247.54	89.54	8.04	2.76	2.60
9658.89	9748.43	658.99	251.08	89.54	8.24	2.80	2.62
9748.43	9837.97	581.46	232.92	89.54	7.27	2.60	2.50
9837.97	9927.52	512.10	215.82	89.54	6.40	2.41	2.37
9927.52	10017.06	997.20	212.39	89.54	12.46	2.37	4.70
10017.06	10106.60	2333.84	206.45	89.54	29.17	2.31	11.30
10106.60	RB 10196.14	228.98	75.32	71.37	2.86	1.06	3.04

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: West Spillway
REACH: A3 RS: 19.57

INPUT
Description: Full 50/50 Q=8000 cfs
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7235	1034	7242.01	1034	7346.11	1033.5	7458.14	1033	7540.92	1032.5
7686.16	1032	7686.76	1032	7837.1	1031.5	8017.52	1031	8148.59	1030.5
8207.12	1030	8212.25	1030	8370.34	1029.5	8396.37	1029	8422.4	1028.5
8448.34	1028	8448.43	1028	8672.26	1027.5	9141.26	1027.5	9195.07	1027.5
9221.67	1027.5	9342.23	1027.5	9647.59	1028	9656.13	1028	9870.84	1028
9890	1028	9903.75	1028	9971.98	1028	9973.2	1028	9982.66	1028
10000	102810047.96		102810049.24		102810067.55		1028.510086.68		1029
10101.4	103010105.81		1029.510123.97		103010127.94		1029.510132.17		1029
10135	1028.5	10136.4	1028.510140.63		102810140.77		102810143.57		1027.5
10146.51	102710156.65		102710160.96		1027.510165.28		102810166.56		1028
10184.33	1028.510203.51		102910237.65		1029.510282.87		103010283.53		1030
10536.89	1030.510736.17		103110794.79		1031.510861.15		103210861.67		1032
10892.16	1032.510940.83		103310997.98		1033.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
7235	.1	10000	.01610067.55		.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8148.5910123.97		570	690	690	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
10123.9710997.98		1034

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1030.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.085	
W.S. Elev (ft)	1029.97	Reach Len. (ft)	570.00	690.00	690.00
Crit W.S. (ft)	1028.62	Flow Area (sq ft)		3815.00	
E.G. Slope (ft/ft)	0.005608	Area (sq ft)		3815.00	173.45
Q Total (cfs)	8000.00	Flow (cfs)		8000.00	
Top Width (ft)	2055.68	Top Width (ft)		1899.88	155.80
Vel Total (ft/s)	2.10	Avg. Vel. (ft/s)		2.10	

Max Chl Dpth (ft)	2.97	Hydr. Depth (ft)	2.01	
Conv. Total (cfs)	106830.0	Conv. (cfs)	106830.0	
Length Wtd. (ft)	690.00	Wetted Per. (ft)	1899.97	
Min Ch El (ft)	1027.50	Shear (lb/sq ft)	0.70	
Alpha	1.00	Stream Power (lb/ft s)	1.47	
Frctn Loss (ft)	5.43	Cum Volume (acre-ft)	329.28	207.45
C & E Loss (ft)	0.00	Cum SA (acres)	246.33	137.40

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8148.59	8280.28	1.16	5.33	58.07	0.01	0.09	0.22
8280.28	8411.97	43.76	65.52	131.70	0.55	0.50	0.67
8411.97	8543.67	425.81	256.63	131.70	5.32	1.95	1.66
8543.67	8675.36	572.87	306.61	131.69	7.16	2.33	1.87
8675.36	8807.05	631.53	325.08	131.69	7.89	2.47	1.94
8807.05	8938.74	631.53	325.08	131.69	7.89	2.47	1.94
8938.74	9070.43	631.52	325.08	131.69	7.89	2.47	1.94
9070.43	9202.13	631.53	325.08	131.69	7.89	2.47	1.94
9202.13	9333.82	631.52	325.08	131.69	7.89	2.47	1.94
9333.82	9465.51	591.75	312.64	131.69	7.40	2.37	1.89
9465.51	9597.20	505.08	284.30	131.69	6.31	2.16	1.78
9597.20	9728.89	438.88	261.31	131.69	5.49	1.98	1.68
9728.89	9860.59	433.07	259.24	131.69	5.41	1.97	1.67
9860.59	9992.28	433.07	259.24	131.69	5.41	1.97	1.67
9992.28	RB 10123.97	1396.93	178.76	129.89	17.46	1.38	7.81

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: West Spillway
REACH: A3 RS: 19.44

INPUT
Description: Full 50/50 Q=8000 cfs
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6540	1029.8	6585	1029.6	6655	1029.5	6732	1029	7000	1028
7245	1026	7475	1025.5	7890	1024	8223.69	1023	8957.17	1023
9151.16	1023	9209.42	1023	9280.28	1023.5	9373.66	1023.5	9880.43	1023.03
9910.73	1023	9935.52	1022.5	9960.02	1022	9961.4	1022	9967.8	1022
10000	102210014.14		102210022.18		1022	10041.4	102210041.73		1022
10046.88	1022.510054.87		102310062.85		1023.510068.13		102410070.95		1024
10089.85	1024.5	10094.3	102510098.75		1025.510103.21		102610103.55		1026
10112.82	102610116.14		102610117.93		1025.510122.69		102510126.19		1024.5
10129.41	102410129.69		102410132.81		1023.510135.93		102310139.05		1022.5
10140.43	1022.510143.87		102210144.21		102210147.71		1021.510156.08		1021.5
10160.61	102210161.38		102210164.03		1022.510166.68		102310170.09		1023.5
10173.65	102410173.81		1024	10214.5	1024.510429.21		102510486.12		1025.5
10565.94	102610566.76		102610669.56		1026.5	10786	102710839.07		1027.5
10878.66	102810878.84		102810922.29		1028.510942.25		1028.511024.11		1028
11024.51	102811025.35		102811034.92		102811080.52		1028.511120.92		1029
11240.61	1029.511298.72		1029.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
6540	.1	10000	.01610062.85		.045

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          7475 10094.3               540     580     570              .1      .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
10116.1411298.72    1030
```

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1024.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.075	
W.S. Elev (ft)	1024.50	Reach Len. (ft)	540.00	580.00	570.00
Crit W.S. (ft)	1023.87	Flow Area (sq ft)		3046.10	
E.G. Slope (ft/ft)	0.011931	Area (sq ft)		3046.10	100.82
Q Total (cfs)	8000.00	Flow (cfs)		8000.00	
Top Width (ft)	2426.15	Top Width (ft)		2337.91	88.23
Vel Total (ft/s)	2.63	Avg. Vel. (ft/s)		2.63	
Max Chl Dpth (ft)	3.00	Hydr. Depth (ft)		1.30	
Conv. Total (cfs)	73239.5	Conv. (cfs)		73239.5	
Length Wtd. (ft)	580.00	Wetted Per. (ft)		2338.01	
Min Ch El (ft)	1022.00	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)		2.55	
Frctn Loss (ft)	4.05	Cum Volume (acre-ft)		274.93	205.28
C & E Loss (ft)	0.02	Cum SA (acres)		212.76	135.47

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
7649.62	7824.24	3.81	9.46	72.34	0.05	0.13	0.40
7824.24	7998.86	102.76	97.10	174.62	1.28	0.56	1.06
7998.86	8173.48	314.06	189.82	174.62	3.93	1.09	1.65
8173.48	8348.10	523.79	258.00	174.62	6.55	1.48	2.03
8348.10	8522.72	536.64	261.78	174.62	6.71	1.50	2.05
8522.72	8697.34	536.64	261.78	174.62	6.71	1.50	2.05
8697.34	8871.96	536.64	261.78	174.62	6.71	1.50	2.05
8871.96	9046.58	536.64	261.78	174.62	6.71	1.50	2.05
9046.58	9221.20	534.97	261.29	174.62	6.69	1.50	2.05
9221.20	9395.82	306.36	187.01	174.62	3.83	1.07	1.64
9395.82	9570.44	320.66	192.20	174.62	4.01	1.10	1.67
9570.44	9745.06	403.08	220.48	174.62	5.04	1.26	1.83
9745.06	9919.68	495.57	249.57	174.62	6.19	1.43	1.99
9919.68	RB 10094.30	2848.39	334.04	170.23	35.60	1.96	8.53

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: West Spillway
REACH: A3 RS: 19.33

INPUT
Description: Full 50/50 Q=8000 cfs
Station Elevation Data num= 84

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5940	1023.6	6355	1022.6	6490	1022.3	6700	1022	6810	1022
6830	1021.6	6850	1022	6915	1020.8	7325	1020	7837.35	1019
7979.84	1018.5	8120.6	1018	8130.79	1018	8170.37	1018	8175.25	1018
8189.19	1018	8203.94	1018	8342.78	1018	8342.97	1018	8496.11	1018

```
 8525.44    1018 8710.51  1018.5  9008.7    1019 9208.91    1019 9213.94    1019
 9428.44    1019 9496.09    1019 9820.57    1019 9972.54  1018.5   10000    1018
10013.98    101810061.41  1018.510077.12    101910092.82  1019.510108.52    1020
10109.23    1020 10114.8  1020.510119.08    102110126.03    102110128.26  1020.5
10130.27    102010130.49    102010136.15  1019.510141.57    101910147.06  1018.5
 10152.5    1018 10153.6    101810155.89  1017.510159.27    101710165.11    1017
10167.37  1017.510169.62    101810170.38    101810173.25  1018.510193.95    1019
10211.28  1019.510228.79    102010231.76    102010279.59  1020.510330.63    1021
10382.02  1021.510537.17  1021.510625.66    102110664.16    102110734.74  1021.5
10760.22    102210760.91    102210841.54  1022.5 11070.4    102311336.24  1023.5
 11383.6    102411384.52    102411391.11  1024.511398.62    102511406.13  1025.5
 11413.7    102611413.76    102611478.93    102611480.22    102611493.05  1025.5
11507.16    102511521.27  1024.511591.99  1024.511596.97  1024.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    5940      .1   10000    .01610061.41    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          691510126.03              700     650     660              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
10126.0311596.97    1030

CROSS SECTION OUTPUT    Profile #Full

  E.G. Elev (ft)            1020.54   Element                   Left OB    Channel   Right OB
  Vel Head (ft)                0.04   Wt. n-Val.                            0.083
  W.S. Elev (ft)            1020.50   Reach Len. (ft)           700.00    650.00    660.00
  Crit W.S. (ft)            1019.34   Flow Area (sq ft)                  4829.14
  E.G. Slope (ft/ft)       0.004570   Area (sq ft)                       4829.14    179.73
  Q Total (cfs)             8000.00   Flow (cfs)                         8000.00
  Top Width (ft)            3195.02   Top Width (ft)                     3044.07    150.95
  Vel Total (ft/s)             1.66   Avg. Vel. (ft/s)                      1.66
  Max Chl Dpth (ft)            3.50   Hydr. Depth (ft)                      1.59
  Conv. Total (cfs)        118333.7   Conv. (cfs)                      118333.7
  Length Wtd. (ft)          650.00   Wetted Per. (ft)                   3044.13
  Min Ch El (ft)            1018.00   Shear (lb/sq ft)                      0.45
  Alpha                        1.00   Stream Power (lb/ft s)                0.75
  Frctn Loss (ft)              6.66   Cum Volume (acre-ft)               222.51    203.45
  C & E Loss (ft)              0.01   Cum SA (acres)                     176.93    133.91


Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT    Profile #Full

  Left Sta      Right Sta        Flow       Area       W.P.    % Conv.    Hydr D.   Velocity
  (ft)          (ft)             (cfs)    (sq ft)      (ft)                (ft)     (ft/s)
  LB 6915.00    7129.07           0.46       3.32     58.38       0.01       0.06       0.14
  7129.07       7343.14          30.41      69.09    214.07       0.38       0.32       0.44
  7343.14       7557.21         121.39     158.53    214.07       1.52       0.74       0.77
  7557.21       7771.27         255.85     247.97    214.07       3.20       1.16       1.03
  7771.27       7985.34         464.10     354.46    214.07       5.80       1.66       1.31
  7985.34       8199.41         828.54     501.87    214.07      10.36       2.34       1.65
  8199.41       8413.48         919.86     534.36    214.07      11.50       2.50       1.72
  8413.48       8627.55         879.81     520.28    214.07      11.00       2.43       1.69
  8627.55       8841.62         621.17     422.21    214.07       7.76       1.97       1.47
  8841.62       9055.69         440.85     343.70    214.07       5.51       1.61       1.28
  9055.69       9269.76         391.96     320.29    214.07       4.90       1.50       1.22
  9269.76       9483.82         391.96     320.29    214.07       4.90       1.50       1.22
  9483.82       9697.89         391.96     320.29    214.07       4.90       1.50       1.22
  9697.89       9911.96         420.39     334.04    214.07       5.25       1.56       1.26
  9911.96       RB 10126.03    1841.28     378.45    202.85      23.02       1.87       4.87
```

```
Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION          RIVER: West Spillway
REACH: A3                 RS: 19.21

