Floodplain Development Permit

Doddridge County, WV Floodplain Management

This permit gives approval for the development/ project listed that impacts the FEMA-designated floodplain and/or floodway of Doddridge County, WV, pursuant to the rules and regulations established by all applicable Federal, State and local laws and ordinances, including the Doddridge County Floodplain Ordinance. This permit must be posted at the site of work as to be clearly visible and must remain posted during entirety of development.

Permit #: 18-502

Date Approved: April 6, 2018 **Expires: April 6, 2019**

Issued to: Antero Midstream, LLC **POC: Rachel McKinney**

Company Address: 535 White Oaks Blvd. Bridgeport, WV 26330

Project Address: Cabin Run Rd

Firm: 54017C0200C **Lat/Long: 39.239846N,-80.890385W**

Purpose of development: Mackay Bridge Replacement

Issued by: George C. Eidel, Doddridge County FPM (*or designee*)

Date: April 6, 2018

For additional information regarding this permit, please contact Doddridge County Floodplain Manager at 304.873.1343, or via email at doddridgecountyfpm@gmail.com
105Court Street Suite3; West Union, WV 26456

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

William P. & Sharon D. Britton
34 Britton Lane
West Union, WV 26456

9590 9402 2228 6193 5135 69

2. Article Number *(Transfer from service label)*

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

William P Britton

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

Jack D. Mackay & Anita G. Peale
1791 Cabin Run Road
West Union, WV 26456

9590 9402 2228 6193 5135 52

2. Article Number *(Transfer from service label)*

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Jack D Mackay ☐ Agent ☒ Addressee

B. Received by *(Printed Name)* C. Date of Delivery
JACK D. MACKAY 2/7/18

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☒ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

7017 1450 0001 5869 6251

For delivery information, visit our website at *www.usps.com*®.

OFFICIAL USE

Certified Mail Fee $ 3.35

Extra Services & Fees *(check box, add fee as appropriate)*
☒ Return Receipt (hardcopy) $ 2.75
☐ Return Receipt (electronic) $
☐ Certified Mail Restricted Delivery $
☐ Adult Signature Required $
☐ Adult Signature Restricted Delivery $

Postmark Here

USPS WEST UNION FEB - 2 2018

Postage $ .49

Total Postage and Fees $ 6.59

Sent To Jack D. Mackay & Anita G. Peale
Street and Apt. No., or PO Box No. 1791 Cabin Run Rd.
City, State, ZIP+4® West Union WV 26456 18-502

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

7017 1450 0001 5869 6237

For delivery information, visit our website at *www.usps.com*®.

GLENVILLE, WV 26351

OFFICIAL USE

Certified Mail Fee $ 3.35 $3.45

0532
04

Extra Services & Fees *(check box, add fee as appropriate)*
☒ Return Receipt (hardcopy) $ 2.75 $2.75
☐ Return Receipt (electronic) $ $0.00
☐ Certified Mail Restricted Delivery $ $0.00
☐ Adult Signature Required $ $0.00
☐ Adult Signature Restricted Delivery $ $0.00

Postmark Here

Postage $ .49 $0.50

02/03/2018

Total Postage and Fees $ 6.59 $6.70

Sent To I. L. (Ike) Morris
Street and Apt. No., or PO Box No. P.O. Box 397
City, State, ZIP+4® Glenville, WV 26351 18-502

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7017 1450 0001 5869 6244

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at www.usps.com®

WEST UNION, WV 26456
OFFICIAL USE

Certified Mail Fee $ 3.35 $3.45 $2.75	0532 04
Extra Services & Fees *(check box, add fee as appropriate)*	
X Return Receipt (hardcopy) $ 2.75 $0.00	
☐ Return Receipt (electronic) $ $0.00	Postmark Here
☐ Certified Mail Restricted Delivery $ $0.00	
☐ Adult Signature Required $ $0.00	
☐ Adult Signature Restricted Delivery $	
Postage $ .49 $0.50	02/03/2018
Total Postage and Fees $ 6.59 $6.70	

Sent To William P. & Sharon D. Britton

Street and Apt. No., or PO Box No. 34 Britton Ln.

City, State, ZIP+4® West Union, WV 26456 18-502

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

ANTERO WATER
1615 WYNKOOP STREET
DENVER, COLORADO 80202

COPY

Vendor Name	Vendor No.	Date	Check Number	Check Total
DODDRIDGE COUNTY COMMISSION	43312	Jan-22-2018	101548	$500.00

INV #	INV DATE	DESCRIPTION	AMOUNT	DISCOUNTS	NET AMOUNT
SR01222018	01/22/18	FLOODPLAIN PERMIT MACKAY BRIDGE REP	500.00	0.00	500.00
TOTAL INVOICES PAID ====>			500.00	0.00	500.00

FP# 18-502

COPY

COPY

COPY

DETACH AND RETAIN FOR TAX PURPOSES

THIS CHECK HAS A COLORED FACE ON WHITE STOCK AND AN ARTIFICIAL WATERMARK ON THE BACK.

ANTERO WATER
1615 WYNKOOP STREET
DENVER, COLORADO 80202

Wells Fargo
Denver, CO

810 - AP ACCT WELLS FARGO

Check No. 101548

11-24
412

COPY

Void After 90 Days

CHECK NUMBER	DATE	PAY EXACTLY
101548	Jan-22-2018	$500.00

PAY EXACTLY $500dols00cts
Five Hundred Dollars and Zero Cents

TO THE ORDER OF
DODDRIDGE COUNTY COMMISSION
118 E COURT ST STE 1~
WEST UNION, WV 26456

COPY

COPY

COPY

⑈101548⑈ ⑆041203824⑆ 9671451749⑈

ANTERO WATER
1615 WYNKOOP STREET
DENVER, COLORADO 80202

Vendor Name	Vendor No.	Date	Check Number	Check Total
DODDRIDGE COUNTY COMMISSION	43312	Jan-22-2018	101548	$500.00

INV #	INV DATE	DESCRIPTION	AMOUNT	DISCOUNTS	NET AMOUNT
SR01222018	01/22/18	FLOODPLAIN PERMIT MACKAY BRIDGE REP	500.00	0.00	500.00

FP# 18-502

Doddridge County, West Virginia

RECEIPT NO: 233

DATE: 2018/02/12

FROM: ANTERO WATER

AMOUNT: $ 500.00

FIVE HUNDRED DOLLARS AND 00 CENTS

FOR: #18-502 MACKAY BRIDGE

00000101548 FP-BUILDING PERMITS 020-318 TOTAL: $500.00

MICHAEL HEADLEY
SHERIFF &TREASURER

MEC
CLERK

Customer Copy

500.00	0.00	500.00

DETACH AND RETAIN FOR TAX PURPOSES

FLOODPLAIN PERMIT #18-502

Antero Resources/Mackay Bridge Replacement

TASK	COMPLETE (DATE)	NOTES
CHECK RECEIVED	2/12/18	
US ARMY CORP. ENGINEERS (USACE)		
US FISH & WILDLIFE SERVICES (USFWS)		
WV DEPT. NATURAL RESOURCES (WVDNR)		
WV DEPT. ENVIROMENTAL PROTECTION (WVDEP)		
STATE HISTORIC & PRESERVATION OFFICE (SHPO)		
OFFICE of LAND & STREAM (OLS)	4/5/18	
DATE OF COMMISSION READING	2/6/18	
DATE AVAILABLE TO BE GRANTED	2/26/18	
PERMIT GRANTED	4/6/18	
COMPLETE	4/6/18	

7017 1450 0001 5869 6237

7017 1450 0001 5869 6244

7017 1450 0001 5869 6251

Doddridge County Floodplain Permits

(Week of January 29, 2018)

Please take notice that on the **23rd** day of **January, 2018**, **Antero Resources** filed an application for a Floodplain Permit **(#18-502)** to develop land located at or about **Cabin Run Rd - Coordinates 39.239846 N, 80.890385 W**. The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours. Any interested persons who desire to comment shall present the same in writing by **January 26, 2018** (20 calendar days after the announcement at the regularly scheduled Doddridge County Commission Meeting) delivered to the Clerk of the County Court at 108 Court Street Ste. 1, West Union, WV 26456. **This project is for a bridge replacement**

Antero Resources
535 White Oaks Blvd.
Bridgeport, WV 26330
Office 304.842.4100
Fax 304.842.4102

January 15, 2018

Doddridge County Commission
Attn: George Eidel, Doddridge County Floodplain Manager
108 Court Street, Suite 1
West Union, WV 26456

Mr. Eidel:

Antero Resources Corporation would like to submit a Doddridge County Floodplain permit application for our ***Mackay Bridge Replacement***. Our project is located in Doddridge County where the replacement is located at coordinates 39.239846N, 80.890385W. Per the FIRM Map #54017C0200C, this location is **in** the floodplain.

Attached you will find the following:

- Doddridge County Floodplain Permit Application
- WV Flood Tool Map
- FIRM Map
- Floodplain Analysis
- Design Plans

If you have any questions please feel free to contact me at (304) 842-4008.

Thank you in advance for your consideration.

Sincerely,

Rachel McKinney
Environmental Specialist II
Antero Resources Corporation

Enclosures

Permit# 18-502

Project Name: MacKay Bridge Replacement

Permittees Name: Antero Resources

JAN23 18 1:34PM

Doddridge County, WV

Floodplain Development Permit Application

This document is to be used for projects that impact/potentially impact the FEMA---designated floodplain and/or floodway of Doddridge County, WV pursuant to the rules and regulations established by all applicable Federal, State and local laws and ordinances, including the Doddridge County Floodplain Ordinance.

SECTION 1: GENERAL PROVISIONS (APPLICANT TO READ AND SIGN)

1. No work may start until a permit is issued.
2. The permit may be revoked if any false statements are made herein.
3. If revoked, all work must cease until permit is re-issued.
4. Development shall not be used or occupied until a Certificate of Compliance is issued.
5. The permit will expire if no work is commenced within six months of issuance.
6. Applicant is hereby informed that other permits may be required to fulfill local, state, and federal requirements.
7. Applicant hereby gives consent to the Floodplain Administrator/Manager or his/her representative to make inspections to verify compliance.
8. I THE APPLICANT CERTIFY THAT ALL STATEMENTS HEREIN AND IN ATTACHMENTS TO THIS APPLICATION ARE, TO THE BEST OF MY KNOWLEDGE, TRUE AND ACCURATE.

APPLICANT'S SIGNATURE [signature] Director - Water

DATE 1/19/18

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Applicant Information:

Please provide all pertinent data.

Applicant Information		
Responsible Company Name: Antero Resources Corporation		
Corporate Mailing Address: 1615 Wynkoop Street		
City: Denver	**State: CO**	**Zip: 80202**
Corporate Point of Contact (POC):		
Corporate POC Title:		
Corporate POC Primary Phone:		
Corporate POC Primary Email:		
Corporate FEIN:	**Corporate DUNS:**	
Corporate Website: www.anteroresources.com		
Local Mailing Address: 535 White Oaks Blvd		
City: Bridgeport	**State: WV**	**Zip: 26330**
Local Project Manager (PM):		
Local PM Primary Phone:		
Local PM Secondary Phone:		
Local PM Primary Email:		
Person Filing Application: Rachel McKinney		
Applicant Title: Environmental Specialist II		
Applicant Primary Phone: (304) 842-4008		
Applicant Secondary Phone: (304) 641-2396		
Applicant Primary Email: rmckinney@anteroresources.com		

Project Narrative:

Describe in detail the proposed development including project name/title, type of development, estimated start and completion timeline, and its potential impact on the floodplain. Use additional copies of this page as needed.

Project Narrative:
The Mackay Bridge Replacement project is located on the west side of County Route 19, south
of Greenwood. The project involves the construction of an access road and bridge over Cabin
Run. The proposed project is located within the Cabin Run Zone A Flood Hazard Area, according
to the Flood Insurance Rate Map (FIRM) for Doddridge County, Map Panel 54017C0200C with a
map revised date of October 4, 2011. A hydrologic and hydraulic analysis was performed for
this project. Please see the included floodplain analysis report.

Proposed Development:

Please check all elements of the proposed project thatapply.

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES)

A. STRUCTURAL DEVELOPMENT

	ACTIVITY		**STRUCTURAL TYPE**
[]	New Structure	[]	Residential (1 – 4 Family)
[]	Addition	[]	Residential (more than 4 Family)
[]	Alteration	[]	Non-residential (floodproofing)
[]	Relocation	[]	Combined Use (res. & com.)
[]	Demolition	[]	Replacement
[]	Manufactured/Mobil Home		

B. OTHER DEVELOPLMENT ACTIVITIES:

[] Fill [] Mining [] Drilling [] Pipelining

[] Grading

[] Excavation (except for STRUCTURAL DEVELOPMENT checked above)

[] Watercourse Alteration (including dredging and channel modification)

[] Drainage Improvements (including culvert work)

[X] Road, Street, or Bridge Construction

[] Subdivision (including new expansion)

[] Individual Water or Sewer System

[] Other (please specify)

___

___

___

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Development Site/Property Information:

Please provide physical description of the site/property, along with pertinent ownership (surface and mineral rights) data as applicable. Attach appropriate maps from the WV Flood Tool showing location of proposed development. Use additional copies of this page if development spans multiple property boundaries. Designate each property by number (i.e. Property 1 of 1, Property 2 of 7, etc.)

Property Designation: 1 **of** 1

Site/Property Information:		
Legal Description: CABIN RUN 259.50 AC		
Physical Address/911 Address: RT19		
Decimal Latitude/Longitude: 39.239847, -80.890386		
DMS Latitude/Longitude: 39°14'23.45"N, 80°53'25.39"W		
District: 01	**Map: 11**	**Parcel: 8**
Land Book Description:		
Deed Book Reference: Deed Book 230, Page 307		
Tax Map Reference: 09 01 0011 0008 0000		
Existing Buildings/Use of Property: Wooded		

Floodplain Location Data: ***(to be completed by Floodplain Manager or designee)***			
Community:	**Number:**	**Panel:**	**Suffix:**
Location (Lat/Long):		**Approximate Elevation:** **Estimated BFE:**	
Is the development in the floodway? ☐ **Yes** ☐ **No**		**Is the development in the floodplain?** ☐ **Yes** ☐ **No** **Zone:** ______	
Notes:			

Property Owner Data:

Please provide data on current site/property landowner(s), both surface and mineral rights (as applicable). Use additional copies of this page as needed. Designate each page in relation to each property listed above.

Property Designation: _1_ **of** _1_	

Property Owner Data:		
Name of Primary Owner (PO): I L (IKE) MORRIS		
PO Address: PO BOX 397		
City: GLENVILLE	**State:** WV	**Zip:** 26351
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Surface Rights Owner Data:		
Name of Primary Owner (PO):		
PO Address:		
City:	**State:**	**Zip:**
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Mineral Rights Owner Data: ***(As Applicable)***		
Name of Primary Owner (PO):		
PO Address:		
City:	**State:**	**Zip:**
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Contractor Data:

Please provide all pertinent data for contractors and sub---contractors that may be participating in this project. Use additional copies of this page as needed. Designate each page in relation to each property listed above.

Property Designation: ____ of ____

Contractor/Sub-Contractor (C/SC) Information:		
C/SC Company Name:		
C/SC WV License Number:		
C/SC FEIN:	**C/SC DUNS:**	
Local C/SC Point of Contact (POC):		
Local C/SC POC Title:		
C/SC Mailing Address:		
City:	**State:**	**Zip-Code:**
Local C/SC Office Phone:		
Local C/SC POC Phone:		
Local C/SC POC E-Mail:		

Engineer Firm Information:		
Engineer Firm Name:		
Engineer WV License Number:		
Engineer Firm FEIN:	**Engineer Firm DUNS:**	
Engineer Firm Primary Point of Contact (POC):		
Engineer Firm Primary POC Title:		
Engineer Firm Mailing Address:		
City:	**State:**	**Zip-Code:**
Engineer Firm Office Phone:		
Engineer Firm Primary POC Phone:		
Engineer Firm Primary POC E-Mail:		

Adjacent and/or Affected Landowners Data

Please provide data for all adjacent and/or affected surface owners (both up and down stream) whose property may be impacted by proposed development as demonstrated by a floodplain study or survey. Use additional copies of this page as needed.

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Jack D. Mackay & Anita G. Peale		
Physical Address: 1791 Cabin Run Road		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): William P. & Sharon D. Britton		
Physical Address: 34 Britton Lane		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO): Jack D. Mackay & Anita G. Peale		
Physical Address: 1791 Cabin Run Road		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO): I. L. (Ike) Morris		
Physical Address: P. O. Box 397		
City: Glenville	State: WV	Zip: 26351
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Site Plan

A Site Plan is an accurate and detailed map of the proposed development for this project. It shows the size, shape, location and special features of the project property, and the size and location of any development planned to the property, especially as that development will impact the floodplain and/or floodway. Site plans show what currently exists on the project property, and any changes or improvements you are proposing to make. **A certified and licensed engineering firm should complete site plans.**

A SITE PLAN MUST CONTAIN THE FOLLOWING INFORMATION:

1. Legal description of the parcel, north arrow and scale
2. All property lines and their dimensions
3. Names of adjacent roads, location of driveways
4. Location of sloughs, tributaries, streams, rivers, wetlands, ponds, and lakes, with setbacks indicated, and including FEMA floodplain data based on most updated FIRM.
5. Location, size, shape of all buildings, existing and proposed, with elevation of lowest floor indicated.
6. Location and dimensions of existing or proposed on-site sewage systems.
7. Location of all propane tanks, fuel tanks or other liquid storage tanks whether above ground or below ground level.
8. Location and dimensions of any proposed pipeline placement(s) into floodplain/floodway.
9. Location and dimensions of any roadway development into floodplain/floodway. *(Includes initial development access roads)*
10. Location and dimensions of any bridge and/or culvert development into floodplain/floodway.
11. Location and dimensions of any storage yard or facility into the floodplain/floodway.
12. Location of any existing utilities and/or proposed utility placement and/or displacement.
13. Location, dimensions and depth of any existing or proposed fill on site.
14. A survey showing the **existing ground elevations** of at least location on the building site. **ELEVATION NOTE**: All vertical datum will reference either NGVD 29 or NAVD 88. Assumed datum will not be acceptable unless the property is located in an area where vertical datum has not been published. For those areas where vertical datum has not been established, a site plan with contours, elevations using assumed datum, high water marks and existing water levels of sloughs, rivers, lakes or streams and proposed lowest floor elevation.

Applicant

Please read print name, sign and date below:

- I certify that I am authorized to submit this application for the primary project developer.
- I certify that the information included in this application is to the best of my knowledge true and complete.
- I certify that all required Federal, State, and local permits required by law and/or ordinance for the above described development of this project have been properly attained, are current and valid, and must be presented with this application before a Doddridge County Floodplain Permit may be issued.
- I understand that if in the course of the development project additional permits become required that were not needed during the initial proposal, the primary developer must notify the Doddridge County Floodplain Manager within 48 hours of such need, and that a "Stop Work" order may be issued for all project work directly impacting the floodplain or floodway, until such time the required additional permits are acquired.
- I understand that once the floodplain permit is submitted, the application will be entered into official public record at the next regularly scheduled Doddridge County Commission meeting after the date of submittal.
- I understand that from the date of submittal of the fully completed permit application, the Doddridge County Floodplain Manager has ninety (90) days to make a determination to either grant or deny said permit application. During this approval period, the Doddridge County Floodplain Manager may, at his or her discretion, conduct a review and/or additional study of provided documentation by means of an independent engineering firm. All costs associated with said review and/or study must be reimbursed to the County before issuance of approved permit.
- I understand that during the approval period, the Doddridge County Floodplain Manager of designee may at his or her discretion conduct site visits and document conditions of proposed development pursuant to the permit application.
- I understand that once the Floodplain Permit is granted, the permit will be entered into official public record at the next scheduled Doddridge County Commission meeting after the date of issuance. Appeals to the permit may be made no later than twenty (20) days after said issuance. If a valid appeal is submitted, as determined by the Doddridge County Floodplain Manager, a "Stop Work" order will be issued for all project development directly involving the floodplain or floodway. A public hearing by the Doddridge County Appeals Board will be scheduled no less than ten (10) days after the next regularly scheduled Doddridge County Commission meeting.
- I understand that all decisions of the Doddridge County Appeals Board shall be final.
- **I understand issuance of a Floodplain Permit authorizes me to proceed with construction as proposed. A Certificate of Compliance is required upon substantial completion of the project.**
- In signing this application, the primary developer hereby grants the Doddridge County Floodplain Manager or designee the right to enter onto the above---described location to inspect the development work proposed, in progress, and/or completed.
- I understand that if I do not follow exactly the site---plan submitted and approved by this permit that a "Stop Work" order may be issued by the Wirt County Floodplain Manager and that I must stop all construction immediately until discrepancies of actual work vs. proposed work is resolved.

Applicant Signature: [signature] Director-Water Date: 1/19/18

Applicant Printed Name: Conrad R. Baston

WV Flood Map

User Notes:
Antero Resources Corporation
MACKAY BRIDGE

Flood Hazard Zone

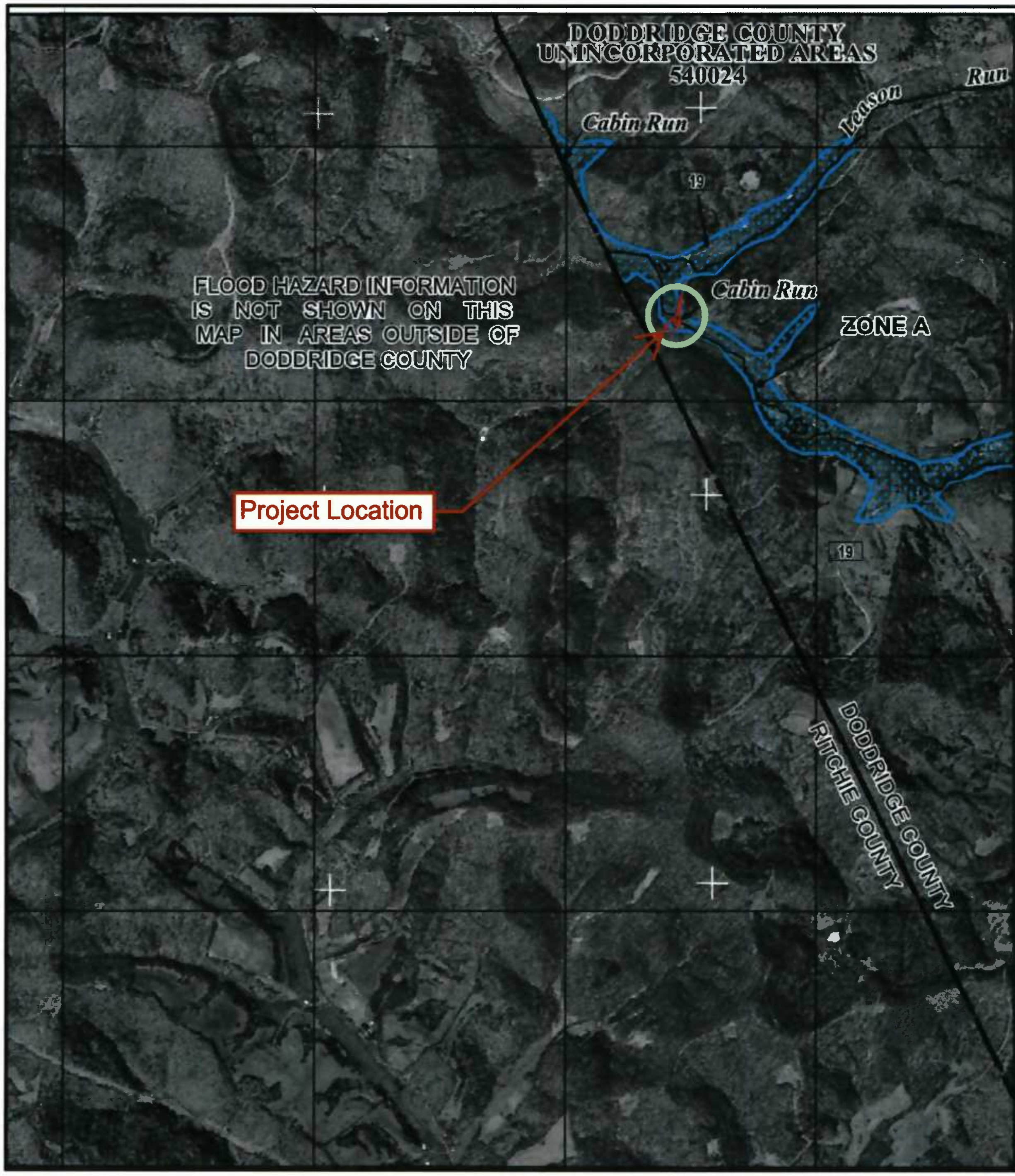
Flood Point of Interest

Disclaimer:
The online map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. To obtain more detailed information in areas where Base Flood Elevations have been determined, users are encouraged to consult the latest Flood Profile data contained in the official flood insurance study. These studies are available online at www.msc.fema.gov.
WV Flood Tool (http://www.MapWV.gov/flood) is supported by FEMA, WV NFIP Office, and WV GIS Technical Center.

Map created on January 5, 2018

Flood Hazard Area:
Flood Hazard Area: Location is WITHIN the FEMA 100-year floodplain.

FEMA Issued Flood Map:	54017C0200C
Watershed (HUC8):	Little Kanawha (5030203)
Elevation:	About 799 ft
Location (long, lat):	(80.890456 W,39.239068 N)
Location (UTM 17N):	(509454, 4343312)
Contacts:	Doddridge
CRS Information:	N/A
Parcel Number:	No Parcel



MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0200C

FIRM

FLOOD INSURANCE RATE MAP

DODDRIDGE COUNTY, WEST VIRGINIA
AND INCORPORATED AREAS

PANEL 200 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0200	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
54017C0200C

MAP REVISED
OCTOBER 4, 2011

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

NAVITUS
ENERGY ENGINEERING
151 Windy Hill Lane, Winchester, VA 22602

December 22, 2017

Doddridge County OEM
105 Court Street, Suite 3
West Union, WV 25456

Attn: George Eidel, Doddridge County Floodplain Manager

Re: Mackay Bridge - Floodplain Analysis

Dear Mr. Cooper:

Navitus Engineering has completed a floodplain analysis for the Mackay Bridge Site along County Route 19, south of Greenwood, in Doddridge County, West Virginia. The entrance to the proposed site is located within FEMA Flood Zone A, as shown on the Flood Insurance Rate Maps (FIRM) from the National Flood Insurance Program (NFIP), Map Number 54017C0200C dated October 4, 2011. Being that the site entrance is located in a Flood Zone A, base flood elevations for this area have not been established, and detailed information for Cabin Run & Leason Run cannot be found within the Flood Insurance Study for Doddridge County, dated October 4, 2011. However, detailed flood information developed by AMEC Foster Wheeler was available for Cabin Run and Leason Run.

In order to establish base flood elevations for this site, a hydrologic and hydraulic analysis was performed as detailed within the Doddridge County Flood Zone Ordinance, enacted May 21st, 2013. Using field shot data, 10-foot interval topography converted from 3 meter West Virginia GIS Technical Center DEM data, and information taken from USGS 7.5 Minute Series Topographic Maps, a drainage analysis was performed for the Cabin Run and Leason Run Drainage Sheds. Upon establishing peak flow drainage calculations for the 100-year storm event utilizing HEC-HMS these flows were compared to the AMEC Foster Wheeler study completed for this portion of Cabin Run and Leason Run. Flows generated from HEC-HMS were noted to be generally lower than the flows computed from the NFF Regression Equation utilized by AMEC therefore the HEC-HMS calculations were utilized. A HEC-RAS river analysis was conducted for a section of Cabin Run and Leason Run adjacent to the Mackay Bridge Site area and Base Flood Elevations (BFE) were established. The resulting BFEs were used to establish adjusted floodplain boundaries for the segments of Cabin Run and Leason Run being studied. These boundaries are shown on the attached Floodplain Exhibit of this development site. The proposed developments are impacted by the existing 100-year BFEs.

In addition to establishing BFEs, a proposed conditions analysis was performed to determine the impacts of the proposed grading from the access road entrances to the site. The proposed grading and proposed bridge were added into the cross sections of the respective models and the manning's "n" were adjusted where necessary. The models were run with these changes to determine the proposed impacts to the floodplain.

The results of this analysis indicate that the proposed improvements will not cause an increase greater than one foot (1.0') in the BFEs along Cabin Run and Leason Run and no upstream or downstream properties will be adversely impacted.

Attached are the following documents associated with this submission:

- A Floodplain Analysis of Cabin Run and Leason Run documenting the methods used for the analysis, drainage computations, cross sections, and a narrative to describe the analysis. Included with this analysis are exhibits that identify the existing and proposed 100-year floodplain.
- The Mackay Bridge Site Plan, prepared by Navitus Engineering, Inc. which includes additional site design and construction specifications.
- Floodplain Permit Application Fee

Should any questions or comments arise during the review, please let us know and we will work to address them. Please let me know if you should need additional information. You can reach me by phone (540) 336-9486 or email: dmurphy@navituseng.com.

Sincerely,
Navitus Engineering, Inc.

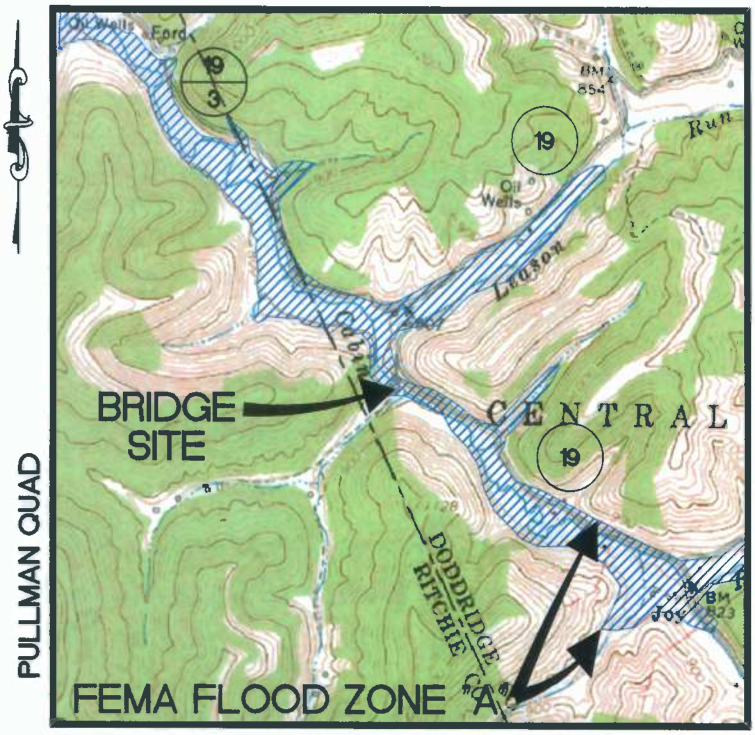
Daniel E. Murphy, CFM

Daniel E. Murphy, CFM
#US-13-07064
Certified Floodplain Manager (CFM®)

CYRUS S. KUMP REGISTERED 19578 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER

FLOODPLAIN ANALYSIS OF
CABIN RUN & LEASON RUN

MACKAY BRIDGE



VICINITY MAP
1" = 2,000'

NAVITUS
ENERGY ENGINEERING
Telephone: (888) 662-4185 | www.NavitusEng.com

Prepared For:

Antero Resources

535 White Oaks Blvd.
Bridgeport, WV 26330
(304) 842-4100

Contacts:
Aaron Kunzler, Construction Supervisor
(405) 227-8344
Robert Wirks, Field Engineer
(304) 627-7405
Lea Anne Hawkins, Land Agent
(XXX) XXX-XXXX

CYRUS S. KUMP
REGISTERED
19578
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
DRAFT
12/22/2017

Date: December 22, 2017

Designed By:
Navitus Engineering Inc.

Project Manager:
Dan Murphy, CFM
dmurphy@navituseng.com

Surface Owner (s):
Jack D. Mackay & Anita G. Peale
Ike L Morris

Tax Parcel:
Map 37 Parcel 3.3
Map 11 Parcel 8

Location:
Central District, Doddridge County
West Virginia

1. Objective

The objective of this floodplain analysis was to establish boundaries for the existing and proposed conditions of the 100 year base flood elevations (BFE). The proposed condition includes the installation of a proposed bridge off of County Route 19, where the bridge is within the mapped FEMA floodplain.

2. Existing Conditions

2.1. Property Description

This site is located in Doddridge County, West Virginia along Cabin Run & Leason Run and County Route 19 south of Greenwood. The proposed bridge is located on the west side of County Route 19.

2.2. Floodplain Delineation

The approximate limit of the 100-year floodplain (a flood event that has a 1% chance of being equaled or exceeded in any given year) is shown on FEMA Flood Insurance Rate Map (FIRM) for Doddridge County on panels 54017C0200C effective October 4, 2011. This floodplain is located in flood zone designation "A" (Advisory A) as shown on the FIRM, and there has not been a detailed study analysis with whole foot base flood elevations established within the Doddridge County Flood Insurance Study (FIS) effective October 4, 2011.

2.3. Floodplain Ordinance

This site is administered under the Doddridge County Floodplain Ordinance, enacted May 21st, 2013

Per Section 4.4.A.1 of the ordinance, when a site is located in FEMA Flood Zone designation "A" the Floodplain Administrator shall use elevation and floodway information from Federal, State, or other acceptable sources when available to determine the elevation above which development will reasonably safe from flooding.

Per Section 4.4.A.2 of the ordinance, when data from an acceptable source is not available, the Floodplain Administrator shall review, or shall cause to be reviewed; all proposed development to determine (1) the amount being invested and (2) the specific flood risk at the site. The Floodplain Administrator shall then require the applicant to determine the elevation above which the development and adjacent properties including but not limited to existing buildings will be reasonably safe from flooding using hydrologic and hydraulic analyses or other techniques. When hydrologic and hydraulic analyses are required, they shall only be prepared by a registered professional engineer who shall certify that the methods used correctly reflect currently accepted technical concepts. The resulting study shall include a cover letter, signed by the responsible professional, providing a statement of findings in basic terms. In addition, studies, analyses, computations, etc. shall be submitted in sufficient detail to allow a thorough review by the Floodplain Administrator.

Per Section 4.4.A.3 of the ordinance, any development and/or use of land shall be permitted provided that all such uses, activities and/or development shall be undertaken in strict compliance with the flood-proofing and related provisions contained herein and in all other applicable Federal and State Laws, Ordinances and Regulations.

Per Section 5.1 of this ordinance permits are required for the construction of the entrance to the facility. The format of the permit will coincide with the requirements set forth in Section 5.2 of the ordinance.

Per Section 6.1.E.1 of this ordinance, any fill outside of the main floodway associated with the project shall be only used in manner which does not adversely affect upstream and downstream properties.

Per Section 6.1.K of this ordinance, ditches have been proposed in low lying areas at the entrance to allow adequate drainage through the drainage shed.

All other specific requirements covered in Section 6.1 of this ordinance are not applicable to this design. (Sections 6.1.A, 6.1.B, 6.1.C, 6.1.D, 6.1.F, 6.1.G, 6.1.H, 6.1.I, 6.1.J, and 6.1.L)

The developer shall conform with all administrative procedures as outline in Article 7 of this ordinance.

2.4. Cabin Run & Leason Run Characteristics

Cabin Run is located in multiple districts within Doddridge County and flows in a north westerly direction. The drainage area flowing to Cabin Run at the bridge off County Route 19 is approximately 3,436.8 acres of forested and agricultural land. Leason Run is located within the Central District of Doddridge County and flows in a westerly direction. The drainage area flowing to Leason Run is approximately 1,123.4 acres of forested and agricultural land.

3. Analysis Information

3.1. HEC-RAS

A HEC-RAS hydraulic analysis was performed for the portion of the Cabin Run & Leason Run that has an impact on the BFE's across the property. HEC-RAS is designed to perform one-dimensional hydraulic calculations for a full network of natural and constructed channels. The steady flow system is designed for applications in floodplain management and flood insurance studies.

3.2. Analysis Limits

The analysis information is based upon two foot interval aerial topography by Blue Mountain Aerial Mapping and two foot interval field shot data. The upstream analysis limit for Cabin Run is located approximately 1,310 feet upstream from the proposed bridge location and represents the 133+38.66 section. The downstream analysis limit for Cabin Run is located approximately 2,028 feet downstream of the proposed bridge location and represents the 100+00.000 section. The upstream analysis limit for Leason Run is located approximately 2,575 feet downstream from the proposed bridge location and represents the 27+37.84 section. These limits were selected so that the HEC-RAS model would accurately determine the base flood elevations on site and off site.

3.3. Flow Data

The hydrologic analysis utilized USDA soil surveys for computation of drainage shed curve numbers, aerial topography, and 3 meter West Virginia GIS Technical Center DEM to determine the drainage area(s) and time of concentration path(s). The peak 100-year discharge within the inundation area was determined through TR-55 SCS methodology. Time of concentration paths were calculated utilizing the SCS lag method. The hydrologic calculations for the drainage area were performed using HEC-HMS. See the table below for a summary of the flow conditions and see Supplement 1 for the complete Drainage Computations.

Stream	**Drainage Area (Sq Mi.)**	**Flow (cfs)**	**Note**
Cabin Run Upper at Leason Run Confluence	5.38	2169.8	
Leason Run at Cabin Run Confluence	1.76	858.6	AMEC Flow = 807.06 cfs
Cabin Run Lower downstream of Leason Run Confluence	7.32	2954.8	AMEC Flow = 2,092.92 cfs

3.4. Cross Section Data

The cross sections were employed at significant changes in site features. This includes major bends in the stream channel, areas of major contraction and expansion of the floodplain area, upstream and downstream of existing culverts, and at building obstructions (cross sections were compiled using Aerial Mapping by Blue Mountain Aerial Mapping).

3.5. Manning's n-value

The channel and overbank areas were assigned manning's n-values based on photographs and close inspection of existing aerial photography. The chart below describes the manning's n values used in this study.

Manning's n value	Description	Portion Used
.04	Clean, winding, some pools, shoals weeds and stones	Main Channel
.013	Asphalt-smooth	Floodplains
.033	Gravel-dry rubble rip rap	Floodplains
.035	Pasture-high grass	Floodplains
.06	Light brush and trees-summer	Floodplains
.1	Heavy stand of timber, few down trees	Floodplains

4. Results

4.1. Existing Conditions

Since the site is in Zone "A" floodplain area as shown on the FIRM, there has not been a detailed study analysis with whole foot base flood elevations established within the Doddridge County Flood Insurance Study (FIS) effective October 4, 2011. An existing conditions model was prepared based upon aerial topography, field shot topography and existing drainage computations. This information was processed in HEC-RAS to determine the existing conditions of the Base Flood Elevations.

4.2. Proposed Conditions

A proposed conditions model was prepared and based on the proposed topography for the bridge. This information was added into the existing conditions cross sections, and then was processed in HEC-RAS to determine the proposed conditions of the Base Flood Elevations. A summary of elevation changes showing the existing and proposed BFEs at the various cross sections has been provided in the appendix. As shown in the table, the proposed development, which the portions contained within the floodplain are partially in fill, will not increase the existing BFEs throughout the analysis area to adversely impact any properties.

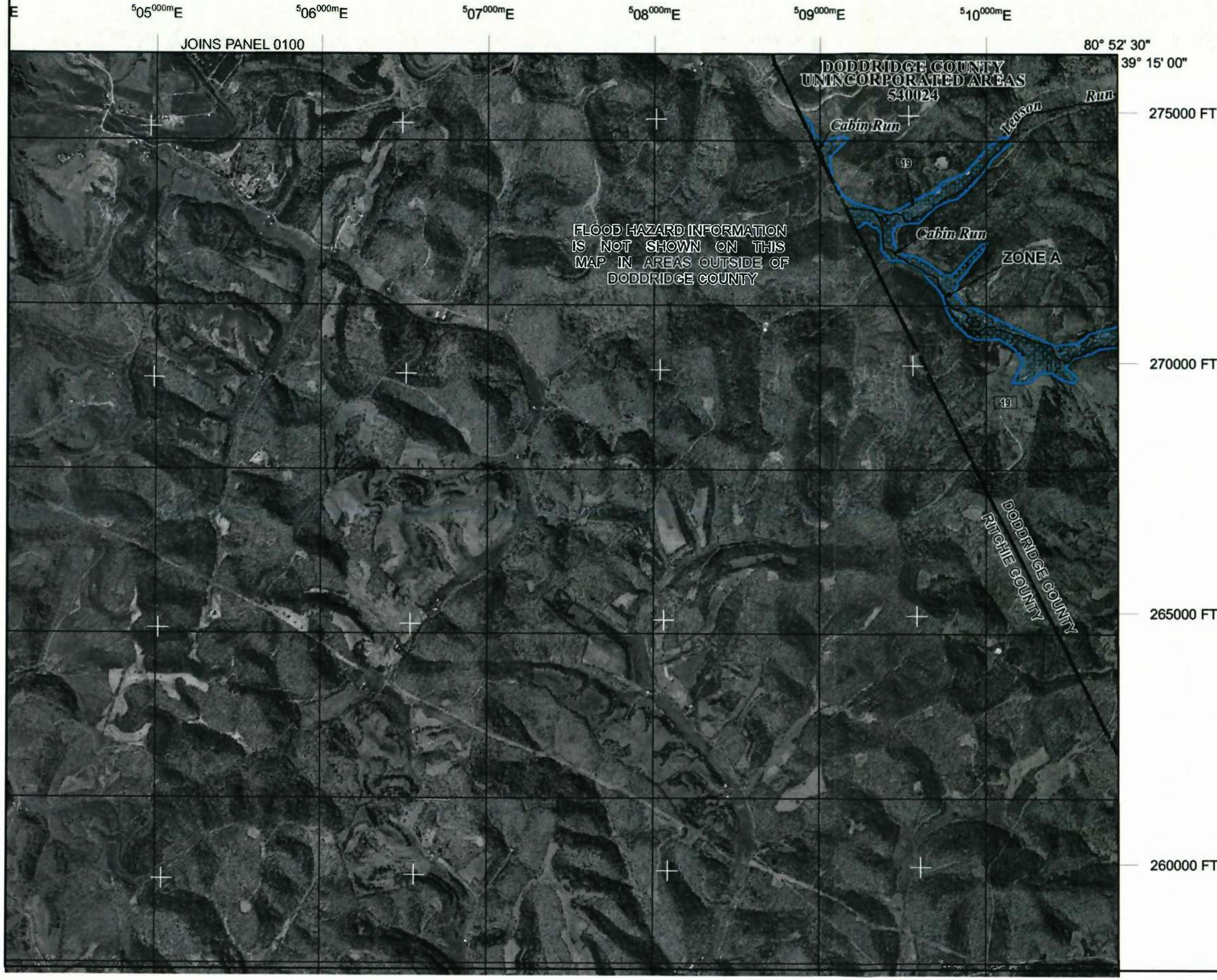
5. Conclusion

The results of this floodplain analysis indicate that there will be no changes in the 100 year base flood elevation and no adverse impacts to upstream and downstream properties along Cabin Run & Leason Run.

APPENDIX

Exhibit A

FIRM Panel 54018C0200C



MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0200C

FIRM

FLOOD INSURANCE RATE MAP

DODDRIDGE COUNTY, WEST VIRGINIA AND INCORPORATED AREAS

PANEL 200 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0200	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
54017C0200C

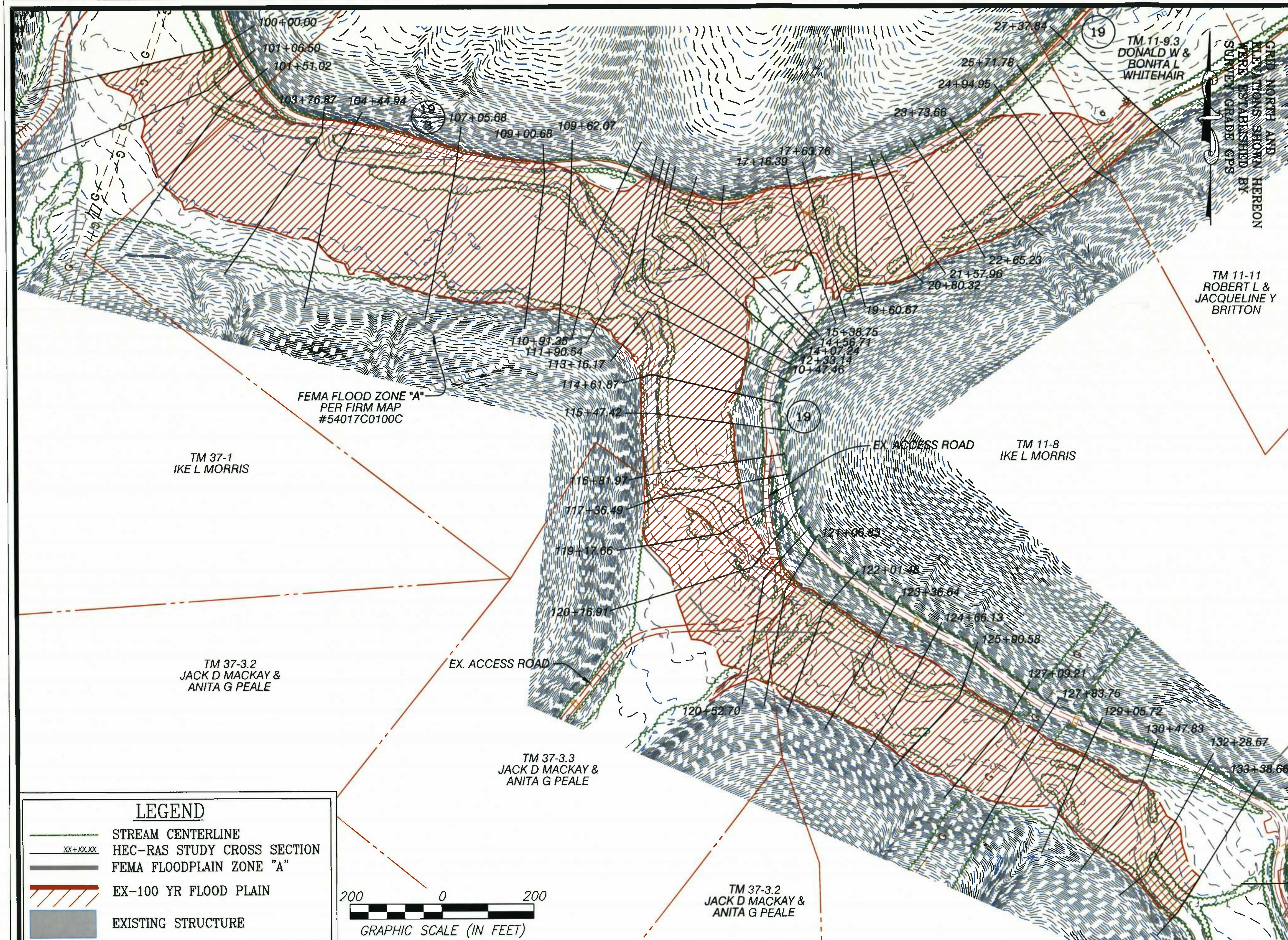
MAP REVISED
OCTOBER 4, 2011

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Exhibit B

Existing Conditions Plan



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CYRUS S. KUMP
REGISTERED
19576
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER
DRAFT
12/22/2107

Antero Resources

THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

EXISTING CONDITIONS PLAN

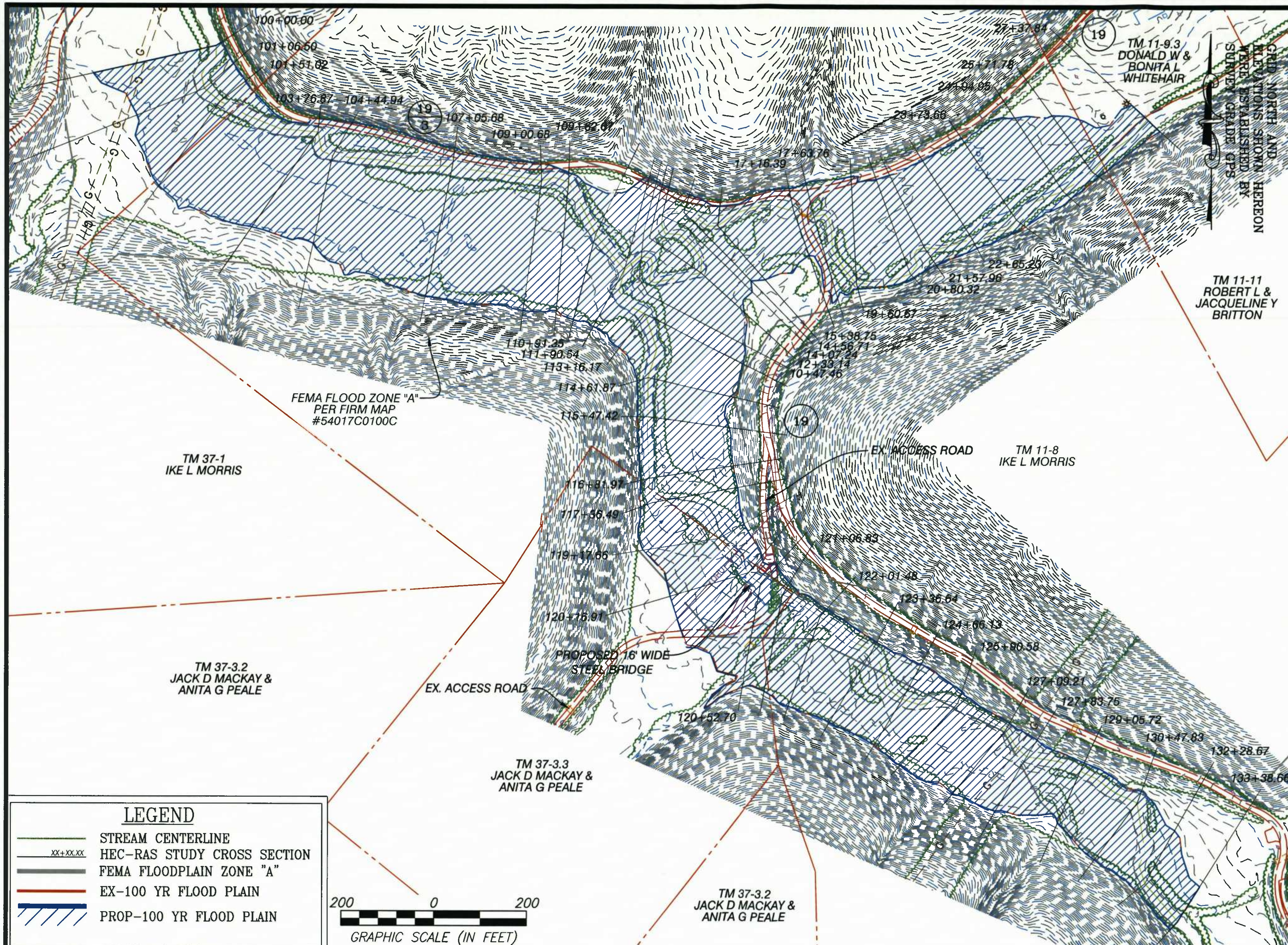
MACKAY BRIDGE
FLOODPLAIN STUDY

CENTRAL DISTRICT
DODDRIDGE COUNTY, WV

SCALE: 1" = 200'
DATE: 12/22/2017
EXHIBIT: B

Exhibit C

Proposed Conditions Plan



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PROFESSIONAL ENGINEER

DRAFT

12/22/2107

Antero Resources

THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

PROPOSED CONDITIONS PLAN

MACKAY BRIDGE FLOODPLAIN STUDY

CENTRAL DISTRICT
DODDRIDGE COUNTY, WV

SCALE: 1" = 200'

DATE: 12/22/2017

EXHIBIT: C

Exhibit D

Drainage Map

DRAINAGE MAP

USGS 7.5 PENNSBORO QUAD MAP

USGS 7.5 WEST UNION QUAD MAP

USGS 7.5 PULLMAN QUAD MAP

USGS 7.5 OXFORD QUAD MAP

WEST VIRGINIA STATE PLANE
COORDINATE SYSTEM
NORTH ZONE, NAD83
ELEVATION BASED ON NAVD88
ESTABLISHED BY SURVEY GRADE GPS
& OPUS POST-PROCESSING

2000 0 2000

GRAPHIC SCALE (IN FEET)

NAVITUS
ENERGY ENGINEERING

Telephone: (888) 662-4185 | www.NavitusEng.com

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DRAFT

12/22/2107

Antero Resources

THIS DOCUMENT
WAS PREPARED FOR:
ANTERO RESOURCES
CORPORATION

DRAINAGE MAP

MACKAY BRIDGE
FLOODPLAIN STUDY

CENTRAL DISTRICT
DODDRIDGE COUNTY, WV

SCALE: 1" = 2000'

DATE: 12/22/2017

EXHIBIT: D

Supplement 1

Drainage Computations

Project: Mackay Bridge   Simulation Run: Mackay

Start of Run: 05Dec2017, 12:00   Basin Model: Mackay
End of Run: 06Dec2017, 12:04   Meteorologic Model: 100 Yr
Compute Time: 05Dec2017, 12:35:44   Control Specifications: Control 1

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Cabin Run Upper	5.38	2169.8	06Dec2017, 01:24	2.08
Leason Run	1.76	858.6	06Dec2017, 01:00	2.03
Junction-1	7.14	2928.5	06Dec2017, 01:16	2.07
Cabin Run Lower	0.18	323.8	06Dec2017, 00:04	2.41
Junction-2	7.32	2954.8	06Dec2017, 01:16	2.08

Supplement 2

Summary of Computed Elevations

MACKAY BRIDGE REPLACEMENT SUMMARY OF COMPUTED WATER SURFACE ELEVATIONS					
CROSS SECTION STATION	RIVER NAME	REACH NAME	100 YEAR BASE FLOOD ELEVATION		
			EXISTING CONDITIONS MODEL	BRIDGE MODEL	BRIDGE DIFFERENCE
13338.650	CABIN RUN	UPPER	811.58	811.58	0.00
13228.660	CABIN RUN	UPPER	811.23	811.23	0.00
13047.830	CABIN RUN	UPPER	810.87	810.87	0.00
12905.720	CABIN RUN	UPPER	809.9	809.9	0.00
12783.740	CABIN RUN	UPPER	809.59	809.59	0.00
12709.200	CABIN RUN	UPPER	809.47	809.47	0.00
12590.580	CABIN RUN	UPPER	809.22	809.22	0.00
12466.120	CABIN RUN	UPPER	808.84	808.84	0.00
12336.630	CABIN RUN	UPPER	808.62	808.62	0.00
12201.470	CABIN RUN	UPPER	808.28	808.28	0.00
12106.820	CABIN RUN	UPPER	807.57	807.62	+ 0.05
12080.000	CABIN RUN	UPPER	Culvert		
12052.690	CABIN RUN	UPPER	807.15	807.33	+ 0.18
12030.000	CABIN RUN	UPPER	Bridge/Culvert		
12016.910	CABIN RUN	UPPER	806.92	806.93	+ 0.01
11917.650	CABIN RUN	UPPER	806.58	806.58	0.00
11736.490	CABIN RUN	UPPER	806.12	806.12	0.00
11681.960	CABIN RUN	UPPER	805.81	805.81	0.00
11547.410	CABIN RUN	UPPER	805.37	805.37	0.00
11461.860	CABIN RUN	UPPER	804.72	804.72	0.00
11316.170	CABIN RUN	UPPER	804.28	804.28	0.00
11190.540	CABIN RUN	UPPER	804.35	804.35	0.00
2737.844	LEASON RUN	LOWER	814.44	814.44	0.00
2571.784	LEASON RUN	LOWER	813.18	813.18	0.00
2494.952	LEASON RUN	LOWER	812.25	812.25	0.00
2373.655	LEASON RUN	LOWER	811.07	811.07	0.00
2265.225	LEASON RUN	LOWER	810.31	810.31	0.00
2157.963	LEASON RUN	LOWER	809.11	809.11	0.00
2080.321	LEASON RUN	LOWER	808.59	808.59	0.00
1960.67	LEASON RUN	LOWER	807.91	807.91	0.00
1763.762	LEASON RUN	LOWER	807.48	807.48	0.00
1740	LEASON RUN	LOWER	Culvert		
1716.392	LEASON RUN	LOWER	806.13	806.13	0.00
1538.753	LEASON RUN	LOWER	805.09	805.09	0.00
1456.709	LEASON RUN	LOWER	804.97	804.97	0.00
1407.241	LEASON RUN	LOWER	804.75	804.75	0.00
1233.14	LEASON RUN	LOWER	804.36	804.36	0.00
1047.463	LEASON RUN	LOWER	804.29	804.29	0.00

MACKAY BRIDGE REPLACEMENT SUMMARY OF COMPUTED WATER SURFACE ELEVATIONS					
CROSS SECTION STATION	RIVER NAME	REACH NAME	100 YEAR BASE FLOOD ELEVATION		
			EXISTING CONDITIONS MODEL	BRIDGE MODEL	BRIDGE DIFFERENCE
11091.35	CABIN RUN	LOWER	803.75	803.75	0.00
10962.06	CABIN RUN	LOWER	802.94	802.94	0.00
10900.67	CABIN RUN	LOWER	803.03	803.03	0.00
10705.68	CABIN RUN	LOWER	802.83	802.83	0.00
10444.93	CABIN RUN	LOWER	802.08	802.08	0.00
10376.87	CABIN RUN	LOWER	801.94	801.94	0.00
10151.02	CABIN RUN	LOWER	801.46	801.46	0.00
10106.5	CABIN RUN	LOWER	801.15	801.15	0.00
10000	CABIN RUN	LOWER	800.09	800.09	0.00

Supplement 3

HEC-RAS Analysis –Existing Conditions Summary w/ Cross Sections

HEC-RAS HEC-RAS 5.0.3 September 2016
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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

PROJECT DATA
Project Title: Mackay Bridge
Project File : MackayBridge.prj
Run Date and Time: 12/12/2017 2:01:45 PM

Project in English units

PLAN DATA

Plan Title: Existing
Plan File : x:\Navitus Jobfiles\Antero Resources\ANT290-Mackay Bridge Replacement\Engineering\2. Preliminary\Prelim 1\Drainage Comp\Floodplain\Documents\MackayBridge.p01

Geometry Title: Existing
Geometry File : x:\Navitus Jobfiles\Antero Resources\ANT290-Mackay Bridge Replacement\Engineering\2. Preliminary\Prelim 1\Drainage Comp\Floodplain\Documents\MackayBridge.g01

Flow Title   : Existing
Flow File   : x:\Navitus Jobfiles\Antero Resources\ANT290-Mackay Bridge Replacement\Engineering\2. Preliminary\Prelim 1\Drainage Comp\Floodplain\Documents\MackayBridge.f01

Plan Summary Information:

```
Number of:  Cross Sections =   44    Multiple Openings  =    0
            Culverts       =    2    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    0
```

Computational Information

Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
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: Existing
Flow File : x:\Navitus Jobfiles\Antero Resources\ANT290-Mackay Bridge Replacement\Engineering\2. Preliminary\Prelim 1\Drainage Comp\Floodplain\Documents\MackayBridge.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Cabin Run	Upper	13338.65	2169.8
Cabin Run	Lower	11091.35	2954.8
Leason Run	Lower	2737.844	858.6

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Cabin Run	Lower	PF 1		Normal S = 0.006

GEOMETRY DATA

Geometry Title: Existing
Geometry File : x:\Navitus Jobfiles\Antero Resources\ANT290-Mackay Bridge Replacement\Engineering\2. Preliminary\Prelim 1\Drainage Comp\Floodplain\Documents\MackayBridge.g01

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
Cabin Run	Upper		Junction
Cabin Run	Lower	Junction	
Leason Run	Lower		Junction

JUNCTION INFORMATION

Name: Junction
Description:
Energy computation Method

Length across Junction River	Reach		Tributary River	Reach	Length	Angle
Cabin Run	Upper	to	Cabin Run	Lower	99.19	0
Leason Run	Lower	to	Cabin Run	Lower	0	0

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 13338.65

INPUT
Description:
Station Elevation Data num= 130

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840	5.12	838	7.67	836.99	8.18	836.78	10.09	836
12.12	835.03	14.24	834	15.05	833.45	17.67	832	19.93	830.52
20.63	830	21.2	829.59	23.28	828	23.91	827.5	25.85	826
28.65	824.11	28.8	824	30.25	822.79	31.42	822	32.69	820.98
34.09	820	35.31	819.1	36.66	818	37.98	816.94	39.49	816
41.61	814.47	42.18	814	43.1	813.31	45.04	812	48.36	810.74
49.9	810	54	808.56	56.56	808	56.59	808.16	58.77	806.02
58.79	806	58.8	805.98	59.66	804.97	74.43	805.01	81.86	805.03
83.3	805.68	83.78	806	86.39	807.34	88.25	808	88.85	808.55
88.87	808.56	92.45	808.57	101.74	808.56	103.79	808.39	104.65	808.39
105.12	808.45	106.1	808.56	110.74	808.67	124.81	810	130.93	810.37
130.97	810.37	135.62	810.53	163.1	811.75	163.36	811.76	164.25	811.79
172.31	811.99	172.66	812	172.78	812	173.2	812.06	185.08	813.14
203.02	813.59	213.3	813.72	224.7	813.98	225.23	814	226.39	814.07
243.87	814.91	255.58	815.5	261.42	815.71	269.76	815.94	271.43	816
272.67	816.04	274.61	816.15	292.08	817.21	297.48	817.58	300.16	817.69
304.31	817.85	308.16	817.96	308.88	818	310.01	818.05	328.28	819.34
330.03	819.47	333.16	820	338.88	820.91	341.99	821.32	345	821.98

345.11	822	347.05	822.42	352.61	823.68	355.63	824	357.71	824.2
357.89	824.2	366.85	824.24	368.83	824.26	369.54	824.29	370.35	824.35
371.55	824.39	372.58	825.91	372.61	826	372.83	826.24	374.63	828
375.82	829.57	376.26	830	376.69	830.41	378.25	832	380.19	833.88
380.34	834	380.39	834.03	382.85	835.98	382.91	836	383.69	836.56
385.72	838	386.44	838.54	388.56	840	389.1	840.4	390.12	841.12
391.63	842	392.84	842.8	394.35	843.62	394.54	843.69	395.46	844
398.89	845.58	399.91	846	401.37	846.64	404.54	848	409.14	850

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	56.56	.04	88.85	.025	355.63	.013	371.55	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
56.56	88.85	138.38	109.99	117.48	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 13228.66

INPUT
Description:
Station Elevation Data num= 146

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840	1.37	839.44	5.16	838	7.56	836.8	9.17	836
11.35	834.81	13.01	834	15.49	832.66	16.48	832	16.85	831.75
19.73	830	22.75	828.12	22.97	828	23.17	827.87	26.28	826
28.78	824.52	29.59	824	31.79	822.69	33.14	822	33.81	821.58
36.24	820	38.14	818.44	38.73	818	39.46	817.48	41.34	816
43.32	814.62	44.17	814	46.35	812.58	47.37	812	48.06	811.73
53.11	810	60.83	809.32	61.47	809.26	62.04	809.21	63.57	809.14
63.66	808.99	64.32	808	64.36	807.97	66.71	806	67.31	805.07
67.37	804.97	72.26	804.99	75.03	805	79.53	805.02	81.79	805.03
82.3	805.03	82.38	805.07	82.61	805.15	85.53	806	87.29	806.53
89.58	807.27	96.43	807.56	98.56	807.67	98.82	807.81	99.58	808
101.82	808.45	103.27	809.01	109.81	809.01	110.77	809.02	113.58	809.01
114.29	808.89	119.42	808	133.27	808	140.1	808.2	143.7	808.42
152.82	808.96	155.75	809.1	159.26	809.25	164.76	809.4	167.95	809.53
175.41	810	178.76	810.62	178.95	810.64	179.8	810.64	196.61	810.77
197.91	810.78	202.99	811.09	221.06	812	221.15	812	230	812.92
239.28	814	247.94	815.04	257.31	816	257.76	816	258.32	816.07
259.26	816.13	263.17	816.52	272.23	817.6	273.99	818	274.82	818.19
281.66	820	285.42	821.01	289.77	822	292.82	822.75	293.62	822.93
296.97	823.92	297.27	824	299.01	824.51	303.42	826	307.88	827.74
308.67	828	308.73	828.03	312.01	829.51	312.92	830	313.23	830.18
316.36	832	317.84	832.77	318.83	833.35	321.46	833.47	323.97	833.43
328.62	833.47	333.73	833.45	337.56	833.52	339.46	833.53	339.9	834
341.27	835.28	342.2	836	342.72	836.59	344.06	838	345.82	839.74
346.19	840.18	347.6	841.33	348.66	842	348.83	842.21	350.92	843.76

351.27	844	351.6	844.15	352.07	844.53	353.92	846	355.99	847.57
356.35	847.87	356.51	848	358.39	849.52	359	850	360.78	851.42
360.83	851.5	361.17	851.59	362	852	363.35	852.66	365.97	854
367.66	854.84	370.07	856	372.27	857.09	373.48	857.63	374.25	858
378.16	860								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	64.32	.04	89.58	.035	318.83	.013	339.46	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
64.32	89.58	175.61	175.61	125.73	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 13047.83

INPUT
Description:
Station Elevation Data num= 126

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840	4.04	838.25	4.65	838	5.89	837.41	8.69	836
9.75	835.39	12.5	834	14.55	832.69	15.64	832	16.39	831.54
18.35	830	20.62	828.42	21.37	828	22.16	827.52	24.92	826.17
25.26	826	25.31	825.97	28.14	824	30.71	822.45	31.53	822
32.24	821.66	34.79	820.11	34.98	820	37.21	818.9	38.91	818
40.56	817.26	42.96	816	46.04	814.75	47.2	814.22	47.75	814
48.55	813.68	49.78	813.26	53.82	812	57.97	811.04	61.31	810
64.49	809.53	65.29	809.54	68.44	809.2	69.45	809.23	86.6	808.41
87.34	808.42	111.51	808.87	143.75	809.51	144.28	809.52	161.07	809.92
163.6	809.99	186.29	809.19	187.94	808.07	188.97	808	190.61	806.04
190.63	806	190.63	806.04	191.07	805.59	191.22	804.73	213.83	804.66
215.88	804.66	222.34	804.65	223.17	805.38	226.04	805.82	226.05	805.82
235.36	805.98	236.04	806	236.23	806.15	238.58	808	240.46	809.72
240.74	810	240.82	810.07	242.06	811.43	243.32	811.7	244.67	812
249.15	812.98	253.74	814	254.73	814.18	255.58	814.37	259.54	815.76
260.26	816	261.32	816.34	266.1	818	266.51	818.08	267.55	818.42
270.15	819.92	270.3	820	270.73	820.27	271.61	820.79	274.27	822
275.98	822.71	278.54	824	278.71	824.17	279.31	824.4	280.66	825.04
281.04	825.22	282.89	826	285.44	827.2	287.05	828	290.54	829.78
290.92	829.94	291.01	830	291.15	830.07	294.22	832	294.71	832.27
297.46	834	298.25	834.4	301.3	836	301.31	836.09	302.86	836.43
305.42	836.97	314.07	837.07	317.3	837.14	318.47	837.04	319.89	836.96
321.84	836.86	323.06	837.98	323.07	838	323.23	838.13	325.37	840
327.33	841.57	327.85	842	328.04	842.16	328.16	842.41	328.67	842.68
331.1	844	334.49	845.77	334.9	846	335.86	846.51	338.6	848
342.26	850								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	61.31	.035	186.29	.04	240.46	.1	305.42	.013
321.84	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
186.29	240.46	141.41	141.41	129.19	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12905.72

INPUT
Description:
Station Elevation Data num= 154

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840	2.44	838.97	4.57	838	5.57	837.52	9.55	836
10.17	835.72	13.42	834	13.71	833.85	17.21	832.03	17.27	832
18.01	831.71	22.34	830	23.18	829.72	28.09	828	29.27	827.56
33.09	826	34.32	825.56	38.3	824	38.65	823.87	43.48	822
48.94	820.51	50.96	820	55.92	818.85	59.62	818	64.59	816.79
67.7	816	68.75	815.75	75.03	814.26	75.87	814.05	76.1	814
76.26	813.95	84.01	812	92.26	810.42	93.88	810	94.69	809.91
97.59	809.8	105.76	809.41	108.25	809.28	114.73	808.92	116.24	808.12
116.45	808	116.94	807.78	118.85	806.81	122.86	806.23	124.35	806
125.7	805.8	129	805.45	131.62	805.88	132.1	806	132.79	806.17
139.38	807.5	139.55	807.46	140	807.47	140.38	807.47	149.42	807.41
151.21	807.45	152.6	807.48	154.62	807.53	161.16	807.72	170.45	808
171.99	808.11	176.56	808.43	190.38	808.23	194.11	808.16	199.08	808.06
202.81	808	204.35	808	205.79	807.35	207.36	806	209.28	804.52
209.44	804.39	211.93	804.33	218.12	804.18	222.69	804.08	226.98	803.97
227.68	804.35	230.32	806	231.28	806.57	233.05	807.53	233.59	807.75
234.17	808	236.19	808.89	236.47	809.01	238.63	810	239.84	810.52
243.02	812	246.89	813.73	247.56	814	247.77	814.08	248.64	814.45
250.65	815.37	251.95	816	254.28	817.18	255.83	818	256.75	818.57
259.03	820	259.51	820.28	260.96	821.19	261.99	821.87	262.18	822
264.93	823.81	265.21	824	267.09	825.23	268.2	826	268.35	826.11
271.05	828	271.31	828.18	272.39	828.91	272.68	829.15	273.78	830
275.56	831.58	276.06	832	277.75	833.42	278.49	834	278.85	834.29
280.93	836	281.94	836.83	282.7	837.49	283.3	838	284.08	838.74
287.92	838.85	291.57	839.48	296.13	839.28	302.53	838.93	304.89	839.66
306.01	839.93	306.26	840	306.33	840.07	307.65	842	307.81	841.77
308.32	843.58	308.64	844	308.72	844.24	309.15	845.35	309.4	846
309.96	847.3	310.3	848	310.57	848.85	311.04	850.47	311.3	850.09
311.5	850	313.19	851.51	313.82	852	317.24	853.91	317.41	854
318.36	854.53	320.93	855.87	321.11	856	321.73	856.39	323.89	857.5
324.76	857.96	324.85	858	324.93	858.04	328.72	860		

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

0	.1	59.62	.035	114.73	.1	139.38	.035	204.35	.04
233.05	.1	287.92	.013	302.53	.1				

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
204.35	233.05	120.76	120.76	103.33	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12783.74

INPUT
Description:
Station Elevation Data num= 148

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	850	3.09	848	4.74	846.87	6.08	846	8.18	844.51
8.9	844	11.51	842.46	12.29	842	12.76	841.74	15.38	840.41
16.07	840	17.97	839.06	19.4	838	21.21	836.76	22.37	836
24	834.8	25.22	834	26.62	832.99	27.89	832	29.14	831.05
30.65	830	31.23	829.52	33.27	828	34.89	826.56	35.62	826
37.44	824.34	37.83	824	40.26	822.06	40.33	822	42.48	820.43
43.04	820.02	43.07	820	43.12	819.96	45.09	818.69	46.14	818
48.16	816.73	49.28	816	52.87	814.28	53.39	814	53.72	813.87
57.83	812	61.56	810.54	63.14	810	75.24	808.63	77.45	808.38
79.13	808.22	80.85	808	81.35	808	88.16	807.76	108.59	807.1
110.49	807.05	120.83	806.69	126.11	806.51	136.69	806.49	140.7	806.49
151.13	807.4	151.47	807.38	154.42	807.47	166.58	807.78	175.49	808
187.06	808	187.28	808.06	187.98	808.11	190.08	806.65	191.01	805.98
191.49	806	192.12	805.63	195.5	804.39	203.37	804.17	212.34	803.91
213.4	803.89	213.96	803.87	214.22	804.02	214.63	804.2	217.25	805.17
218.95	806	219.55	806.33	220.92	807	229.29	807.46	231.93	807.5
234.22	807.71	241.92	808	244.83	809.11	246.75	809.75	247.37	810
247.58	810.08	247.76	810.1	249.99	811.33	250.95	812	252.08	812.94
253.52	814	255.9	815.94	255.98	816	256.84	816.68	258.58	818
258.64	818.04	261.26	820.02	261.97	820.56	263.67	821.84	263.89	822
264.51	822.47	266.79	824	267.98	824.72	269.63	826	270.04	826.25
271.18	826.95	272.78	828	273.82	828.63	274.65	829.24	275.23	829.64
275.7	830	277.03	830.97	278.39	832	280.76	833.67	281.19	834
283.72	835.84	283.93	836	284.78	836.61	286.58	838	289.06	839.75
289.38	840	289.6	840.17	290.89	841.25	294.84	840.98	296.32	840.96
296.71	840.92	297.89	840.88	307.77	840.72	308.7	840.97	312.72	842
313.19	842.59	314.39	844	315.17	845.34	315.61	846	316.23	847.28
316.64	848	317.6	849.69	317.77	850	318	850.36	319.3	852
319.47	852.53	320.3	852.86	322.25	854	324.69	855.06	326.87	856
330.53	857.69	331.1	858	333.38	860				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	187.06	.04	220.92	.035	290.89	.013	307.77	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
187.06	220.92	73.75	73.75	73.99	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12709.20

INPUT
Description:
Station Elevation Data num= 141

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.56	828.27	2.96	828	3.46	827.64	5.83	826
8.26	824.47	8.96	824	10.3	823.03	12.05	822	13.76	820.95
15.32	820	17.61	818.55	18.4	818	19.73	817.13	21.6	816
22.53	815.49	25.27	814	27.03	813.07	29.14	812	32.78	810.51
33.89	810	36.38	809.33	40.3	808.07	40.47	808.02	40.53	808
50.81	807.52	55.4	807.44	60.57	807.3	96.56	806	108.16	806
125.26	806.73	134.35	807.2	139.76	807.26	152.52	807.58	161.31	807.8
162.33	807.81	173.83	807.26	174.69	807.24	183.83	806.94	186.43	806.87
189.9	806.8	191.96	807.07	199.64	807.92	202.23	806.03	202.25	806
203.2	805.1	203.31	804.95	206.51	805.01	207.55	805.05	208.08	804.84
208.19	804	210.22	804.14	210.48	804.17	210.59	804.16	211.75	804.13
216.38	803.94	222.39	803.67	223.95	803.98	224.12	804	225.23	804.52
228.3	806	228.54	806.07	229.42	806.35	230.75	807.55	231.27	808
233.64	809.92	233.73	810	235.65	811.61	236.13	812	237.53	813.19
237.56	813.21	237.66	813.29	238.9	814	241.24	815.75	241.58	816
243.97	817.68	244.41	818	244.82	818.3	247.27	820	248.02	820.58
249.05	821.36	249.97	821.78	250.41	822	252.53	823.05	254.3	824
257.9	825.72	258.43	826	259.05	826.34	260.56	827.1	261.21	827.72
261.53	828	262.89	829.24	263.72	830	265.58	831.69	265.98	832
266.26	832.23	268.25	834	268.58	834.28	269.99	835.64	270.59	835.95
270.66	836	273.39	837.8	273.62	838	276.37	839.8	276.61	840
276.93	840.26	278.11	840.79	279.62	841.67	280.19	842	282.41	842.4
287.31	842.39	288.32	842.36	298.16	842.42	298.64	842.43	299.52	842.47
300.73	842.57	301.04	842.6	301.39	842.63	301.66	843.82	301.76	844
301.93	844.24	303.24	846	303.29	846.08	303.55	846.53	304.43	847.96
304.46	848	304.48	848.04	305.24	849.37	305.62	850	306.7	851.69
306.94	852	307.02	852.11	307.92	853.89	307.99	853.91	308.62	854
310.94	855.7	311.37	856	311.64	856.18	314.55	858	314.71	858.11
317.75	860								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	40.3	.035	199.64	.04	231.27	.1	282.41	.013
300.73	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
199.64	231.27	118.63	118.63	143.39	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12590.58

INPUT
Description:
Station Elevation Data num= 127

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	1.64	828.76	2.62	828	5.27	826.07	5.35	826
7.97	824.03	8.01	824	8.06	823.96	10.76	822	11.12	821.73
13.3	820	15.47	818.41	16.02	818	18.68	816.11	18.82	816
18.93	815.92	20.86	814.52	21.55	814	21.83	813.8	24.27	812
26.22	810.83	27.73	810	29.39	809.3	31.51	808	36.98	806.28
37.64	806	81.83	806	82.33	806.04	96.06	806.7	103.4	806.42
105.46	806.38	109.43	806.81	110.49	806.93	132.94	807.59	134.82	807.67
136.5	807.7	145.34	807.69	160.45	807.69	164.92	807.66	187.09	806.58
191.72	806.3	194.36	806.11	196.17	806	196.74	806.28	197.15	805.56
197.49	804	197.63	803.97	198.35	803.76	213.25	803.53	219.45	803.43
221.84	803.39	222.16	803.58	223.05	804	225.63	805.16	227.54	806
228.48	806.48	229.74	806.97	234.65	808	235.26	808.15	238.79	808.75
240.64	809.23	242.21	810	243.03	810.36	246.26	812	247.36	812.47
247.85	812.71	249.16	813.62	249.84	814	251.19	814.82	253.19	816
255.02	817.08	256.54	818	258.85	819.34	260.07	820	260.38	820.27
263.58	821.76	264.09	822	268.14	823.85	268.44	824	271.48	825.41
272.82	825.99	272.83	826	276.42	827.95	276.51	828	276.95	828.27
280.08	830	280.53	830.25	280.9	830.45	283.62	832	285.18	832.84
287.25	834	288.77	834.81	289.52	835.25	289.87	835.64	290.36	836
291.18	836.64	292.78	838	294.79	839.7	295.16	840	295.38	840.13
297.5	842	298.14	842.62	298.36	842.87	303.15	843.5	304.33	843.63
305.47	843.69	311.53	844	312.22	844.03	313.01	844.07	316.73	844.51
318.4	844.75	318.7	845	319.66	846	321.02	847.11	321.9	848
322.83	848.94	324.1	850	325.01	850.94	326.35	852	326.69	852.56
327.63	853.18	328.84	854	331.67	855.85	331.84	856	334.87	857.95
334.93	858	337.99	860						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	37.64	.035	196.74	.04	227.54	.1	303.15	.013
318.4	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
196.74	227.54	119.79	119.79	89.65	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12466.12

INPUT
Description:
Station Elevation Data num= 147

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.99	828	4.45	826.97	5.61	826.22	5.92	826
6.16	825.85	8.7	824	11.14	822.25	11.5	822	13.4	820.8
14.79	820	17.48	818.65	18.5	818	20.48	816.96	21.84	816
22.9	815.26	24.8	814	27.99	812.07	28.11	812	28.51	811.87
33.77	810	36.97	808.81	39.23	808	47.61	806.49	50.04	806
78.12	806	80.04	806.16	81.02	806.04	81.44	806	88.47	805.38
88.55	805.38	92.54	805.08	92.97	805.12	102.37	806	103.18	806.08
106.54	806.43	113.84	807.22	124.88	807.17	128.97	807.14	132.11	807.17
134.65	806.64	143.45	807.47	143.49	807.43	143.6	807.01	143.72	806
143.98	805.31	144.17	804	144.22	805.12	144.5	803.76	153	803.4
154.12	803.35	163.09	802.9	164.69	803.99	164.7	804	166.49	805.02
167.6	805.62	170.38	805.73	170.94	805.74	181.47	805.66	187.28	805.77
189.97	805.91	191.17	806	191.96	806.06	197.93	806.51	202.07	806.23
205.3	806	217.22	805.18	219.53	805.01	220.3	804.95	221.83	805.18
224.17	805.55	227.19	806	233.03	806.94	234.9	807.23	235.45	807.32
235.56	807.41	235.78	807.52	237.41	808	238.04	808.46	239.93	808.84
243.17	809.62	244.54	810	246.09	810.83	248.59	812	249.19	812
251.72	813.88	251.95	814	254.16	815.59	254.63	816	256.85	817.6
257.18	818	258.31	819.12	259.37	819.93	259.51	819.99	259.62	820
260.26	820.51	262.34	822	262.86	822.37	265.12	824	265.97	824.62
267.81	826	267.92	826.05	268.11	826.13	268.87	826.89	270.15	828
271.98	829.89	272.17	830	272.46	830.23	274.51	832	275.42	832.72
276.91	834	278.75	835.42	279.45	836	281.79	837.73	282.19	838
282.49	838.19	284.39	839.63	284.88	840	284.91	840.03	287.52	842
288.68	842.95	289.28	843.45	289.78	843.53	291.66	844	292.64	844.28
294.66	844.75	302.14	844.46	304.7	844.4	306.04	844.76	309.96	845.85
310.47	845.87	310.55	846	311.25	846.72	312.55	848	313.24	848.84
314.24	850	315.8	851.79	315.99	852	316.07	852.11	316.72	853.01
316.79	853	318.41	854	321.2	855.85	321.41	856	324.42	857.93
324.53	858	327.66	860						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	50.04	.035	143.45	.04	167.6	.1	294.66	.013
306.04	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
143.45	167.6	124.22	124.22	107.77	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12336.63

INPUT
Description:

Station Elevation Data num= 142

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.91	828	3.39	827.64	5.14	826.52	5.79	826
6.24	825.68	8.59	824	10.2	822.8	11.33	822	11.59	821.82
14.23	820	16.02	818.73	17.1	818	18.68	816.97	20.18	816
22.59	814.51	23.42	814	23.85	813.75	26.55	812	29.82	810.2
30.12	810	31.61	809.42	35.07	808	56.03	806.68	67.64	806
80.05	806	83.63	806.18	89.38	806.46	93.57	806.71	121.45	807.45
122.82	806.91	125.55	806	129.45	804.78	131.33	804.15	135.3	804.02
136.23	804	137.23	803.93	139.15	803.82	141.94	803.71	145.58	803.58
147.41	803.74	147.62	803.76	149.97	804	154.2	804.42	160.59	804.93
161.84	805.06	162.87	805.18	171.52	805.34	177.54	805.44	177.88	805.47
178.07	805.5	178.81	805.6	182.24	806	186.83	806	192.29	806.44
193.72	806	198.3	804.69	200.48	804	201.15	803.71	215.22	803.25
215.79	803.23	223.73	802.9	224.84	803.47	225.5	804	225.68	804.09
226.28	804.52	226.39	804.78	229.15	805.56	231.29	806	233.15	806.61
234.32	806.92	235.02	807.5	235.67	808	238.06	809.77	238.4	810
238.57	810.12	241.17	812	243.02	813.34	243.95	814	244.33	814.27
244.63	814.51	245.04	814.79	246.85	816	247.72	816.6	249.79	818
250.77	818.67	252.81	820	254.48	821.14	255.75	822	256.05	822.25
256.27	822.38	259.35	824	261.21	825.01	263.15	826	266.82	827.96
266.89	828	266.93	828.02	267.11	828.12	270.68	830	273.64	831.57
274.49	832	277.12	833.42	277.34	833.54	277.88	834	278.4	834.36
280.52	836	281.41	836.67	281.45	836.7	283.02	838	284.27	838.93
285.64	840	287.51	841.39	288.29	842	289.89	843.05	291.06	844
291.67	844	296.81	844.92	296.98	844.95	297.23	844.95	309.44	844.88
313.05	845.54	315.9	846	316.12	845.78	316.16	845.71	316.17	845.71
316.26	845.79	316.65	846.14	318.57	848	320.17	849.47	320.68	850
322.45	851.55	322.88	852	322.98	852.13	322.99	852.29	325.38	853.81
325.7	854	326.24	854.34	328.83	856	329.24	856.26	331.93	858
332.23	858.19	335.02	860						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	35.07	.035	192.29	.04	231.29	.1	296.81	.013
313.05	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
192.29	231.29	134.44	134.44	106.77	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12201.47