INPUT
Description: Full 50/50 Q=8000 cfs
Station Elevation Data    num=      77
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    5500    1015    5815    1014    6160  1013.5    6280  1012.9    6490  1013.1
    6850    1014    7035  1014.2    7165    1014    7770    1012    8020  1011.5
 8152.84    1012 8156.63    1012 8428.92  1012.5 8672.76    1013 8851.81  1013.5
 9019.45    1014 9071.55    1014 9081.91    1014 9087.94    1014 9228.32  1013.5
 9547.69    1013 9765.05  1012.5 9779.24  1012.5 9800.11  1012.7 9838.55    1013
 9864.95    1013 9889.89  1012.5 9908.12  1012.5 9926.88    1013 9937.05  1013.5
 9946.78    1014 9947.21    1014   10000  1014.510008.63    101510012.83  1015.5
10017.57  1015.510022.55    101510027.53  1014.510036.46    101410036.47    1014
10042.09  1013.510043.32    101310044.54  1012.510047.46  1012.510059.26    1013
10072.01  1013.510082.38    101410085.42    101410112.12  1014.510138.92    1015
   10140    101510140.11    101510161.37  1015.510180.66    101610181.19    1016
 10218.8  1016.510276.09  1016.510299.08    101610299.75    101610309.41  1015.5
10317.27    101510325.13  1014.510333.06    101410333.29    101410459.63    1014
10462.16    101410533.03  1014.510654.91    101510745.15  1015.511035.98    1016
 11038.2    101611107.29  1016.511204.13    101711284.48  1017.5 11366.8    1018
11366.93    101811453.71  1018.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    5500      .1   10000    .01610059.26    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          5815 9947.21              770     770     780              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
10017.5711453.71    1019

CROSS SECTION OUTPUT    Profile #Full

  E.G. Elev (ft)            1013.87   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.12   Wt. n-Val.                            0.100
  W.S. Elev (ft)            1013.74   Reach Len. (ft)            770.00     770.00     780.00
  Crit W.S. (ft)            1013.32   Flow Area (sq ft)                    2853.91
  E.G. Slope (ft/ft)       0.041981   Area (sq ft)                         2853.91      24.45
  Q Total (cfs)             8000.00   Flow (cfs)                           8000.00
  Top Width (ft)            3268.02   Top Width (ft)                       3230.28      37.74
  Vel Total (ft/s)             2.80   Avg. Vel. (ft/s)                        2.80
  Max Chl Dpth (ft)            2.24   Hydr. Depth (ft)                        0.88
  Conv. Total (cfs)         39045.1   Conv. (cfs)                         39045.1
  Length Wtd. (ft)           770.00   Wetted Per. (ft)                    3230.32
  Min Ch El (ft)            1011.50   Shear (lb/sq ft)                        2.32
  Alpha                        1.00   Stream Power (lb/ft s)                  6.49
  Frctn Loss (ft)              4.98   Cum Volume (acre-ft)                 165.18     201.90
  C & E Loss (ft)              0.03   Cum SA (acres)                       130.12     132.48


Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT    Profile #Full

  Left Sta     Right Sta        Flow       Area       W.P.    % Conv.    Hydr D.   Velocity
```

(ft)	(ft)	(cfs)	(sq ft)	(ft)		(ft)	(ft/s)
LB 5815.00	6090.48	3.07	7.13	99.23	0.04	0.07	0.43
6090.48	6365.96	243.54	147.93	275.48	3.04	0.54	1.65
6365.96	6641.44	266.74	156.23	275.48	3.33	0.57	1.71
6641.44	6916.92	9.19	14.15	106.39	0.11	0.13	0.65
6916.92	7192.40						
7192.40	7467.88	108.63	84.14	225.62	1.36	0.37	1.29
7467.88	7743.36	931.78	330.90	275.48	11.65	1.20	2.82
7743.36	8018.85	2116.46	541.34	275.48	26.46	1.97	3.91
8018.85	8294.33	1835.30	496.97	275.48	22.94	1.80	3.69
8294.33	8569.81	970.76	339.14	275.48	12.13	1.23	2.86
8569.81	8845.29	320.49	174.42	275.48	4.01	0.63	1.84
8845.29	9120.77	7.55	11.68	88.52	0.09	0.13	0.65
9120.77	9396.25	80.31	71.54	236.59	1.00	0.30	1.12
9396.25	9671.73	419.02	204.86	275.48	5.24	0.74	2.05
9671.73	RB 9947.21	687.17	273.48	270.11	8.59	1.01	2.51

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: West Spillway
REACH: A3 RS: 19.06

INPUT
Description: Flow modeled only in portion of cross-section between Jackrabbit Trail and a split approximately 1800 west of Tuthill Road.
Full
50/50 Q=5500 cfs
Station Elevation Data num= 113

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4297.71	1008	4304.11	1007.5	4309.62	1007	4315.41	1006.5	4319.8	1006.5
4360.15	1007	4409.68	1007.5	4495.05	1007.5	4649.13	1007	4693.79	1007
4783.86	1007.5	4844.95	1008	4897.25	1008	5317.5	1008	5317.51	1008
5345.37	1007.5	5369.35	1007	5393.33	1006.5	5417.32	1006	5419.58	1006
5491.84	1005.5	5547.94	1005.5	5620.4	1006	5624.39	1006	5645.97	1006
5657.78	1006	5841.53	1005.5	5945.17	1005.5	6047.79	1006	6073	1006
6190.08	1006.5	6372.85	1007	6504.78	1007.5	6617.64	1008	6626.52	1008
7056.33	1008	7059.8	1008	7226.24	1007.5	7548.83	1007	7748.09	1007
7794.17	1007.5	7838.17	1008	7844.21	1008.5	7856.62	1009	7860.46	1009.5
7880.31	1009.5	7881.4	1009	7882.5	1008.5	7883.6	1008	7884.69	1007.5
7885.79	1007	7886.89	1006.5	7887.99	1006	7889.09	1005.5	7890.19	1005
7891.29	1004.5	7892.39	1004	7893.49	1003.5	7894.59	1003	7895.69	1002.5
7896.79	1002	7897.89	1001.5	7898.99	1001	7900.09	1000.5	7900.83	1000
7901.19	1000	7911.95	999.5	7919.89	999	7922.05	998.5	7924.21	998
7926.36	997.5	7927.07	997.5	7928.22	998	7929.36	998.5	7930.51	999
7980	1008	8000	1009	8010	1009	8030	1008	8050	1006.5
8130	1006.7	8320	1007.4	8800	1007.6	8940	1007.4	9280	1007.3
9590	1007.5	9800	1007.6	10000	1008	10010	1008.5	10050	1008.5
10060	1008	10070	1007.5	10080	1008	10120	1008.4	10230	1008.3
10270	1008	10290	1007.9	10410	1007.8	10470	1008	10555	1008.4
10590	1008.3	10680	1008.9	10815	1008	10845	1007.8	10855	1008
10890	1008.4	11065	1009.2	11085	1009	11195	1010	11260	1010.3
11315	1010.3	11330	1010	11435	1008.3				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4297.71	.1	10000	.016	10050	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4297.71	8000	700	1019	1300	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
8000	11435	1012

Blocked Obstructions num= 1

Sta L	Sta R	Elev

7881.4 8000 1009

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1008.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.100	
W.S. Elev (ft)	1008.84	Reach Len. (ft)	700.00	1019.00	1300.00
Crit W.S. (ft)	1007.06	Flow Area (sq ft)		6071.07	
E.G. Slope (ft/ft)	0.001822	Area (sq ft)		6071.07	3416.79
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	6545.87	Top Width (ft)		3555.04	2990.83
Vel Total (ft/s)	0.91	Avg. Vel. (ft/s)		0.91	
Max Chl Dpth (ft)	3.34	Hydr. Depth (ft)		1.71	
Conv. Total (cfs)	128862.8	Conv. (cfs)		128862.8	
Length Wtd. (ft)	1019.00	Wetted Per. (ft)		3556.02	
Min Ch El (ft)	1005.50	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.18	
Frctn Loss (ft)	4.90	Cum Volume (acre-ft)		86.30	171.09
C & E Loss (ft)	0.03	Cum SA (acres)		70.15	105.36

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 4297.71	4544.53	297.34	386.87	247.73	5.41	1.57	0.77
4544.53	4791.35	329.58	410.91	246.82	5.99	1.66	0.80
4791.35	5038.17	116.43	220.09	246.82	2.12	0.89	0.53
5038.17	5284.99	106.25	208.33	246.82	1.93	0.84	0.51
5284.99	5531.81	572.39	572.26	246.84	10.41	2.32	1.00
5531.81	5778.63	894.50	748.02	246.82	16.26	3.03	1.20
5778.63	6025.45	1009.45	804.30	246.82	18.35	3.26	1.26
6025.45	6272.26	660.51	623.58	246.82	12.01	2.53	1.06
6272.26	6519.08	353.30	428.40	246.82	6.42	1.74	0.82
6519.08	6765.90	125.16	229.85	246.82	2.28	0.93	0.54
6765.90	7012.72	106.25	208.33	246.82	1.93	0.84	0.51
7012.72	7259.54	161.11	267.45	246.82	2.93	1.08	0.60
7259.54	7506.36	304.31	391.70	246.82	5.53	1.59	0.78
7506.36	7753.18	388.63	453.61	246.82	7.07	1.84	0.86
7753.18	RB 8000.00	74.81	117.40	99.60	1.36	1.18	0.64

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: West Spillway
REACH: A3 RS: 18.87

INPUT
Description: North Bank, Roosevelt Canal
Full 50/50 Q=5500 cfs
Survey Date
12/15/99
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4240	1005.98	4660	1004.32	5220	1003.04	5710	1002.76	6230	1003.31
6770	1004.68	7330	1003.63	7820	1002.88	8350	1003.21	8880	1002.24
9390	1002.06	9830	1002.4	101201001.774		10330	1001.32	10890	1001.3

```
   11390 1001.04   11930    1001   12420 1000.99

Manning's n Values        num=       1
     Sta   n Val
    4240    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4660    8350                 0       0       0              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
    8350   12420    1006

CROSS SECTION OUTPUT    Profile #Full

  E.G. Elev (ft)            1003.93   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.27   Wt. n-Val.                              0.045
  W.S. Elev (ft)            1003.65   Reach Len. (ft)
  Crit W.S. (ft)            1003.65   Flow Area (sq ft)                     1307.18
  E.G. Slope (ft/ft)       0.037364   Area (sq ft)                          1307.18    8048.85
  Q Total (cfs)             5500.00   Flow (cfs)                            5500.00
  Top Width (ft)            6512.34   Top Width (ft)                        2442.34    4070.00
  Vel Total (ft/s)             4.21   Avg. Vel. (ft/s)                         4.21
  Max Chl Dpth (ft)            2.66   Hydr. Depth (ft)                         0.54
  Conv. Total (cfs)         28453.7   Conv. (cfs)                          28453.7
  Length Wtd. (ft)                    Wetted Per. (ft)                      2442.34
  Min Ch El (ft)            1002.76   Shear (lb/sq ft)                         1.25
  Alpha                        1.00   Stream Power (lb/ft s)                   5.25
  Frctn Loss (ft)                     Cum Volume (acre-ft)
  C & E Loss (ft)                     Cum SA (acres)

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT    Profile #Full

  Left Sta     Right Sta       Flow       Area       W.P.    % Conv.    Hydr D.   Velocity
  (ft)         (ft)            (cfs)    (sq ft)      (ft)                (ft)     (ft/s)
  4906.00      5152.00         98.90      45.32    199.13       1.80      0.23       2.18
  5152.00      5398.00        659.64     153.97    246.00      11.99      0.63       4.28
  5398.00      5644.00        957.20     192.51    246.00      17.40      0.78       4.97
  5644.00      5890.00       1026.03     200.70    246.00      18.66      0.82       5.11
  5890.00      6136.00        564.57     140.24    246.00      10.26      0.57       4.03
  6136.00      6382.00        142.35      59.55    228.24       2.59      0.26       2.39
  6382.00      7120.00
  7120.00      7366.00          1.25       1.85     46.97       0.02      0.04       0.68
  7366.00      7612.00        156.43      64.93    246.00       2.84      0.26       2.41
  7612.00      7858.00        674.20     156.00    246.00      12.26      0.63       4.32
  7858.00      8104.00        739.50     164.90    246.00      13.45      0.67       4.48
  8104.00      RB 8350.00     479.92     127.22    246.00       8.73      0.52       3.77

Warning: Divided flow computed for this cross-section.


SUMMARY OF MANNING'S N VALUES

River:West Spillway

      Reach          River Sta.       n1        n2        n3

 A3                   20.09          .045       .02      .045
 A3                   20.04          .045       .02      .045
 A3                   19.84            .1      .016      .045
 A3                   19.68            .1      .016      .045
 A3                   19.57            .1      .016      .045
 A3                   19.44            .1      .016      .045
 A3                   19.33            .1      .016      .045
 A3                   19.21            .1      .016      .045
```

A3	19.06	.1	.016	.045
A3	18.87	.045		

SUMMARY OF REACH LENGTHS

River: West Spillway

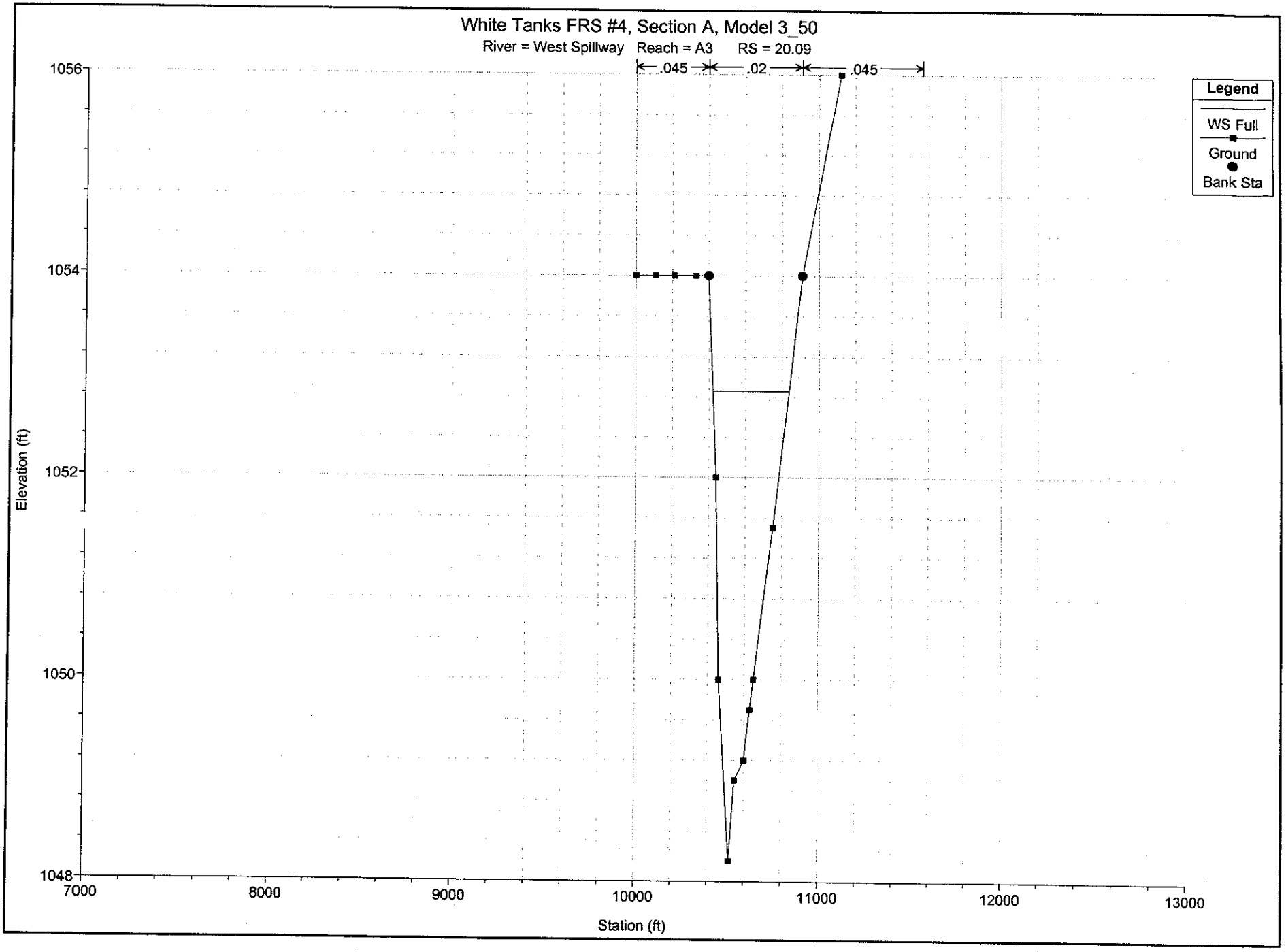
Reach	River Sta.	Left	Channel	Right
A3	20.09	500	580	620
A3	20.04	1200	1150	1150
A3	19.84	870	870	870
A3	19.68	490	570	480
A3	19.57	570	690	690
A3	19.44	540	580	570
A3	19.33	700	650	660
A3	19.21	770	770	780
A3	19.06	700	1019	1300
A3	18.87	0	0	0

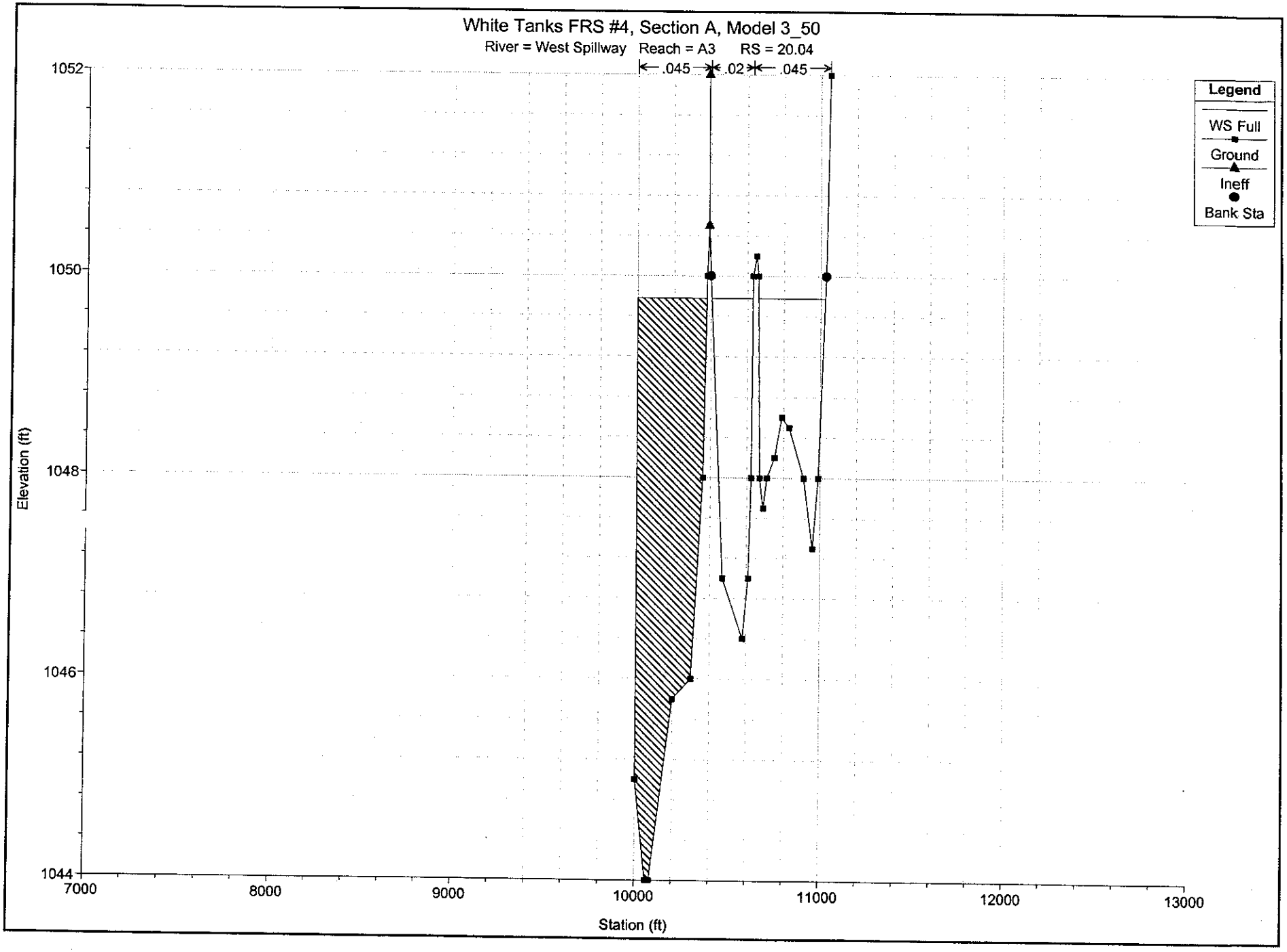
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: West Spillway

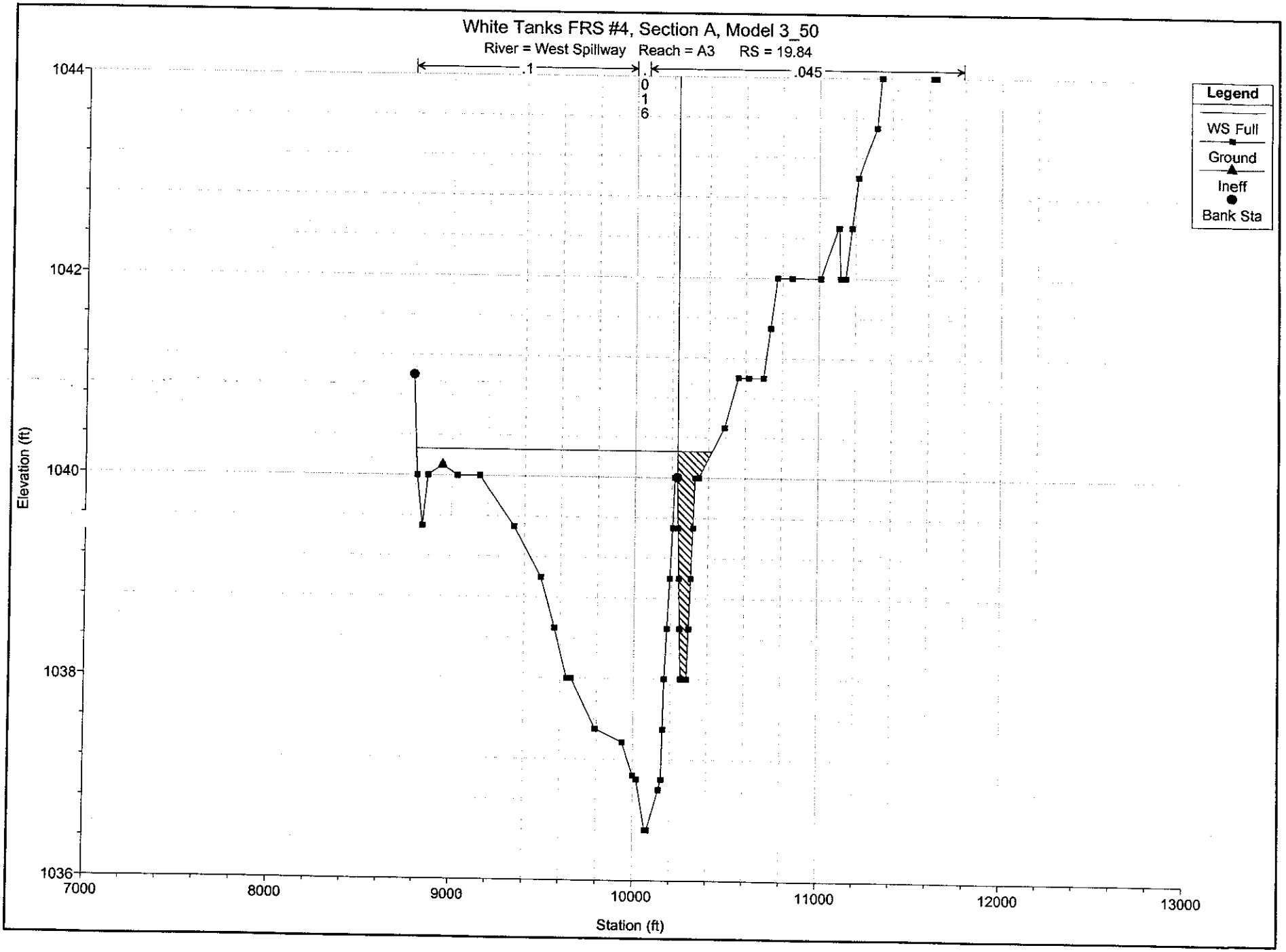
Reach	River Sta.	Contr.	Expan.
A3	20.09	.1	.3
A3	20.04	.1	.3
A3	19.84	.1	.3
A3	19.68	.1	.3
A3	19.57	.1	.3
A3	19.44	.1	.3
A3	19.33	.1	.3
A3	19.21	.1	.3
A3	19.06	.1	.3
A3	18.87	.1	.3

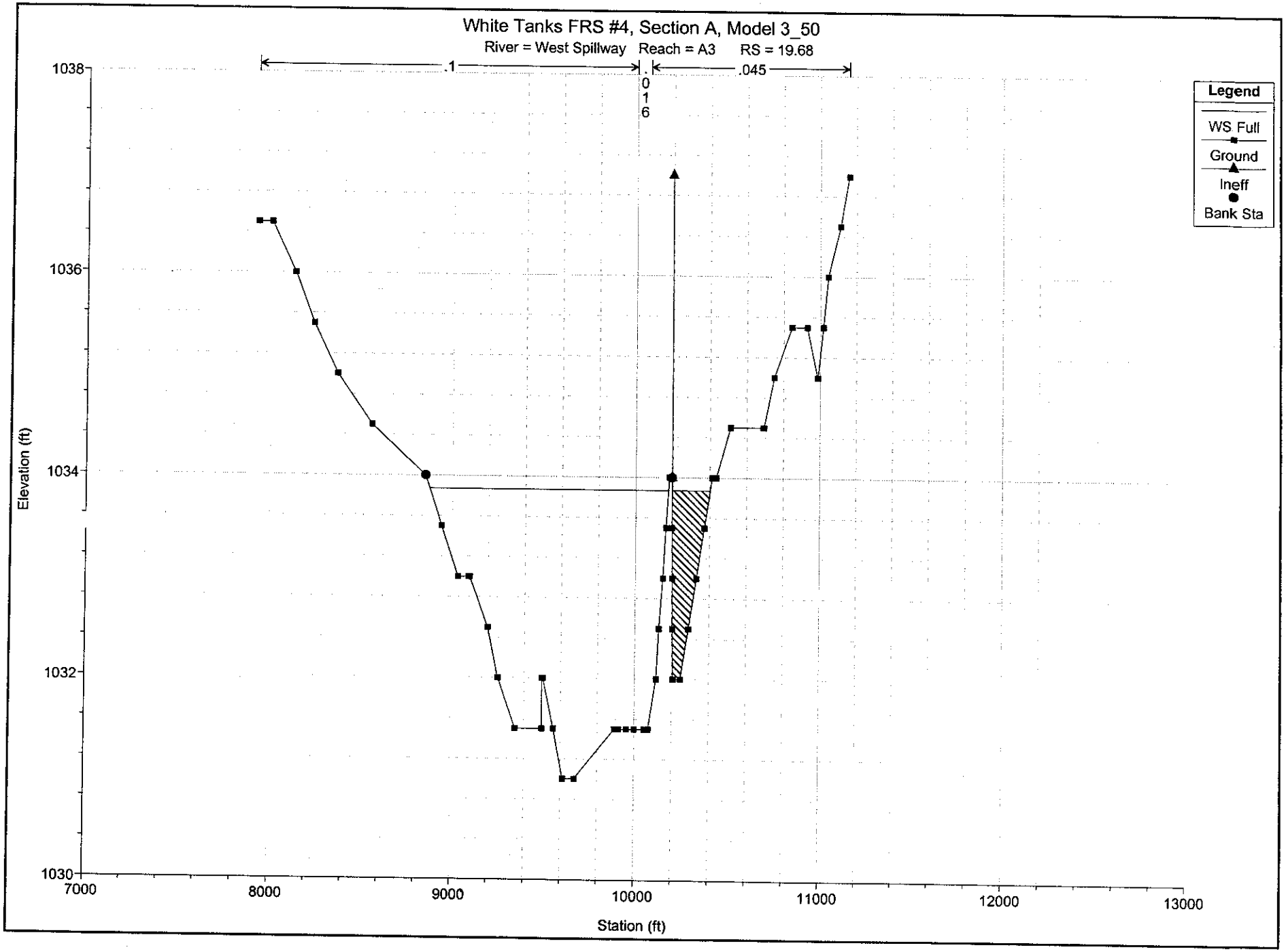
HEC-RAS Plan: WT4A3_50 River: West Spillway Reach: A3

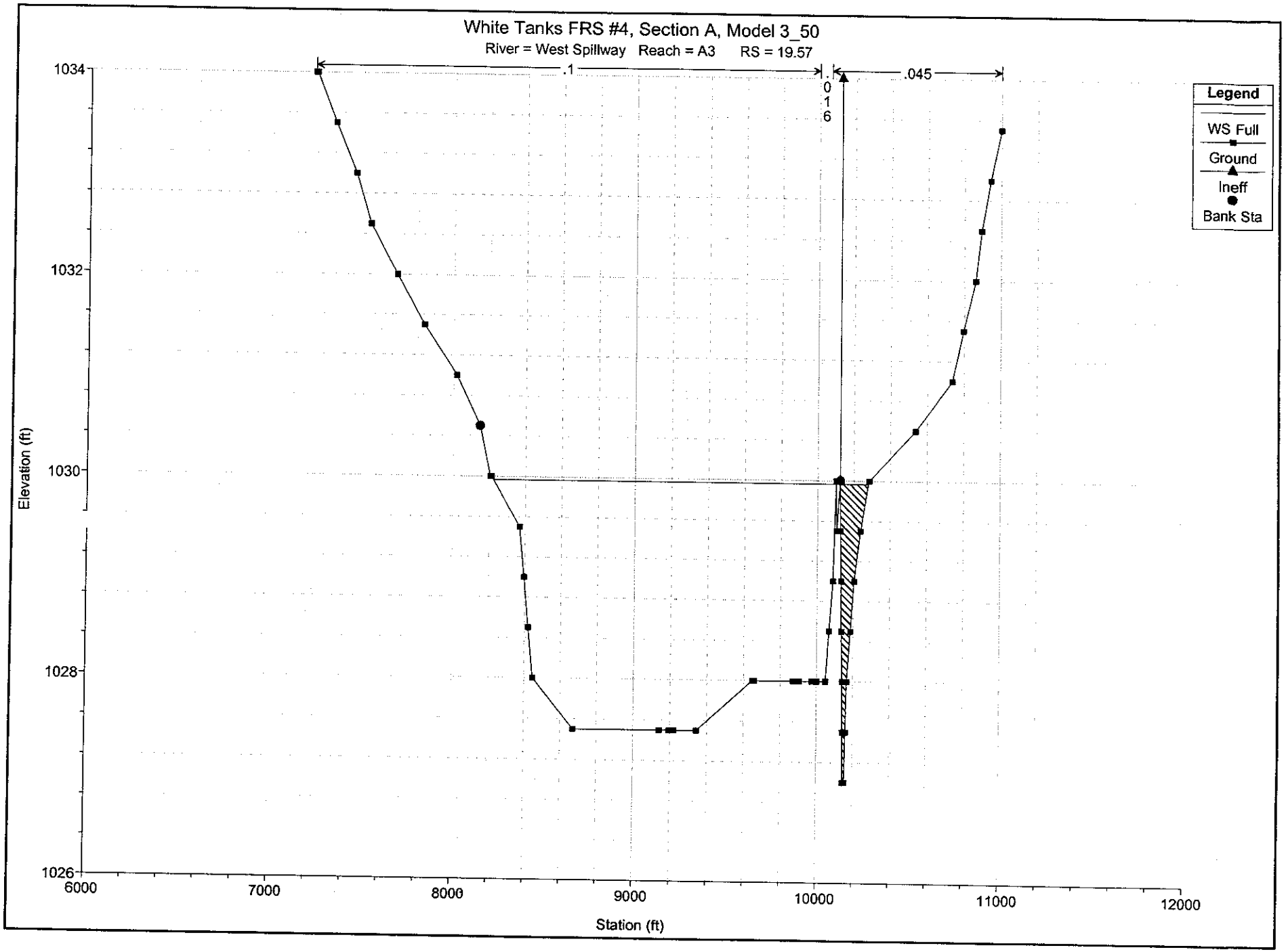
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
A3	18.87	5500.00	1002.76	1003.65	1003.65	1003.93	0.037364	4.21	1307.18	6512.34	1.01