INPUT
Description:
Station Elevation Data num= 128

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.16	828.06	2.24	828	4.48	826.19	4.7	826

6.84	824.27	7.11	824	7.62	823.57	9.54	822	10.67	821.08
11.8	820	14.83	818.02	14.87	817.98	17.52	816	18.97	814.79
20.17	814	22.8	812.21	23.15	812	23.57	811.72	24.68	811.06
26.36	810	27.74	809.34	30.62	808	36.99	807.71	38.89	807.65
51.88	807.09	52.85	807.07	79.41	806	164.37	806	166.32	806.04
171.37	806.14	174.51	806.22	175.24	806.17	177.11	806.04	177.77	806
192.12	806	192.23	805.99	194.74	805.83	206.23	804.86	209.52	805.02
210.56	805.17	214.45	805.22	218.18	804.47	221.37	804.4	223.66	804
224.73	803.79	225.03	803.71	233.23	803.39	237.4	803.21	239.4	803.14
243.93	802.96	245.52	802.9	247.3	803.99	247.32	804	247.33	804.02
247.95	804.39	248.84	804.72	252.74	806	253.32	806.23	258.33	808
258.75	808.03	258.91	808.04	259.47	808.56	260.87	810	262.24	811.3
263.06	812	264.46	813.36	265.19	814	265.8	814.71	267.06	815.42
267.78	816	267.84	816.09	269.25	816.92	271.07	818	272.98	819.1
274.54	820	277.82	821.96	277.89	822	277.95	822.04	281.44	824
282.94	824.89	284.54	826	284.58	826.08	287.3	827.46	288.3	828
291.62	829.89	291.83	830	294.85	831.63	295.57	832	295.65	832.04
299.47	834	302.45	835.59	303.23	836	303.39	836.07	303.64	836.18
305.89	837.81	306.12	838	307.87	839.37	308.5	839.85	308.7	840
308.72	840.02	311.55	842	311.88	842.24	314.38	844	314.81	844.31
316.87	845.78	317.92	845.98	318.12	846	318.69	846.14	322.14	846.92
330.33	846.96	333.02	846.98	339.17	846.27	339.3	846.26	339.33	846.35
340.09	848	340.93	849.13	341.64	850	342.75	851.78	342.88	852
343.02	852.3	344.31	854.04	344.32	854	344.52	854.16	346.91	856
350.22	857.92	350.53	858.09	353.88	860				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	30.62	.035	214.45	.04	248.84	.1	322.14	.013
339.17	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
214.45	248.84	271.82	147.48	205.71	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12106.82

INPUT
Description:
Station Elevation Data num= 155

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	1.97	828.58	2.66	828	4.99	826.36	5.41	826
5.73	825.73	8.13	824	8.49	823.76	11.14	822	13.8	820.26
14.22	820	16.39	818.57	17.26	818	18.85	816.85	20.44	816
23.52	814.11	23.71	814	23.8	813.94	27.12	812	28.96	810.88
30.73	810	33.99	808.77	36.6	808	54.09	807.32	64.43	806.92
68.26	806.76	84.27	806.07	85.74	806	95.33	806	95.81	805.96
97.35	805.81	97.49	805.79	97.62	805.77	109.84	804.04	110.35	804.28

110.74	804.44	115.49	806	115.6	806.04	116.18	806	174.71	806
178.9	806.97	181.08	807.48	182.08	807.66	183.19	807.56	184.44	807.65
185.64	807.41	186.6	807.28	188.12	806.85	189.06	806.49	190.86	806
198.49	805.47	201.76	805.07	215.79	804.15	218.14	804	220.46	803.88
224.48	803.62	226.05	803.58	228.93	803.8	231.14	803.89	232.1	803.95
233.27	803.91	234.46	803.92	235.95	803.86	236.4	803.82	236.71	803.85
237.71	803.75	238.31	803.59	240.82	803.59	248.62	803.8	257.65	803.53
264.49	803.26	270.02	803.04	273.89	802.9	274	802.9	274.33	802.96
278.63	803.76	278.99	803.87	279.31	804	279.47	804.05	282.8	804.99
285.88	806	286.77	806.38	291.63	808	292.72	808.57	295.73	810
296.98	810.67	299.29	811.8	299.66	812	300.91	812.57	302.92	813.61
305.14	814	312.33	815.08	312.73	815.15	313.19	815.22	313.21	815.24
313.35	815.32	314.05	816	315.9	817.33	316.95	818	317.69	818.52
319.48	820	321.69	821.84	321.91	822	323.58	823.4	324.34	823.99
324.35	824	324.38	824.02	326.88	826	327.04	826.12	329.43	828
331.64	829.83	331.87	830	331.9	830.06	332.88	830.94	335.56	831.86
335.86	832	336.9	832.64	337.91	833.11	339.85	834	342.11	835.43
343.08	836	343.93	836.54	346.31	838	348.65	839.47	349.56	840
349.69	840.08	353	842	353.71	842.4	356.49	844	357.6	844.66
360.09	846	360.78	846.47	360.97	846.7	364.14	846.81	365.97	846.87
371.58	846.7	377.59	846.72	382.3	846.87	383.62	846.93	383.76	847.18
384.25	848	385.99	849.75	386.23	850	386.29	850.1	387.98	852
388.04	852.07	389.73	854	391.56	855.86	391.71	856	391.91	856.39
392.38	856.98	392.41	856.98	393.07	857.37	394.28	858	397.55	860

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	36.6	.035	115.49	.1	190.86	.04	285.88	.1
364.14	.013	382.3	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
190.86	285.88	48.53	53.43	150.07	.1	.3

CULVERT

RIVER: Cabin Run
REACH: Upper RS: 12080

INPUT
Description:
Distance from Upstream XS = 9
Deck/Roadway Width = 14
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 3

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
190.86	806	0	266	804	0	285.88	806	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 155

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	1.97	828.58	2.66	828	4.99	826.36	5.41	826
5.73	825.73	8.13	824	8.49	823.76	11.14	822	13.8	820.26
14.22	820	16.39	818.57	17.26	818	18.85	816.85	20.44	816
23.52	814.11	23.71	814	23.8	813.94	27.12	812	28.96	810.88
30.73	810	33.99	808.77	36.6	808	54.09	807.32	64.43	806.92
68.26	806.76	84.27	806.07	85.74	806	95.33	806	95.81	805.96
97.35	805.81	97.49	805.79	97.62	805.77	109.84	804.04	110.35	804.28
110.74	804.44	115.49	806	115.6	806.04	116.18	806	174.71	806
178.9	806.97	181.08	807.48	182.08	807.66	183.19	807.56	184.44	807.65
185.64	807.41	186.6	807.28	188.12	806.85	189.06	806.49	190.86	806
198.49	805.47	201.76	805.07	215.79	804.15	218.14	804	220.46	803.88
224.48	803.62	226.05	803.58	228.93	803.8	231.14	803.89	232.1	803.95
233.27	803.91	234.46	803.92	235.95	803.86	236.4	803.82	236.71	803.85
237.71	803.75	238.31	803.59	240.82	803.59	248.62	803.8	257.65	803.53
264.49	803.26	270.02	803.04	273.89	802.9	274	802.9	274.33	802.96
278.63	803.76	278.99	803.87	279.31	804	279.47	804.05	282.8	804.99
285.88	806	286.77	806.38	291.63	808	292.72	808.57	295.73	810
296.98	810.67	299.29	811.8	299.66	812	300.91	812.57	302.92	813.61
305.14	814	312.33	815.08	312.73	815.15	313.19	815.22	313.21	815.24
313.35	815.32	314.05	816	315.9	817.33	316.95	818	317.69	818.52
319.48	820	321.69	821.84	321.91	822	323.58	823.4	324.34	823.99
324.35	824	324.38	824.02	326.88	826	327.04	826.12	329.43	828
331.64	829.83	331.87	830	331.9	830.06	332.88	830.94	335.56	831.86
335.86	832	336.9	832.64	337.91	833.11	339.85	834	342.11	835.43
343.08	836	343.93	836.54	346.31	838	348.65	839.47	349.56	840
349.69	840.08	353	842	353.71	842.4	356.49	844	357.6	844.66
360.09	846	360.78	846.47	360.97	846.7	364.14	846.81	365.97	846.87
371.58	846.7	377.59	846.72	382.3	846.87	383.62	846.93	383.76	847.18
384.25	848	385.99	849.75	386.23	850	386.29	850.1	387.98	852
388.04	852.07	389.73	854	391.56	855.86	391.71	856	391.91	856.39
392.38	856.98	392.41	856.98	393.07	857.37	394.28	858	397.55	860

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	36.6	.035	115.49	.1	190.86	.04	285.88	.1
364.14	.013	382.3	.1						

Bank Sta: Left	Right	Coeff Contr.	Expan.
190.86	285.88	.1	.3

Downstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
247.36	804	0	262	803		292	800.95	0
308.23	803.68	0						

Downstream Bridge Cross Section Data
Station Elevation Data num= 189

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.09	828	5.18	826.65	6.29	826	8.51	824.83

9.89	824	10.66	823.54	13.19	822	14.91	820.9	16.57	820
19.14	818.64	20.29	818	22.79	816.77	24.35	816	26.17	815.2
28.51	814	30.16	813.36	32.34	812.69	34.11	812.04	34.21	812
34.46	811.9	39	810	40.41	809.52	46.92	808	51.35	807.3
52.14	807.13	55.85	806.46	58.25	806	60.86	806	61.01	806.03
64.42	806.75	65.16	806.31	65.77	806	67.94	804.96	68.51	804.73
69.33	805.03	70.85	805.49	72.99	806	73.16	806.05	80.17	807.53
85.97	807.68	86.22	807.69	87.07	807.66	92.51	807.66	115.19	806.28
116.47	806.24	119.41	806.15	125.91	806	137.08	806	143.43	805.68
157.58	805.24	159.09	805.2	160.85	805.15	185.55	804.05	187.14	804.03
190.46	804.01	192.8	804	195.53	803.98	197.93	803.97	199.98	803.96
200.25	803.95	208.51	803.95	212.27	803.96	221.88	803.93	224.64	803.96
226.27	803.98	227.1	804	247.36	804	248.08	803.7	248.25	803.65
248.49	803.41	250.77	802.68	251.85	802.36	252.3	802	254.42	800.4
254.77	800.25	255.32	800.32	256.02	800	257.9	799.23	259.13	799.33
262.44	798.91	263.2	798.72	263.43	798.71	263.49	798.7	263.72	798.69
264.6	798.63	265.17	798.59	265.33	798.57	265.52	798.55	270.78	798.49
271.34	798.48	282.49	799.25	283.37	799.34	284.71	799.15	285.09	799.44
285.25	799.48	285.42	799.5	285.95	799.52	286.57	799.51	287.13	799.51
289.46	799.49	292.59	799.43	297.93	799.6	298.63	799.62	299.08	799.66
299.6	799.67	302.87	801.53	303.22	801.72	303.53	801.88	303.85	801.99
308.23	803.68	311.72	803.67	315.77	803.76	317.36	803.93	318.1	804
324.45	804.59	328.89	805.03	334.2	806	334.56	806	335.1	806.92
336.32	807.85	336.53	808	338.86	809.76	339.2	810	340.9	811.32
341.95	812	342.82	812.56	344.97	814	346.14	814.7	348.1	816
348.43	816.23	352.33	816.68	356.95	817.64	357.31	818	357.54	818.19
359.65	820	361.68	821.97	361.72	822	361.82	822.09	364.29	824
365.31	824.92	366.69	826	368.12	827.37	369.04	828	369.34	828.29
370.53	829.41	371.23	830	372.81	831.31	373.63	832	373.72	832.09
374.15	832.64	375.72	833.55	376.4	834	377.4	834.63	379.62	836
382.32	837.78	382.67	838	385.8	839.97	385.84	840	388.76	841.67
389.27	842	392.07	843.8	392.42	844	395.49	845.79	395.86	846
398.82	847.77	400.83	847.77	403.01	847.78	403.33	847.79	403.71	847.76
408.52	847.49	414.88	847.24	416.77	847.21	421.62	847	421.7	847.38
422.05	848	423.9	849.86	424.06	850	424.22	850.2	425.81	852
426.84	853.28	427.49	854	428.56	855.32	429.27	856	430.32	857.35
431.16	858.09	431.3	858	431.32	858	434.52	860		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	125.91	.035	247.36	.04	315.77	.013	338.86	.1
398.82	.013	421.62	.1						

Bank Sta: Left	Right	Coeff Contr.	Expan.
247.36	308.23	.1	.3

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins =
Energy head used in spillway design =

```
Spillway height used in design            =
Weir crest shape                          = Broad Crested

Number of Culverts =  2

Culvert Name     Shape      Rise    Span
Culvert #2      Circular     .83
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                  7      14     .011     .011        0                  .2
       1
Number of Barrels =  5
Upstream   Elevation =  803.5
Centerline Stations
    Sta.    Sta.    Sta.    Sta.    Sta.
  261.57  262.33  263.25  264.08  265.09
Downstream Elevation =  800.5
Centerline Stations
    Sta.    Sta.    Sta.    Sta.    Sta.
  286.69  287.53   288.3  289.06  290.15

Culvert Name     Shape      Rise    Span
Culvert #1      Circular    1.25
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                  7      14     .011     .011        0                  .2
       1
Number of Barrels =  6
Upstream   Elevation =  803
Centerline Stations
    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.
  267.61  269.23  270.74  272.09  273.55  274.61
Downstream Elevation =  800.26
Centerline Stations
    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.
  292.99   294.5  295.77  296.67  298.05  298.82

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

  Q Culv Group (cfs)         15.31    Culv Full Len (ft)        14.00
  # Barrels                      5    Culv Vel US (ft/s)         5.66
  Q Barrel (cfs)              3.06    Culv Vel DS (ft/s)         5.66
  E.G. US. (ft)             807.93    Culv Inv El Up (ft)      803.50
  W.S. US. (ft)             807.57    Culv Inv El Dn (ft)      800.50
  E.G. DS (ft)              807.27    Culv Frctn Ls (ft)         0.20
```

W.S. DS (ft)	807.15	Culv Exit Loss (ft)	0.37
Delta EG (ft)	0.66	Culv Entr Loss (ft)	0.10
Delta WS (ft)	0.43	Q Weir (cfs)	2111.04
E.G. IC (ft)	805.24	Weir Sta Lft (ft)	39.25
E.G. OC (ft)	807.95	Weir Sta Rgt (ft)	291.32
Culvert Control	Outlet	Weir Submerg	0.68
Culv WS Inlet (ft)	804.33	Weir Max Depth (ft)	3.90
Culv WS Outlet (ft)	801.33	Weir Avg Depth (ft)	2.08
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	525.50
Culv Crt Depth (ft)	0.76	Min El Weir Flow (ft)	804.01

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

Q Culv Group (cfs)	43.46	Culv Full Len (ft)	14.00
# Barrels	6	Culv Vel US (ft/s)	5.90
Q Barrel (cfs)	7.24	Culv Vel DS (ft/s)	5.90
E.G. US. (ft)	807.93	Culv Inv El Up (ft)	803.00
W.S. US. (ft)	807.57	Culv Inv El Dn (ft)	800.26
E.G. DS (ft)	807.27	Culv Frctn Ls (ft)	0.13
W.S. DS (ft)	807.15	Culv Exit Loss (ft)	0.42
Delta EG (ft)	0.66	Culv Entr Loss (ft)	0.11
Delta WS (ft)	0.43	Q Weir (cfs)	2111.04
E.G. IC (ft)	805.10	Weir Sta Lft (ft)	39.25
E.G. OC (ft)	807.92	Weir Sta Rgt (ft)	291.32
Culvert Control	Outlet	Weir Submerg	0.68
Culv WS Inlet (ft)	804.25	Weir Max Depth (ft)	3.90
Culv WS Outlet (ft)	801.51	Weir Avg Depth (ft)	2.08
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	525.50
Culv Crt Depth (ft)	1.07	Min El Weir Flow (ft)	804.01

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12052.69

INPUT
Description:
Station Elevation Data num= 189

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.09	828	5.18	826.65	6.29	826	8.51	824.83
9.89	824	10.66	823.54	13.19	822	14.91	820.9	16.57	820
19.14	818.64	20.29	818	22.79	816.77	24.35	816	26.17	815.2
28.51	814	30.16	813.36	32.34	812.69	34.11	812.04	34.21	812
34.46	811.9	39	810	40.41	809.52	46.92	808	51.35	807.3
52.14	807.13	55.85	806.46	58.25	806	60.86	806	61.01	806.03
64.42	806.75	65.16	806.31	65.77	806	67.94	804.96	68.51	804.73
69.33	805.03	70.85	805.49	72.99	806	73.16	806.05	80.17	807.53
85.97	807.68	86.22	807.69	87.07	807.66	92.51	807.66	115.19	806.28

116.47	806.24	119.41	806.15	125.91	806	137.08	806	143.43	805.68
157.58	805.24	159.09	805.2	160.85	805.15	185.55	804.05	187.14	804.03
190.46	804.01	192.8	804	195.53	803.98	197.93	803.97	199.98	803.96
200.25	803.95	208.51	803.95	212.27	803.96	221.88	803.93	224.64	803.96
226.27	803.98	227.1	804	247.36	804	248.08	803.7	248.25	803.65
248.49	803.41	250.77	802.68	251.85	802.36	252.3	802	254.42	800.4
254.77	800.25	255.32	800.32	256.02	800	257.9	799.23	259.13	799.33
262.44	798.91	263.2	798.72	263.43	798.71	263.49	798.7	263.72	798.69
264.6	798.63	265.17	798.59	265.33	798.57	265.52	798.55	270.78	798.49
271.34	798.48	282.49	799.25	283.37	799.34	284.71	799.15	285.09	799.44
285.25	799.48	285.42	799.5	285.95	799.52	286.57	799.51	287.13	799.51
289.46	799.49	292.59	799.43	297.93	799.6	298.63	799.62	299.08	799.66
299.6	799.67	302.87	801.53	303.22	801.72	303.53	801.88	303.85	801.99
308.23	803.68	311.72	803.67	315.77	803.76	317.36	803.93	318.1	804
324.45	804.59	328.89	805.03	334.2	806	334.56	806	335.1	806.92
336.32	807.85	336.53	808	338.86	809.76	339.2	810	340.9	811.32
341.95	812	342.82	812.56	344.97	814	346.14	814.7	348.1	816
348.43	816.23	352.33	816.68	356.95	817.64	357.31	818	357.54	818.19
359.65	820	361.68	821.97	361.72	822	361.82	822.09	364.29	824
365.31	824.92	366.69	826	368.12	827.37	369.04	828	369.34	828.29
370.53	829.41	371.23	830	372.81	831.31	373.63	832	373.72	832.09
374.15	832.64	375.72	833.55	376.4	834	377.4	834.63	379.62	836
382.32	837.78	382.67	838	385.8	839.97	385.84	840	388.76	841.67
389.27	842	392.07	843.8	392.42	844	395.49	845.79	395.86	846
398.82	847.77	400.83	847.77	403.01	847.78	403.33	847.79	403.71	847.76
408.52	847.49	414.88	847.24	416.77	847.21	421.62	847	421.7	847.38
422.05	848	423.9	849.86	424.06	850	424.22	850.2	425.81	852
426.84	853.28	427.49	854	428.56	855.32	429.27	856	430.32	857.35
431.16	858.09	431.3	858	431.32	858	434.52	860		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	125.91	.035	247.36	.04	315.77	.013	338.86	.1
398.82	.013	421.62	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
247.36	308.23	302.6	35.46	177.95	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12016.91

INPUT
Description:
Station Elevation Data num= 167

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.69	828	4.43	826.71	5.4	826	6.43	825.29
8.51	824	10.12	822.83	11.22	822	14.04	820.05	14.2	819.95
17.91	818	18.29	817.84	20.09	817.05	22.37	816.08	22.57	816

28.88	814.17	29.3	814	31.08	813.55	37.52	812	40.06	811.66
42.32	811.4	50.88	810	74.51	808.68	81.35	808.32	85.16	808.11
85.69	808.09	87.86	808	95.77	808	101.46	807.97	139.54	807.07
142.68	807	155.01	806.73	185.54	806	194.7	806	212.74	805.25
223.46	804.73	236.59	804.09	236.71	804.09	238.67	804	298.92	804
300.66	803.95	301.16	803.32	302.17	802	302.9	801.16	303.83	800
303.95	799.72	304.07	799.61	308.6	799.64	309.86	799.64	312.47	799.63
315.29	799.61	317.03	799.62	317.95	799.52	320.3	799.27	322.62	799.42
323.95	799.55	324.41	799.61	324.82	799.66	326.17	799.84	327.78	800
328.97	800.13	329.98	800.29	332.99	800.88	334.44	801.15	334.87	801.22
336.8	801.5	337.42	801.59	338.66	802	339.37	802.17	339.41	802.19
339.72	802.29	340.13	802.31	340.29	802.33	348.34	803.32	352.94	803.91
353.88	804	355.06	804	358.11	804.42	360.86	804.59	366.03	805.55
366.65	805.7	367.78	806.07	368.05	806.17	371.29	807.19	373.76	807.9
374.09	808	379.94	809.78	380.51	810	381.14	810.22	381.18	810.23
381.28	810.25	384.81	811.18	388.25	811.64	391.62	812	396.7	812.61
402.26	813.29	404.97	813.6	405.63	814	406.51	814.67	408.43	816
411.19	817.78	411.52	818	411.53	818	414.36	819.89	414.54	820
414.73	820.14	417.47	822	417.85	822.26	418.1	822.42	419.04	823.19
419.33	823.4	422.1	825.56	422.45	825.83	422.66	826	423.5	826.67
425.23	828	426.32	828.92	427.76	830	429.2	831.14	430.12	832
430.28	832.18	430.85	832.68	432.4	833.83	432.64	834	434.64	835.56
435.25	836	435.33	836.06	436.42	836.92	437.7	837.88	437.86	838
438.51	838.51	440.64	840	440.97	840.22	443.22	842	443.32	842.07
445.95	844	446.19	844.16	448.7	846	449.06	846.26	452.56	848.82
452.64	848.76	454.13	848.98	459.79	849.05	460.32	849.01	461.17	848.95
462.83	848.85	470.3	848.28	471.45	848.3	474.54	848.07	476.45	847.92
477.41	847.86	477.54	847.86	477.62	847.84	477.78	847.94	481.13	850
481.19	850.04	484.01	852	484.34	852.22	486.96	854	489.72	855.86
489.93	856	490.1	856.11	492.66	857.82	492.69	857.85	493.05	858.01
493.2	858.09	496.59	860						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	50.88	.035	308.6	.04	348.34	.013	367.78	.1
459.79	.013	477.41	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
300.66	352.94	296.75	99.03	182.81	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 11917.65

INPUT
Description:
Station Elevation Data num= 157

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.89	828	7.25	826.05	7.33	826	7.48	825.9

11	824	13.13	822.72	14.13	822	16.47	820.71	17.71	820
19.73	818.69	21.08	818	22.15	817.52	24.43	816.07	24.56	816
24.75	815.91	29.13	814	31.14	813.18	33.87	812	36.89	811.16
40.68	810	46.93	808.93	52.3	808	57.44	807.42	64.97	806.76
70.35	806.21	73.81	806	82.73	805.02	89.06	804.37	90.97	804.18
93.34	804	93.53	804	94.39	803.99	104.49	803.96	105.88	803.94
120.65	803.87	123.87	803.86	127.58	803.85	141.4	804	148.22	804
199.99	804	206.93	804.65	207.71	804.73	210.38	804.88	211	804.33
211.54	804	211.96	803.8	215.85	801.86	216.42	801.95	216.71	802
218.12	801.86	218.86	801.35	220.91	800.83	232.06	800.74	232.42	800.74
233.31	800.73	240.37	800.68	241.76	800.67	241.81	800.77	241.85	800.96
242.89	802	243.89	802.99	245.12	804	246.42	805.4	247.49	805.42
258.76	805.65	259.08	805.66	259.42	805.67	264.18	806	274.19	806
280.01	805.97	282.57	805.97	284.41	806	289.34	806.08	293.82	806.15
300.14	807.22	304.64	808	310.84	809.04	311.57	809.14	312.27	809.56
313.04	810	313.16	810.08	316.82	812	317.61	812.45	317.85	812.58
318.36	812.99	320.1	814	321.53	815.05	322.94	816	324.17	816.97
325.52	818	326.93	819.06	328.18	820	329.75	821.09	330.95	822
332.73	823.37	333.97	824	336.59	824.87	338.25	825.36	340.65	825.56
341.86	825.76	342.63	825.79	344.19	826	345.47	826	351.34	826.9
352.34	827.19	352.69	827.19	352.96	827.42	353.45	827.65	353.94	828
354.56	828.48	354.97	828.84	356.74	830	358.84	831.84	359.08	832
359.46	832.38	361.45	834	362.3	834.7	363.81	836	364.63	836.62
366.44	838	367.85	839.05	368.97	840	371.29	841.76	371.64	842
371.93	842.23	374.49	844	375.34	844.61	377.68	846	382.47	847.16
384.69	848	385.98	848.19	393.69	848.2	397.57	848.16	398.26	848.1
399.06	848	399.52	847.95	401.92	847.68	404.41	847.44	406.4	847.33
406.74	847.94	406.77	848	406.87	848.06	408.46	848.8	410.14	850
412.5	851.93	412.59	852	412.64	852.05	415.3	854	415.98	854.59
417.99	856	418.25	856.18	418.62	856.49	420.32	857.85	420.66	858
422.08	859.04	423.48	860						

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	52.3	.035	210.38	.04	246.42	.1	338.25	.013
351.34	.1	385.98	.013	406.74	.1				

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
210.38	246.42	143.36	163.25	197.2	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 11736.49

INPUT
Description:
Station Elevation Data num= 151

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.95	828	5.68	826.12	5.86	826	7.32	825.01

8	824.55	8.81	824	10.02	823.22	11.73	822	13.81	820.85
15.33	820	16.69	819.42	19.31	818	22.36	816.26	22.9	816
23.05	815.91	24.87	815.36	27.18	814	30.86	812.09	31.13	812
31.44	811.82	35.09	810	37.01	809.02	38.98	808.16	39.27	808
39.51	807.89	42.7	806.58	44.08	806	44.21	805.95	44.29	805.93
44.48	805.89	46.3	805.37	50.98	804	53.18	803.8	57.76	803.34
58.28	802.06	58.29	802	58.45	801.74	58.91	800.68	59.19	800.16
59.33	800	59.8	799.53	59.82	799.52	60.03	799.52	70.54	799.96
80.05	800.31	81.38	800.3	90.42	800.3	91.92	800.28	115.78	800.3
117.6	800.31	119.92	799.99	121.22	800	121.81	800.81	122.66	802
124.17	802.58	127.13	804.17	127.23	804	133.1	804.08	135.47	804.11
140.97	804.17	151.13	804.28	157.22	804.31	172.55	805.59	175.54	805.44
175.82	805.44	178.85	805.47	194.7	804.99	198.42	805.17	211.33	805.58
214.07	805.17	214.76	805.11	215.2	805.11	219.78	805.48	231.32	804.97
252.2	805.5	257.05	805.81	257.51	806	259.19	806.5	263.06	808
265.22	808.92	267.83	810	268.82	810.42	271.42	811.48	271.85	811.74
272.1	812	274.39	813.47	275.26	814	276.99	815.2	278.15	816
279.36	816.62	281.27	818	282.41	818.73	284.48	820	285.77	820.83
286.58	821.33	286.77	821.41	287.93	822	290.5	823.45	291.42	823.98
291.43	824	292.4	824.58	295.08	826	296.01	826.52	296.43	826.79
298.22	828	298.61	828.23	301.21	830	301.88	830.43	304.12	832
306.12	833.04	307.45	834	307.73	834	308.89	834.42	310.48	834.84
311.48	834.97	317.68	835.3	318.35	835.32	319.07	835.35	319.38	835.39
319.78	835.49	320.79	836	320.84	835.92	322.69	836.68	324	838
324.8	838.84	326.12	840	327.95	841.84	328.24	841.96	328.39	842
328.92	842.34	331.63	844	332.03	844.35	333.03	844.86	333.13	844.88
333.25	844.9	334.43	845.11	336.08	845.36	338.17	845.63	339.33	845.73
341.57	846	350.41	846.35	351.52	846.37	353.61	846.31	353.9	846.31
359.77	846.17	360.4	846.19	362.05	846.08	362.39	846.48	363.94	848
366.14	850								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	57.76	.04	127.13	.1	310.48	.013	319.78	.1
341.57	.013	362.05	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
57.76	127.13	53.75	53.75	45.14	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 11681.96

INPUT
Description:
Station Elevation Data num= 132

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.79	828	3.32	827.61	5.9	826	6.93	825.3
7.75	824.73	8.74	824	11.48	822.23	11.83	822	12.88	821.32

14.72	820	15.74	819.19	17.35	818	18.02	817.52	20	816
21.67	814.71	22.75	814	23.77	813.36	25.57	812	27.84	810.33
28.3	810	30.94	808.11	31.09	808	31.62	807.7	35.5	806
38.44	804.78	39.38	804.27	39.88	804	40.16	803.82	43.25	802
43.57	801.75	46.21	800.6	47.35	800	48.05	799.72	48.13	799.61
48.25	799.47	49.46	799.53	55.51	799.64	63.85	799.82	63.98	799.81
64.88	799.95	65.07	800	65.11	800.09	66.76	802	67.94	803.46
68.07	803.55	68.83	803.6	70.53	803.64	73.33	803.7	87.08	804
103.91	804	109.55	804	118.45	803.5	127.58	803.19	139.69	803.34
151.68	803.32	159.31	803.85	161.63	804	166.89	804.34	174.59	804.83
188.45	804.21	192	804.14	196.34	804	197.03	804.01	198.16	804.03
201.7	804.37	206.4	804.08	207.31	804	219.73	804	220.84	804.01
221.49	804.03	224.47	804.29	238.11	805.01	238.43	805.18	240.09	806
243.74	807.87	244.01	808	244.06	808.02	248.26	810	249.77	810.76
251.23	811.52	251.64	811.77	251.99	812	252.93	812.53	255.4	814
257.7	815.48	258.54	816	259.74	816.75	261.79	818	262.69	818.55
265.28	820	265.45	820.11	266.49	820.83	267.19	821.13	269.35	822
273.84	823.96	273.95	824	277.85	825.6	278.86	826	279.29	826.18
283.28	827.9	283.36	828	285.91	829.65	286.15	829.74	286.53	829.99
286.54	830	286.88	830.27	289.24	832	290.17	832.71	291.95	834
293.47	835.12	294.65	836	295.66	836.72	297.4	838	300.19	839.7
301.03	840	305	840.54	315.78	841.72	317.95	842	318.1	842.05
318.68	842.33	319.86	842.46	326.71	842.84	334.28	843.26	335.29	843.35
336.35	843.48	339.65	844	341.36	845.36	342.57	846	344.37	847.93
344.43	848	346.37	850						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	39.88	.04	67.94	.1	127.58	.035	238.11	.1
305	.013	339.65	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
39.88	67.94	134.52	134.52	52.33	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 11547.41

INPUT
Description:
Station Elevation Data num= 133

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.83	828	5.9	826.54	6.64	826	7.11	825.68
7.25	825.58	8.54	824.7	9.61	824	11.87	822.65	12.59	822
13.37	821.41	15.28	820	17.72	818	20.05	816	21.91	814.53
22.59	814	24.04	812.51	24.48	812	26.13	810.25	26.35	810
29.13	808.34	29.55	808	29.93	807.79	33.56	806	35.36	805.11
38.16	804	41.71	803.44	43.38	803.11	45.83	802.61	46.13	802.24
46.28	802	46.48	801.86	48.73	800	49.77	799	50.59	798.29

64.62	798.24	68.66	798.21	70.08	799.74	70.28	800	70.51	800.27
72.3	802	73.08	802.92	74.5	804.27	75.76	804.01	75.8	804
79.56	804	108.74	803.9	114.76	803.88	128.17	803.84	137.8	803.81
147.52	803.74	167.75	803.41	177.87	803.28	191.44	803.51	210.33	803.81
213.19	803.9	216.75	804	222.54	804.17	226.42	804.26	239.48	805.65
242.14	806	242.67	806.33	246.61	808	248.04	808.86	250.16	810
252.04	810.89	253.85	812	254.57	812.39	255.6	812.92	256.8	813.68
257.37	814	259.54	815.39	260.54	816	261.98	816.97	263.62	818
265.92	819.45	266.84	820	269.32	821.61	270	822	270.11	822.06
270.7	822.45	273.75	824	274.66	824.44	277.68	826	278.52	826.42
280.45	827.41	281.79	827.97	281.95	828	285.84	829.68	286.63	830
287.19	830.23	289.15	830.8	291.12	832	291.27	831.96	291.39	832.01
291.79	832.21	294.83	834	297.03	835.23	298.26	836	300.65	837.39
301.6	838	303.94	839.34	305.12	840.02	305.87	839.99	305.96	840
306.17	840.02	311.55	840.55	315.88	840.44	324.61	840.28	330.59	841.31
331.75	841.47	331.86	841.55	332.59	842	334.82	843.49	335.67	844
336.45	844.46	338.76	846	339.38	846.38	339.92	846.75	341.84	848
343.3	849.01	344.78	850	346.9	851.49	347.68	852	348.99	852.95
350.67	854	351.19	854.32	353.73	856.03	353.98	856.01	354.02	856
356.56	857.31	358.03	858	362.46	860				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	45.83	.04	74.5	.035	242.14	.1	305.12	.013
330.59	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
45.83	74.5	85.55	85.55	62.2	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 11461.86

INPUT
Description:
Station Elevation Data num= 122

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.11	828	3.67	826.45	4.29	826	4.85	825.59
6.58	824	7.17	823.54	8.36	822.59	9.37	822	12.11	820.08
12.31	820	14.39	818.61	15.2	818	17.83	816.01	17.84	816
18.09	815.86	21.14	814.24	21.6	814	22.33	813.6	25.03	812
27.85	810.37	28.54	810	29.58	809.55	32.52	808.34	33.33	808
34.1	807.68	38.19	806	42.86	804.09	43.08	804	45.38	803.61
51.8	802.46	54.03	802	54.32	802.21	54.34	802.22	55.11	801.54
56.96	800	57.83	799.2	58.87	798.29	65.68	798.23	70.56	798.19
77.44	798.12	78.63	799.6	78.91	800	79.12	800.23	80.97	802
81.54	802.71	82.2	803.65	82.59	803.58	82.84	803.57	111.18	803.68
125.48	803.56	157.2	803.3	170.81	803.33	182.18	803.23	207.85	803.44
221.29	803.57	239.69	803.67	244.33	803.7	246.29	803.89	248.01	804

253.22	804.55	262.44	805.26	263.89	806	266.26	807.25	267.79	808
270.91	809.68	271.53	810	271.89	810.16	272.64	810.58	272.78	810.67
274.93	812	277.07	813.24	278.16	814	279.86	815.16	281.16	816
282.01	816.49	284.38	818	285.26	818.5	287.32	819.78	287.77	820
288.54	820.45	291.57	822	292.66	822.64	295.29	824	297.21	824.99
298.37	825.69	298.85	826	301.68	827.77	302.02	828	302.3	828.19
305.24	830	305.9	830.42	308.38	832	309.51	832.55	310.58	833.35
311.67	834	312.23	834.39	314.36	834.46	318.31	835.08	319.9	835.19
323.63	835.23	327.52	835.49	330.3	835.6	331.32	835.69	334.12	836
338.91	836.9	340.26	837.25	340.84	837.47	341.55	838	342.28	838.66
343.91	840	345.2	841.11	346.25	842	348.29	843.86	348.45	844
348.62	844.19	349.23	844.62	351.15	846	352.02	846.58	354.56	848
355.4	848.42	358.51	850.01						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	54.32	.04	82.2	.035	262.44	.1	318.31	.013
338.91	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
54.32	82.2	139.15	139.15	49.68	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 11316.17

INPUT
Description:
Station Elevation Data num= 128

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.5	828	5.69	826.77	6.93	826	7.55	825.61
9.91	824	11.2	823.05	13.16	822	14.83	820.99	16.98	820
17.93	819.37	19.94	818	21.95	816.7	23.24	816	25.53	814.82
27.44	814	29.95	812.62	30.64	812	32.67	810.78	33.6	810
34.63	809.38	37.54	808	38.71	807.25	38.83	807.17	40.43	806
42.35	805.23	46.21	804	100.11	804	101.11	803.94	115.43	803.18
115.7	802.94	115.99	802	117.44	800.6	117.99	800	118.1	799.88
119.12	798.2	130.06	798.17	137.88	798.15	145.61	798.14	156.11	798.12
158.91	799.52	159.86	800	160.47	800.3	164.05	802	166.25	803.12
166.53	803.29	166.54	803.31	199.52	803.56	232.95	803.54	234.89	803.54
269.37	803.48	274.44	803.46	277.48	803.45	307.09	803.55	327.63	803.75
350.45	802.69	355.34	802.47	358.7	802.69	374.72	803.51	375.34	803.83
375.72	804	378.95	805.29	380.75	806	382.87	806.92	385.56	808
386.83	808.53	386.88	808.6	393.8	809.87	394.37	810	395.03	810.16
402.84	812	402.88	812.01	402.91	812.02	405.76	813.01	407.62	814
410.34	815.55	410.71	815.78	411.15	816	412.2	816.59	414.8	818
416.01	818.66	417.98	819.64	418.55	820	419.14	820.42	421.92	822
422.99	822.77	424.65	824	426.37	825.25	427.16	826	429.04	827
429.47	827	433.27	826.85	434.36	826.56	435.85	826.29	436.26	826.28

438.45	826.55	448.42	827.31	449.12	827.37	449.17	827.38	449.27	827.37
449.59	827.44	450.82	827.54	455.8	828	456.84	828.32	458.05	829.01
459.14	830	460.76	831.59	461.23	832	461.25	832.06	462.91	833.76
463.19	834	464.29	835.04	464.45	835.32	465.42	836	466.35	836.82
467.77	838	469.74	839.72	470.08	840	470.9	840.73	472.31	841.92
472.41	842	472.5	842.07	474.82	844	477	845.86	477.18	846
477.72	846.46	479.55	848	485.32	850				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	115.43	.04	166.25	.035	374.72	.1	438.45	.013
455.8	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
115.43	166.25	106.44	106.44	577.06	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 11190.54

INPUT
Description:
Station Elevation Data num= 153

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.44	828	6.06	826.82	7.27	826.14	7.57	826
7.9	825.85	11.48	824	13.33	823.06	14.13	822.49	14.68	822
15.29	821.38	16.19	820.7	17.44	820	19.73	818.77	21.16	818
24.32	817.02	26.4	816	28	815.3	30.58	814.77	35.11	814.02
35.17	814	39.34	812.18	39.65	812	39.71	811.94	42.35	810
42.4	809.96	45.31	808	46.74	806.93	48.59	806	49.33	805.69
51.63	804	51.81	804	54.93	803.46	62.53	802	80.08	802
97.07	802.42	102.43	802.53	109	802.67	112.3	802.75	128.82	803.19
129.44	802.73	131.74	802.27	132.34	802	133.12	802.27	133.36	801.08
134.4	800	135.44	798.91	136.12	797.81	137.38	797.84	138.6	797.83
143.48	798	143.83	798.05	144.35	797.94	148.54	797.95	155.45	797.91
157.09	797.92	165.27	797.88	167.73	797.86	173.46	797.86	175.7	797.88
181.6	797.88	182.99	797.89	188.64	797.94	191.82	797.97	201.4	798.03
208.78	798.12	209.66	798.03	209.97	798	210.33	798.29	211.13	799.04
214.21	799.21	216.38	799.33	218.81	799.95	219.04	800	219.36	800.07
223.75	801.13	229.24	801.87	230.2	802	231.06	802.1	233.77	802.45
238.59	802.43	243.97	802.27	245.37	802.36	250.49	802	253.05	802
258.42	801.4	258.86	801.37	259.17	801.35	259.37	801.35	259.74	801.34
261.37	801.35	267.62	801.7	272.25	801.87	274.49	802	274.66	802.01
280.58	802.4	281.45	802.45	283.82	802.58	301.66	803.19	303.11	803.25
305.71	803.28	322.5	803.36	329.92	803.28	346.87	802.94	355.52	803.41
357.19	803.52	365.85	804	375.05	804.52	378.43	804.7	378.67	804.71
379.45	804.79	379.91	804.74	385.23	804.23	385.38	804.23	388.23	804.06
390.06	804	394.7	804	395.14	804.04	398.65	804.27	399.77	804.38
401.12	805.96	401.17	806	401.59	806.42	403.16	807.97	403.19	808

404.39	809.26	405.08	809.98	405.1	810	406.94	811.76	407.2	812
408.13	813.12	408.17	813.18	409.06	813.57	410.26	814	410.97	814.28
416.08	816	416.74	816.24	422.08	818	425.36	819.55	426.26	820
427.53	820.64	430.15	822	431.27	822.56	434.04	824	435.26	824.59
437.76	825.96	437.84	826	439.03	826.59	439.07	826.61	439.17	826.67
441.7	828	441.78	828.04	445.37	830				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	62.53	.035	132.34	.04	233.77	.035	385.23	.013
398.65	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
132.34	233.77	99.19	99.19	45.84	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 11091.35

INPUT
Description:
Station Elevation Data num= 125

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	1.72	828	2.01	827.74	3.65	826	5.65	824.27
6.16	824	7.27	823.45	7.58	823.34	9.25	822.79	9.96	822.7
10.55	822.59	11.53	822.49	14.09	822.68	15.42	822.69	17.96	822.24
18.7	822	20.31	821.03	22.25	820	22.98	819.46	25.06	818
25.58	817.66	28.43	816	31.08	814.06	31.16	814	31.28	813.93
34.03	812	34.47	811.73	37.2	810	40.49	808.11	40.67	808
40.85	807.9	44.48	806	47.13	804.76	48.68	804	52.04	802.79
55.64	802	148.28	802	158.19	802	161.58	802.07	162.9	802.07
181.69	802.29	200.86	802.7	202.26	802.72	207.73	802.82	208.43	802.83
210.66	802.86	218.61	802.95	219.99	802.24	220.49	802	222.25	801.16
224.29	800	226.3	798.16	226.44	798.08	226.49	798	226.54	797.98
227.69	797.71	233.03	797.78	237.03	797.83	240.83	797.9	241.5	797.91
250.75	798.06	254.24	798.12	256.6	798.03	257.16	798	257.9	798.41
260.1	798.2	260.3	798.14	260.43	798.11	261.09	798.06	269.29	799.09
269.73	799.28	271.3	800	272.93	800.68	275	801.67	281.61	801.84
285.26	801.91	288.88	802	290.89	802.18	301.02	802.92	315.75	802.54
323.88	802.89	328.21	803.19	333.63	803.39	350.05	804	353.96	804.29
356.4	804.46	379.26	805.98	379.49	805.99	379.61	806	384.82	806
385.06	805.97	387.89	805.62	389.21	805.39	395.39	805.28	399.97	805.2
400.68	805.27	403.48	805.72	403.61	806	403.87	805.8	404.75	806.43
406.42	808	407.25	808.67	408.73	810	409.97	811.28	410.85	812.09
411.3	812.13	411.32	812	414.14	812.96	417.43	814	421.19	815.08
424.47	816	427	816.69	430.43	817.68	431.58	818	434.71	818.98
437.43	820	438.45	820.38	442.64	822	444.84	822.86	447.88	824
450.91	825.16	453.16	826	456.8	827.41	458.38	828	463.37	830

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	55.64	.035	222.25	.04	275	.1	301.02	.035
389.21	.013	399.97	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
222.25	275	129.26	129.26	152.11	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 10962.06

INPUT
Description:
Station Elevation Data num= 129

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.92	828	3.03	827.91	4.04	827.32	6.15	826
8.32	824.72	9.69	824	11.26	823.08	13.11	822	15.3	820.72
17.73	819.41	19.36	818.47	20.04	818	20.5	817.72	23.41	816
26.67	814.22	26.95	814	27.27	813.75	29.96	812	32.38	810.31
32.89	810	33.43	809.67	36.23	808	40.03	806.21	40.39	806
41.25	805.76	42.39	805.53	47.04	804.46	50.43	804	51.71	803.83
52.44	803.68	56.22	802.95	61.53	802	76.35	802	142.39	801.3
142.92	801.31	180.84	801.68	192.21	801.82	192.54	801.82	204.2	801.91
209.84	801.95	212.44	802	222.95	802.21	222.97	802.21	226.71	802.24
235.95	802.23	237.35	802.24	253.04	802.53	255.69	802.58	269.83	803.11
269.98	803.1	270.08	803.1	270.11	803.09	275.69	802	275.88	802
280.27	801.73	281.74	801.71	288.6	802	292.02	802.14	292.74	802.12
294.11	802.02	294.21	802.02	294.3	802	296.87	801.49	302.42	800.09
303.19	800.05	303.89	800	307.1	799.74	309	799.62	312.69	799.54
314.42	798.24	314.73	798	314.89	797.93	315.58	797.48	322.11	797.29
324.22	797.27	332.67	797.16	338.53	796.99	342.28	796.89	352.72	796.76
353.08	797.48	353.42	798	354.56	798.84	355.69	800	356.72	800.84
357.92	802	358.58	802.78	358.91	803.15	361.75	803.48	362.64	803.6
364.53	804.02	364.78	804.02	366.71	803.63	369.94	802.95	377.14	803.11
382.09	803.36	383.03	803.41	384.19	803.56	384.91	804	386.49	805
388.07	806	388.81	806.41	389.86	807.1	390.69	807.74	391.1	808
392.91	809.34	393.77	810	396.09	811.61	396.61	812	397.99	812.98
399.64	814	402.4	815.75	402.95	816	404.45	816.88	406.38	818
408.98	819.49	409.94	820	412.39	821.38	413.7	822	415.81	823.15
416.22	823.33	417.66	824	418.35	824.37	420.7	825.62	421.48	826
423.16	826.92	424.59	827.7	425.14	828	428.88	830		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	61.53	.035	312.69	.04	354.56	.1	369.94	.013
383.03	.1								

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

312.69	354.56	58.91	58.91	64.64	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 10900.67

INPUT
Description:
Station Elevation Data num= 122

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.77	828.62	3.79	828	5.62	827.19	8.2	826
10.9	824.4	12.02	824	13.99	822.69	15.63	822	17.28	821.21
19.85	820	20.7	819.45	22.82	818	23.53	817.49	25.22	816
25.9	815.49	27.81	814	27.86	813.96	30.08	812	30.49	811.71
32.48	810	34.32	808.62	34.96	808	35.75	807.34	37.88	806
40.89	804.06	40.98	804	41.38	803.9	48.54	802	51.74	802
60.96	800.9	62.27	800.76	64.92	800.59	72.93	800	86.42	800
87.27	800.02	87.32	800.01	87.83	800.01	89.38	800.02	90.09	800.03
90.31	800.03	94.09	800.08	120.06	800.3	143.65	800.54	213.8	801.17
230.1	801.59	244.42	802	247.11	802	251.15	802.09	253	802.06
259.01	802	261.84	802	274.6	802	274.93	802.01	276.42	802.02
291.58	802.49	302.72	802.43	303.59	802.45	303.75	802.39	305.2	802.06
305.53	802	305.76	801.95	309.38	801.25	311.62	801.29	312.76	801.31
313.73	800.64	314.73	800	315.2	799.66	316.03	798.82	316.35	798.88
316.68	798.85	317.82	798.22	318.25	798	318.71	797.79	319.73	797.13
328.71	796.98	330.87	796.95	345	796.76	345.88	797.62	346.33	798
348.54	799.47	349.17	800.11	349.4	800	352.17	800.39	354.91	800.79
356.25	800.83	358.57	801.01	368.29	802	368.3	802	369.42	801.96
370.34	802.98	371.31	804	372.89	805.61	373.26	806	373.74	806.64
373.89	806.81	373.95	806.84	375.52	808	377.15	809.17	378.2	810
378.9	810.55	380.83	812	381.67	812.64	383.43	814	384.68	814.89
384.87	814.96	386.27	816	388.7	817.65	389.2	818	390.85	819.06
392.46	820	392.95	820.28	395.95	822	396.62	822.4	398.05	823.22
398.64	823.57	399.43	824	400.94	824.91	402.74	826	405.47	827.77
405.83	828	409.13	830						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	48.54	.035	314.73	.04	349.17	.013	368.29	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
314.73	349.17	194.97	194.97	182.73	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 10705.68

INPUT
Description:
Station Elevation Data num= 120

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	.84	829.52	4.29	828	7.54	826.15	7.81	826
8.82	825.39	10.79	824.34	11.48	824	14.92	822.08	15.05	822
19.45	820	24.1	818	24.61	817.76	27.57	816.55	28.57	816
30.07	815.17	32.81	814	36.82	812.05	36.93	812	37.03	811.95
39.59	810.74	41.21	810	46.33	808.02	46.39	808	46.49	807.96
46.75	807.89	47.37	807.7	52.78	806	53.36	805.76	55.62	804
58.32	802.31	58.97	802	72.02	801.04	80.33	800.59	90.66	800
187.84	800	190.95	799.87	199.93	799.98	205.48	800.19	207.07	800.23
209.31	800.25	220.87	800.27	232.79	800.29	235.83	800.32	241.66	800.41
257.2	800.83	260.28	800.84	264.28	800.86	267.38	800.88	269.12	801.02
287.34	801.68	289.17	801.4	298.13	799.99	306.78	799.99	323.33	800
324.22	800.18	324.67	800.25	324.75	800.27	324.81	800.29	324.82	800.17
324.87	800.1	324.96	800	326.18	798	326.35	797.55	326.38	796.67
341.25	796.47	345.05	796.39	357.2	796.15	359.61	797.82	359.79	798
360.3	798.18	363.72	798.92	366.84	799.73	367.1	799.74	367.19	799.75
367.79	799.78	367.99	799.78	369.2	799.81	372.36	799.88	377.41	800
377.48	800	378.13	800.02	378.76	800.02	382.89	800.71	384.14	800.98
385.37	800.9	386.07	801.95	386.13	802	388.39	803.88	388.57	804
390.7	805.81	391.05	806	391.98	806.47	394.47	808	395.43	808.54
398.12	810	398.82	810.41	401.86	812	402.28	812.23	405.78	814
405.9	814.06	406.46	814.33	408.14	815.34	409.4	816	411.11	816.93
413.06	818	413.9	818.03	414.9	818.52	415.28	818.77	416.71	820
419.76	821.78	420.13	822	420.42	822.16	423.33	824	423.68	824.22
426.46	826	427.33	826.52	429.81	828	430.48	828.22	433.8	830

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	58.97	.035	298.13	.1	324.87	.04	366.84	.013
378.13	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
324.87	366.84	259.79	259.79	216.96	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 10444.93

INPUT
Description:
Station Elevation Data num= 133

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	5.01	828	7.77	826.97	9.55	826	13.61	824.67
15.33	824	16.62	823.41	19	822	21.33	820.56	22.24	820
24.78	819.06	28.13	818	30.56	817.01	33.19	816	35.62	815.18
39.01	814	39.44	813.81	44.31	812	50.69	810.88	51.34	810.82

58.58	810	61.86	810	68.03	808.52	71.34	808	71.67	808
72.86	807.89	73.06	807.87	82.12	807.29	85.44	807.1	88.63	806.97
93.05	806.57	95.07	806.44	98.86	806.15	100.32	806	103.84	805.66
107.49	805.38	110.61	805.1	116.28	804.49	118.89	804.23	119.19	804.21
119.69	804.18	122.15	804	123.11	804	127.73	803.64	128.43	803.58
134.31	803	137.77	802.79	141.2	802.54	143.84	802.35	147.77	802
158.07	800.98	166.2	800	166.71	800	206.07	799.79	249.89	799.66
262.04	799.62	263.68	799.65	269.94	799.73	271.3	799.75	279.56	800
284.52	800.4	300.41	800.84	305.44	800.91	318.91	800.49	321.7	800.38
330.79	800	330.95	800.4	331.21	800.57	331.36	800.87	331.75	799.84
332.5	798	332.93	796.69	333.29	796	333.39	795.69	333.8	794.99
341.99	795.1	343.65	795.13	349.45	795.21	352.98	795.81	353.72	796
354.84	796.32	359.66	797.54	360.82	797.67	363.7	798	374.27	799.26
375.11	799.36	376.48	799.31	388.94	798.93	396.46	798.98	396.55	798.98
396.57	798.99	400.23	800	400.38	800.04	404.93	801.31	409.58	800.89
410.47	800.77	410.87	800.76	422.38	800.76	424.53	800.88	425.56	801.06
426.19	802	427.7	803.41	428.25	804	428.35	804.11	429.86	806
430.98	807.33	431.63	808	432.1	808.5	432.14	808.51	432.95	809.41
433.39	810	433.95	810.72	435.11	812	435.68	812.74	436.84	814
437.22	814.46	437.5	814.68	438.15	815.62	438.41	816	439.02	816.85
440.59	818.97	441.29	820	441.81	820.75	442.85	822	443.52	822.9
444.54	824	445.77	825.29	446.72	826	449.59	827.55	450.28	828
451.03	828.44	453.49	829.39	454.35	830				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	44.31	.035	332.5	.04	359.66	.1	410.47	.013
422.38	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
332.5	359.66	61.04	61.04	82.99	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 10376.87

INPUT
Description:
Station Elevation Data num= 128

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	4.02	828.07	4.17	828	4.35	827.92	7.94	826
9.87	824.99	11.73	824	13.05	823.47	17.21	822	18.41	821.49
21.24	820	23.62	818.75	25.17	818	26.31	817.66	28.12	817.52
31.57	817.03	32.88	816.92	34.94	816.71	40.59	816	42.73	815.7
44.92	815.43	47.55	815.17	52.11	814.75	56.37	814.4	57.74	814.27
60.14	814	67.66	813.17	69.31	813.01	76.84	812.05	77.25	812
87.57	810.96	89.73	810.73	95.73	810	105.84	808.33	107.83	808
108.32	807.87	114.59	806	117.62	804.8	119.98	804	123.2	803
125.71	802	129.04	800.85	131.44	800	135.09	799.97	157.79	799.8

169.16	799.72	238.02	799.24	247.42	799.51	258.2	799.84	263.8	799.99
269.66	800.16	280.72	800.43	284.64	800.43	295.53	800.57	301.61	800.56
320.67	800.41	323.39	800.29	325.07	800.22	325.97	800.2	326.46	800.19
330.71	800.19	337.98	800	351.59	800	351.99	799.99	352.99	799.95
356.72	798.74	358.21	798.43	360.09	798.03	360.17	798	360.89	797.94
364.1	797.67	364.21	797.66	364.32	797.56	364.47	797.37	364.88	796
365.25	795.52	365.4	794.99	366.66	795	378.18	795.11	380.38	795.13
381.58	795.14	387.92	795.21	388.56	795.97	388.58	796	388.65	796.13
390.07	798	390.62	798.74	391.82	800	392.4	800.82	393.05	801.6
393.96	801.58	396.3	801.23	402.25	801.42	406.89	801.6	408.1	801.88
408.42	802	408.59	802.02	411.07	802.53	411.7	803.19	412.35	804
413.53	805.23	414.31	806	415.6	807.39	416.13	808	417.03	808.8
417.24	809.15	417.51	810	418.02	811.14	418.48	812	418.96	812.88
419.46	814	419.85	814.7	420.49	816	421.06	816.91	421.55	818
422.22	819.22	422.89	820	424.12	820.99	424.92	822	426.55	823.22
427.61	824	428.26	824.49	430.28	826	430.93	826.53	432.55	827.84
432.81	828	433.13	828.22	435.29	830				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	25.17	.035	364.1	.04	390.07	.013	406.89	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
364.1	390.07	222.63	222.63	150.07	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 10151.02

INPUT
Description:
Station Elevation Data num= 123

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	5.75	828	6.69	827.63	10.64	826	15.91	824.46
17.37	824	25.18	822.41	26.63	822.13	27.31	822	37.11	820.24
38.2	820	40.53	819.12	43.73	818	50.06	816.5	51.82	816
54.28	815.02	57.12	814	60	812.65	61.3	812	64.88	810.78
68.25	810	70.25	809.35	71.35	809.1	76.91	808	90.41	806.01
90.46	806	90.57	805.99	123.22	804	153.24	804	153.7	803.95
170.56	802	172.53	801.56	180.05	800	185.81	800	188.41	799.94
200.22	799.68	204.72	799.58	214.27	799.41	269.93	798.27	290.64	798.35
293.01	798.29	294.78	798.26	297.48	798.49	303.66	799.03	343.12	799.76
346.07	799.82	347.34	799.77	364.37	799.11	370	799.45	376.55	799.81
378.3	798.93	380	798.01	383.07	798.39	383.92	798.02	386.99	798
388.11	797.28	390.39	796	391.33	795.34	391.71	794.99	399.6	795.11
400.21	795.1	407.52	795.13	408.88	795.49	411.82	796	412.94	796.2
415.54	796.66	419.02	797.76	419.75	798	420.1	798.13	421.21	798.52
426.53	798.6	428.14	798.64	429.88	798.7	445.16	798.56	445.99	798.52
455.49	798.27	460.93	798.49	467.59	798.84	468.82	799.78	469.14	800

469.64	800.35	472.27	802	474.32	803.52	475.05	804	476.42	804.73
478.56	806	480.84	806.3	483.05	806.61	494.08	806.02	494.33	806
494.48	805.99	499.02	805.29	499.07	805.79	499.13	806	499.57	806.38
501.79	808	502.01	808.25	503.63	810	503.69	810.06	504.3	810.46
504.5	810.78	505.03	812	505.28	812.37	506.18	814	506.24	814.08
506.51	814.53	507.28	816	507.74	816.62	508.46	818	508.77	818.66
509.15	819.44	510.04	820	511.28	821.37	512.03	822	513.8	823.48
514.38	824	516.52	825.77	516.82	826	519.2	827.94	519.28	828
519.33	828.05	521.55	829.89	521.89	830				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	76.91	.035	386.99	.04	421.21	.1	483.05	.013
494.08	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
386.99	421.21	44.52	44.52	48.94	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 10106.50

INPUT
Description:
Station Elevation Data num= 175

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840	5.31	838	6.32	837.64	10.56	836	11.47	835.66
15.79	834	16.91	833.6	21.15	832	22.75	831.44	26.86	830
28.86	829.3	32.7	828	33.68	827.66	35.35	827.09	37.75	826.34
38.86	826	39.77	825.72	45.34	824	45.73	823.88	47.82	823.23
51.06	822	55.43	820.46	56.69	820	61.13	818.29	61.92	818
61.96	818	62.89	817.64	66.73	816.2	67.18	816	72.14	814.18
72.56	814	73.12	813.81	79.23	812	81.12	811.4	85.84	810
88.47	809.2	91.94	808.07	92.5	808.14	93.91	808	94.26	808
108.46	807.25	108.9	807.23	109.16	807.22	109.26	807.21	109.28	807.21
132.58	806.6	132.91	806.59	136.53	806.56	138.47	806.48	145.56	806
150.16	806	151.75	805.98	155.59	805.98	161.19	805.99	165.07	805.93
167.51	805.95	169.58	805.96	171.63	805.94	174.89	805.84	177.91	805.72
187.86	805.26	190.48	805.12	196.68	804.83	212.49	804	216.88	804
220.33	803.85	253.27	802	267.09	802	272.62	801.83	272.82	801.83
277.6	801.66	280.79	801.53	285.71	801.35	314.54	800	320.82	800
326.55	799.81	328.65	799.96	331.28	799.87	345.69	799.37	352.42	799.21
367.28	798.83	383.43	798.35	390.08	798.4	395.75	798.52	396.88	798.17
397.48	798	398.92	797.65	400.39	797.22	401.62	797.86	401.92	798
403.13	798.56	403.25	798.6	406.59	798.64	427.07	799.02	427.38	798.09
427.4	798	427.83	797.6	429.74	796	429.87	795.32	430.14	794.99
446.52	794.71	458.43	794.5	462.24	794.43	466.41	795.96	466.49	796
466.54	796.03	467.9	796.55	468.78	796.81	469.5	797.17	472.67	797.81
475.61	797.79	482.81	797.77	487.33	797.89	489.54	797.89	494.38	797.96

495.96	797.95	501.24	797.98	501.75	797.99	502.06	798	510.4	798.11
514.76	798.14	518.93	798.13	523.81	798.16	524.49	798.17	525.45	798.19
526.33	798.18	528.28	799.57	528.95	800	531.16	801.54	531.91	802
532.4	802.31	534.93	804	536.17	804.87	537.86	806	539.75	807.27
540.96	808.08	540.98	807.97	541.35	807.98	541.86	807.99	545.2	807.76
545.45	807.75	546.69	807.72	547.54	807.71	555.57	807.44	558.97	806.59
559.93	806.47	560.02	806.69	560.37	808	561.81	809.91	561.86	810
561.89	810.07	563.05	812	563.76	813.24	564.17	813.97	564.19	814
564.2	814.03	564.75	815.02	565.33	816	565.36	816.04	566.52	818
567.7	819.9	567.77	820	567.84	820.12	568.76	821.91	569.36	822.02
569.42	822	569.89	822.37	572.02	824	573.37	824.88	575.12	826
577.39	827.49	578.07	827.91	578.19	828	578.24	828.03	581.19	830

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	427.07	.04	472.67	.1	540.96	.013	555.57	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
427.07	472.67	387.32	97.1	53.75	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 10000.00

INPUT
Description:
Station Elevation Data num= 166

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	810	6.08	810.87	12.16	812	15.34	812.58	21.35	814
25.7	815.01	28.35	816	28.87	816.17	32.93	818	33.83	818.28
33.96	818.29	34.27	818.3	34.56	818.29	36.59	818.56	39.15	818.63
42.4	818.45	43.89	818.35	51.52	818	54.63	817.85	55.89	817.8
56.63	817.78	57	817.75	64.42	816.98	72.08	816.21	72.73	816.14
73.64	816	73.99	815.96	74.33	815.86	75.41	815.57	78.43	814
79.14	813.54	80.59	812.68	81.63	812	84.27	810.49	85.17	810
86.3	809.42	88.76	808	90.11	807.47	91.11	806.89	93.22	806
96.43	804.93	98.92	804	106.66	803.42	116.15	802.62	125.82	802.09
127.07	802.05	127.48	802.01	127.52	802	127.83	801.98	132.27	801.72
134.93	801.53	149.06	800.35	150.49	800.14	151.65	800.02	151.86	800
152.3	800	155.82	799.91	163.6	799.75	166.13	799.71	166.42	799.71
180.54	799.37	199.38	799.05	213.01	798.83	216.82	798.8	220.72	798.77
224.08	798.68	234.67	798.36	236.49	798.33	247.29	798.04	247.38	798.03
247.74	798.03	249.43	798	259.42	798	261.65	797.99	273.67	797.96
275.26	797.96	291.87	797.89	309.81	797.84	323.54	797.84	332.43	798
343.86	798	344.19	798	350.35	798.37	360.78	798.72	376.82	798.89
404.58	798.68	404.59	798.68	404.6	798.67	405.41	798	409.05	796.15
409.28	796	410.79	795.14	410.98	794.99	412.21	794.95	433.72	794.33
434.24	795.17	435.02	796	435.83	796.73	436.96	798	437.76	798.75
438.79	800.05	438.81	800	439.2	800.37	440.36	801.67	440.66	802

442.24	803.65	442.57	804	444.46	805.91	444.55	806	446.58	807.98
446.6	808	447	808.43	447.95	809.41	449.1	809.43	452.75	808.67
453.33	808.71	455.01	808.77	463.58	808.91	463.97	808.87	467.53	808.21
467.89	808.99	468.51	810	469.79	811.74	469.96	812	471.14	813.75
471.3	814	472.49	815.82	472.61	816	473.86	817.98	473.87	818
473.98	818.17	475.4	820	476.72	821.82	476.86	822	477.13	822.29
478.88	824	480.22	825.26	480.96	825.82	481.21	826	483.49	827.62
484.01	828	486.42	829.83	486.68	830	486.95	830.18	489.39	832
489.59	832.14	491.95	834	491.98	834.02	493.65	835.33	494.85	835.99
494.87	836	495.86	836.73	497.76	838	499.55	839.22	500.74	840
502.55	841.34	502.96	841.63	503.42	841.97	503.5	842	505.77	843.84
505.97	844	508.17	845.8	508.4	846	509.37	846.83	510.84	848
513.22	850								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	39.15	.013	72.08	.035	404.58	.04	437.76	.1
452.75	.013	463.58	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
404.58	437.76	1	1	1	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 2737.844

INPUT
Description:
Station Elevation Data num= 146

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	850	4.93	848	9.99	846.14	10.34	846	10.85	845.85
17.24	844	18.12	843.76	19.41	843.38	24.14	842	25.48	841.6
30.23	840	31.45	839.48	34.14	838	35.86	836.33	36.37	836
37.87	834.14	38.03	834	39.01	832.64	39.52	832	40.51	830.71
41.06	830.04	41.12	829.96	42.77	828	43.99	826.4	44.29	826
45.65	824.6	46.19	824	46.64	823.57	48.85	822	50.52	820.61
52.07	820	52.97	819.3	54.52	818	55.59	817.06	57.18	816
59.04	815.06	60.87	814	63.86	813.36	67.27	812.59	69.68	812
73.41	811.81	86.54	811.16	88.69	810.44	89.97	810	90.06	809.97
91.22	809.48	104.17	809.62	104.72	809.63	104.85	809.66	105.57	810
105.84	810.13	107.14	811.96	108.68	812.02	108.7	812	109.88	812.09
113.29	812.31	120.35	812.72	127.08	813.17	137.23	813.92	137.85	813.96
138.28	814	147.84	814.74	149.59	814.78	152.08	814.92	156.07	815.1
159.44	815.13	168.94	815.33	169.94	815.38	174.68	815.52	190.75	816
191.29	816	194.27	816.25	203.67	816.99	206.79	817.18	216.44	817.89
216.98	817.93	217.23	817.95	218.01	818	227.93	818.73	231.65	819
235.62	819.32	239.96	819.55	241.68	819.69	247.1	820	250.87	820.23
251.14	820.24	253.92	820.44	260.37	820.82	264.82	820.97	269.6	821.44
271.97	821.61	278.52	821.98	278.57	821.98	279.48	822	281.47	822.03

283.69	822	286.33	821.96	289.11	821.97	289.2	821.98	290.51	822
305.44	822.29	307.32	822.33	318.26	822.5	318.98	822.53	320.02	822.56
321.4	822.47	322.01	822.35	322.52	822.28	324.38	822.2	324.97	822.28
328.39	823.29	329.57	823.68	330.26	824	332.27	825.14	334.15	826
336.56	827.44	337.54	828	339.13	828.84	341.54	830	345	831.01
346.47	831.21	348.76	831.83	351.49	831.81	355.5	831.8	357.44	831.93
357.83	832	359.16	832.75	361.7	833.95	361.78	834	361.94	834.12
363.25	835.27	364.04	835.89	364.17	836	364.28	836.11	366.26	838
366.27	838.01	368.73	840	369.16	840.29	371.95	842	374.63	843.33
376.13	844	377.11	844.7	379.57	846	381.52	846.96	383.45	848
388.17	850								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	86.54	.04	107.14	.025	324.38	.1	348.76	.013
357.44	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
19.41	174.68	164.77	164.77	110.64	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 2571.784

INPUT
Description:
Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840	3.8	838	4.17	837.78	6.8	836.05	6.88	836
7.4	835.76	10.24	834	12.53	832.67	13.62	832	15.22	830.88
16.69	830	18.12	828.97	19.42	828	19.51	827.93	22.22	826
25.31	824.06	25.41	824	27.6	822.51	28.31	822	28.84	821.67
31.22	820	32.67	819.06	34.02	818	35.96	816.73	36.81	816
38.14	815.04	39.28	814	40.13	813.39	42.14	812	45.45	810.08
45.6	810	48.96	809.84	55.81	809.51	56.05	809.47	56.43	809.38
57.93	808.81	58.33	808.81	60.14	808.83	67.79	808.95	69.56	809.9
69.82	810	72.66	811.48	72.94	811.66	76.61	811.79	83.82	811.99
83.98	812	112.22	812	137.28	812	140.67	812.08	159.98	812.53
160.87	812.54	163.8	812.61	169.04	812.66	181.5	812.86	220.29	813.3
220.82	813.29	227.95	813.39	237.41	813.61	237.89	813.61	251.75	813.9
252	813.9	255.31	814	255.64	814	257.3	814.17	272.69	815.51
273.68	815.53	276.29	815.07	277.95	815.34	282.41	816	287.13	816.7
293.49	817.93	293.58	818	294.27	818.35	298.29	820	300.55	821.38
301.78	822	303.12	822.66	304.22	823.51	304.67	823.67	305.27	824
307.15	824.95	307.3	824.97	317.28	825.37	320.85	826	323.18	828
324.63	829.26	325.33	830	326.1	830.93	327.09	832	328.22	833.16
328.95	834	330.57	835.51	331.1	836	331.62	836.33	333.16	836.95
335.21	838	335.69	838.27	340.07	840				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	42.14	.04	72.66	.1	83.82	.035	276.29	.1
307.15	.013	317.28	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
6.8	112.22	76.83	76.83	65.26	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 2494.952

INPUT
Description:
Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.62	828	4.42	826.68	5.2	826	6.47	825.17
7.72	824.35	8.19	824	10.37	822.53	11.07	822	12.49	821.22
14.28	820	16.58	818.69	17.84	818	18.57	817.47	21.02	816
22.8	814.65	23.89	814	25.49	813.06	27.07	812	32.58	810.86
35.15	810.37	36.71	810	36.81	809.98	39.69	809.6	39.88	809.58
39.93	809.57	40.03	809.54	42.68	808.41	47.2	808.46	50.32	808.49
58.87	808.59	59.36	808.76	62.89	810	65	810.67	65.27	810.76
66.95	810.9	68	810.98	72.14	811.41	78.8	812	91.45	812
97.02	811.95	147.36	811.49	150.11	811.52	150.38	811.52	151.51	811.53
153.94	811.58	156.06	811.63	169.3	811.58	185.09	811.66	187.01	811.64
231.37	812	236.62	812	250.71	812.85	255.66	813.16	268.34	813.91
268.66	813.92	269.67	814	270.7	814.13	270.99	814.03	273.98	815.73
274.53	816	276.15	816.88	277.85	818	278.88	818.68	280.54	820
283.41	821.66	283.83	822	292.9	822.59	296.99	822.78	297.11	822.75
300.07	822.34	301.85	823.94	301.9	824	302.19	824.24	303.91	826
304.74	826.76	305.75	828	306.01	828.39	307.5	830	307.81	830.32
309.48	832	309.93	832.31	311.53	833.44	312.21	834	313.34	834.55
316.21	836	318.85	837.4	319.94	838	323.41	840		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	35.15	.04	65	.1	78.8	.035	268.66	.1
283.83	.013	296.99	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
6.47	97.02	118.47	118.47	121.57	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 2373.655

INPUT
Description:
Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840	2.84	838.86	3.32	838.62	4.53	838	7.42	836.71
8.61	836	10.21	835.16	11.56	834	13.26	832.63	14.23	832
16.22	830.59	17.11	830	18.41	828.91	19.38	828	19.69	827.71
21.6	826	23.57	824.35	24.05	824	25.25	823.01	26.5	822.21
26.75	822	27.18	821.68	28.36	821	30	820	32.36	818.4
32.9	818	33.04	817.9	35.2	816	35.69	815.65	37.78	814
39.05	813.21	41.04	812	49.75	810.1	50.24	810	52.13	809.74
58.56	808.84	59.46	808.14	59.75	808	59.95	807.98	62.3	807.84
69.7	807.72	69.79	807.72	77.26	807.79	78.22	807.84	78.75	808
80.2	808.62	83.1	809.78	85.41	809.93	92.28	810.01	96.91	810
135.93	810	272.58	810	276.6	810.46	280.22	810.8	283	811
283.88	811.53	284.52	812	285.34	812.52	287.91	814	291.2	815.99
291.27	816	294.29	816.55	298.38	817.26	302.44	818	304.66	818
304.67	818.09	304.86	818	308.72	817.36	309.16	818	310.84	819.66
311.09	820	311.22	820.17	312.61	822.05	312.65	822	313.8	823.8
313.93	824	314.5	824.82	315.43	826	315.69	826.24	316.85	826.99
317.59	828	318.22	828.59	319.69	829.21	320.89	829.96	320.94	830
323.5	831.84	323.7	832	324.02	832.28	325.51	834	326.26	835.13
326.94	836	328.48	837.78	328.81	838	331.52	840		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	49.75	.04	83.1	.1	135.93	.035	272.58	.1
291.2	.013	308.72	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3.32	135.93	104.33	104.33	96.43	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 2265.225

INPUT
Description:
Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.73	828	3.11	827.71	5.15	826	6.27	825.12
6.46	824.97	7.78	824	9.64	822.56	10.42	822	13.24	820.09
13.63	819.86	16.55	818	17.55	817.42	20.19	816	21.9	815.17
23.96	814	27.43	812.29	28.27	812	29.58	811.59	34.49	810
37.09	809.44	45.7	808	45.86	807.97	47.04	807.41	48.52	807.16
57.21	807.25	62.72	807.3	63.15	807.58	63.57	808	65.1	808.89
66.46	809.63	72.76	809.72	82.14	809.93	84.7	810	88.51	810
94.47	809.9	100.11	809.79	102.19	809.74	107.21	809.64	109.74	809.6
115.18	809.52	156.07	809.69	156.4	809.7	156.48	809.69	156.59	809.69

176.4	809.4	192.31	809.36	197.75	809.4	202.6	808.98	203.39	808.9
207.07	809.2	208.9	809.33	209.95	809.32	232.2	808.81	243.47	808.81
255.54	808.98	256.54	809.45	257.74	810	261.31	811.66	262.08	812
262.51	812.2	263.52	812.68	265.46	812.72	267.68	812.87	267.77	812.87
275.78	812.85	276.2	812.86	277.12	812.93	277.59	812.93	280.96	813.27
281.03	813.53	281.43	814	282.42	815	283.88	816	284.65	816.79
285.56	817.5	285.7	817.81	285.81	818	287.19	819.62	287.5	820
289.08	822	291.12	824	291.94	825.06	292.58	825.75	292.97	825.99
293.16	826	294.59	827.15	295.87	828	298.7	830	300.1	830.97
301.51	832	302.97	833	304.37	834	304.43	834.08	304.62	834.24
305.97	835.09	307.4	836	309.41	837.28	310.5	838	313.56	840

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	37.09	.04	66.46	.035	255.54	.1	265.46	.013
280.96	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
6.27	109.74	105.3	105.3	71.99	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 2157.963

INPUT
Description:
Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.4	829.25	5.72	828	9.51	826.46	10.49	826
11.25	825.6	14.25	824	15.23	823.44	17.77	822	18.11	821.8
19.64	820.92	20.77	820	21.71	818.86	22.99	818	24.84	816.2
25.02	816	25.12	815.86	25.56	815.42	26.76	814	27.15	813.49
28.39	812	30.28	810.04	30.31	810	30.34	809.98	34.3	808
35.37	807.98	35.97	808	36.37	808	38.33	808.13	44.01	808.77
48.72	808.86	55.88	808.76	56.54	808.77	61.31	808.91	64.6	808.98
65.17	809	66.67	808.62	68.59	808	68.86	807.85	72.4	807.21
72.72	807.21	79.18	807.11	84.2	807.03	84.59	807.37	85.51	808
86.45	808.62	88.13	809.6	92.86	809.46	94.52	809.38	95.92	809.41
126.02	808.8	131.45	808.76	138.85	808.71	161.86	808.54	170.09	808.29
174.51	808.14	179.03	808	180.38	807.96	190.33	807.74	210.08	807.67
213.68	807.72	214.71	807.72	217.39	807.61	221.63	807.46	223.91	807.59
226.74	807.78	240.94	807.91	244.65	807.93	246.31	807.98	247.37	808
247.72	808	249.33	808.03	250.19	808.07	253.5	809.09	255.76	809.77
256.23	809.78	257.4	809.8	258.4	809.82	262.43	809.85	265.41	809.67
267.71	809.74	270.2	809.82	274.79	809.99	275.15	810	275.32	810.08
278.78	812	279.54	812.7	281.27	814	282.26	815.04	283.23	816
284.41	817.28	285.13	818	286.37	819.19	287.17	820	287.39	820.38
289.27	821.63	289.79	822	292.84	824	293.33	824.33	295.89	826
297.63	827.18	298.91	828	301.84	830				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	64.6	.04	88.13	.035	256.23	.013	274.79	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
18.11	138.85	65.54	65.54	25.52	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 2080.321

INPUT
Description:
Station Elevation Data num= 105

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	1.98	828	2.61	827.32	3.09	826.92	4.2	826
4.82	825.41	6.22	824	7.37	822.95	8.36	822	9.58	820.89
10.57	820	11.33	819.23	12.64	818	13.56	817.18	14.82	816.02
14.89	816	16.77	814.78	17.92	814	19.73	812.93	21.21	812
23.5	810.71	24.57	810	26.64	808.71	27.39	808.37	27.46	808.35
29.46	807.89	33.21	806.83	45.02	806.84	50.14	806.85	51.32	806.85
51.58	806.89	53.56	807.29	55.93	807.43	57.6	807.45	58.52	807.62
60.52	808	60.99	808.08	62.21	808.32	65.71	808.62	71	809.23
73.07	809.31	74.14	809.28	93.13	808.9	96.69	808.88	98.26	808.82
99.38	808.75	103.34	808.68	131.74	808.05	133.54	808.04	136.27	808.05
145.8	808.06	157.54	808.11	161.32	808.13	164.7	808.13	169.01	808.14
175.75	808	193.98	807.61	198.67	807.54	202.07	807.49	223.72	807.44
223.88	807.44	226.74	807.38	227.64	807.35	231.72	807.68	232.21	807.72
233.87	807.72	236.71	807.69	253.95	807.29	255.6	807.84	255.97	808
259.11	809.17	259.8	809.29	262.97	808.78	263.6	808.82	267.24	808.82
273.38	808.89	275.09	808.72	277.72	808.67	280.14	809.76	280.56	809.9
280.76	810	280.85	810.03	283.26	811.02	283.82	811.62	284.11	812
285.86	813.76	286.12	814	286.48	814.32	288.14	816	289.08	817.1
289.17	817.18	289.25	817.23	290.58	818	291.02	818.29	293.8	820
296.43	821.79	296.75	822	296.95	822.13	300.07	824	302.25	825.43
303.14	826	305.77	827.74	306.18	828	306.39	828.17	308.91	830

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	26.64	.04	62.21	.025	262.97	.013	277.72	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3.09	74.14	117.82	117.82	39.43	.1	.3

CROSS SECTION

RIVER: Leason Run

REACH: Lower RS: 1960.670

INPUT
Description:
Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.61	828	4.13	827.66	6.22	826	6.7	825.54
7.08	825.16	8.17	824	8.25	823.9	9.98	822	11.28	820.57
11.78	820	12.19	819.54	13.57	818	14.51	817.2	15.62	816
19.28	815.17	21.47	814	31.97	812.14	32.88	812	35.04	811.51
38.07	810.83	41	810.16	41.53	810	47.16	808.49	48.7	808
49.2	807.85	50.69	807.42	51.58	807.03	51.89	806.65	52.94	806
53.11	805.96	53.82	805.96	60.98	805.76	61.03	805.75	64	806
76.1	806	77.82	807.33	78.67	807.52	82.78	807.27	84.42	807.57
85.65	807.43	86.66	807.54	86.76	807.54	87.32	807.58	103.88	806.99
107.01	807.1	107.95	807.3	110.32	807.35	113.64	807.34	117.21	807.31
143.83	807.09	174	807.03	182.39	807.05	192.37	807.04	219	806.98
238.74	807.03	248.56	806.98	250.58	806.65	251.11	806.49	253.5	806.54
255.13	806.64	271.01	806.63	273.76	806.67	275.83	807.13	276.83	807.31
278.72	807.69	285.52	807.34	288.61	807.35	289.91	807.35	296.32	808
299.57	809.03	299.97	809.16	302.19	809.86	302.71	810	303.65	810.27
303.87	810.32	304.34	810.57	307.07	812	308.06	812.51	310.67	814
313.9	815.58	314.16	815.73	314.44	816	314.87	816.3	317.45	818
319.27	819.41	320.14	820	321.02	820.55	322.99	822	325.04	823.31
325.86	824	328.38	825.88	328.47	825.94	328.69	826	331.31	827.72
331.77	828	331.85	828.05	334.89	830				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	50.69	.04	78.67	.035	278.72	.013	296.32	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
6.7	117.21	172.09	172.09	106.18	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 1763.762

INPUT
Description:
Station Elevation Data num= 112

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.1	828.12	3.29	828	3.44	827.9	6.4	826
8.97	824.27	9.39	824	12.1	822.07	12.2	822	13.12	821.34
14.76	820	15.1	819.74	17.25	818	18.92	816.67	19.72	816
20.71	815.28	22.31	814	24.54	812.7	26.78	812	33	810.35
34.59	810	35.31	809.87	39.37	809.26	44.94	808.66	46.63	808.53
49.95	808	54.03	806.47	54.35	806.4	54.43	806.42	60.74	807.43
61.64	807.47	61.7	807.47	62.26	807.46	71.21	807.75	73.52	807.59

78.35	807.47	85.52	807.39	92.47	807.19	93.71	807.18	100.37	807.02
103.68	806.98	104.04	806.98	111.56	807.03	134.12	807.19	142.73	807.16
161.13	807.21	163.56	807.16	182.71	806.79	186.47	806.74	204.72	806.53
214.32	806.42	214.43	806.42	214.82	806.41	214.9	806.41	221.65	807.57
221.7	807.58	221.9	807.55	223.56	806	225.21	804.39	225.66	804
225.73	803.94	226.41	803.23	227	802.53	227.63	802.47	236.27	802.26
237.06	802.25	240.17	802.16	243.04	803.73	243.3	804	246.02	805.73
246.44	806	247.13	806.05	250.27	806.3	251.22	806.32	266.92	806.32
268.97	806.39	272.45	806.34	280.47	806	291.47	805.52	294.49	805.37
296.63	805.28	297.29	805.26	299.83	805.41	304.8	805.54	305.79	805.71
307.39	805.98	307.56	806	308.47	806.15	312.6	807.32	314.97	808
318.26	809.49	319.12	810	319.6	810.32	322.76	812.03	322.81	812
323.61	812.34	326.8	814	329.24	815.47	330.25	816	331.24	816.59
333.53	818	334.71	818.67	336.78	820	340	821.96	340.07	822
340.1	822.01	343.81	824	344.15	824.18	347.56	826	350.62	827.7
351.27	828	355.57	830						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	49.95	.035	223.56	.04	247.13	.013	296.63	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
163.56	305.79	46.18	46.18	37.25	.1	.3

CULVERT

RIVER: Leason Run
REACH: Lower RS: 1740

INPUT
Description:
Distance from Upstream XS = 14
Deck/Roadway Width = 12
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 3

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
223.56	806	0	237	807.5	0	246.44	806	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 112

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.1	828.12	3.29	828	3.44	827.9	6.4	826
8.97	824.27	9.39	824	12.1	822.07	12.2	822	13.12	821.34
14.76	820	15.1	819.74	17.25	818	18.92	816.67	19.72	816
20.71	815.28	22.31	814	24.54	812.7	26.78	812	33	810.35
34.59	810	35.31	809.87	39.37	809.26	44.94	808.66	46.63	808.53
49.95	808	54.03	806.47	54.35	806.4	54.43	806.42	60.74	807.43
61.64	807.47	61.7	807.47	62.26	807.46	71.21	807.75	73.52	807.59
78.35	807.47	85.52	807.39	92.47	807.19	93.71	807.18	100.37	807.02

103.68	806.98	104.04	806.98	111.56	807.03	134.12	807.19	142.73	807.16
161.13	807.21	163.56	807.16	182.71	806.79	186.47	806.74	204.72	806.53
214.32	806.42	214.43	806.42	214.82	806.41	214.9	806.41	221.65	807.57
221.7	807.58	221.9	807.55	223.56	806	225.21	804.39	225.66	804
225.73	803.94	226.41	803.23	227	802.53	227.63	802.47	236.27	802.26
237.06	802.25	240.17	802.16	243.04	803.73	243.3	804	246.02	805.73
246.44	806	247.13	806.05	250.27	806.3	251.22	806.32	266.92	806.32
268.97	806.39	272.45	806.34	280.47	806	291.47	805.52	294.49	805.37
296.63	805.28	297.29	805.26	299.83	805.41	304.8	805.54	305.79	805.71
307.39	805.98	307.56	806	308.47	806.15	312.6	807.32	314.97	808
318.26	809.49	319.12	810	319.6	810.32	322.76	812.03	322.81	812
323.61	812.34	326.8	814	329.24	815.47	330.25	816	331.24	816.59
333.53	818	334.71	818.67	336.78	820	340	821.96	340.07	822
340.1	822.01	343.81	824	344.15	824.18	347.56	826	350.62	827.7
351.27	828	355.57	830						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	49.95	.035	223.56	.04	247.13	.013	296.63	.1

Bank Sta: Left	Right	Coeff Contr.	Expan.
163.56	305.79	.1	.3

Downstream Deck/Roadway Coordinates
num= 3

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
249.15	805.61	0	268.55	807.5	0	292	805.26	0

Downstream Bridge Cross Section Data
Station Elevation Data num= 135

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	.23	829.86	3.1	828	5.43	826.5	6.2	826
6.86	825.55	9.26	824	10.1	823.39	12.1	822	13.33	821.11
15.06	820	17.27	818.39	17.8	818	20.32	816.26	20.66	816
21.77	815.19	22.94	814.57	24.27	814	26.94	812.9	29.3	812
30.36	811.67	30.94	811.41	31.24	811.17	32.76	810	35.4	808.52
36.26	808	41.08	808	44.62	808.4	49.94	808.83	53.57	808.6
63.97	808	66.2	807.88	72.27	807.59	74.35	807.54	76.32	807.5
78.5	807.47	83.2	807.43	86.11	807.78	88.22	808	92.04	808.45
98.87	808.8	100.14	808.74	102.08	808.74	103.53	808.76	112.86	808.92
117.57	808.99	119.68	808.98	126.79	808.4	127.01	808.38	127.09	808.38
127.18	808.37	127.71	808.28	129.32	808	130.4	807.87	131.58	807.7
135.17	807.6	140.75	807.71	142.87	807.59	151.41	807.34	152.73	807.29
154.09	807.16	157.86	806.76	162.71	806.47	166.37	806.1	167.06	806.07
168.59	806.05	170.71	806.06	174.13	806.13	174.72	806.06	178.71	806.08
182.68	806.13	188.45	806.14	195.75	806.01	196.28	806	197.07	806
201.1	806	208.08	806.33	211.32	806.39	216.45	806.45	230.79	806
239.97	805.7	243.38	805.62	249.15	805.61	249.96	805.55	250.98	805.31
253.07	804.7	254.65	804	257.23	803.18	258.58	802.36	260.98	802.31
268.56	802.25	276.75	802.16	277.82	802.54	285.7	804	286.42	804.13
287.72	804.34	290.88	804.92	291.36	805.03	292	805.26	294.18	805.16

299.24	804.86	303.2	804.85	314.14	804.77	315.65	804.85	317.46	804.68
318.17	805.36	318.71	806	320.51	807.5	321.2	808	323.18	809.68
323.6	810	324.04	810.55	324.1	810.6	324.37	810.76	326.77	812
330.18	813.83	330.47	814	331.18	814.41	334.26	816	336.58	817.21
338.09	818	338.42	818.17	340.39	819.27	341.08	819.65	341.49	819.92
341.77	820	344.67	821.88	344.87	822	345.13	822.17	348.25	824
350.95	825.71	351.46	826	352.46	826.58	354.92	828	358.3	830

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	49.94	.013	83.2	.035	249.15	.04	292	.013
317.46	.1								

Bank Sta: Left	Right	Coeff Contr.	Expan.
197.07	340.39	.1	.3

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

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Ellipse	5	7

FHWA Chart # 29- Horizontal Ellipse; Concrete
FHWA Scale # 1 - Square edge with headwall
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	9	30	.011	.011	0	.2	1

Upstream Elevation = 802.26
Centerline Station = 236.37
Downstream Elevation = 802.25
Centerline Station = 268.55

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

Q Culv Group (cfs)	195.77	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	8.36
Q Barrel (cfs)	195.77	Culv Vel DS (ft/s)	8.56
E.G. US. (ft)	807.67	Culv Inv El Up (ft)	802.26
W.S. US. (ft)	807.48	Culv Inv El Dn (ft)	802.25
E.G. DS (ft)	806.55	Culv Frctn Ls (ft)	0.98
W.S. DS (ft)	806.13	Culv Exit Loss (ft)	0.72
Delta EG (ft)	1.12	Culv Entr Loss (ft)	0.35
Delta WS (ft)	1.35	Q Weir (cfs)	659.88

E.G. IC (ft)	807.67	Weir Sta Lft (ft)	50.83
E.G. OC (ft)	807.64	Weir Sta Rgt (ft)	313.82
Culvert Control	Inlet	Weir Submerg	0.08
Culv WS Inlet (ft)	806.23	Weir Max Depth (ft)	2.41
Culv WS Outlet (ft)	806.13	Weir Avg Depth (ft)	0.91
Culv Nml Depth (ft)	5.00	Weir Flow Area (sq ft)	236.39
Culv Crt Depth (ft)	3.39	Min El Weir Flow (ft)	805.27

Note: The normal depth exceeds the height of the culvert. The program assumes that the normal depth is equal to the height of the culvert.