A3	19.06	5500.00	1005.50	1008.84	1007.06	1008.86	0.001822	0.91	6071.07	6545.87	0.12
A3	19.21	8000.00	1011.50	1013.74	1013.32	1013.87	0.041981	2.80	2853.91	3268.02	0.53
A3	19.33	8000.00	1018.00	1020.50	1019.34	1020.54	0.004570	1.66	4829.14	3195.02	0.23
A3	19.44	8000.00	1022.00	1024.50	1023.87	1024.61	0.011931	2.63	3046.10	2426.15	0.41
A3	19.57	8000.00	1027.50	1029.97	1028.62	1030.04	0.005608	2.10	3815.00	2055.68	0.26
A3	19.68	8000.00	1031.00	1033.87	1032.84	1034.03	0.008994	3.23	2473.72	1508.15	0.41
A3	19.84	8000.00	1036.50	1040.26	1039.24	1040.46	0.006105	3.59	2227.69	1614.36	0.51
A3	20.04	9000.00	1046.40	1049.78	1049.78	1050.75	0.007753	7.91	1138.02	966.34	1.00
A3	20.09	9000.00	1048.20	1052.86	1052.84	1054.07	0.004268	8.84	1018.23	414.15	0.99

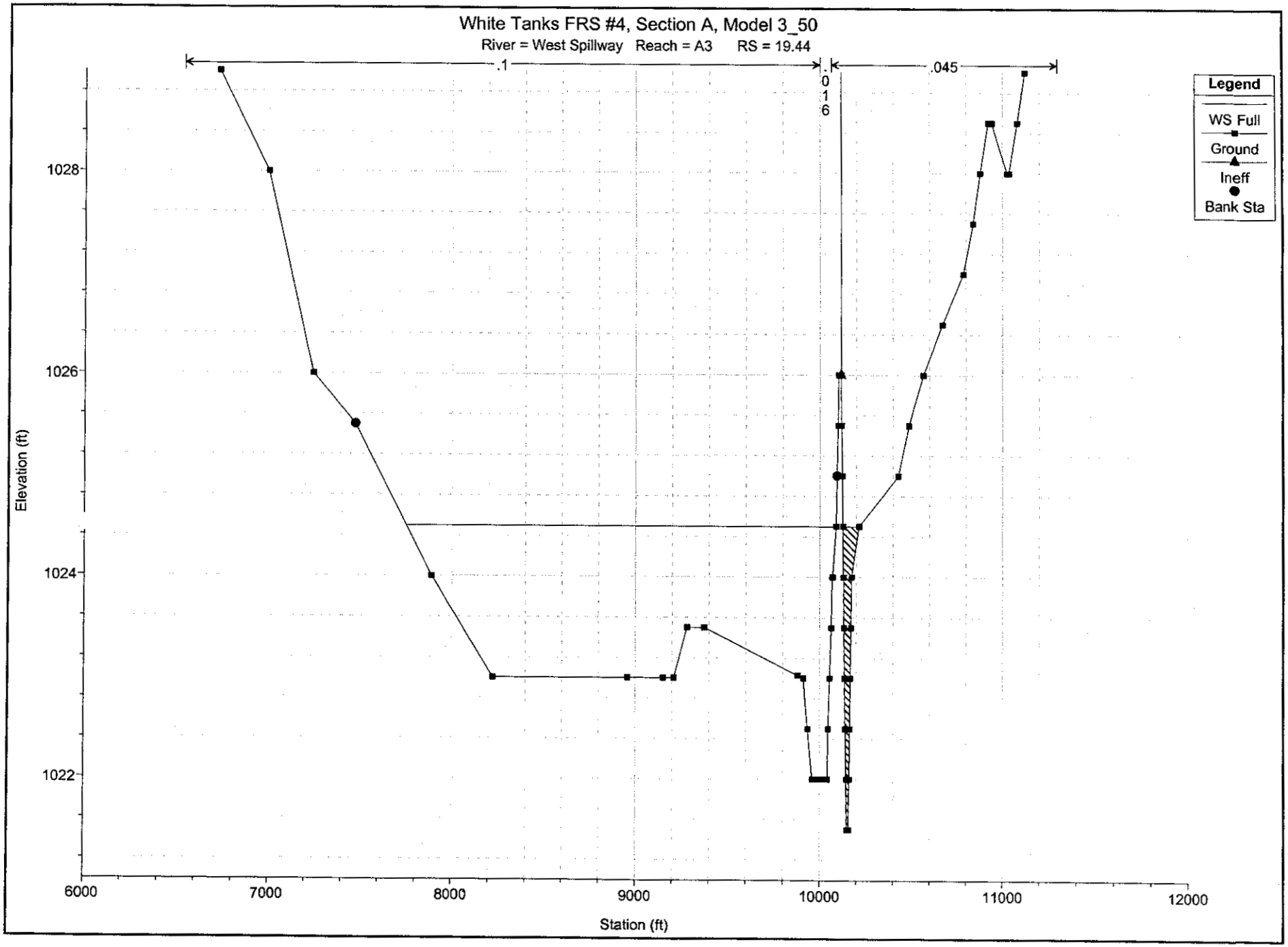

White Tanks FRS #4, Section A, Model 3_50
River = West Spillway Reach = A3 RS = 20.09
.045
.02
.045
Legend
WS Full
Ground
Bank Sta
Elevation (ft)
1056
1054
1052
1050
1048
7000
8000
9000
10000
11000
12000
13000
Station (ft)

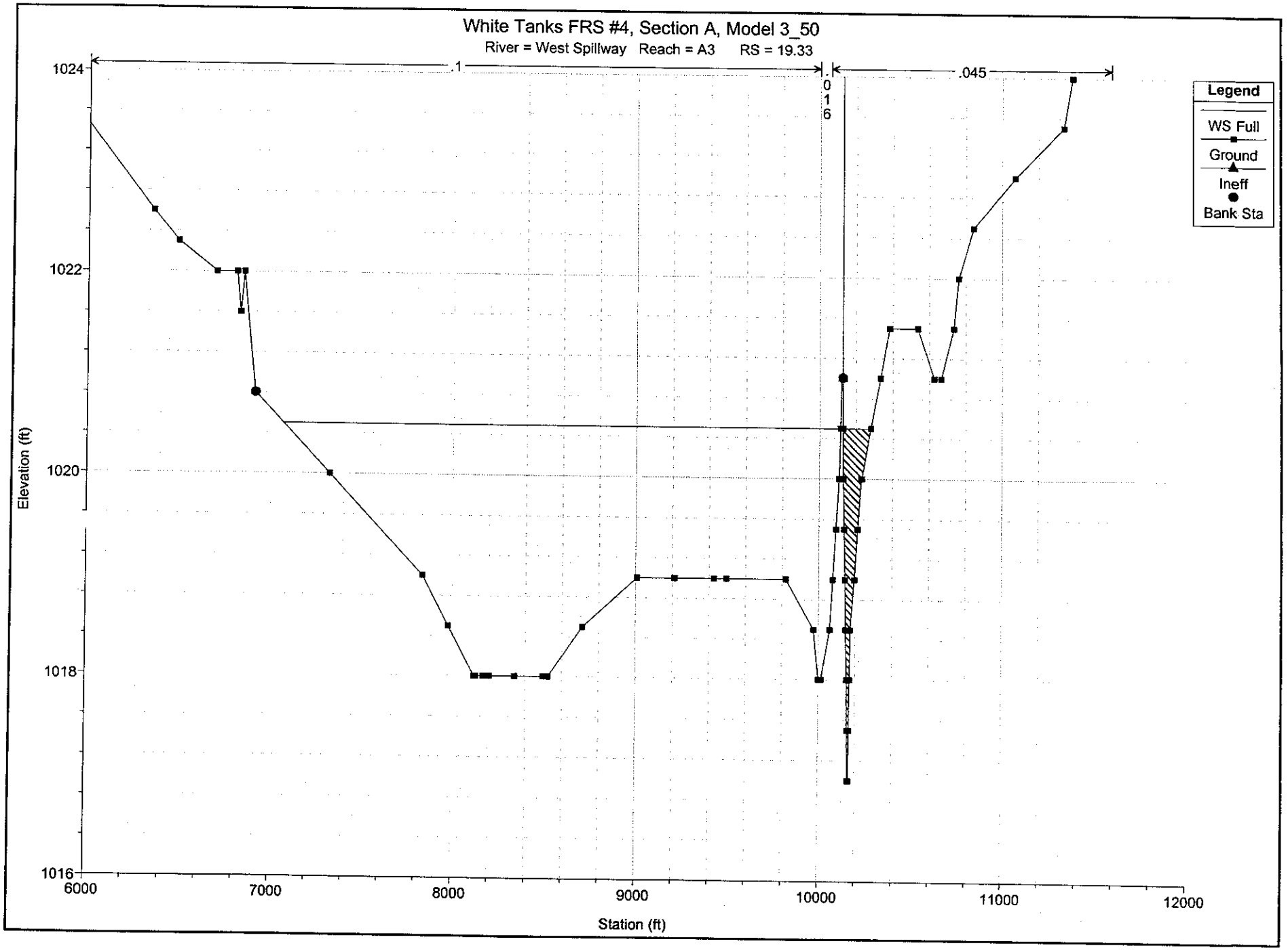

White Tanks FRS #4, Section A, Model 3_50
River = West Spillway Reach = A3 RS = 20.04
.045
.02
.045
Legend
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
1052
1050
1048
1046
1044
7000
8000
9000
10000
11000
12000
13000
Station (ft)

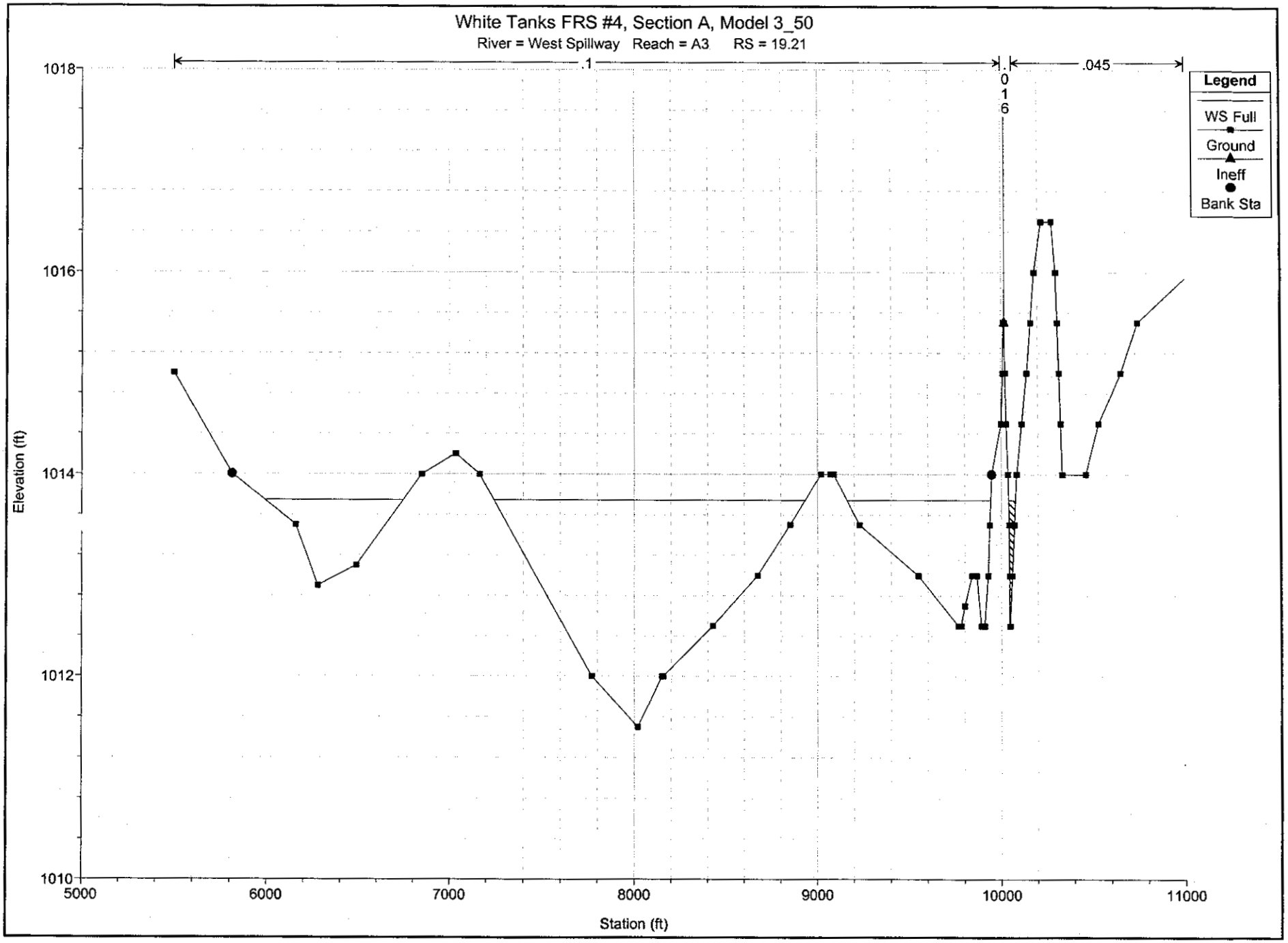

White Tanks FRS #4, Section A, Model 3_50
River = West Spillway Reach = A3 RS = 19.84
.1
.016
.045
Legend
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
1044
1042
1040
1038
1036
7000
8000
9000
10000
11000
12000
13000
Station (ft)

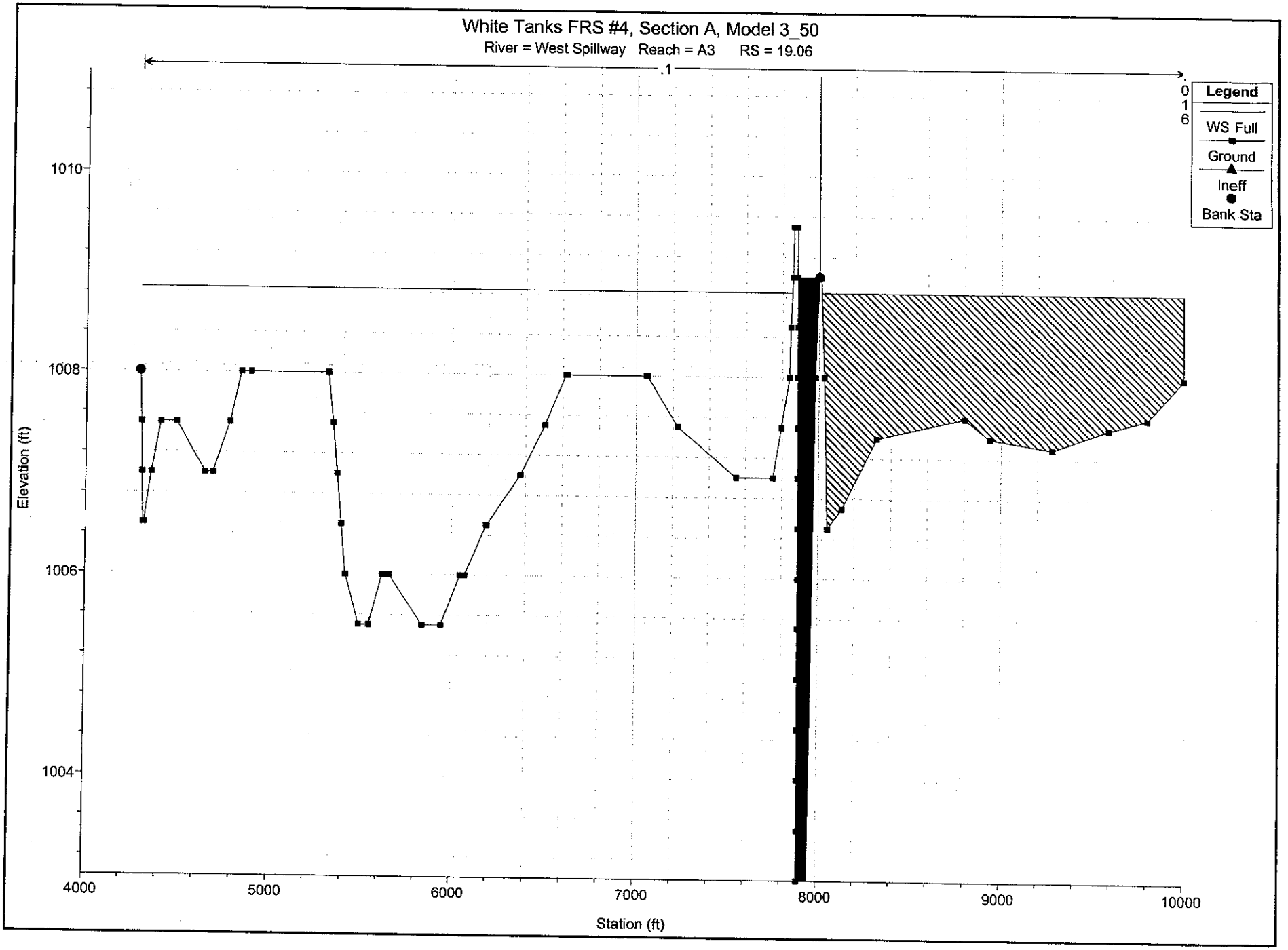

White Tanks FRS #4, Section A, Model 3_50
River = West Spillway Reach = A3 RS = 19.68
.1
.016
.045
Legend
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
1038
1036
1034
1032
1030
7000
8000
9000
10000
11000
12000
13000
Station (ft)

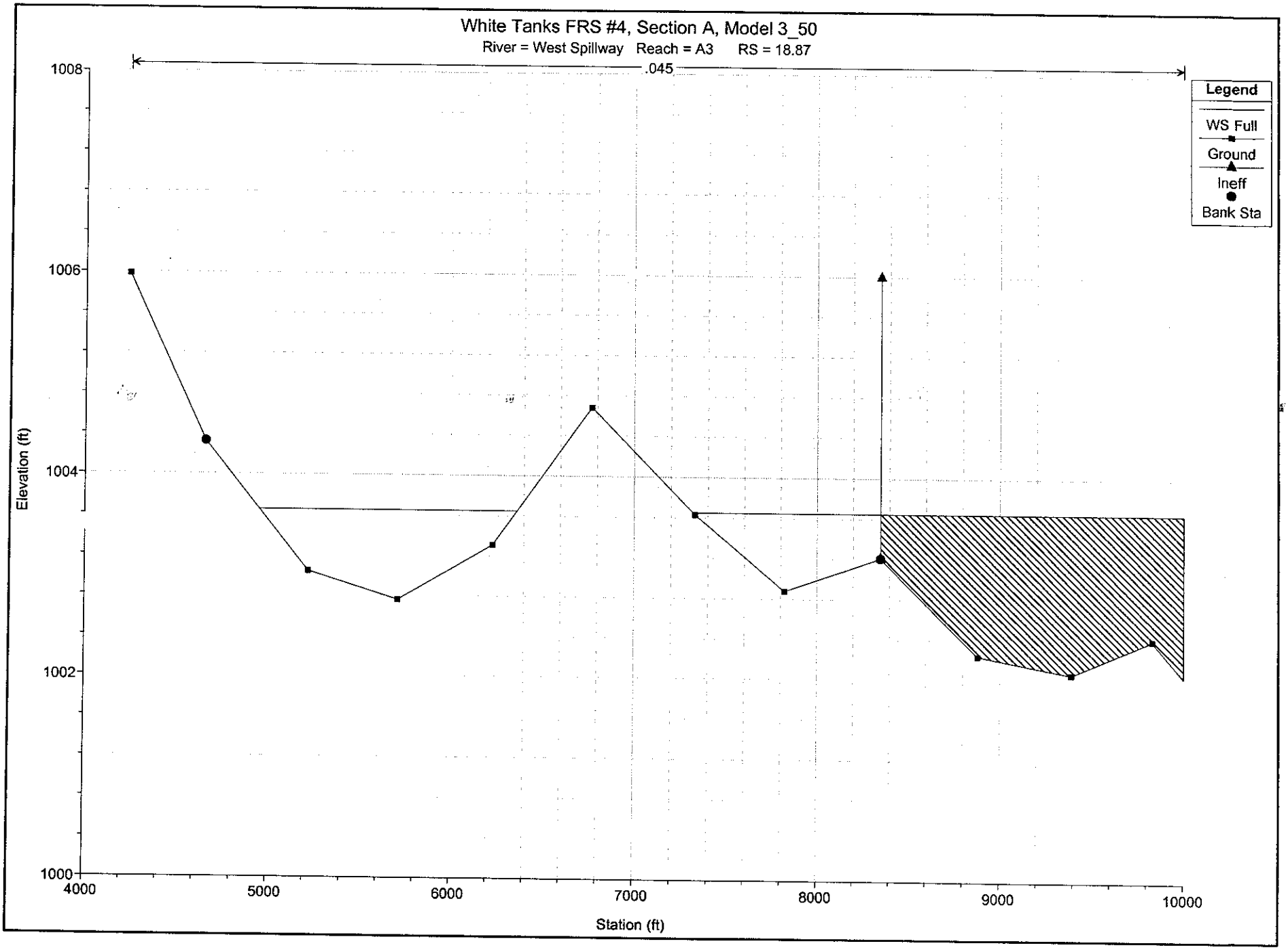

White Tanks FRS #4, Section A, Model 3_50
River = West Spillway Reach = A3 RS = 19.57
.1
.016
.045
Legend
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1032
1030
1028
1026
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS #4, Section A, Model 3_50
River = West Spillway Reach = A3 RS = 19.44
.1
.016
.045
Legend
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
1028
1026
1024
1022
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS #4, Section A, Model 3_50
River = West Spillway Reach = A3 RS = 19.33
.1
.016
.045
Legend
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
1024
1022
1020
1018
1016
6000
7000
8000
9000
10000
11000
12000
Station (ft)


White Tanks FRS #4, Section A, Model 3_50
River = West Spillway Reach = A3 RS = 19.21
.1
.016
.045
Legend
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
1018
1016
1014
1012
1010
5000
6000
7000
8000
9000
10000
11000
Station (ft)


White Tanks FRS #4, Section A, Model 3_50
River = West Spillway Reach = A3 RS = 19.06
.1
0.16
Legend
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
1010
1008
1006
1004
4000
5000
6000
7000
8000
9000
10000
Station (ft)


White Tanks FRS #4, Section A, Model 3_50
River = West Spillway Reach = A3 RS = 18.87
.045
Legend
WS Full
Ground
Ineff
Bank Sta
Elevation (ft)
1008
1006
1004
1002
1000
4000
5000
6000
7000
8000
9000
10000
Station (ft)