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 1716.392

INPUT
Description:
Station Elevation Data num= 135

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	.23	829.86	3.1	828	5.43	826.5	6.2	826
6.86	825.55	9.26	824	10.1	823.39	12.1	822	13.33	821.11
15.06	820	17.27	818.39	17.8	818	20.32	816.26	20.66	816
21.77	815.19	22.94	814.57	24.27	814	26.94	812.9	29.3	812
30.36	811.67	30.94	811.41	31.24	811.17	32.76	810	35.4	808.52
36.26	808	41.08	808	44.62	808.4	49.94	808.83	53.57	808.6
63.97	808	66.2	807.88	72.27	807.59	74.35	807.54	76.32	807.5
78.5	807.47	83.2	807.43	86.11	807.78	88.22	808	92.04	808.45
98.87	808.8	100.14	808.74	102.08	808.74	103.53	808.76	112.86	808.92
117.57	808.99	119.68	808.98	126.79	808.4	127.01	808.38	127.09	808.38
127.18	808.37	127.71	808.28	129.32	808	130.4	807.87	131.58	807.7
135.17	807.6	140.75	807.71	142.87	807.59	151.41	807.34	152.73	807.29
154.09	807.16	157.86	806.76	162.71	806.47	166.37	806.1	167.06	806.07
168.59	806.05	170.71	806.06	174.13	806.13	174.72	806.06	178.71	806.08
182.68	806.13	188.45	806.14	195.75	806.01	196.28	806	197.07	806
201.1	806	208.08	806.33	211.32	806.39	216.45	806.45	230.79	806
239.97	805.7	243.38	805.62	249.15	805.61	249.96	805.55	250.98	805.31
253.07	804.7	254.65	804	257.23	803.18	258.58	802.36	260.98	802.31
268.56	802.25	276.75	802.16	277.82	802.54	285.7	804	286.42	804.13
287.72	804.34	290.88	804.92	291.36	805.03	292	805.26	294.18	805.16
299.24	804.86	303.2	804.85	314.14	804.77	315.65	804.85	317.46	804.68
318.17	805.36	318.71	806	320.51	807.5	321.2	808	323.18	809.68
323.6	810	324.04	810.55	324.1	810.6	324.37	810.76	326.77	812
330.18	813.83	330.47	814	331.18	814.41	334.26	816	336.58	817.21
338.09	818	338.42	818.17	340.39	819.27	341.08	819.65	341.49	819.92
341.77	820	344.67	821.88	344.87	822	345.13	822.17	348.25	824
350.95	825.71	351.46	826	352.46	826.58	354.92	828	358.3	830

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	49.94	.013	83.2	.035	249.15	.04	292	.013
317.46	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
197.07	340.39	168.18	168.18	142.68	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 1538.753

INPUT
Description:
Station Elevation Data num= 141

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.68	828	3.05	827.68	5.29	826	7.22	824.53
7.95	824	8.21	823.77	10.55	822	10.94	821.68	13.2	820
13.35	819.92	15.35	818.32	15.41	818.32	15.71	818	16.82	817.11
18.44	816	19.06	815.62	21.59	814	23.39	812.99	23.71	812.72
30.6	812.01	30.68	812	32.46	811.8	32.68	811.77	32.88	811.75
32.95	811.75	45.33	811.97	45.4	811.99	45.53	811.99	45.85	811.98
47.51	811.89	51.18	811.71	55.58	811.53	56.14	811.48	57.26	811.21
62.11	810.58	63.14	810.47	63.88	810.4	69.57	810	81.46	809.27
111.26	808	111.61	807.99	112.14	807.96	112.51	807.96	117.14	807.47
130.37	806	144.14	806	145.43	805.98	145.52	805.98	160.55	805.49
174.15	805.06	191.63	804.53	194.74	804.72	200	805.2	201.15	805.16
214.63	804	218.96	803.63	222.25	803.35	228.41	803.56	241.51	803.91
244.04	804	244.49	804	246.67	804.14	249.21	804.33	251.96	804.53
260.38	804.18	265.19	804	266.38	803.95	269.63	803.86	284.66	803.74
286.1	803.76	290.96	803.79	302.77	804	304.15	804.07	304.32	804.08
311.14	804.02	321.99	804.49	322.24	804	322.96	803.41	324.65	802
325.14	801.74	325.44	801.58	328.99	801.51	330.74	801.48	336.52	801.39
336.98	801.66	337.41	802	338.37	802.58	338.99	802.92	339.08	802.95
345.17	803.5	345.43	803.53	345.73	803.56	351.76	803.73	351.96	803.79
351.97	803.79	352.14	803.83	353.27	804	354.16	804.09	357.97	804.74
364.92	806	365.42	806.11	366.07	806	372.17	805.16	373.31	804.99
374.43	805.11	381.43	805.82	382.01	805.87	382.04	805.88	382.19	805.89
383.81	806	383.95	806	384.48	805.89	384.72	805.89	385.24	806.39
387.36	808	388.67	809.14	389.68	810	391.61	811.62	392.06	812
393.77	813.37	394.55	814	396.48	815.61	396.94	816	397.69	816.62
397.84	816.76	399.14	817.83	399.37	818	399.8	818.37	401.76	820
402.31	820.45	404.2	822	404.98	822.65	406.59	824	407.68	824.9
409.16	826	410.27	827.05	410.9	827.56	411.12	827.69	411.9	828
415.35	830								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	32.46	.013	47.51	.035	321.99	.04	351.76	.035

374.43	.013	383.81	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
249.21	415.35	79.02	79.02	62.82	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 1456.709

INPUT
Description:
Station Elevation Data num= 151

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	1.69	828.68	2.6	828	3.75	827.03	5.05	826
6.34	824.86	7.53	824	9.36	822.42	9.91	822	12.12	820.18
12.36	820	12.7	819.82	13.4	819.18	14.53	818	15.07	817.56
16.77	816	18.93	814.34	19.38	814	19.44	813.87	20.01	813.39
21.07	813.29	21.44	813.26	21.62	813.25	36.12	813.09	39.31	813
47.12	813.22	49.01	813.29	50.02	813.34	50.49	813.33	53.55	812.47
55.31	812	58.35	811.09	60.56	810.47	61.72	810.36	63.04	810.26
65.69	810.06	66.66	810	68.31	809.89	84.17	809.13	98.19	808.52
107.18	808	115.77	807.91	117.58	807.87	127.76	806.82	129.58	806.79
134.21	806.8	147.04	806	147.41	806	151.04	805.6	151.08	805.59
156.12	806	159.63	806	160.2	805.93	167.84	805.18	176.43	805.41
186.91	805.11	198.91	804.7	202.6	804.48	210.17	804	225.74	803.03
226.05	803	226.44	802.97	227.01	802.92	227.12	802.91	227.32	802.92
227.74	802.93	227.97	802.94	228.79	802.97	231.15	803.08	236.36	803.29
252.56	803.96	253.62	803.97	254.66	803.94	255.71	803.92	257.87	803.86
273.91	803.23	297.83	803.67	314.01	804	319.61	804	321.14	803.96
322.49	804	328.21	804	330.78	804.13	335.85	804.38	341.54	804.21
343.54	804.16	350.44	804	350.55	804.08	351.15	803.83	351.85	803.77
356.95	802.73	358.3	802.57	366.9	802.29	369.52	802.22	371.79	802.4
374.84	802.28	377.41	801.97	377.48	802	380.66	801.74	381.39	801.79
390.09	801.6	390.23	801.59	390.38	801.59	390.4	801.58	400.78	801.49
405.14	801.41	405.89	801.39	405.94	801.44	406.4	801.88	406.48	802
409.09	803.59	409.19	803.65	409.43	803.67	412.37	804	415.35	804.34
417.38	804.56	421.54	804.27	424.43	804.06	429.51	804.22	434.79	804.35
437.18	804.4	441.1	804.45	441.4	804.82	442.37	806	443.71	807.37
444.33	808	445.4	809.19	446.25	810	448.1	811.96	448.14	812
450.07	813.49	450.64	814	452.26	815.06	454.24	816	454.67	816.2
458.93	818	459.03	818.01	461.09	818.86	462.33	819.7	462.81	820
464.93	821.51	465.67	822	468	823.58	468.63	824	469.8	824.8
471.19	825.76	471.61	826.04	472.25	826.61	472.42	826.69	475.22	828
479.39	830								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	20.01	.013	49.01	.035	350.55	.04	409.19	.035
424.43	.013	441.1	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
330.78	469.8	47.12	47.12	51.23	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 1407.241

INPUT
Description:
Station Elevation Data num= 159

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.22	828	3.28	827.08	4.41	826	4.61	825.81
6.49	824	7.08	823.45	8.57	822.07	8.61	822	9.91	820.78
10.74	820	12.34	818.55	12.93	818	13.63	817.32	15.12	816
18.63	814.24	19.51	814.2	21.48	814.13	26.29	814.07	30.92	814.08
32.46	814.13	37.92	814.22	40.25	814.26	41.16	814.29	45.83	814.62
48.2	814.79	48.25	814.79	48.25	814.8	48.44	814.73	50.5	814
52.4	813.31	56.45	812	56.66	811.87	57.55	811.58	61.57	810.64
63.55	810.5	71.17	810	84.48	809.11	86.06	809.03	87.39	808.97
104.07	808	120.4	807.82	121.07	807.81	124.78	807.43	125.44	807.42
133.75	807.45	136.89	807.26	137.52	807.2	138.96	807.26	147.14	806.64
155.58	806	161.46	805.58	170.98	804.68	176.08	804.8	193.83	804.29
199.7	804.18	201.01	804.16	201.79	804.14	205.04	804	210.45	803.76
212.44	803.64	227.57	803.05	246.11	803.31	252.82	803.59	253.08	803.59
266.95	803.25	267.16	803.25	267.58	803.24	270.65	803.11	275.05	803.19
314.18	804	315.37	804	317.44	803.95	318.81	804	321.85	804.11
328.51	804.34	331.53	804.33	332.14	804.3	332.79	804.3	336.15	804.29
342.67	804.25	350.48	804.31	356.68	804.23	360.52	804.02	361.47	803.97
363.47	803.85	372.17	803.77	372.6	803.74	372.86	803.78	372.94	803.78
373.03	803.79	376.23	803.89	379.8	804	387.16	804	388.97	803.91
389.47	803.97	395.6	802.95	403.01	802.23	408.81	802.38	413.34	802.24
414.9	802.36	418.03	803.13	420.39	802.51	421.83	802	422.2	801.92
423.05	801.65	424.53	801.08	425.28	800.81	429.7	800.85	433.99	800.87
437.63	800.93	438.87	801.59	439.53	802	443.18	803.77	443.24	803.81
443.27	803.83	443.46	803.83	465.88	804	468.28	804.12	471.19	804.27
477.33	804.08	478.84	804	483.32	804	485.69	804.02	487.44	804.03
488.37	804.05	491.1	804.05	491.89	804.06	492.63	804.08	493.28	804.6
495.15	806	496.35	806.99	497.72	808	498.97	808.94	500.36	810
501.57	810.82	503.28	812	503.46	812.23	503.66	812.49	505.8	813.41
507.08	814	508.51	814.66	511.55	816	513.67	816.98	515.88	818
516.45	818.26	516.61	818.27	518.49	819.45	519.47	820	521.26	821.08
522.75	822	524.85	823.26	526.02	824	529.32	825.95	529.46	826.04
530.26	826.44	533.05	827.93	533.19	828	536.76	830		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	19.51	.013	48.25	.035	418.03	.04	443.18	.35
477.33	.013	491.1	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
332.79	526.02	149.56	149.56	161.7	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 1233.140

INPUT
Description:
Station Elevation Data num= 171

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.1	828	2.31	827.79	4.13	826	5.91	824.29
6.2	824	6.36	823.66	6.6	823.43	6.65	823.39	8.56	822
8.85	821.76	10.65	820.36	11.19	820	11.42	819.85	11.45	819.85
11.76	819.62	14.11	818	14.81	817.49	21.41	817.27	23.14	817.41
23.73	817.43	27.6	817.73	30.68	818	34.14	818.29	36.45	818.28
38.09	818.15	39.54	818	44.05	816.78	47.2	816.08	47.46	816
48.03	815.84	52.94	814.17	53.17	814.1	53.23	814	57.02	812.22
57.49	812	58.12	811.59	58.45	811.43	58.56	811.39	70.87	810.26
74.52	810.04	74.77	810.02	75.28	810	75.51	810	88.57	809.78
91.18	809.71	95.39	809.41	113.93	808.28	117.29	808	137.66	806.34
138.89	806.24	139.21	806.16	140.11	806	145.62	805.1	154.13	804.3
155.26	804.27	158.45	804.18	162.62	804	162.71	804	171.29	803.61
174.81	803.48	177.96	803.43	179.4	803.43	182.45	803.49	189.56	803.75
201.03	803.15	202.45	803.18	230.25	803.51	249.93	803.22	265	803.22
270.44	803.3	270.67	803.3	270.91	803.04	271.35	802	271.46	801.14
271.82	800	272.01	800.08	272.18	800.13	279.28	799.94	281.63	799.89
286.53	799.78	290.88	799.71	293.17	799.64	293.78	799.99	293.81	800
293.95	800.06	298.68	802.09	299.37	802.1	299.8	802	300.14	802.19
300.48	802.29	300.96	802.37	303.01	802.57	305.38	802.41	305.86	802.42
306.44	802.4	311.32	802	311.54	801.98	313.51	801.98	313.79	802
314.83	802.01	321.02	802.63	322.71	802.76	323.13	802.8	325.35	802.97
327.85	803.12	338.29	803.51	345.2	803.56	355.04	803.7	364.41	803.97
365.24	804	368.71	804	370.97	804.09	383.13	804.11	391.51	804.01
391.61	804	391.75	804	395.16	803.93	401.73	803.8	403.39	803.75
404.53	803.73	408.19	803.67	416.1	803.61	421.54	803.82	431.01	803.81
446.13	803.57	452.4	803.54	458.81	803.58	473.52	803.4	481.11	803.37
494.96	803.83	506.47	804	514.6	804.37	515.2	804.4	515.35	804.39
515.39	804.39	516.85	804.32	523.15	804	534.63	804	536.13	804.03
538.15	805.66	538.6	806	539.51	806.76	541.15	808	543.07	809.54
543.57	810	544.61	810.82	546.31	812	546.69	812.49	546.97	812.61
549.97	814	553.31	815.55	554.33	816	555.05	816.33	558.66	818
559.58	818.42	559.66	818.43	560.61	819.02	562.34	820	565.49	821.9
565.65	822	566.39	822.44	569.62	824	570.3	824.34	573.7	826
574.08	826.19	574.69	826.5	576.6	827.52	577.52	828	579.96	829.37
581.11	830								

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	21.41	.013	36.45	.1	58.45	.035	270.44	.04
303.01	.035	514.6	.013	534.63	.1				

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
162.71	395.16	133.75	133.4	15.65	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 1047.463

INPUT
Description:
Station Elevation Data num= 160

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	1.8	828.41	2.21	828	2.3	828	3.77	826.59
4.8	826	6.84	824.73	7.95	824	10.88	822.23	10.9	822.18
11.21	822	11.75	821.66	12.04	821.53	12.35	821.46	12.72	821.44
17.06	821.53	19.3	821.49	19.72	821.51	21.47	821.48	28.03	821.63
31.57	821.63	37.28	820.82	41.12	820.42	41.66	820.42	42.18	820
44	818.66	44.9	818	45.21	817.79	47.41	816	48.49	815.22
50.38	814.15	50.64	814	51.11	813.7	51.53	813.54	54.75	812
54.96	811.9	57.32	811.61	59.23	811.29	66.73	810	82.83	808.48
85.99	808.19	88.6	808.02	88.68	808	89.76	807.9	90.2	807.79
97.32	806	102.61	804.8	104.73	804.27	106.33	804.19	110.37	804.04
111.09	804	114.68	803.83	122.48	803.38	131.5	802.77	144.95	803.15
156.17	803.67	178.32	803.54	206.07	803.47	214.32	803.48	221.09	803.48
227.36	803.43	259.97	803.64	302.09	802.73	302.85	802.72	311.66	802.61
321.77	802.79	330.05	802.65	335.45	802.48	343.38	803.19	349.47	803.52
349.53	803.6	350.2	803.54	350.68	803.42	352.52	803.33	360.87	803.12
362.07	803.02	363.32	802.95	365.73	802.84	371.29	802.49	375.18	802
386.97	802	390.75	802.02	403.48	801.43	408.95	801.2	410.23	801.12
419.97	801.08	420.34	801.07	420.63	800.92	421.68	800	422.01	799.59
424.39	799.72	426.27	799.56	430.71	798.78	431.09	798.68	431.61	798.67
440.54	798.47	441.29	799.36	441.76	800	442.83	800.86	443.92	802
444.19	802.39	444.28	802.67	446.09	802.65	449.85	802.74	465.56	803.16
477.66	803.39	478.61	803.43	481.75	803.41	483.04	803.41	501.55	803.39
504.43	803.44	506.59	803.45	541.66	803.07	544.92	803.01	552.67	803.43
560.59	803.78	568.35	804.12	578.38	804.57	584.38	804.07	585.03	804.01
585.38	804	585.39	804	590.63	803.67	593.62	803.48	593.65	803.48
597.4	804	598	804.07	598.85	804.1	600.1	805.11	601.2	806
603.21	807.65	603.67	808	603.9	808.19	605.9	810	605.94	810.03
608.08	812	608.35	812.33	608.64	812.77	609.57	813.17	611.39	814
613.77	815.04	615.89	816	619.06	817.39	620.37	818	621.62	818.57
621.7	818.62	622.23	818.92	624.58	820	625.62	820.51	628.75	822
630.6	822.92	632.83	824	635.01	825.08	636.89	826	637.63	826.37
637.98	826.55	639.08	827.14	640.72	828	642.1	828.77	644.35	830

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	12.04	.013	31.57	.1	104.73	.035	419.97	.04
444.28	.035	578.38	.013	593.62	.1				

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
302.85	560.59	1	1	1	.1	.3

SUMMARY OF MANNING'S N VALUES

River:Cabin Run

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8
Upper	13338.65	.1	.04	.025	.013	.1			
Upper	13228.66	.1	.04	.035	.013	.1			
Upper	13047.83	.1	.035	.04	.1	.013	.1		
Upper	12905.72	.1	.035	.1	.035	.04	.1	.013	.1
Upper	12783.74	.035	.04	.035	.013	.035			
Upper	12709.20	.1	.035	.04	.1	.013	.1		
Upper	12590.58	.1	.035	.04	.1	.013	.1		
Upper	12466.12	.1	.035	.04	.1	.013	.1		
Upper	12336.63	.1	.035	.04	.1	.013	.1		
Upper	12201.47	.1	.035	.04	.1	.013	.1		
Upper	12106.82	.1	.035	.1	.04	.1	.013	.1	
Upper	12080	Culvert							
Upper	12052.69	.1	.035	.04	.013	.1	.013	.1	
Upper	12016.91	.1	.035	.04	.013	.1	.013	.1	
Upper	11917.65	.1	.035	.04	.1	.013	.1	.013	.1
Upper	11736.49	.1	.04	.1	.013	.1	.013	.1	
Upper	11681.96	.1	.04	.1	.035				

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.1       .013          .1
 Upper                  11547.41            .1        .04       .035         .1
.013          .1
 Upper                  11461.86            .1        .04       .035         .1
.013          .1
 Upper                  11316.17            .1        .04       .035         .1
.013          .1
 Upper                  11190.54            .1       .035        .04       .035
.013          .1
 Lower                  11091.35            .1       .035        .04         .1
.035       .013          .1
 Lower                  10962.06            .1       .035        .04         .1
.013          .1
 Lower                  10900.67            .1       .035        .04       .013
.1
 Lower                  10705.68            .1       .035         .1        .04
.013          .1
 Lower                  10444.93            .1       .035        .04         .1
.013          .1
 Lower                  10376.87            .1       .035        .04       .013
.1
 Lower                  10151.02            .1       .035        .04         .1
.013          .1
 Lower                  10106.50          .035        .04         .1       .013
.1
 Lower                  10000.00          .035       .013       .035        .04
.1       .013          .1


River:Leason Run


      Reach             River Sta.         n1         n2         n3         n4         n5
    n6         n7         n8


 Lower                  2737.844            .1        .04       .025         .1
.013          .1
 Lower                  2571.784            .1        .04         .1       .035
.1       .013          .1
 Lower                  2494.952            .1        .04         .1       .035
.1       .013          .1
 Lower                  2373.655            .1        .04         .1       .035
.1       .013          .1
 Lower                  2265.225            .1        .04       .035         .1
.013          .1
 Lower                  2157.963            .1        .04       .035       .013
.1
 Lower                  2080.321            .1        .04       .025       .013
.1
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Lower	1960.670		.1	.04	.035	.013
.1						
Lower	1763.762		.1	.035	.04	.013
.1						
Lower	1740	Culvert				
Lower	1716.392		.1	.013	.035	.04
.013 .1						
Lower	1538.753		.1	.013	.035	.04
.035 .013 .1						
Lower	1456.709		.1	.013	.035	.04
.035 .013 .1						
Lower	1407.241		.1	.013	.035	.04
.35 .013 .1						
Lower	1233.140		.1	.013	.1	.035
.04 .035 .013 .1						
Lower	1047.463		.1	.013	.1	.035
.04 .035 .013 .1						

SUMMARY OF REACH LENGTHS

River: Cabin Run

Reach	River Sta.	Left	Channel	Right
Upper	13338.65	138.38	109.99	117.48
Upper	13228.66	175.61	175.61	125.73
Upper	13047.83	141.41	141.41	129.19
Upper	12905.72	120.76	120.76	103.33
Upper	12783.74	73.75	73.75	73.99
Upper	12709.20	118.63	118.63	143.39
Upper	12590.58	119.79	119.79	89.65
Upper	12466.12	124.22	124.22	107.77
Upper	12336.63	134.44	134.44	106.77
Upper	12201.47	271.82	147.48	205.71
Upper	12106.82	48.53	53.43	150.07
Upper	12080	Culvert		
Upper	12052.69	302.6	35.46	177.95
Upper	12016.91	296.75	99.03	182.81
Upper	11917.65	143.36	163.25	197.2
Upper	11736.49	53.75	53.75	45.14
Upper	11681.96	134.52	134.52	52.33
Upper	11547.41	85.55	85.55	62.2
Upper	11461.86	139.15	139.15	49.68
Upper	11316.17	106.44	106.44	577.06
Upper	11190.54	99.19	99.19	45.84
Lower	11091.35	129.26	129.26	152.11

Lower	10962.06	58.91	58.91	64.64
Lower	10900.67	194.97	194.97	182.73
Lower	10705.68	259.79	259.79	216.96
Lower	10444.93	61.04	61.04	82.99
Lower	10376.87	222.63	222.63	150.07
Lower	10151.02	44.52	44.52	48.94
Lower	10106.50	387.32	97.1	53.75
Lower	10000.00	1	1	1

River: Leason Run

Reach	River Sta.	Left	Channel	Right
Lower	2737.844	164.77	164.77	110.64
Lower	2571.784	76.83	76.83	65.26
Lower	2494.952	118.47	118.47	121.57
Lower	2373.655	104.33	104.33	96.43
Lower	2265.225	105.3	105.3	71.99
Lower	2157.963	65.54	65.54	25.52
Lower	2080.321	117.82	117.82	39.43
Lower	1960.670	172.09	172.09	106.18
Lower	1763.762	46.18	46.18	37.25
Lower	1740	Culvert		
Lower	1716.392	168.18	168.18	142.68
Lower	1538.753	79.02	79.02	62.82
Lower	1456.709	47.12	47.12	51.23
Lower	1407.241	149.56	149.56	161.7
Lower	1233.140	133.75	133.4	15.65
Lower	1047.463	1	1	1

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Cabin Run

Reach	River Sta.	Contr.	Expan.
Upper	13338.65	.1	.3
Upper	13228.66	.1	.3
Upper	13047.83	.1	.3
Upper	12905.72	.1	.3
Upper	12783.74	.1	.3
Upper	12709.20	.1	.3
Upper	12590.58	.1	.3
Upper	12466.12	.1	.3
Upper	12336.63	.1	.3
Upper	12201.47	.1	.3
Upper	12106.82	.1	.3

Upper	12080	Culvert	
Upper	12052.69	.1	.3
Upper	12016.91	.1	.3
Upper	11917.65	.1	.3
Upper	11736.49	.1	.3
Upper	11681.96	.1	.3
Upper	11547.41	.1	.3
Upper	11461.86	.1	.3
Upper	11316.17	.1	.3
Upper	11190.54	.1	.3
Lower	11091.35	.1	.3
Lower	10962.06	.1	.3
Lower	10900.67	.1	.3
Lower	10705.68	.1	.3
Lower	10444.93	.1	.3
Lower	10376.87	.1	.3
Lower	10151.02	.1	.3
Lower	10106.50	.1	.3
Lower	10000.00	.1	.3

River: Leason Run

Reach	River Sta.	Contr.	Expan.
Lower	2737.844	.1	.3
Lower	2571.784	.1	.3
Lower	2494.952	.1	.3
Lower	2373.655	.1	.3
Lower	2265.225	.1	.3
Lower	2157.963	.1	.3
Lower	2080.321	.1	.3
Lower	1960.670	.1	.3
Lower	1763.762	.1	.3
Lower	1740	Culvert	
Lower	1716.392	.1	.3
Lower	1538.753	.1	.3
Lower	1456.709	.1	.3
Lower	1407.241	.1	.3
Lower	1233.140	.1	.3
Lower	1047.463	.1	.3

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Ex

River: Cabin Run Reach: Upper RS: 13047.83 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.
River: Cabin Run Reach: Upper RS: 12052.69 Profile: PF 1
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.
River: Cabin Run Reach: Upper RS: 12016.91 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
River: Cabin Run Reach: Upper RS: 11736.49 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Cabin Run Reach: Upper RS: 11461.86 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Cabin Run Reach: Upper RS: 11316.17 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Cabin Run Reach: Upper RS: 11190.54 Profile: PF 1
Warning:Divided flow computed for this cross-section.
River: Cabin Run Reach: Lower RS: 10962.06 Profile: PF 1
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.
River: Cabin Run Reach: Lower RS: 10705.68 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Cabin Run Reach: Lower RS: 10106.50 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Leason Run Reach: Lower RS: 2737.844 Profile: PF 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.
Note: Manning's n values were composited to a single value in the main channel.
River: Leason Run Reach: Lower RS: 2571.784 Profile: PF 1

Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
River: Leason Run Reach: Lower RS: 2494.952 Profile: PF 1
Warning:The conveyance ratio (upstream 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.
Note: Manning's n values were composited to a single value in the main channel.
River: Leason Run Reach: Lower RS: 2373.655 Profile: PF 1
Note: Manning's n values were composited to a single value in the main channel.
River: Leason Run Reach: Lower RS: 2265.225 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
River: Leason Run Reach: Lower RS: 2157.963 Profile: PF 1
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: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: Manning's n values were composited to a single value in the main channel.
River: Leason Run Reach: Lower RS: 2080.321 Profile: PF 1
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: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: Manning's n values were composited to a single value in the main channel.
River: Leason Run Reach: Lower RS: 1960.670 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Manning's n values were composited to a single value in the main channel.

River: Leason Run Reach: Lower RS: 1740 Profile: PF 1 Culv: Culvert #1

Note: The normal depth exceeds the height of the culvert. The program assumes that the normal depth is equal to the height of the culvert.

River: Leason Run Reach: Lower RS: 1716.392 Profile: PF 1

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.

Note: Manning's n values were composited to a single value in the main channel.

River: Leason Run Reach: Lower RS: 1538.753 Profile: PF 1

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.

Note: Manning's n values were composited to a single value in the main channel.

River: Leason Run Reach: Lower RS: 1456.709 Profile: PF 1

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

Note: Manning's n values were composited to a single value in the main channel.

River: Leason Run Reach: Lower RS: 1407.241 Profile: PF 1

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.

Note: Manning's n values were composited to a single value in the main channel.

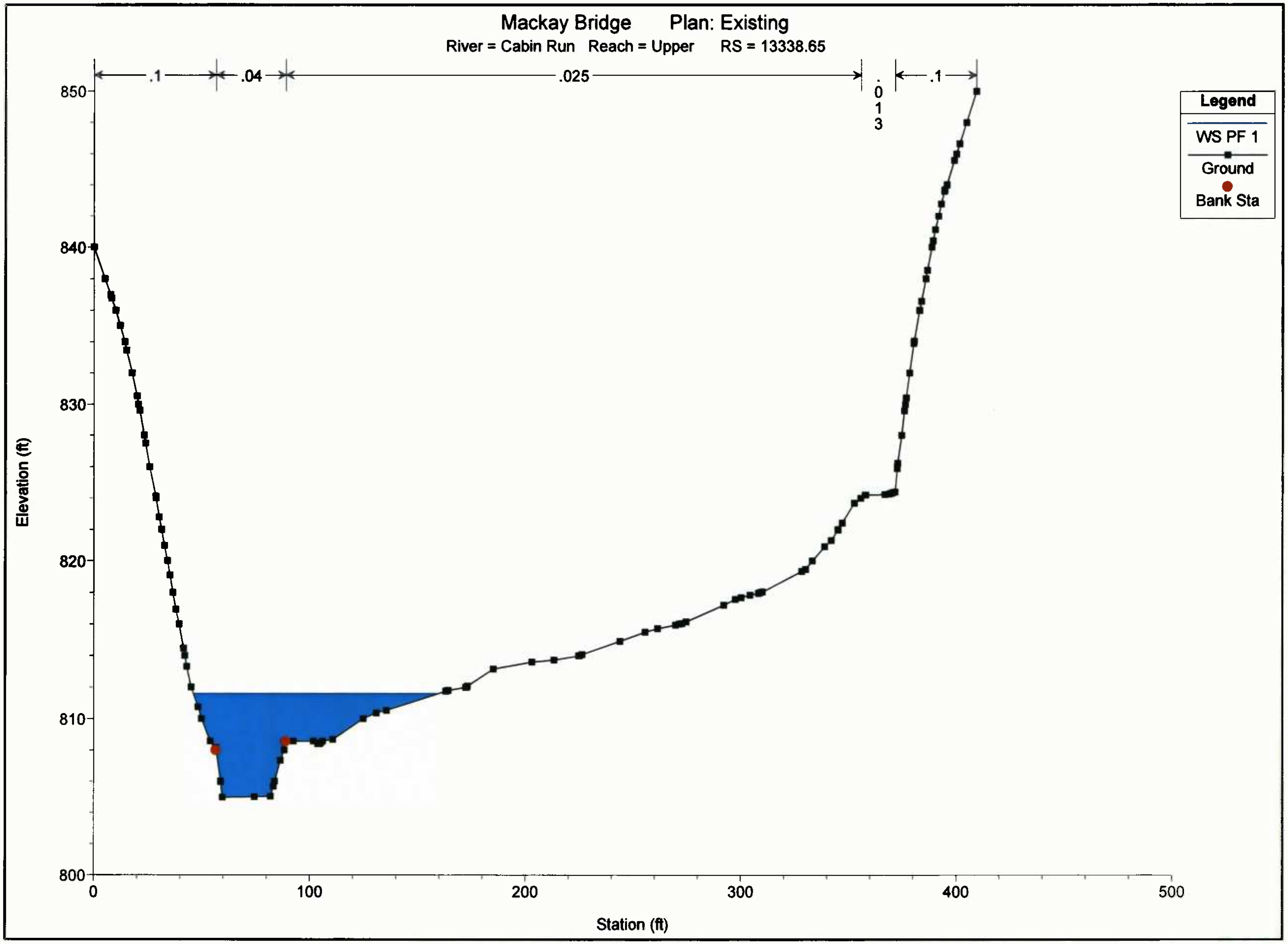
River: Leason Run Reach: Lower RS: 1233.140 Profile: PF 1

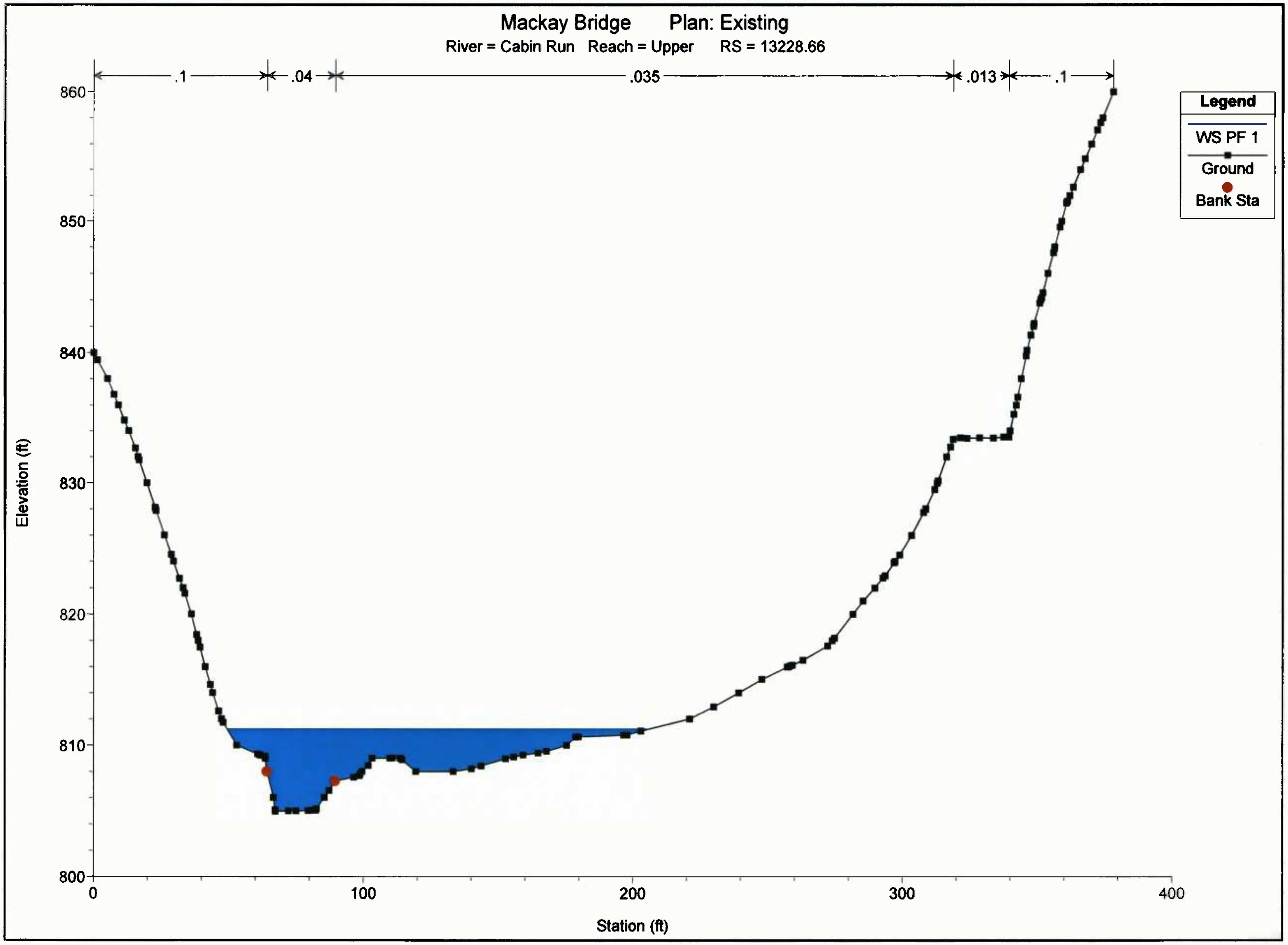
Warning:Divided flow computed for this cross-section.

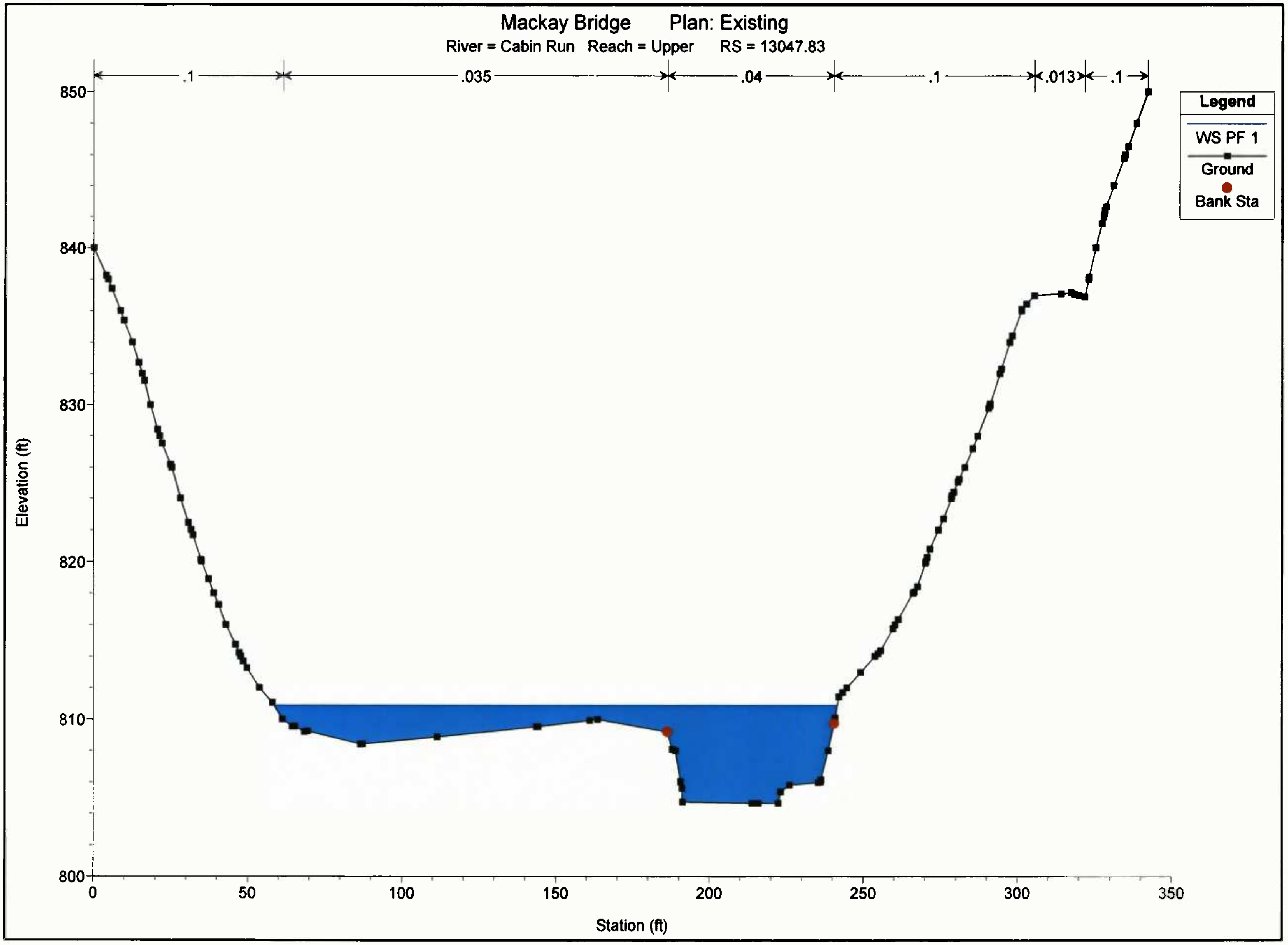
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

River: Leason Run Reach: Lower RS: 1047.463 Profile: PF 1

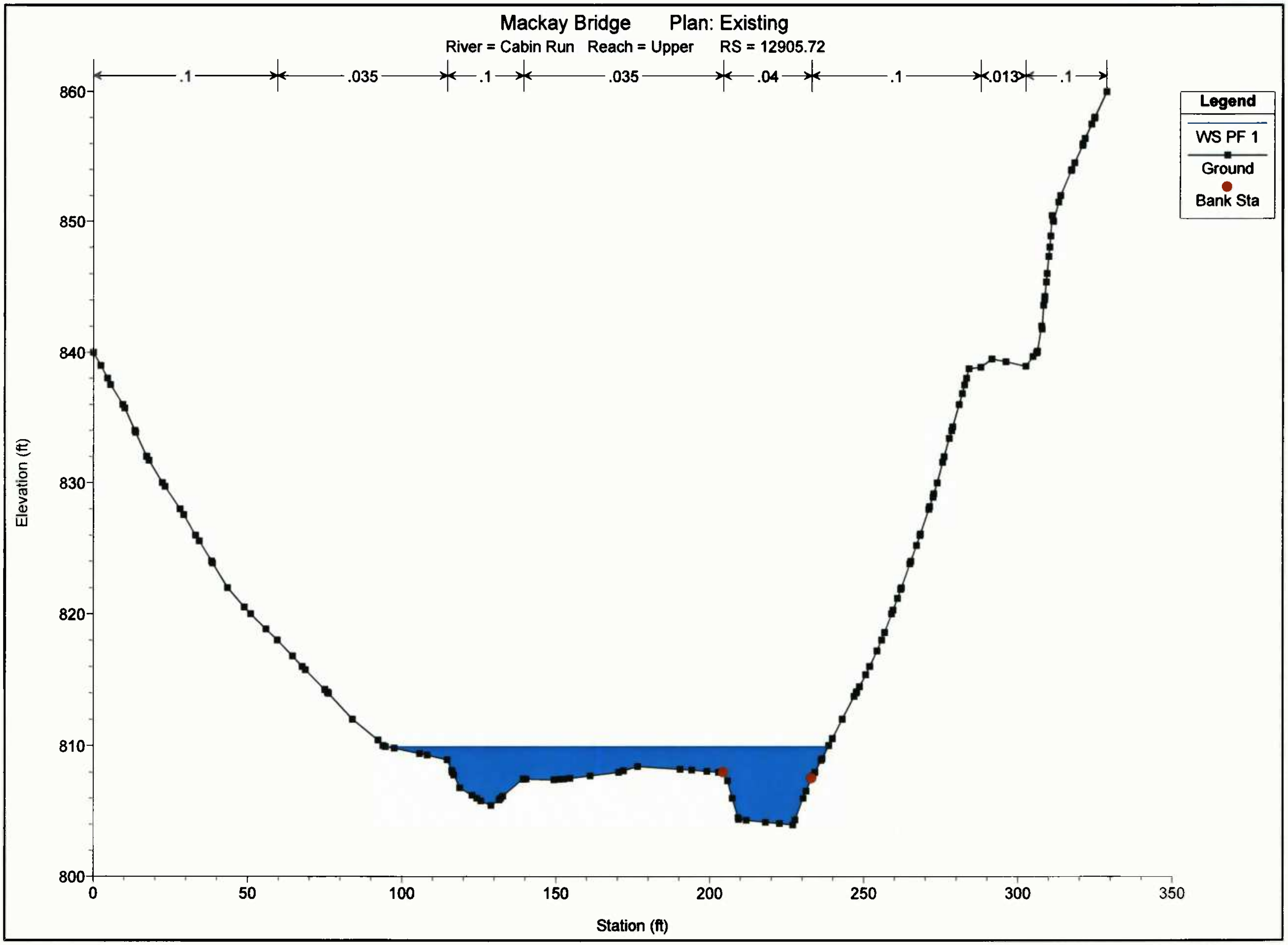
Warning:Divided flow computed for this cross-section.

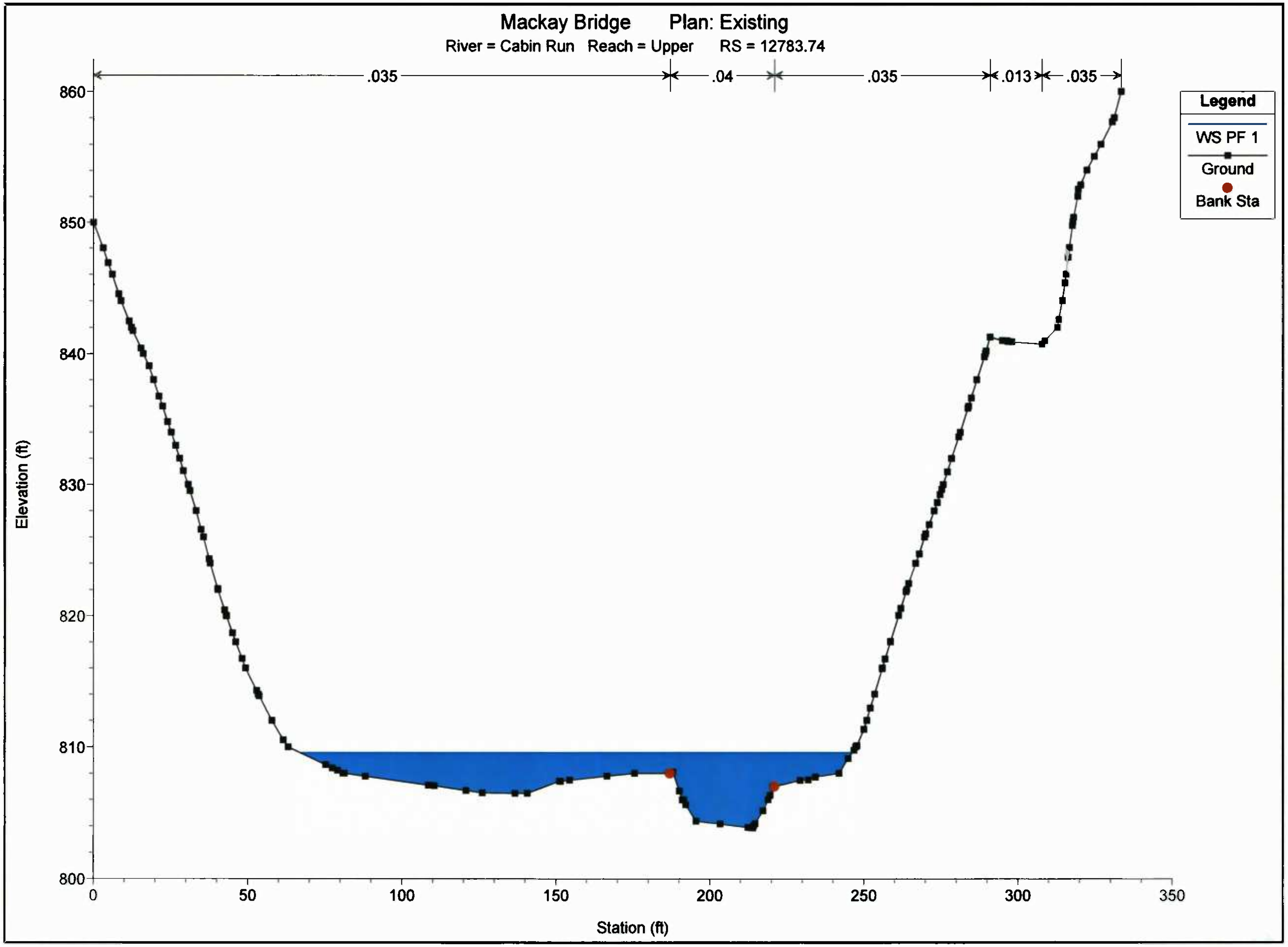

Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 13338.65
.1
.04
.025
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
850
840
830
820
810
800
0
100
200
300
400
500
Station (ft)

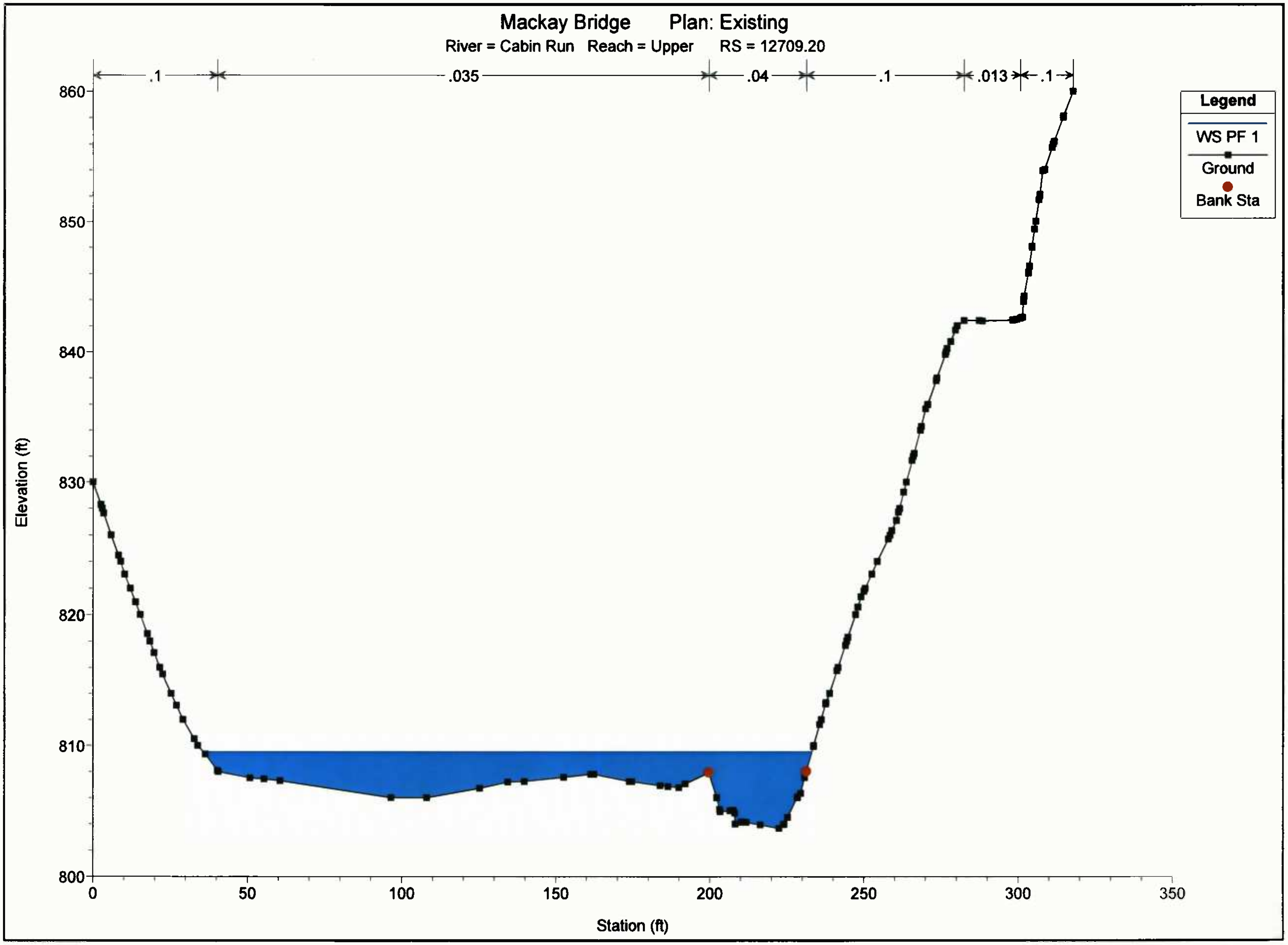

Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 13228.66
.1
.04
.035
.013
.1
Legend
WS PF 1
Ground
Bank Sta
860
850
840
830
820
810
800
Elevation (ft)
0
100
200
300
400
Station (ft)



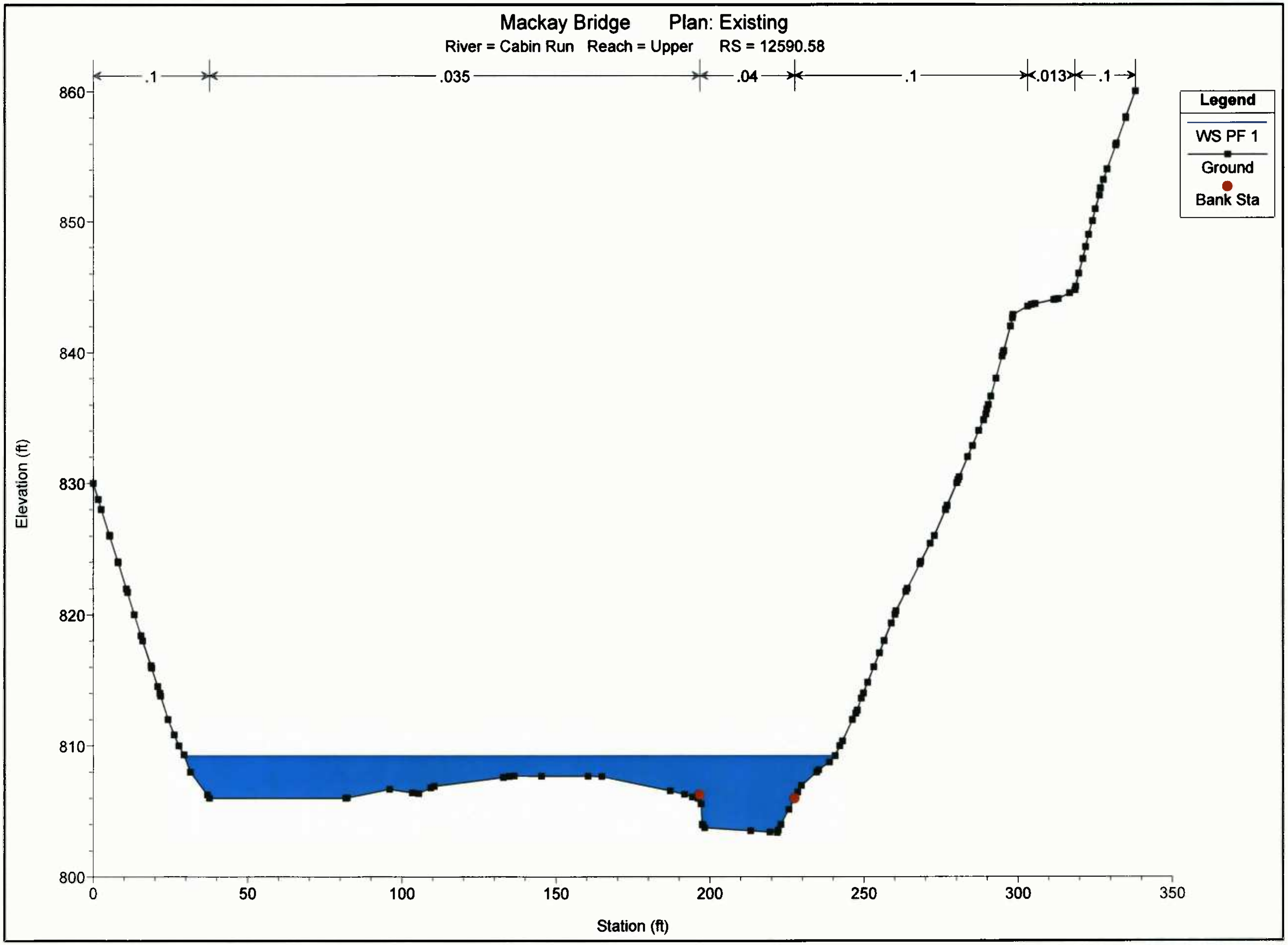
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 13047.83
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
850
840
830
820
810
800
0
50
100
150
200
250
300
350
Station (ft)


Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 12905.72
.1
.035
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
860
850
840
830
820
810
800
0
50
100
150
200
250
300
350
Station (ft)

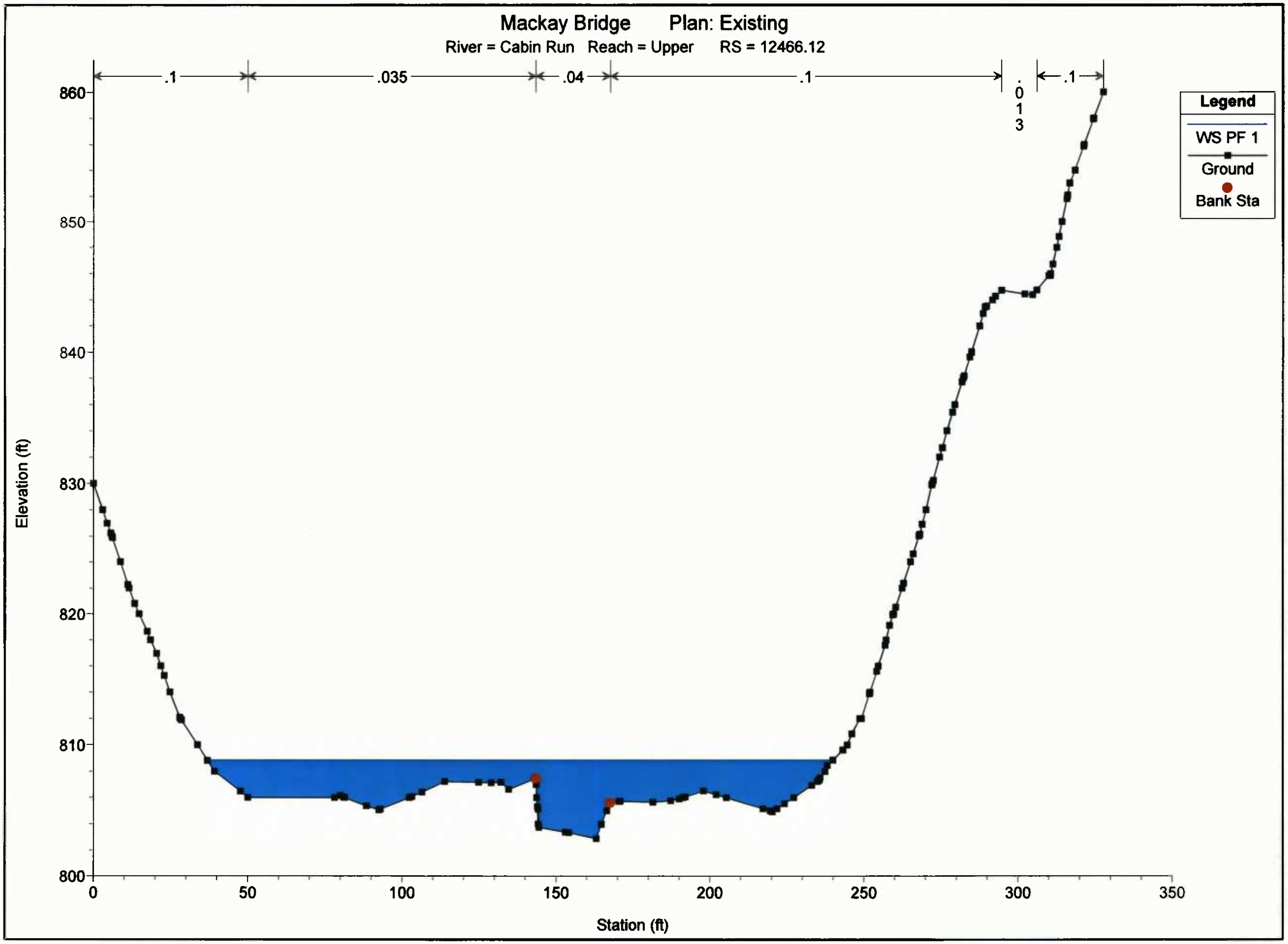

Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 12783.74
.035
.04
.035
.013
.035
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
860
850
840
830
820
810
800
0
50
100
150
200
250
300
350
Station (ft)

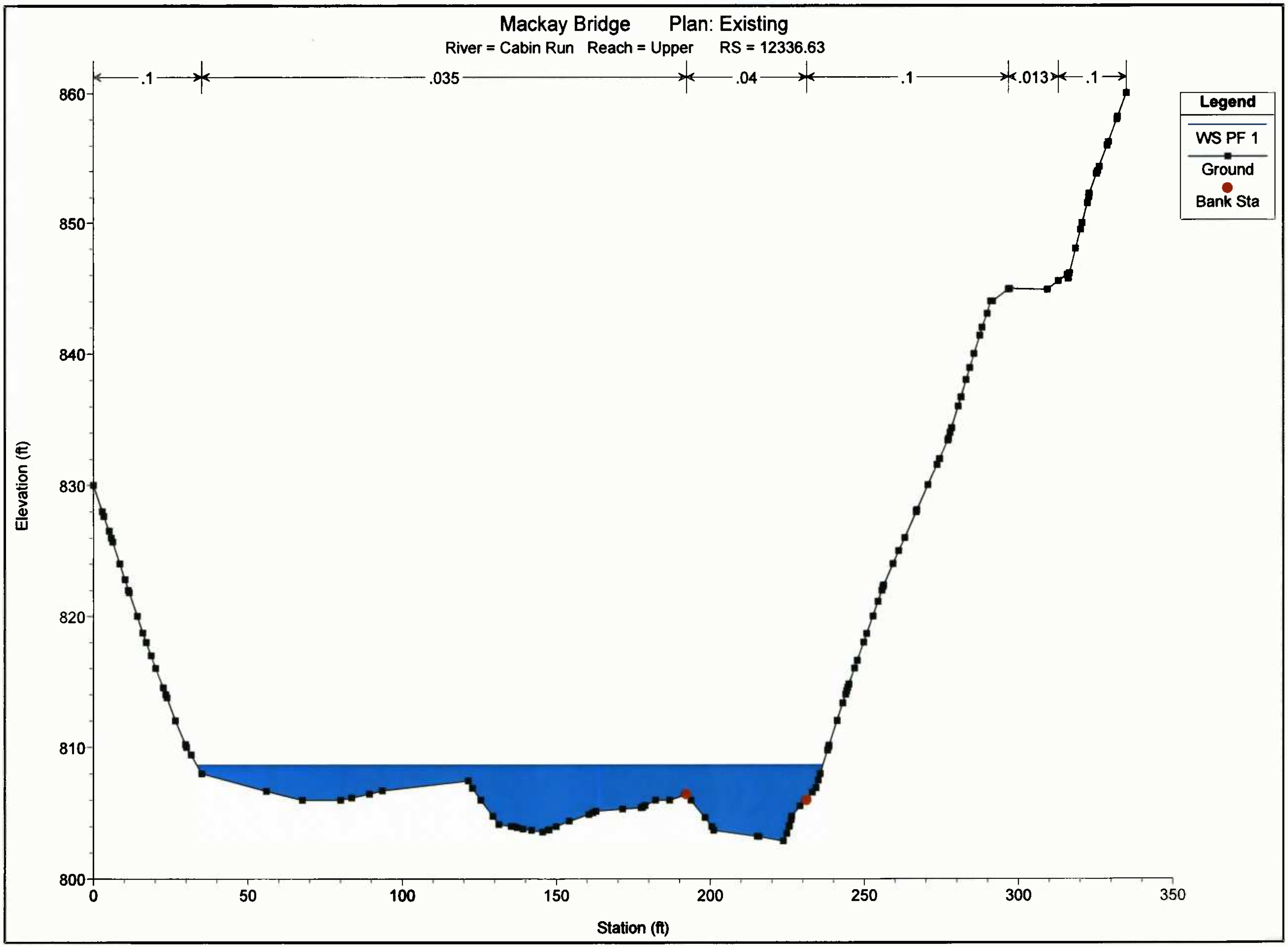


Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 12709.20
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
860
850
840
830
820
810
800
0
50
100
150
200
250
300
350

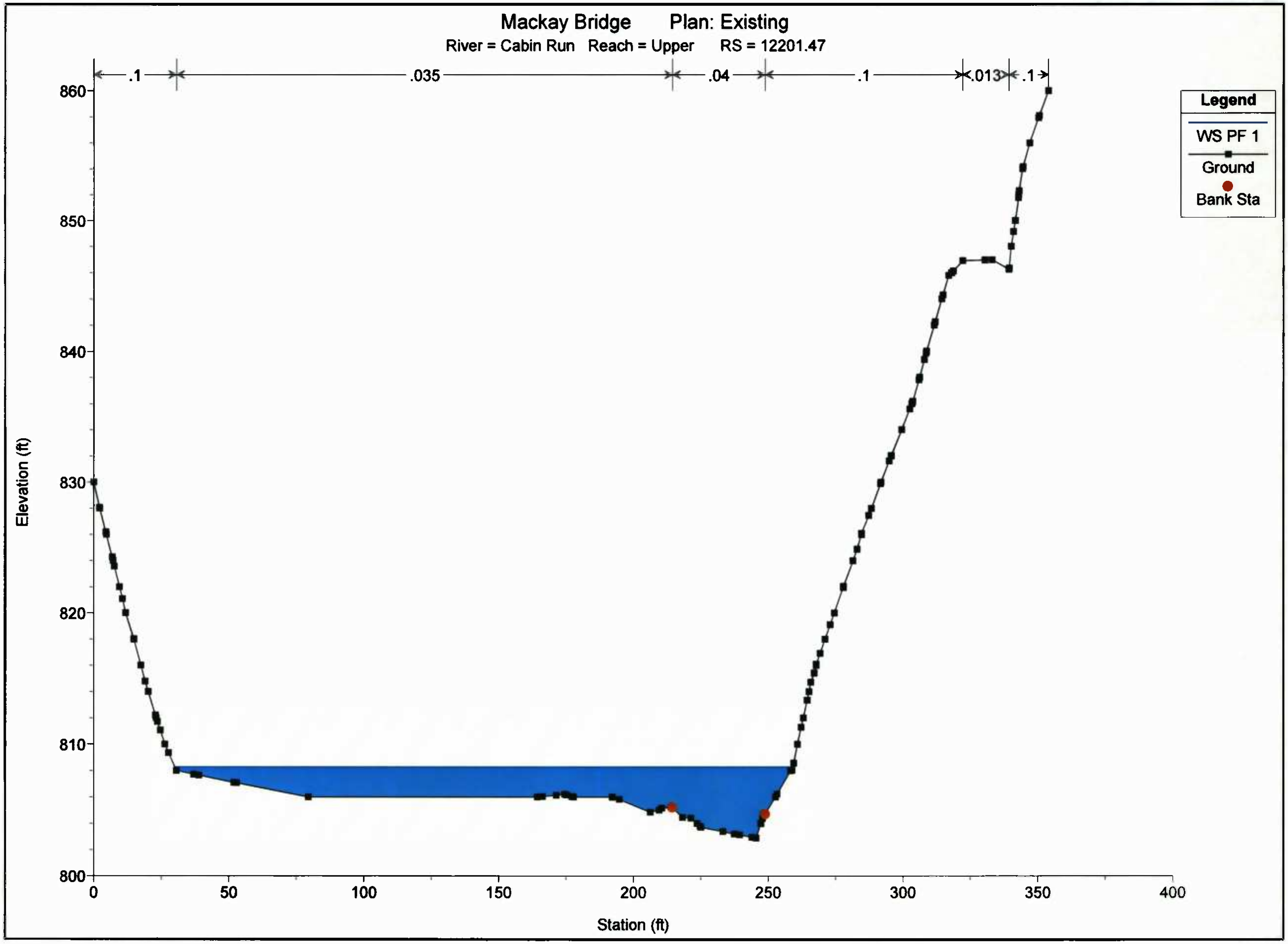


Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 12590.58
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
860
850
840
830
820
810
800
0
50
100
150
200
250
300
350

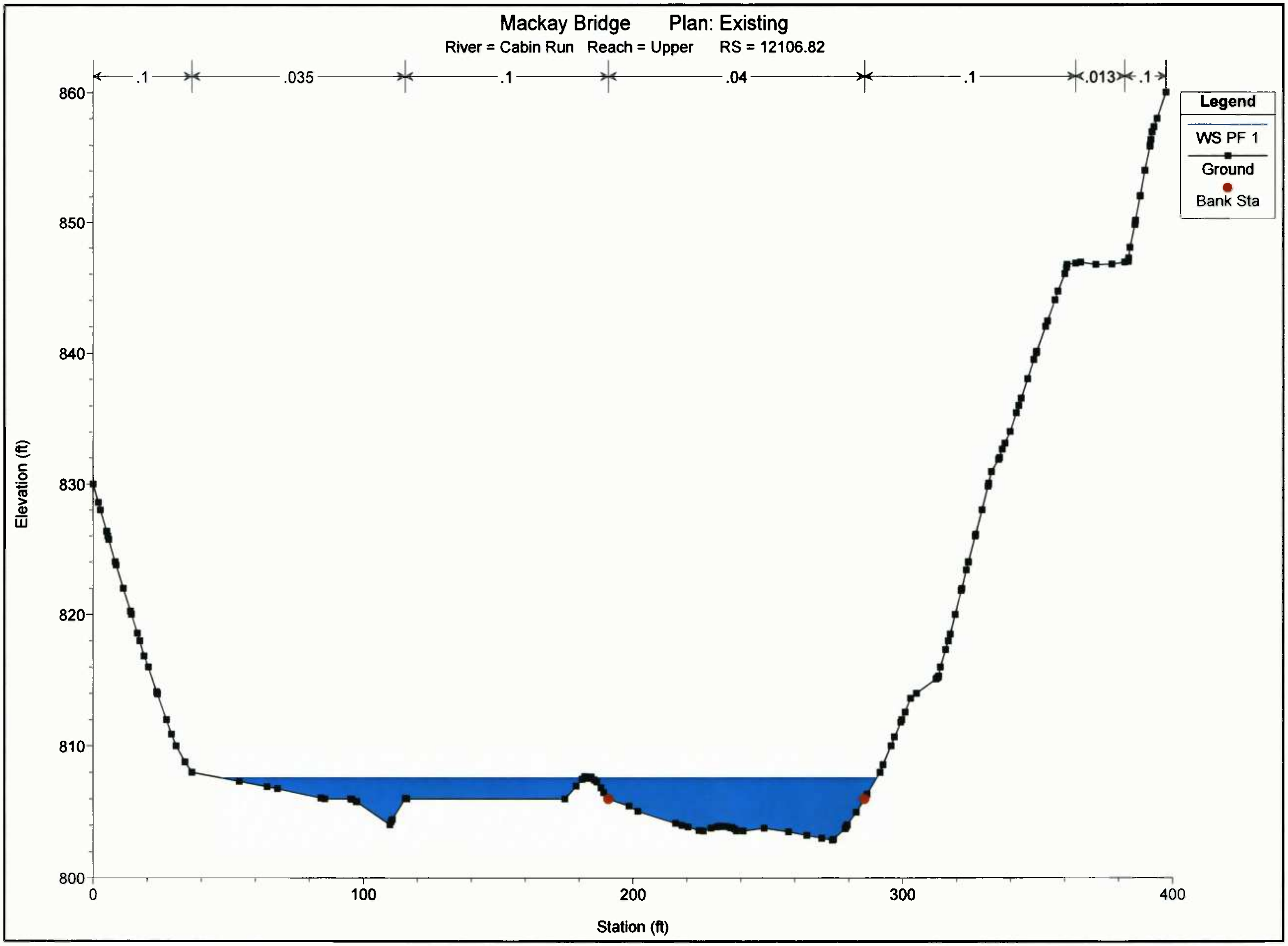

Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 12466.12
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
860
850
840
830
820
810
800
0
50
100
150
200
250
300
350
Station (ft)



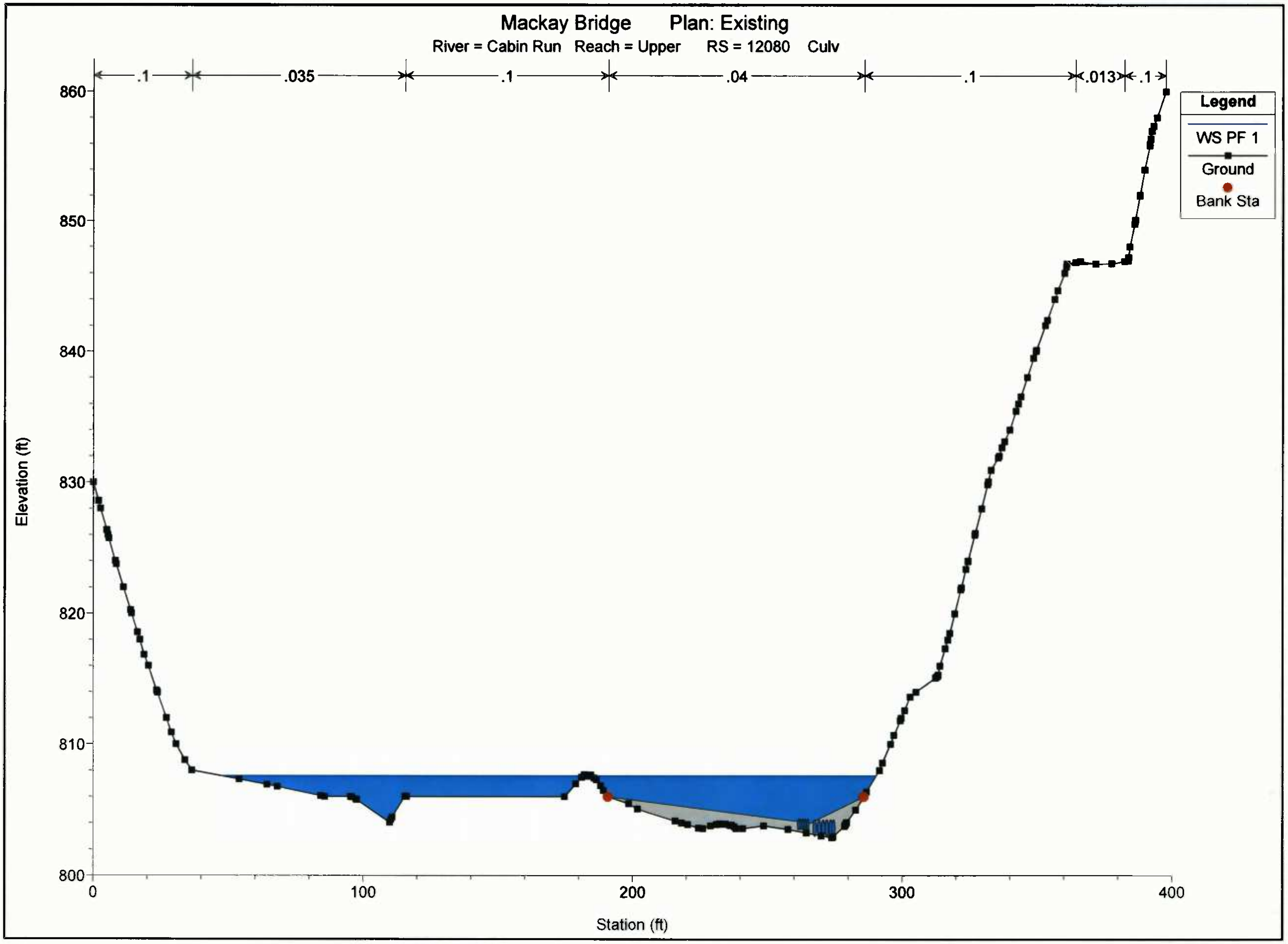
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 12336.63
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
860
850
840
830
820
810
800
0
50
100
150
200
250
300
350
Station (ft)

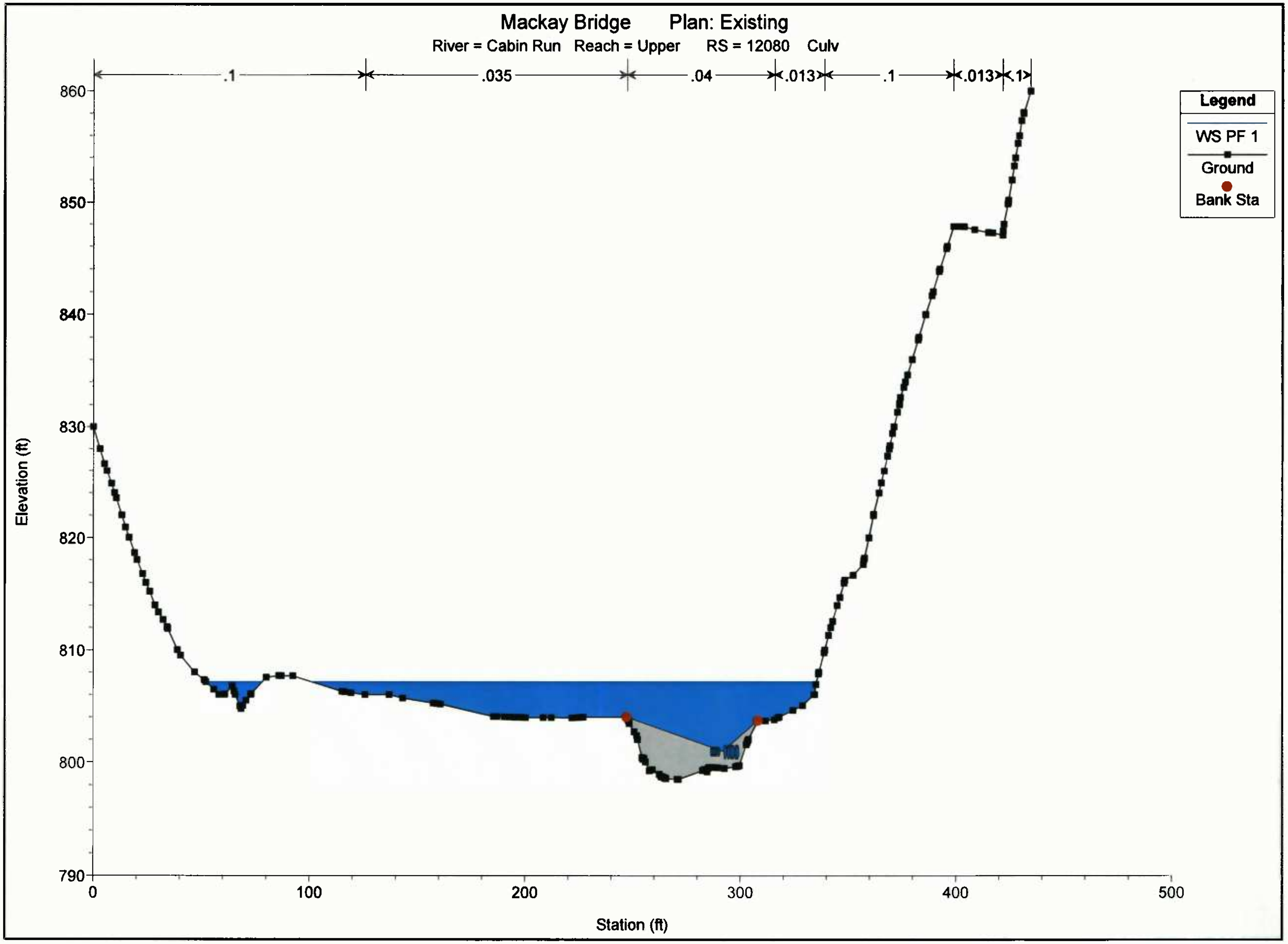


Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 12201.47
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
860
850
840
830
820
810
800
0
50
100
150
200
250
300
350
400
Station (ft)