```
                    HEC-RAS September 1998 Version 2.2
                      U.S. Army Corp of Engineers
                     Hydrologic Engineering Center
                       609 Second Street, Suite D
                      Davis, California 95616-4687
                             (916) 756-1104

X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: White Tanks FRS #4, Section A, Model 4_50
Project File : WT4A4_50.prj
Run Date and Time: 06/26/2000 10:17:10 AM

Project in English units

Project Description:
Study Name: White Tanks FRS #4 Spillway Delineation Study
Contract No.: FCD 98-32
Purpose of Study: Delineation of the inundation limits of the 1/3, 2/3, and full spillway discharges for the eastern spillway of the White Tanks Flood Retarding Structure #4.

Model Name: WT4A4_50
Model Description: Set up to model the portion of east spillway flow which weirs over the Roosevelt Canal to the east of Jackrabbit Trail. Northern boundary is the East Spillway, southern boundary is the Roosevelt Irrigation District Canal.
Flow Profiles: Profile #1, Full spillway discharge for the 1/2 PMF
Sections 20.00 to 19.15, Q=9000 cfs
Sections 19.02 and 18.87, Q=7500 cfs.

HEC-RAS Version: Version 2.2, September 1998 with RASPATCH

Consultants: Hoskin Engineering Consultants, Inc.
323 W. Roosevelt Street, Suite 200
Phoenix, AZ 85003
(602)252-8384 Phone
(602)252-8385 Fax
HEC 990006

DEI Professional Services, LLC
6225 N. 24th St., Ste. 200
Phoenix, AZ 85016
(602)954-0038 Phone
(602)944-8605 Fax

PLAN DATA

Plan Title: Section A, East of Jackrabbit
Plan File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final models\50-50\WT4A4_50.p02

Geometry Title: Section A, East of Jackrabbit

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          Geometry File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White
Tanks\hecras\i10-rsvlt\final models\50-50\WT4A4_50.g02

          Flow Title    : Section A, East of Jackrabbit
          Flow File     : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White
Tanks\hecras\i10-rsvlt\final models\50-50\WT4A4_50.f01

Plan Summary Information:
Number of:  Cross Sections =    8    Mulitple Openings =    0
            Culverts       =    0    Inline Weirs      =    0
            Bridges        =    0

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

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


FLOW DATA

Flow Title: Section A, East of Jackrabbit
Flow File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-rsvlt\final
models\50-50\WT4A4_50.f01

Flow Data (cfs)

  River          Reach          RS                  Full
  East Spillway  A4             20.00               9000
  East Spillway  A4             19.02               7500


Boundary Conditions

  River          Reach          Profile                      Upstream                Downstream

  East Spillway  A4             Full                                                   Critical


GEOMETRY DATA

Geometry Title: Section A, East of Jackrabbit
Geometry File : g:\Filedir\99\990006 - Spillway Inundation Studies\01-White Tanks\hecras\i10-
rsvlt\final models\50-50\WT4A4_50.g02

CROSS SECTION          RIVER: East Spillway
REACH: A4                 RS: 20.00

INPUT
Description: White Tanks FRS #4 Eastern Spillway
Northern Boundary of HEC-RAS
            Model
Full 50/50 Q=9000 cfs
Station Elevation Data    num=      53
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
    8796     1060 8853.18  1059.5 8912.47     1059 8972.95  1058.5 9033.42     1058
 9033.47     1058 9078.32  1057.5 9127.18     1057 9169.03  1056.5 9209.87     1056
 9210.87     1056 9284.28  1055.5 9366.39     1055 9440.19  1054.5 9508.73     1054
```

9548.7	1053.5	9589.92	1053	9635.69	1052.5	9680.18	1052	9681.67	1052
9683.8	1051.5	9685.94	1051	9688.07	1050.5	9693.34	1050	9702.32	1050.5
9712.89	1051	9724.94	1051.5	9736.99	1052	9747.98	1052.5	9758.59	1053
9769.2	1053.5	9779.81	1054	9781.02	1054	9790.07	1054.5	9799.5	1054.5
9807.8	1054	9815.74	1054	9822.5	1053.5	9829.25	1053	9836.01	1052.5
9841.82	1052	9842.63	1052	9852.27	1051.5	9861.91	1051	9871.55	1050.5
9876.3	1050.3	9886.16	1050.1	9909	1050	9946	1049.6	10000	1049
10026	1049.5	10056	1050	10102	1053				

Manning's n Values num= 1

Sta	n Val
8796	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9799.5	10102	1200	1000	800	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
8796	9790.5	1054.5

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1055.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.16	Wt. n-Val.		0.045	
W.S. Elev (ft)	1054.05	Reach Len. (ft)	1200.00	1000.00	800.00
Crit W.S. (ft)	1053.51	Flow Area (sq ft)		1042.48	
E.G. Slope (ft/ft)	0.012780	Area (sq ft)	402.69	1042.48	
Q Total (cfs)	9000.00	Flow (cfs)		9000.00	
Top Width (ft)	575.80	Top Width (ft)	280.70	295.10	
Vel Total (ft/s)	8.63	Avg. Vel. (ft/s)		8.63	
Max Chl Dpth (ft)	5.05	Hydr. Depth (ft)		3.53	
Conv. Total (cfs)	79613.1	Conv. (cfs)		79613.1	
Length Wtd. (ft)	1000.00	Wetted Per. (ft)		296.39	
Min Ch El (ft)	1049.00	Shear (lb/sq ft)		2.81	
Alpha	1.00	Stream Power (lb/ft s)		24.23	
Frctn Loss (ft)	11.46	Cum Volume (acre-ft)	8.41	519.17	2.62
C & E Loss (ft)	0.26	Cum SA (acres)	13.54	406.67	2.50

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9799.50	9819.67	0.89	1.24	12.78	0.01	0.10	0.72
9819.67	9839.83	80.29	22.09	20.22	0.89	1.10	3.63
9839.83	9860.00	304.07	49.08	20.20	3.38	2.43	6.20
9860.00	9880.17	544.65	69.62	20.19	6.05	3.45	7.82
9880.17	9900.33	684.47	79.82	20.17	7.61	3.96	8.58
9900.33	9920.50	720.50	82.31	20.17	8.01	4.08	8.75
9920.50	9940.67	782.14	86.47	20.17	8.69	4.29	9.05
9940.67	9960.83	850.00	90.89	20.17	9.44	4.51	9.35
9960.83	9981.00	921.57	95.41	20.17	10.24	4.73	9.66
9981.00	10001.17	995.11	99.91	20.17	11.06	4.95	9.96
10001.17	10021.33	956.36	97.56	20.17	10.63	4.84	9.80
10021.33	10041.50	836.87	90.05	20.17	9.30	4.47	9.29
10041.50	10061.67	722.44	82.47	20.18	8.03	4.09	8.76
10061.67	10081.83	437.18	61.04	20.21	4.86	3.03	7.16
10081.83	RB 10102.00	163.44	34.52	21.26	1.82	1.71	4.73

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION          RIVER: East Spillway
REACH: A4                 RS: 19.81

INPUT
Description: Full 50/50 Q=9000 cfs
Station Elevation Data    num=      74
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 8415.86    1046 8421.46    1046 8482.54  1045.5 8594.62    1045  8602.7    1045
 8605.64    1045 8832.38  1044.5 9044.48    1044 9048.28    1044 9062.71    1044
 9186.32    1044 9186.51    1044 9186.74  1043.5 9343.33    1043 9419.83  1042.5
  9522.4    1042 9525.11    1042 9620.66  1041.5 9729.35    1041 9834.89  1040.5
 9885.86  1040.5 9899.91  1040.5 9912.15  1040.5 9951.63  1040.5   10000  1040.5
10065.861040.91210080.01    104110115.861041.43710121.02  1041.510202.72    1042
10300.02    104210512.04    104210513.75    104210553.83    104210560.86    1042
10593.95    104210594.28    104210596.19  1042.510598.11    104310600.04  1043.5
10601.97    104410602.15    104410604.32  1044.510606.66    104510609.01  1045.5
10611.24    104610611.28    104610612.53  1046.510613.89    104710615.24  1047.5
 10616.6    104810617.95  1048.510619.31    104910620.59  1049.510623.18    1050
10662.12    105010665.45  1049.510668.07    1049 10669.2  1048.510670.33    1048
10671.45  1047.510672.58    104710674.09  1046.510676.37    104610678.65  1045.5
10680.93    1045 10683.2  1044.510685.48    104410695.26  1043.510705.15    1043
10715.16  1042.510725.17    104210806.93    104210819.13  1042.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 8415.86    .075 9951.63    .016   10000    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9186.7410600.04              900    1070    1050             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
10623.1810819.13    1050

CROSS SECTION OUTPUT    Profile #Full

  E.G. Elev (ft)          1043.49   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.30   Wt. n-Val.                          0.047
  W.S. Elev (ft)          1043.19   Reach Len. (ft)           900.00   1070.00    1050.00
  Crit W.S. (ft)          1042.70   Flow Area (sq ft)                  2055.86
  E.G. Slope (ft/ft)     0.010353   Area (sq ft)                       2055.86     123.44
  Q Total (cfs)           9000.00   Flow (cfs)                         9000.00
  Top Width (ft)          1434.22   Top Width (ft)                     1316.39     117.82
  Vel Total (ft/s)           4.38   Avg. Vel. (ft/s)                      4.38
  Max Chl Dpth (ft)          2.69   Hydr. Depth (ft)                      1.56
  Conv. Total (cfs)       88454.1   Conv. (cfs)                        88454.1
  Length Wtd. (ft)        1070.00   Wetted Per. (ft)                   1316.56
  Min Ch El (ft)          1040.50   Shear (lb/sq ft)                      1.01
  Alpha                      1.00   Stream Power (lb/ft s)                4.42
  Frctn Loss (ft)            8.53   Cum Volume (acre-ft)         2.86   483.60       1.49
  C & E Loss (ft)            0.05   Cum SA (acres)               9.67   388.18       1.42

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT    Profile #Full

  Left Sta     Right Sta       Flow       Area       W.P.    % Conv.   Hydr D.   Velocity
  (ft)         (ft)            (cfs)    (sq ft)      (ft)                (ft)     (ft/s)
  9280.96      9375.18          8.73      15.42     92.71      0.10      0.17       0.57
  9375.18      9469.40         94.72      64.89     94.22      1.05      0.69       1.46
  9469.40      9563.62        226.75     109.57     94.22      2.52      1.16       2.07
  9563.62      9657.84        401.23     154.31     94.22      4.46      1.64       2.60
```

9657.84	9752.06	598.81	196.21	94.22	6.65	2.08	3.05
9752.06	9846.28	823.85	237.61	94.22	9.15	2.52	3.47
9846.28	9940.50	919.91	253.86	94.22	10.22	2.69	3.62
9940.50	10034.72	2849.92	250.09	94.22	31.67	2.65	11.40
10034.72	10128.94	1019.58	198.75	94.22	11.33	2.11	5.13
10128.94	10223.16	497.32	129.19	94.22	5.53	1.37	3.85
10223.16	10317.38	395.11	112.53	94.22	4.39	1.19	3.51
10317.38	10411.60	395.11	112.53	94.22	4.39	1.19	3.51
10411.60	10505.82	395.12	112.53	94.22	4.39	1.19	3.51
10505.82	RB 10600.04	373.85	108.38	93.19	4.15	1.16	3.45

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION RIVER: East Spillway
REACH: A4 RS: 19.61

INPUT
Description: Full 50/50 Q=9000 cfs
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7530	1037.5	7908.15	1037	7974.49	1036.5	8369.7	1036	8369.86	1036
8477.95	1035.5	8664.47	1035	8781.31	1034.5	8843.79	1034	8843.88	1034
8846.34	1034	8847.48	1034	8985.29	1034	8986.91	1034	9052.68	1033.5
9224.98	1033	9301.15	1032.5	9310.59	1032.5	9367.4	1032.5	9591.24	1032
9705.27	1032	9779.91	1032	9800	1032	9880.2	1032	9958.84	1032
10000	1032.41	210008.79	1032.5	10058.74	1033	100701	1033.11	310108.62	1033.5
10171.55	1034	10173.34	1034	10180.91	1034	10337.14	1033.5	10364.03	1033.5
10396.63	1034	10510.1	1034.5	10560.22	1035	10591.76	1035.5	10623.27	1036
10623.3	1036	10642.23	1036.5	10661.15	1037	10680.08	1037.5	10692.89	1037.5
10696.02	1037	10698.97	1036.5	10700.43	1036.5	10701.52	1037	10702.61	1037.5
10703.69	1038	10704.78	1038.5	10706.78	1039	10711.29	1039.5	10712.78	1040
10715.8	1040	10716.64	1040.5	10717.48	1041	10718.33	1041.5	10719.17	1042
10720.01	1042.5	10720.85	1043	10721.69	1043.5	10722.53	1044	10723.37	1044.5
10724.22	1045	10725.06	1045.5	10725.9	1046	10726.74	1046.5	10727.58	1047
10728.42	1047.5	10729.5	1048	10730.82	1048.5	10732.14	1049	10733.46	1049.5
10734.4	1050	10783.19	1050						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
7530	.075	9958.84	.016	10008.79	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8664.47	10560.22	800	730	750	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
10171.55	10783.19	1034

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1034.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.059	
W.S. Elev (ft)	1034.78	Reach Len. (ft)	800.00	730.00	750.00
Crit W.S. (ft)	1033.78	Flow Area (sq ft)		3048.87	
E.G. Slope (ft/ft)	0.006376	Area (sq ft)		3048.87	
Q Total (cfs)	9000.00	Flow (cfs)		9000.00	
Top Width (ft)	1822.38	Top Width (ft)		1822.38	
Vel Total (ft/s)	2.95	Avg. Vel. (ft/s)		2.95	
Max Chl Dpth (ft)	2.78	Hydr. Depth (ft)		1.67	
Conv. Total (cfs)	112710.1	Conv. (cfs)		112710.1	
Length Wtd. (ft)	730.00	Wetted Per. (ft)		1822.40	
Min Ch El (ft)	1032.00	Shear (lb/sq ft)		0.67	
Alpha	1.00	Stream Power (lb/ft s)		1.97	
Frctn Loss (ft)	6.08	Cum Volume (acre-ft)	2.86	420.91	
C & E Loss (ft)	0.01	Cum SA (acres)	9.67	349.63	

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: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8664.47	8790.85	5.26	12.22	75.04	0.06	0.16	0.43
8790.85	8917.24	98.71	87.40	126.38	1.10	0.69	1.13
8917.24	9043.62	146.67	110.84	126.39	1.63	0.88	1.32
9043.62	9170.00	333.55	181.46	126.38	3.71	1.44	1.84
9170.00	9296.39	521.77	237.35	126.39	5.80	1.88	2.20
9296.39	9422.77	735.08	291.54	126.38	8.17	2.31	2.52
9422.77	9549.15	865.97	321.66	126.38	9.62	2.55	2.69
9549.15	9675.54	994.00	349.40	126.38	11.04	2.76	2.84
9675.54	9801.92	1003.40	351.38	126.38	11.15	2.78	2.86
9801.92	9928.30	1003.39	351.38	126.38	11.15	2.78	2.86
9928.30	10054.69	2196.80	305.40	126.39	24.41	2.42	7.19
10054.69	10181.07	431.55	155.89	126.39	4.80	1.23	2.77
10181.07	10307.45	295.66	124.24	126.38	3.29	0.98	2.38
10307.45	10433.84	321.28	130.59	126.39	3.57	1.03	2.46
10433.84	RB 10560.22	46.90	38.13	104.36	0.52	0.37	1.23

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: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find 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: East Spillway
REACH: A4 RS: 19.47

INPUT
Description: Full 50/50 Q=9000 cfs
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6222.15	1031	6388.53	1031	6417.56	1030.5	6447.41	1030	6447.89	1030
6593.69	1029.5	6795.31	1029	6802.03	1028.5	6805.56	1028	6807.47	1028
6878.91	1028	6881.87	1028	6928.24	1028.5	7016.14	1029	7102.52	1029
7124.11	1029	7188.79	1029.5	7252.94	1030	7253.42	1030	7352.7	1030
7362.55	1030	7424.94	1029.5	7449.59	1029.5	7464.59	1029.5	7767.39	1029
7852.82	1028.5	8008.81	1028.5	8072.41	1028.5	8132.41	1028.5	8186.13	1029
8270.76	1029	8358.58	1028.5	8428.72	1028	8429.77	1028	8464.15	1027.5
8510.99	1027.5	8596.88	1027.5	8654.48	1027	8688.47	1026.5	8732.66	1026.5
8764.87	1026.5	8768.47	1026	8772.51	1026	8788.07	1026	8789.21	1026
8796.14	1026.5	8806.74	1026.5	8810.22	1026	8813.71	1026	8814.98	1026
8835.34	1026	8864.01	1026	8905.34	1026.5	8946.67	1027	8949.42	1027
8960.86	1026.5	8994.12	1026	8994.14	1026	9001.5	1026	9025.48	1026
9027.36	1026	9075.61	1026	9076.58	1026	9076.69	1026	9078.12	1026
9364.41	1026	9403.47	1026	9487.49	1026.5	9680	1026.9	9742.15	1026.5
9767.19	1026.5	9800	1026.7	9933.42	1027	9940.03	1027.5	9943.87	1027.5
9953.43	1027	9960.42	1026.5	9962.15	1026.5	10000	1026.5	10022.15	1026.841
10032.52	1027	10178.54	1027.5	10493.15	1028	10493.33	1028	10665.7	1028.5
10867.14	1029	10997.14	1029.5	11109.98	1030				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
6222.15	.075	8814.98	.1	9960.42	.016	10000	.1

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

```
      8270.7610867.14              860     920     910             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
 6222.15 8270.76    1029
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 8654.48    9680  1026.9
```

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1028.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.082	
W.S. Elev (ft)	1028.72	Reach Len. (ft)	860.00	920.00	910.00
Crit W.S. (ft)	1027.92	Flow Area (sq ft)		3483.13	
E.G. Slope (ft/ft)	0.011416	Area (sq ft)	150.15	3483.13	
Q Total (cfs)	9000.00	Flow (cfs)		9000.00	
Top Width (ft)	2940.85	Top Width (ft)	507.68	2433.18	
Vel Total (ft/s)	2.58	Avg. Vel. (ft/s)		2.58	
Max Chl Dpth (ft)	2.22	Hydr. Depth (ft)		1.43	
Conv. Total (cfs)	84233.6	Conv. (cfs)		84233.6	
Length Wtd. (ft)	920.00	Wetted Per. (ft)		2433.25	
Min Ch El (ft)	1026.50	Shear (lb/sq ft)		1.02	
Alpha	1.00	Stream Power (lb/ft s)		2.64	
Frctn Loss (ft)	7.57	Cum Volume (acre-ft)	1.48	366.17	
C & E Loss (ft)	0.02	Cum SA (acres)	5.01	313.97	

Warning: Divided flow computed for this cross-section.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 8270.76	8443.85	54.55	49.29	123.55	0.61	0.40	1.11
8443.85	8616.94	486.10	209.56	173.09	5.40	1.21	2.32
8616.94	8790.04	905.90	304.45	173.09	10.07	1.76	2.98
8790.04	8963.13	749.24	313.86	173.09	8.32	1.81	2.39
8963.13	9136.22	717.81	314.66	173.09	7.98	1.82	2.28
9136.22	9309.31	717.81	314.66	173.09	7.98	1.82	2.28
9309.31	9482.40	717.81	314.66	173.09	7.98	1.82	2.28
9482.40	9655.50	717.82	314.66	173.09	7.98	1.82	2.28
9655.50	9828.59	864.30	351.75	173.09	9.60	2.03	2.46
9828.59	10001.68	1966.23	326.10	173.14	21.85	1.88	6.03
10001.68	10174.77	556.23	270.02	173.10	6.18	1.56	2.06
10174.77	10347.86	304.38	188.05	173.09	3.38	1.09	1.62
10347.86	10520.96	185.99	139.93	173.09	2.07	0.81	1.33
10520.96	10694.05	54.65	67.11	173.09	0.61	0.39	0.81
10694.05	RB 10867.14	1.18	4.39	59.44	0.01	0.07	0.27

Warning: Divided flow computed for this cross-section.
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.

CROSS SECTION RIVER: East Spillway
REACH: A4 RS: 19.30

INPUT
Description: Full 50/50 Q=9000 cfs
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5440	1021.5	5581.05	1021.5	5986.79	1021.5	6118.77	1021.5	6197.42	1021.5
6219.23	1021.5	6236.56	1021.5	6399.89	1021	6694.22	1021	6721.27	1021
6775.75	1020.5	6829.64	1020.5	6836.51	1021	6853.93	1021	6875.71	1021
7036.85	1021	7118.87	1020.5	7177.06	1020	7179.54	1020	7494.26	1019.5
8199.47	1019	8518.27	1019	8587.17	1019	8592.2	1019	8660.62	1019.5
9041.97	1020	9042.45	1020	9198.03	1020.5	9302.92	1020.5	9351.45	1020.5

```
 9359.31  1020.5 9680.84    1020 9683.02    1020    97801019.621 9810.98  1019.5
   10000  1019.510001.98  1019.510004.98  1019.510035.37  1019.5   10060  1019.5
10290.06  1019.5 10571.1    102010574.51    102010682.18  1020.510840.14    1021
10953.19  1021.5 11035.6    102211138.78  1022.511231.94    1023

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
    5440    .045 6836.51      .110001.98    .01610035.37      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6236.5610953.19              730     750     830              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
    5440 7036.85    1021

CROSS SECTION OUTPUT    Profile #Full

  E.G. Elev (ft)            1021.23   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.04   Wt. n-Val.                            0.094
  W.S. Elev (ft)            1021.20   Reach Len. (ft)            730.00     750.00     830.00
  Crit W.S. (ft)            1020.16   Flow Area (sq ft)                    5793.53
  E.G. Slope (ft/ft)       0.006277   Area (sq ft)                         5793.53
  Q Total (cfs)             9000.00   Flow (cfs)                           9000.00
  Top Width (ft)            4548.55   Top Width (ft)                       4548.55
  Vel Total (ft/s)             1.55   Avg. Vel. (ft/s)                        1.55
  Max Chl Dpth (ft)            2.20   Hydr. Depth (ft)                        1.27
  Conv. Total (cfs)        113597.5   Conv. (cfs)                         113597.5
  Length Wtd. (ft)           750.00   Wetted Per. (ft)                     4548.58
  Min Ch El (ft)            1019.00   Shear (lb/sq ft)                        0.50
  Alpha                        1.00   Stream Power (lb/ft s)                  0.78
  Frctn Loss (ft)              6.90   Cum Volume (acre-ft)                  268.21
  C & E Loss (ft)              0.00   Cum SA (acres)                        240.24

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.

FLOW DISTRIBUTION OUTPUT    Profile #Full

  Left Sta      Right Sta        Flow       Area       W.P.    % Conv.   Hydr D.   Velocity
  (ft)          (ft)             (cfs)    (sq ft)      (ft)                (ft)     (ft/s)
  LB 6236.56    6551.00          26.24      35.88    215.11      0.29      0.17      0.73
  6551.00       6865.44         118.46     103.89    314.46      1.32      0.33      1.14
  6865.44       7179.89          76.94     128.58    314.45      0.85      0.41      0.60
  7179.89       7494.33         631.67     454.76    314.44      7.02      1.45      1.39
  7494.33       7808.77         915.92     568.33    314.44     10.18      1.81      1.61
  7808.77       8123.21        1111.85     638.43    314.44     12.35      2.03      1.74
  8123.21       8437.65        1260.72     688.43    314.44     14.01      2.19      1.83
  8437.65       8752.10        1065.02     622.16    314.44     11.83      1.98      1.71
  8752.10       9066.54         575.85     430.20    314.44      6.40      1.37      1.34
  9066.54       9380.98         228.36     246.98    314.44      2.54      0.79      0.92
  9380.98       9695.42         327.15     306.43    314.44      3.64      0.97      1.07
  9695.42       10009.86        866.09     507.19    314.44      9.62      1.61      1.71
  10009.86      10324.31       1171.78     532.23    314.44     13.02      1.69      2.20
  10324.31      10638.75        554.69     420.65    314.44      6.16      1.34      1.32
  10638.75      RB 10953.19      69.27     109.38    245.69      0.77      0.45      0.63

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.

CROSS SECTION          RIVER: East Spillway
REACH: A4                 RS: 19.15

INPUT
```

Description: Full 50/50 Q=9000 cfs
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5413.61	1014.5	5496.77	1015	5609.3	1015	5748.62	1014.5	5914.6	1014
5915.55	1014	6375.55	1013.5	8605.61	1013	8979.76	1013	9639.57	1013.5
9783.29	1013.5	9783.61	1013.5	9845.63	1013.5	9918.46	1013.5	9949.42	1013
9992.34	1012.5	10000	1012.5	10013.61	1012.52	10063.61	1012.622	10259.7	1013
10417.34	1013.5	10635.63	1014	10640.6	1014	10966.28	1014.5	11200.61	1015

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5413.61	.1	9949.42	.016	9992.34	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5748.62	10966.28	670	700	770	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5413.61	5609.3	1015

CROSS SECTION OUTPUT Profile #Full

E.G. Elev (ft)	1014.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.091	
W.S. Elev (ft)	1014.27	Reach Len. (ft)	670.00	700.00	770.00
Crit W.S. (ft)	1013.74	Flow Area (sq ft)		4714.84	
E.G. Slope (ft/ft)	0.014659	Area (sq ft)		4714.84	
Q Total (cfs)	9000.00	Flow (cfs)		9000.00	
Top Width (ft)	4995.66	Top Width (ft)		4995.66	
Vel Total (ft/s)	1.91	Avg. Vel. (ft/s)		1.91	
Max Chl Dpth (ft)	1.77	Hydr. Depth (ft)		0.94	
Conv. Total (cfs)	74334.7	Conv. (cfs)		74334.7	
Length Wtd. (ft)	700.00	Wetted Per. (ft)		4995.67	
Min Ch El (ft)	1012.50	Shear (lb/sq ft)		0.86	
Alpha	1.00	Stream Power (lb/ft s)		1.65	
Frctn Loss (ft)	4.03	Cum Volume (acre-ft)		177.74	
C & E Loss (ft)	0.01	Cum SA (acres)		158.07	

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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 5748.62	6096.46	60.19	80.14	272.90	0.67	0.29	0.75
6096.46	6444.31	291.41	227.51	347.84	3.24	0.65	1.28
6444.31	6792.15	432.26	288.24	347.84	4.80	0.83	1.50
6792.15	7140.00	502.15	315.36	347.84	5.58	0.91	1.59
7140.00	7487.84	576.21	342.49	347.84	6.40	0.98	1.68
7487.84	7835.68	654.28	369.63	347.84	7.27	1.06	1.77
7835.68	8183.53	736.27	396.76	347.84	8.18	1.14	1.86
8183.53	8531.37	822.05	423.88	347.84	9.13	1.22	1.94
8531.37	8879.22	883.48	442.61	347.84	9.82	1.27	2.00
8879.22	9227.06	809.75	420.07	347.84	9.00	1.21	1.93
9227.06	9574.90	547.65	332.21	347.84	6.09	0.96	1.65
9574.90	9922.75	390.14	271.04	347.84	4.33	0.78	1.44
9922.75	10270.59	1921.70	516.85	347.85	21.35	1.49	3.72
10270.59	10618.44	357.38	257.15	347.85	3.97	0.74	1.39
10618.44	RB 10966.28	15.09	30.91	200.79	0.17	0.15	0.49