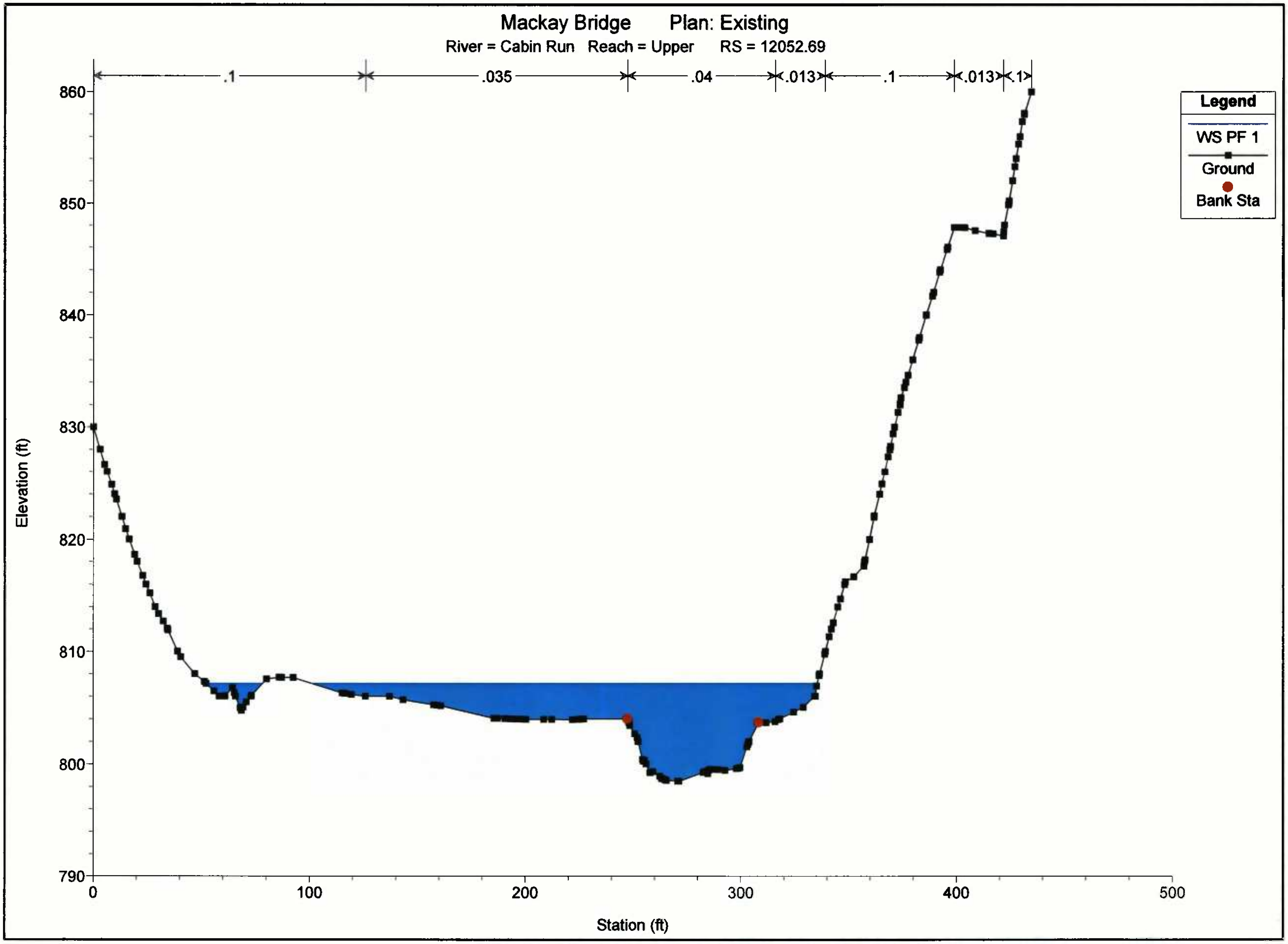


Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 12106.82
.1
.035
.1
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
860
850
840
830
820
810
800
Elevation (ft)
0
100
200
300
400
Station (ft)

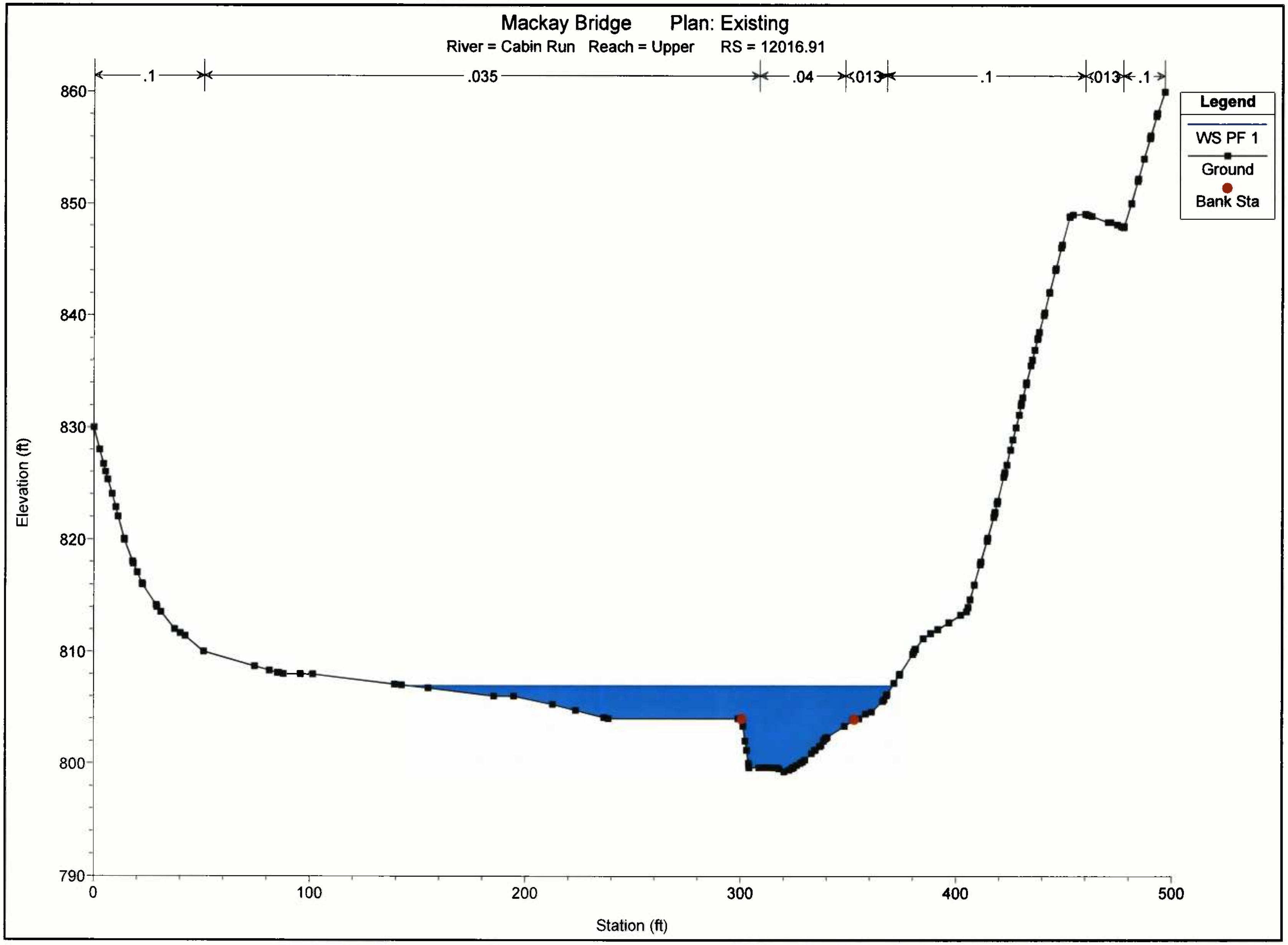

Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 12080 Culv
.1
.035
.1
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
860
850
840
830
820
810
800
0
100
200
300
400
Station (ft)



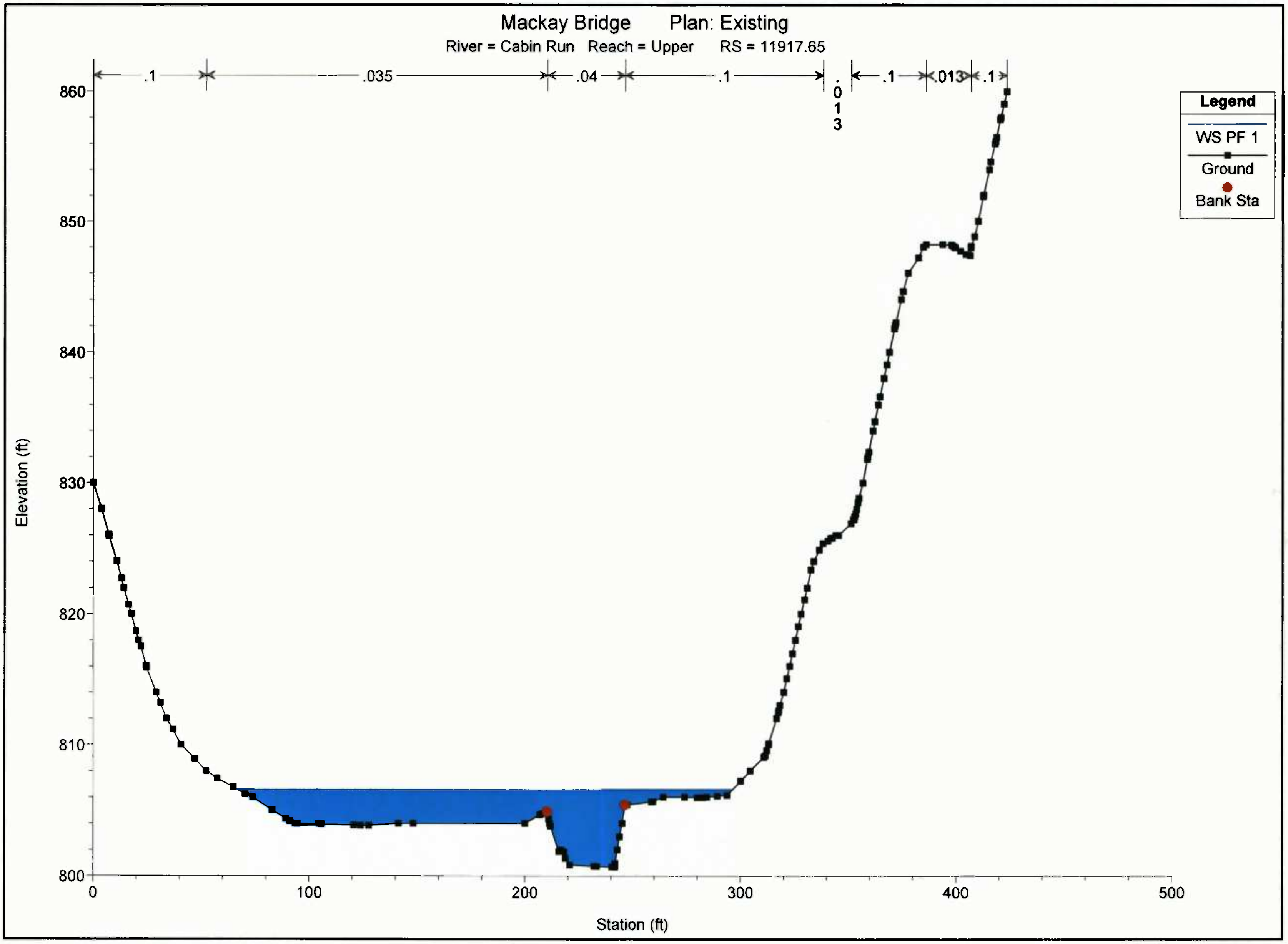
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 12080 Culv
.1
.035
.04
.013
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
860
850
840
830
820
810
800
790
0
100
200
300
400
500



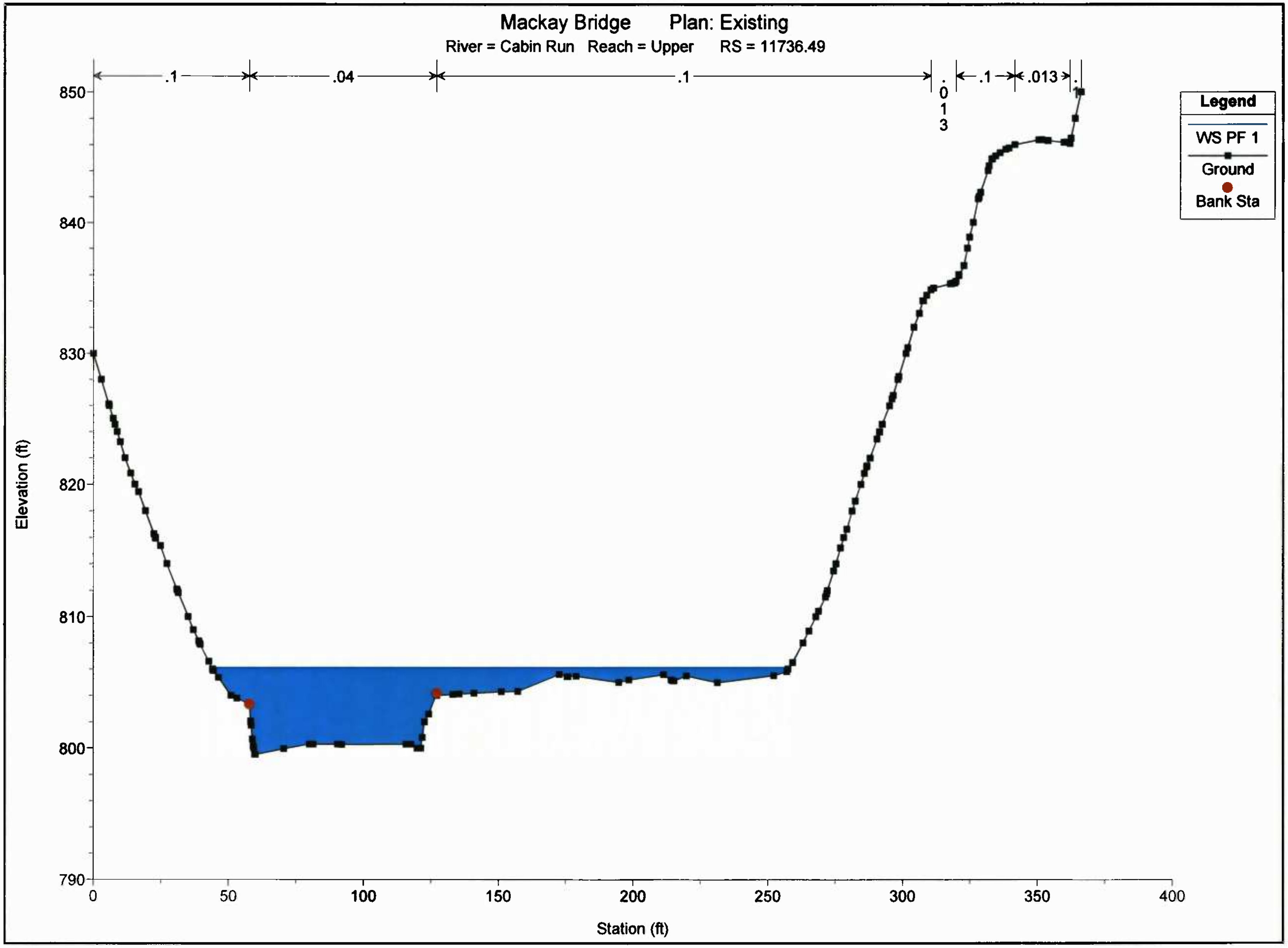
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 12052.69
.1
.035
.04
.013
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
860
850
840
830
820
810
800
790
0
100
200
300
400
500
Station (ft)



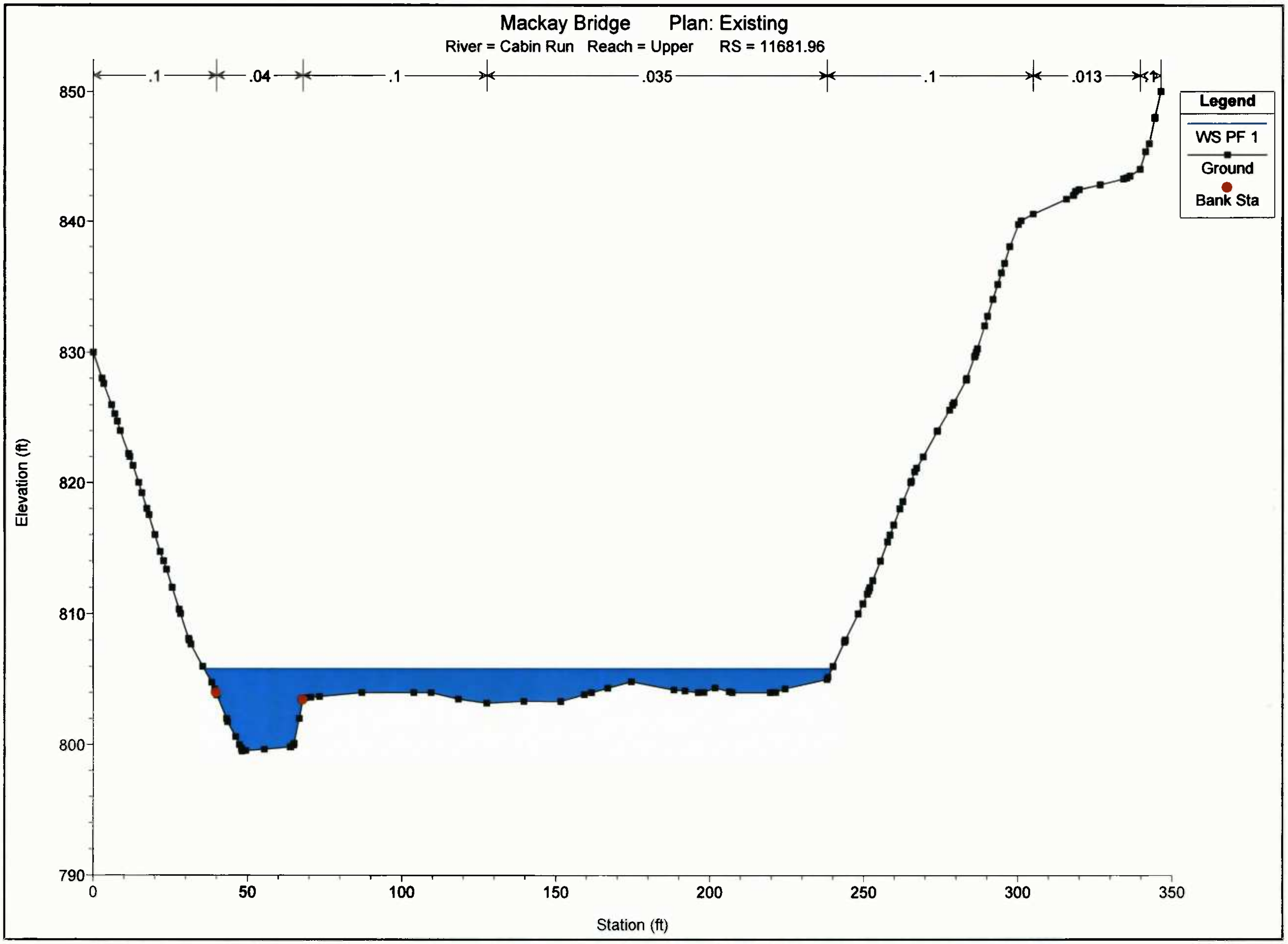
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 12016.91
.1
.035
.04
.013
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
860
850
840
830
820
810
800
790
0
100
200
300
400
500
Station (ft)



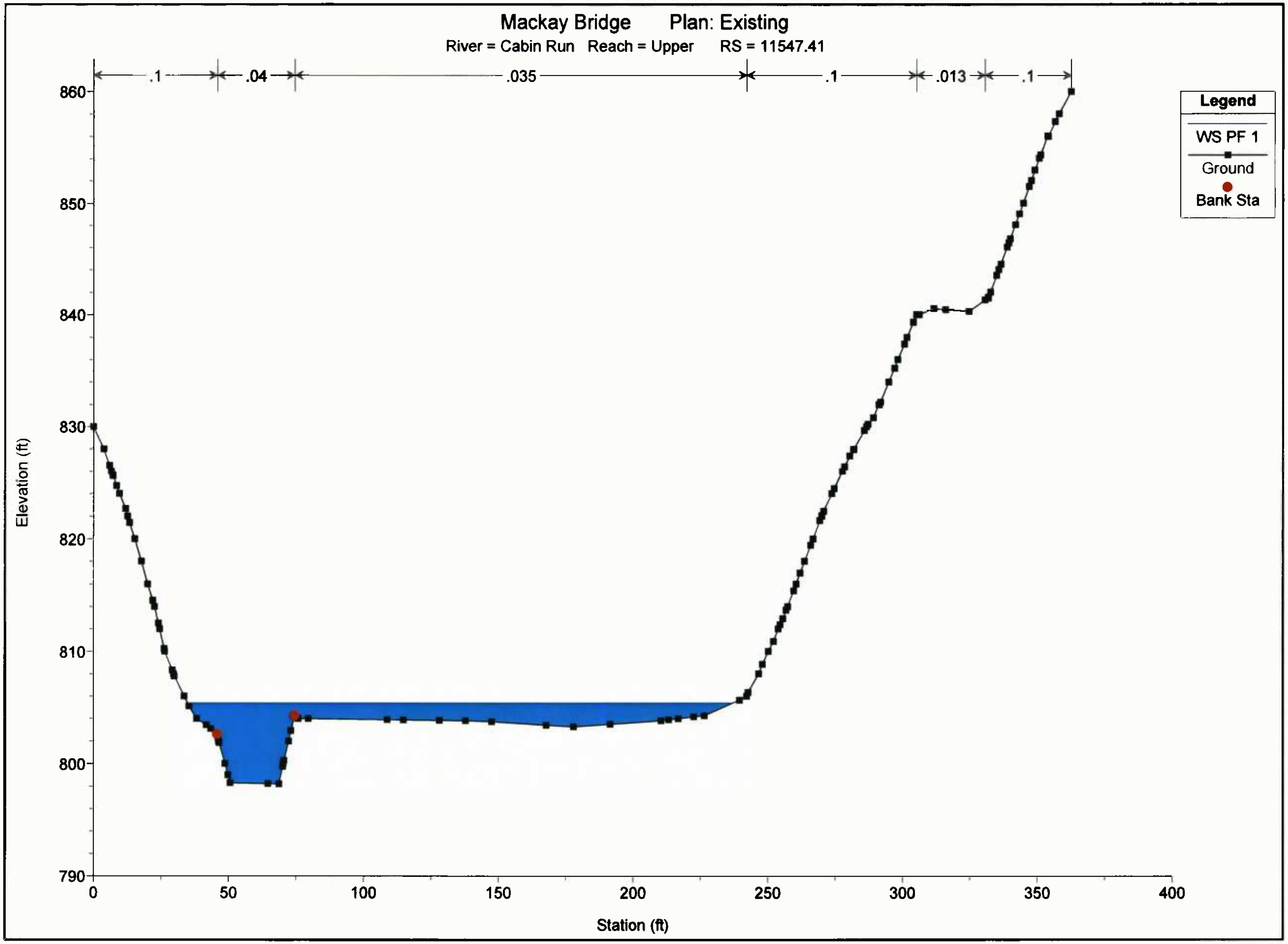
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 11917.65
.1
.035
.04
.1
.013
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
860
850
840
830
820
810
800
0
100
200
300
400
500
Station (ft)



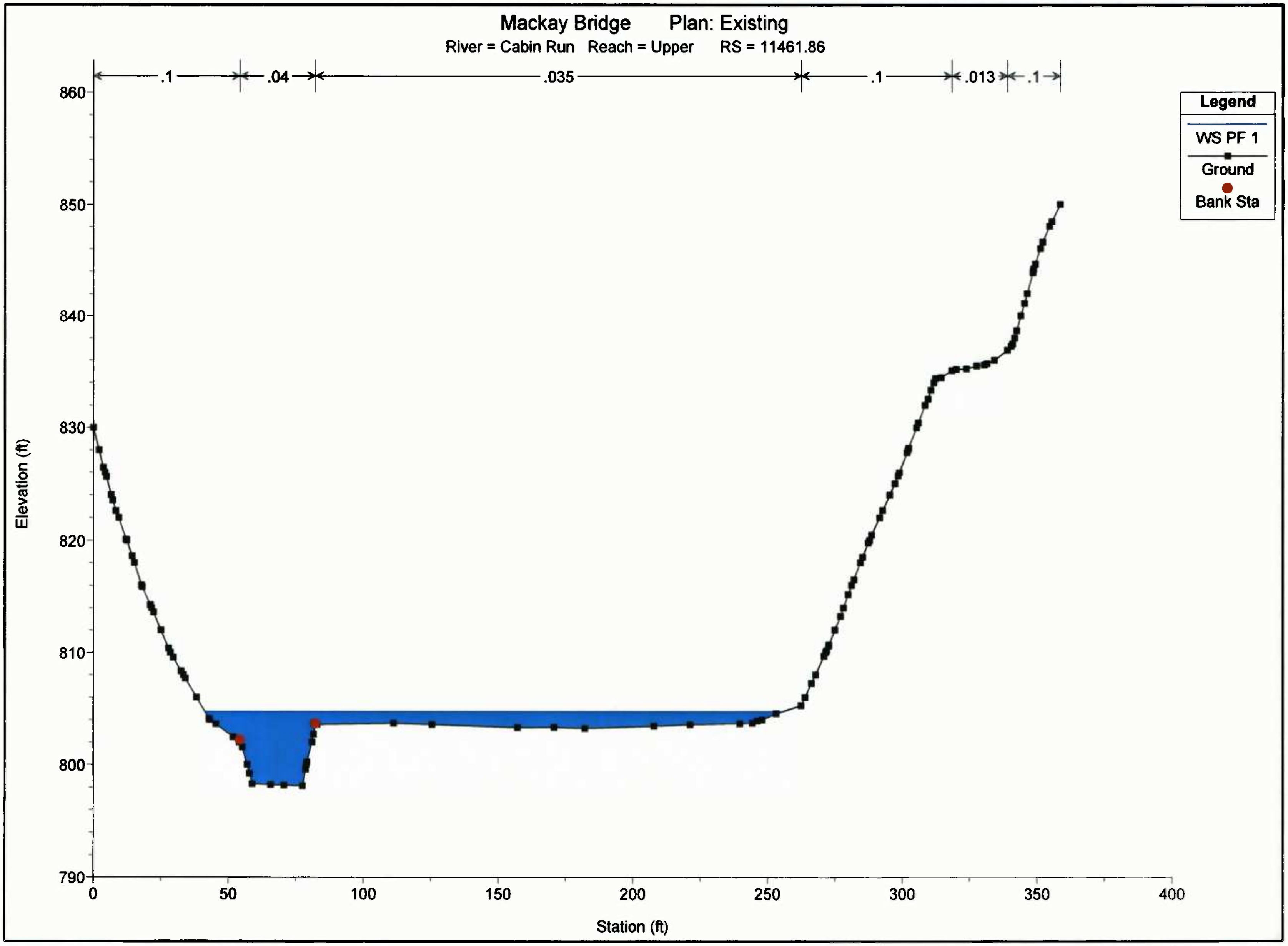
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 11736.49
.1
.04
.1
.013
.1
.013
.
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
850
840
830
820
810
800
790
0
50
100
150
200
250
300
350
400
Station (ft)



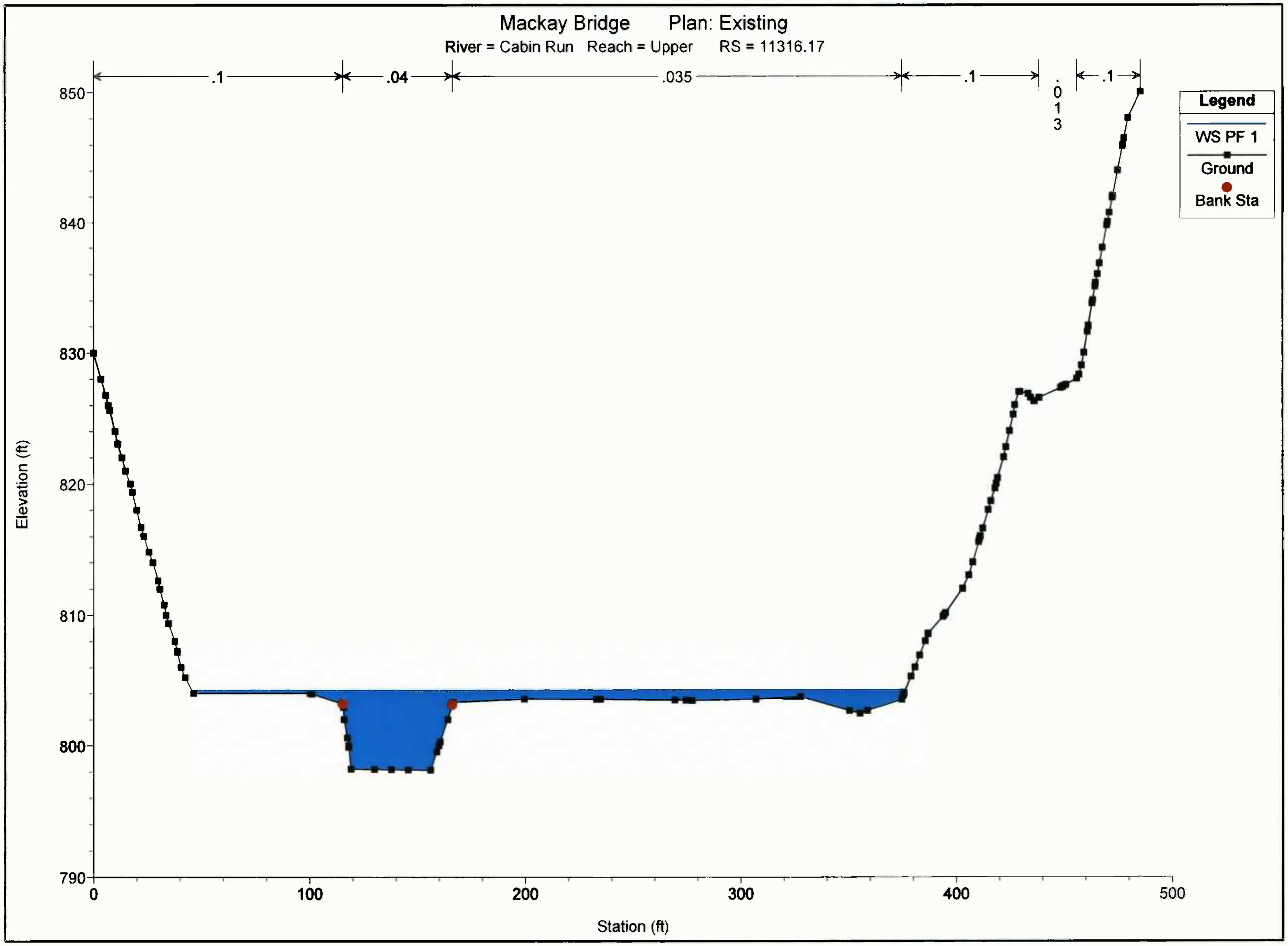
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 11681.96
.1
.04
.1
.035
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
850
840
830
820
810
800
790
Elevation (ft)
0
50
100
150
200
250
300
350
Station (ft)

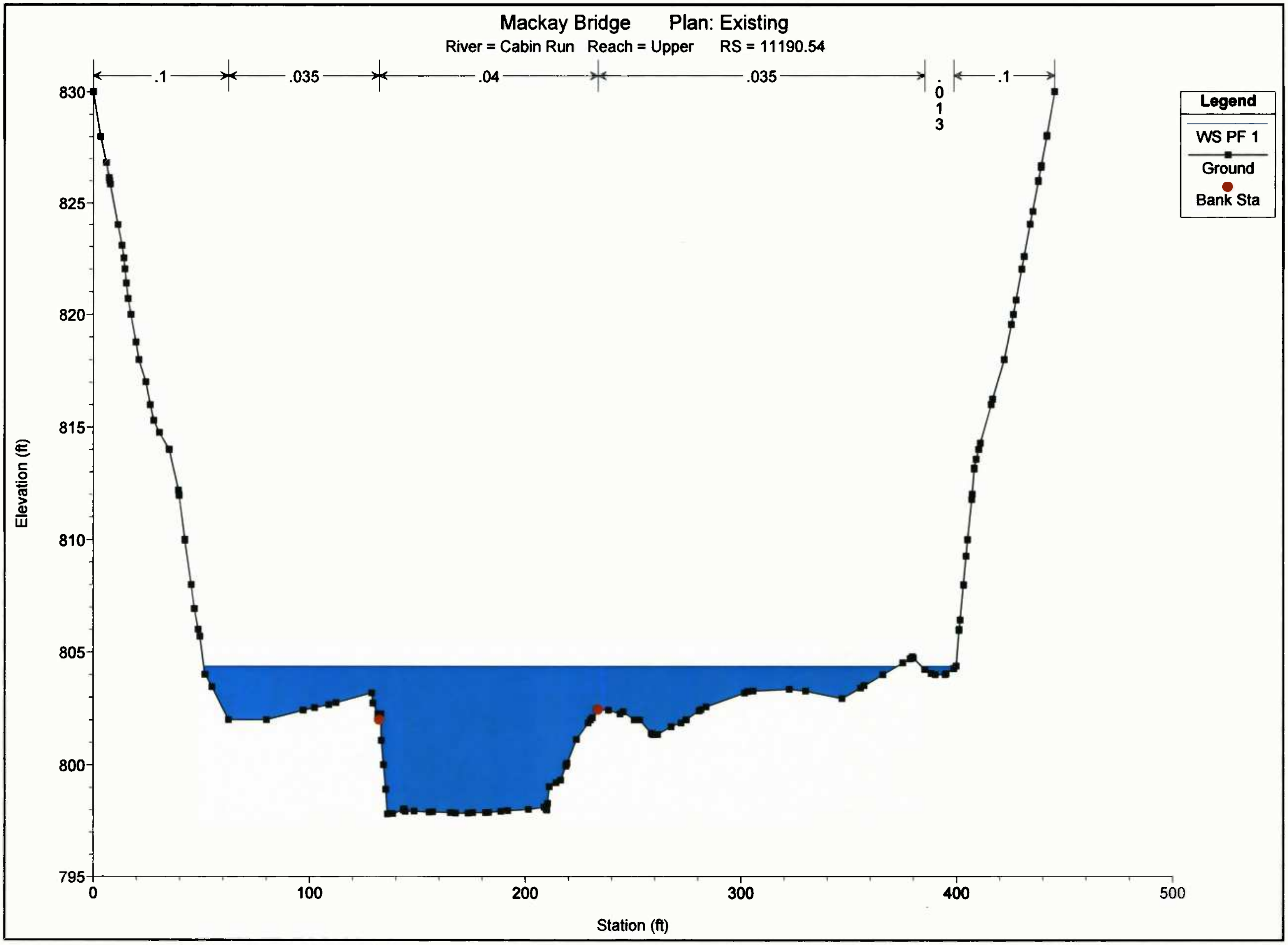


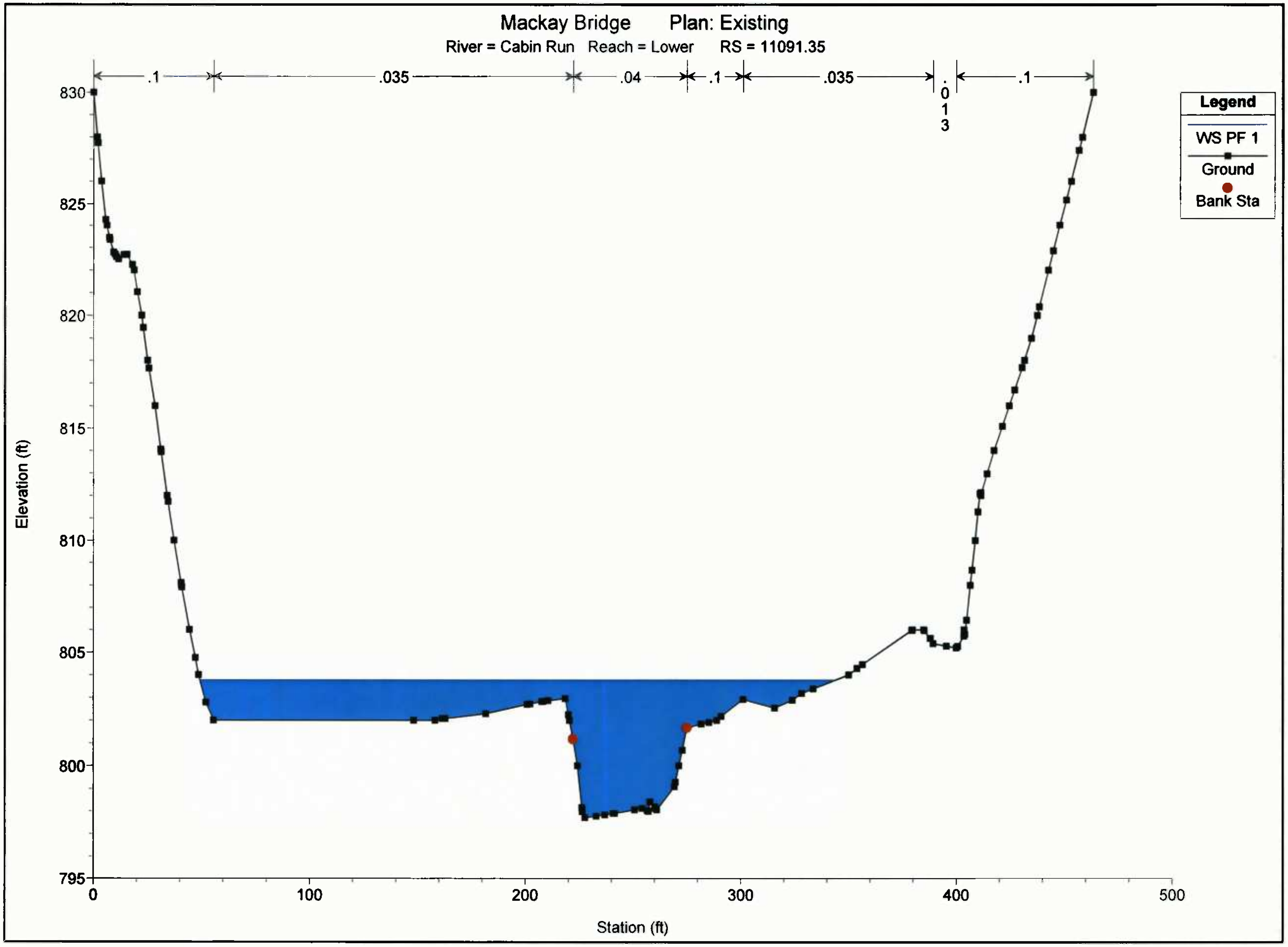
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 11547.41
.1
.04
.035
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
860
850
840
830
820
810
800
790
Elevation (ft)
0
50
100
150
200
250
300
350
400
Station (ft)



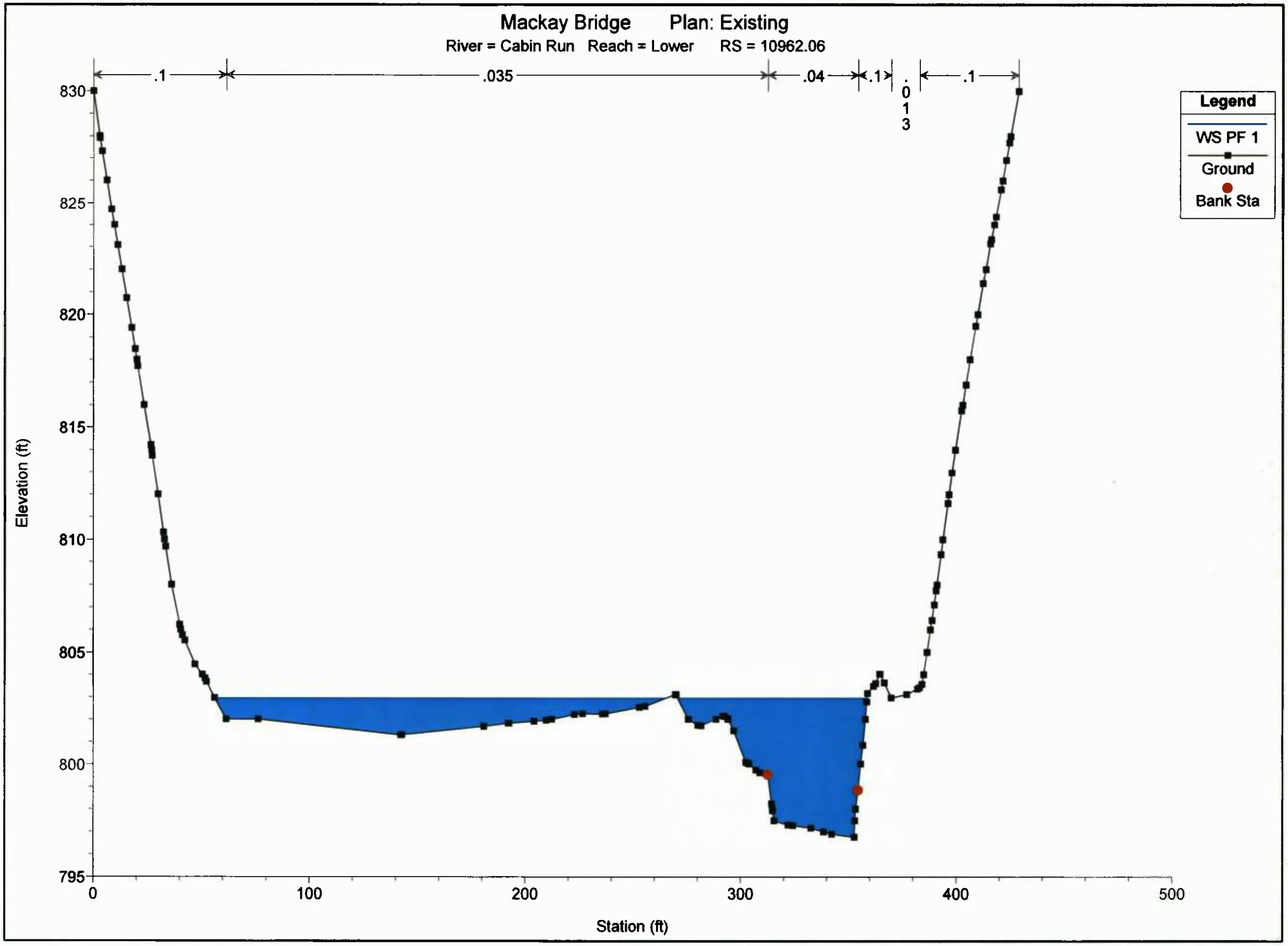
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 11461.86
.1
.04
.035
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
860
850
840
830
820
810
800
790
Elevation (ft)
0
50
100
150
200
250
300
350
400
Station (ft)


Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 11316.17
.1
.04
.035
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
850
840
830
820
810
800
790
Elevation (ft)
0
100
200
300
400
500
Station (ft)

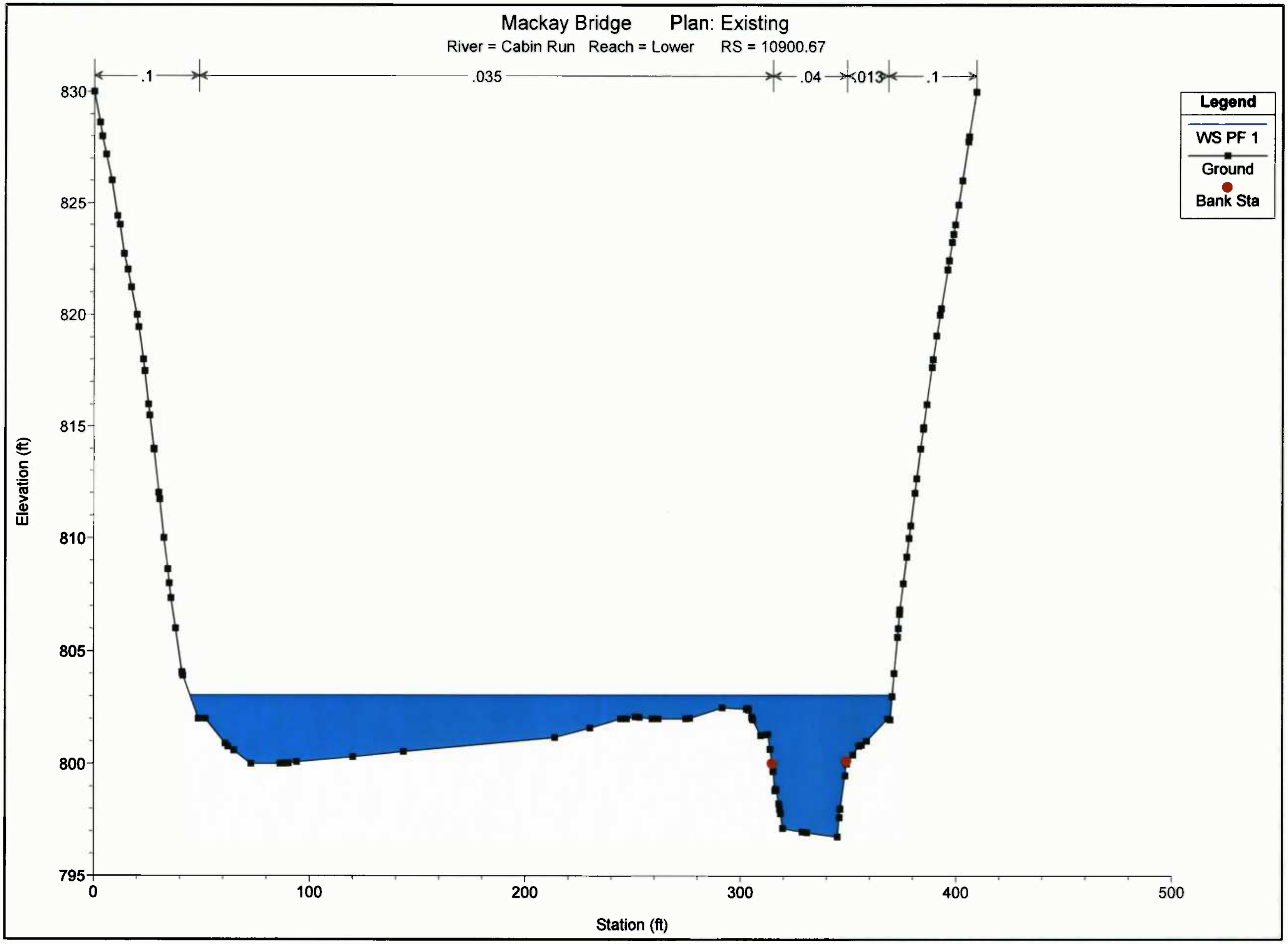

Mackay Bridge Plan: Existing
River = Cabin Run Reach = Upper RS = 11190.54
.1
.035
.04
.035
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
100
200
300
400
500
Station (ft)



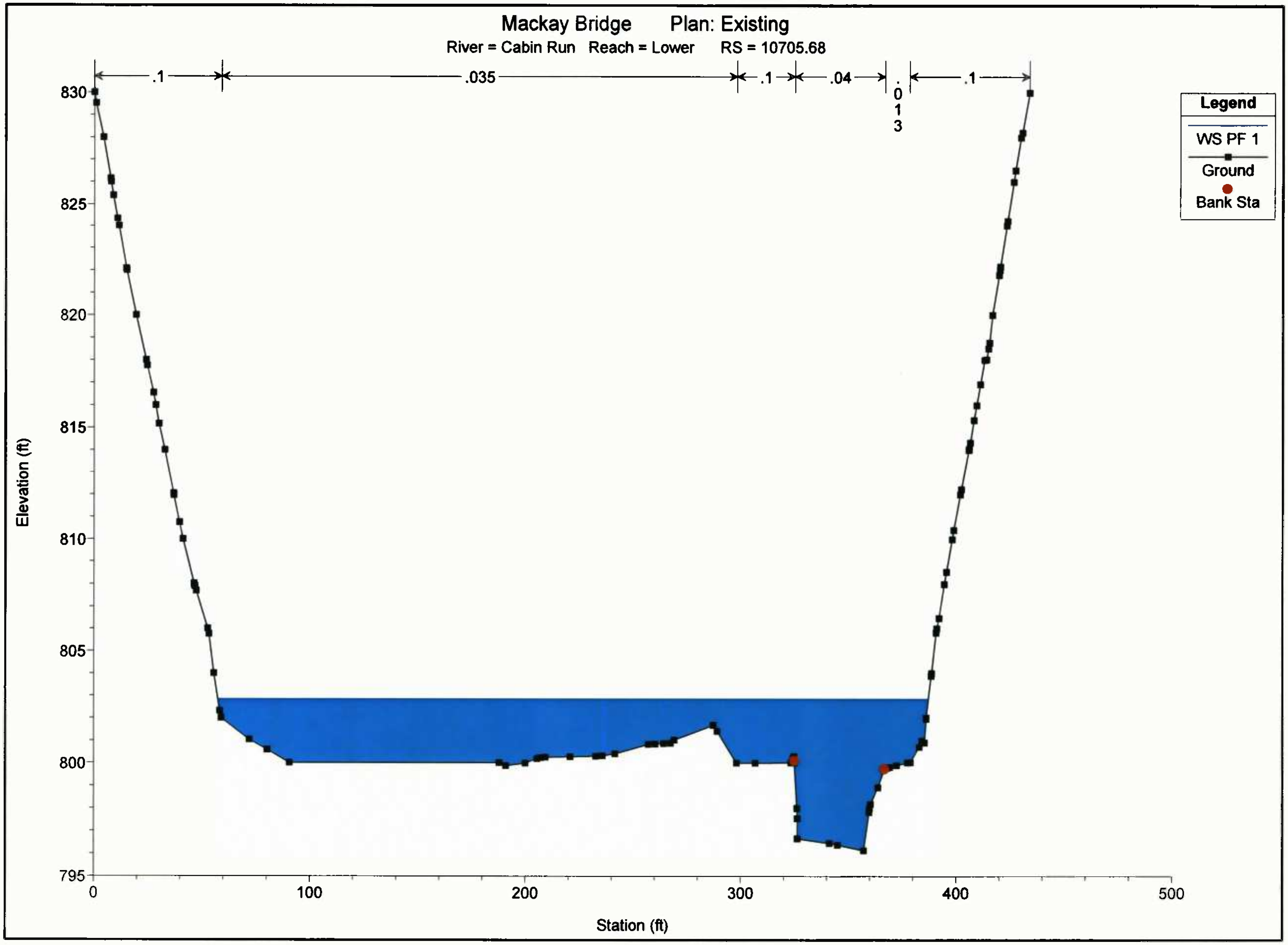
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Lower RS = 11091.35
.1
.035
.04
.1
.035
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
830
825
820
815
810
805
800
795
0
100
200
300
400
500



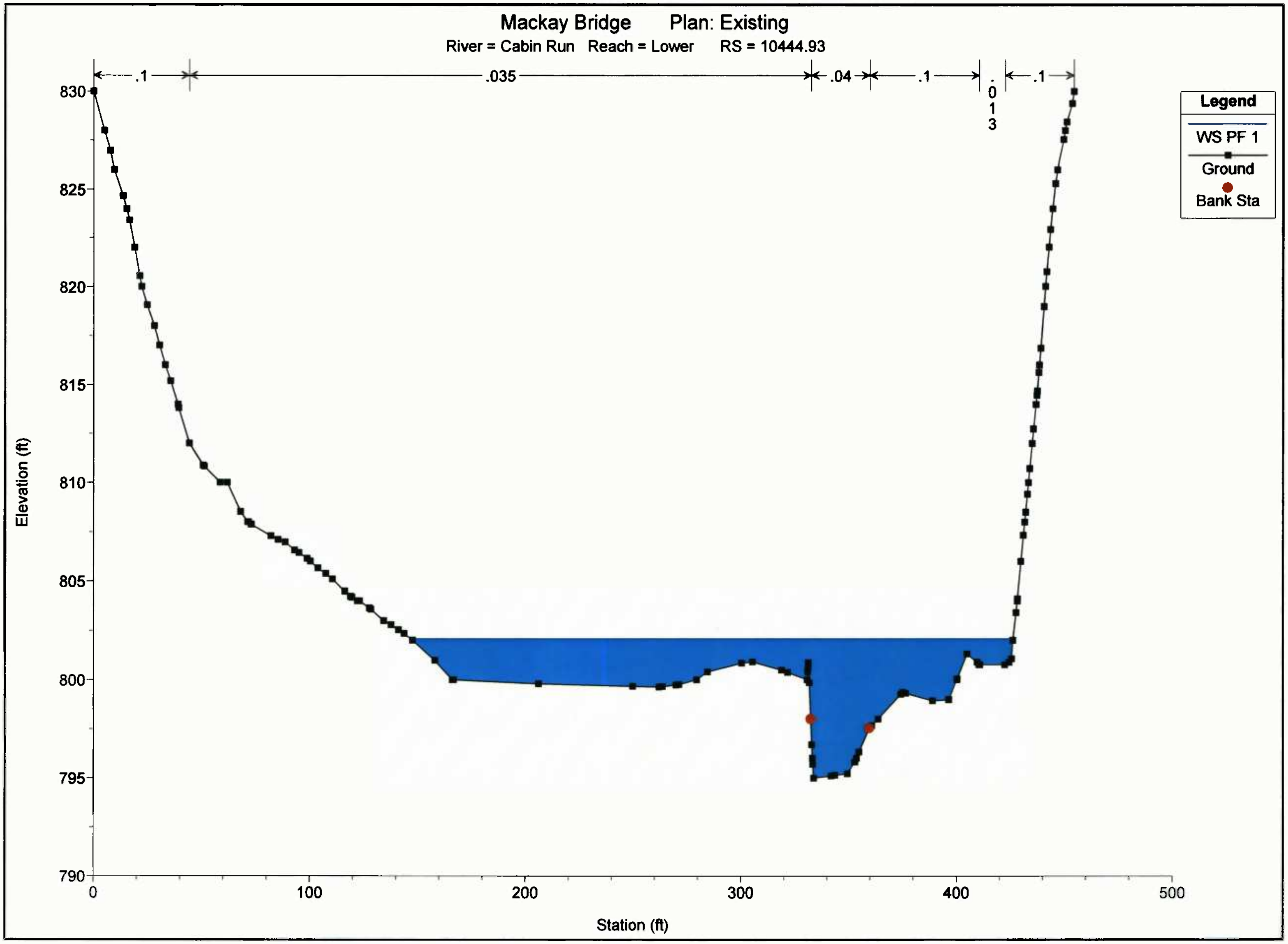
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Lower RS = 10962.06
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
830
825
820
815
810
805
800
795
0
100
200
300
400
500



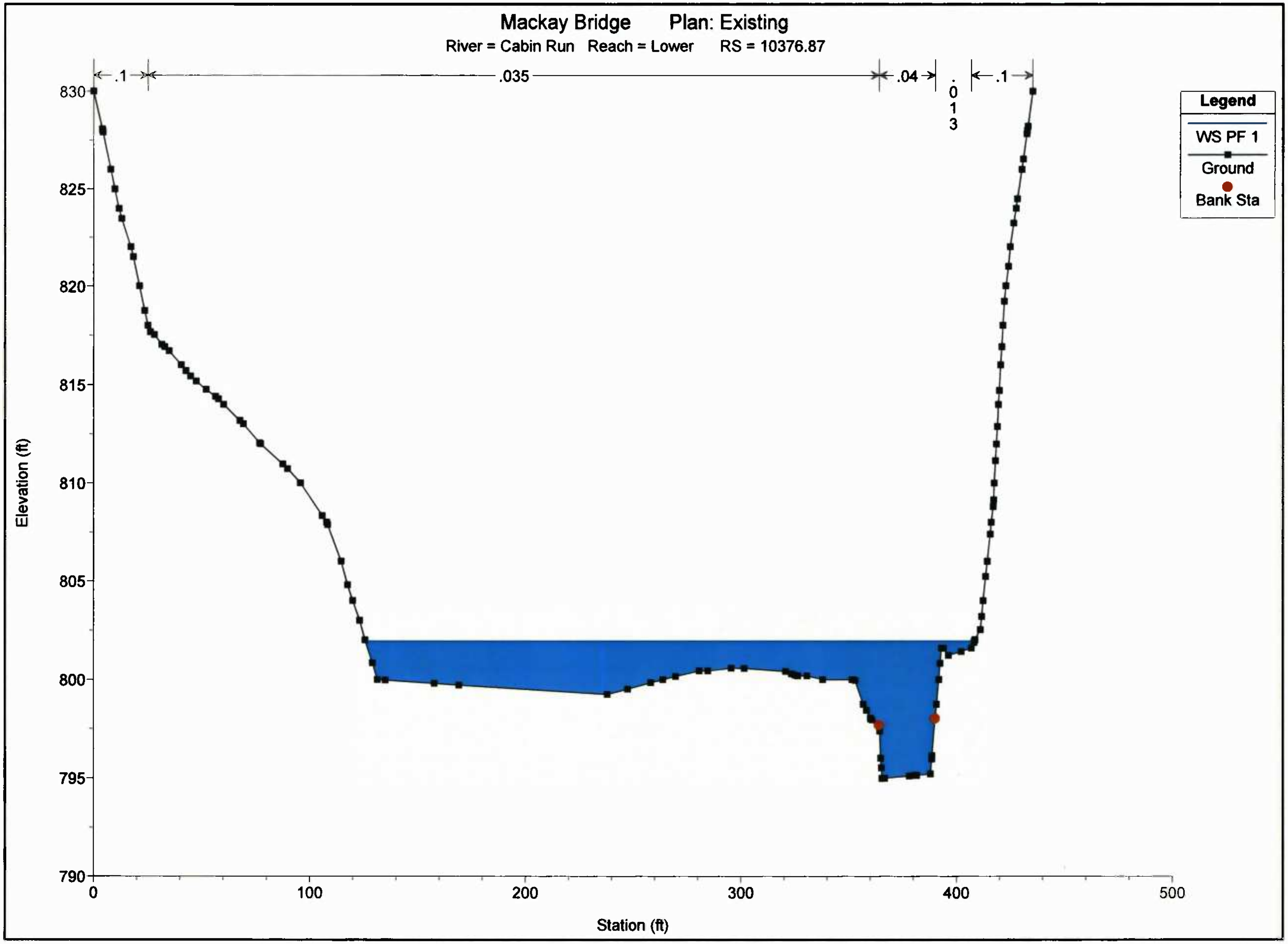
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Lower RS = 10900.67
.1
.035
.04
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
100
200
300
400
500
Station (ft)



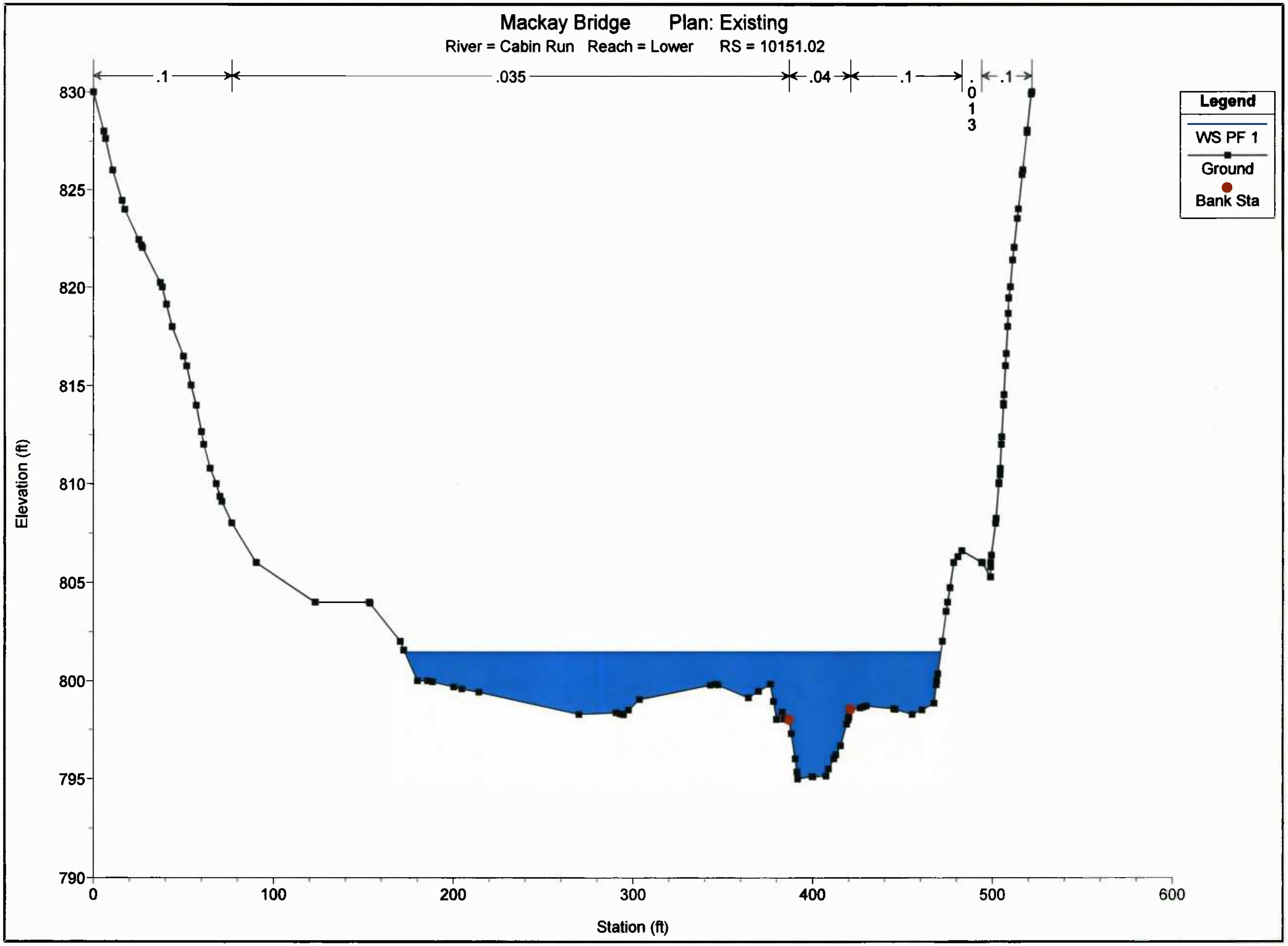
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Lower RS = 10705.68
.1
.035
.1
.04
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
830
825
820
815
810
805
800
795
0
100
200
300
400
500



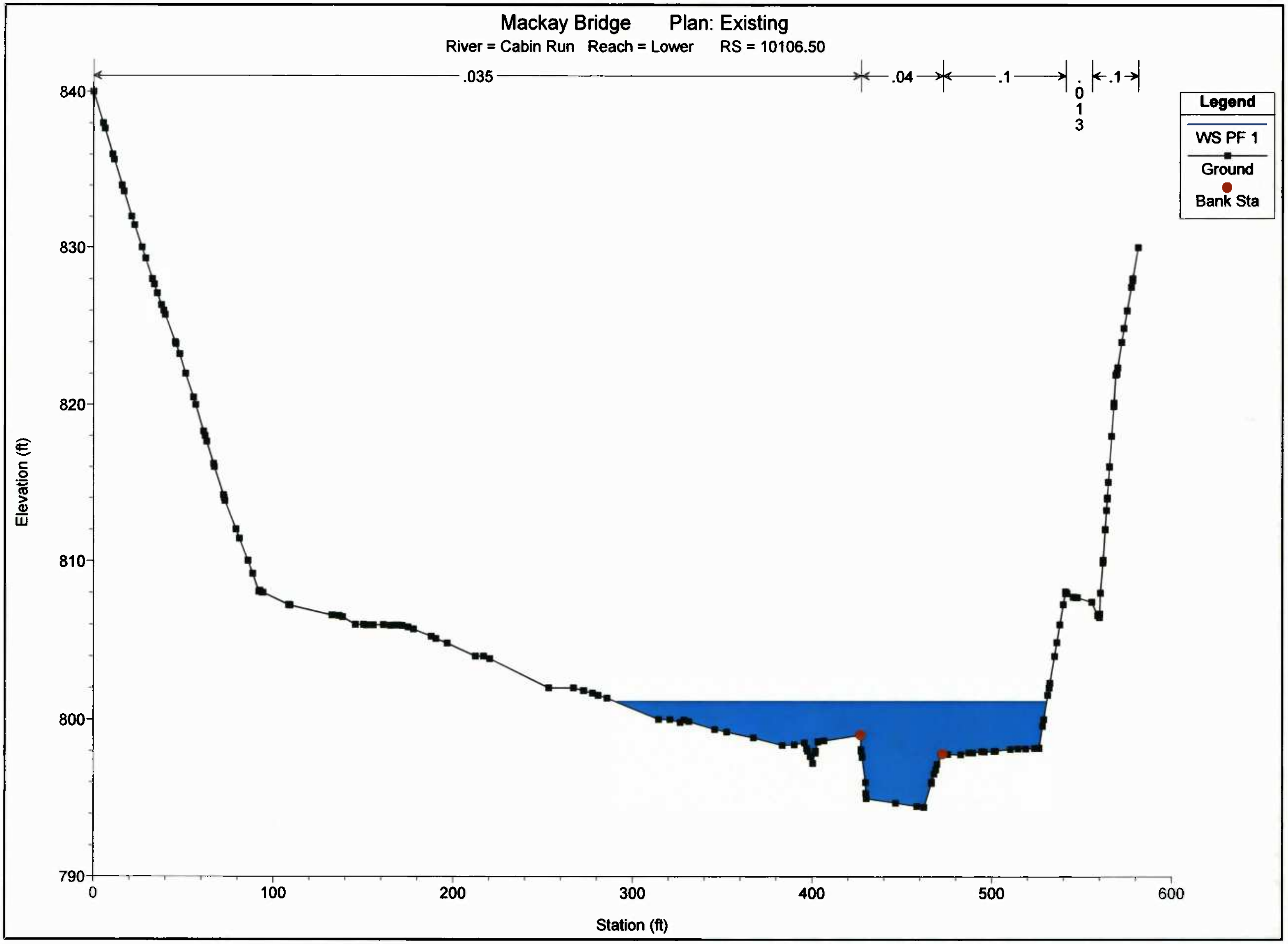
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Lower RS = 10444.93
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
790
0
100
200
300
400
500
Station (ft)



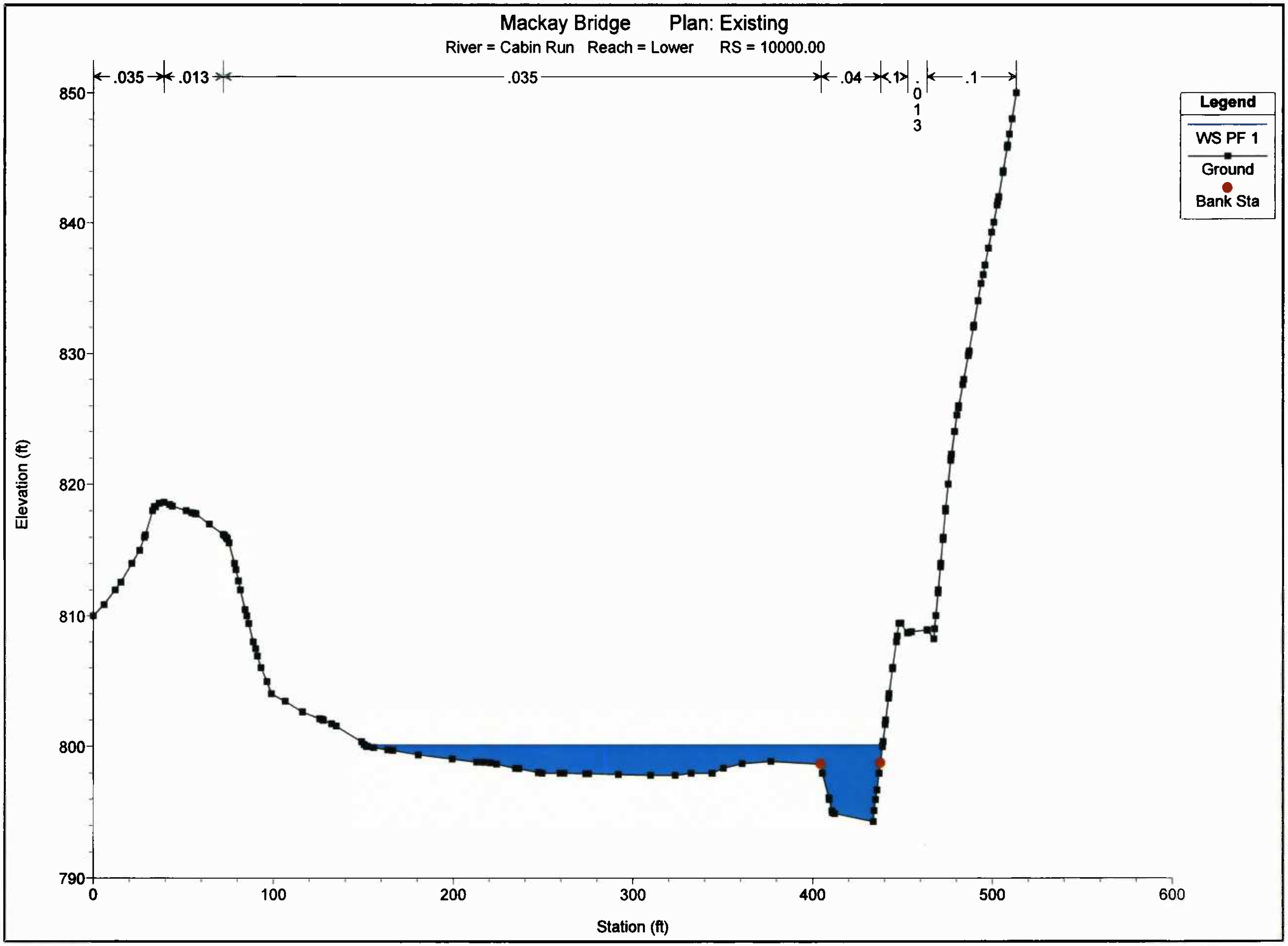
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Lower RS = 10376.87
.1
.035
.04
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
790
0
100
200
300
400
500
Station (ft)



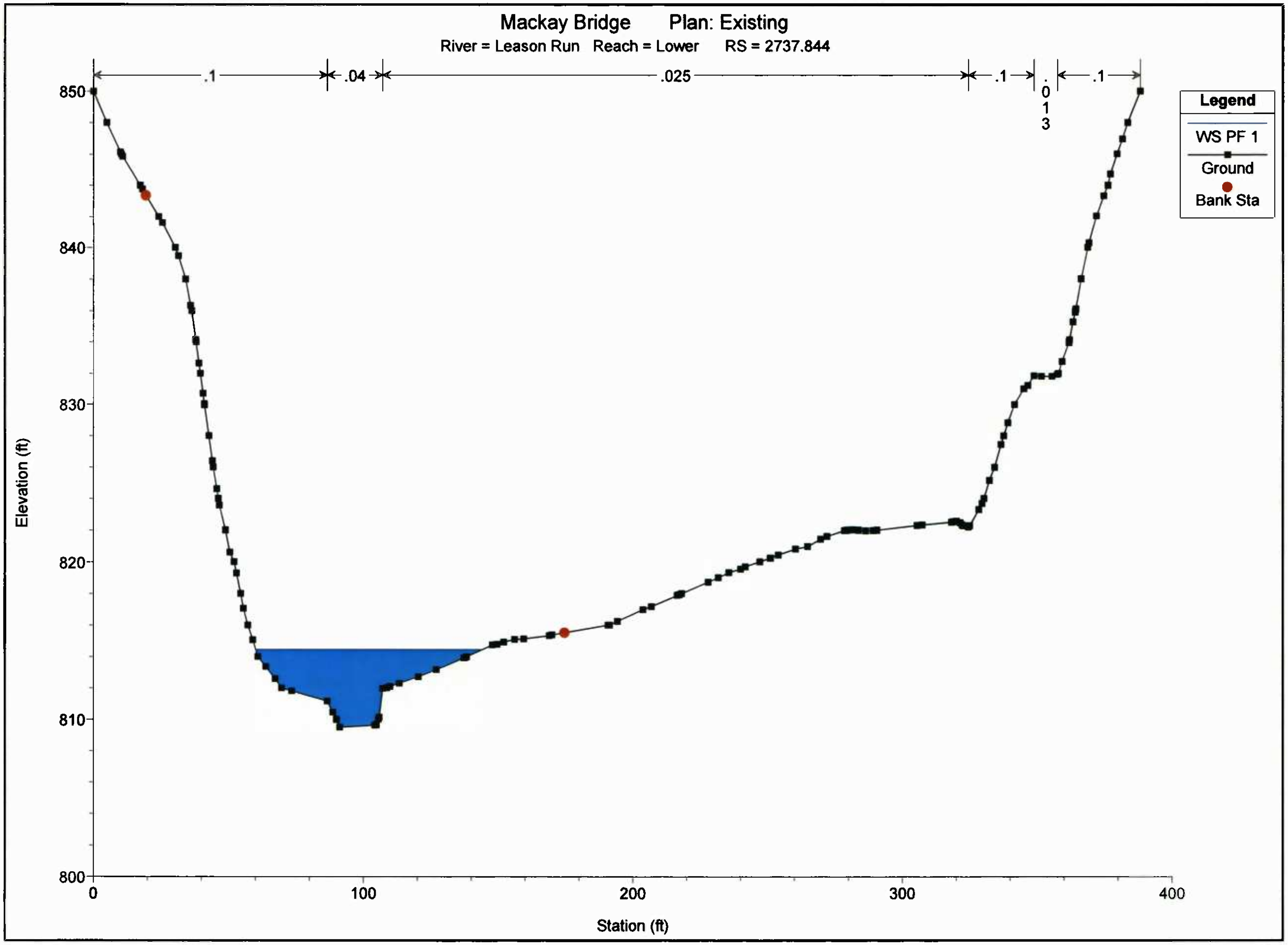
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Lower RS = 10151.02
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
790
0
100
200
300
400
500
600
Station (ft)



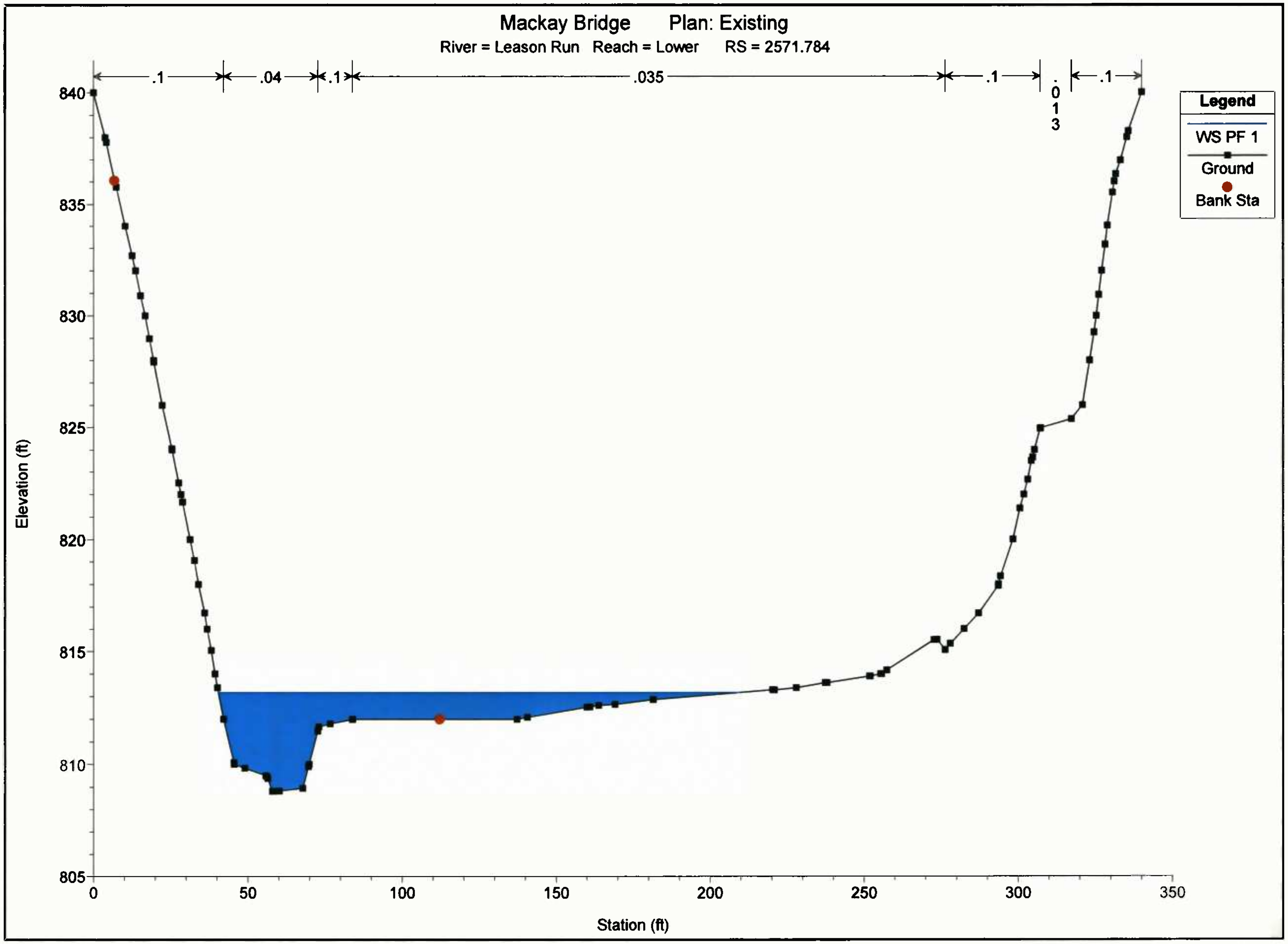
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Lower RS = 10106.50
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
840
830
820
810
800
790
0
100
200
300
400
500
600
Station (ft)



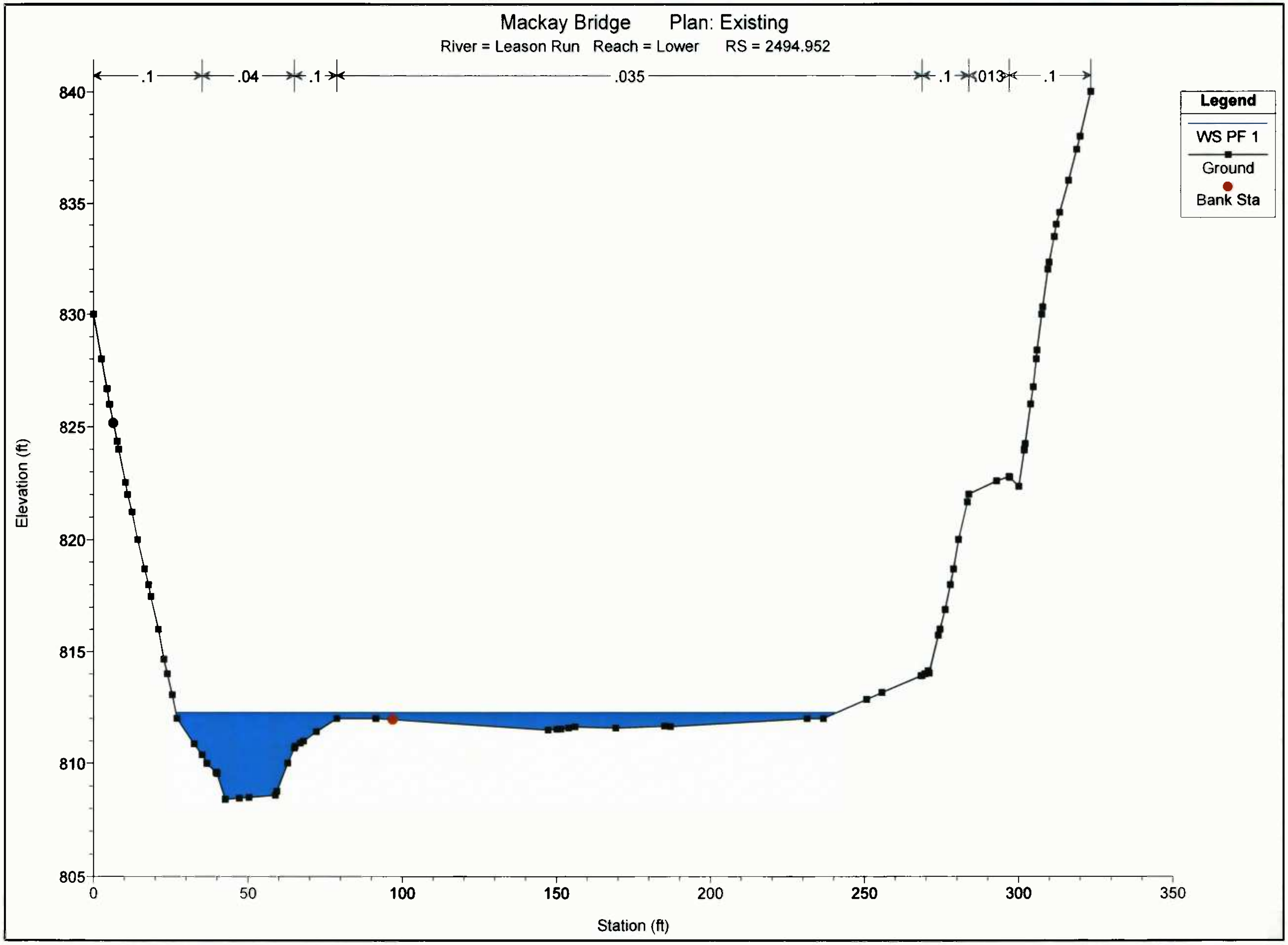
Mackay Bridge Plan: Existing
River = Cabin Run Reach = Lower RS = 10000.00
.035
.013
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
850
840
830
820
810
800
790
Station (ft)
0
100
200
300
400
500
600



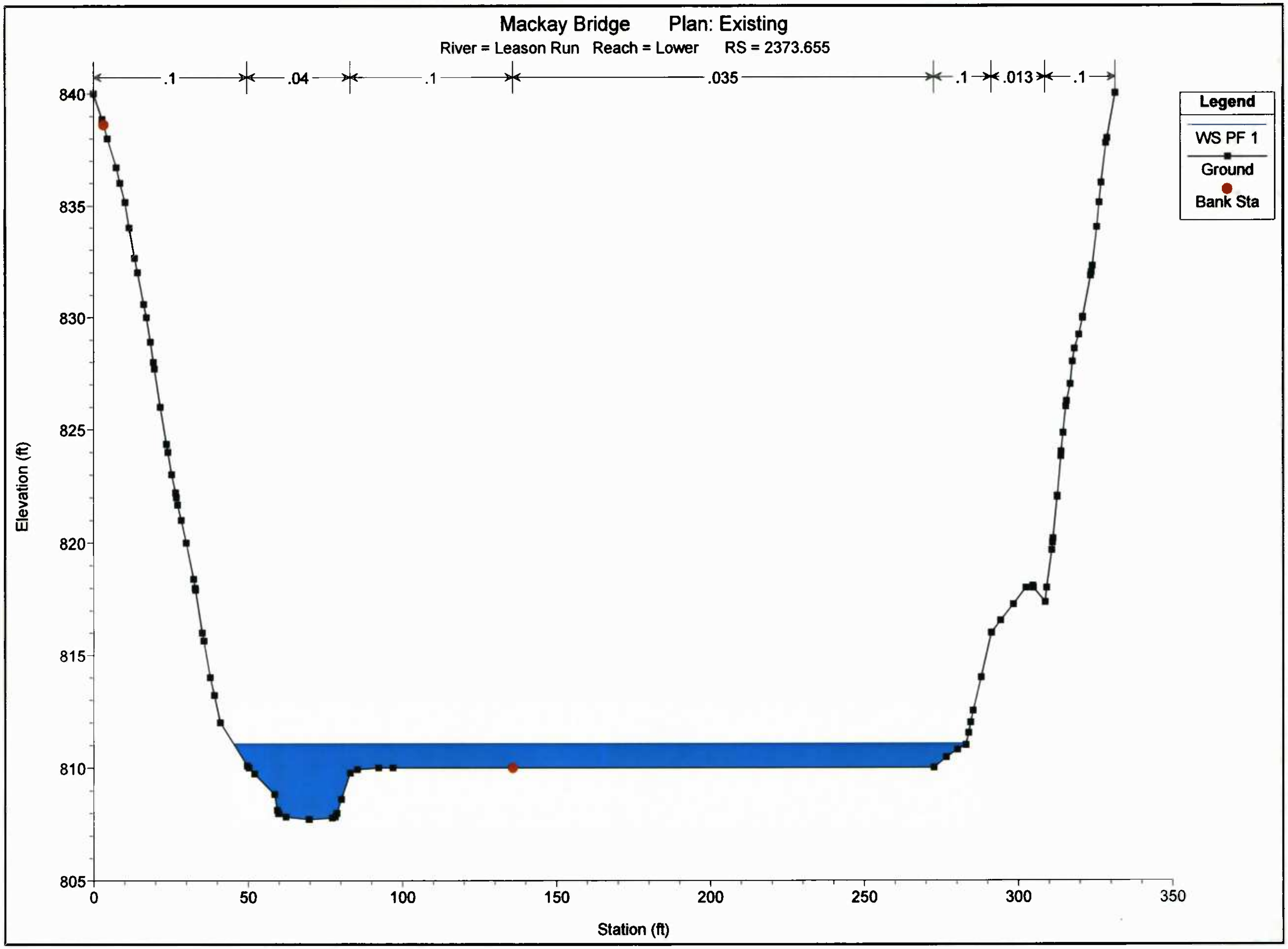
Mackay Bridge Plan: Existing
River = Leason Run Reach = Lower RS = 2737.844
.1
.04
.025
.1
.013
.1
850
840
830
820
810
800
Elevation (ft)
0
100
200
300
400
Station (ft)
Legend
WS PF 1
Ground
Bank Sta



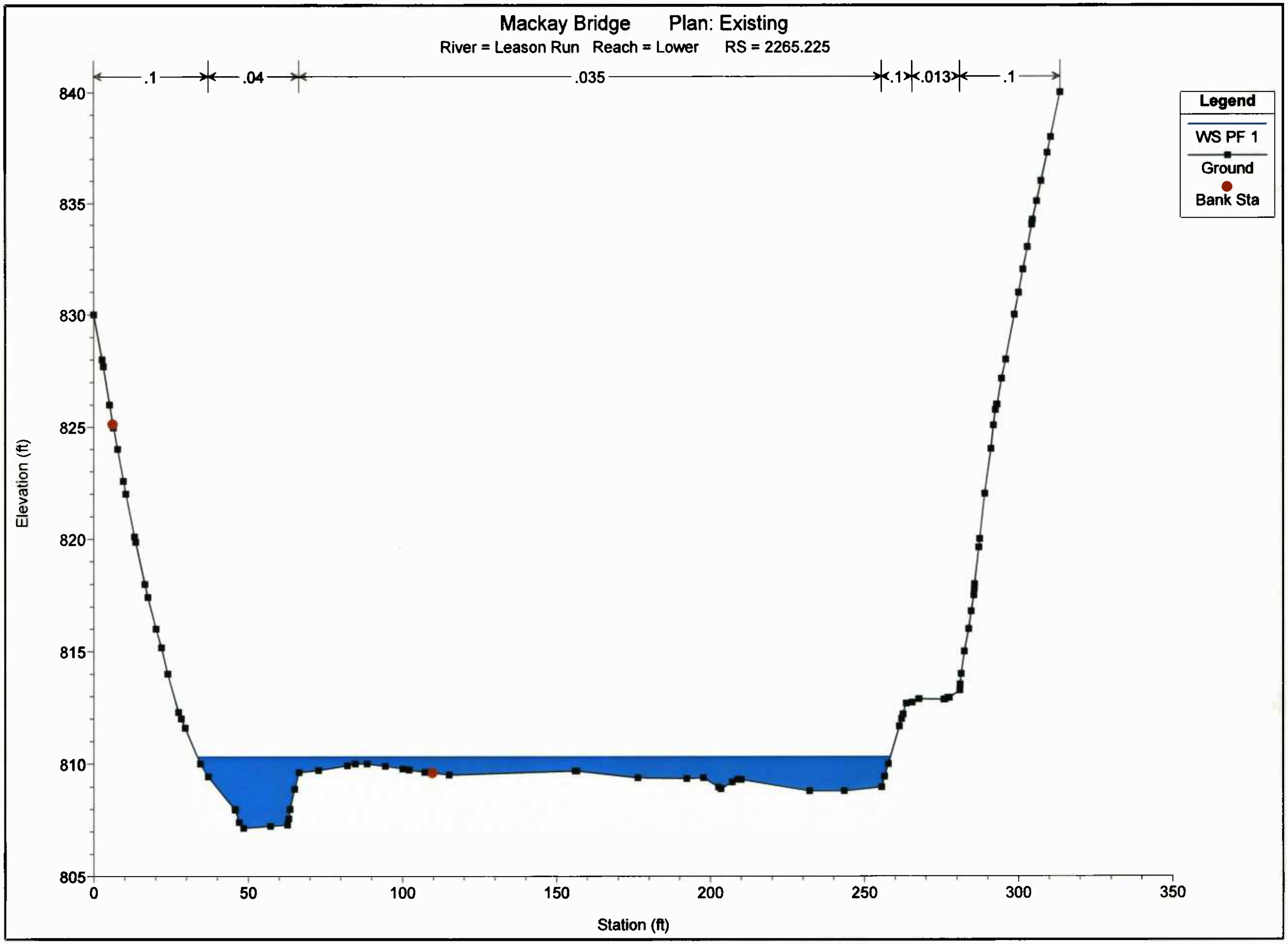
Mackay Bridge Plan: Existing
River = Leason Run Reach = Lower RS = 2571.784
.1
.04
.1
.035
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
840
835
830
825
820
815
810
805
0
50
100
150
200
250
300
350
Station (ft)



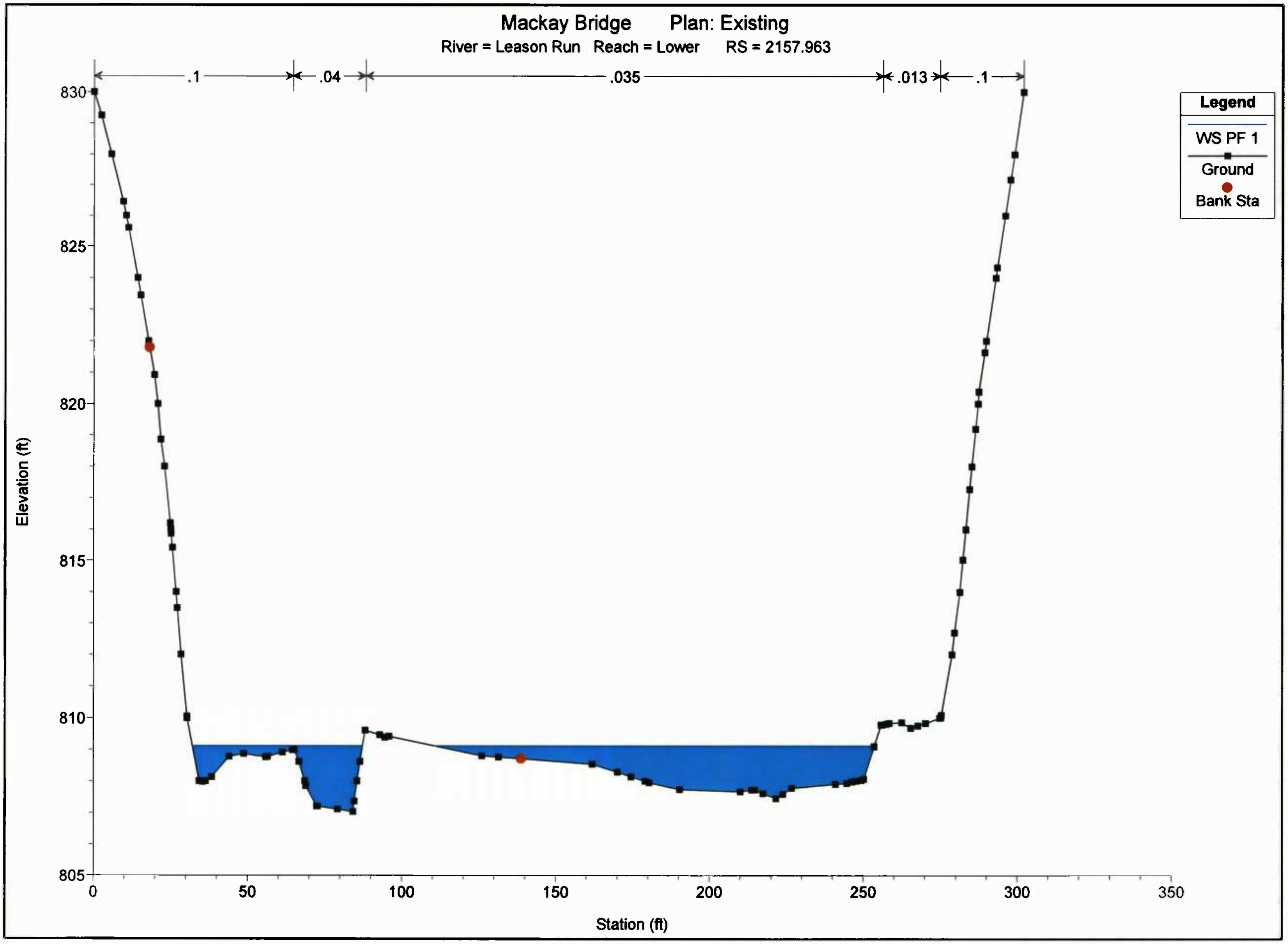
Mackay Bridge Plan: Existing
River = Leason Run Reach = Lower RS = 2494.952
.1
.04
.1
.035
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
840
835
830
825
820
815
810
805
0
50
100
150
200
250
300
350
Station (ft)



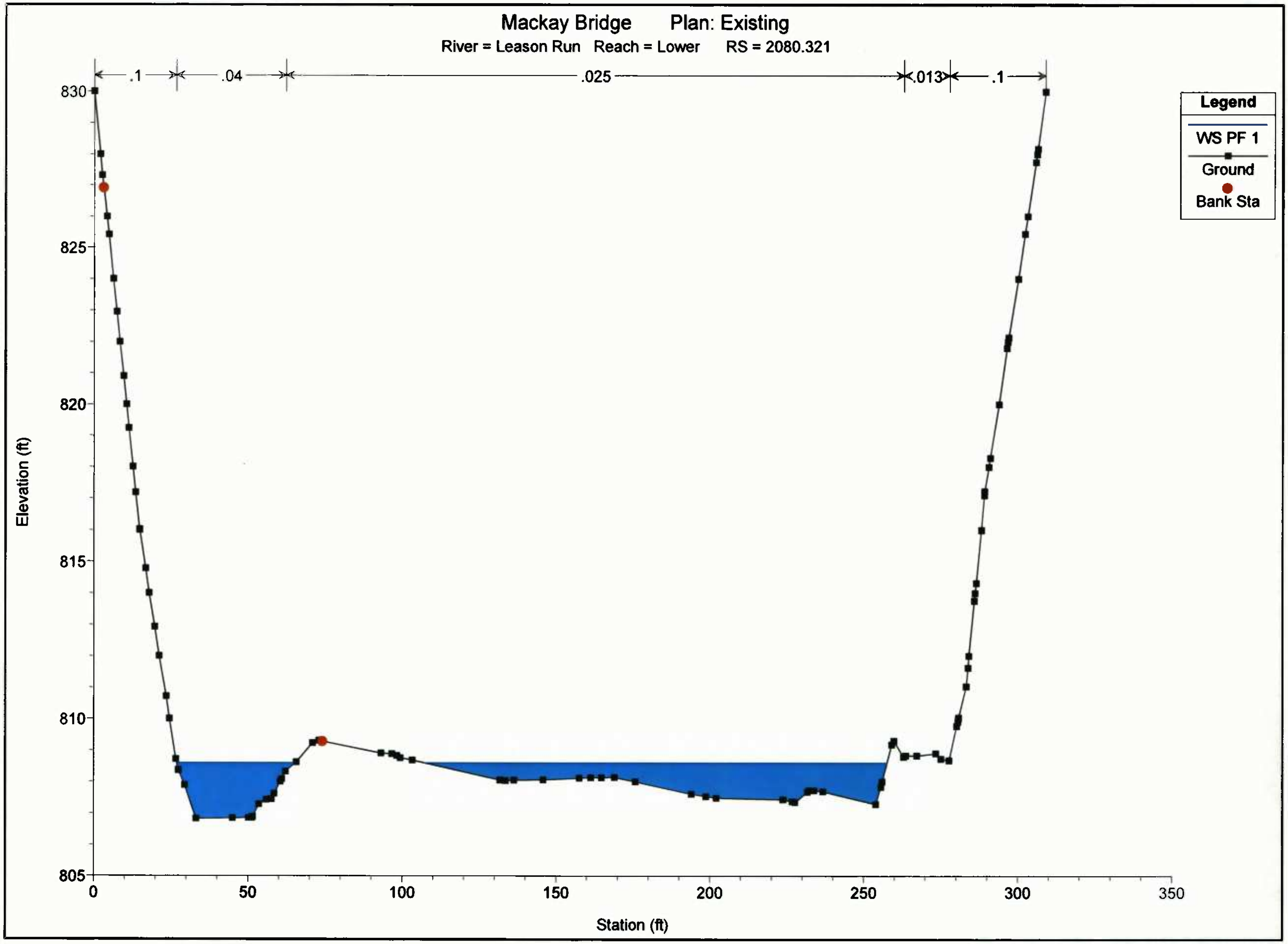
Mackay Bridge Plan: Existing
River = Leason Run Reach = Lower RS = 2373.655
.1
.04
.1
.035
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
840
835
830
825
820
815
810
805
0
50
100
150
200
250
300
350
Station (ft)



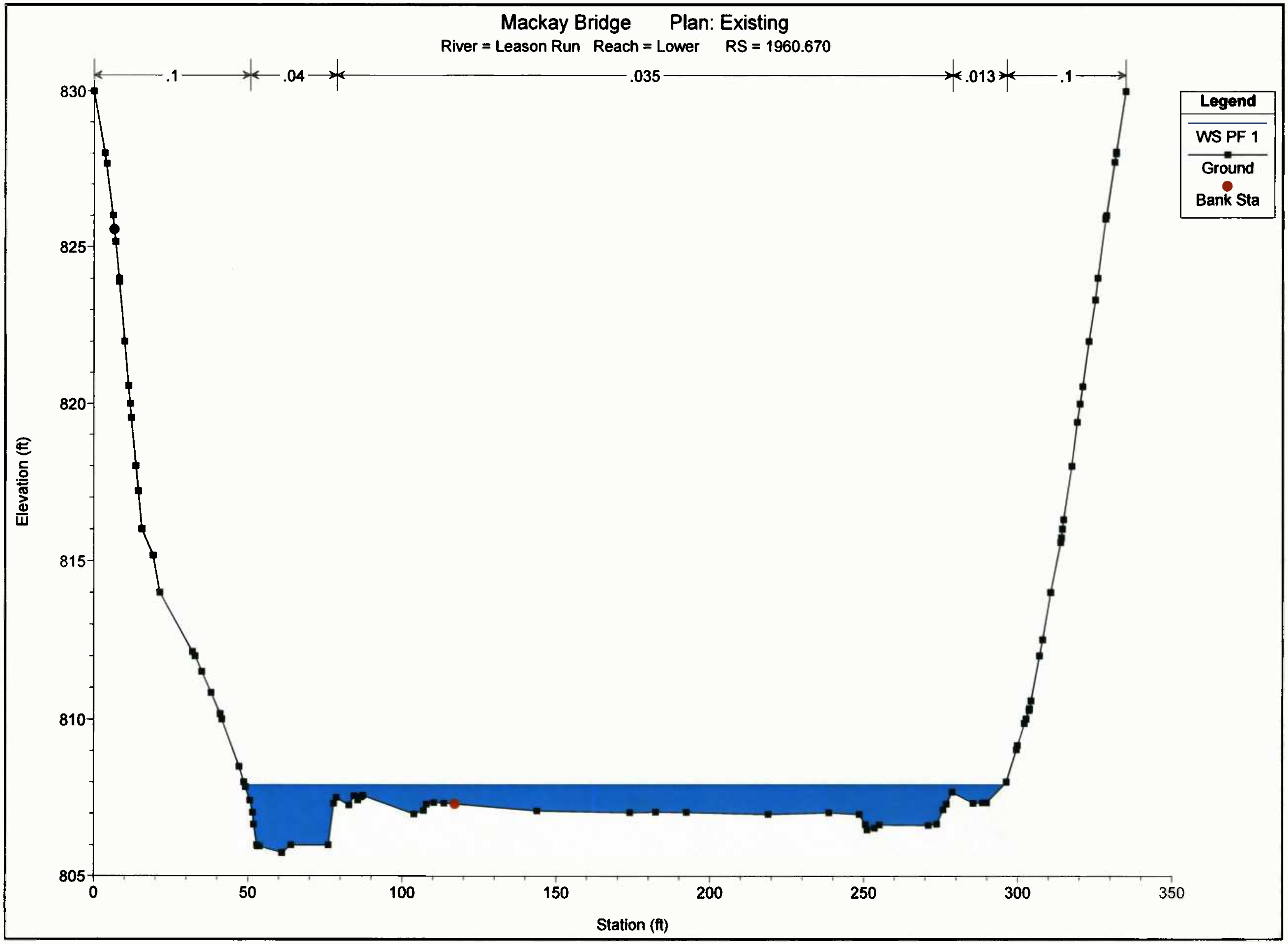
Mackay Bridge Plan: Existing
River = Leason Run Reach = Lower RS = 2265.225
.1
.04
.035
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
840
835
830
825
820
815
810
805
0
50
100
150
200
250
300
350
Station (ft)



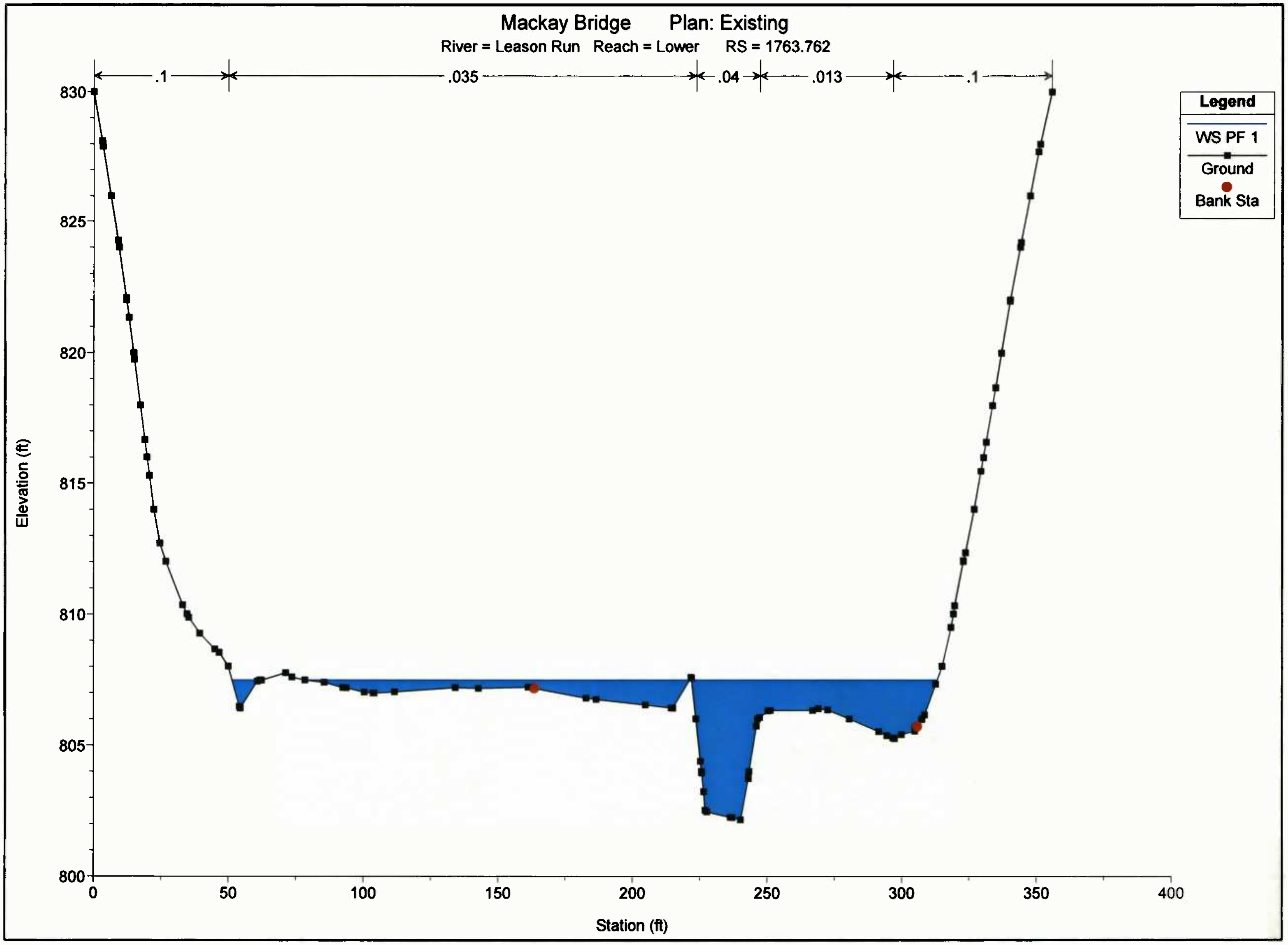
Mackay Bridge Plan: Existing
River = Leason Run Reach = Lower RS = 2157.963
.1
.04
.035
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
0
50
100
150
200
250
300
350
Station (ft)



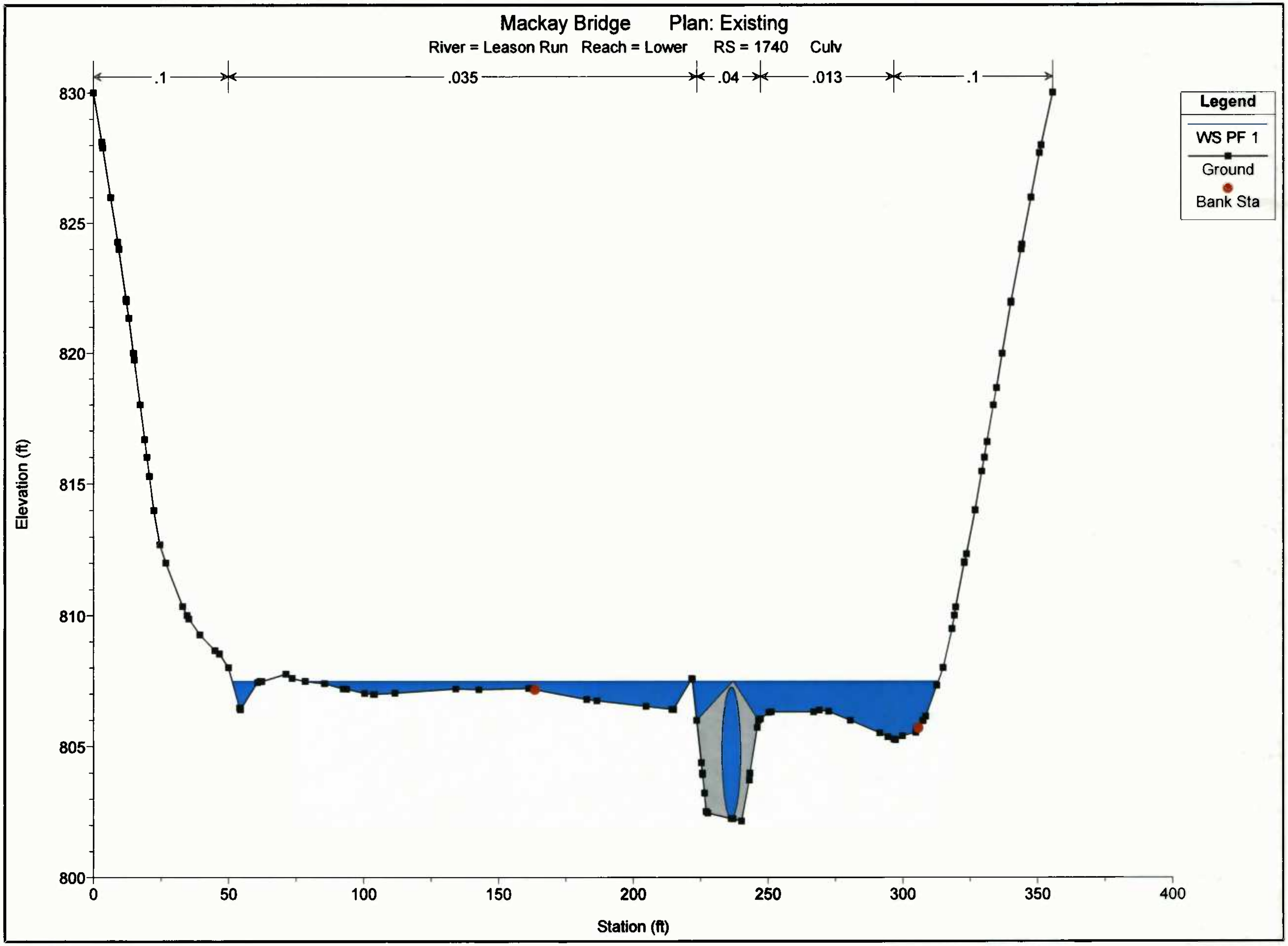
Mackay Bridge Plan: Existing
River = Leason Run Reach = Lower RS = 2080.321
.1
.04
.025
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
830
825
820
815
810
805
0
50
100
150
200
250
300
350



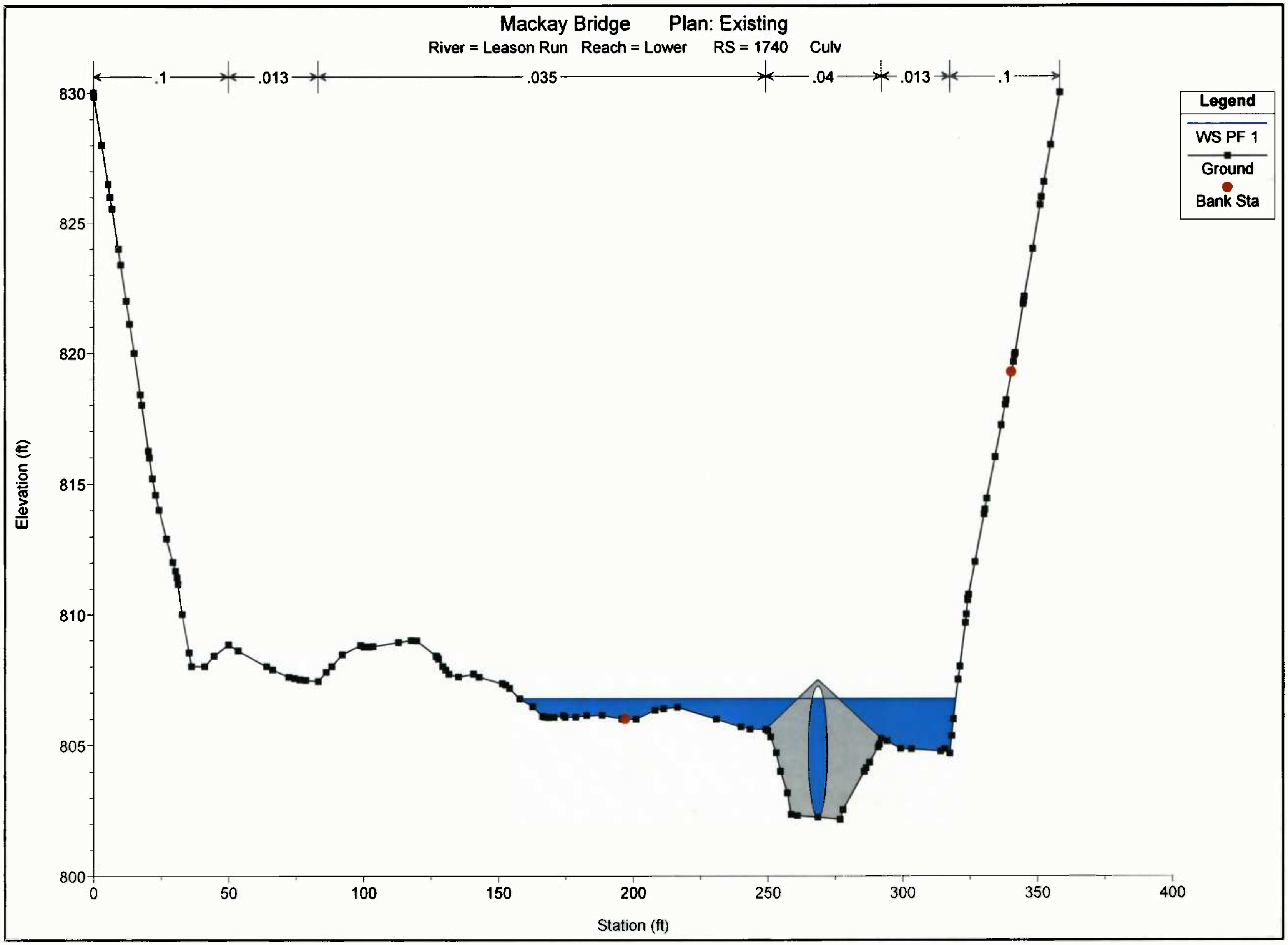
Mackay Bridge Plan: Existing
River = Leason Run Reach = Lower RS = 1960.670
.1
.04
.035
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
0
50
100
150
200
250
300
350
Station (ft)

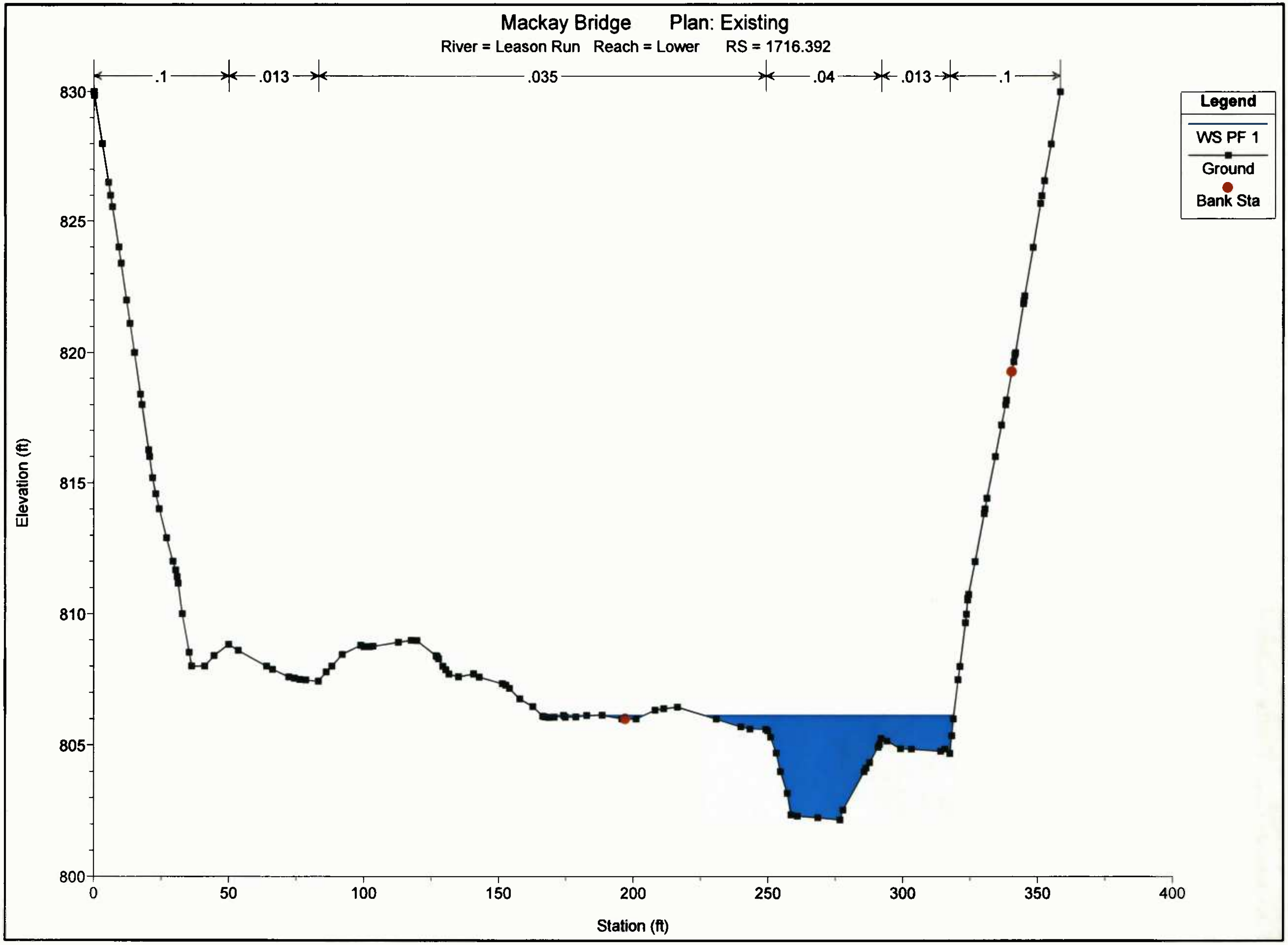


Mackay Bridge Plan: Existing
River = Leason Run Reach = Lower RS = 1763.762
.1
.035
.04
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
0
50
100
150
200
250
300
350
400
Station (ft)

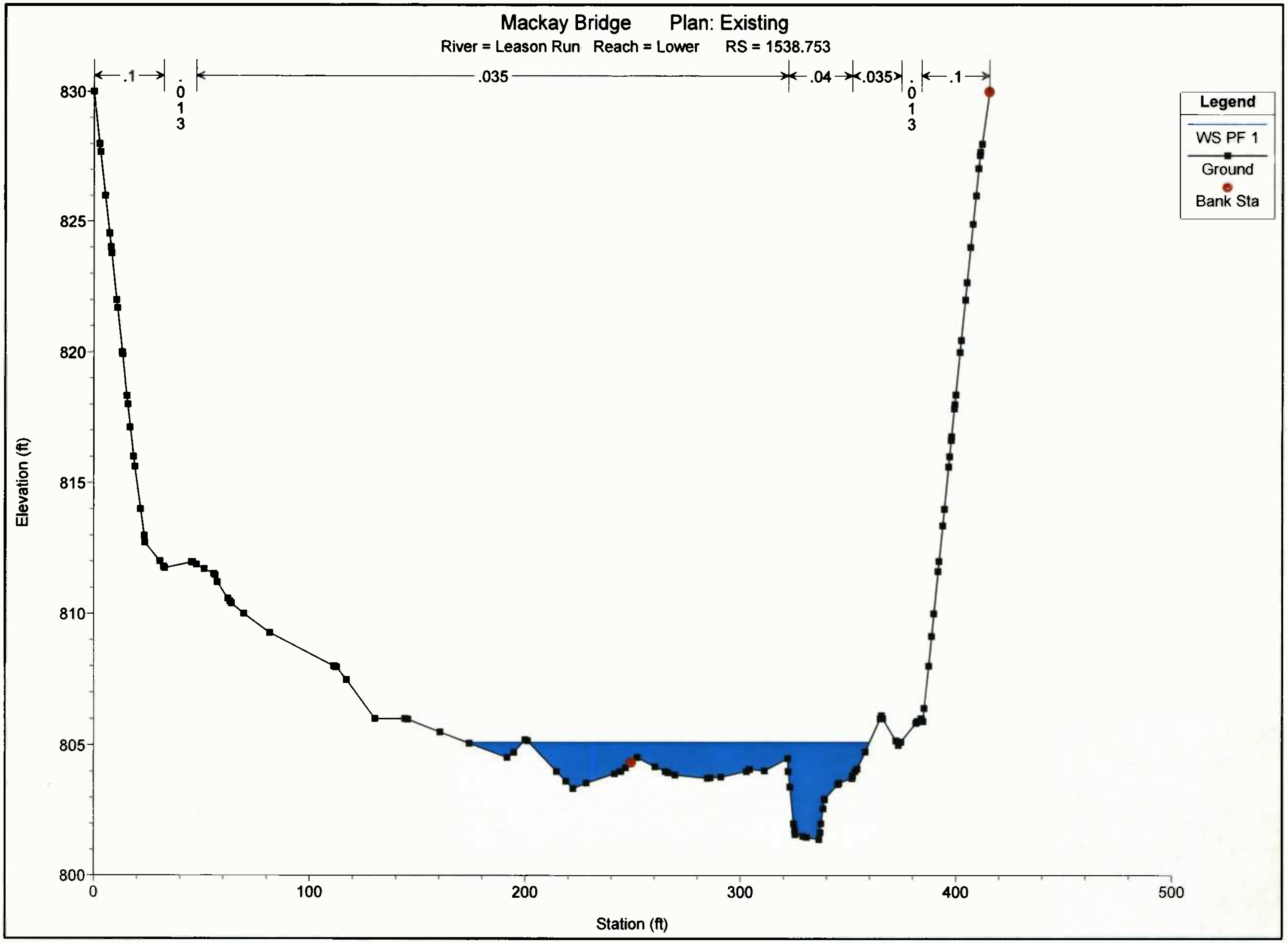


Mackay Bridge Plan: Existing
River = Leason Run Reach = Lower RS = 1740 Culv
.1
.035
.04
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
0
50
100
150
200
250
300
350
400
Station (ft)

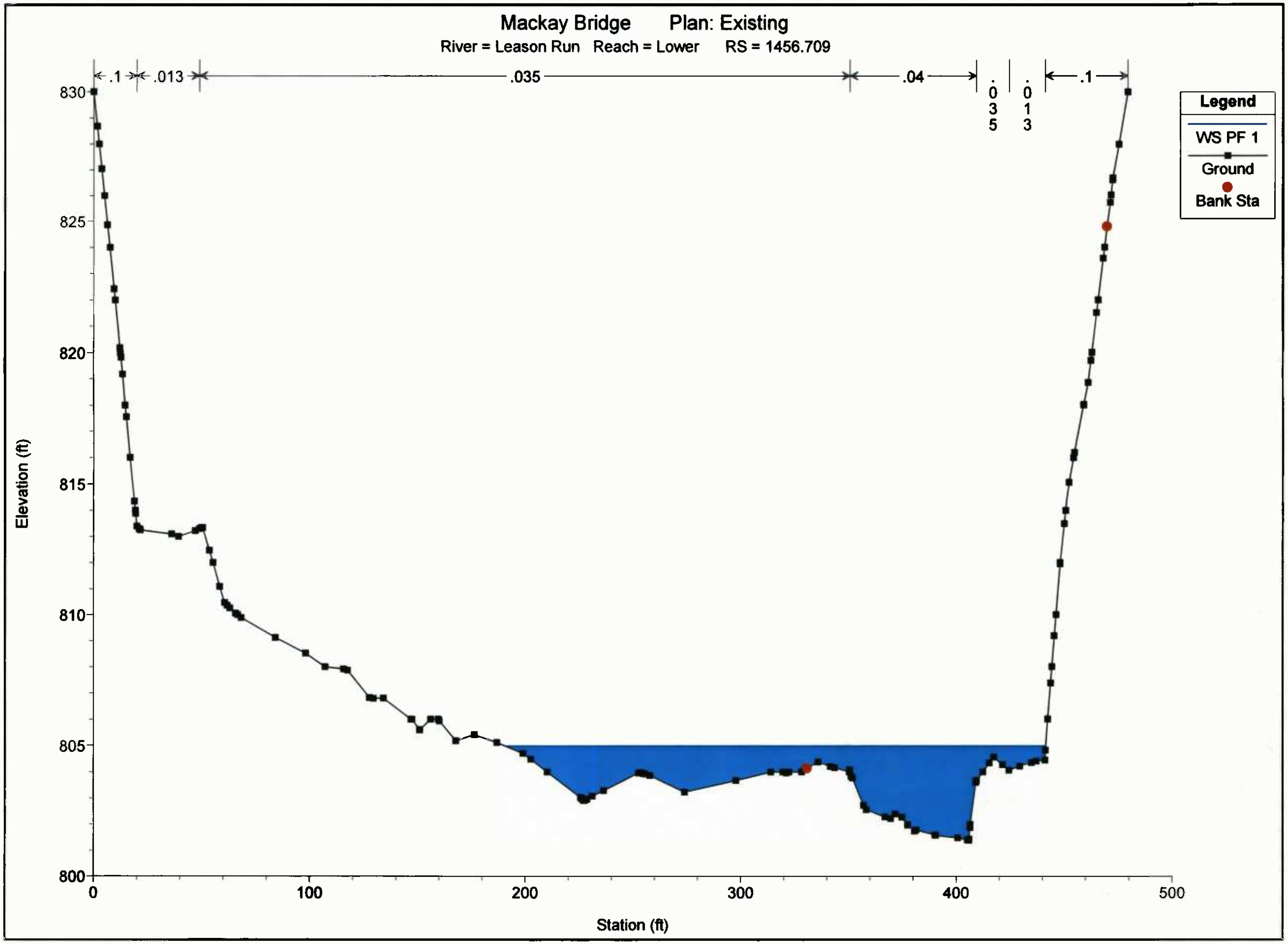

Mackay Bridge Plan: Existing
River = Leason Run Reach = Lower RS = 1740 Culv
.1
.013
.035
.04
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
0
50
100
150
200
250
300
350
400
Station (ft)



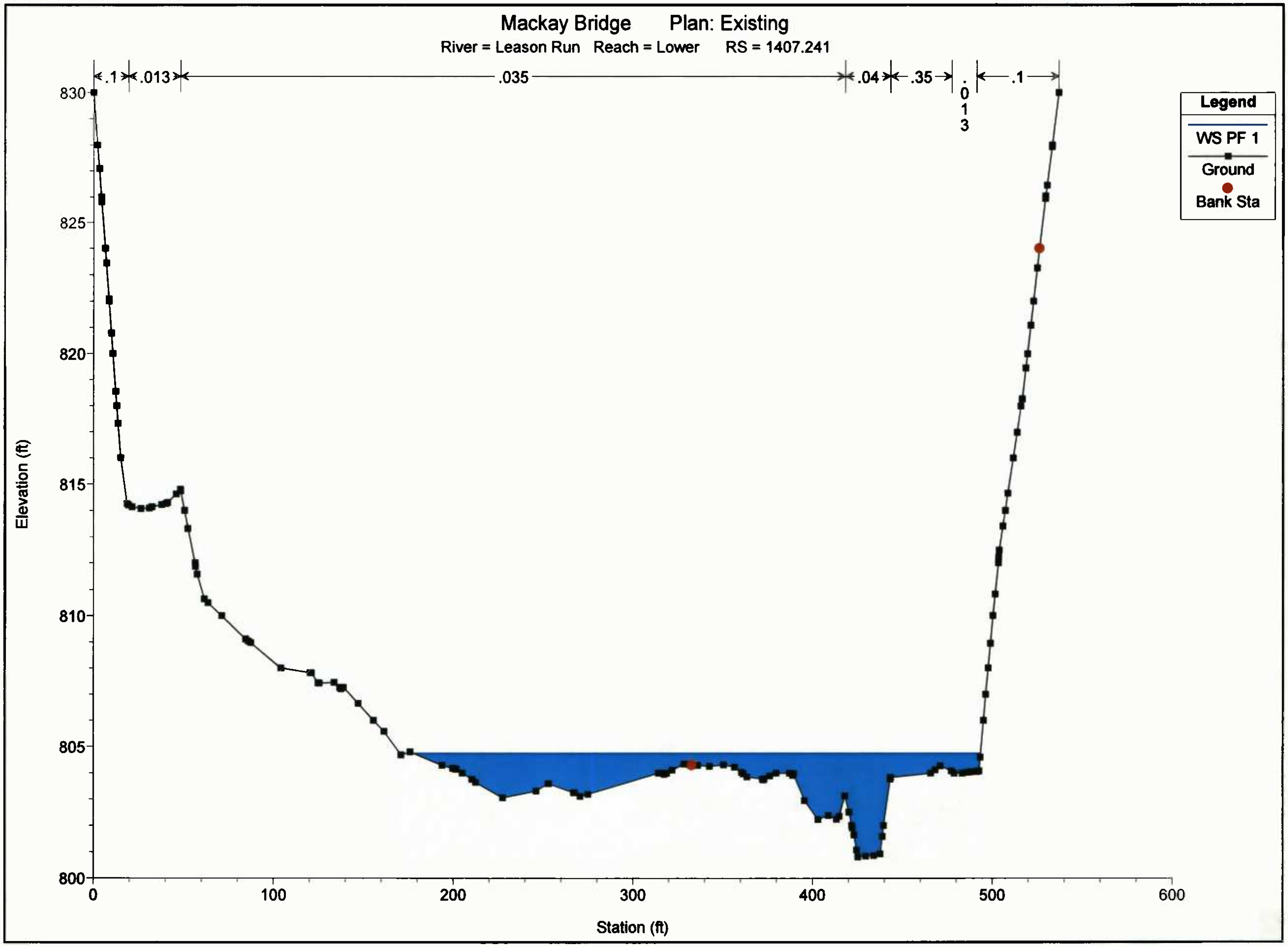
Mackay Bridge Plan: Existing
River = Leason Run Reach = Lower RS = 1716.392
.1
.013
.035
.04
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
0
50
100
150
200
250
300
350
400
Station (ft)



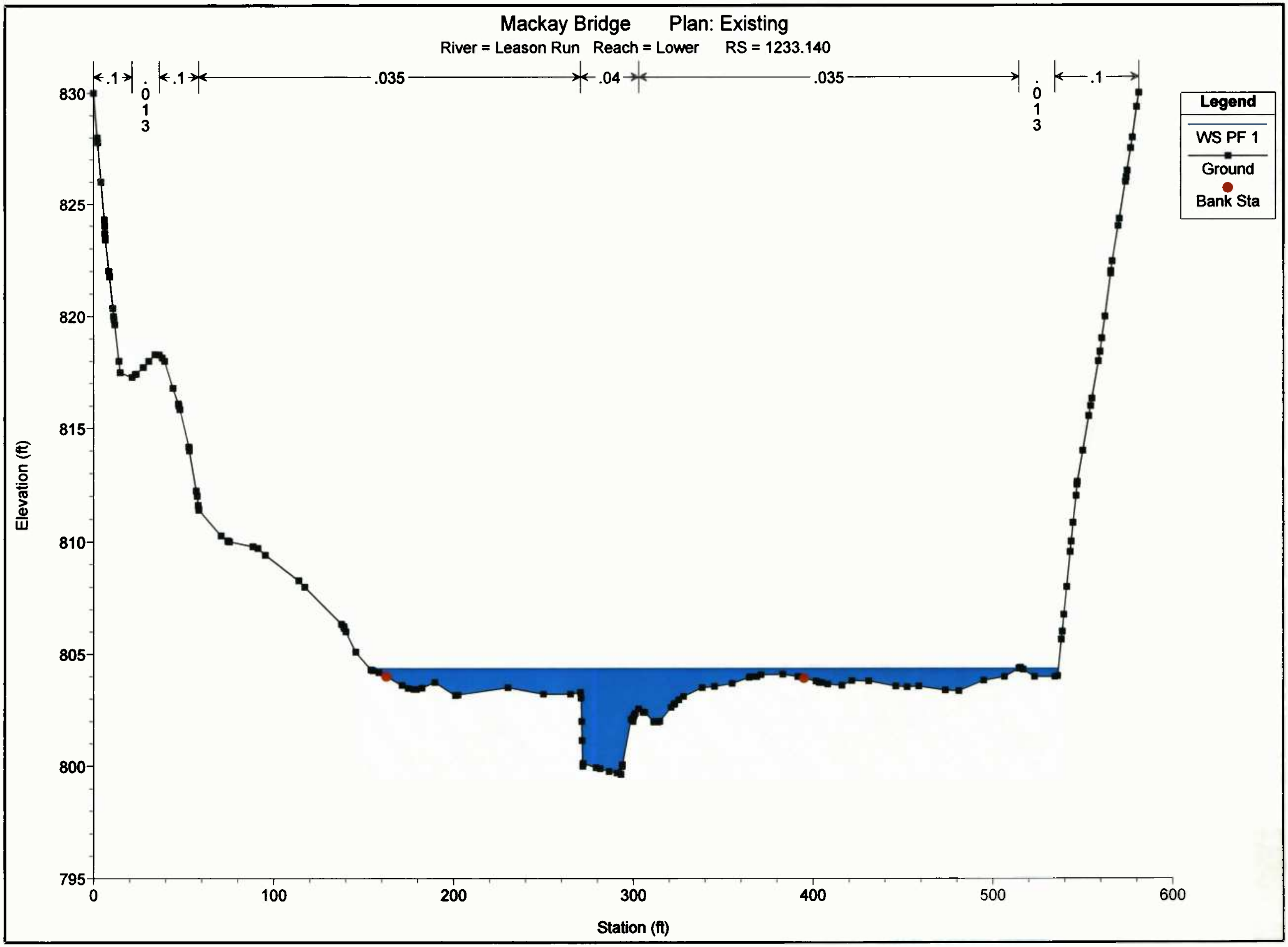
Mackay Bridge Plan: Existing
River = Leason Run Reach = Lower RS = 1538.753
.1
.013
.035
.04
.035
.013
.1
Legend
WS PF 1
Ground
Bank Sta
830
825
820
815
810
805
800
Elevation (ft)
0
100
200
300
400
500
Station (ft)

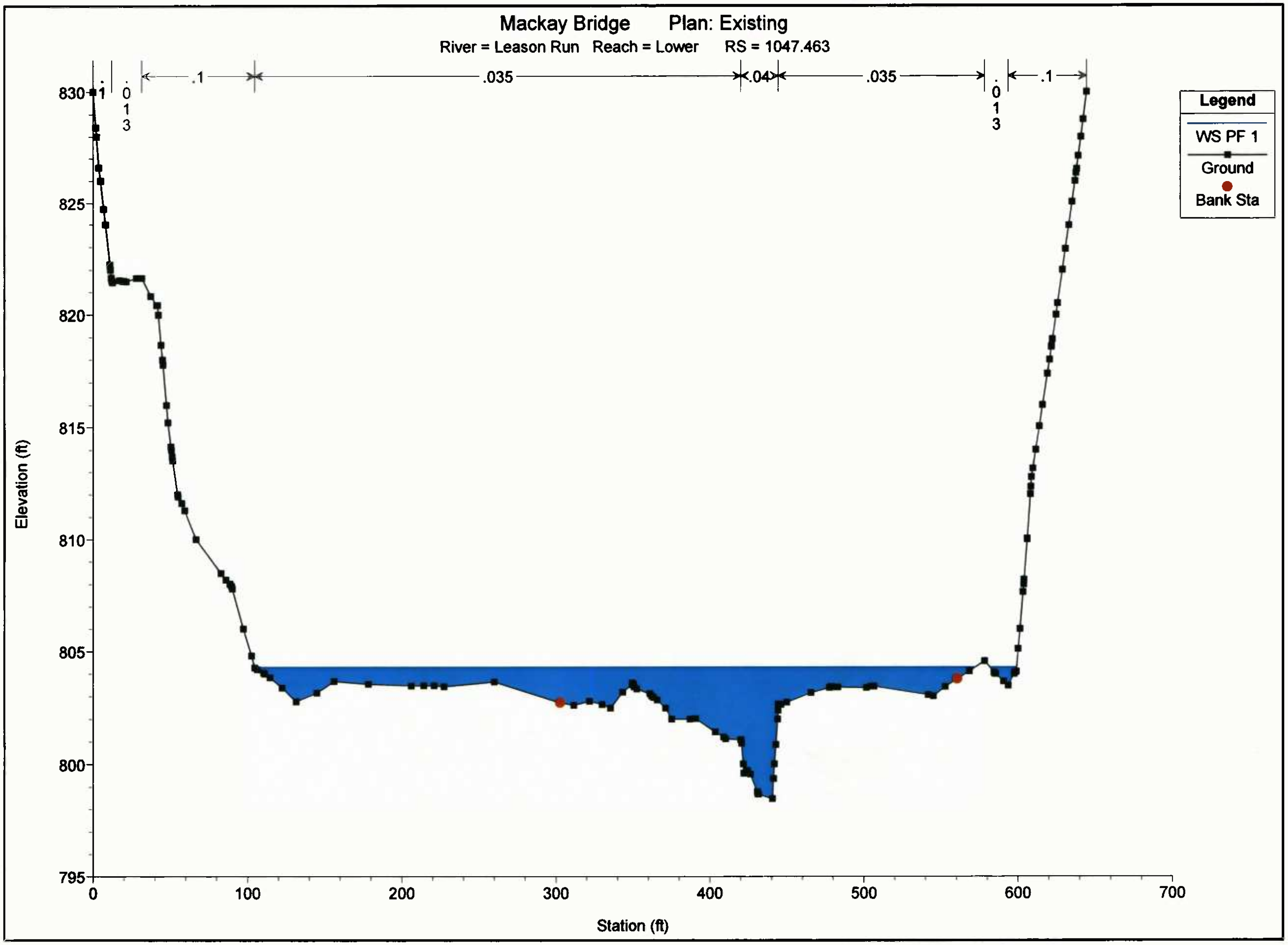


Mackay Bridge Plan: Existing
River = Leason Run Reach = Lower RS = 1456.709
.1
.013
.035
.04
.035
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
830
825
820
815
810
805
800
0
100
200
300
400
500



Mackay Bridge Plan: Existing
River = Leason Run Reach = Lower RS = 1407.241
.1
.013
.035
.04
.35
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
830
825
820
815
810
805
800
0
100
200
300
400
500
600


Mackay Bridge Plan: Existing
River = Leason Run Reach = Lower RS = 1233.140
.1
.013
.1
.035
.04
.035
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
100
200
300
400
500
600
Station (ft)



Mackay Bridge Plan: Existing
River = Leason Run Reach = Lower RS = 1047.463
.1
.013
.1
.035
.04
.035
.013
.1
Legend
WS PF 1
Ground
Bank Sta
830
825
820
815
810
805
800
795
Elevation (ft)
0
100
200
300
400
500
600
700
Station (ft)

Supplement 4

HEC-RAS Analysis –Proposed Conditions Summary w/ Cross Sections

HEC-RAS HEC-RAS 5.0.3 September 2016
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX   XXXX        XXXX      XX      XXXX
X     X  X       X    X      X    X    X  X    X
X     X  X       X           X    X   X    X   X
XXXXXXX  XXXX    X      XXX  XXXX     XXXXXX    XXXX
X     X  X       X           X  X     X    X        X
X     X  X       X    X      X    X   X    X        X
X     X  XXXXXX   XXXX       X     X  X    X   XXXXX
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PROJECT DATA
Project Title: Mackay Bridge
Project File : MackayBridge.prj
Run Date and Time: 12/13/2017 3:48:52 PM

Project in English units

PLAN DATA

Plan Title: Bridge
Plan File : x:\Navitus Jobfiles\Antero Resources\ANT290-Mackay Bridge Replacement\Engineering\2. Preliminary\Prelim 1\Drainage Comp\Floodplain\Documents\MackayBridge.p02

Geometry Title: Bridge
Geometry File : x:\Navitus Jobfiles\Antero Resources\ANT290-Mackay Bridge Replacement\Engineering\2. Preliminary\Prelim 1\Drainage Comp\Floodplain\Documents\MackayBridge.g02

Flow Title : Existing
Flow File : x:\Navitus Jobfiles\Antero Resources\ANT290-Mackay Bridge Replacement\Engineering\2. Preliminary\Prelim 1\Drainage Comp\Floodplain\Documents\MackayBridge.f01

Plan Summary Information:

Number of:	Cross Sections	= 44	Multiple Openings	=	0
	Culverts	= 2	Inline Structures	=	0
	Bridges	= 1	Lateral Structures	=	0

Computational Information

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

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

FLOW DATA

Flow Title: Existing
Flow File : x:\Navitus Jobfiles\Antero Resources\ANT290-Mackay Bridge Replacement\Engineering\2. Preliminary\Prelim 1\Drainage Comp\Floodplain\Documents\MackayBridge.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Cabin Run	Upper	13338.65	2169.8
Cabin Run	Lower	11091.35	2954.8
Leason Run	Lower	2737.844	858.6

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Cabin Run	Lower	PF 1		Normal S = 0.006

GEOMETRY DATA

Geometry Title: Bridge
Geometry File : x:\Navitus Jobfiles\Antero Resources\ANT290-Mackay Bridge Replacement\Engineering\2. Preliminary\Prelim 1\Drainage Comp\Floodplain\Documents\MackayBridge.g02

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
Cabin Run	Upper		Junction
Cabin Run	Lower	Junction	
Leason Run	Lower		Junction

JUNCTION INFORMATION

Name: Junction
Description:
Energy computation Method

Length across Junction River	Reach	Tributary River	Reach	Length	Angle
Cabin Run	Upper	to Cabin Run	Lower	99.19	0
Leason Run	Lower	to Cabin Run	Lower	0	0

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 13338.65

INPUT
Description:
Station Elevation Data num= 130

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840	5.12	838	7.67	836.99	8.18	836.78	10.09	836
12.12	835.03	14.24	834	15.05	833.45	17.67	832	19.93	830.52
20.63	830	21.2	829.59	23.28	828	23.91	827.5	25.85	826
28.65	824.11	28.8	824	30.25	822.79	31.42	822	32.69	820.98
34.09	820	35.31	819.1	36.66	818	37.98	816.94	39.49	816
41.61	814.47	42.18	814	43.1	813.31	45.04	812	48.36	810.74
49.9	810	54	808.56	56.56	808	56.59	808.16	58.77	806.02
58.79	806	58.8	805.98	59.66	804.97	74.43	805.01	81.86	805.03
83.3	805.68	83.78	806	86.39	807.34	88.25	808	88.85	808.55
88.87	808.56	92.45	808.57	101.74	808.56	103.79	808.39	104.65	808.39
105.12	808.45	106.1	808.56	110.74	808.67	124.81	810	130.93	810.37
130.97	810.37	135.62	810.53	163.1	811.75	163.36	811.76	164.25	811.79
172.31	811.99	172.66	812	172.78	812	173.2	812.06	185.08	813.14
203.02	813.59	213.3	813.72	224.7	813.98	225.23	814	226.39	814.07
243.87	814.91	255.58	815.5	261.42	815.71	269.76	815.94	271.43	816
272.67	816.04	274.61	816.15	292.08	817.21	297.48	817.58	300.16	817.69
304.31	817.85	308.16	817.96	308.88	818	310.01	818.05	328.28	819.34
330.03	819.47	333.16	820	338.88	820.91	341.99	821.32	345	821.98

345.11	822	347.05	822.42	352.61	823.68	355.63	824	357.71	824.2
357.89	824.2	366.85	824.24	368.83	824.26	369.54	824.29	370.35	824.35
371.55	824.39	372.58	825.91	372.61	826	372.83	826.24	374.63	828
375.82	829.57	376.26	830	376.69	830.41	378.25	832	380.19	833.88
380.34	834	380.39	834.03	382.85	835.98	382.91	836	383.69	836.56
385.72	838	386.44	838.54	388.56	840	389.1	840.4	390.12	841.12
391.63	842	392.84	842.8	394.35	843.62	394.54	843.69	395.46	844
398.89	845.58	399.91	846	401.37	846.64	404.54	848	409.14	850

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	56.56	.04	88.85	.025	355.63	.013	371.55	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
56.56	88.85	138.38	109.99	117.48	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 13228.66

INPUT
Description:
Station Elevation Data num= 146

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840	1.37	839.44	5.16	838	7.56	836.8	9.17	836
11.35	834.81	13.01	834	15.49	832.66	16.48	832	16.85	831.75
19.73	830	22.75	828.12	22.97	828	23.17	827.87	26.28	826
28.78	824.52	29.59	824	31.79	822.69	33.14	822	33.81	821.58
36.24	820	38.14	818.44	38.73	818	39.46	817.48	41.34	816
43.32	814.62	44.17	814	46.35	812.58	47.37	812	48.06	811.73
53.11	810	60.83	809.32	61.47	809.26	62.04	809.21	63.57	809.14
63.66	808.99	64.32	808	64.36	807.97	66.71	806	67.31	805.07
67.37	804.97	72.26	804.99	75.03	805	79.53	805.02	81.79	805.03
82.3	805.03	82.38	805.07	82.61	805.15	85.53	806	87.29	806.53
89.58	807.27	96.43	807.56	98.56	807.67	98.82	807.81	99.58	808
101.82	808.45	103.27	809.01	109.81	809.01	110.77	809.02	113.58	809.01
114.29	808.89	119.42	808	133.27	808	140.1	808.2	143.7	808.42
152.82	808.96	155.75	809.1	159.26	809.25	164.76	809.4	167.95	809.53
175.41	810	178.76	810.62	178.95	810.64	179.8	810.64	196.61	810.77
197.91	810.78	202.99	811.09	221.06	812	221.15	812	230	812.92
239.28	814	247.94	815.04	257.31	816	257.76	816	258.32	816.07
259.26	816.13	263.17	816.52	272.23	817.6	273.99	818	274.82	818.19
281.66	820	285.42	821.01	289.77	822	292.82	822.75	293.62	822.93
296.97	823.92	297.27	824	299.01	824.51	303.42	826	307.88	827.74
308.67	828	308.73	828.03	312.01	829.51	312.92	830	313.23	830.18
316.36	832	317.84	832.77	318.83	833.35	321.46	833.47	323.97	833.43
328.62	833.47	333.73	833.45	337.56	833.52	339.46	833.53	339.9	834
341.27	835.28	342.2	836	342.72	836.59	344.06	838	345.82	839.74
346.19	840.18	347.6	841.33	348.66	842	348.83	842.21	350.92	843.76

351.27	844	351.6	844.15	352.07	844.53	353.92	846	355.99	847.57
356.35	847.87	356.51	848	358.39	849.52	359	850	360.78	851.42
360.83	851.5	361.17	851.59	362	852	363.35	852.66	365.97	854
367.66	854.84	370.07	856	372.27	857.09	373.48	857.63	374.25	858
378.16	860								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	64.32	.04	89.58	.035	318.83	.013	339.46	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
64.32	89.58	175.61	175.61	125.73	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 13047.83

INPUT
Description:
Station Elevation Data num= 126

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840	4.04	838.25	4.65	838	5.89	837.41	8.69	836
9.75	835.39	12.5	834	14.55	832.69	15.64	832	16.39	831.54
18.35	830	20.62	828.42	21.37	828	22.16	827.52	24.92	826.17
25.26	826	25.31	825.97	28.14	824	30.71	822.45	31.53	822
32.24	821.66	34.79	820.11	34.98	820	37.21	818.9	38.91	818
40.56	817.26	42.96	816	46.04	814.75	47.2	814.22	47.75	814
48.55	813.68	49.78	813.26	53.82	812	57.97	811.04	61.31	810
64.49	809.53	65.29	809.54	68.44	809.2	69.45	809.23	86.6	808.41
87.34	808.42	111.51	808.87	143.75	809.51	144.28	809.52	161.07	809.92
163.6	809.99	186.29	809.19	187.94	808.07	188.97	808	190.61	806.04
190.63	806	190.63	806.04	191.07	805.59	191.22	804.73	213.83	804.66
215.88	804.66	222.34	804.65	223.17	805.38	226.04	805.82	226.05	805.82
235.36	805.98	236.04	806	236.23	806.15	238.58	808	240.46	809.72
240.74	810	240.82	810.07	242.06	811.43	243.32	811.7	244.67	812
249.15	812.98	253.74	814	254.73	814.18	255.58	814.37	259.54	815.76
260.26	816	261.32	816.34	266.1	818	266.51	818.08	267.55	818.42
270.15	819.92	270.3	820	270.73	820.27	271.61	820.79	274.27	822
275.98	822.71	278.54	824	278.71	824.17	279.31	824.4	280.66	825.04
281.04	825.22	282.89	826	285.44	827.2	287.05	828	290.54	829.78
290.92	829.94	291.01	830	291.15	830.07	294.22	832	294.71	832.27
297.46	834	298.25	834.4	301.3	836	301.31	836.09	302.86	836.43
305.42	836.97	314.07	837.07	317.3	837.14	318.47	837.04	319.89	836.96
321.84	836.86	323.06	837.98	323.07	838	323.23	838.13	325.37	840
327.33	841.57	327.85	842	328.04	842.16	328.16	842.41	328.67	842.68
331.1	844	334.49	845.77	334.9	846	335.86	846.51	338.6	848
342.26	850								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	61.31	.035	186.29	.04	240.46	.1	305.42	.013
321.84	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
186.29	240.46	141.41	141.41	129.19	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12905.72

INPUT
Description:
Station Elevation Data num= 154

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840	2.44	838.97	4.57	838	5.57	837.52	9.55	836
10.17	835.72	13.42	834	13.71	833.85	17.21	832.03	17.27	832
18.01	831.71	22.34	830	23.18	829.72	28.09	828	29.27	827.56
33.09	826	34.32	825.56	38.3	824	38.65	823.87	43.48	822
48.94	820.51	50.96	820	55.92	818.85	59.62	818	64.59	816.79
67.7	816	68.75	815.75	75.03	814.26	75.87	814.05	76.1	814
76.26	813.95	84.01	812	92.26	810.42	93.88	810	94.69	809.91
97.59	809.8	105.76	809.41	108.25	809.28	114.73	808.92	116.24	808.12
116.45	808	116.94	807.78	118.85	806.81	122.86	806.23	124.35	806
125.7	805.8	129	805.45	131.62	805.88	132.1	806	132.79	806.17
139.38	807.5	139.55	807.46	140	807.47	140.38	807.47	149.42	807.41
151.21	807.45	152.6	807.48	154.62	807.53	161.16	807.72	170.45	808
171.99	808.11	176.56	808.43	190.38	808.23	194.11	808.16	199.08	808.06
202.81	808	204.35	808	205.79	807.35	207.36	806	209.28	804.52
209.44	804.39	211.93	804.33	218.12	804.18	222.69	804.08	226.98	803.97
227.68	804.35	230.32	806	231.28	806.57	233.05	807.53	233.59	807.75
234.17	808	236.19	808.89	236.47	809.01	238.63	810	239.84	810.52
243.02	812	246.89	813.73	247.56	814	247.77	814.08	248.64	814.45
250.65	815.37	251.95	816	254.28	817.18	255.83	818	256.75	818.57
259.03	820	259.51	820.28	260.96	821.19	261.99	821.87	262.18	822
264.93	823.81	265.21	824	267.09	825.23	268.2	826	268.35	826.11
271.05	828	271.31	828.18	272.39	828.91	272.68	829.15	273.78	830
275.56	831.58	276.06	832	277.75	833.42	278.49	834	278.85	834.29
280.93	836	281.94	836.83	282.7	837.49	283.3	838	284.08	838.74
287.92	838.85	291.57	839.48	296.13	839.28	302.53	838.93	304.89	839.66
306.01	839.93	306.26	840	306.33	840.07	307.65	842	307.81	841.77
308.32	843.58	308.64	844	308.72	844.24	309.15	845.35	309.4	846
309.96	847.3	310.3	848	310.57	848.85	311.04	850.47	311.3	850.09
311.5	850	313.19	851.51	313.82	852	317.24	853.91	317.41	854
318.36	854.53	320.93	855.87	321.11	856	321.73	856.39	323.89	857.5
324.76	857.96	324.85	858	324.93	858.04	328.72	860		

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

0	.1	59.62	.035	114.73	.1	139.38	.035	204.35	.04
233.05	.1	287.92	.013	302.53	.1				

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
204.35	233.05	120.76	120.76	103.33	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12783.74

INPUT
Description:
Station Elevation Data num= 148

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	850	3.09	848	4.74	846.87	6.08	846	8.18	844.51
8.9	844	11.51	842.46	12.29	842	12.76	841.74	15.38	840.41
16.07	840	17.97	839.06	19.4	838	21.21	836.76	22.37	836
24	834.8	25.22	834	26.62	832.99	27.89	832	29.14	831.05
30.65	830	31.23	829.52	33.27	828	34.89	826.56	35.62	826
37.44	824.34	37.83	824	40.26	822.06	40.33	822	42.48	820.43
43.04	820.02	43.07	820	43.12	819.96	45.09	818.69	46.14	818
48.16	816.73	49.28	816	52.87	814.28	53.39	814	53.72	813.87
57.83	812	61.56	810.54	63.14	810	75.24	808.63	77.45	808.38
79.13	808.22	80.85	808	81.35	808	88.16	807.76	108.59	807.1
110.49	807.05	120.83	806.69	126.11	806.51	136.69	806.49	140.7	806.49
151.13	807.4	151.47	807.38	154.42	807.47	166.58	807.78	175.49	808
187.06	808	187.28	808.06	187.98	808.11	190.08	806.65	191.01	805.98
191.49	806	192.12	805.63	195.5	804.39	203.37	804.17	212.34	803.91
213.4	803.89	213.96	803.87	214.22	804.02	214.63	804.2	217.25	805.17
218.95	806	219.55	806.33	220.92	807	229.29	807.46	231.93	807.5
234.22	807.71	241.92	808	244.83	809.11	246.75	809.75	247.37	810
247.58	810.08	247.76	810.1	249.99	811.33	250.95	812	252.08	812.94
253.52	814	255.9	815.94	255.98	816	256.84	816.68	258.58	818
258.64	818.04	261.26	820.02	261.97	820.56	263.67	821.84	263.89	822
264.51	822.47	266.79	824	267.98	824.72	269.63	826	270.04	826.25
271.18	826.95	272.78	828	273.82	828.63	274.65	829.24	275.23	829.64
275.7	830	277.03	830.97	278.39	832	280.76	833.67	281.19	834
283.72	835.84	283.93	836	284.78	836.61	286.58	838	289.06	839.75
289.38	840	289.6	840.17	290.89	841.25	294.84	840.98	296.32	840.96
296.71	840.92	297.89	840.88	307.77	840.72	308.7	840.97	312.72	842
313.19	842.59	314.39	844	315.17	845.34	315.61	846	316.23	847.28
316.64	848	317.6	849.69	317.77	850	318	850.36	319.3	852
319.47	852.53	320.3	852.86	322.25	854	324.69	855.06	326.87	856
330.53	857.69	331.1	858	333.38	860				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	187.06	.04	220.92	.035	290.89	.013	307.77	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
187.06	220.92	73.75	73.75	73.99	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12709.20

INPUT
Description:
Station Elevation Data num= 141

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.56	828.27	2.96	828	3.46	827.64	5.83	826
8.26	824.47	8.96	824	10.3	823.03	12.05	822	13.76	820.95
15.32	820	17.61	818.55	18.4	818	19.73	817.13	21.6	816
22.53	815.49	25.27	814	27.03	813.07	29.14	812	32.78	810.51
33.89	810	36.38	809.33	40.3	808.07	40.47	808.02	40.53	808
50.81	807.52	55.4	807.44	60.57	807.3	96.56	806	108.16	806
125.26	806.73	134.35	807.2	139.76	807.26	152.52	807.58	161.31	807.8
162.33	807.81	173.83	807.26	174.69	807.24	183.83	806.94	186.43	806.87
189.9	806.8	191.96	807.07	199.64	807.92	202.23	806.03	202.25	806
203.2	805.1	203.31	804.95	206.51	805.01	207.55	805.05	208.08	804.84
208.19	804	210.22	804.14	210.48	804.17	210.59	804.16	211.75	804.13
216.38	803.94	222.39	803.67	223.95	803.98	224.12	804	225.23	804.52
228.3	806	228.54	806.07	229.42	806.35	230.75	807.55	231.27	808
233.64	809.92	233.73	810	235.65	811.61	236.13	812	237.53	813.19
237.56	813.21	237.66	813.29	238.9	814	241.24	815.75	241.58	816
243.97	817.68	244.41	818	244.82	818.3	247.27	820	248.02	820.58
249.05	821.36	249.97	821.78	250.41	822	252.53	823.05	254.3	824
257.9	825.72	258.43	826	259.05	826.34	260.56	827.1	261.21	827.72
261.53	828	262.89	829.24	263.72	830	265.58	831.69	265.98	832
266.26	832.23	268.25	834	268.58	834.28	269.99	835.64	270.59	835.95
270.66	836	273.39	837.8	273.62	838	276.37	839.8	276.61	840
276.93	840.26	278.11	840.79	279.62	841.67	280.19	842	282.41	842.4
287.31	842.39	288.32	842.36	298.16	842.42	298.64	842.43	299.52	842.47
300.73	842.57	301.04	842.6	301.39	842.63	301.66	843.82	301.76	844
301.93	844.24	303.24	846	303.29	846.08	303.55	846.53	304.43	847.96
304.46	848	304.48	848.04	305.24	849.37	305.62	850	306.7	851.69
306.94	852	307.02	852.11	307.92	853.89	307.99	853.91	308.62	854
310.94	855.7	311.37	856	311.64	856.18	314.55	858	314.71	858.11
317.75	860								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	40.3	.035	199.64	.04	231.27	.1	282.41	.013
300.73	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
199.64	231.27	118.63	118.63	143.39	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12590.58

INPUT
Description:
Station Elevation Data num= 127

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	1.64	828.76	2.62	828	5.27	826.07	5.35	826
7.97	824.03	8.01	824	8.06	823.96	10.76	822	11.12	821.73
13.3	820	15.47	818.41	16.02	818	18.68	816.11	18.82	816
18.93	815.92	20.86	814.52	21.55	814	21.83	813.8	24.27	812
26.22	810.83	27.73	810	29.39	809.3	31.51	808	36.98	806.28
37.64	806	81.83	806	82.33	806.04	96.06	806.7	103.4	806.42
105.46	806.38	109.43	806.81	110.49	806.93	132.94	807.59	134.82	807.67
136.5	807.7	145.34	807.69	160.45	807.69	164.92	807.66	187.09	806.58
191.72	806.3	194.36	806.11	196.17	806	196.74	806.28	197.15	805.56
197.49	804	197.63	803.97	198.35	803.76	213.25	803.53	219.45	803.43
221.84	803.39	222.16	803.58	223.05	804	225.63	805.16	227.54	806
228.48	806.48	229.74	806.97	234.65	808	235.26	808.15	238.79	808.75
240.64	809.23	242.21	810	243.03	810.36	246.26	812	247.36	812.47
247.85	812.71	249.16	813.62	249.84	814	251.19	814.82	253.19	816
255.02	817.08	256.54	818	258.85	819.34	260.07	820	260.38	820.27
263.58	821.76	264.09	822	268.14	823.85	268.44	824	271.48	825.41
272.82	825.99	272.83	826	276.42	827.95	276.51	828	276.95	828.27
280.08	830	280.53	830.25	280.9	830.45	283.62	832	285.18	832.84
287.25	834	288.77	834.81	289.52	835.25	289.87	835.64	290.36	836
291.18	836.64	292.78	838	294.79	839.7	295.16	840	295.38	840.13
297.5	842	298.14	842.62	298.36	842.87	303.15	843.5	304.33	843.63
305.47	843.69	311.53	844	312.22	844.03	313.01	844.07	316.73	844.51
318.4	844.75	318.7	845	319.66	846	321.02	847.11	321.9	848
322.83	848.94	324.1	850	325.01	850.94	326.35	852	326.69	852.56
327.63	853.18	328.84	854	331.67	855.85	331.84	856	334.87	857.95
334.93	858	337.99	860						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	37.64	.035	196.74	.04	227.54	.1	303.15	.013
318.4	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
196.74	227.54	119.79	119.79	89.65	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12466.12

INPUT
Description:
Station Elevation Data num= 147

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.99	828	4.45	826.97	5.61	826.22	5.92	826
6.16	825.85	8.7	824	11.14	822.25	11.5	822	13.4	820.8
14.79	820	17.48	818.65	18.5	818	20.48	816.96	21.84	816
22.9	815.26	24.8	814	27.99	812.07	28.11	812	28.51	811.87
33.77	810	36.97	808.81	39.23	808	47.61	806.49	50.04	806
78.12	806	80.04	806.16	81.02	806.04	81.44	806	88.47	805.38
88.55	805.38	92.54	805.08	92.97	805.12	102.37	806	103.18	806.08
106.54	806.43	113.84	807.22	124.88	807.17	128.97	807.14	132.11	807.17
134.65	806.64	143.45	807.47	143.49	807.43	143.6	807.01	143.72	806
143.98	805.31	144.17	804	144.22	805.12	144.5	803.76	153	803.4
154.12	803.35	163.09	802.9	164.69	803.99	164.7	804	166.49	805.02
167.6	805.62	170.38	805.73	170.94	805.74	181.47	805.66	187.28	805.77
189.97	805.91	191.17	806	191.96	806.06	197.93	806.51	202.07	806.23
205.3	806	217.22	805.18	219.53	805.01	220.3	804.95	221.83	805.18
224.17	805.55	227.19	806	233.03	806.94	234.9	807.23	235.45	807.32
235.56	807.41	235.78	807.52	237.41	808	238.04	808.46	239.93	808.84
243.17	809.62	244.54	810	246.09	810.83	248.59	812	249.19	812
251.72	813.88	251.95	814	254.16	815.59	254.63	816	256.85	817.6
257.18	818	258.31	819.12	259.37	819.93	259.51	819.99	259.62	820
260.26	820.51	262.34	822	262.86	822.37	265.12	824	265.97	824.62
267.81	826	267.92	826.05	268.11	826.13	268.87	826.89	270.15	828
271.98	829.89	272.17	830	272.46	830.23	274.51	832	275.42	832.72
276.91	834	278.75	835.42	279.45	836	281.79	837.73	282.19	838
282.49	838.19	284.39	839.63	284.88	840	284.91	840.03	287.52	842
288.68	842.95	289.28	843.45	289.78	843.53	291.66	844	292.64	844.28
294.66	844.75	302.14	844.46	304.7	844.4	306.04	844.76	309.96	845.85
310.47	845.87	310.55	846	311.25	846.72	312.55	848	313.24	848.84
314.24	850	315.8	851.79	315.99	852	316.07	852.11	316.72	853.01
316.79	853	318.41	854	321.2	855.85	321.41	856	324.42	857.93
324.53	858	327.66	860						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	50.04	.035	143.45	.04	167.6	.1	294.66	.013
306.04	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
143.45	167.6	124.22	124.22	107.77	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12336.63

INPUT
Description:

Station Elevation Data num= 142

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.91	828	3.39	827.64	5.14	826.52	5.79	826
6.24	825.68	8.59	824	10.2	822.8	11.33	822	11.59	821.82
14.23	820	16.02	818.73	17.1	818	18.68	816.97	20.18	816
22.59	814.51	23.42	814	23.85	813.75	26.55	812	29.82	810.2
30.12	810	31.61	809.42	35.07	808	56.03	806.68	67.64	806
80.05	806	83.63	806.18	89.38	806.46	93.57	806.71	121.45	807.45
122.82	806.91	125.55	806	129.45	804.78	131.33	804.15	135.3	804.02
136.23	804	137.23	803.93	139.15	803.82	141.94	803.71	145.58	803.58
147.41	803.74	147.62	803.76	149.97	804	154.2	804.42	160.59	804.93
161.84	805.06	162.87	805.18	171.52	805.34	177.54	805.44	177.88	805.47
178.07	805.5	178.81	805.6	182.24	806	186.83	806	192.29	806.44
193.72	806	198.3	804.69	200.48	804	201.15	803.71	215.22	803.25
215.79	803.23	223.73	802.9	224.84	803.47	225.5	804	225.68	804.09
226.28	804.52	226.39	804.78	229.15	805.56	231.29	806	233.15	806.61
234.32	806.92	235.02	807.5	235.67	808	238.06	809.77	238.4	810
238.57	810.12	241.17	812	243.02	813.34	243.95	814	244.33	814.27
244.63	814.51	245.04	814.79	246.85	816	247.72	816.6	249.79	818
250.77	818.67	252.81	820	254.48	821.14	255.75	822	256.05	822.25
256.27	822.38	259.35	824	261.21	825.01	263.15	826	266.82	827.96
266.89	828	266.93	828.02	267.11	828.12	270.68	830	273.64	831.57
274.49	832	277.12	833.42	277.34	833.54	277.88	834	278.4	834.36
280.52	836	281.41	836.67	281.45	836.7	283.02	838	284.27	838.93
285.64	840	287.51	841.39	288.29	842	289.89	843.05	291.06	844
291.67	844	296.81	844.92	296.98	844.95	297.23	844.95	309.44	844.88
313.05	845.54	315.9	846	316.12	845.78	316.16	845.71	316.17	845.71
316.26	845.79	316.65	846.14	318.57	848	320.17	849.47	320.68	850
322.45	851.55	322.88	852	322.98	852.13	322.99	852.29	325.38	853.81
325.7	854	326.24	854.34	328.83	856	329.24	856.26	331.93	858
332.23	858.19	335.02	860						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	35.07	.035	192.29	.04	231.29	.1	296.81	.013
313.05	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
192.29	231.29	134.44	134.44	106.77	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12201.47

INPUT
Description:
Station Elevation Data num= 128

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.16	828.06	2.24	828	4.48	826.19	4.7	826