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

CROSS SECTION RIVER: East Spillway
REACH: A4 RS: 19.02

INPUT
Description: Full 50/50 Q=7500 cfs
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5108.24	1008.5	5225.44	1009	5344.58	1009.5	5420	1009.8	5770.66	1009.5
6551.8	1009	6947.86	1009	7150.85	1009	7836.05	1008.5	8390.99	1008
8392.32	1008	8667.66	1008	8669.81	1008	8760.68	1008.5	8988.24	1008.65
9028.24	1008.68	9495.22	1009	9631.57	1009	9776.29	1008.5	9798.24	1008.293
9829.27	1008	10000	1008						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5108.24	.1	8988.24	.016	9028.24	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5108.24	10000	690	800	700	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5108.24	5420	1009.8	10000	10000	1010.5

CROSS SECTION OUTPUT Profile #Full

			Left OB	Channel	Right OB
E.G. Elev (ft)	1010.29	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.095	
W.S. Elev (ft)	1010.28	Reach Len. (ft)	690.00	800.00	700.00
Crit W.S. (ft)	1009.13	Flow Area (sq ft)		7133.03	
E.G. Slope (ft/ft)	0.002738	Area (sq ft)		7133.03	
Q Total (cfs)	7500.00	Flow (cfs)		7500.00	
Top Width (ft)	4891.76	Top Width (ft)		4891.76	
Vel Total (ft/s)	1.05	Avg. Vel. (ft/s)		1.05	
Max Chl Dpth (ft)	2.28	Hydr. Depth (ft)		1.46	
Conv. Total (cfs)	143319.9	Conv. (cfs)		143319.9	
Length Wtd. (ft)	800.00	Wetted Per. (ft)		4895.82	
Min Ch El (ft)	1008.00	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		0.26	
Frctn Loss (ft)	5.37	Cum Volume (acre-ft)		82.55	
C & E Loss (ft)	0.02	Cum SA (acres)		78.63	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

FLOW DISTRIBUTION OUTPUT Profile #Full

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 5108.24	5434.36	277.51	355.08	327.90	3.70	1.09	0.78
5434.36	5760.48	111.12	204.59	326.12	1.48	0.63	0.54
5760.48	6086.59	192.88	284.83	326.12	2.57	0.87	0.68
6086.59	6412.71	275.69	352.91	326.12	3.68	1.08	0.78
6412.71	6738.83	353.66	409.79	326.12	4.72	1.26	0.86
6738.83	7064.94	362.61	415.99	326.12	4.83	1.28	0.87
7064.94	7391.06	393.71	437.04	326.12	5.25	1.34	0.90
7391.06	7717.18	512.51	511.96	326.12	6.83	1.57	1.00
7717.18	8043.30	655.18	593.24	326.12	8.74	1.82	1.10
8043.30	8369.41	838.42	687.84	326.12	11.18	2.11	1.22
8369.41	8695.53	947.19	740.07	326.12	12.63	2.27	1.28
8695.53	9021.65	898.39	568.22	326.12	11.98	1.74	1.58
9021.65	9347.77	525.00	485.39	326.12	7.00	1.49	1.08
9347.77	9673.88	378.06	426.53	326.12	5.04	1.31	0.89
9673.88	RB 10000.00	778.08	659.53	328.40	10.37	2.02	1.18

```
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.

CROSS SECTION          RIVER: East Spillway
REACH: A4                 RS: 18.87

INPUT
Description: North Bank, Roosevelt Canal
Full 50/50 Q=7500 cfs
Survey Date
             12/15/99
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4700 1005.33    5230 1004.69    5750  1004.5    6290 1004.08    6830 1004.19
    7350 1004.56    7830 1004.74    8350 1003.48    8880 1003.36    9420  1004.9
    9800 1005.74    9910 1005.98   10000 1005.67

Manning's n Values        num=       1
     Sta   n Val
    4700    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          5230    9420                 0       0       0              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
    9910   10000 1005.98

CROSS SECTION OUTPUT    Profile #Full

  E.G. Elev (ft)            1004.90   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.25   Wt. n-Val.                              0.045
  W.S. Elev (ft)            1004.64   Reach Len. (ft)
  Crit W.S. (ft)            1004.64   Flow Area (sq ft)                     1856.49
  E.G. Slope (ft/ft)       0.037152   Area (sq ft)                          1856.49
  Q Total (cfs)             7500.00   Flow (cfs)                            7500.00
  Top Width (ft)            3671.09   Top Width (ft)                        3671.09
  Vel Total (ft/s)             4.04   Avg. Vel. (ft/s)                         4.04
  Max Chl Dpth (ft)            1.28   Hydr. Depth (ft)                         0.51
  Conv. Total (cfs)         38911.1   Conv. (cfs)                           38911.1
  Length Wtd. (ft)                    Wetted Per. (ft)                      3671.09
  Min Ch El (ft)            1003.36   Shear (lb/sq ft)                         1.17
  Alpha                        1.00   Stream Power (lb/ft s)                   4.74
  Frctn Loss (ft)                     Cum Volume (acre-ft)
  C & E Loss (ft)                     Cum SA (acres)

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT    Profile #Full

  Left Sta     Right Sta        Flow       Area       W.P.    % Conv.    Hydr D.   Velocity
  (ft)         (ft)             (cfs)    (sq ft)      (ft)                (ft)     (ft/s)
  LB 5230.00   5509.33          1.81       4.11     150.04       0.02       0.03       0.44
  5509.33      5788.67         32.57      29.88     279.33       0.43       0.11       1.09
  5788.67      6068.00        163.39      78.62     279.33       2.18       0.28       2.08
  6068.00      6347.33        415.76     137.69     279.33       5.54       0.49       3.02
  6347.33      6626.67        458.36     145.99     279.33       6.11       0.52       3.14
  6626.67      6906.00        371.16     128.63     279.33       4.95       0.46       2.89
  6906.00      7185.33        181.03      83.61     279.33       2.41       0.30       2.17
  7185.33      7464.67         33.35      30.30     279.33       0.44       0.11       1.10
  7464.67      7744.00          0.75       2.11     106.05       0.01       0.02       0.36
  7744.00      8023.33         44.77      28.44     153.21       0.60       0.19       1.57
  8023.33      8302.67        763.15     198.23     279.33      10.18       0.71       3.85
  8302.67      8582.00       1768.18     328.18     279.33      23.58       1.17       5.39
  8582.00      8861.33       1952.60     348.31     279.33      26.03       1.25       5.61
  8861.33      9140.67       1210.08     261.39     279.34      16.13       0.94       4.63
```

9140.67	RB 9420.00	103.02	51.00	189.13	1.37	0.27	2.02

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:East Spillway

Reach	River Sta.	n1	n2	n3	n4
A4	20.00	.045			
A4	19.81	.075	.016	.045	
A4	19.61	.075	.016	.045	
A4	19.47	.075	.1	.016	.1
A4	19.30	.045	.1	.016	.1
A4	19.15	.1	.016	.1	
A4	19.02	.1	.016	.1	
A4	18.87	.045			

SUMMARY OF REACH LENGTHS

River: East Spillway

Reach	River Sta.	Left	Channel	Right
A4	20.00	1200	1000	800
A4	19.81	900	1070	1050
A4	19.61	800	730	750
A4	19.47	860	920	910
A4	19.30	730	750	830
A4	19.15	670	700	770
A4	19.02	690	800	700
A4	18.87	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: East Spillway

Reach	River Sta.	Contr.	Expan.
A4	20.00	.1	.3
A4	19.81	.1	.3
A4	19.61	.1	.3
A4	19.47	.1	.3
A4	19.30	.1	.3
A4	19.15	.1	.3
A4	19.02	.1	.3
A4	18.87	.1	.3

WHITE TANKS
FLOOD RETARDING STRUCTURE #4
SPILLWAY DELINEATION STUDY
(FCD 98-32)

APPENDIX E: COMPUTER FILES

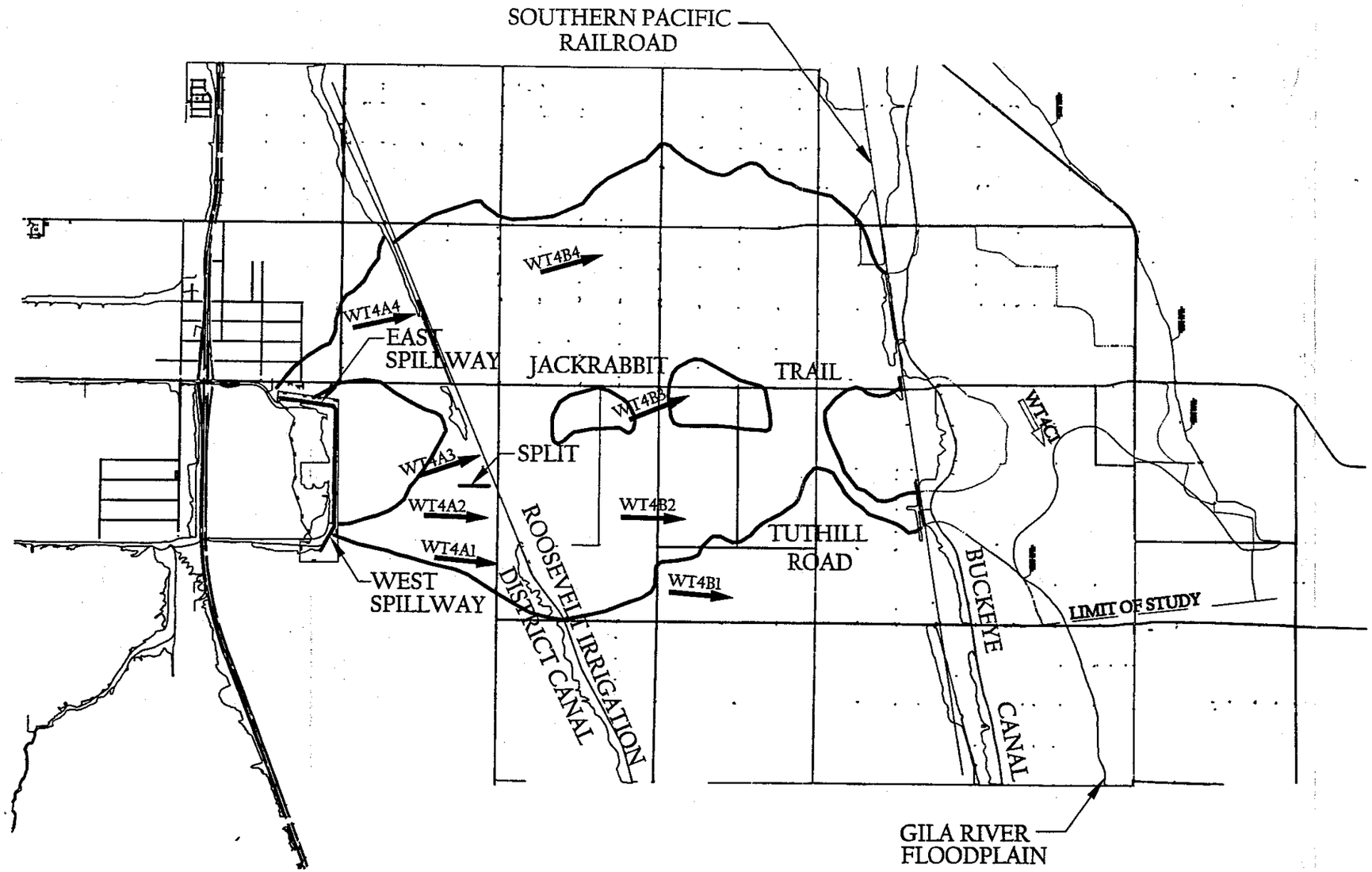
White Tanks
Flood Retarding Structure #4
Spillway Delineation Study

Appendix E: Computer Files

Table of Contents

Figure E-1: HEC-RAS Model Index Map

CD With HEC-RAS Models



FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

WHITE TANKS FRS #4
SPILLWAY
DELINEATION STUDY

F.C.D. CONTRACT NO. 98-32

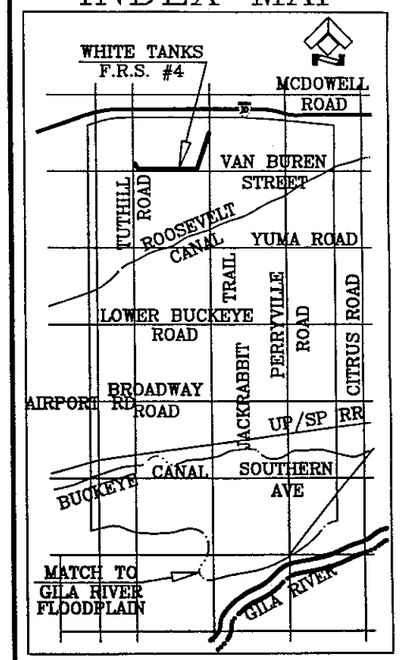
LEGEND

WT4B4 — HEC-RAS MODEL NUMBER

DAM

100-YEAR FLOODPLAIN

INDEX MAP



4000 0 4000

SCALE: 1"=4000'

Hoskin Engineering Consultants, Inc.

HEC-RAS MODEL
INDEX MAP
FIGURE E-1