6.84	824.27	7.11	824	7.62	823.57	9.54	822	10.67	821.08
11.8	820	14.83	818.02	14.87	817.98	17.52	816	18.97	814.79
20.17	814	22.8	812.21	23.15	812	23.57	811.72	24.68	811.06
26.36	810	27.74	809.34	30.62	808	36.99	807.71	38.89	807.65
51.88	807.09	52.85	807.07	79.41	806	164.37	806	166.32	806.04
171.37	806.14	174.51	806.22	175.24	806.17	177.11	806.04	177.77	806
192.12	806	192.23	805.99	194.74	805.83	206.23	804.86	209.52	805.02
210.56	805.17	214.45	805.22	218.18	804.47	221.37	804.4	223.66	804
224.73	803.79	225.03	803.71	233.23	803.39	237.4	803.21	239.4	803.14
243.93	802.96	245.52	802.9	247.3	803.99	247.32	804	247.33	804.02
247.95	804.39	248.84	804.72	252.74	806	253.32	806.23	258.33	808
258.75	808.03	258.91	808.04	259.47	808.56	260.87	810	262.24	811.3
263.06	812	264.46	813.36	265.19	814	265.8	814.71	267.06	815.42
267.78	816	267.84	816.09	269.25	816.92	271.07	818	272.98	819.1
274.54	820	277.82	821.96	277.89	822	277.95	822.04	281.44	824
282.94	824.89	284.54	826	284.58	826.08	287.3	827.46	288.3	828
291.62	829.89	291.83	830	294.85	831.63	295.57	832	295.65	832.04
299.47	834	302.45	835.59	303.23	836	303.39	836.07	303.64	836.18
305.89	837.81	306.12	838	307.87	839.37	308.5	839.85	308.7	840
308.72	840.02	311.55	842	311.88	842.24	314.38	844	314.81	844.31
316.87	845.78	317.92	845.98	318.12	846	318.69	846.14	322.14	846.92
330.33	846.96	333.02	846.98	339.17	846.27	339.3	846.26	339.33	846.35
340.09	848	340.93	849.13	341.64	850	342.75	851.78	342.88	852
343.02	852.3	344.31	854.04	344.32	854	344.52	854.16	346.91	856
350.22	857.92	350.53	858.09	353.88	860				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	30.62	.035	214.45	.04	248.84	.1	322.14	.013
339.17	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
214.45	248.84	271.82	147.48	205.71	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12106.82

INPUT
Description:
Station Elevation Data num= 155

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	1.97	828.58	2.66	828	4.99	826.36	5.41	826
5.73	825.73	8.13	824	8.49	823.76	11.14	822	13.8	820.26
14.22	820	16.39	818.57	17.26	818	18.85	816.85	20.44	816
23.52	814.11	23.71	814	23.8	813.94	27.12	812	28.96	810.88
30.73	810	33.99	808.77	36.6	808	54.09	807.32	64.43	806.92
68.26	806.76	84.27	806.07	85.74	806	95.33	806	95.81	805.96
97.35	805.81	97.49	805.79	97.62	805.77	109.84	804.04	110.35	804.28

110.74	804.44	115.49	806	115.6	806.04	116.18	806	174.71	806
178.9	806.97	181.08	807.48	182.08	807.66	183.19	807.56	184.44	807.65
185.64	807.41	186.6	807.28	188.12	806.85	189.06	806.49	190.86	806
198.49	805.47	201.76	805.07	215.79	804.15	218.14	804	220.46	803.88
224.48	803.62	226.05	803.58	228.93	803.8	231.14	803.89	232.1	803.95
233.27	803.91	234.46	803.92	235.95	803.86	236.4	803.82	236.71	803.85
237.71	803.75	238.31	803.59	240.82	803.59	248.62	803.8	257.65	803.53
264.49	803.26	270.02	803.04	273.89	802.9	274	802.9	274.33	802.96
278.63	803.76	278.99	803.87	279.31	804	279.47	804.05	282.8	804.99
285.88	806	286.77	806.38	291.63	808	292.72	808.57	295.73	810
296.98	810.67	299.29	811.8	299.66	812	300.91	812.57	302.92	813.61
305.14	814	312.33	815.08	312.73	815.15	313.19	815.22	313.21	815.24
313.35	815.32	314.05	816	315.9	817.33	316.95	818	317.69	818.52
319.48	820	321.69	821.84	321.91	822	323.58	823.4	324.34	823.99
324.35	824	324.38	824.02	326.88	826	327.04	826.12	329.43	828
331.64	829.83	331.87	830	331.9	830.06	332.88	830.94	335.56	831.86
335.86	832	336.9	832.64	337.91	833.11	339.85	834	342.11	835.43
343.08	836	343.93	836.54	346.31	838	348.65	839.47	349.56	840
349.69	840.08	353	842	353.71	842.4	356.49	844	357.6	844.66
360.09	846	360.78	846.47	360.97	846.7	364.14	846.81	365.97	846.87
371.58	846.7	377.59	846.72	382.3	846.87	383.62	846.93	383.76	847.18
384.25	848	385.99	849.75	386.23	850	386.29	850.1	387.98	852
388.04	852.07	389.73	854	391.56	855.86	391.71	856	391.91	856.39
392.38	856.98	392.41	856.98	393.07	857.37	394.28	858	397.55	860

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	36.6	.035	115.49	.1	190.86	.04	285.88	.1
364.14	.013	382.3	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
190.86	285.88	48.53	53.43	150.07	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	69.44	820	T
333.49	397.55	820	T

CULVERT

RIVER: Cabin Run
REACH: Upper RS: 12080

INPUT
Description:
Distance from Upstream XS = 9
Deck/Roadway Width = 14
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 3

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord

190.86	806	0	266	804	0	285.88	806	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 155

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	1.97	828.58	2.66	828	4.99	826.36	5.41	826
5.73	825.73	8.13	824	8.49	823.76	11.14	822	13.8	820.26
14.22	820	16.39	818.57	17.26	818	18.85	816.85	20.44	816
23.52	814.11	23.71	814	23.8	813.94	27.12	812	28.96	810.88
30.73	810	33.99	808.77	36.6	808	54.09	807.32	64.43	806.92
68.26	806.76	84.27	806.07	85.74	806	95.33	806	95.81	805.96
97.35	805.81	97.49	805.79	97.62	805.77	109.84	804.04	110.35	804.28
110.74	804.44	115.49	806	115.6	806.04	116.18	806	174.71	806
178.9	806.97	181.08	807.48	182.08	807.66	183.19	807.56	184.44	807.65
185.64	807.41	186.6	807.28	188.12	806.85	189.06	806.49	190.86	806
198.49	805.47	201.76	805.07	215.79	804.15	218.14	804	220.46	803.88
224.48	803.62	226.05	803.58	228.93	803.8	231.14	803.89	232.1	803.95
233.27	803.91	234.46	803.92	235.95	803.86	236.4	803.82	236.71	803.85
237.71	803.75	238.31	803.59	240.82	803.59	248.62	803.8	257.65	803.53
264.49	803.26	270.02	803.04	273.89	802.9	274	802.9	274.33	802.96
278.63	803.76	278.99	803.87	279.31	804	279.47	804.05	282.8	804.99
285.88	806	286.77	806.38	291.63	808	292.72	808.57	295.73	810
296.98	810.67	299.29	811.8	299.66	812	300.91	812.57	302.92	813.61
305.14	814	312.33	815.08	312.73	815.15	313.19	815.22	313.21	815.24
313.35	815.32	314.05	816	315.9	817.33	316.95	818	317.69	818.52
319.48	820	321.69	821.84	321.91	822	323.58	823.4	324.34	823.99
324.35	824	324.38	824.02	326.88	826	327.04	826.12	329.43	828
331.64	829.83	331.87	830	331.9	830.06	332.88	830.94	335.56	831.86
335.86	832	336.9	832.64	337.91	833.11	339.85	834	342.11	835.43
343.08	836	343.93	836.54	346.31	838	348.65	839.47	349.56	840
349.69	840.08	353	842	353.71	842.4	356.49	844	357.6	844.66
360.09	846	360.78	846.47	360.97	846.7	364.14	846.81	365.97	846.87
371.58	846.7	377.59	846.72	382.3	846.87	383.62	846.93	383.76	847.18
384.25	848	385.99	849.75	386.23	850	386.29	850.1	387.98	852
388.04	852.07	389.73	854	391.56	855.86	391.71	856	391.91	856.39
392.38	856.98	392.41	856.98	393.07	857.37	394.28	858	397.55	860

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	36.6	.035	115.49	.1	190.86	.04	285.88	.1
364.14	.013	382.3	.1						

Bank Sta: Left	Right	Coeff Contr.	Expan.
190.86	285.88	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	69.44	820	T
333.49	397.55	820	T

Downstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
247.36	804	0	262	803		292	800.95	0
308.23	803.68	0						

Downstream Bridge Cross Section Data
Station Elevation Data num= 189

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.09	828	5.18	826.65	6.29	826	8.51	824.83
9.89	824	10.66	823.54	13.19	822	14.91	820.9	16.57	820
19.14	818.64	20.29	818	22.79	816.77	24.35	816	26.17	815.2
28.51	814	30.16	813.36	32.34	812.69	34.11	812.04	34.21	812
34.46	811.9	39	810	40.41	809.52	46.92	808	51.35	807.3
52.14	807.13	55.85	806.46	58.25	806	60.86	806	61.01	806.03
64.42	806.75	65.16	806.31	65.77	806	67.94	804.96	68.51	804.73
69.33	805.03	70.85	805.49	72.99	806	73.16	806.05	80.17	807.53
85.97	807.68	86.22	807.69	87.07	807.66	92.51	807.66	115.19	806.28
116.47	806.24	119.41	806.15	125.91	806	137.08	806	143.43	805.68
157.58	805.24	159.09	805.2	160.85	805.15	185.55	804.05	187.14	804.03
190.46	804.01	192.8	804	195.53	803.98	197.93	803.97	199.98	803.96
200.25	803.95	208.51	803.95	212.27	803.96	221.88	803.93	224.64	803.96
226.27	803.98	227.1	804	247.36	804	248.08	803.7	248.25	803.65
248.49	803.41	250.77	802.68	251.85	802.36	252.3	802	254.42	800.4
254.77	800.25	255.32	800.32	256.02	800	257.9	799.23	259.13	799.33
262.44	798.91	263.2	798.72	263.43	798.71	263.49	798.7	263.72	798.69
264.6	798.63	265.17	798.59	265.33	798.57	265.52	798.55	270.78	798.49
271.34	798.48	282.49	799.25	283.37	799.34	284.71	799.15	285.09	799.44
285.25	799.48	285.42	799.5	285.95	799.52	286.57	799.51	287.13	799.51
289.46	799.49	292.59	799.43	297.93	799.6	298.63	799.62	299.08	799.66
299.6	799.67	302.87	801.53	303.22	801.72	303.53	801.88	303.85	801.99
308.23	803.68	311.72	803.67	315.77	803.76	317.36	803.93	318.1	804
324.45	804.59	328.89	805.03	334.2	806	334.56	806	335.1	806.92
336.32	807.85	336.53	808	338.86	809.76	339.2	810	340.9	811.32
341.95	812	342.82	812.56	344.97	814	346.14	814.7	348.1	816
348.43	816.23	352.33	816.68	356.95	817.64	357.31	818	357.54	818.19
359.65	820	361.68	821.97	361.72	822	361.82	822.09	364.29	824
365.31	824.92	366.69	826	368.12	827.37	369.04	828	369.34	828.29
370.53	829.41	371.23	830	372.81	831.31	373.63	832	373.72	832.09
374.15	832.64	375.72	833.55	376.4	834	377.4	834.63	379.62	836
382.32	837.78	382.67	838	385.8	839.97	385.84	840	388.76	841.67
389.27	842	392.07	843.8	392.42	844	395.49	845.79	395.86	846
398.82	847.77	400.83	847.77	403.01	847.78	403.33	847.79	403.71	847.76
408.52	847.49	414.88	847.24	416.77	847.21	421.62	847	421.7	847.38
422.05	848	423.9	849.86	424.06	850	424.22	850.2	425.81	852
426.84	853.28	427.49	854	428.56	855.32	429.27	856	430.32	857.35
431.16	858.09	431.3	858	431.32	858	434.52	860		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	125.91	.035	247.36	.04	315.77	.013	338.86	.1
398.82	.013	421.62	.1						

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Bank Sta: Left   Right    Coeff Contr.   Expan.
        247.36  308.23            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  217.77     820        T
  310.18  434.52     820        T

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

Number of Culverts =  2

Culvert Name     Shape      Rise    Span
Culvert #2      Circular     .83
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                  7      14     .011     .011        0                    .2
       1
Number of Barrels =  5
Upstream   Elevation =  803.5
Centerline Stations
    Sta.    Sta.    Sta.    Sta.    Sta.
  261.57  262.33  263.25  264.08  265.09
Downstream Elevation =  800.5
Centerline Stations
    Sta.    Sta.    Sta.    Sta.    Sta.
  286.69  287.53   288.3  289.06  290.15

Culvert Name     Shape      Rise    Span
Culvert #1      Circular    1.25
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                  7      14     .011     .011        0                    .2
       1
Number of Barrels =  6
Upstream   Elevation =  803
Centerline Stations
    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.
  267.61  269.23  270.74  272.09  273.55  274.61
Downstream Elevation =  800.26
```

Centerline Stations

Sta.	Sta.	Sta.	Sta.	Sta.	Sta.
292.99	294.5	295.77	296.67	298.05	298.82

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

Q Culv Group (cfs)	13.34	Culv Full Len (ft)	14.00
# Barrels	5	Culv Vel US (ft/s)	4.93
Q Barrel (cfs)	2.67	Culv Vel DS (ft/s)	4.93
E.G. US. (ft)	807.95	Culv Inv El Up (ft)	803.50
W.S. US. (ft)	807.62	Culv Inv El Dn (ft)	800.50
E.G. DS (ft)	807.57	Culv Frctn Ls (ft)	0.15
W.S. DS (ft)	807.33	Culv Exit Loss (ft)	0.13
Delta EG (ft)	0.38	Culv Entr Loss (ft)	0.08
Delta WS (ft)	0.29	Q Weir (cfs)	2117.21
E.G. IC (ft)	804.93	Weir Sta Lft (ft)	69.44
E.G. OC (ft)	807.93	Weir Sta Rgt (ft)	291.45
Culvert Control	Outlet	Weir Submerg	0.75
Culv WS Inlet (ft)	804.33	Weir Max Depth (ft)	3.94
Culv WS Outlet (ft)	801.33	Weir Avg Depth (ft)	2.33
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	517.03
Culv Crt Depth (ft)	0.72	Min El Weir Flow (ft)	804.01

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

Q Culv Group (cfs)	39.25	Culv Full Len (ft)	14.00
# Barrels	6	Culv Vel US (ft/s)	5.33
Q Barrel (cfs)	6.54	Culv Vel DS (ft/s)	5.33
E.G. US. (ft)	807.95	Culv Inv El Up (ft)	803.00
W.S. US. (ft)	807.62	Culv Inv El Dn (ft)	800.26
E.G. DS (ft)	807.57	Culv Frctn Ls (ft)	0.10
W.S. DS (ft)	807.33	Culv Exit Loss (ft)	0.19
Delta EG (ft)	0.38	Culv Entr Loss (ft)	0.09
Delta WS (ft)	0.29	Q Weir (cfs)	2117.21
E.G. IC (ft)	804.84	Weir Sta Lft (ft)	69.44
E.G. OC (ft)	807.96	Weir Sta Rgt (ft)	291.45
Culvert Control	Outlet	Weir Submerg	0.75
Culv WS Inlet (ft)	804.25	Weir Max Depth (ft)	3.94
Culv WS Outlet (ft)	801.51	Weir Avg Depth (ft)	2.33
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	517.03
Culv Crt Depth (ft)	1.03	Min El Weir Flow (ft)	804.01

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12052.69

INPUT

Description:
Station Elevation Data num= 189

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.09	828	5.18	826.65	6.29	826	8.51	824.83
9.89	824	10.66	823.54	13.19	822	14.91	820.9	16.57	820
19.14	818.64	20.29	818	22.79	816.77	24.35	816	26.17	815.2
28.51	814	30.16	813.36	32.34	812.69	34.11	812.04	34.21	812
34.46	811.9	39	810	40.41	809.52	46.92	808	51.35	807.3
52.14	807.13	55.85	806.46	58.25	806	60.86	806	61.01	806.03
64.42	806.75	65.16	806.31	65.77	806	67.94	804.96	68.51	804.73
69.33	805.03	70.85	805.49	72.99	806	73.16	806.05	80.17	807.53
85.97	807.68	86.22	807.69	87.07	807.66	92.51	807.66	115.19	806.28
116.47	806.24	119.41	806.15	125.91	806	137.08	806	143.43	805.68
157.58	805.24	159.09	805.2	160.85	805.15	185.55	804.05	187.14	804.03
190.46	804.01	192.8	804	195.53	803.98	197.93	803.97	199.98	803.96
200.25	803.95	208.51	803.95	212.27	803.96	221.88	803.93	224.64	803.96
226.27	803.98	227.1	804	247.36	804	248.08	803.7	248.25	803.65
248.49	803.41	250.77	802.68	251.85	802.36	252.3	802	254.42	800.4
254.77	800.25	255.32	800.32	256.02	800	257.9	799.23	259.13	799.33
262.44	798.91	263.2	798.72	263.43	798.71	263.49	798.7	263.72	798.69
264.6	798.63	265.17	798.59	265.33	798.57	265.52	798.55	270.78	798.49
271.34	798.48	282.49	799.25	283.37	799.34	284.71	799.15	285.09	799.44
285.25	799.48	285.42	799.5	285.95	799.52	286.57	799.51	287.13	799.51
289.46	799.49	292.59	799.43	297.93	799.6	298.63	799.62	299.08	799.66
299.6	799.67	302.87	801.53	303.22	801.72	303.53	801.88	303.85	801.99
308.23	803.68	311.72	803.67	315.77	803.76	317.36	803.93	318.1	804
324.45	804.59	328.89	805.03	334.2	806	334.56	806	335.1	806.92
336.32	807.85	336.53	808	338.86	809.76	339.2	810	340.9	811.32
341.95	812	342.82	812.56	344.97	814	346.14	814.7	348.1	816
348.43	816.23	352.33	816.68	356.95	817.64	357.31	818	357.54	818.19
359.65	820	361.68	821.97	361.72	822	361.82	822.09	364.29	824
365.31	824.92	366.69	826	368.12	827.37	369.04	828	369.34	828.29
370.53	829.41	371.23	830	372.81	831.31	373.63	832	373.72	832.09
374.15	832.64	375.72	833.55	376.4	834	377.4	834.63	379.62	836
382.32	837.78	382.67	838	385.8	839.97	385.84	840	388.76	841.67
389.27	842	392.07	843.8	392.42	844	395.49	845.79	395.86	846
398.82	847.77	400.83	847.77	403.01	847.78	403.33	847.79	403.71	847.76
408.52	847.49	414.88	847.24	416.77	847.21	421.62	847	421.7	847.38
422.05	848	423.9	849.86	424.06	850	424.22	850.2	425.81	852
426.84	853.28	427.49	854	428.56	855.32	429.27	856	430.32	857.35
431.16	858.09	431.3	858	431.32	858	434.52	860		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	125.91	.035	247.36	.04	315.77	.013	338.86	.1
398.82	.013	421.62	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
247.36	308.23	302.6	35.46	177.95	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent

0	217.77	820	T
310.18	434.52	820	T

BRIDGE

RIVER: Cabin Run
REACH: Upper RS: 12030

INPUT
Description:
Distance from Upstream XS = 7
Deck/Roadway Width = 16
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
217.01	804.66	0	257.51	805.5	804.5	260.51	808.5	804.5
307.18	808.5	804.5	310.18	805.5	804.5	336.73	807.41	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 189

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.09	828	5.18	826.65	6.29	826	8.51	824.83
9.89	824	10.66	823.54	13.19	822	14.91	820.9	16.57	820
19.14	818.64	20.29	818	22.79	816.77	24.35	816	26.17	815.2
28.51	814	30.16	813.36	32.34	812.69	34.11	812.04	34.21	812
34.46	811.9	39	810	40.41	809.52	46.92	808	51.35	807.3
52.14	807.13	55.85	806.46	58.25	806	60.86	806	61.01	806.03
64.42	806.75	65.16	806.31	65.77	806	67.94	804.96	68.51	804.73
69.33	805.03	70.85	805.49	72.99	806	73.16	806.05	80.17	807.53
85.97	807.68	86.22	807.69	87.07	807.66	92.51	807.66	115.19	806.28
116.47	806.24	119.41	806.15	125.91	806	137.08	806	143.43	805.68
157.58	805.24	159.09	805.2	160.85	805.15	185.55	804.05	187.14	804.03
190.46	804.01	192.8	804	195.53	803.98	197.93	803.97	199.98	803.96
200.25	803.95	208.51	803.95	212.27	803.96	221.88	803.93	224.64	803.96
226.27	803.98	227.1	804	247.36	804	248.08	803.7	248.25	803.65
248.49	803.41	250.77	802.68	251.85	802.36	252.3	802	254.42	800.4
254.77	800.25	255.32	800.32	256.02	800	257.9	799.23	259.13	799.33
262.44	798.91	263.2	798.72	263.43	798.71	263.49	798.7	263.72	798.69
264.6	798.63	265.17	798.59	265.33	798.57	265.52	798.55	270.78	798.49
271.34	798.48	282.49	799.25	283.37	799.34	284.71	799.15	285.09	799.44
285.25	799.48	285.42	799.5	285.95	799.52	286.57	799.51	287.13	799.51
289.46	799.49	292.59	799.43	297.93	799.6	298.63	799.62	299.08	799.66
299.6	799.67	302.87	801.53	303.22	801.72	303.53	801.88	303.85	801.99
308.23	803.68	311.72	803.67	315.77	803.76	317.36	803.93	318.1	804
324.45	804.59	328.89	805.03	334.2	806	334.56	806	335.1	806.92
336.32	807.85	336.53	808	338.86	809.76	339.2	810	340.9	811.32
341.95	812	342.82	812.56	344.97	814	346.14	814.7	348.1	816
348.43	816.23	352.33	816.68	356.95	817.64	357.31	818	357.54	818.19
359.65	820	361.68	821.97	361.72	822	361.82	822.09	364.29	824

365.31	824.92	366.69	826	368.12	827.37	369.04	828	369.34	828.29
370.53	829.41	371.23	830	372.81	831.31	373.63	832	373.72	832.09
374.15	832.64	375.72	833.55	376.4	834	377.4	834.63	379.62	836
382.32	837.78	382.67	838	385.8	839.97	385.84	840	388.76	841.67
389.27	842	392.07	843.8	392.42	844	395.49	845.79	395.86	846
398.82	847.77	400.83	847.77	403.01	847.78	403.33	847.79	403.71	847.76
408.52	847.49	414.88	847.24	416.77	847.21	421.62	847	421.7	847.38
422.05	848	423.9	849.86	424.06	850	424.22	850.2	425.81	852
426.84	853.28	427.49	854	428.56	855.32	429.27	856	430.32	857.35
431.16	858.09	431.3	858	431.32	858	434.52	860		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	125.91	.035	247.36	.04	315.77	.013	338.86	.1
398.82	.013	421.62	.1						

Bank Sta: Left	Right	Coeff Contr.	Expan.
247.36	308.23	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	217.77	820	T
310.18	434.52	820	T

Downstream Deck/Roadway Coordinates
num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
266.73	804.24	0	291.49	805.5	804.5	294.49	808.5	804.5
345.06	808.5	804.5	348.06	805.5	804.5	365.63	806	0

Downstream Bridge Cross Section Data
Station Elevation Data num= 167

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.69	828	4.43	826.71	5.4	826	6.43	825.29
8.51	824	10.12	822.83	11.22	822	14.04	820.05	14.2	819.95
17.91	818	18.29	817.84	20.09	817.05	22.37	816.08	22.57	816
28.88	814.17	29.3	814	31.08	813.55	37.52	812	40.06	811.66
42.32	811.4	50.88	810	74.51	808.68	81.35	808.32	85.16	808.11
85.69	808.09	87.86	808	95.77	808	101.46	807.97	139.54	807.07
142.68	807	155.01	806.73	185.54	806	194.7	806	212.74	805.25
223.46	804.73	236.59	804.09	236.71	804.09	238.67	804	298.92	804
300.66	803.95	301.16	803.32	302.17	802	302.9	801.16	303.83	800
303.95	799.72	304.07	799.61	308.6	799.64	309.86	799.64	312.47	799.63
315.29	799.61	317.03	799.62	317.95	799.52	320.3	799.27	322.62	799.42
323.95	799.55	324.41	799.61	324.82	799.66	326.17	799.84	327.78	800
328.97	800.13	329.98	800.29	332.99	800.88	334.44	801.15	334.87	801.22
336.8	801.5	337.42	801.59	338.66	802	339.37	802.17	339.41	802.19
339.72	802.29	340.13	802.31	340.29	802.33	348.34	803.32	352.94	803.91
353.88	804	355.06	804	358.11	804.42	360.86	804.59	366.03	805.55
366.65	805.7	367.78	806.07	368.05	806.17	371.29	807.19	373.76	807.9
374.09	808	379.94	809.78	380.51	810	381.14	810.22	381.18	810.23
381.28	810.25	384.81	811.18	388.25	811.64	391.62	812	396.7	812.61

402.26	813.29	404.97	813.6	405.63	814	406.51	814.67	408.43	816
411.19	817.78	411.52	818	411.53	818	414.36	819.89	414.54	820
414.73	820.14	417.47	822	417.85	822.26	418.1	822.42	419.04	823.19
419.33	823.4	422.1	825.56	422.45	825.83	422.66	826	423.5	826.67
425.23	828	426.32	828.92	427.76	830	429.2	831.14	430.12	832
430.28	832.18	430.85	832.68	432.4	833.83	432.64	834	434.64	835.56
435.25	836	435.33	836.06	436.42	836.92	437.7	837.88	437.86	838
438.51	838.51	440.64	840	440.97	840.22	443.22	842	443.32	842.07
445.95	844	446.19	844.16	448.7	846	449.06	846.26	452.56	848.82
452.64	848.76	454.13	848.98	459.79	849.05	460.32	849.01	461.17	848.95
462.83	848.85	470.3	848.28	471.45	848.3	474.54	848.07	476.45	847.92
477.41	847.86	477.54	847.86	477.62	847.84	477.78	847.94	481.13	850
481.19	850.04	484.01	852	484.34	852.22	486.96	854	489.72	855.86
489.93	856	490.1	856.11	492.66	857.82	492.69	857.85	493.05	858.01
493.2	858.09	496.59	860						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	50.88	.035	300.66	.04	352.94	.013	367.78	.1
459.79	.013	477.41	.1						

Bank Sta: Left Right Coeff Contr. Expan.
300.66 352.94 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	132.15	820	T
358.38	496.59	820	T

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

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

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

BRIDGE OUTPUT Profile #PF 1

E.G. US. (ft)	807.57	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	807.33	E.G. Elev (ft)	807.51	807.28
Q Total (cfs)	2169.80	W.S. Elev (ft)	806.80	806.86
Q Bridge (cfs)	1737.47	Crit W.S. (ft)	803.37	804.50
Q Weir (cfs)		Max Chl Dpth (ft)	8.32	7.59
Weir Sta Lft (ft)		Vel Total (ft/s)	6.73	5.01
Weir Sta Rgt (ft)		Flow Area (sq ft)	322.59	433.23
Weir Submerg		Froude # Chl	0.41	0.33
Weir Max Depth (ft)		Specif Force (cu ft)	1755.42	1434.93
Min El Weir Flow (ft)	804.69	Hydr Depth (ft)	7.62	2.79
Min El Prs (ft)	804.50	W.P. Total (ft)	155.22	274.09
Delta EG (ft)	0.37	Conv. Total (cfs)	20299.3	24917.3
Delta WS (ft)	0.40	Top Width (ft)	194.41	167.11
BR Open Area (sq ft)	186.25	Frctn Loss (ft)	0.15	0.03
BR Open Vel (ft/s)	9.33	C & E Loss (ft)	0.09	0.05
BR Sluice Coef		Shear Total (lb/sq ft)	1.48	0.75
BR Sel Method	Energy only	Power Total (lb/ft s)	9.97	3.75

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

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 12016.91

INPUT

Description:

Station Elevation Data num= 167

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.69	828	4.43	826.71	5.4	826	6.43	825.29
8.51	824	10.12	822.83	11.22	822	14.04	820.05	14.2	819.95
17.91	818	18.29	817.84	20.09	817.05	22.37	816.08	22.57	816
28.88	814.17	29.3	814	31.08	813.55	37.52	812	40.06	811.66
42.32	811.4	50.88	810	74.51	808.68	81.35	808.32	85.16	808.11
85.69	808.09	87.86	808	95.77	808	101.46	807.97	139.54	807.07
142.68	807	155.01	806.73	185.54	806	194.7	806	212.74	805.25
223.46	804.73	236.59	804.09	236.71	804.09	238.67	804	298.92	804
300.66	803.95	301.16	803.32	302.17	802	302.9	801.16	303.83	800
303.95	799.72	304.07	799.61	308.6	799.64	309.86	799.64	312.47	799.63
315.29	799.61	317.03	799.62	317.95	799.52	320.3	799.27	322.62	799.42
323.95	799.55	324.41	799.61	324.82	799.66	326.17	799.84	327.78	800
328.97	800.13	329.98	800.29	332.99	800.88	334.44	801.15	334.87	801.22
336.8	801.5	337.42	801.59	338.66	802	339.37	802.17	339.41	802.19
339.72	802.29	340.13	802.31	340.29	802.33	348.34	803.32	352.94	803.91
353.88	804	355.06	804	358.11	804.42	360.86	804.59	366.03	805.55
366.65	805.7	367.78	806.07	368.05	806.17	371.29	807.19	373.76	807.9
374.09	808	379.94	809.78	380.51	810	381.14	810.22	381.18	810.23
381.28	810.25	384.81	811.18	388.25	811.64	391.62	812	396.7	812.61
402.26	813.29	404.97	813.6	405.63	814	406.51	814.67	408.43	816
411.19	817.78	411.52	818	411.53	818	414.36	819.89	414.54	820
414.73	820.14	417.47	822	417.85	822.26	418.1	822.42	419.04	823.19
419.33	823.4	422.1	825.56	422.45	825.83	422.66	826	423.5	826.67
425.23	828	426.32	828.92	427.76	830	429.2	831.14	430.12	832
430.28	832.18	430.85	832.68	432.4	833.83	432.64	834	434.64	835.56
435.25	836	435.33	836.06	436.42	836.92	437.7	837.88	437.86	838
438.51	838.51	440.64	840	440.97	840.22	443.22	842	443.32	842.07
445.95	844	446.19	844.16	448.7	846	449.06	846.26	452.56	848.82
452.64	848.76	454.13	848.98	459.79	849.05	460.32	849.01	461.17	848.95
462.83	848.85	470.3	848.28	471.45	848.3	474.54	848.07	476.45	847.92
477.41	847.86	477.54	847.86	477.62	847.84	477.78	847.94	481.13	850
481.19	850.04	484.01	852	484.34	852.22	486.96	854	489.72	855.86
489.93	856	490.1	856.11	492.66	857.82	492.69	857.85	493.05	858.01
493.2	858.09	496.59	860						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	50.88	.035	300.66	.04	352.94	.013	367.78	.1
459.79	.013	477.41	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
300.66	352.94	296.75	99.03	182.81	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	132.15	820	T
358.38	496.59	820	T

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 11917.65

INPUT
Description:
Station Elevation Data num= 157

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.89	828	7.25	826.05	7.33	826	7.48	825.9
11	824	13.13	822.72	14.13	822	16.47	820.71	17.71	820
19.73	818.69	21.08	818	22.15	817.52	24.43	816.07	24.56	816
24.75	815.91	29.13	814	31.14	813.18	33.87	812	36.89	811.16
40.68	810	46.93	808.93	52.3	808	57.44	807.42	64.97	806.76
70.35	806.21	73.81	806	82.73	805.02	89.06	804.37	90.97	804.18
93.34	804	93.53	804	94.39	803.99	104.49	803.96	105.88	803.94
120.65	803.87	123.87	803.86	127.58	803.85	141.4	804	148.22	804
199.99	804	206.93	804.65	207.71	804.73	210.38	804.88	211	804.33
211.54	804	211.96	803.8	215.85	801.86	216.42	801.95	216.71	802
218.12	801.86	218.86	801.35	220.91	800.83	232.06	800.74	232.42	800.74
233.31	800.73	240.37	800.68	241.76	800.67	241.81	800.77	241.85	800.96
242.89	802	243.89	802.99	245.12	804	246.42	805.4	247.49	805.42
258.76	805.65	259.08	805.66	259.42	805.67	264.18	806	274.19	806
280.01	805.97	282.57	805.97	284.41	806	289.34	806.08	293.82	806.15
300.14	807.22	304.64	808	310.84	809.04	311.57	809.14	312.27	809.56
313.04	810	313.16	810.08	316.82	812	317.61	812.45	317.85	812.58
318.36	812.99	320.1	814	321.53	815.05	322.94	816	324.17	816.97
325.52	818	326.93	819.06	328.18	820	329.75	821.09	330.95	822
332.73	823.37	333.97	824	336.59	824.87	338.25	825.36	340.65	825.56
341.86	825.76	342.63	825.79	344.19	826	345.47	826	351.34	826.9
352.34	827.19	352.69	827.19	352.96	827.42	353.45	827.65	353.94	828
354.56	828.48	354.97	828.84	356.74	830	358.84	831.84	359.08	832
359.46	832.38	361.45	834	362.3	834.7	363.81	836	364.63	836.62
366.44	838	367.85	839.05	368.97	840	371.29	841.76	371.64	842
371.93	842.23	374.49	844	375.34	844.61	377.68	846	382.47	847.16
384.69	848	385.98	848.19	393.69	848.2	397.57	848.16	398.26	848.1
399.06	848	399.52	847.95	401.92	847.68	404.41	847.44	406.4	847.33
406.74	847.94	406.77	848	406.87	848.06	408.46	848.8	410.14	850
412.5	851.93	412.59	852	412.64	852.05	415.3	854	415.98	854.59
417.99	856	418.25	856.18	418.62	856.49	420.32	857.85	420.66	858
422.08	859.04	423.48	860						

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	52.3	.035	210.38	.04	246.42	.1	338.25	.013
351.34	.1	385.98	.013	406.74	.1				

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
210.38	246.42	143.36	163.25	197.2	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
315.64	423.48	820	T

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 11736.49

INPUT
Description:
Station Elevation Data num= 151

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.95	828	5.68	826.12	5.86	826	7.32	825.01
8	824.55	8.81	824	10.02	823.22	11.73	822	13.81	820.85
15.33	820	16.69	819.42	19.31	818	22.36	816.26	22.9	816
23.05	815.91	24.87	815.36	27.18	814	30.86	812.09	31.13	812
31.44	811.82	35.09	810	37.01	809.02	38.98	808.16	39.27	808
39.51	807.89	42.7	806.58	44.08	806	44.21	805.95	44.29	805.93
44.48	805.89	46.3	805.37	50.98	804	53.18	803.8	57.76	803.34
58.28	802.06	58.29	802	58.45	801.74	58.91	800.68	59.19	800.16
59.33	800	59.8	799.53	59.82	799.52	60.03	799.52	70.54	799.96
80.05	800.31	81.38	800.3	90.42	800.3	91.92	800.28	115.78	800.3
117.6	800.31	119.92	799.99	121.22	800	121.81	800.81	122.66	802
124.17	802.58	127.13	804.17	127.23	804	133.1	804.08	135.47	804.11
140.97	804.17	151.13	804.28	157.22	804.31	172.55	805.59	175.54	805.44
175.82	805.44	178.85	805.47	194.7	804.99	198.42	805.17	211.33	805.58
214.07	805.17	214.76	805.11	215.2	805.11	219.78	805.48	231.32	804.97
252.2	805.5	257.05	805.81	257.51	806	259.19	806.5	263.06	808
265.22	808.92	267.83	810	268.82	810.42	271.42	811.48	271.85	811.74
272.1	812	274.39	813.47	275.26	814	276.99	815.2	278.15	816
279.36	816.62	281.27	818	282.41	818.73	284.48	820	285.77	820.83
286.58	821.33	286.77	821.41	287.93	822	290.5	823.45	291.42	823.98
291.43	824	292.4	824.58	295.08	826	296.01	826.52	296.43	826.79
298.22	828	298.61	828.23	301.21	830	301.88	830.43	304.12	832
306.12	833.04	307.45	834	307.73	834	308.89	834.42	310.48	834.84
311.48	834.97	317.68	835.3	318.35	835.32	319.07	835.35	319.38	835.39
319.78	835.49	320.79	836	320.84	835.92	322.69	836.68	324	838
324.8	838.84	326.12	840	327.95	841.84	328.24	841.96	328.39	842
328.92	842.34	331.63	844	332.03	844.35	333.03	844.86	333.13	844.88
333.25	844.9	334.43	845.11	336.08	845.36	338.17	845.63	339.33	845.73
341.57	846	350.41	846.35	351.52	846.37	353.61	846.31	353.9	846.31
359.77	846.17	360.4	846.19	362.05	846.08	362.39	846.48	363.94	848
366.14	850								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	57.76	.04	127.13	.1	310.48	.013	319.78	.1
341.57	.013	362.05	.1						

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

57.76	127.13	53.75	53.75	45.14		.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 11681.96

INPUT
Description:
Station Elevation Data num= 132

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.79	828	3.32	827.61	5.9	826	6.93	825.3
7.75	824.73	8.74	824	11.48	822.23	11.83	822	12.88	821.32
14.72	820	15.74	819.19	17.35	818	18.02	817.52	20	816
21.67	814.71	22.75	814	23.77	813.36	25.57	812	27.84	810.33
28.3	810	30.94	808.11	31.09	808	31.62	807.7	35.5	806
38.44	804.78	39.38	804.27	39.88	804	40.16	803.82	43.25	802
43.57	801.75	46.21	800.6	47.35	800	48.05	799.72	48.13	799.61
48.25	799.47	49.46	799.53	55.51	799.64	63.85	799.82	63.98	799.81
64.88	799.95	65.07	800	65.11	800.09	66.76	802	67.94	803.46
68.07	803.55	68.83	803.6	70.53	803.64	73.33	803.7	87.08	804
103.91	804	109.55	804	118.45	803.5	127.58	803.19	139.69	803.34
151.68	803.32	159.31	803.85	161.63	804	166.89	804.34	174.59	804.83
188.45	804.21	192	804.14	196.34	804	197.03	804.01	198.16	804.03
201.7	804.37	206.4	804.08	207.31	804	219.73	804	220.84	804.01
221.49	804.03	224.47	804.29	238.11	805.01	238.43	805.18	240.09	806
243.74	807.87	244.01	808	244.06	808.02	248.26	810	249.77	810.76
251.23	811.52	251.64	811.77	251.99	812	252.93	812.53	255.4	814
257.7	815.48	258.54	816	259.74	816.75	261.79	818	262.69	818.55
265.28	820	265.45	820.11	266.49	820.83	267.19	821.13	269.35	822
273.84	823.96	273.95	824	277.85	825.6	278.86	826	279.29	826.18
283.28	827.9	283.36	828	285.91	829.65	286.15	829.74	286.53	829.99
286.54	830	286.88	830.27	289.24	832	290.17	832.71	291.95	834
293.47	835.12	294.65	836	295.66	836.72	297.4	838	300.19	839.7
301.03	840	305	840.54	315.78	841.72	317.95	842	318.1	842.05
318.68	842.33	319.86	842.46	326.71	842.84	334.28	843.26	335.29	843.35
336.35	843.48	339.65	844	341.36	845.36	342.57	846	344.37	847.93
344.43	848	346.37	850						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	39.88	.04	67.94	.1	127.58	.035	238.11	.1
305	.013	339.65	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
39.88	67.94	134.52	134.52	52.33	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 11547.41

INPUT
Description:
Station Elevation Data num= 133

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.83	828	5.9	826.54	6.64	826	7.11	825.68
7.25	825.58	8.54	824.7	9.61	824	11.87	822.65	12.59	822
13.37	821.41	15.28	820	17.72	818	20.05	816	21.91	814.53
22.59	814	24.04	812.51	24.48	812	26.13	810.25	26.35	810
29.13	808.34	29.55	808	29.93	807.79	33.56	806	35.36	805.11
38.16	804	41.71	803.44	43.38	803.11	45.83	802.61	46.13	802.24
46.28	802	46.48	801.86	48.73	800	49.77	799	50.59	798.29
64.62	798.24	68.66	798.21	70.08	799.74	70.28	800	70.51	800.27
72.3	802	73.08	802.92	74.5	804.27	75.76	804.01	75.8	804
79.56	804	108.74	803.9	114.76	803.88	128.17	803.84	137.8	803.81
147.52	803.74	167.75	803.41	177.87	803.28	191.44	803.51	210.33	803.81
213.19	803.9	216.75	804	222.54	804.17	226.42	804.26	239.48	805.65
242.14	806	242.67	806.33	246.61	808	248.04	808.86	250.16	810
252.04	810.89	253.85	812	254.57	812.39	255.6	812.92	256.8	813.68
257.37	814	259.54	815.39	260.54	816	261.98	816.97	263.62	818
265.92	819.45	266.84	820	269.32	821.61	270	822	270.11	822.06
270.7	822.45	273.75	824	274.66	824.44	277.68	826	278.52	826.42
280.45	827.41	281.79	827.97	281.95	828	285.84	829.68	286.63	830
287.19	830.23	289.15	830.8	291.12	832	291.27	831.96	291.39	832.01
291.79	832.21	294.83	834	297.03	835.23	298.26	836	300.65	837.39
301.6	838	303.94	839.34	305.12	840.02	305.87	839.99	305.96	840
306.17	840.02	311.55	840.55	315.88	840.44	324.61	840.28	330.59	841.31
331.75	841.47	331.86	841.55	332.59	842	334.82	843.49	335.67	844
336.45	844.46	338.76	846	339.38	846.38	339.92	846.75	341.84	848
343.3	849.01	344.78	850	346.9	851.49	347.68	852	348.99	852.95
350.67	854	351.19	854.32	353.73	856.03	353.98	856.01	354.02	856
356.56	857.31	358.03	858	362.46	860				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	45.83	.04	74.5	.035	242.14	.1	305.12	.013
330.59	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
45.83	74.5	85.55	85.55	62.2	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 11461.86

INPUT
Description:

Station Elevation Data num= 122

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.11	828	3.67	826.45	4.29	826	4.85	825.59
6.58	824	7.17	823.54	8.36	822.59	9.37	822	12.11	820.08
12.31	820	14.39	818.61	15.2	818	17.83	816.01	17.84	816
18.09	815.86	21.14	814.24	21.6	814	22.33	813.6	25.03	812
27.85	810.37	28.54	810	29.58	809.55	32.52	808.34	33.33	808
34.1	807.68	38.19	806	42.86	804.09	43.08	804	45.38	803.61
51.8	802.46	54.03	802	54.32	802.21	54.34	802.22	55.11	801.54
56.96	800	57.83	799.2	58.87	798.29	65.68	798.23	70.56	798.19
77.44	798.12	78.63	799.6	78.91	800	79.12	800.23	80.97	802
81.54	802.71	82.2	803.65	82.59	803.58	82.84	803.57	111.18	803.68
125.48	803.56	157.2	803.3	170.81	803.33	182.18	803.23	207.85	803.44
221.29	803.57	239.69	803.67	244.33	803.7	246.29	803.89	248.01	804
253.22	804.55	262.44	805.26	263.89	806	266.26	807.25	267.79	808
270.91	809.68	271.53	810	271.89	810.16	272.64	810.58	272.78	810.67
274.93	812	277.07	813.24	278.16	814	279.86	815.16	281.16	816
282.01	816.49	284.38	818	285.26	818.5	287.32	819.78	287.77	820
288.54	820.45	291.57	822	292.66	822.64	295.29	824	297.21	824.99
298.37	825.69	298.85	826	301.68	827.77	302.02	828	302.3	828.19
305.24	830	305.9	830.42	308.38	832	309.51	832.55	310.58	833.35
311.67	834	312.23	834.39	314.36	834.46	318.31	835.08	319.9	835.19
323.63	835.23	327.52	835.49	330.3	835.6	331.32	835.69	334.12	836
338.91	836.9	340.26	837.25	340.84	837.47	341.55	838	342.28	838.66
343.91	840	345.2	841.11	346.25	842	348.29	843.86	348.45	844
348.62	844.19	349.23	844.62	351.15	846	352.02	846.58	354.56	848
355.4	848.42	358.51	850.01						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	54.32	.04	82.2	.035	262.44	.1	318.31	.013
338.91	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
54.32	82.2	139.15	139.15	49.68	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 11316.17

INPUT
Description:
Station Elevation Data num= 128

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.5	828	5.69	826.77	6.93	826	7.55	825.61
9.91	824	11.2	823.05	13.16	822	14.83	820.99	16.98	820
17.93	819.37	19.94	818	21.95	816.7	23.24	816	25.53	814.82
27.44	814	29.95	812.62	30.64	812	32.67	810.78	33.6	810
34.63	809.38	37.54	808	38.71	807.25	38.83	807.17	40.43	806

42.35	805.23	46.21	804	100.11	804	101.11	803.94	115.43	803.18
115.7	802.94	115.99	802	117.44	800.6	117.99	800	118.1	799.88
119.12	798.2	130.06	798.17	137.88	798.15	145.61	798.14	156.11	798.12
158.91	799.52	159.86	800	160.47	800.3	164.05	802	166.25	803.12
166.53	803.29	166.54	803.31	199.52	803.56	232.95	803.54	234.89	803.54
269.37	803.48	274.44	803.46	277.48	803.45	307.09	803.55	327.63	803.75
350.45	802.69	355.34	802.47	358.7	802.69	374.72	803.51	375.34	803.83
375.72	804	378.95	805.29	380.75	806	382.87	806.92	385.56	808
386.83	808.53	386.88	808.6	393.8	809.87	394.37	810	395.03	810.16
402.84	812	402.88	812.01	402.91	812.02	405.76	813.01	407.62	814
410.34	815.55	410.71	815.78	411.15	816	412.2	816.59	414.8	818
416.01	818.66	417.98	819.64	418.55	820	419.14	820.42	421.92	822
422.99	822.77	424.65	824	426.37	825.25	427.16	826	429.04	827
429.47	827	433.27	826.85	434.36	826.56	435.85	826.29	436.26	826.28
438.45	826.55	448.42	827.31	449.12	827.37	449.17	827.38	449.27	827.37
449.59	827.44	450.82	827.54	455.8	828	456.84	828.32	458.05	829.01
459.14	830	460.76	831.59	461.23	832	461.25	832.06	462.91	833.76
463.19	834	464.29	835.04	464.45	835.32	465.42	836	466.35	836.82
467.77	838	469.74	839.72	470.08	840	470.9	840.73	472.31	841.92
472.41	842	472.5	842.07	474.82	844	477	845.86	477.18	846
477.72	846.46	479.55	848	485.32	850				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	115.43	.04	166.25	.035	374.72	.1	438.45	.013
455.8	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
115.43	166.25	106.44	106.44	577.06	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Upper RS: 11190.54

INPUT
Description:
Station Elevation Data num= 153

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.44	828	6.06	826.82	7.27	826.14	7.57	826
7.9	825.85	11.48	824	13.33	823.06	14.13	822.49	14.68	822
15.29	821.38	16.19	820.7	17.44	820	19.73	818.77	21.16	818
24.32	817.02	26.4	816	28	815.3	30.58	814.77	35.11	814.02
35.17	814	39.34	812.18	39.65	812	39.71	811.94	42.35	810
42.4	809.96	45.31	808	46.74	806.93	48.59	806	49.33	805.69
51.63	804	51.81	804	54.93	803.46	62.53	802	80.08	802
97.07	802.42	102.43	802.53	109	802.67	112.3	802.75	128.82	803.19
129.44	802.73	131.74	802.27	132.34	802	133.12	802.27	133.36	801.08
134.4	800	135.44	798.91	136.12	797.81	137.38	797.84	138.6	797.83
143.48	798	143.83	798.05	144.35	797.94	148.54	797.95	155.45	797.91

157.09	797.92	165.27	797.88	167.73	797.86	173.46	797.86	175.7	797.88
181.6	797.88	182.99	797.89	188.64	797.94	191.82	797.97	201.4	798.03
208.78	798.12	209.66	798.03	209.97	798	210.33	798.29	211.13	799.04
214.21	799.21	216.38	799.33	218.81	799.95	219.04	800	219.36	800.07
223.75	801.13	229.24	801.87	230.2	802	231.06	802.1	233.77	802.45
238.59	802.43	243.97	802.27	245.37	802.36	250.49	802	253.05	802
258.42	801.4	258.86	801.37	259.17	801.35	259.37	801.35	259.74	801.34
261.37	801.35	267.62	801.7	272.25	801.87	274.49	802	274.66	802.01
280.58	802.4	281.45	802.45	283.82	802.58	301.66	803.19	303.11	803.25
305.71	803.28	322.5	803.36	329.92	803.28	346.87	802.94	355.52	803.41
357.19	803.52	365.85	804	375.05	804.52	378.43	804.7	378.67	804.71
379.45	804.79	379.91	804.74	385.23	804.23	385.38	804.23	388.23	804.06
390.06	804	394.7	804	395.14	804.04	398.65	804.27	399.77	804.38
401.12	805.96	401.17	806	401.59	806.42	403.16	807.97	403.19	808
404.39	809.26	405.08	809.98	405.1	810	406.94	811.76	407.2	812
408.13	813.12	408.17	813.18	409.06	813.57	410.26	814	410.97	814.28
416.08	816	416.74	816.24	422.08	818	425.36	819.55	426.26	820
427.53	820.64	430.15	822	431.27	822.56	434.04	824	435.26	824.59
437.76	825.96	437.84	826	439.03	826.59	439.07	826.61	439.17	826.67
441.7	828	441.78	828.04	445.37	830				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	62.53	.035	132.34	.04	233.77	.035	385.23	.013
398.65	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
132.34	233.77	99.19	99.19	45.84	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 11091.35

INPUT
Description:
Station Elevation Data num= 125

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	1.72	828	2.01	827.74	3.65	826	5.65	824.27
6.16	824	7.27	823.45	7.58	823.34	9.25	822.79	9.96	822.7
10.55	822.59	11.53	822.49	14.09	822.68	15.42	822.69	17.96	822.24
18.7	822	20.31	821.03	22.25	820	22.98	819.46	25.06	818
25.58	817.66	28.43	816	31.08	814.06	31.16	814	31.28	813.93
34.03	812	34.47	811.73	37.2	810	40.49	808.11	40.67	808
40.85	807.9	44.48	806	47.13	804.76	48.68	804	52.04	802.79
55.64	802	148.28	802	158.19	802	161.58	802.07	162.9	802.07
181.69	802.29	200.86	802.7	202.26	802.72	207.73	802.82	208.43	802.83
210.66	802.86	218.61	802.95	219.99	802.24	220.49	802	222.25	801.16
224.29	800	226.3	798.16	226.44	798.08	226.49	798	226.54	797.98
227.69	797.71	233.03	797.78	237.03	797.83	240.83	797.9	241.5	797.91

250.75	798.06	254.24	798.12	256.6	798.03	257.16	798	257.9	798.41
260.1	798.2	260.3	798.14	260.43	798.11	261.09	798.06	269.29	799.09
269.73	799.28	271.3	800	272.93	800.68	275	801.67	281.61	801.84
285.26	801.91	288.88	802	290.89	802.18	301.02	802.92	315.75	802.54
323.88	802.89	328.21	803.19	333.63	803.39	350.05	804	353.96	804.29
356.4	804.46	379.26	805.98	379.49	805.99	379.61	806	384.82	806
385.06	805.97	387.89	805.62	389.21	805.39	395.39	805.28	399.97	805.2
400.68	805.27	403.48	805.72	403.61	806	403.87	805.8	404.75	806.43
406.42	808	407.25	808.67	408.73	810	409.97	811.28	410.85	812.09
411.3	812.13	411.32	812	414.14	812.96	417.43	814	421.19	815.08
424.47	816	427	816.69	430.43	817.68	431.58	818	434.71	818.98
437.43	820	438.45	820.38	442.64	822	444.84	822.86	447.88	824
450.91	825.16	453.16	826	456.8	827.41	458.38	828	463.37	830

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	55.64	.035	222.25	.04	275	.1	301.02	.035
389.21	.013	399.97	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
222.25	275	129.26	129.26	152.11	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 10962.06

INPUT
Description:
Station Elevation Data num= 129

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.92	828	3.03	827.91	4.04	827.32	6.15	826
8.32	824.72	9.69	824	11.26	823.08	13.11	822	15.3	820.72
17.73	819.41	19.36	818.47	20.04	818	20.5	817.72	23.41	816
26.67	814.22	26.95	814	27.27	813.75	29.96	812	32.38	810.31
32.89	810	33.43	809.67	36.23	808	40.03	806.21	40.39	806
41.25	805.76	42.39	805.53	47.04	804.46	50.43	804	51.71	803.83
52.44	803.68	56.22	802.95	61.53	802	76.35	802	142.39	801.3
142.92	801.31	180.84	801.68	192.21	801.82	192.54	801.82	204.2	801.91
209.84	801.95	212.44	802	222.95	802.21	222.97	802.21	226.71	802.24
235.95	802.23	237.35	802.24	253.04	802.53	255.69	802.58	269.83	803.11
269.98	803.1	270.08	803.1	270.11	803.09	275.69	802	275.88	802
280.27	801.73	281.74	801.71	288.6	802	292.02	802.14	292.74	802.12
294.11	802.02	294.21	802.02	294.3	802	296.87	801.49	302.42	800.09
303.19	800.05	303.89	800	307.1	799.74	309	799.62	312.69	799.54
314.42	798.24	314.73	798	314.89	797.93	315.58	797.48	322.11	797.29
324.22	797.27	332.67	797.16	338.53	796.99	342.28	796.89	352.72	796.76
353.08	797.48	353.42	798	354.56	798.84	355.69	800	356.72	800.84
357.92	802	358.58	802.78	358.91	803.15	361.75	803.48	362.64	803.6
364.53	804.02	364.78	804.02	366.71	803.63	369.94	802.95	377.14	803.11

382.09	803.36	383.03	803.41	384.19	803.56	384.91	804	386.49	805
388.07	806	388.81	806.41	389.86	807.1	390.69	807.74	391.1	808
392.91	809.34	393.77	810	396.09	811.61	396.61	812	397.99	812.98
399.64	814	402.4	815.75	402.95	816	404.45	816.88	406.38	818
408.98	819.49	409.94	820	412.39	821.38	413.7	822	415.81	823.15
416.22	823.33	417.66	824	418.35	824.37	420.7	825.62	421.48	826
423.16	826.92	424.59	827.7	425.14	828	428.88	830		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	61.53	.035	312.69	.04	354.56	.1	369.94	.013
383.03	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
312.69	354.56	58.91	58.91	64.64	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 10900.67

INPUT
Description:
Station Elevation Data num= 122

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.77	828.62	3.79	828	5.62	827.19	8.2	826
10.9	824.4	12.02	824	13.99	822.69	15.63	822	17.28	821.21
19.85	820	20.7	819.45	22.82	818	23.53	817.49	25.22	816
25.9	815.49	27.81	814	27.86	813.96	30.08	812	30.49	811.71
32.48	810	34.32	808.62	34.96	808	35.75	807.34	37.88	806
40.89	804.06	40.98	804	41.38	803.9	48.54	802	51.74	802
60.96	800.9	62.27	800.76	64.92	800.59	72.93	800	86.42	800
87.27	800.02	87.32	800.01	87.83	800.01	89.38	800.02	90.09	800.03
90.31	800.03	94.09	800.08	120.06	800.3	143.65	800.54	213.8	801.17
230.1	801.59	244.42	802	247.11	802	251.15	802.09	253	802.06
259.01	802	261.84	802	274.6	802	274.93	802.01	276.42	802.02
291.58	802.49	302.72	802.43	303.59	802.45	303.75	802.39	305.2	802.06
305.53	802	305.76	801.95	309.38	801.25	311.62	801.29	312.76	801.31
313.73	800.64	314.73	800	315.2	799.66	316.03	798.82	316.35	798.88
316.68	798.85	317.82	798.22	318.25	798	318.71	797.79	319.73	797.13
328.71	796.98	330.87	796.95	345	796.76	345.88	797.62	346.33	798
348.54	799.47	349.17	800.11	349.4	800	352.17	800.39	354.91	800.79
356.25	800.83	358.57	801.01	368.29	802	368.3	802	369.42	801.96
370.34	802.98	371.31	804	372.89	805.61	373.26	806	373.74	806.64
373.89	806.81	373.95	806.84	375.52	808	377.15	809.17	378.2	810
378.9	810.55	380.83	812	381.67	812.64	383.43	814	384.68	814.89
384.87	814.96	386.27	816	388.7	817.65	389.2	818	390.85	819.06
392.46	820	392.95	820.28	395.95	822	396.62	822.4	398.05	823.22
398.64	823.57	399.43	824	400.94	824.91	402.74	826	405.47	827.77
405.83	828	409.13	830						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	48.54	.035	314.73	.04	349.17	.013	368.29	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
314.73	349.17	194.97	194.97	182.73	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 10705.68

INPUT
Description:
Station Elevation Data num= 120

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	.84	829.52	4.29	828	7.54	826.15	7.81	826
8.82	825.39	10.79	824.34	11.48	824	14.92	822.08	15.05	822
19.45	820	24.1	818	24.61	817.76	27.57	816.55	28.57	816
30.07	815.17	32.81	814	36.82	812.05	36.93	812	37.03	811.95
39.59	810.74	41.21	810	46.33	808.02	46.39	808	46.49	807.96
46.75	807.89	47.37	807.7	52.78	806	53.36	805.76	55.62	804
58.32	802.31	58.97	802	72.02	801.04	80.33	800.59	90.66	800
187.84	800	190.95	799.87	199.93	799.98	205.48	800.19	207.07	800.23
209.31	800.25	220.87	800.27	232.79	800.29	235.83	800.32	241.66	800.41
257.2	800.83	260.28	800.84	264.28	800.86	267.38	800.88	269.12	801.02
287.34	801.68	289.17	801.4	298.13	799.99	306.78	799.99	323.33	800
324.22	800.18	324.67	800.25	324.75	800.27	324.81	800.29	324.82	800.17
324.87	800.1	324.96	800	326.18	798	326.35	797.55	326.38	796.67
341.25	796.47	345.05	796.39	357.2	796.15	359.61	797.82	359.79	798
360.3	798.18	363.72	798.92	366.84	799.73	367.1	799.74	367.19	799.75
367.79	799.78	367.99	799.78	369.2	799.81	372.36	799.88	377.41	800
377.48	800	378.13	800.02	378.76	800.02	382.89	800.71	384.14	800.98
385.37	800.9	386.07	801.95	386.13	802	388.39	803.88	388.57	804
390.7	805.81	391.05	806	391.98	806.47	394.47	808	395.43	808.54
398.12	810	398.82	810.41	401.86	812	402.28	812.23	405.78	814
405.9	814.06	406.46	814.33	408.14	815.34	409.4	816	411.11	816.93
413.06	818	413.9	818.03	414.9	818.52	415.28	818.77	416.71	820
419.76	821.78	420.13	822	420.42	822.16	423.33	824	423.68	824.22
426.46	826	427.33	826.52	429.81	828	430.48	828.22	433.8	830

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	58.97	.035	298.13	.1	324.87	.04	366.84	.013
378.13	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
324.87	366.84	259.79	259.79	216.96	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 10444.93

INPUT
Description:
Station Elevation Data num= 133

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	5.01	828	7.77	826.97	9.55	826	13.61	824.67
15.33	824	16.62	823.41	19	822	21.33	820.56	22.24	820
24.78	819.06	28.13	818	30.56	817.01	33.19	816	35.62	815.18
39.01	814	39.44	813.81	44.31	812	50.69	810.88	51.34	810.82
58.58	810	61.86	810	68.03	808.52	71.34	808	71.67	808
72.86	807.89	73.06	807.87	82.12	807.29	85.44	807.1	88.63	806.97
93.05	806.57	95.07	806.44	98.86	806.15	100.32	806	103.84	805.66
107.49	805.38	110.61	805.1	116.28	804.49	118.89	804.23	119.19	804.21
119.69	804.18	122.15	804	123.11	804	127.73	803.64	128.43	803.58
134.31	803	137.77	802.79	141.2	802.54	143.84	802.35	147.77	802
158.07	800.98	166.2	800	166.71	800	206.07	799.79	249.89	799.66
262.04	799.62	263.68	799.65	269.94	799.73	271.3	799.75	279.56	800
284.52	800.4	300.41	800.84	305.44	800.91	318.91	800.49	321.7	800.38
330.79	800	330.95	800.4	331.21	800.57	331.36	800.87	331.75	799.84
332.5	798	332.93	796.69	333.29	796	333.39	795.69	333.8	794.99
341.99	795.1	343.65	795.13	349.45	795.21	352.98	795.81	353.72	796
354.84	796.32	359.66	797.54	360.82	797.67	363.7	798	374.27	799.26
375.11	799.36	376.48	799.31	388.94	798.93	396.46	798.98	396.55	798.98
396.57	798.99	400.23	800	400.38	800.04	404.93	801.31	409.58	800.89
410.47	800.77	410.87	800.76	422.38	800.76	424.53	800.88	425.56	801.06
426.19	802	427.7	803.41	428.25	804	428.35	804.11	429.86	806
430.98	807.33	431.63	808	432.1	808.5	432.14	808.51	432.95	809.41
433.39	810	433.95	810.72	435.11	812	435.68	812.74	436.84	814
437.22	814.46	437.5	814.68	438.15	815.62	438.41	816	439.02	816.85
440.59	818.97	441.29	820	441.81	820.75	442.85	822	443.52	822.9
444.54	824	445.77	825.29	446.72	826	449.59	827.55	450.28	828
451.03	828.44	453.49	829.39	454.35	830				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	44.31	.035	332.5	.04	359.66	.1	410.47	.013
422.38	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
332.5	359.66	61.04	61.04	82.99	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 10376.87

INPUT
Description:
Station Elevation Data num= 128

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	4.02	828.07	4.17	828	4.35	827.92	7.94	826
9.87	824.99	11.73	824	13.05	823.47	17.21	822	18.41	821.49
21.24	820	23.62	818.75	25.17	818	26.31	817.66	28.12	817.52
31.57	817.03	32.88	816.92	34.94	816.71	40.59	816	42.73	815.7
44.92	815.43	47.55	815.17	52.11	814.75	56.37	814.4	57.74	814.27
60.14	814	67.66	813.17	69.31	813.01	76.84	812.05	77.25	812
87.57	810.96	89.73	810.73	95.73	810	105.84	808.33	107.83	808
108.32	807.87	114.59	806	117.62	804.8	119.98	804	123.2	803
125.71	802	129.04	800.85	131.44	800	135.09	799.97	157.79	799.8
169.16	799.72	238.02	799.24	247.42	799.51	258.2	799.84	263.8	799.99
269.66	800.16	280.72	800.43	284.64	800.43	295.53	800.57	301.61	800.56
320.67	800.41	323.39	800.29	325.07	800.22	325.97	800.2	326.46	800.19
330.71	800.19	337.98	800	351.59	800	351.99	799.99	352.99	799.95
356.72	798.74	358.21	798.43	360.09	798.03	360.17	798	360.89	797.94
364.1	797.67	364.21	797.66	364.32	797.56	364.47	797.37	364.88	796
365.25	795.52	365.4	794.99	366.66	795	378.18	795.11	380.38	795.13
381.58	795.14	387.92	795.21	388.56	795.97	388.58	796	388.65	796.13
390.07	798	390.62	798.74	391.82	800	392.4	800.82	393.05	801.6
393.96	801.58	396.3	801.23	402.25	801.42	406.89	801.6	408.1	801.88
408.42	802	408.59	802.02	411.07	802.53	411.7	803.19	412.35	804
413.53	805.23	414.31	806	415.6	807.39	416.13	808	417.03	808.8
417.24	809.15	417.51	810	418.02	811.14	418.48	812	418.96	812.88
419.46	814	419.85	814.7	420.49	816	421.06	816.91	421.55	818
422.22	819.22	422.89	820	424.12	820.99	424.92	822	426.55	823.22
427.61	824	428.26	824.49	430.28	826	430.93	826.53	432.55	827.84
432.81	828	433.13	828.22	435.29	830				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	25.17	.035	364.1	.04	390.07	.013	406.89	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
364.1	390.07	222.63	222.63	150.07	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 10151.02

INPUT
Description:
Station Elevation Data num= 123

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	5.75	828	6.69	827.63	10.64	826	15.91	824.46
17.37	824	25.18	822.41	26.63	822.13	27.31	822	37.11	820.24

38.2	820	40.53	819.12	43.73	818	50.06	816.5	51.82	816
54.28	815.02	57.12	814	60	812.65	61.3	812	64.88	810.78
68.25	810	70.25	809.35	71.35	809.1	76.91	808	90.41	806.01
90.46	806	90.57	805.99	123.22	804	153.24	804	153.7	803.95
170.56	802	172.53	801.56	180.05	800	185.81	800	188.41	799.94
200.22	799.68	204.72	799.58	214.27	799.41	269.93	798.27	290.64	798.35
293.01	798.29	294.78	798.26	297.48	798.49	303.66	799.03	343.12	799.76
346.07	799.82	347.34	799.77	364.37	799.11	370	799.45	376.55	799.81
378.3	798.93	380	798.01	383.07	798.39	383.92	798.02	386.99	798
388.11	797.28	390.39	796	391.33	795.34	391.71	794.99	399.6	795.11
400.21	795.1	407.52	795.13	408.88	795.49	411.82	796	412.94	796.2
415.54	796.66	419.02	797.76	419.75	798	420.1	798.13	421.21	798.52
426.53	798.6	428.14	798.64	429.88	798.7	445.16	798.56	445.99	798.52
455.49	798.27	460.93	798.49	467.59	798.84	468.82	799.78	469.14	800
469.64	800.35	472.27	802	474.32	803.52	475.05	804	476.42	804.73
478.56	806	480.84	806.3	483.05	806.61	494.08	806.02	494.33	806
494.48	805.99	499.02	805.29	499.07	805.79	499.13	806	499.57	806.38
501.79	808	502.01	808.25	503.63	810	503.69	810.06	504.3	810.46
504.5	810.78	505.03	812	505.28	812.37	506.18	814	506.24	814.08
506.51	814.53	507.28	816	507.74	816.62	508.46	818	508.77	818.66
509.15	819.44	510.04	820	511.28	821.37	512.03	822	513.8	823.48
514.38	824	516.52	825.77	516.82	826	519.2	827.94	519.28	828
519.33	828.05	521.55	829.89	521.89	830				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	76.91	.035	386.99	.04	421.21	.1	483.05	.013
494.08	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
386.99	421.21	44.52	44.52	48.94	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 10106.50

INPUT
Description:
Station Elevation Data num= 175

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840	5.31	838	6.32	837.64	10.56	836	11.47	835.66
15.79	834	16.91	833.6	21.15	832	22.75	831.44	26.86	830
28.86	829.3	32.7	828	33.68	827.66	35.35	827.09	37.75	826.34
38.86	826	39.77	825.72	45.34	824	45.73	823.88	47.82	823.23
51.06	822	55.43	820.46	56.69	820	61.13	818.29	61.92	818
61.96	818	62.89	817.64	66.73	816.2	67.18	816	72.14	814.18
72.56	814	73.12	813.81	79.23	812	81.12	811.4	85.84	810
88.47	809.2	91.94	808.07	92.5	808.14	93.91	808	94.26	808
108.46	807.25	108.9	807.23	109.16	807.22	109.26	807.21	109.28	807.21

132.58	806.6	132.91	806.59	136.53	806.56	138.47	806.48	145.56	806
150.16	806	151.75	805.98	155.59	805.98	161.19	805.99	165.07	805.93
167.51	805.95	169.58	805.96	171.63	805.94	174.89	805.84	177.91	805.72
187.86	805.26	190.48	805.12	196.68	804.83	212.49	804	216.88	804
220.33	803.85	253.27	802	267.09	802	272.62	801.83	272.82	801.83
277.6	801.66	280.79	801.53	285.71	801.35	314.54	800	320.82	800
326.55	799.81	328.65	799.96	331.28	799.87	345.69	799.37	352.42	799.21
367.28	798.83	383.43	798.35	390.08	798.4	395.75	798.52	396.88	798.17
397.48	798	398.92	797.65	400.39	797.22	401.62	797.86	401.92	798
403.13	798.56	403.25	798.6	406.59	798.64	427.07	799.02	427.38	798.09
427.4	798	427.83	797.6	429.74	796	429.87	795.32	430.14	794.99
446.52	794.71	458.43	794.5	462.24	794.43	466.41	795.96	466.49	796
466.54	796.03	467.9	796.55	468.78	796.81	469.5	797.17	472.67	797.81
475.61	797.79	482.81	797.77	487.33	797.89	489.54	797.89	494.38	797.96
495.96	797.95	501.24	797.98	501.75	797.99	502.06	798	510.4	798.11
514.76	798.14	518.93	798.13	523.81	798.16	524.49	798.17	525.45	798.19
526.33	798.18	528.28	799.57	528.95	800	531.16	801.54	531.91	802
532.4	802.31	534.93	804	536.17	804.87	537.86	806	539.75	807.27
540.96	808.08	540.98	807.97	541.35	807.98	541.86	807.99	545.2	807.76
545.45	807.75	546.69	807.72	547.54	807.71	555.57	807.44	558.97	806.59
559.93	806.47	560.02	806.69	560.37	808	561.81	809.91	561.86	810
561.89	810.07	563.05	812	563.76	813.24	564.17	813.97	564.19	814
564.2	814.03	564.75	815.02	565.33	816	565.36	816.04	566.52	818
567.7	819.9	567.77	820	567.84	820.12	568.76	821.91	569.36	822.02
569.42	822	569.89	822.37	572.02	824	573.37	824.88	575.12	826
577.39	827.49	578.07	827.91	578.19	828	578.24	828.03	581.19	830

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	427.07	.04	472.67	.1	540.96	.013	555.57	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
427.07	472.67	387.32	97.1	53.75	.1	.3

CROSS SECTION

RIVER: Cabin Run
REACH: Lower RS: 10000.00

INPUT
Description:
Station Elevation Data num= 166

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	810	6.08	810.87	12.16	812	15.34	812.58	21.35	814
25.7	815.01	28.35	816	28.87	816.17	32.93	818	33.83	818.28
33.96	818.29	34.27	818.3	34.56	818.29	36.59	818.56	39.15	818.63
42.4	818.45	43.89	818.35	51.52	818	54.63	817.85	55.89	817.8
56.63	817.78	57	817.75	64.42	816.98	72.08	816.21	72.73	816.14
73.64	816	73.99	815.96	74.33	815.86	75.41	815.57	78.43	814
79.14	813.54	80.59	812.68	81.63	812	84.27	810.49	85.17	810

86.3	809.42	88.76	808	90.11	807.47	91.11	806.89	93.22	806
96.43	804.93	98.92	804	106.66	803.42	116.15	802.62	125.82	802.09
127.07	802.05	127.48	802.01	127.52	802	127.83	801.98	132.27	801.72
134.93	801.53	149.06	800.35	150.49	800.14	151.65	800.02	151.86	800
152.3	800	155.82	799.91	163.6	799.75	166.13	799.71	166.42	799.71
180.54	799.37	199.38	799.05	213.01	798.83	216.82	798.8	220.72	798.77
224.08	798.68	234.67	798.36	236.49	798.33	247.29	798.04	247.38	798.03
247.74	798.03	249.43	798	259.42	798	261.65	797.99	273.67	797.96
275.26	797.96	291.87	797.89	309.81	797.84	323.54	797.84	332.43	798
343.86	798	344.19	798	350.35	798.37	360.78	798.72	376.82	798.89
404.58	798.68	404.59	798.68	404.6	798.67	405.41	798	409.05	796.15
409.28	796	410.79	795.14	410.98	794.99	412.21	794.95	433.72	794.33
434.24	795.17	435.02	796	435.83	796.73	436.96	798	437.76	798.75
438.79	800.05	438.81	800	439.2	800.37	440.36	801.67	440.66	802
442.24	803.65	442.57	804	444.46	805.91	444.55	806	446.58	807.98
446.6	808	447	808.43	447.95	809.41	449.1	809.43	452.75	808.67
453.33	808.71	455.01	808.77	463.58	808.91	463.97	808.87	467.53	808.21
467.89	808.99	468.51	810	469.79	811.74	469.96	812	471.14	813.75
471.3	814	472.49	815.82	472.61	816	473.86	817.98	473.87	818
473.98	818.17	475.4	820	476.72	821.82	476.86	822	477.13	822.29
478.88	824	480.22	825.26	480.96	825.82	481.21	826	483.49	827.62
484.01	828	486.42	829.83	486.68	830	486.95	830.18	489.39	832
489.59	832.14	491.95	834	491.98	834.02	493.65	835.33	494.85	835.99
494.87	836	495.86	836.73	497.76	838	499.55	839.22	500.74	840
502.55	841.34	502.96	841.63	503.42	841.97	503.5	842	505.77	843.84
505.97	844	508.17	845.8	508.4	846	509.37	846.83	510.84	848
513.22	850								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	39.15	.013	72.08	.035	404.58	.04	437.76	.1
452.75	.013	463.58	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
404.58	437.76	1	1	1	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 2737.844

INPUT
Description:
Station Elevation Data num= 146

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	850	4.93	848	9.99	846.14	10.34	846	10.85	845.85
17.24	844	18.12	843.76	19.41	843.38	24.14	842	25.48	841.6
30.23	840	31.45	839.48	34.14	838	35.86	836.33	36.37	836
37.87	834.14	38.03	834	39.01	832.64	39.52	832	40.51	830.71
41.06	830.04	41.12	829.96	42.77	828	43.99	826.4	44.29	826

45.65	824.6	46.19	824	46.64	823.57	48.85	822	50.52	820.61
52.07	820	52.97	819.3	54.52	818	55.59	817.06	57.18	816
59.04	815.06	60.87	814	63.86	813.36	67.27	812.59	69.68	812
73.41	811.81	86.54	811.16	88.69	810.44	89.97	810	90.06	809.97
91.22	809.48	104.17	809.62	104.72	809.63	104.85	809.66	105.57	810
105.84	810.13	107.14	811.96	108.68	812.02	108.7	812	109.88	812.09
113.29	812.31	120.35	812.72	127.08	813.17	137.23	813.92	137.85	813.96
138.28	814	147.84	814.74	149.59	814.78	152.08	814.92	156.07	815.1
159.44	815.13	168.94	815.33	169.94	815.38	174.68	815.52	190.75	816
191.29	816	194.27	816.25	203.67	816.99	206.79	817.18	216.44	817.89
216.98	817.93	217.23	817.95	218.01	818	227.93	818.73	231.65	819
235.62	819.32	239.96	819.55	241.68	819.69	247.1	820	250.87	820.23
251.14	820.24	253.92	820.44	260.37	820.82	264.82	820.97	269.6	821.44
271.97	821.61	278.52	821.98	278.57	821.98	279.48	822	281.47	822.03
283.69	822	286.33	821.96	289.11	821.97	289.2	821.98	290.51	822
305.44	822.29	307.32	822.33	318.26	822.5	318.98	822.53	320.02	822.56
321.4	822.47	322.01	822.35	322.52	822.28	324.38	822.2	324.97	822.28
328.39	823.29	329.57	823.68	330.26	824	332.27	825.14	334.15	826
336.56	827.44	337.54	828	339.13	828.84	341.54	830	345	831.01
346.47	831.21	348.76	831.83	351.49	831.81	355.5	831.8	357.44	831.93
357.83	832	359.16	832.75	361.7	833.95	361.78	834	361.94	834.12
363.25	835.27	364.04	835.89	364.17	836	364.28	836.11	366.26	838
366.27	838.01	368.73	840	369.16	840.29	371.95	842	374.63	843.33
376.13	844	377.11	844.7	379.57	846	381.52	846.96	383.45	848
388.17	850								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	86.54	.04	107.14	.025	324.38	.1	348.76	.013
357.44	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
19.41	174.68	164.77	164.77	110.64	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 2571.784

INPUT
Description:
Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840	3.8	838	4.17	837.78	6.8	836.05	6.88	836
7.4	835.76	10.24	834	12.53	832.67	13.62	832	15.22	830.88
16.69	830	18.12	828.97	19.42	828	19.51	827.93	22.22	826
25.31	824.06	25.41	824	27.6	822.51	28.31	822	28.84	821.67
31.22	820	32.67	819.06	34.02	818	35.96	816.73	36.81	816
38.14	815.04	39.28	814	40.13	813.39	42.14	812	45.45	810.08
45.6	810	48.96	809.84	55.81	809.51	56.05	809.47	56.43	809.38

57.93	808.81	58.33	808.81	60.14	808.83	67.79	808.95	69.56	809.9
69.82	810	72.66	811.48	72.94	811.66	76.61	811.79	83.82	811.99
83.98	812	112.22	812	137.28	812	140.67	812.08	159.98	812.53
160.87	812.54	163.8	812.61	169.04	812.66	181.5	812.86	220.29	813.3
220.82	813.29	227.95	813.39	237.41	813.61	237.89	813.61	251.75	813.9
252	813.9	255.31	814	255.64	814	257.3	814.17	272.69	815.51
273.68	815.53	276.29	815.07	277.95	815.34	282.41	816	287.13	816.7
293.49	817.93	293.58	818	294.27	818.35	298.29	820	300.55	821.38
301.78	822	303.12	822.66	304.22	823.51	304.67	823.67	305.27	824
307.15	824.95	307.3	824.97	317.28	825.37	320.85	826	323.18	828
324.63	829.26	325.33	830	326.1	830.93	327.09	832	328.22	833.16
328.95	834	330.57	835.51	331.1	836	331.62	836.33	333.16	836.95
335.21	838	335.69	838.27	340.07	840				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	42.14	.04	72.66	.1	83.82	.035	276.29	.1
307.15	.013	317.28	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
6.8	112.22	76.83	76.83	65.26	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 2494.952

INPUT
Description:
Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.62	828	4.42	826.68	5.2	826	6.47	825.17
7.72	824.35	8.19	824	10.37	822.53	11.07	822	12.49	821.22
14.28	820	16.58	818.69	17.84	818	18.57	817.47	21.02	816
22.8	814.65	23.89	814	25.49	813.06	27.07	812	32.58	810.86
35.15	810.37	36.71	810	36.81	809.98	39.69	809.6	39.88	809.58
39.93	809.57	40.03	809.54	42.68	808.41	47.2	808.46	50.32	808.49
58.87	808.59	59.36	808.76	62.89	810	65	810.67	65.27	810.76
66.95	810.9	68	810.98	72.14	811.41	78.8	812	91.45	812
97.02	811.95	147.36	811.49	150.11	811.52	150.38	811.52	151.51	811.53
153.94	811.58	156.06	811.63	169.3	811.58	185.09	811.66	187.01	811.64
231.37	812	236.62	812	250.71	812.85	255.66	813.16	268.34	813.91
268.66	813.92	269.67	814	270.7	814.13	270.99	814.03	273.98	815.73
274.53	816	276.15	816.88	277.85	818	278.88	818.68	280.54	820
283.41	821.66	283.83	822	292.9	822.59	296.99	822.78	297.11	822.75
300.07	822.34	301.85	823.94	301.9	824	302.19	824.24	303.91	826
304.74	826.76	305.75	828	306.01	828.39	307.5	830	307.81	830.32
309.48	832	309.93	832.31	311.53	833.44	312.21	834	313.34	834.55
316.21	836	318.85	837.4	319.94	838	323.41	840		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	35.15	.04	65	.1	78.8	.035	268.66	.1
283.83	.013	296.99	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
6.47	97.02	118.47	118.47	121.57	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 2373.655

INPUT
Description:
Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840	2.84	838.86	3.32	838.62	4.53	838	7.42	836.71
8.61	836	10.21	835.16	11.56	834	13.26	832.63	14.23	832
16.22	830.59	17.11	830	18.41	828.91	19.38	828	19.69	827.71
21.6	826	23.57	824.35	24.05	824	25.25	823.01	26.5	822.21
26.75	822	27.18	821.68	28.36	821	30	820	32.36	818.4
32.9	818	33.04	817.9	35.2	816	35.69	815.65	37.78	814
39.05	813.21	41.04	812	49.75	810.1	50.24	810	52.13	809.74
58.56	808.84	59.46	808.14	59.75	808	59.95	807.98	62.3	807.84
69.7	807.72	69.79	807.72	77.26	807.79	78.22	807.84	78.75	808
80.2	808.62	83.1	809.78	85.41	809.93	92.28	810.01	96.91	810
135.93	810	272.58	810	276.6	810.46	280.22	810.8	283	811
283.88	811.53	284.52	812	285.34	812.52	287.91	814	291.2	815.99
291.27	816	294.29	816.55	298.38	817.26	302.44	818	304.66	818
304.67	818.09	304.86	818	308.72	817.36	309.16	818	310.84	819.66
311.09	820	311.22	820.17	312.61	822.05	312.65	822	313.8	823.8
313.93	824	314.5	824.82	315.43	826	315.69	826.24	316.85	826.99
317.59	828	318.22	828.59	319.69	829.21	320.89	829.96	320.94	830
323.5	831.84	323.7	832	324.02	832.28	325.51	834	326.26	835.13
326.94	836	328.48	837.78	328.81	838	331.52	840		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	49.75	.04	83.1	.1	135.93	.035	272.58	.1
291.2	.013	308.72	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3.32	135.93	104.33	104.33	96.43	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 2265.225

INPUT
Description:
Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.73	828	3.11	827.71	5.15	826	6.27	825.12
6.46	824.97	7.78	824	9.64	822.56	10.42	822	13.24	820.09
13.63	819.86	16.55	818	17.55	817.42	20.19	816	21.9	815.17
23.96	814	27.43	812.29	28.27	812	29.58	811.59	34.49	810
37.09	809.44	45.7	808	45.86	807.97	47.04	807.41	48.52	807.16
57.21	807.25	62.72	807.3	63.15	807.58	63.57	808	65.1	808.89
66.46	809.63	72.76	809.72	82.14	809.93	84.7	810	88.51	810
94.47	809.9	100.11	809.79	102.19	809.74	107.21	809.64	109.74	809.6
115.18	809.52	156.07	809.69	156.4	809.7	156.48	809.69	156.59	809.69
176.4	809.4	192.31	809.36	197.75	809.4	202.6	808.98	203.39	808.9
207.07	809.2	208.9	809.33	209.95	809.32	232.2	808.81	243.47	808.81
255.54	808.98	256.54	809.45	257.74	810	261.31	811.66	262.08	812
262.51	812.2	263.52	812.68	265.46	812.72	267.68	812.87	267.77	812.87
275.78	812.85	276.2	812.86	277.12	812.93	277.59	812.93	280.96	813.27
281.03	813.53	281.43	814	282.42	815	283.88	816	284.65	816.79
285.56	817.5	285.7	817.81	285.81	818	287.19	819.62	287.5	820
289.08	822	291.12	824	291.94	825.06	292.58	825.75	292.97	825.99
293.16	826	294.59	827.15	295.87	828	298.7	830	300.1	830.97
301.51	832	302.97	833	304.37	834	304.43	834.08	304.62	834.24
305.97	835.09	307.4	836	309.41	837.28	310.5	838	313.56	840

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	37.09	.04	66.46	.035	255.54	.1	265.46	.013
280.96	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
6.27	109.74	105.3	105.3	71.99	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 2157.963

INPUT
Description:
Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.4	829.25	5.72	828	9.51	826.46	10.49	826
11.25	825.6	14.25	824	15.23	823.44	17.77	822	18.11	821.8
19.64	820.92	20.77	820	21.71	818.86	22.99	818	24.84	816.2
25.02	816	25.12	815.86	25.56	815.42	26.76	814	27.15	813.49
28.39	812	30.28	810.04	30.31	810	30.34	809.98	34.3	808
35.37	807.98	35.97	808	36.37	808	38.33	808.13	44.01	808.77
48.72	808.86	55.88	808.76	56.54	808.77	61.31	808.91	64.6	808.98

65.17	809	66.67	808.62	68.59	808	68.86	807.85	72.4	807.21
72.72	807.21	79.18	807.11	84.2	807.03	84.59	807.37	85.51	808
86.45	808.62	88.13	809.6	92.86	809.46	94.52	809.38	95.92	809.41
126.02	808.8	131.45	808.76	138.85	808.71	161.86	808.54	170.09	808.29
174.51	808.14	179.03	808	180.38	807.96	190.33	807.74	210.08	807.67
213.68	807.72	214.71	807.72	217.39	807.61	221.63	807.46	223.91	807.59
226.74	807.78	240.94	807.91	244.65	807.93	246.31	807.98	247.37	808
247.72	808	249.33	808.03	250.19	808.07	253.5	809.09	255.76	809.77
256.23	809.78	257.4	809.8	258.4	809.82	262.43	809.85	265.41	809.67
267.71	809.74	270.2	809.82	274.79	809.99	275.15	810	275.32	810.08
278.78	812	279.54	812.7	281.27	814	282.26	815.04	283.23	816
284.41	817.28	285.13	818	286.37	819.19	287.17	820	287.39	820.38
289.27	821.63	289.79	822	292.84	824	293.33	824.33	295.89	826
297.63	827.18	298.91	828	301.84	830				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	64.6	.04	88.13	.035	256.23	.013	274.79	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
18.11	138.85	65.54	65.54	25.52	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 2080.321

INPUT
Description:
Station Elevation Data num= 105

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	1.98	828	2.61	827.32	3.09	826.92	4.2	826
4.82	825.41	6.22	824	7.37	822.95	8.36	822	9.58	820.89
10.57	820	11.33	819.23	12.64	818	13.56	817.18	14.82	816.02
14.89	816	16.77	814.78	17.92	814	19.73	812.93	21.21	812
23.5	810.71	24.57	810	26.64	808.71	27.39	808.37	27.46	808.35
29.46	807.89	33.21	806.83	45.02	806.84	50.14	806.85	51.32	806.85
51.58	806.89	53.56	807.29	55.93	807.43	57.6	807.45	58.52	807.62
60.52	808	60.99	808.08	62.21	808.32	65.71	808.62	71	809.23
73.07	809.31	74.14	809.28	93.13	808.9	96.69	808.88	98.26	808.82
99.38	808.75	103.34	808.68	131.74	808.05	133.54	808.04	136.27	808.05
145.8	808.06	157.54	808.11	161.32	808.13	164.7	808.13	169.01	808.14
175.75	808	193.98	807.61	198.67	807.54	202.07	807.49	223.72	807.44
223.88	807.44	226.74	807.38	227.64	807.35	231.72	807.68	232.21	807.72
233.87	807.72	236.71	807.69	253.95	807.29	255.6	807.84	255.97	808
259.11	809.17	259.8	809.29	262.97	808.78	263.6	808.82	267.24	808.82
273.38	808.89	275.09	808.72	277.72	808.67	280.14	809.76	280.56	809.9
280.76	810	280.85	810.03	283.26	811.02	283.82	811.62	284.11	812
285.86	813.76	286.12	814	286.48	814.32	288.14	816	289.08	817.1
289.17	817.18	289.25	817.23	290.58	818	291.02	818.29	293.8	820

296.43	821.79	296.75	822	296.95	822.13	300.07	824	302.25	825.43
303.14	826	305.77	827.74	306.18	828	306.39	828.17	308.91	830

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	26.64	.04	62.21	.025	262.97	.013	277.72	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3.09	74.14	117.82	117.82	39.43	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 1960.670

INPUT
Description:
Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.61	828	4.13	827.66	6.22	826	6.7	825.54
7.08	825.16	8.17	824	8.25	823.9	9.98	822	11.28	820.57
11.78	820	12.19	819.54	13.57	818	14.51	817.2	15.62	816
19.28	815.17	21.47	814	31.97	812.14	32.88	812	35.04	811.51
38.07	810.83	41	810.16	41.53	810	47.16	808.49	48.7	808
49.2	807.85	50.69	807.42	51.58	807.03	51.89	806.65	52.94	806
53.11	805.96	53.82	805.96	60.98	805.76	61.03	805.75	64	806
76.1	806	77.82	807.33	78.67	807.52	82.78	807.27	84.42	807.57
85.65	807.43	86.66	807.54	86.76	807.54	87.32	807.58	103.88	806.99
107.01	807.1	107.95	807.3	110.32	807.35	113.64	807.34	117.21	807.31
143.83	807.09	174	807.03	182.39	807.05	192.37	807.04	219	806.98
238.74	807.03	248.56	806.98	250.58	806.65	251.11	806.49	253.5	806.54
255.13	806.64	271.01	806.63	273.76	806.67	275.83	807.13	276.83	807.31
278.72	807.69	285.52	807.34	288.61	807.35	289.91	807.35	296.32	808
299.57	809.03	299.97	809.16	302.19	809.86	302.71	810	303.65	810.27
303.87	810.32	304.34	810.57	307.07	812	308.06	812.51	310.67	814
313.9	815.58	314.16	815.73	314.44	816	314.87	816.3	317.45	818
319.27	819.41	320.14	820	321.02	820.55	322.99	822	325.04	823.31
325.86	824	328.38	825.88	328.47	825.94	328.69	826	331.31	827.72
331.77	828	331.85	828.05	334.89	830				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	50.69	.04	78.67	.035	278.72	.013	296.32	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
6.7	117.21	172.09	172.09	106.18	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 1763.762

INPUT
Description:
Station Elevation Data num= 112

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.1	828.12	3.29	828	3.44	827.9	6.4	826
8.97	824.27	9.39	824	12.1	822.07	12.2	822	13.12	821.34
14.76	820	15.1	819.74	17.25	818	18.92	816.67	19.72	816
20.71	815.28	22.31	814	24.54	812.7	26.78	812	33	810.35
34.59	810	35.31	809.87	39.37	809.26	44.94	808.66	46.63	808.53
49.95	808	54.03	806.47	54.35	806.4	54.43	806.42	60.74	807.43
61.64	807.47	61.7	807.47	62.26	807.46	71.21	807.75	73.52	807.59
78.35	807.47	85.52	807.39	92.47	807.19	93.71	807.18	100.37	807.02
103.68	806.98	104.04	806.98	111.56	807.03	134.12	807.19	142.73	807.16
161.13	807.21	163.56	807.16	182.71	806.79	186.47	806.74	204.72	806.53
214.32	806.42	214.43	806.42	214.82	806.41	214.9	806.41	221.65	807.57
221.7	807.58	221.9	807.55	223.56	806	225.21	804.39	225.66	804
225.73	803.94	226.41	803.23	227	802.53	227.63	802.47	236.27	802.26
237.06	802.25	240.17	802.16	243.04	803.73	243.3	804	246.02	805.73
246.44	806	247.13	806.05	250.27	806.3	251.22	806.32	266.92	806.32
268.97	806.39	272.45	806.34	280.47	806	291.47	805.52	294.49	805.37
296.63	805.28	297.29	805.26	299.83	805.41	304.8	805.54	305.79	805.71
307.39	805.98	307.56	806	308.47	806.15	312.6	807.32	314.97	808
318.26	809.49	319.12	810	319.6	810.32	322.76	812.03	322.81	812
323.61	812.34	326.8	814	329.24	815.47	330.25	816	331.24	816.59
333.53	818	334.71	818.67	336.78	820	340	821.96	340.07	822
340.1	822.01	343.81	824	344.15	824.18	347.56	826	350.62	827.7
351.27	828	355.57	830						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	49.95	.035	223.56	.04	247.13	.013	296.63	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
163.56	305.79	46.18	46.18	37.25	.1	.3

CULVERT

RIVER: Leason Run
REACH: Lower RS: 1740

INPUT
Description:
Distance from Upstream XS = 14
Deck/Roadway Width = 12
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 3

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
223.56	806	0	237	807.5	0	246.44	806	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 112

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	3.1	828.12	3.29	828	3.44	827.9	6.4	826
8.97	824.27	9.39	824	12.1	822.07	12.2	822	13.12	821.34
14.76	820	15.1	819.74	17.25	818	18.92	816.67	19.72	816
20.71	815.28	22.31	814	24.54	812.7	26.78	812	33	810.35
34.59	810	35.31	809.87	39.37	809.26	44.94	808.66	46.63	808.53
49.95	808	54.03	806.47	54.35	806.4	54.43	806.42	60.74	807.43
61.64	807.47	61.7	807.47	62.26	807.46	71.21	807.75	73.52	807.59
78.35	807.47	85.52	807.39	92.47	807.19	93.71	807.18	100.37	807.02
103.68	806.98	104.04	806.98	111.56	807.03	134.12	807.19	142.73	807.16
161.13	807.21	163.56	807.16	182.71	806.79	186.47	806.74	204.72	806.53
214.32	806.42	214.43	806.42	214.82	806.41	214.9	806.41	221.65	807.57
221.7	807.58	221.9	807.55	223.56	806	225.21	804.39	225.66	804
225.73	803.94	226.41	803.23	227	802.53	227.63	802.47	236.27	802.26
237.06	802.25	240.17	802.16	243.04	803.73	243.3	804	246.02	805.73
246.44	806	247.13	806.05	250.27	806.3	251.22	806.32	266.92	806.32
268.97	806.39	272.45	806.34	280.47	806	291.47	805.52	294.49	805.37
296.63	805.28	297.29	805.26	299.83	805.41	304.8	805.54	305.79	805.71
307.39	805.98	307.56	806	308.47	806.15	312.6	807.32	314.97	808
318.26	809.49	319.12	810	319.6	810.32	322.76	812.03	322.81	812
323.61	812.34	326.8	814	329.24	815.47	330.25	816	331.24	816.59
333.53	818	334.71	818.67	336.78	820	340	821.96	340.07	822
340.1	822.01	343.81	824	344.15	824.18	347.56	826	350.62	827.7
351.27	828	355.57	830						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	49.95	.035	223.56	.04	247.13	.013	296.63	.1

Bank Sta: Left	Right	Coeff Contr.	Expan.
163.56	305.79	.1	.3

Downstream Deck/Roadway Coordinates
num= 3

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
249.15	805.61	0	268.55	807.5	0	292	805.26	0

Downstream Bridge Cross Section Data
Station Elevation Data num= 135

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	.23	829.86	3.1	828	5.43	826.5	6.2	826
6.86	825.55	9.26	824	10.1	823.39	12.1	822	13.33	821.11
15.06	820	17.27	818.39	17.8	818	20.32	816.26	20.66	816
21.77	815.19	22.94	814.57	24.27	814	26.94	812.9	29.3	812
30.36	811.67	30.94	811.41	31.24	811.17	32.76	810	35.4	808.52
36.26	808	41.08	808	44.62	808.4	49.94	808.83	53.57	808.6

63.97	808	66.2	807.88	72.27	807.59	74.35	807.54	76.32	807.5
78.5	807.47	83.2	807.43	86.11	807.78	88.22	808	92.04	808.45
98.87	808.8	100.14	808.74	102.08	808.74	103.53	808.76	112.86	808.92
117.57	808.99	119.68	808.98	126.79	808.4	127.01	808.38	127.09	808.38
127.18	808.37	127.71	808.28	129.32	808	130.4	807.87	131.58	807.7
135.17	807.6	140.75	807.71	142.87	807.59	151.41	807.34	152.73	807.29
154.09	807.16	157.86	806.76	162.71	806.47	166.37	806.1	167.06	806.07
168.59	806.05	170.71	806.06	174.13	806.13	174.72	806.06	178.71	806.08
182.68	806.13	188.45	806.14	195.75	806.01	196.28	806	197.07	806
201.1	806	208.08	806.33	211.32	806.39	216.45	806.45	230.79	806
239.97	805.7	243.38	805.62	249.15	805.61	249.96	805.55	250.98	805.31
253.07	804.7	254.65	804	257.23	803.18	258.58	802.36	260.98	802.31
268.56	802.25	276.75	802.16	277.82	802.54	285.7	804	286.42	804.13
287.72	804.34	290.88	804.92	291.36	805.03	292	805.26	294.18	805.16
299.24	804.86	303.2	804.85	314.14	804.77	315.65	804.85	317.46	804.68
318.17	805.36	318.71	806	320.51	807.5	321.2	808	323.18	809.68
323.6	810	324.04	810.55	324.1	810.6	324.37	810.76	326.77	812
330.18	813.83	330.47	814	331.18	814.41	334.26	816	336.58	817.21
338.09	818	338.42	818.17	340.39	819.27	341.08	819.65	341.49	819.92
341.77	820	344.67	821.88	344.87	822	345.13	822.17	348.25	824
350.95	825.71	351.46	826	352.46	826.58	354.92	828	358.3	830

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	49.94	.013	83.2	.035	249.15	.04	292	.013
317.46	.1								

Bank Sta: Left	Right	Coeff Contr.	Expan.
197.07	340.39	.1	.3

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

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Ellipse	5	7

FHWA Chart # 29- Horizontal Ellipse; Concrete
FHWA Scale # 1 - Square edge with headwall
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	9	30	.011	.011	0	.2	1

Upstream Elevation = 802.26
Centerline Station = 236.37

Downstream Elevation = 802.25
Centerline Station = 268.55

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

Q Culv Group (cfs)	195.77	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	8.36
Q Barrel (cfs)	195.77	Culv Vel DS (ft/s)	8.56
E.G. US. (ft)	807.67	Culv Inv El Up (ft)	802.26
W.S. US. (ft)	807.48	Culv Inv El Dn (ft)	802.25
E.G. DS (ft)	806.55	Culv Frctn Ls (ft)	0.98
W.S. DS (ft)	806.13	Culv Exit Loss (ft)	0.72
Delta EG (ft)	1.12	Culv Entr Loss (ft)	0.35
Delta WS (ft)	1.35	Q Weir (cfs)	659.88
E.G. IC (ft)	807.67	Weir Sta Lft (ft)	50.83
E.G. OC (ft)	807.64	Weir Sta Rgt (ft)	313.82
Culvert Control	Inlet	Weir Submerg	0.08
Culv WS Inlet (ft)	806.23	Weir Max Depth (ft)	2.41
Culv WS Outlet (ft)	806.13	Weir Avg Depth (ft)	0.91
Culv Nml Depth (ft)	5.00	Weir Flow Area (sq ft)	236.39
Culv Crt Depth (ft)	3.39	Min El Weir Flow (ft)	805.27

Note: The normal depth exceeds the height of the culvert. The program assumes that the normal depth is equal to the
height of the culvert.

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 1716.392

INPUT
Description:
Station Elevation Data num= 135

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	.23	829.86	3.1	828	5.43	826.5	6.2	826
6.86	825.55	9.26	824	10.1	823.39	12.1	822	13.33	821.11
15.06	820	17.27	818.39	17.8	818	20.32	816.26	20.66	816
21.77	815.19	22.94	814.57	24.27	814	26.94	812.9	29.3	812
30.36	811.67	30.94	811.41	31.24	811.17	32.76	810	35.4	808.52
36.26	808	41.08	808	44.62	808.4	49.94	808.83	53.57	808.6
63.97	808	66.2	807.88	72.27	807.59	74.35	807.54	76.32	807.5
78.5	807.47	83.2	807.43	86.11	807.78	88.22	808	92.04	808.45
98.87	808.8	100.14	808.74	102.08	808.74	103.53	808.76	112.86	808.92
117.57	808.99	119.68	808.98	126.79	808.4	127.01	808.38	127.09	808.38
127.18	808.37	127.71	808.28	129.32	808	130.4	807.87	131.58	807.7
135.17	807.6	140.75	807.71	142.87	807.59	151.41	807.34	152.73	807.29
154.09	807.16	157.86	806.76	162.71	806.47	166.37	806.1	167.06	806.07
168.59	806.05	170.71	806.06	174.13	806.13	174.72	806.06	178.71	806.08

182.68	806.13	188.45	806.14	195.75	806.01	196.28	806	197.07	806
201.1	806	208.08	806.33	211.32	806.39	216.45	806.45	230.79	806
239.97	805.7	243.38	805.62	249.15	805.61	249.96	805.55	250.98	805.31
253.07	804.7	254.65	804	257.23	803.18	258.58	802.36	260.98	802.31
268.56	802.25	276.75	802.16	277.82	802.54	285.7	804	286.42	804.13
287.72	804.34	290.88	804.92	291.36	805.03	292	805.26	294.18	805.16
299.24	804.86	303.2	804.85	314.14	804.77	315.65	804.85	317.46	804.68
318.17	805.36	318.71	806	320.51	807.5	321.2	808	323.18	809.68
323.6	810	324.04	810.55	324.1	810.6	324.37	810.76	326.77	812
330.18	813.83	330.47	814	331.18	814.41	334.26	816	336.58	817.21
338.09	818	338.42	818.17	340.39	819.27	341.08	819.65	341.49	819.92
341.77	820	344.67	821.88	344.87	822	345.13	822.17	348.25	824
350.95	825.71	351.46	826	352.46	826.58	354.92	828	358.3	830

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	49.94	.013	83.2	.035	249.15	.04	292	.013
317.46	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
197.07	340.39	168.18	168.18	142.68	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 1538.753

INPUT
Description:
Station Elevation Data num= 141

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.68	828	3.05	827.68	5.29	826	7.22	824.53
7.95	824	8.21	823.77	10.55	822	10.94	821.68	13.2	820
13.35	819.92	15.35	818.32	15.41	818.32	15.71	818	16.82	817.11
18.44	816	19.06	815.62	21.59	814	23.39	812.99	23.71	812.72
30.6	812.01	30.68	812	32.46	811.8	32.68	811.77	32.88	811.75
32.95	811.75	45.33	811.97	45.4	811.99	45.53	811.99	45.85	811.98
47.51	811.89	51.18	811.71	55.58	811.53	56.14	811.48	57.26	811.21
62.11	810.58	63.14	810.47	63.88	810.4	69.57	810	81.46	809.27
111.26	808	111.61	807.99	112.14	807.96	112.51	807.96	117.14	807.47
130.37	806	144.14	806	145.43	805.98	145.52	805.98	160.55	805.49
174.15	805.06	191.63	804.53	194.74	804.72	200	805.2	201.15	805.16
214.63	804	218.96	803.63	222.25	803.35	228.41	803.56	241.51	803.91
244.04	804	244.49	804	246.67	804.14	249.21	804.33	251.96	804.53
260.38	804.18	265.19	804	266.38	803.95	269.63	803.86	284.66	803.74
286.1	803.76	290.96	803.79	302.77	804	304.15	804.07	304.32	804.08
311.14	804.02	321.99	804.49	322.24	804	322.96	803.41	324.65	802
325.14	801.74	325.44	801.58	328.99	801.51	330.74	801.48	336.52	801.39
336.98	801.66	337.41	802	338.37	802.58	338.99	802.92	339.08	802.95
345.17	803.5	345.43	803.53	345.73	803.56	351.76	803.73	351.96	803.79

351.97	803.79	352.14	803.83	353.27	804	354.16	804.09	357.97	804.74
364.92	806	365.42	806.11	366.07	806	372.17	805.16	373.31	804.99
374.43	805.11	381.43	805.82	382.01	805.87	382.04	805.88	382.19	805.89
383.81	806	383.95	806	384.48	805.89	384.72	805.89	385.24	806.39
387.36	808	388.67	809.14	389.68	810	391.61	811.62	392.06	812
393.77	813.37	394.55	814	396.48	815.61	396.94	816	397.69	816.62
397.84	816.76	399.14	817.83	399.37	818	399.8	818.37	401.76	820
402.31	820.45	404.2	822	404.98	822.65	406.59	824	407.68	824.9
409.16	826	410.27	827.05	410.9	827.56	411.12	827.69	411.9	828
415.35	830								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	32.46	.013	47.51	.035	321.99	.04	351.76	.035
374.43	.013	383.81	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
249.21	415.35	79.02	79.02	62.82	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 1456.709

INPUT
Description:
Station Elevation Data num= 151

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	1.69	828.68	2.6	828	3.75	827.03	5.05	826
6.34	824.86	7.53	824	9.36	822.42	9.91	822	12.12	820.18
12.36	820	12.7	819.82	13.4	819.18	14.53	818	15.07	817.56
16.77	816	18.93	814.34	19.38	814	19.44	813.87	20.01	813.39
21.07	813.29	21.44	813.26	21.62	813.25	36.12	813.09	39.31	813
47.12	813.22	49.01	813.29	50.02	813.34	50.49	813.33	53.55	812.47
55.31	812	58.35	811.09	60.56	810.47	61.72	810.36	63.04	810.26
65.69	810.06	66.66	810	68.31	809.89	84.17	809.13	98.19	808.52
107.18	808	115.77	807.91	117.58	807.87	127.76	806.82	129.58	806.79
134.21	806.8	147.04	806	147.41	806	151.04	805.6	151.08	805.59
156.12	806	159.63	806	160.2	805.93	167.84	805.18	176.43	805.41
186.91	805.11	198.91	804.7	202.6	804.48	210.17	804	225.74	803.03
226.05	803	226.44	802.97	227.01	802.92	227.12	802.91	227.32	802.92
227.74	802.93	227.97	802.94	228.79	802.97	231.15	803.08	236.36	803.29
252.56	803.96	253.62	803.97	254.66	803.94	255.71	803.92	257.87	803.86
273.91	803.23	297.83	803.67	314.01	804	319.61	804	321.14	803.96
322.49	804	328.21	804	330.78	804.13	335.85	804.38	341.54	804.21
343.54	804.16	350.44	804	350.55	804.08	351.15	803.83	351.85	803.77
356.95	802.73	358.3	802.57	366.9	802.29	369.52	802.22	371.79	802.4
374.84	802.28	377.41	801.97	377.48	802	380.66	801.74	381.39	801.79
390.09	801.6	390.23	801.59	390.38	801.59	390.4	801.58	400.78	801.49
405.14	801.41	405.89	801.39	405.94	801.44	406.4	801.88	406.48	802

409.09	803.59	409.19	803.65	409.43	803.67	412.37	804	415.35	804.34
417.38	804.56	421.54	804.27	424.43	804.06	429.51	804.22	434.79	804.35
437.18	804.4	441.1	804.45	441.4	804.82	442.37	806	443.71	807.37
444.33	808	445.4	809.19	446.25	810	448.1	811.96	448.14	812
450.07	813.49	450.64	814	452.26	815.06	454.24	816	454.67	816.2
458.93	818	459.03	818.01	461.09	818.86	462.33	819.7	462.81	820
464.93	821.51	465.67	822	468	823.58	468.63	824	469.8	824.8
471.19	825.76	471.61	826.04	472.25	826.61	472.42	826.69	475.22	828
479.39	830								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	20.01	.013	49.01	.035	350.55	.04	409.19	.035
424.43	.013	441.1	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
330.78	469.8	47.12	47.12	51.23	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 1407.241

INPUT
Description:
Station Elevation Data num= 159

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.22	828	3.28	827.08	4.41	826	4.61	825.81
6.49	824	7.08	823.45	8.57	822.07	8.61	822	9.91	820.78
10.74	820	12.34	818.55	12.93	818	13.63	817.32	15.12	816
18.63	814.24	19.51	814.2	21.48	814.13	26.29	814.07	30.92	814.08
32.46	814.13	37.92	814.22	40.25	814.26	41.16	814.29	45.83	814.62
48.2	814.79	48.25	814.79	48.25	814.8	48.44	814.73	50.5	814
52.4	813.31	56.45	812	56.66	811.87	57.55	811.58	61.57	810.64
63.55	810.5	71.17	810	84.48	809.11	86.06	809.03	87.39	808.97
104.07	808	120.4	807.82	121.07	807.81	124.78	807.43	125.44	807.42
133.75	807.45	136.89	807.26	137.52	807.2	138.96	807.26	147.14	806.64
155.58	806	161.46	805.58	170.98	804.68	176.08	804.8	193.83	804.29
199.7	804.18	201.01	804.16	201.79	804.14	205.04	804	210.45	803.76
212.44	803.64	227.57	803.05	246.11	803.31	252.82	803.59	253.08	803.59
266.95	803.25	267.16	803.25	267.58	803.24	270.65	803.11	275.05	803.19
314.18	804	315.37	804	317.44	803.95	318.81	804	321.85	804.11
328.51	804.34	331.53	804.33	332.14	804.3	332.79	804.3	336.15	804.29
342.67	804.25	350.48	804.31	356.68	804.23	360.52	804.02	361.47	803.97
363.47	803.85	372.17	803.77	372.6	803.74	372.86	803.78	372.94	803.78
373.03	803.79	376.23	803.89	379.8	804	387.16	804	388.97	803.91
389.47	803.97	395.6	802.95	403.01	802.23	408.81	802.38	413.34	802.24
414.9	802.36	418.03	803.13	420.39	802.51	421.83	802	422.2	801.92
423.05	801.65	424.53	801.08	425.28	800.81	429.7	800.85	433.99	800.87
437.63	800.93	438.87	801.59	439.53	802	443.18	803.77	443.24	803.81

443.27	803.83	443.46	803.83	465.88	804	468.28	804.12	471.19	804.27
477.33	804.08	478.84	804	483.32	804	485.69	804.02	487.44	804.03
488.37	804.05	491.1	804.05	491.89	804.06	492.63	804.08	493.28	804.6
495.15	806	496.35	806.99	497.72	808	498.97	808.94	500.36	810
501.57	810.82	503.28	812	503.46	812.23	503.66	812.49	505.8	813.41
507.08	814	508.51	814.66	511.55	816	513.67	816.98	515.88	818
516.45	818.26	516.61	818.27	518.49	819.45	519.47	820	521.26	821.08
522.75	822	524.85	823.26	526.02	824	529.32	825.95	529.46	826.04
530.26	826.44	533.05	827.93	533.19	828	536.76	830		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	19.51	.013	48.25	.035	418.03	.04	443.18	.35
477.33	.013	491.1	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
332.79	526.02	149.56	149.56	161.7	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 1233.140

INPUT
Description:
Station Elevation Data num= 171

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	2.1	828	2.31	827.79	4.13	826	5.91	824.29
6.2	824	6.36	823.66	6.6	823.43	6.65	823.39	8.56	822
8.85	821.76	10.65	820.36	11.19	820	11.42	819.85	11.45	819.85
11.76	819.62	14.11	818	14.81	817.49	21.41	817.27	23.14	817.41
23.73	817.43	27.6	817.73	30.68	818	34.14	818.29	36.45	818.28
38.09	818.15	39.54	818	44.05	816.78	47.2	816.08	47.46	816
48.03	815.84	52.94	814.17	53.17	814.1	53.23	814	57.02	812.22
57.49	812	58.12	811.59	58.45	811.43	58.56	811.39	70.87	810.26
74.52	810.04	74.77	810.02	75.28	810	75.51	810	88.57	809.78
91.18	809.71	95.39	809.41	113.93	808.28	117.29	808	137.66	806.34
138.89	806.24	139.21	806.16	140.11	806	145.62	805.1	154.13	804.3
155.26	804.27	158.45	804.18	162.62	804	162.71	804	171.29	803.61
174.81	803.48	177.96	803.43	179.4	803.43	182.45	803.49	189.56	803.75
201.03	803.15	202.45	803.18	230.25	803.51	249.93	803.22	265	803.22
270.44	803.3	270.67	803.3	270.91	803.04	271.35	802	271.46	801.14
271.82	800	272.01	800.08	272.18	800.13	279.28	799.94	281.63	799.89
286.53	799.78	290.88	799.71	293.17	799.64	293.78	799.99	293.81	800
293.95	800.06	298.68	802.09	299.37	802.1	299.8	802	300.14	802.19
300.48	802.29	300.96	802.37	303.01	802.57	305.38	802.41	305.86	802.42
306.44	802.4	311.32	802	311.54	801.98	313.51	801.98	313.79	802
314.83	802.01	321.02	802.63	322.71	802.76	323.13	802.8	325.35	802.97
327.85	803.12	338.29	803.51	345.2	803.56	355.04	803.7	364.41	803.97
365.24	804	368.71	804	370.97	804.09	383.13	804.11	391.51	804.01

391.61	804	391.75	804	395.16	803.93	401.73	803.8	403.39	803.75
404.53	803.73	408.19	803.67	416.1	803.61	421.54	803.82	431.01	803.81
446.13	803.57	452.4	803.54	458.81	803.58	473.52	803.4	481.11	803.37
494.96	803.83	506.47	804	514.6	804.37	515.2	804.4	515.35	804.39
515.39	804.39	516.85	804.32	523.15	804	534.63	804	536.13	804.03
538.15	805.66	538.6	806	539.51	806.76	541.15	808	543.07	809.54
543.57	810	544.61	810.82	546.31	812	546.69	812.49	546.97	812.61
549.97	814	553.31	815.55	554.33	816	555.05	816.33	558.66	818
559.58	818.42	559.66	818.43	560.61	819.02	562.34	820	565.49	821.9
565.65	822	566.39	822.44	569.62	824	570.3	824.34	573.7	826
574.08	826.19	574.69	826.5	576.6	827.52	577.52	828	579.96	829.37
581.11	830								

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	21.41	.013	36.45	.1	58.45	.035	270.44	.04
303.01	.035	514.6	.013	534.63	.1				

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
162.71	395.16	133.75	133.4	15.65	.1	.3

CROSS SECTION

RIVER: Leason Run
REACH: Lower RS: 1047.463

INPUT
Description:
Station Elevation Data num= 160

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830	1.8	828.41	2.21	828	2.3	828	3.77	826.59
4.8	826	6.84	824.73	7.95	824	10.88	822.23	10.9	822.18
11.21	822	11.75	821.66	12.04	821.53	12.35	821.46	12.72	821.44
17.06	821.53	19.3	821.49	19.72	821.51	21.47	821.48	28.03	821.63
31.57	821.63	37.28	820.82	41.12	820.42	41.66	820.42	42.18	820
44	818.66	44.9	818	45.21	817.79	47.41	816	48.49	815.22
50.38	814.15	50.64	814	51.11	813.7	51.53	813.54	54.75	812
54.96	811.9	57.32	811.61	59.23	811.29	66.73	810	82.83	808.48
85.99	808.19	88.6	808.02	88.68	808	89.76	807.9	90.2	807.79
97.32	806	102.61	804.8	104.73	804.27	106.33	804.19	110.37	804.04
111.09	804	114.68	803.83	122.48	803.38	131.5	802.77	144.95	803.15
156.17	803.67	178.32	803.54	206.07	803.47	214.32	803.48	221.09	803.48
227.36	803.43	259.97	803.64	302.09	802.73	302.85	802.72	311.66	802.61
321.77	802.79	330.05	802.65	335.45	802.48	343.38	803.19	349.47	803.52
349.53	803.6	350.2	803.54	350.68	803.42	352.52	803.33	360.87	803.12
362.07	803.02	363.32	802.95	365.73	802.84	371.29	802.49	375.18	802
386.97	802	390.75	802.02	403.48	801.43	408.95	801.2	410.23	801.12
419.97	801.08	420.34	801.07	420.63	800.92	421.68	800	422.01	799.59
424.39	799.72	426.27	799.56	430.71	798.78	431.09	798.68	431.61	798.67
440.54	798.47	441.29	799.36	441.76	800	442.83	800.86	443.92	802

444.19	802.39	444.28	802.67	446.09	802.65	449.85	802.74	465.56	803.16
477.66	803.39	478.61	803.43	481.75	803.41	483.04	803.41	501.55	803.39
504.43	803.44	506.59	803.45	541.66	803.07	544.92	803.01	552.67	803.43
560.59	803.78	568.35	804.12	578.38	804.57	584.38	804.07	585.03	804.01
585.38	804	585.39	804	590.63	803.67	593.62	803.48	593.65	803.48
597.4	804	598	804.07	598.85	804.1	600.1	805.11	601.2	806
603.21	807.65	603.67	808	603.9	808.19	605.9	810	605.94	810.03
608.08	812	608.35	812.33	608.64	812.77	609.57	813.17	611.39	814
613.77	815.04	615.89	816	619.06	817.39	620.37	818	621.62	818.57
621.7	818.62	622.23	818.92	624.58	820	625.62	820.51	628.75	822
630.6	822.92	632.83	824	635.01	825.08	636.89	826	637.63	826.37
637.98	826.55	639.08	827.14	640.72	828	642.1	828.77	644.35	830

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	12.04	.013	31.57	.1	104.73	.035	419.97	.04
444.28	.035	578.38	.013	593.62	.1				

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
302.85	560.59	1	1	1	.1	.3

SUMMARY OF MANNING'S N VALUES

River:Cabin Run

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8
Upper	13338.65	.1	.04	.025	.013	.1			
Upper	13228.66	.1	.04	.035	.013	.1			
Upper	13047.83	.1	.035	.04	.1	.013	.1		
Upper	12905.72	.1	.035	.1	.035	.04	.1	.013	.1
Upper	12783.74	.035	.04	.035	.013	.035			
Upper	12709.20	.1	.035	.04	.1	.013	.1		
Upper	12590.58	.1	.035	.04	.1	.013	.1		
Upper	12466.12	.1	.035	.04	.1	.013	.1		
Upper	12336.63	.1	.035	.04	.1	.013	.1		
Upper	12201.47	.1	.035	.04	.1				

```
.013        .1
 Upper                 12106.82            .1      .035        .1       .04
.1      .013        .1
 Upper                 12080        Culvert

 Upper                 12052.69            .1      .035       .04      .013
.1      .013        .1
 Upper                 12030        Bridge

 Upper                 12016.91            .1      .035       .04      .013
.1      .013        .1
 Upper                 11917.65            .1      .035       .04        .1
.013        .1      .013        .1
 Upper                 11736.49            .1       .04        .1      .013
.1      .013        .1
 Upper                 11681.96            .1       .04        .1      .035
.1      .013        .1
 Upper                 11547.41            .1       .04      .035        .1
.013        .1
 Upper                 11461.86            .1       .04      .035        .1
.013        .1
 Upper                 11316.17            .1       .04      .035        .1
.013        .1
 Upper                 11190.54            .1      .035       .04      .035
.013        .1
 Lower                 11091.35            .1      .035       .04        .1
.035      .013        .1
 Lower                 10962.06            .1      .035       .04        .1
.013        .1
 Lower                 10900.67            .1      .035       .04      .013
.1
 Lower                 10705.68            .1      .035        .1       .04
.013        .1
 Lower                 10444.93            .1      .035       .04        .1
.013        .1
 Lower                 10376.87            .1      .035       .04      .013
.1
 Lower                 10151.02            .1      .035       .04        .1
.013        .1
 Lower                 10106.50          .035       .04        .1      .013
.1
 Lower                 10000.00          .035      .013      .035       .04
.1      .013        .1


River:Leason Run


      Reach          River Sta.       n1        n2        n3        n4        n5
    n6        n7        n8
```

```
 Lower               2737.844             .1        .04       .025         .1
.013        .1
 Lower               2571.784             .1        .04         .1       .035
.1      .013        .1
 Lower               2494.952             .1        .04         .1       .035
.1      .013        .1
 Lower               2373.655             .1        .04         .1       .035
.1      .013        .1
 Lower               2265.225             .1        .04       .035         .1
.013        .1
 Lower               2157.963             .1        .04       .035       .013
.1
 Lower               2080.321             .1        .04       .025       .013
.1
 Lower               1960.670             .1        .04       .035       .013
.1
 Lower               1763.762             .1       .035        .04       .013
.1
 Lower               1740         Culvert

 Lower               1716.392             .1       .013       .035        .04
.013        .1
 Lower               1538.753             .1       .013       .035        .04
.035       .013        .1
 Lower               1456.709             .1       .013       .035        .04
.035       .013        .1
 Lower               1407.241             .1       .013       .035        .04
.35       .013        .1
 Lower               1233.140             .1       .013         .1       .035
.04       .035      .013        .1
 Lower               1047.463             .1       .013         .1       .035
.04       .035      .013        .1
```

SUMMARY OF REACH LENGTHS

River: Cabin Run

Reach	River Sta.	Left	Channel	Right
Upper	13338.65	138.38	109.99	117.48
Upper	13228.66	175.61	175.61	125.73
Upper	13047.83	141.41	141.41	129.19
Upper	12905.72	120.76	120.76	103.33
Upper	12783.74	73.75	73.75	73.99
Upper	12709.20	118.63	118.63	143.39

Upper	12590.58	119.79	119.79	89.65
Upper	12466.12	124.22	124.22	107.77
Upper	12336.63	134.44	134.44	106.77
Upper	12201.47	271.82	147.48	205.71
Upper	12106.82	48.53	53.43	150.07
Upper	12080	Culvert		
Upper	12052.69	302.6	35.46	177.95
Upper	12030	Bridge		
Upper	12016.91	296.75	99.03	182.81
Upper	11917.65	143.36	163.25	197.2
Upper	11736.49	53.75	53.75	45.14
Upper	11681.96	134.52	134.52	52.33
Upper	11547.41	85.55	85.55	62.2
Upper	11461.86	139.15	139.15	49.68
Upper	11316.17	106.44	106.44	577.06
Upper	11190.54	99.19	99.19	45.84
Lower	11091.35	129.26	129.26	152.11
Lower	10962.06	58.91	58.91	64.64
Lower	10900.67	194.97	194.97	182.73
Lower	10705.68	259.79	259.79	216.96
Lower	10444.93	61.04	61.04	82.99
Lower	10376.87	222.63	222.63	150.07
Lower	10151.02	44.52	44.52	48.94
Lower	10106.50	387.32	97.1	53.75
Lower	10000.00	1	1	1

River: Leason Run

Reach	River Sta.	Left	Channel	Right
Lower	2737.844	164.77	164.77	110.64
Lower	2571.784	76.83	76.83	65.26
Lower	2494.952	118.47	118.47	121.57
Lower	2373.655	104.33	104.33	96.43
Lower	2265.225	105.3	105.3	71.99
Lower	2157.963	65.54	65.54	25.52
Lower	2080.321	117.82	117.82	39.43
Lower	1960.670	172.09	172.09	106.18
Lower	1763.762	46.18	46.18	37.25
Lower	1740	Culvert		
Lower	1716.392	168.18	168.18	142.68
Lower	1538.753	79.02	79.02	62.82
Lower	1456.709	47.12	47.12	51.23
Lower	1407.241	149.56	149.56	161.7
Lower	1233.140	133.75	133.4	15.65
Lower	1047.463	1	1	1

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Cabin Run

Reach	River Sta.	Contr.	Expan.
Upper	13338.65	.1	.3
Upper	13228.66	.1	.3
Upper	13047.83	.1	.3
Upper	12905.72	.1	.3
Upper	12783.74	.1	.3
Upper	12709.20	.1	.3
Upper	12590.58	.1	.3
Upper	12466.12	.1	.3
Upper	12336.63	.1	.3
Upper	12201.47	.1	.3
Upper	12106.82	.1	.3
Upper	12080	Culvert	
Upper	12052.69	.1	.3
Upper	12030	Bridge	
Upper	12016.91	.1	.3
Upper	11917.65	.1	.3
Upper	11736.49	.1	.3
Upper	11681.96	.1	.3
Upper	11547.41	.1	.3
Upper	11461.86	.1	.3
Upper	11316.17	.1	.3
Upper	11190.54	.1	.3
Lower	11091.35	.1	.3
Lower	10962.06	.1	.3
Lower	10900.67	.1	.3
Lower	10705.68	.1	.3
Lower	10444.93	.1	.3
Lower	10376.87	.1	.3
Lower	10151.02	.1	.3
Lower	10106.50	.1	.3
Lower	10000.00	.1	.3

River: Leason Run

Reach	River Sta.	Contr.	Expan.
Lower	2737.844	.1	.3
Lower	2571.784	.1	.3
Lower	2494.952	.1	.3
Lower	2373.655	.1	.3
Lower	2265.225	.1	.3
Lower	2157.963	.1	.3
Lower	2080.321	.1	.3
Lower	1960.670	.1	.3

Lower	1763.762	.1	.3
Lower	1740	Culvert	
Lower	1716.392	.1	.3
Lower	1538.753	.1	.3
Lower	1456.709	.1	.3
Lower	1407.241	.1	.3
Lower	1233.140	.1	.3
Lower	1047.463	.1	.3

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Bridge

River: Cabin Run Reach: Upper RS: 13047.83 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Cabin Run Reach: Upper RS: 12052.69 Profile: PF 1
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.
River: Cabin Run Reach: Upper RS: 12030 Profile: PF 1 Downstream
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Cabin Run Reach: Upper RS: 11736.49 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Cabin Run Reach: Upper RS: 11461.86 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Cabin Run Reach: Upper RS: 11316.17 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Cabin Run Reach: Upper RS: 11190.54 Profile: PF 1
Warning:Divided flow computed for this cross-section.
River: Cabin Run Reach: Lower RS: 10962.06 Profile: PF 1
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.
River: Cabin Run  Reach: Lower     RS: 10705.68     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
River: Cabin Run  Reach: Lower     RS: 10106.50     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
River: Leason Run  Reach: Lower     RS: 2737.844     Profile: PF 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.
     Note:   Manning's n values were composited to a single value in the main
channel.
River: Leason Run  Reach: Lower     RS: 2571.784     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main
channel.
River: Leason Run  Reach: Lower     RS: 2494.952     Profile: PF 1
     Warning:The conveyance ratio (upstream 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.
     Note:   Manning's n values were composited to a single value in the main
channel.
River: Leason Run  Reach: Lower     RS: 2373.655     Profile: PF 1
     Note:   Manning's n values were composited to a single value in the main
channel.
River: Leason Run  Reach: Lower     RS: 2265.225     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main
channel.
River: Leason Run  Reach: Lower     RS: 2157.963     Profile: PF 1
     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: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:   Manning's n values were composited to a single value in the main
channel.
```

River: Leason Run Reach: Lower RS: 2080.321 Profile: PF 1
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: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: Manning's n values were composited to a single value in the main channel.
River: Leason Run Reach: Lower RS: 1960.670 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
River: Leason Run Reach: Lower RS: 1740 Profile: PF 1 Culv: Culvert #1

Note: The normal depth exceeds the height of the culvert. The program assumes that the normal depth is equal to the height
of the culvert.
River: Leason Run Reach: Lower RS: 1716.392 Profile: PF 1
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.
Note: Manning's n values were composited to a single value in the main channel.
River: Leason Run Reach: Lower RS: 1538.753 Profile: PF 1
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.
Note: Manning's n values were composited to a single value in the main channel.
River: Leason Run Reach: Lower RS: 1456.709 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
River: Leason Run Reach: Lower RS: 1407.241 Profile: PF 1
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.
Note: Manning's n values were composited to a single value in the main channel.
River: Leason Run Reach: Lower RS: 1233.140 Profile: PF 1

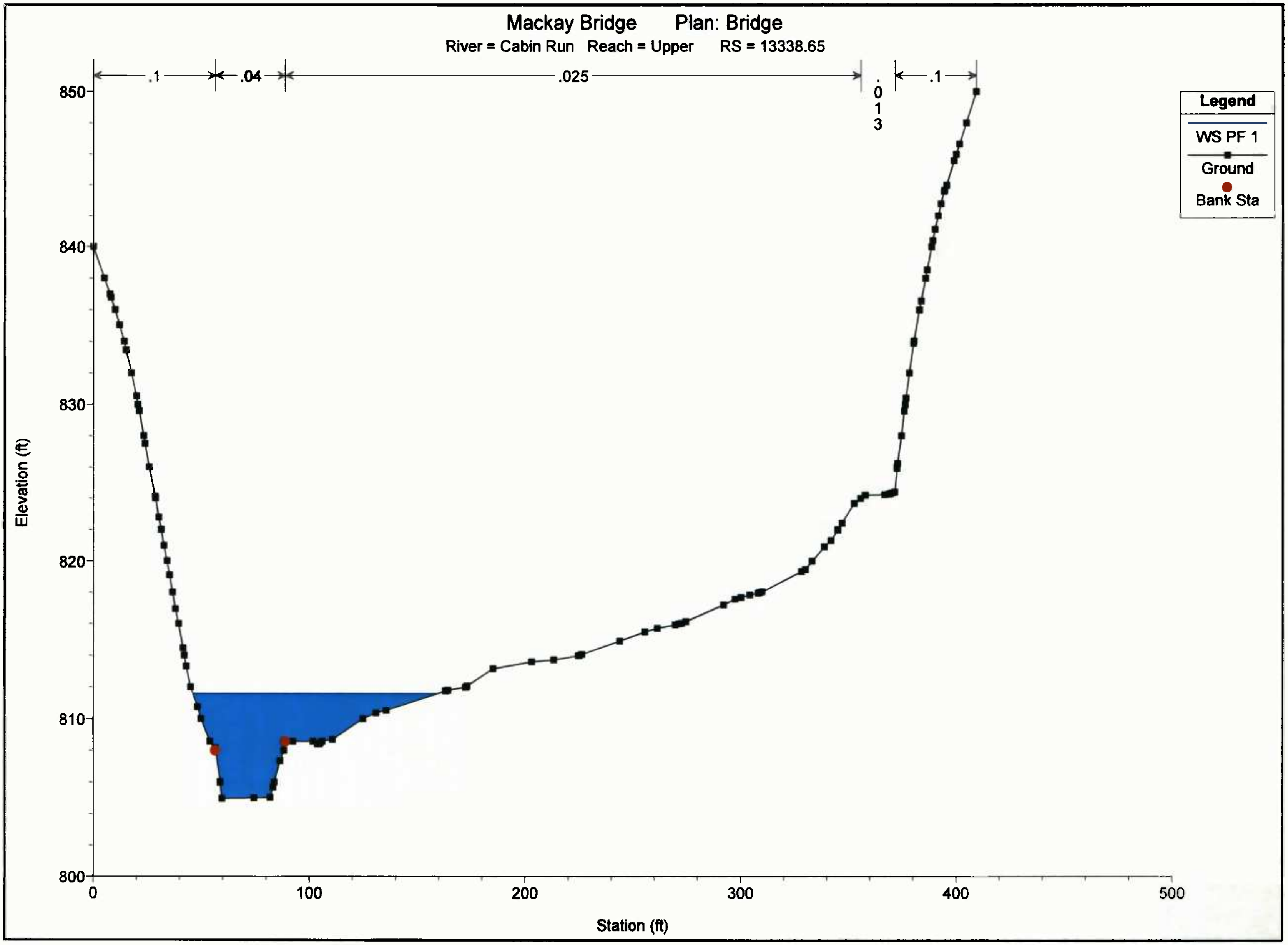
Warning:Divided flow computed for this cross-section.

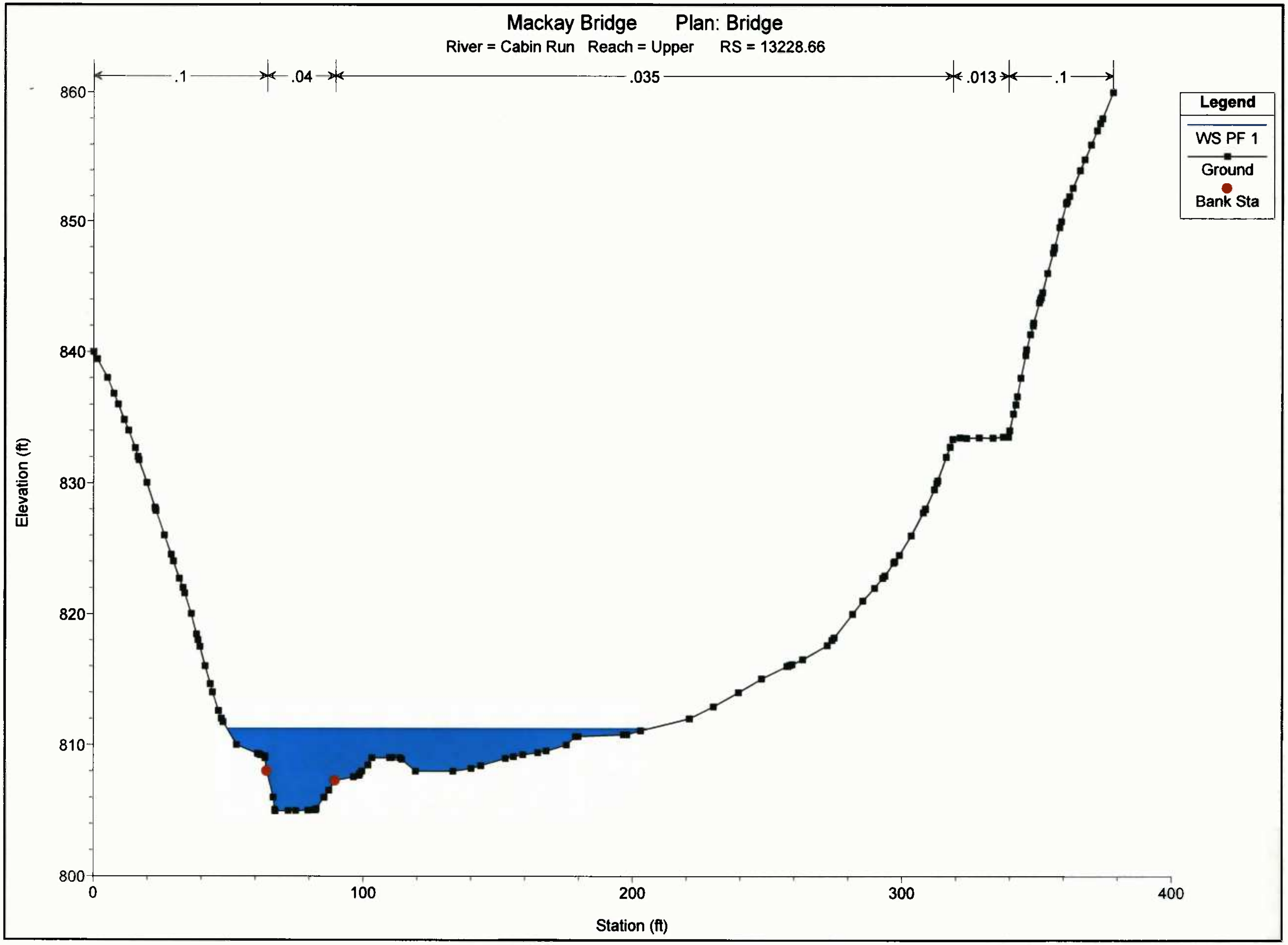
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

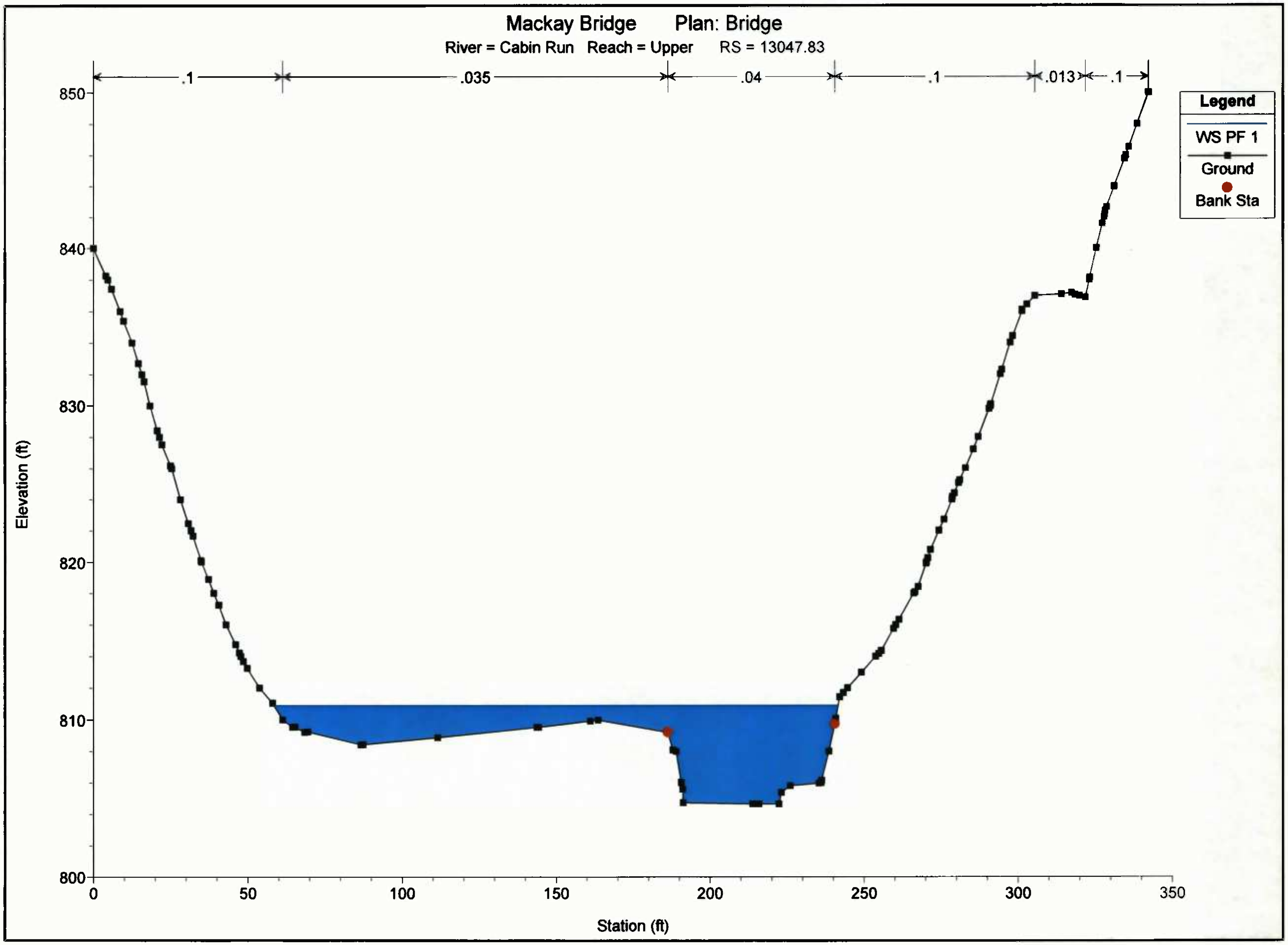
This may indicate the need for additional cross sections.

River: Leason Run Reach: Lower RS: 1047.463 Profile: PF 1

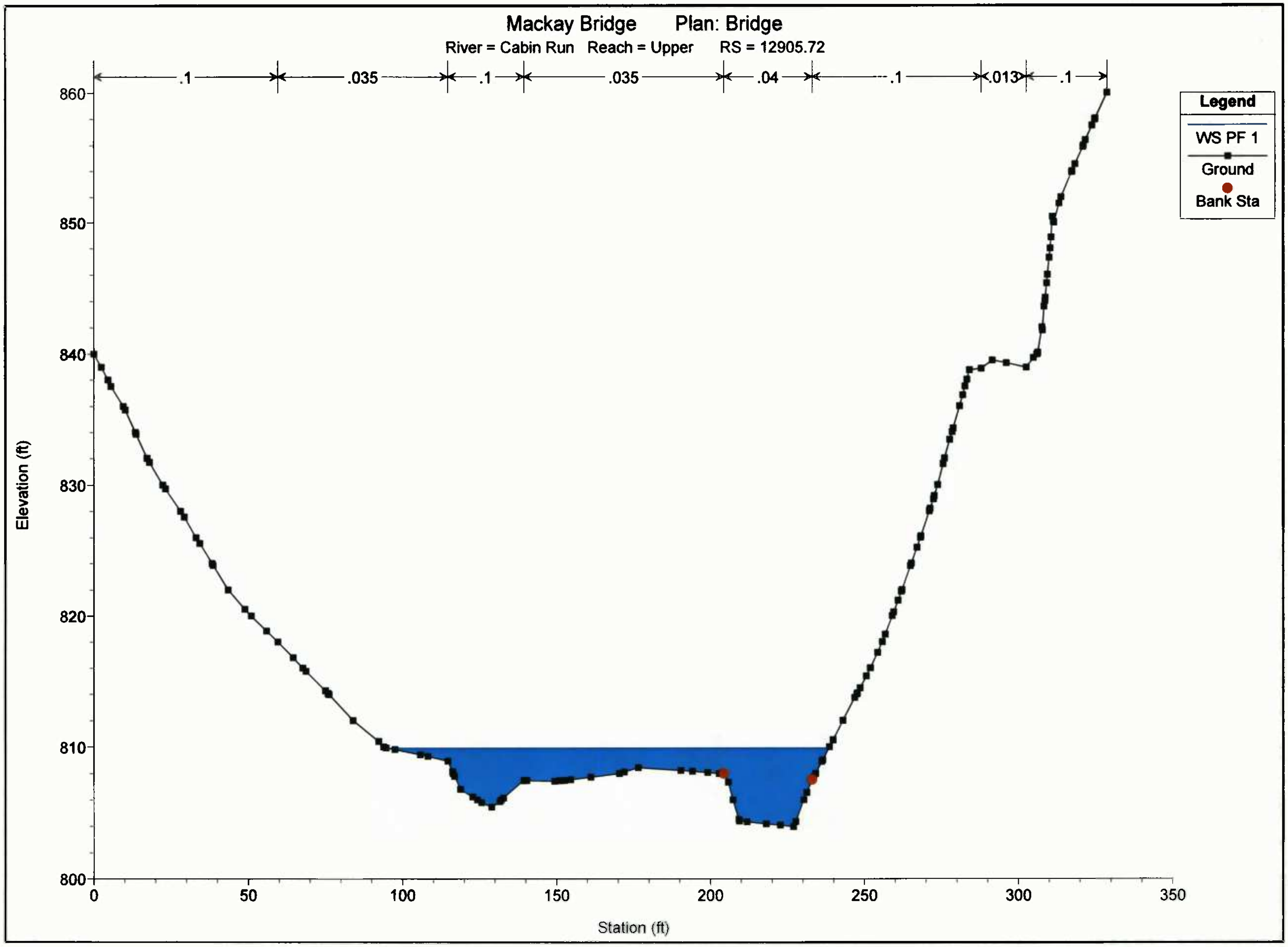
Warning:Divided flow computed for this cross-section.


Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 13338.65
.1
.04
.025
.013
.1
Legend
WS PF 1
Ground
Bank Sta
850
840
830
820
810
800
Elevation (ft)
0
100
200
300
400
500
Station (ft)


Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 13228.66
.1
.04
.035
.013
.1
Legend
WS PF 1
Ground
Bank Sta
860
850
840
830
820
810
800
Elevation (ft)
0
100
200
300
400
Station (ft)



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 13047.83
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
850
840
830
820
810
800
0
50
100
150
200
250
300
350
Station (ft)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River = Cabin Run Reach = Upper RS = 12905.72
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.035
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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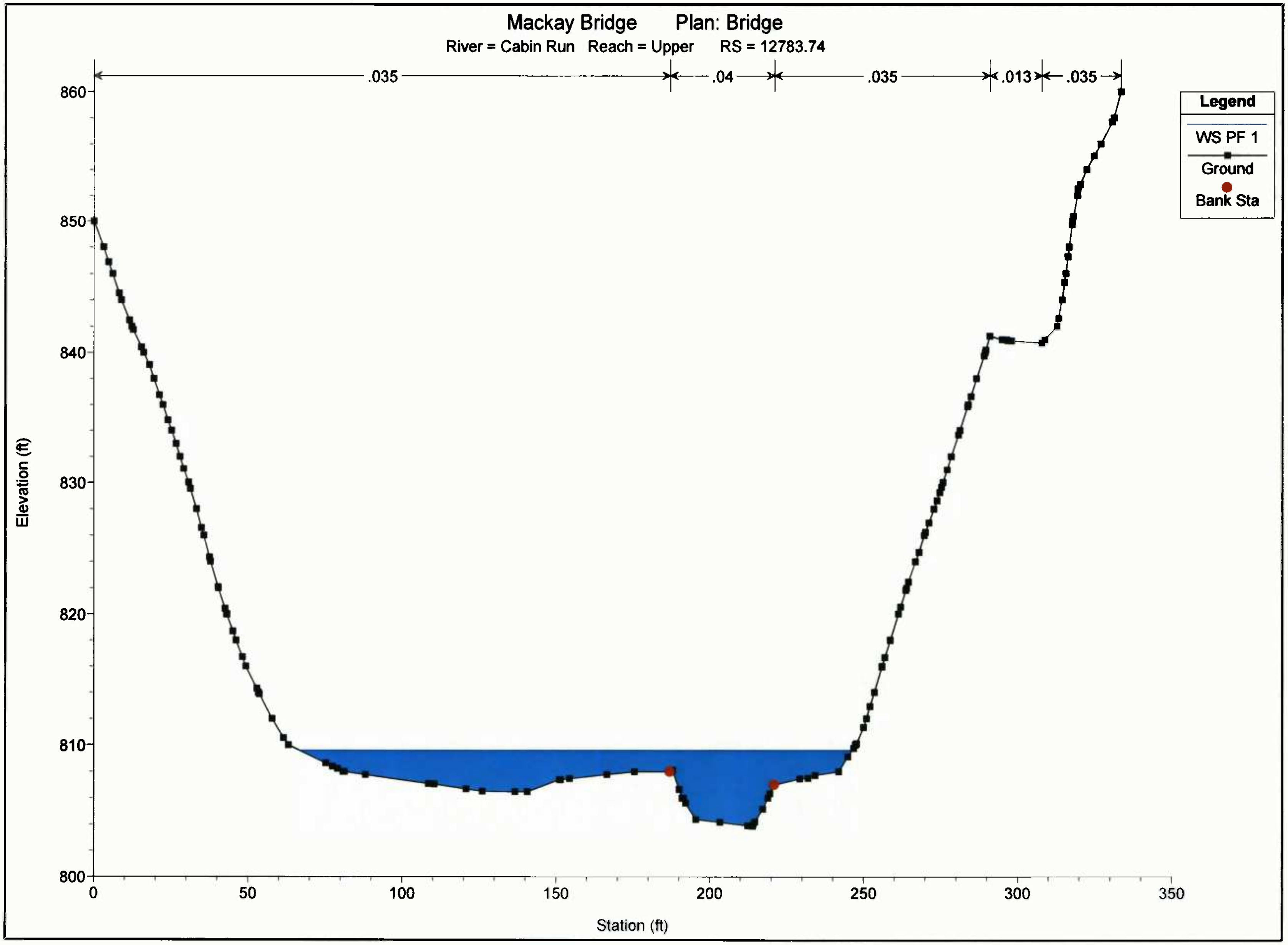
850
840
830
820
810
800
0
50
100
150
200
250
300
350
Station (ft)


Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 12783.74
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.04
.035
.013
.035
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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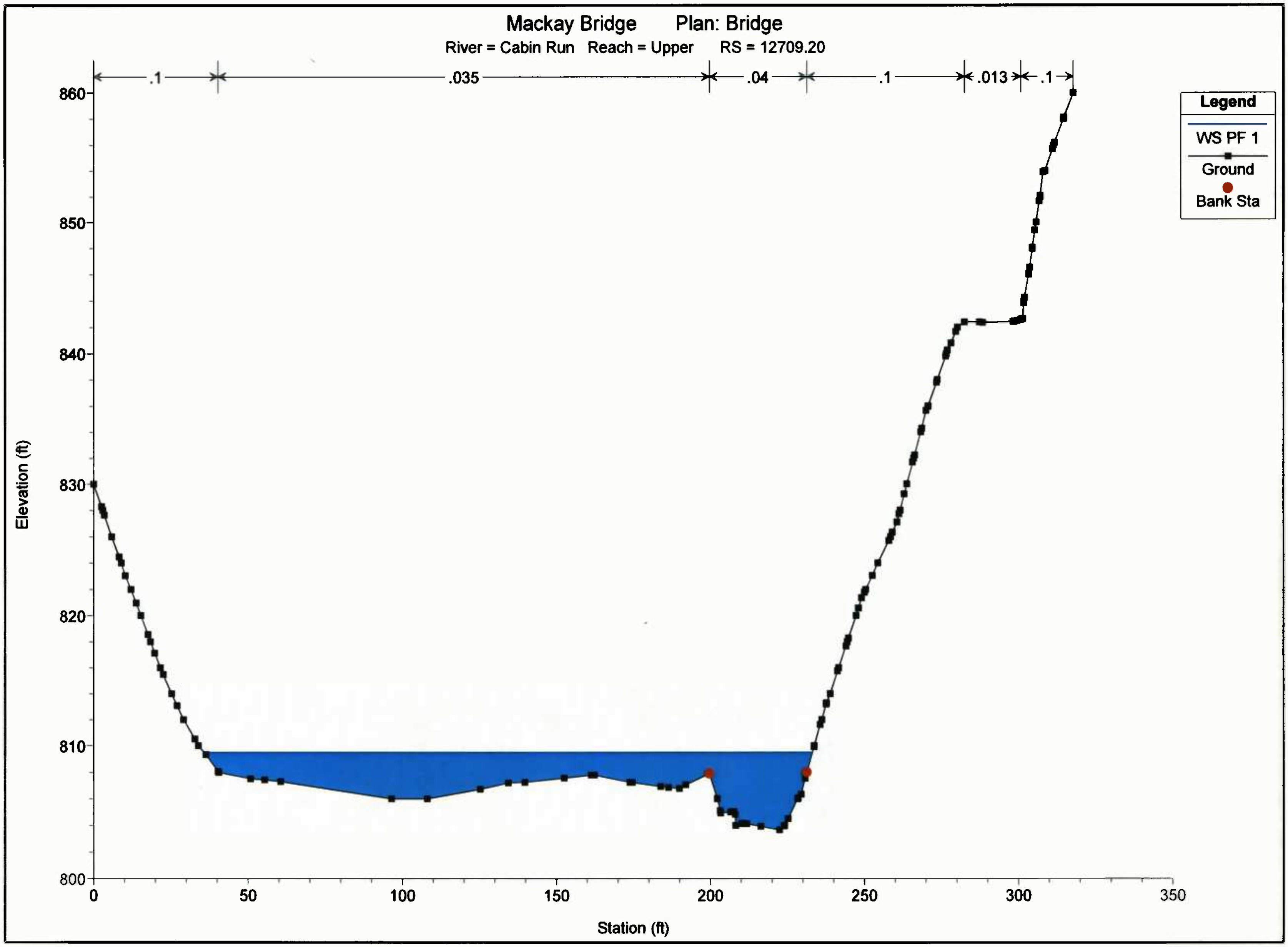
850
840
830
820
810
800
0
50
100
150
200
250
300
350
Station (ft)



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 12709.20
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.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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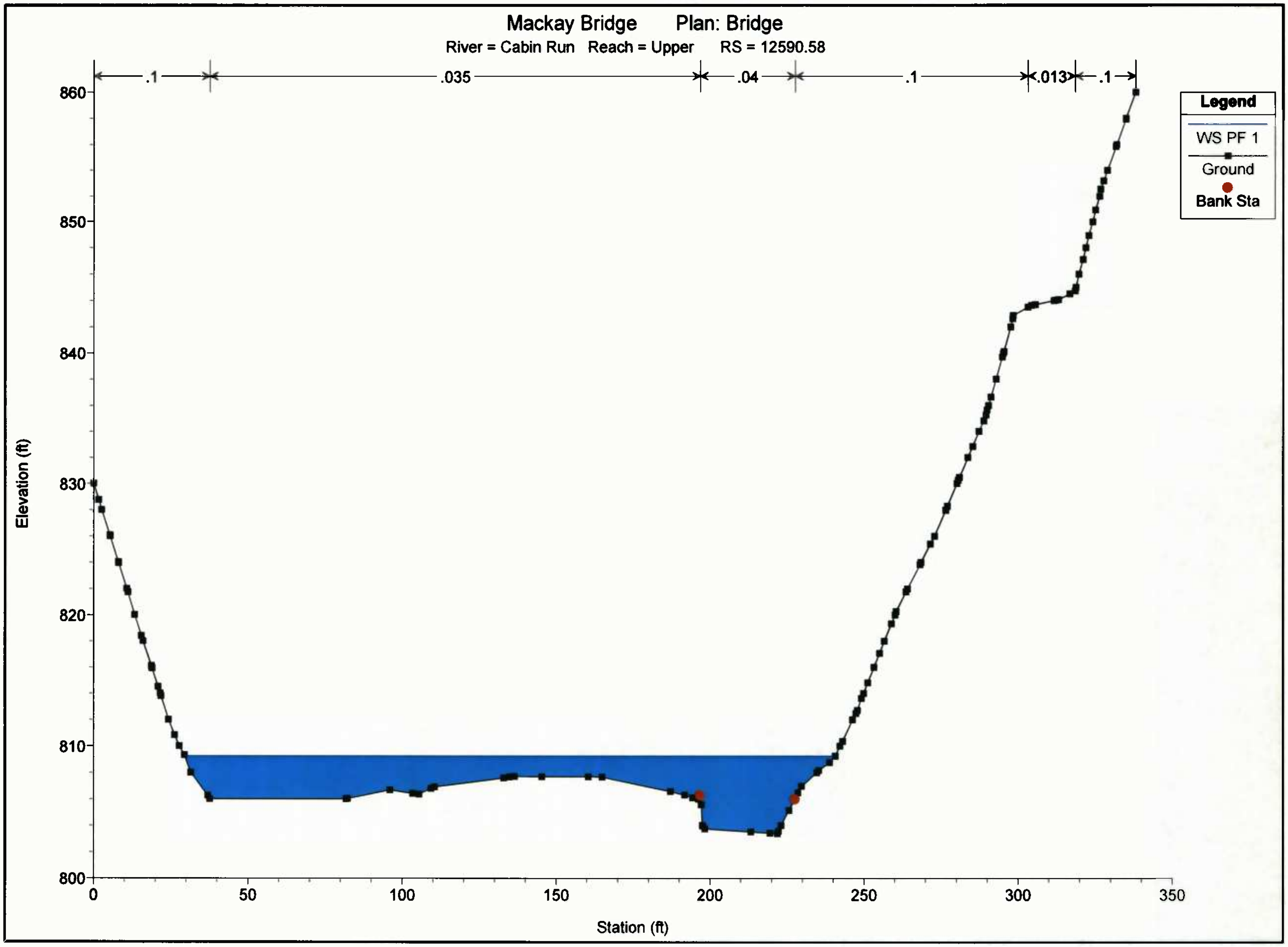
850
840
830
820
810
800
0
50
100
150
200
250
300
350
Station (ft)


Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 12590.58
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
860
850
840
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820
810
800
0
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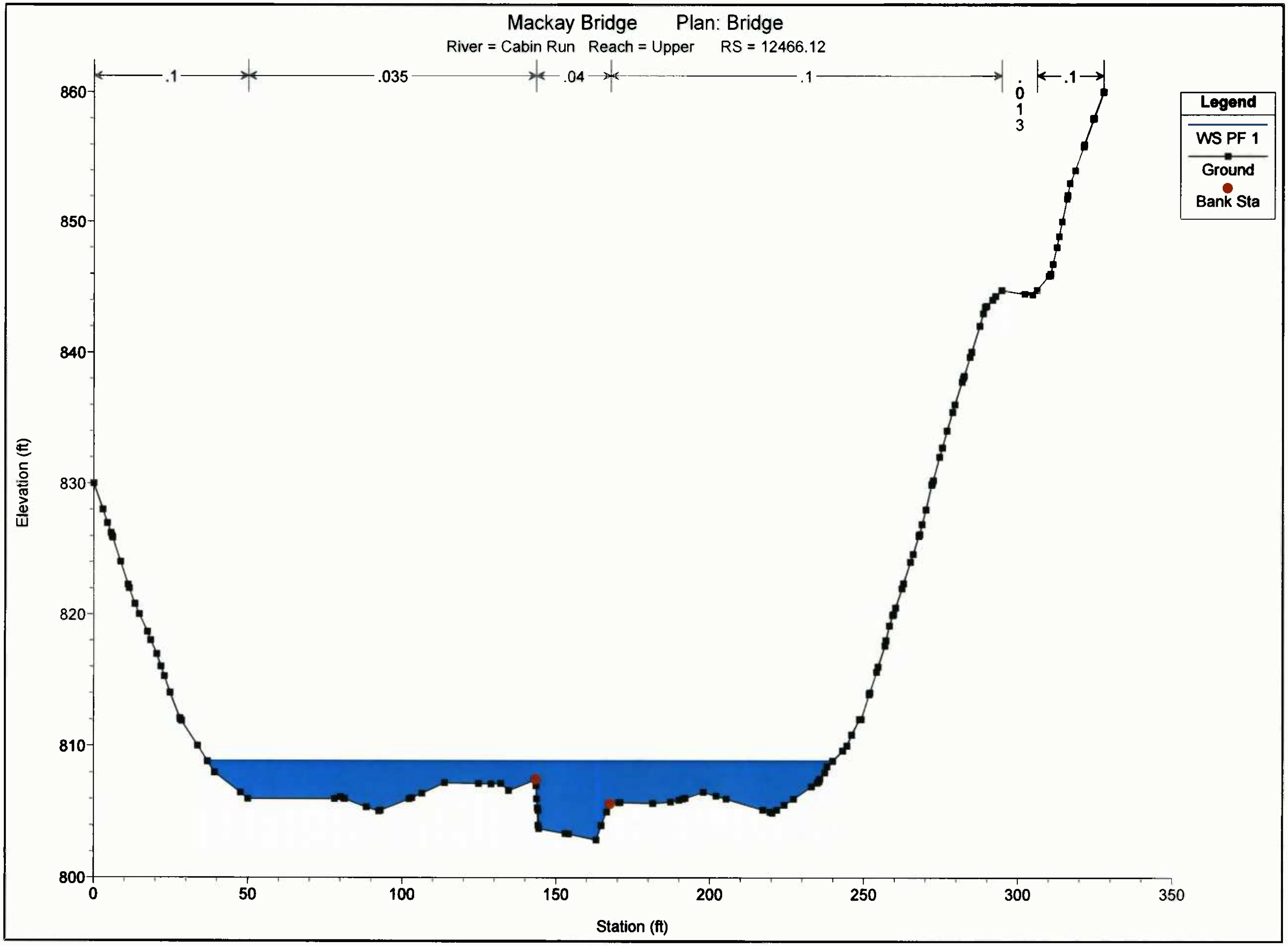
100
150
200
250
300
350
Station (ft)



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 12466.12
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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850
840
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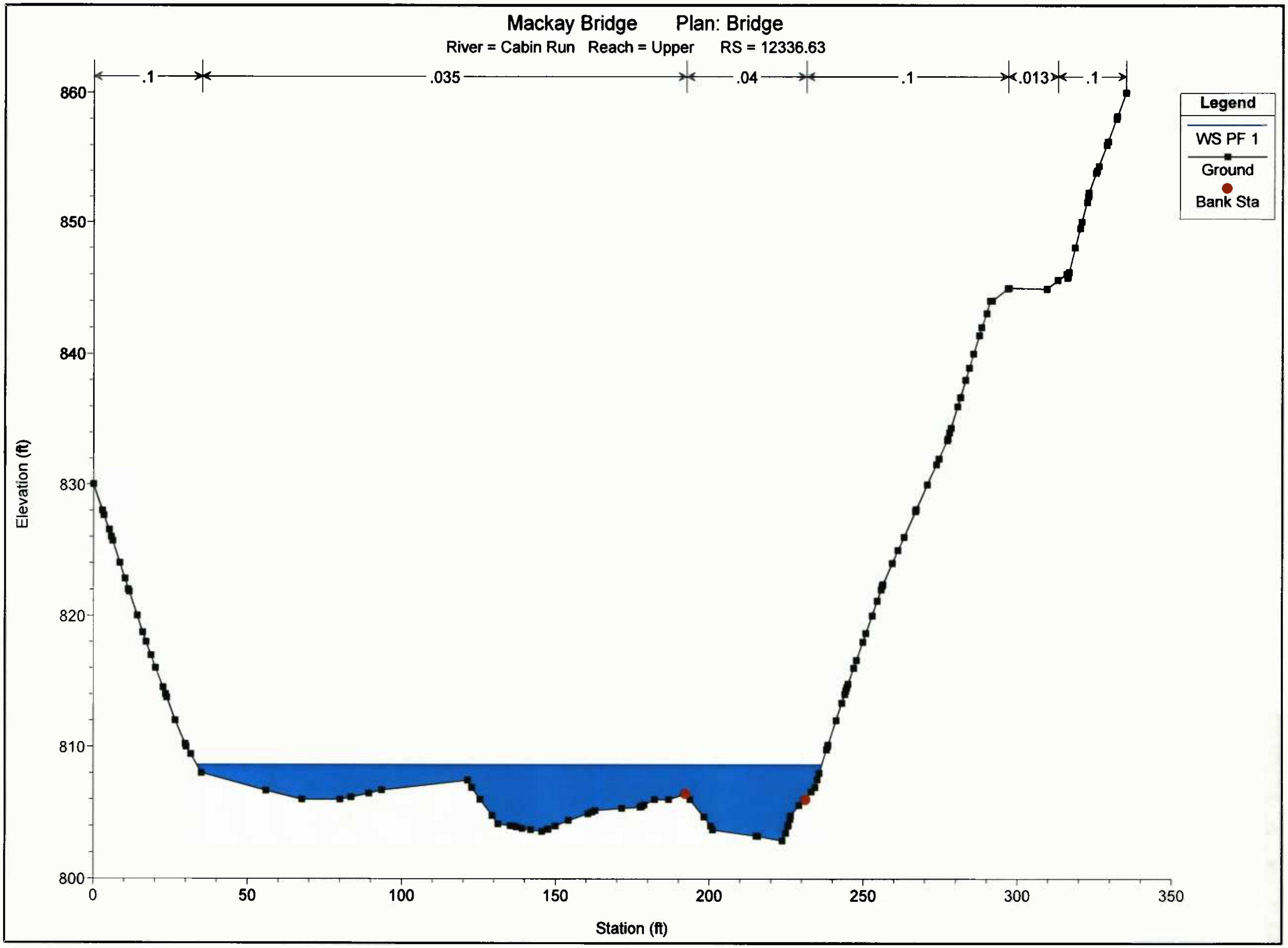
Station (ft)



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 12336.63
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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850
840
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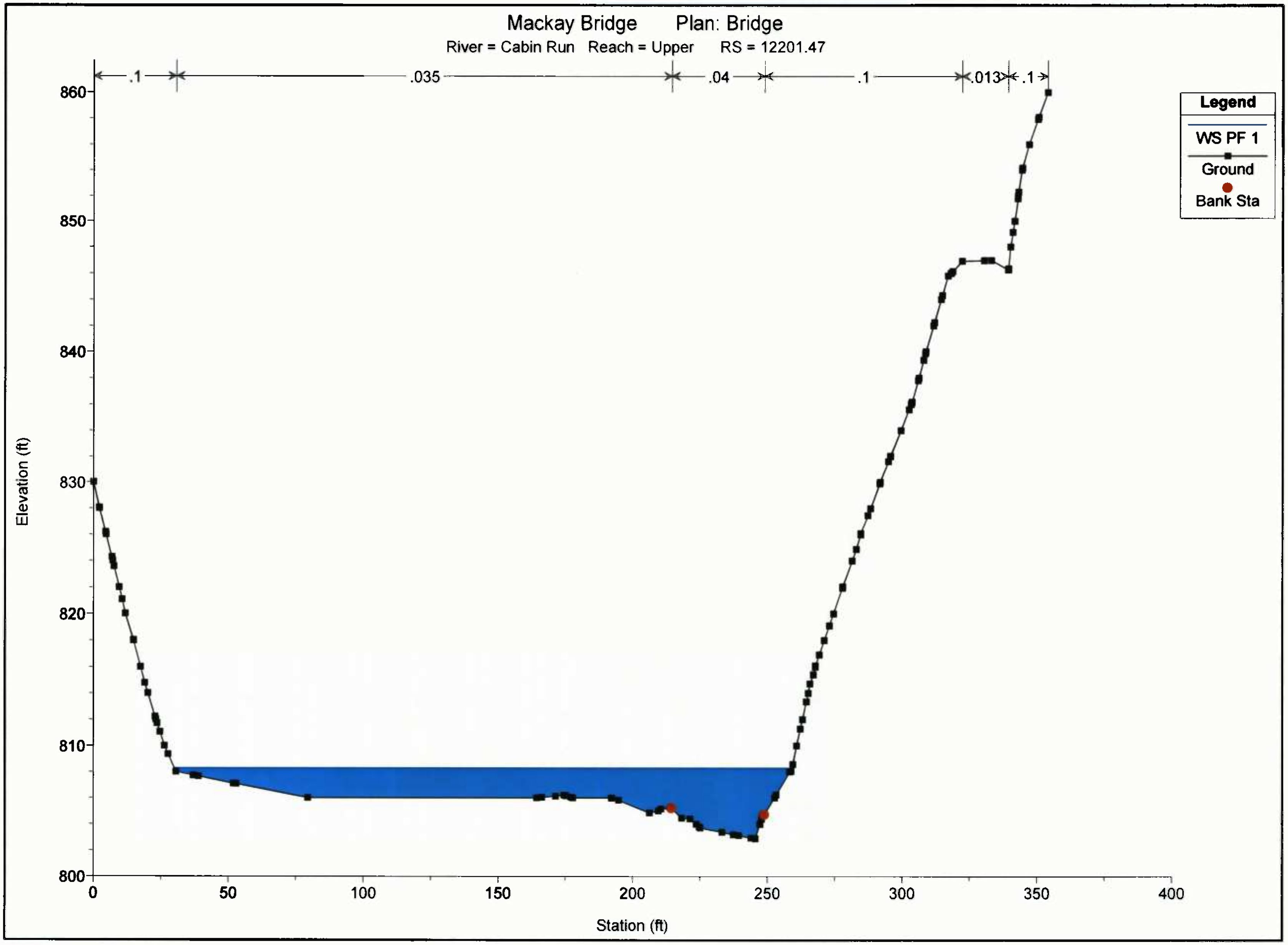
Station (ft)



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 12201.47
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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200
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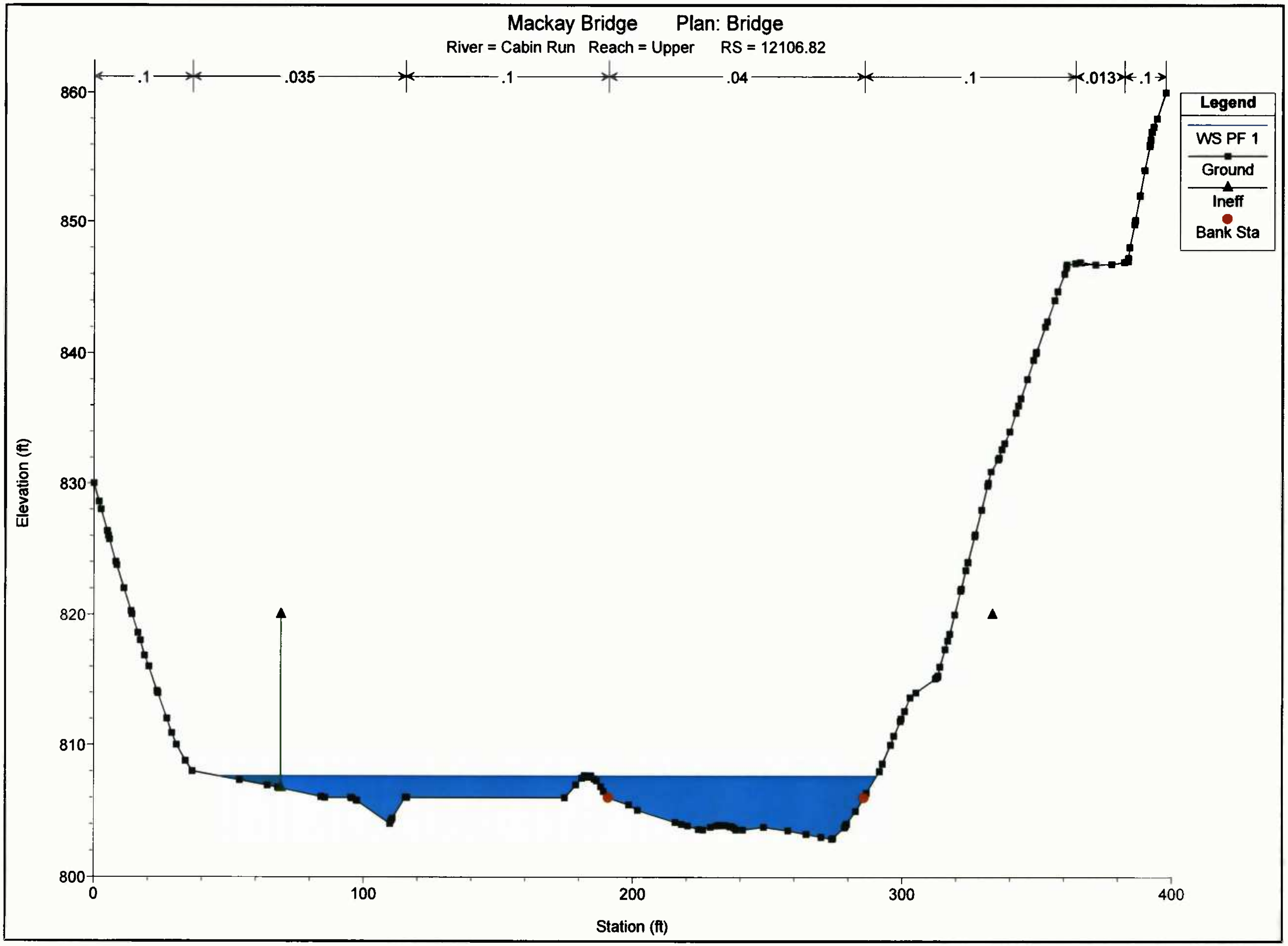
400
Station (ft)


Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 12106.82
.1
.035
.1
.04
.1
.013
.1
Legend
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
860
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800
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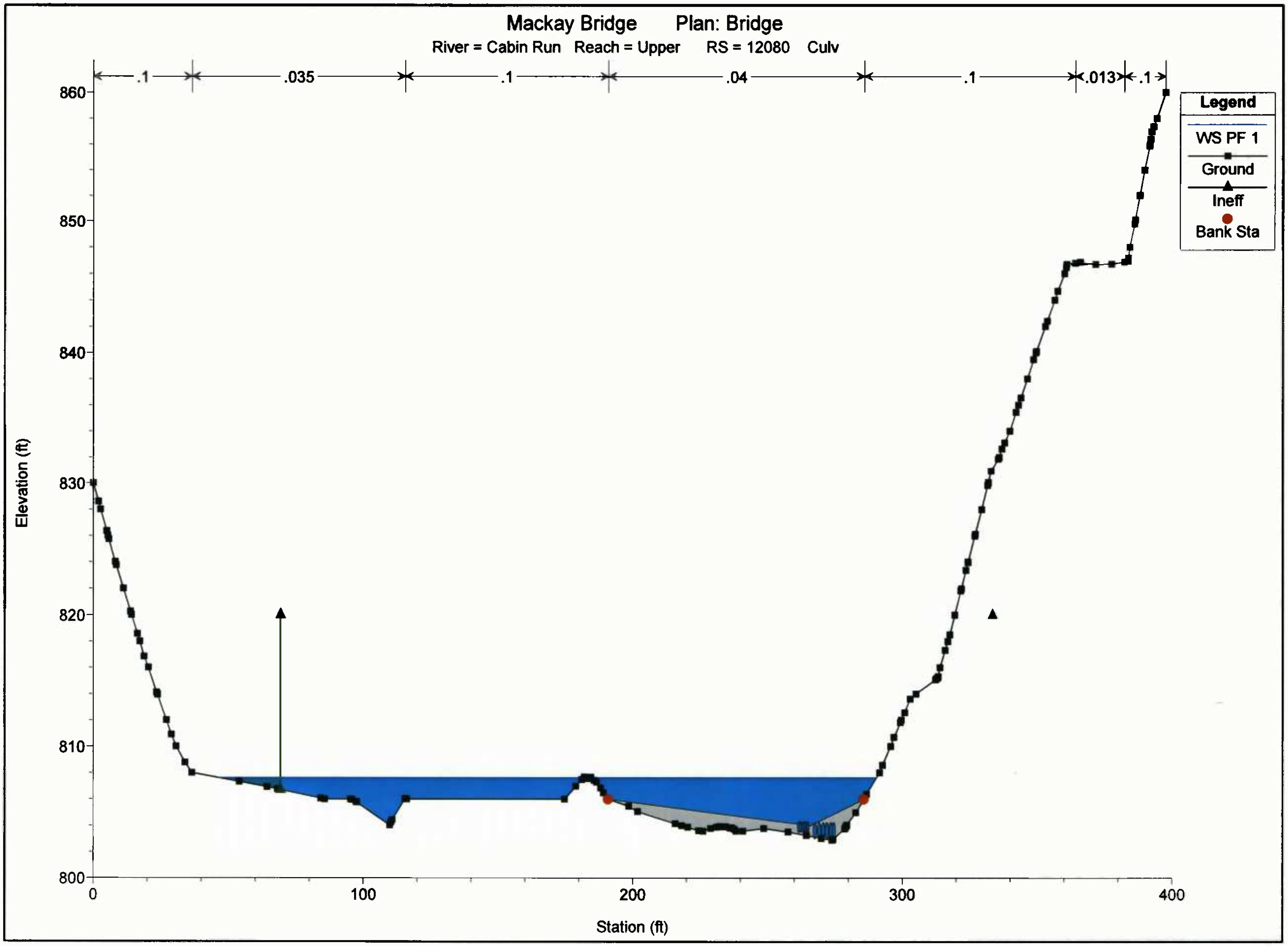
400
Station (ft)



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 12080 Culv
.1
.035
.1
.04
.1
.013
.1
Legend
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
860
850
840
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800
0
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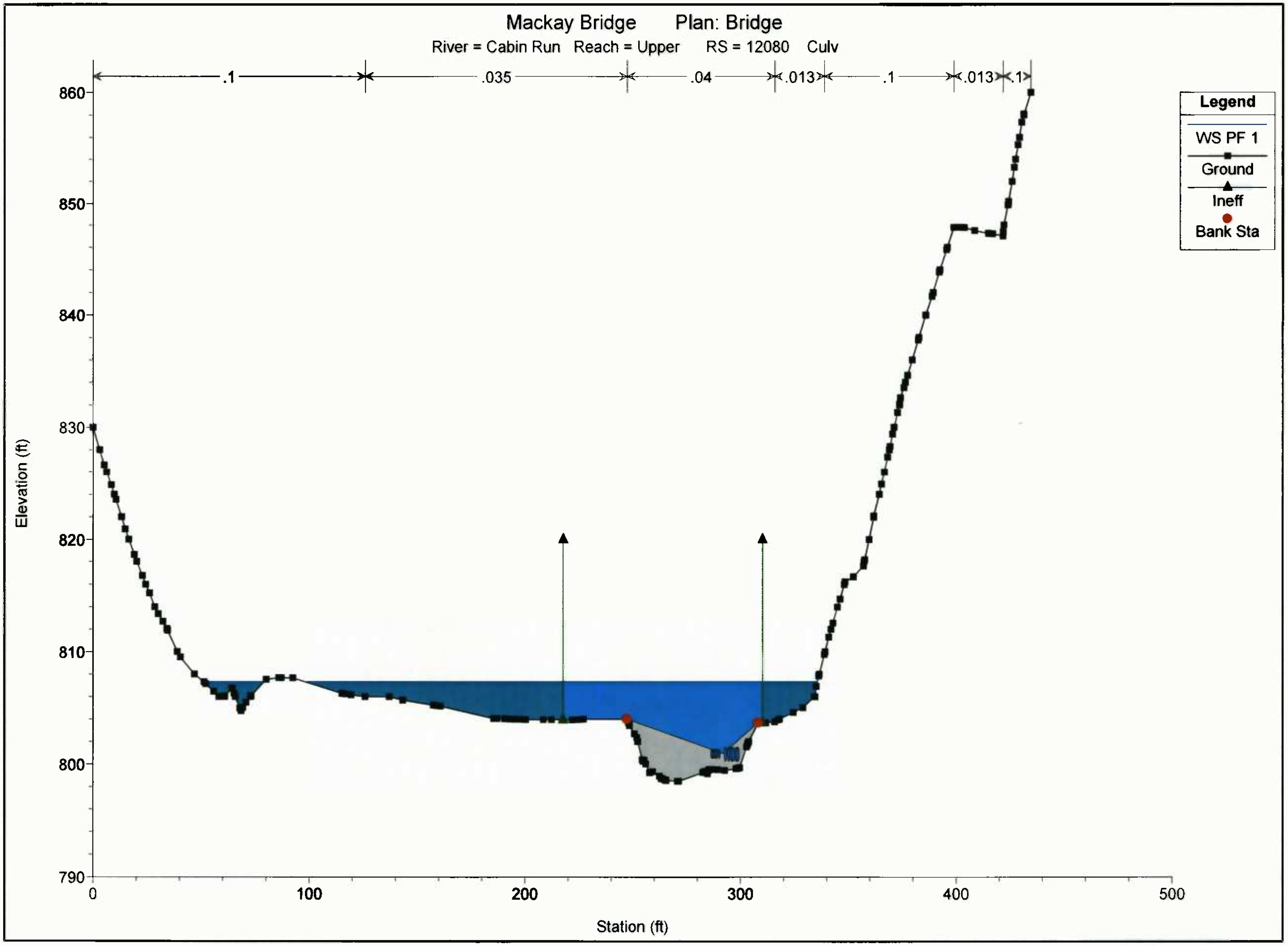
400
Station (ft)



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 12080 Culv
.1
.035
.04
.013
.1
.013
.1
Legend
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
860
850
840
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810
800
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0
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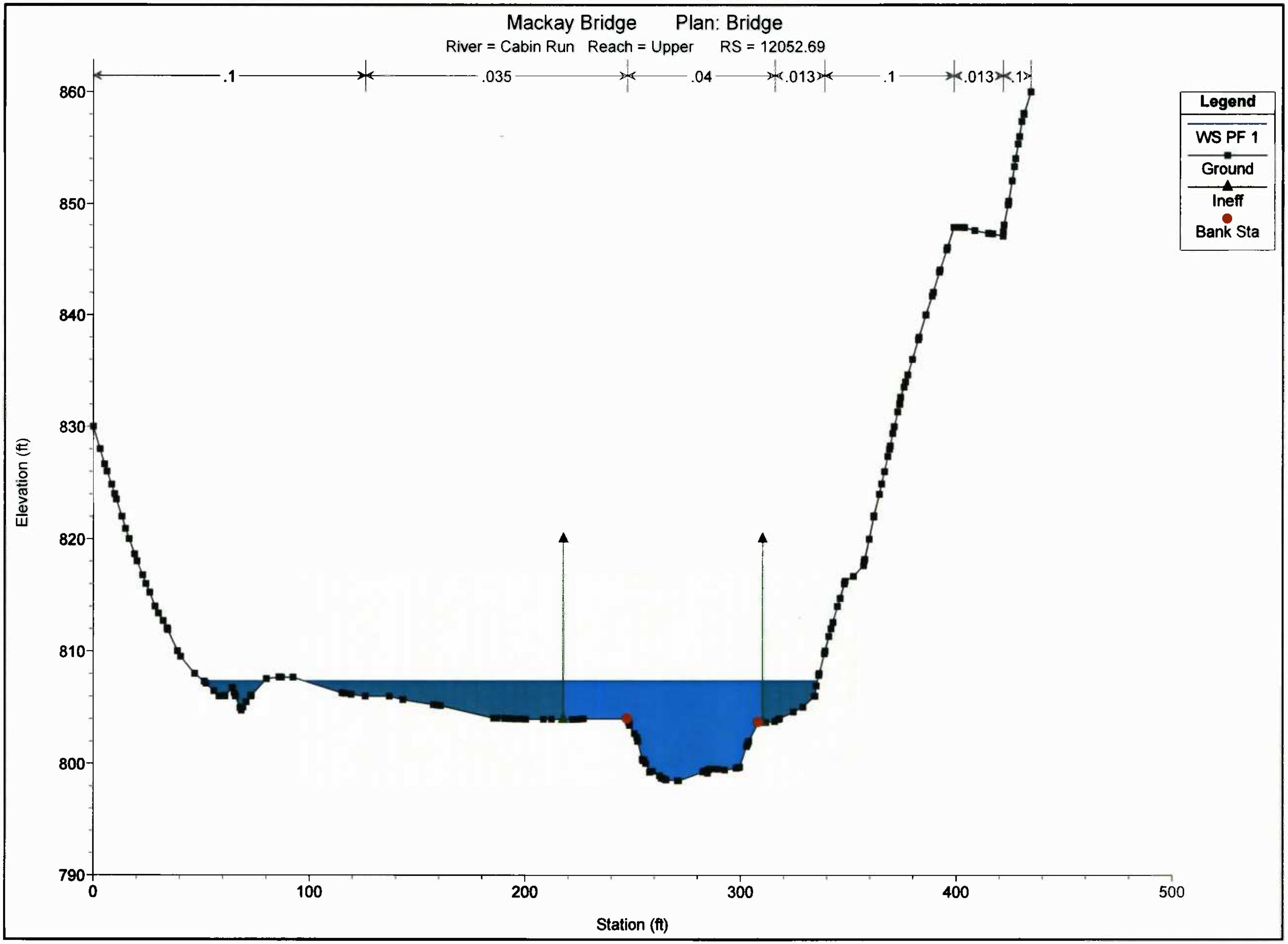
400
500



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 12052.69
.1
.035
.04
.013
.1
.013
.1
Legend
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
860
850
840
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820
810
800
790
0
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200
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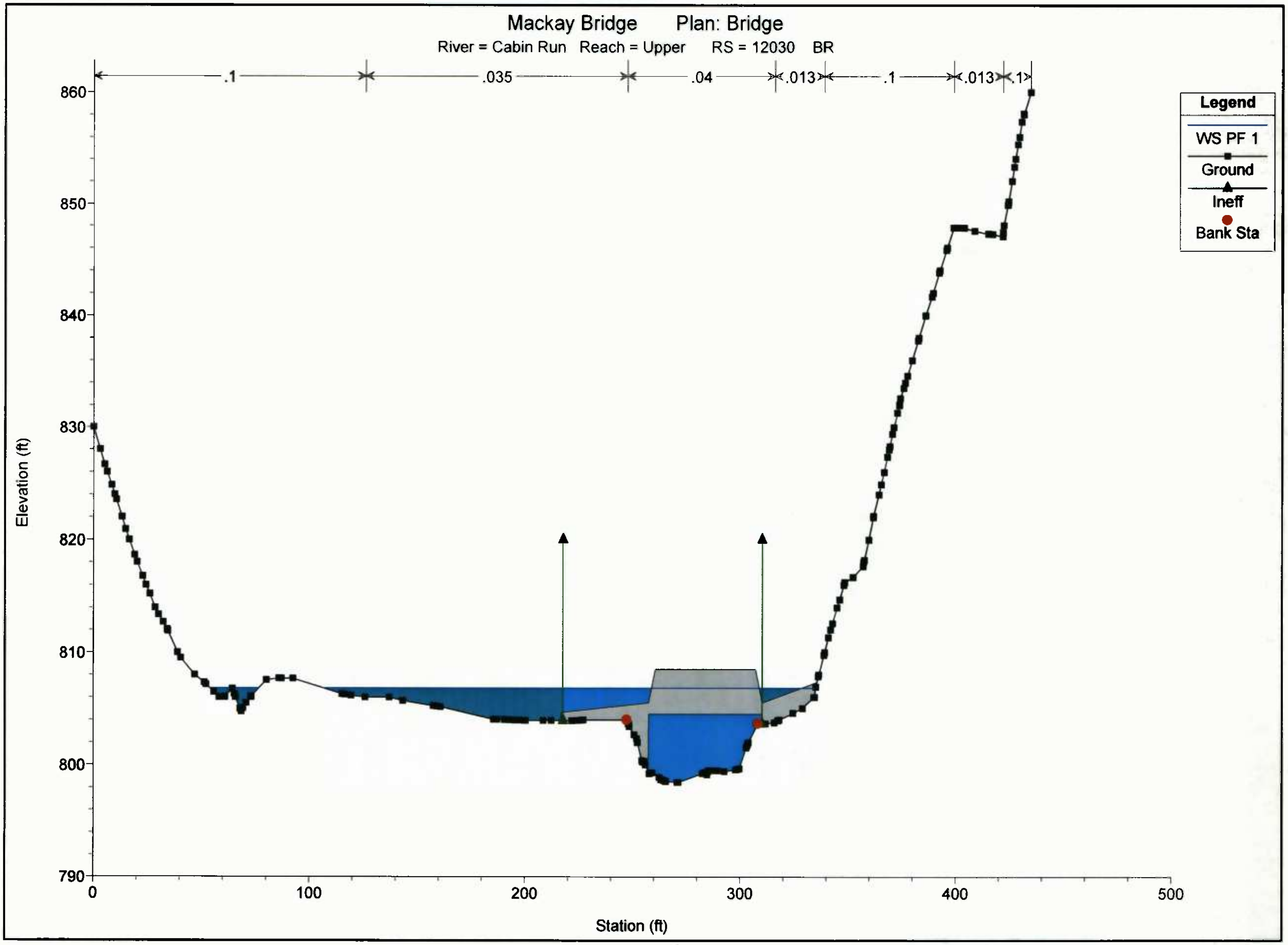
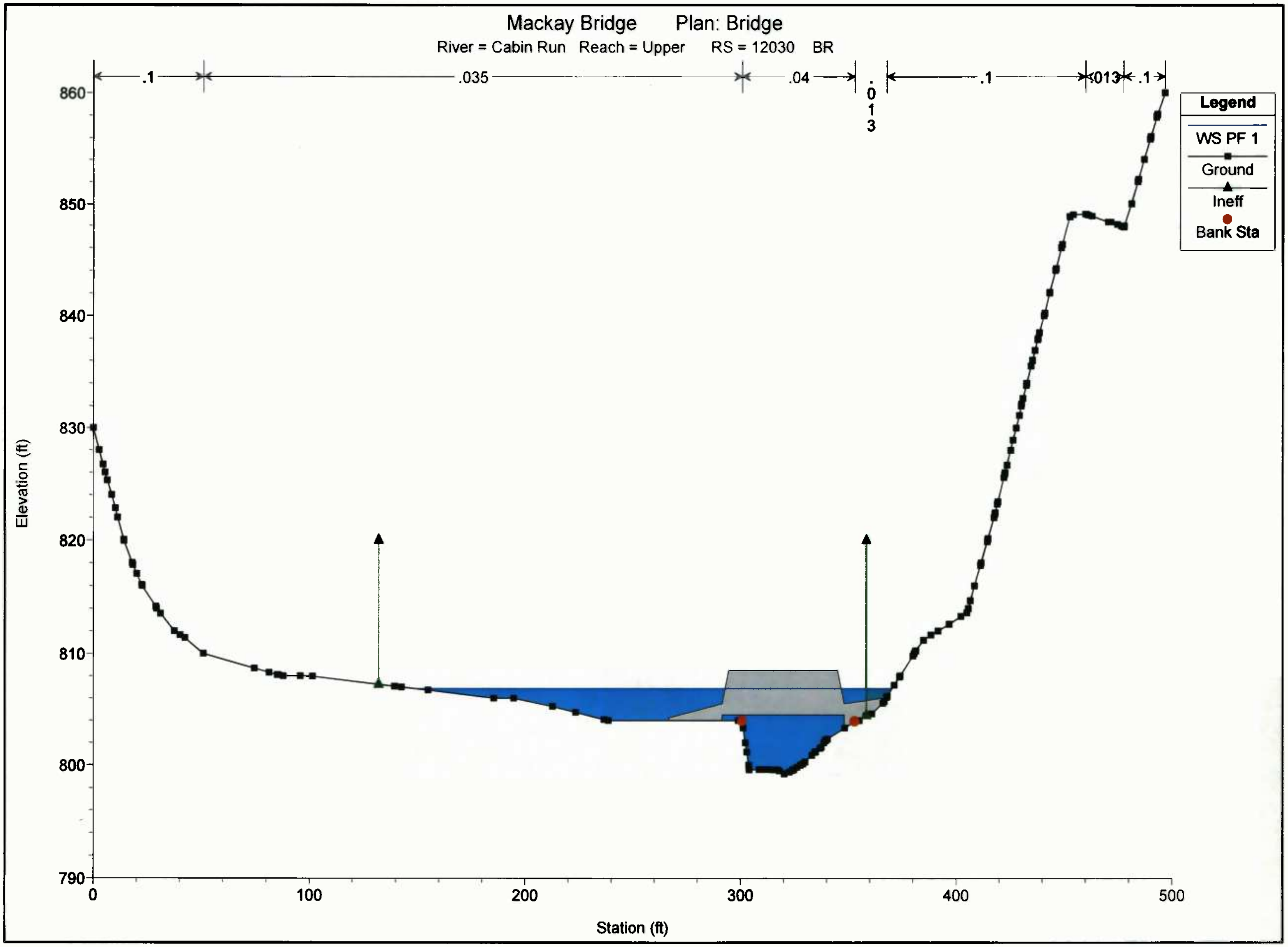
400
500



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 12030 BR
.1
.035
.04
.013
.1
.013
.1
860
850
840
830
820
810
800
790
Elevation (ft)
0
100
200
300
400
500
Station (ft)
Legend
WS PF 1
Ground
Ineff
Bank Sta



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 12030 BR
.1
.035
.04
.013
.1
.013
.1
Legend
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
860
850
840
830
820
810
800
790
0
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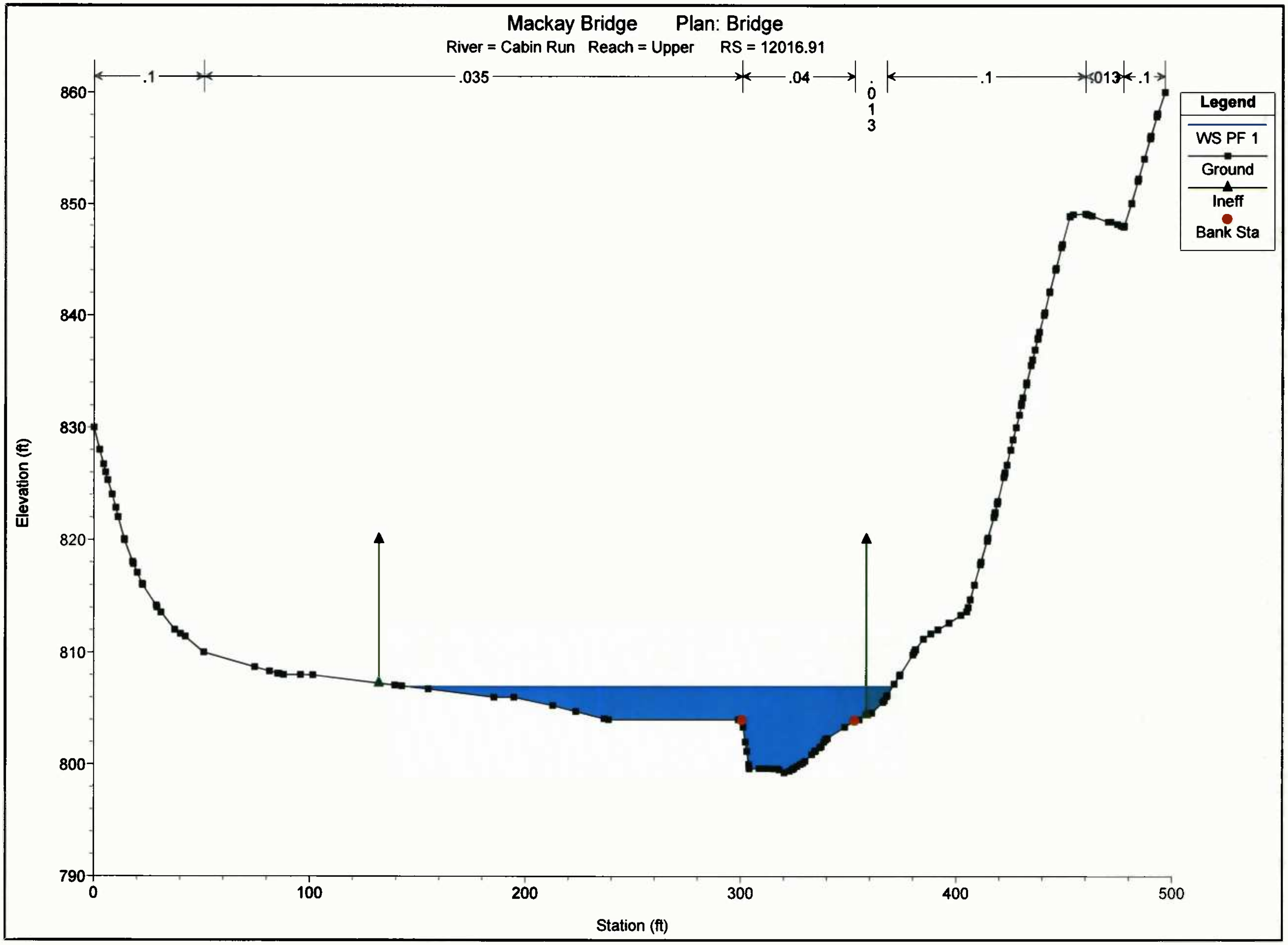
200
300
400
500



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 12016.91
.1
.035
.04
.013
.1
.013
.1
Legend
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
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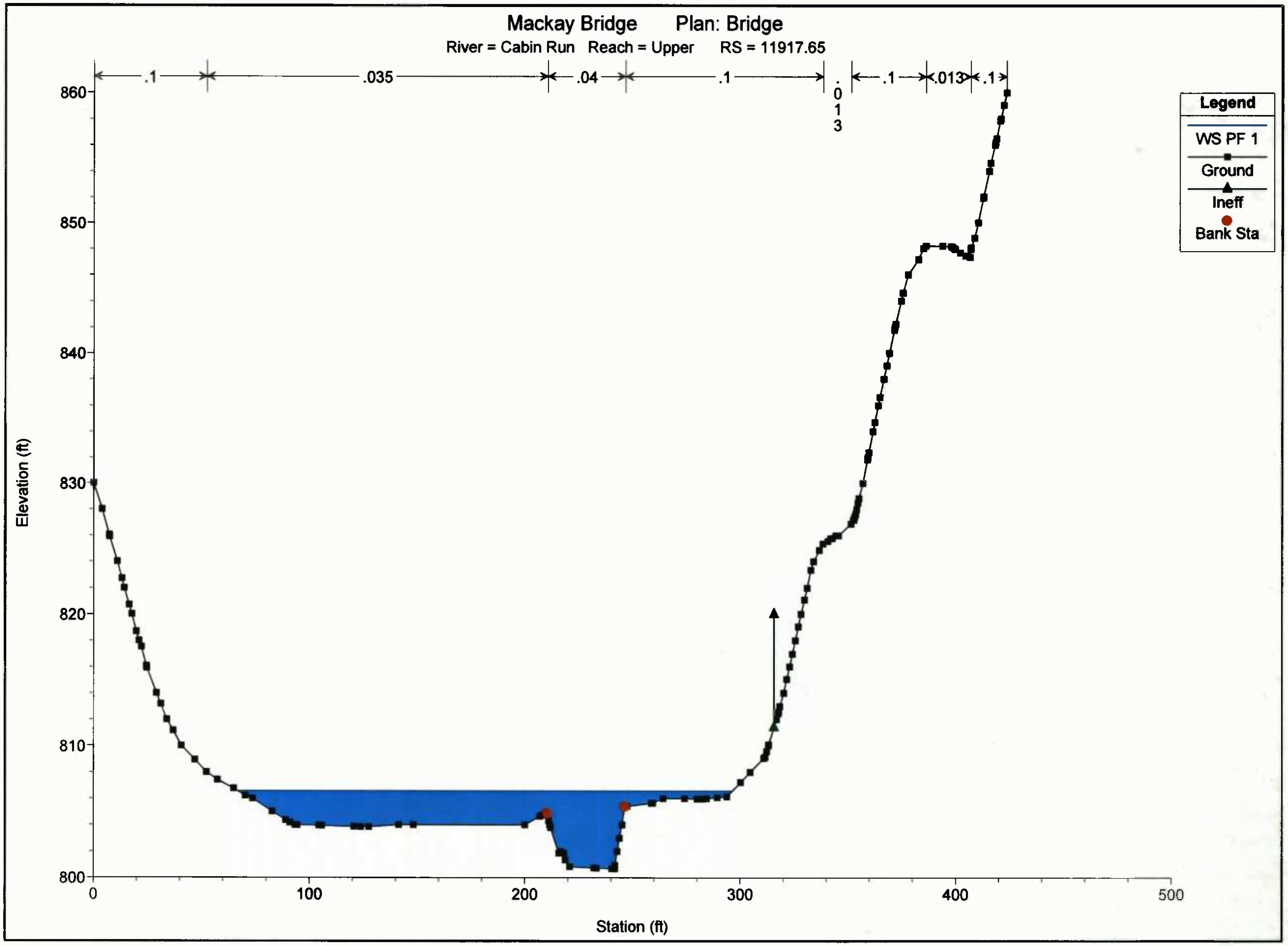
850
840
830
820
810
800
790
0
100
200
300
400
500
Station (ft)



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 11917.65
.1
.035
.04
.1
.013
.1
.013
.1
Legend
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
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850
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830
820
810
800
0
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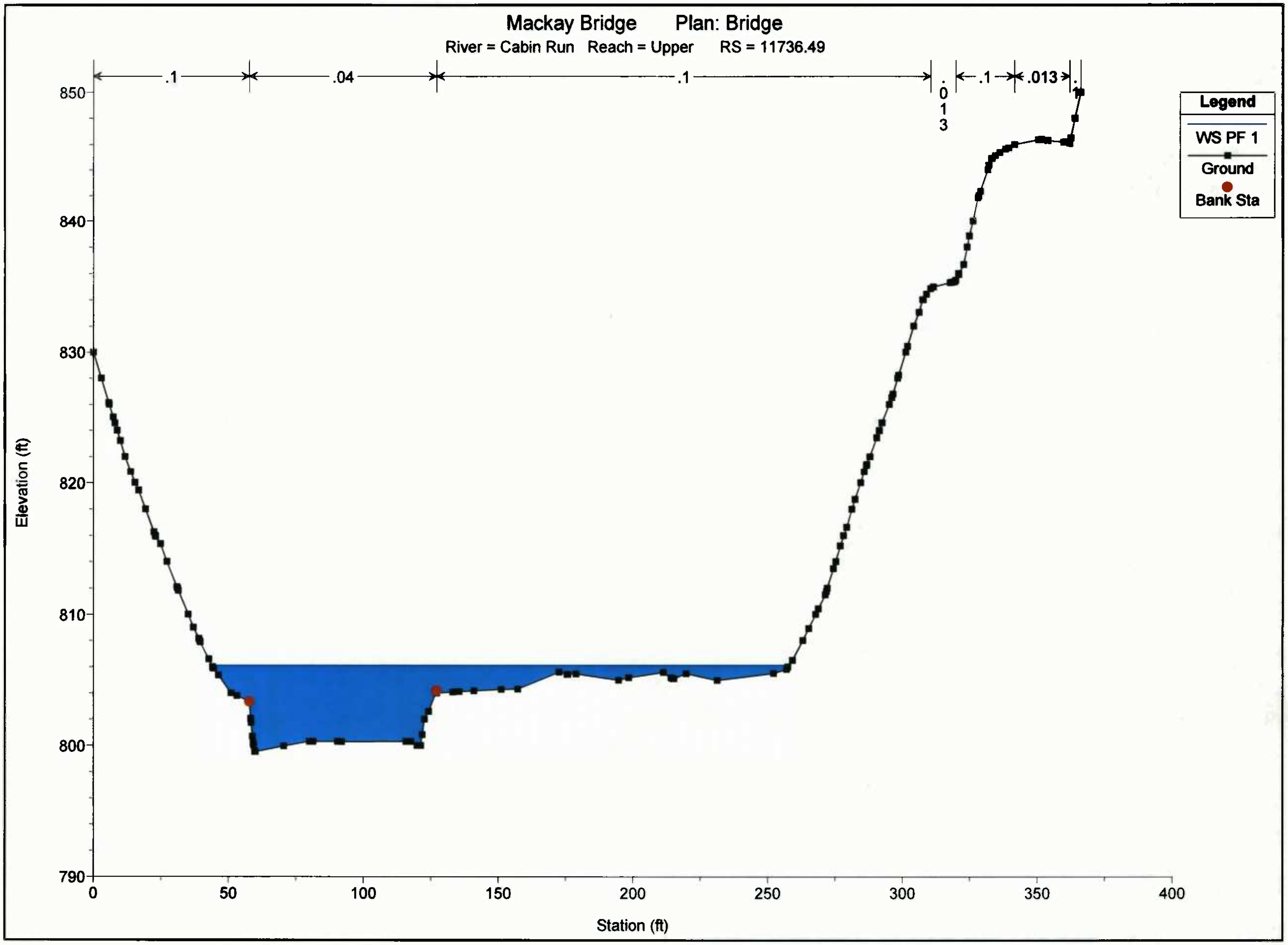
200
300
400
500



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 11736.49
.1
.04
.1
.013
.1
.013
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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840
830
820
810
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790
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50
100
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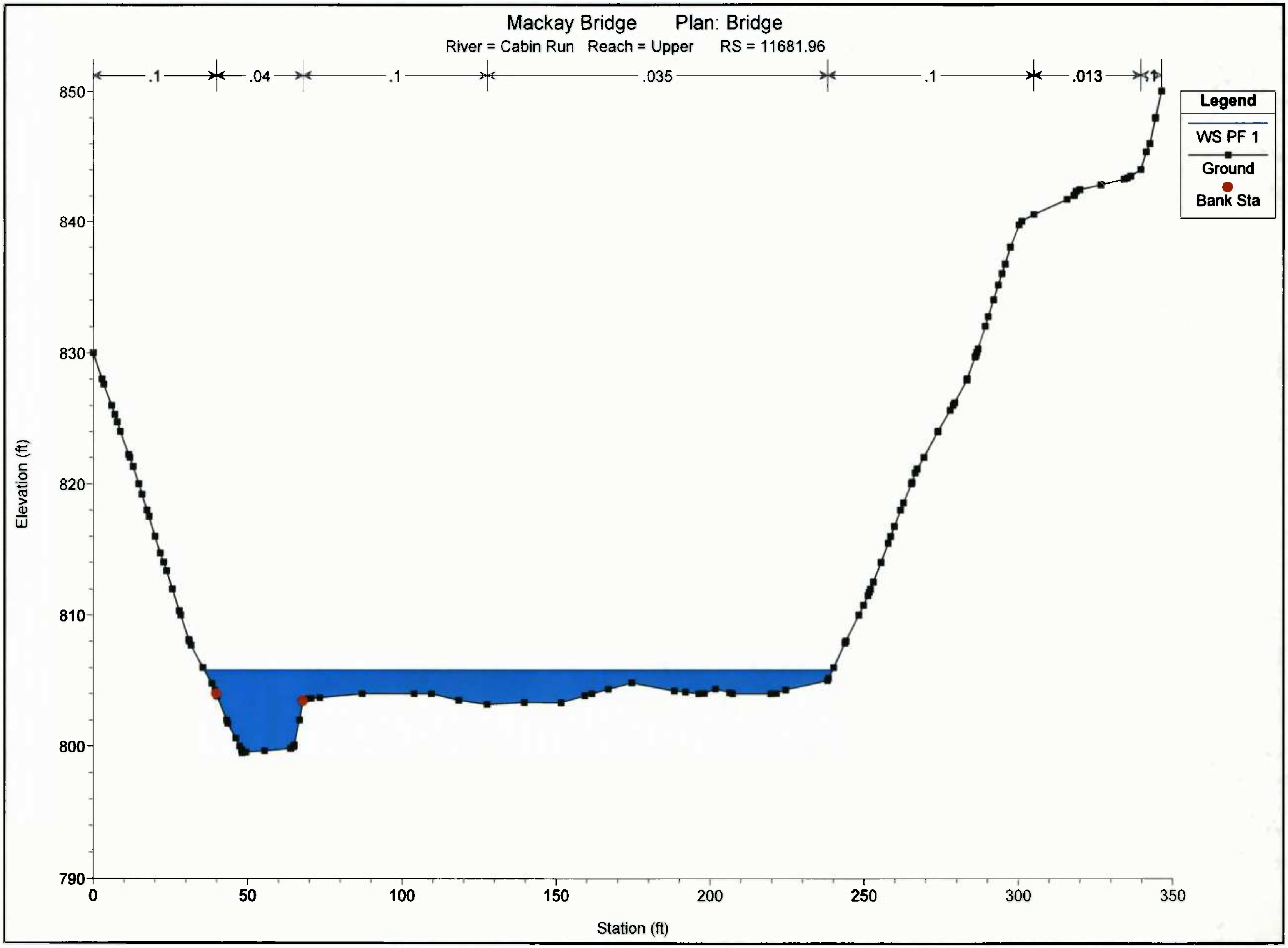
350
400



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 11681.96
.1
.04
.1
.035
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
850
840
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820
810
800
790
Elevation (ft)
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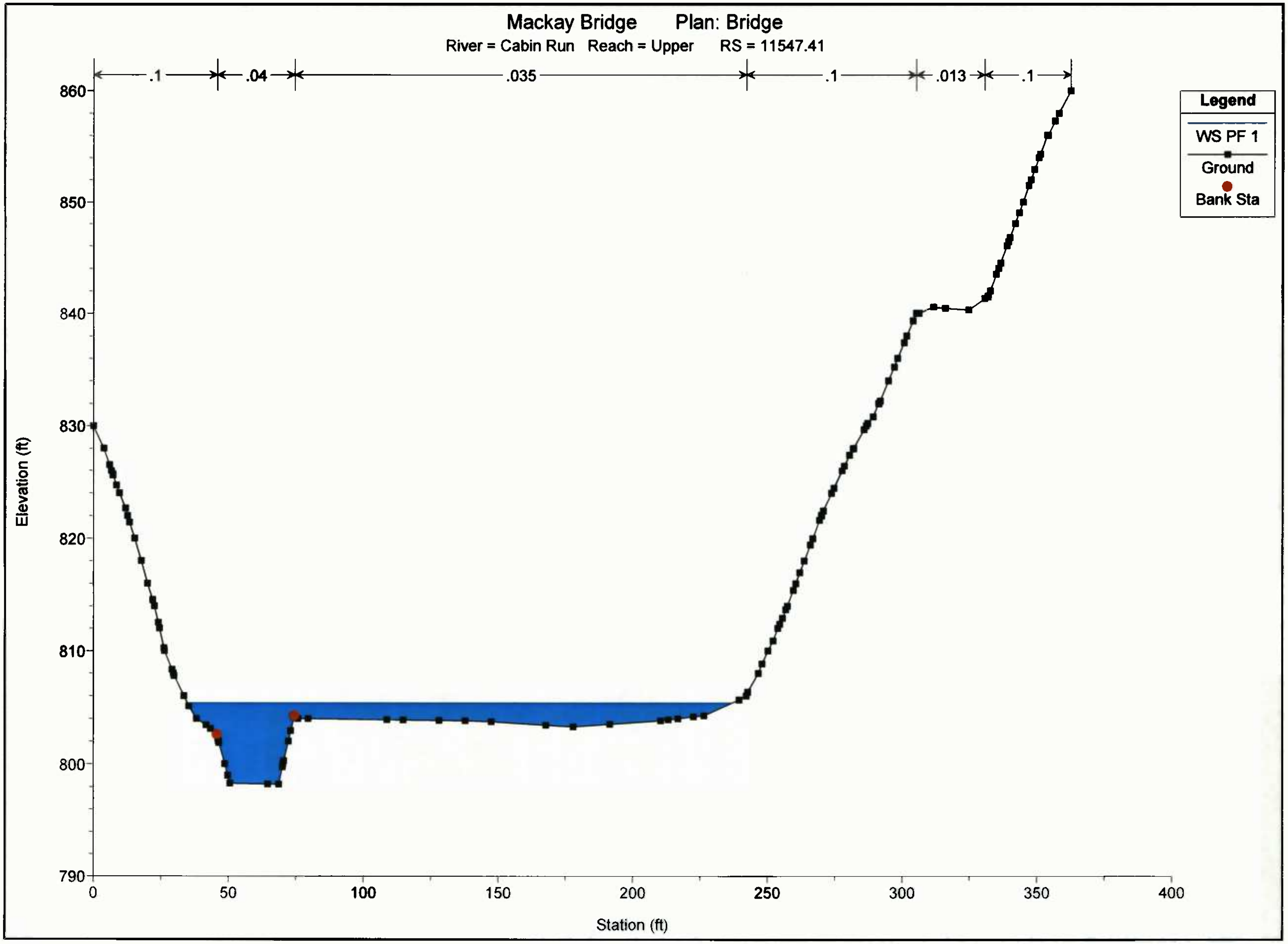
100
150
200
250
300
350
Station (ft)



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 11547.41
.1
.04
.035
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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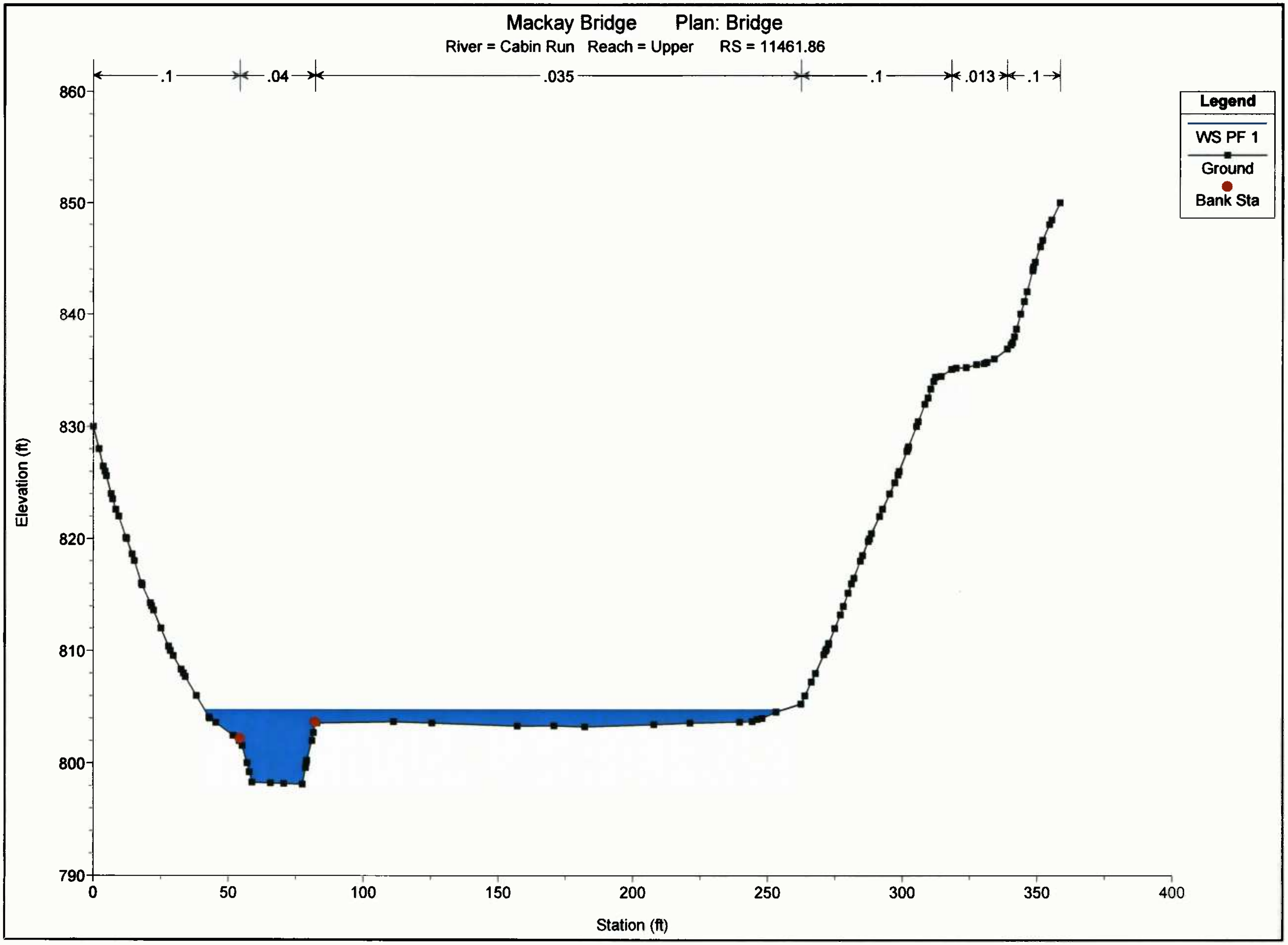
850
840
830
820
810
800
790
0
50
100
150
200
250
300
350
400
Station (ft)


Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 11461.86
.1
.04
.035
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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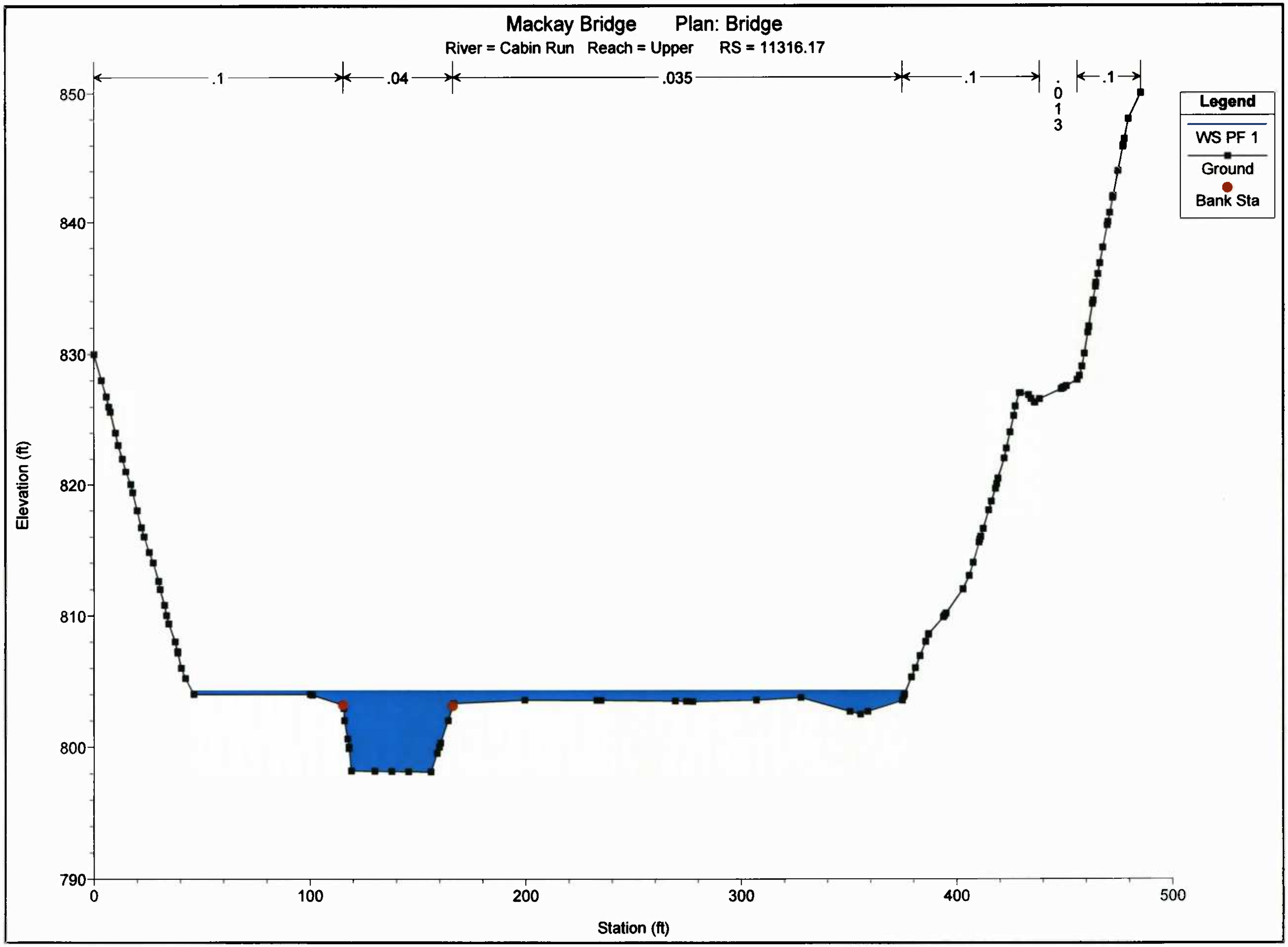
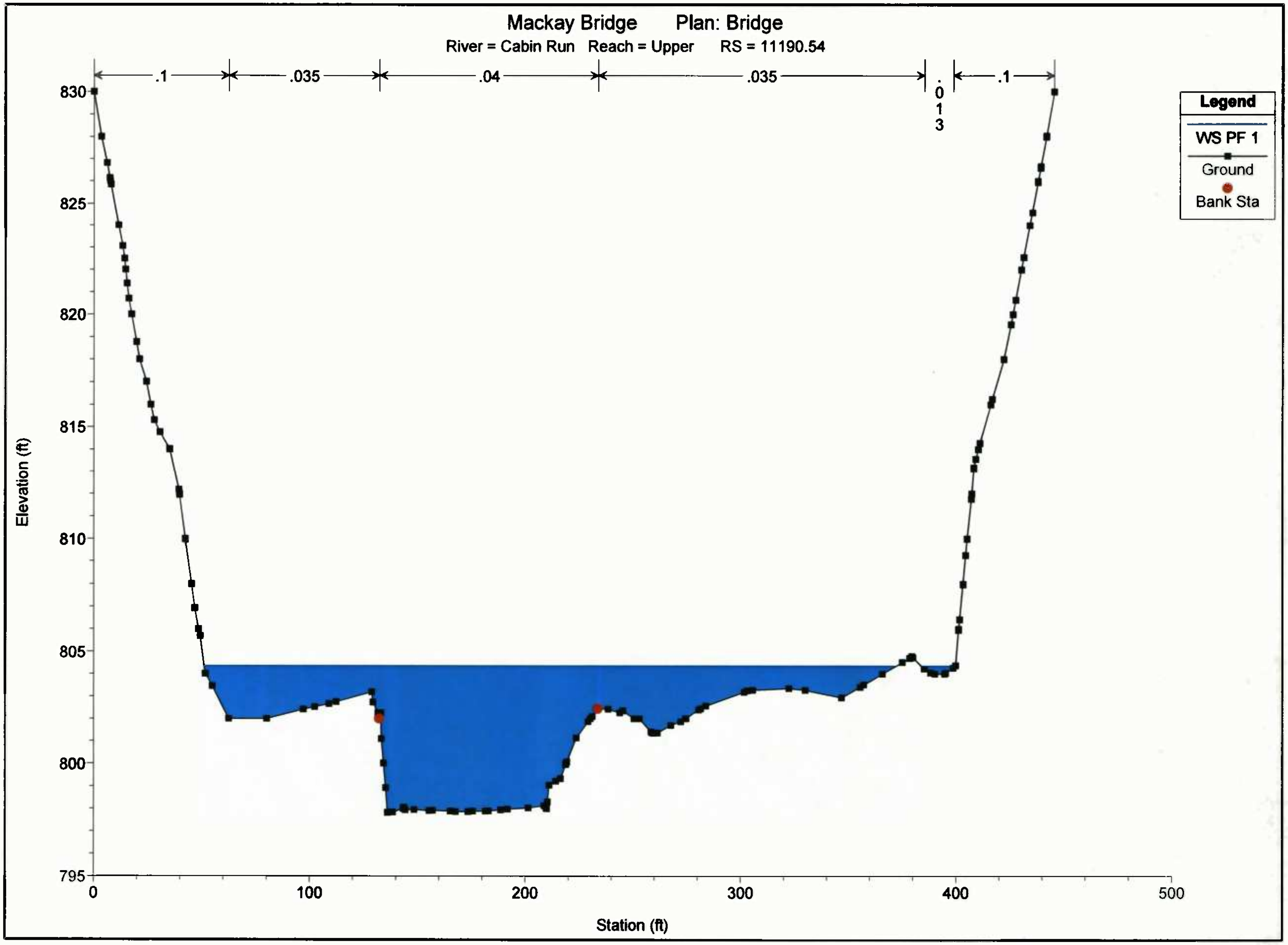
850
840
830
820
810
800
790
0
50
100
150
200
250
300
350
400



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 11316.17
.1
.04
.035
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
850
840
830
820
810
800
790
0
100
200
300
400
500
Station (ft)



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Upper RS = 11190.54
.1
.035
.04
.035
.013
.1
Legend
WS PF 1
Ground
Bank Sta
830
825
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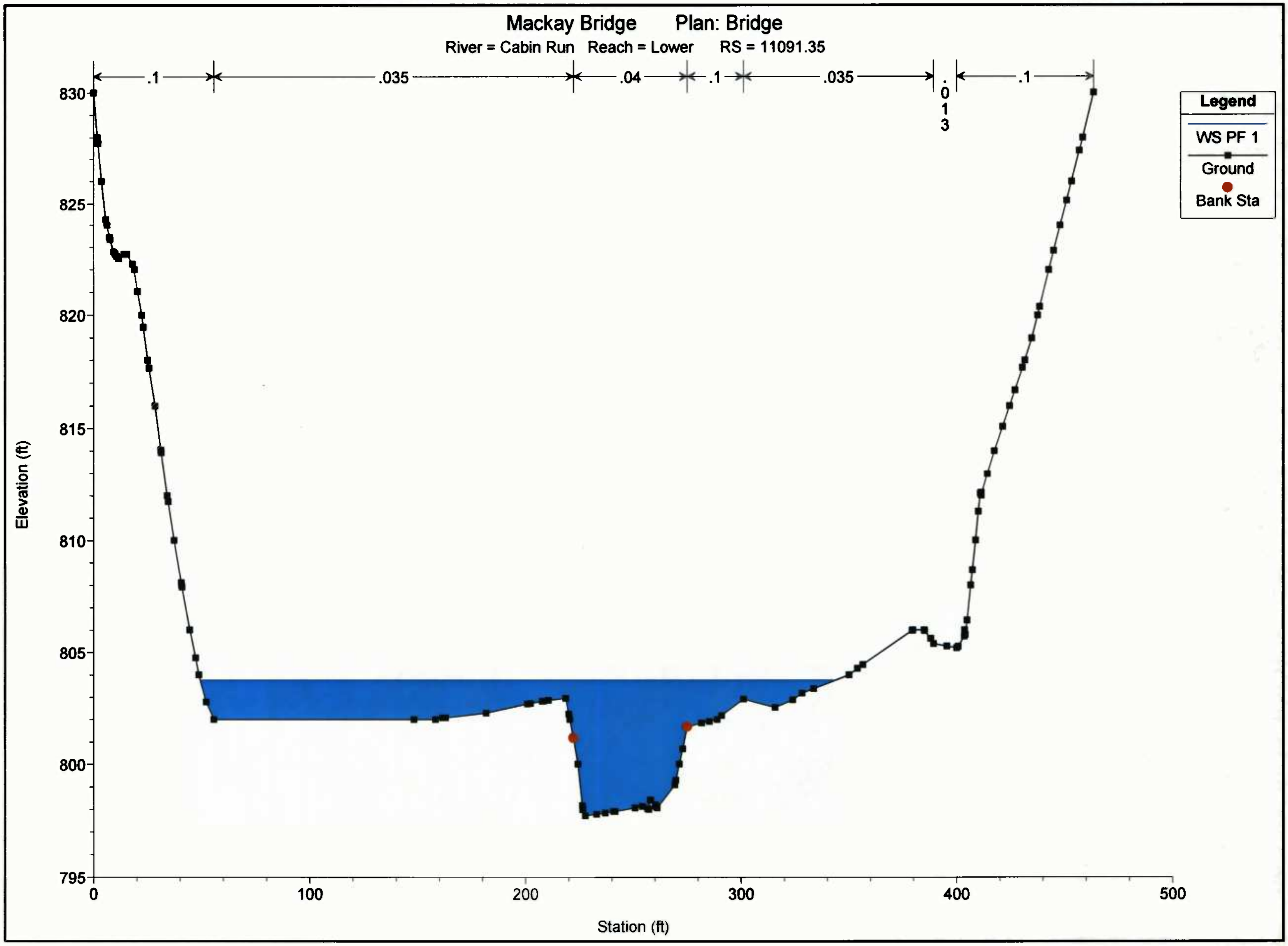
815
810
805
800
795
Elevation (ft)
0
100
200
300
400
500
Station (ft)



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Lower RS = 11091.35
.1
.035
.04
.1
.035
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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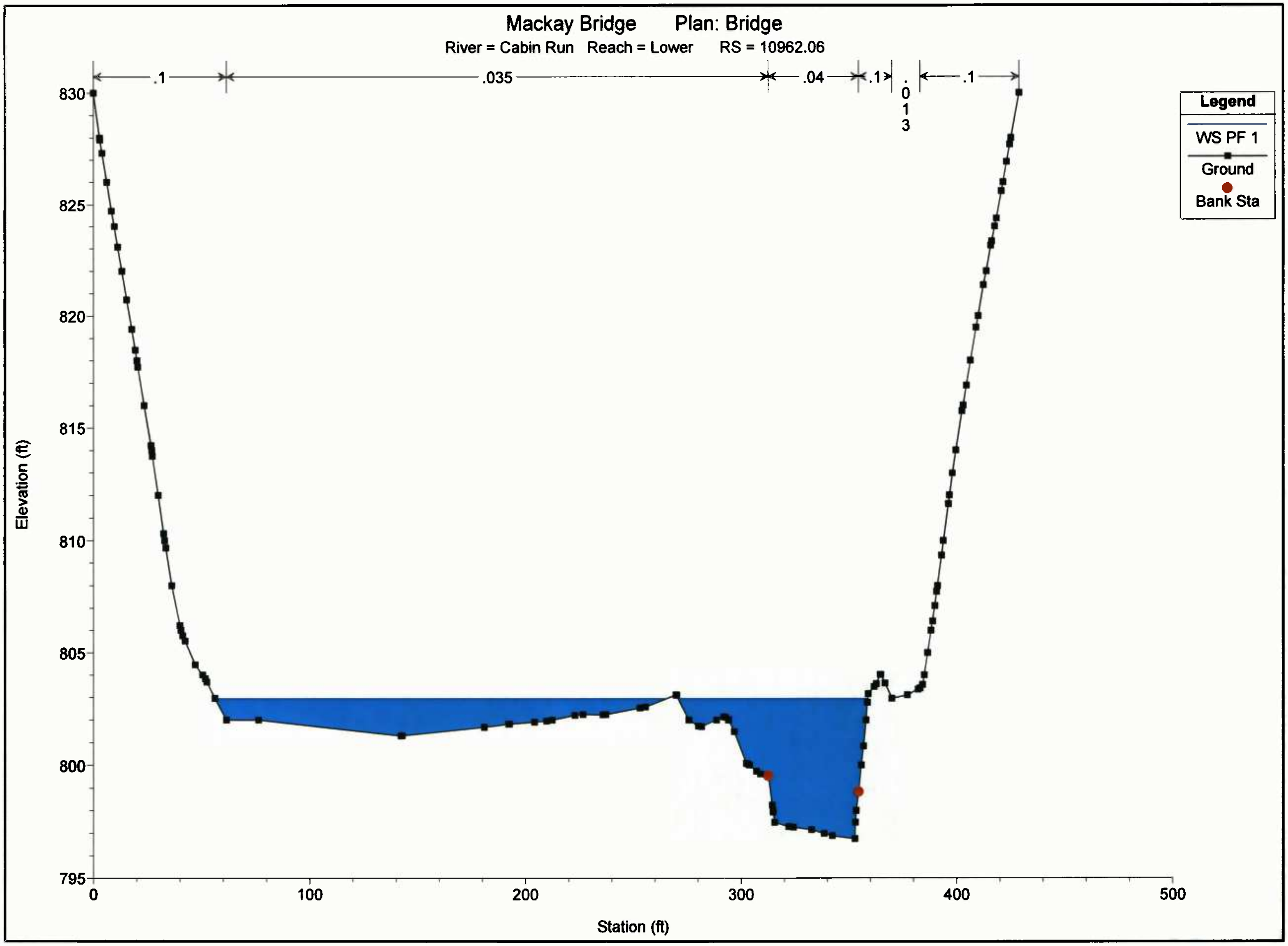
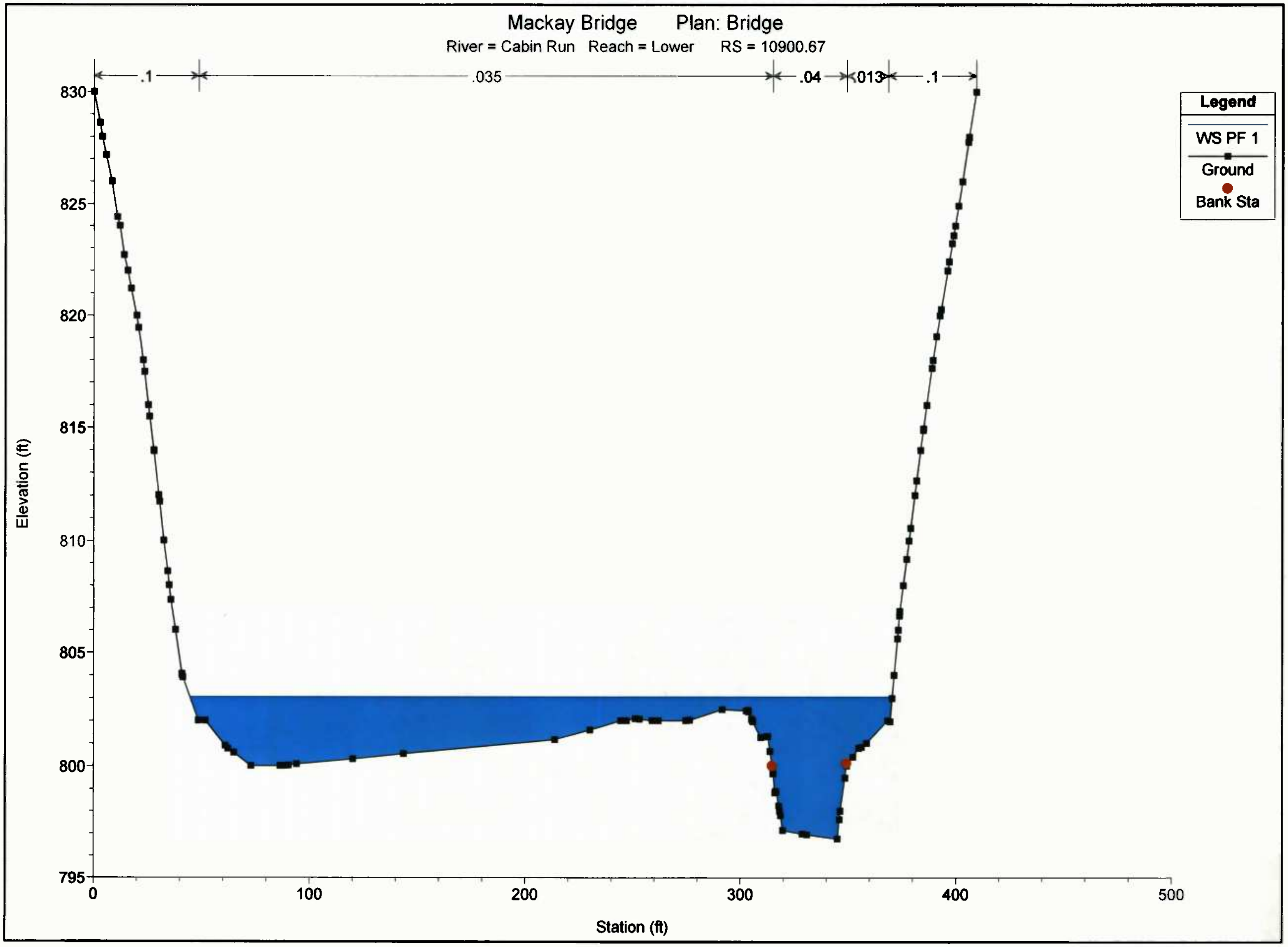
825
820
815
810
805
800
795
0
100
200
300
400
500
Station (ft)


Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Lower RS = 10962.06
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
830
825
820
815
810
805
800
795
Elevation (ft)
0
100
200
300
400
500
Station (ft)


Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Lower RS = 10900.67
.1
.035
.04
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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825
820
815
810
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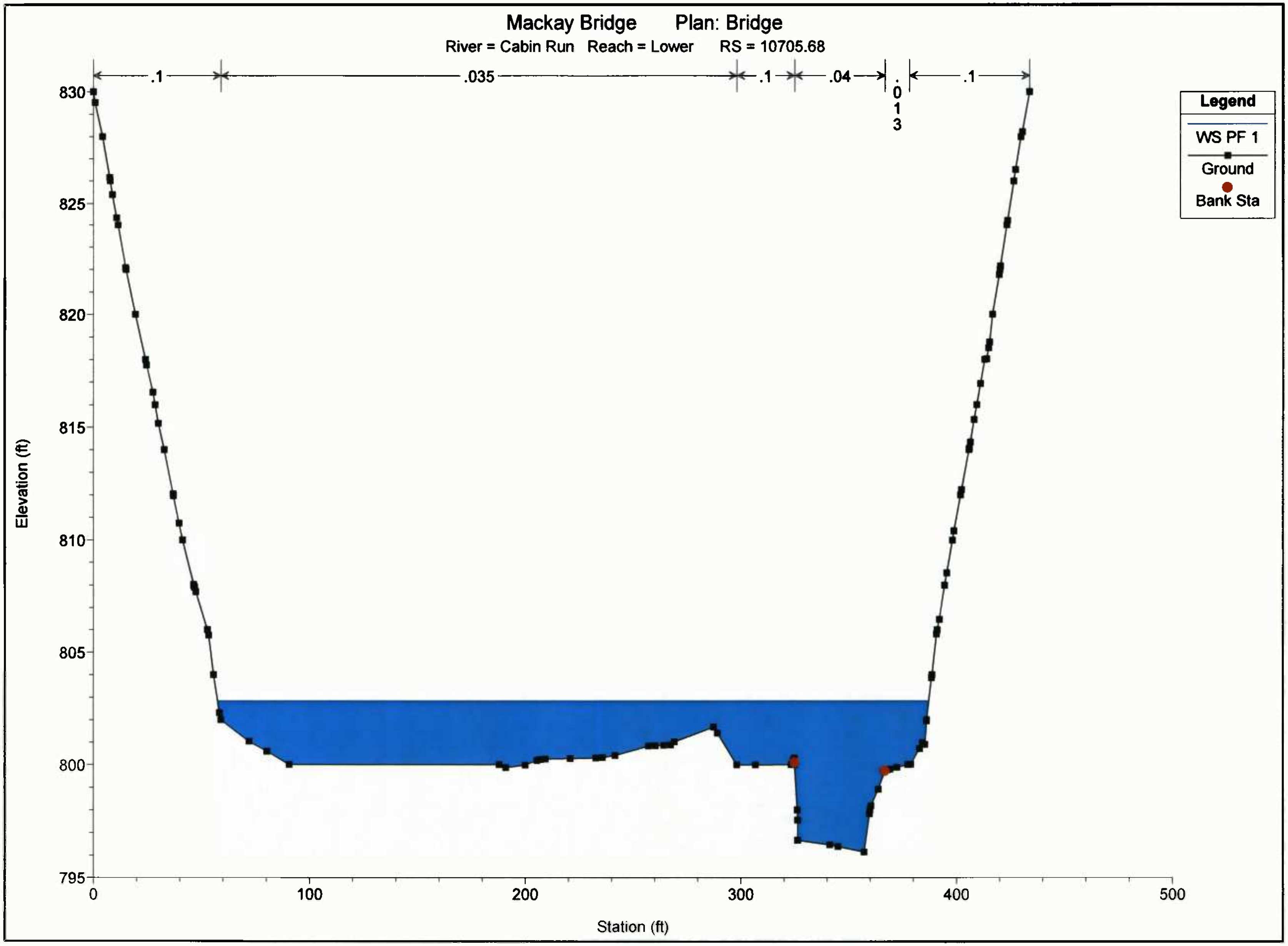
800
795
0
100
200
300
400
500
Station (ft)



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Lower RS = 10705.68
.1
.035
.1
.04
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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820
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795
0
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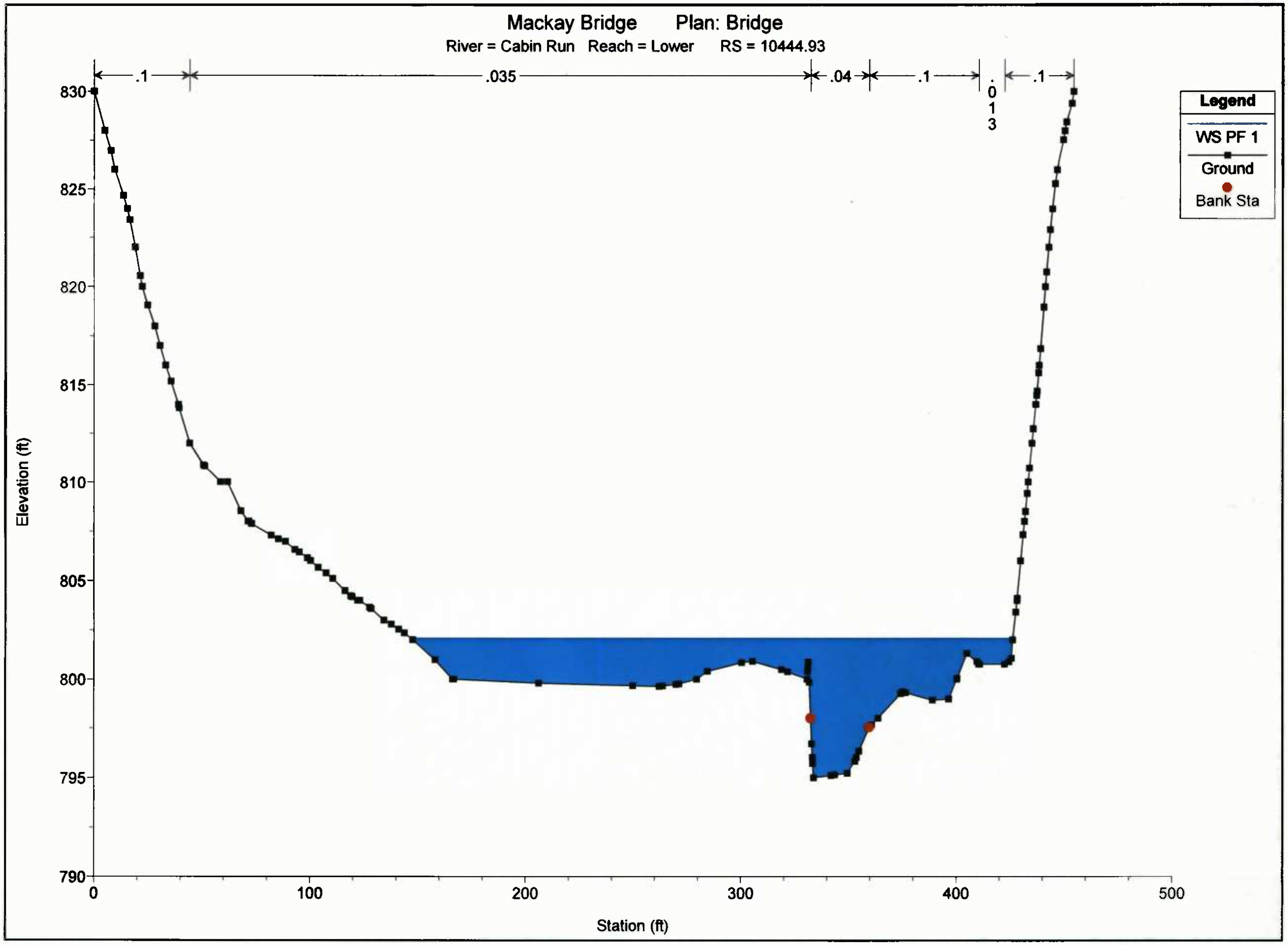
200
300
400
500
Station (ft)



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Lower RS = 10444.93
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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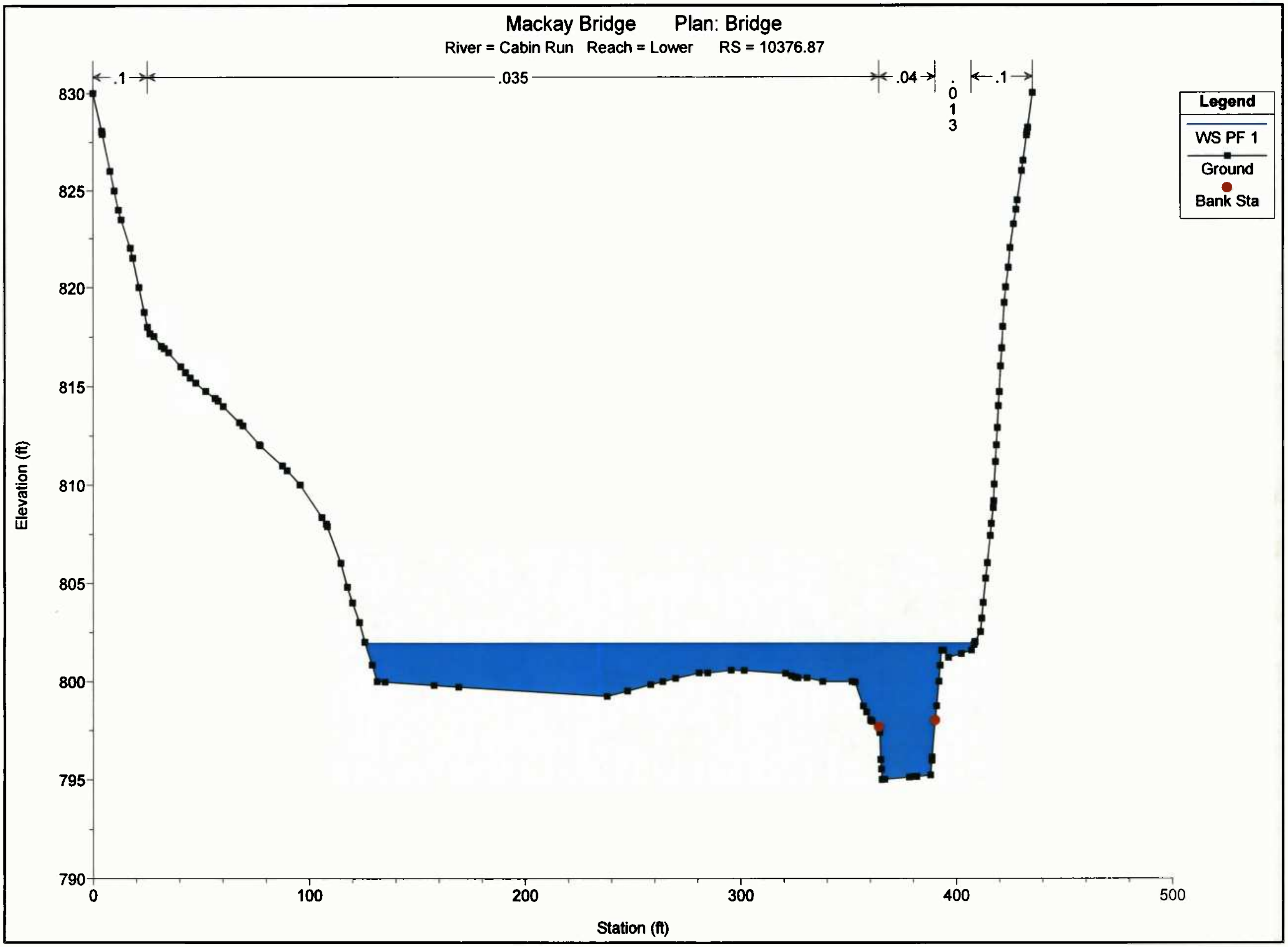
825
820
815
810
805
800
795
790
0
100
200
300
400
500
Station (ft)


Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Lower RS = 10376.87
.1
.035
.04
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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815
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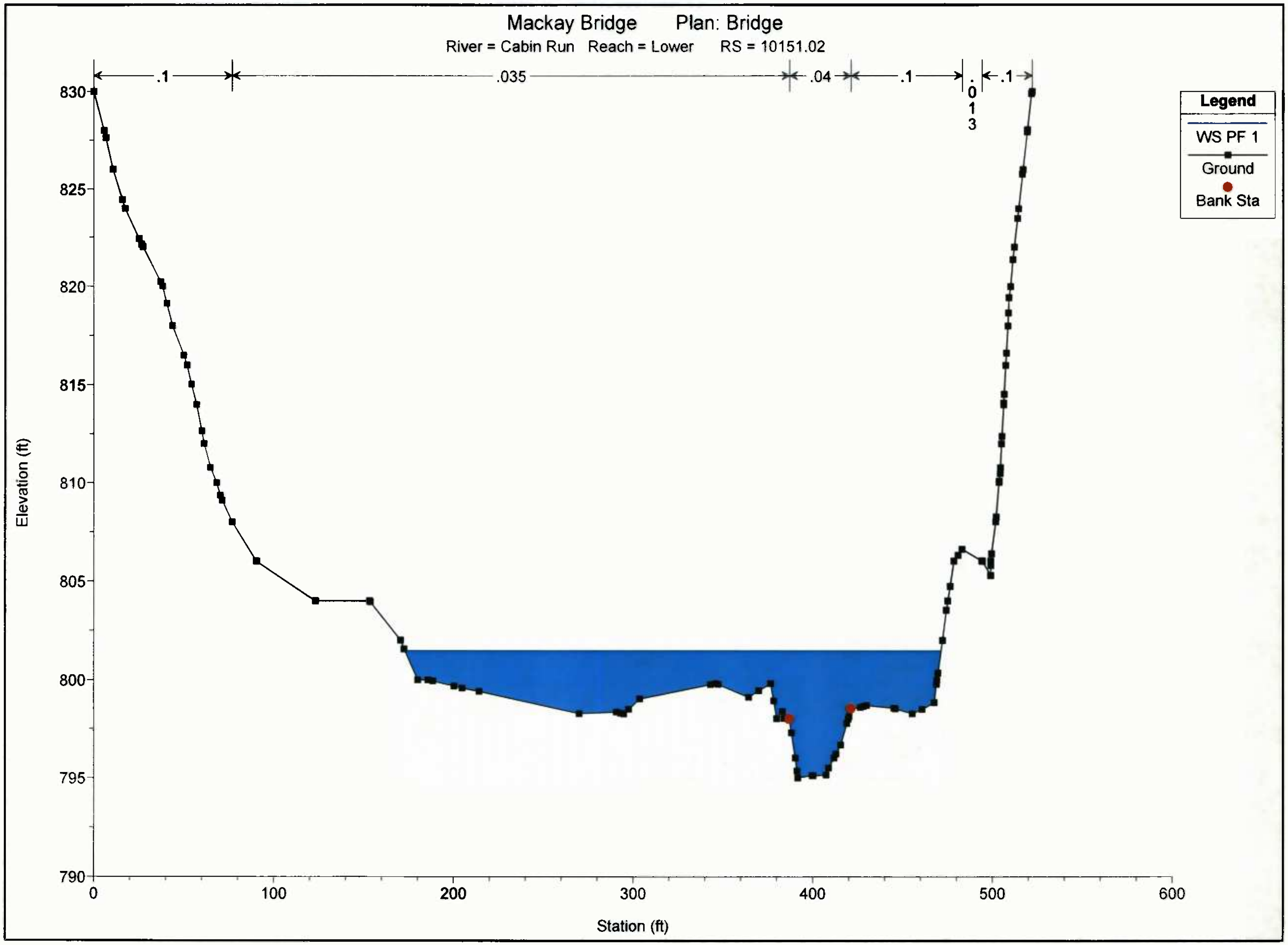
800
795
790
0
100
200
300
400
500
Station (ft)



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Lower RS = 10151.02
.1
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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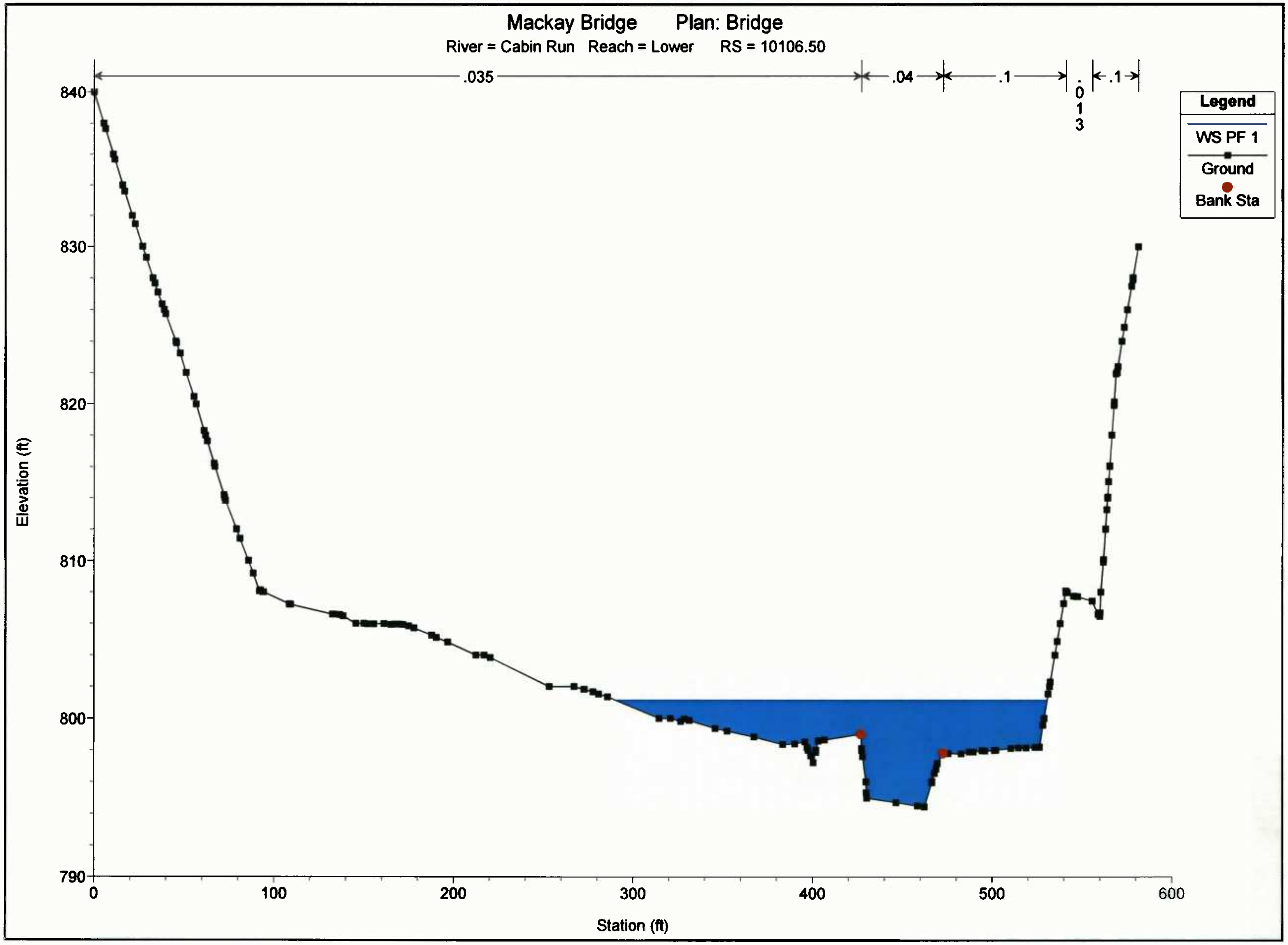
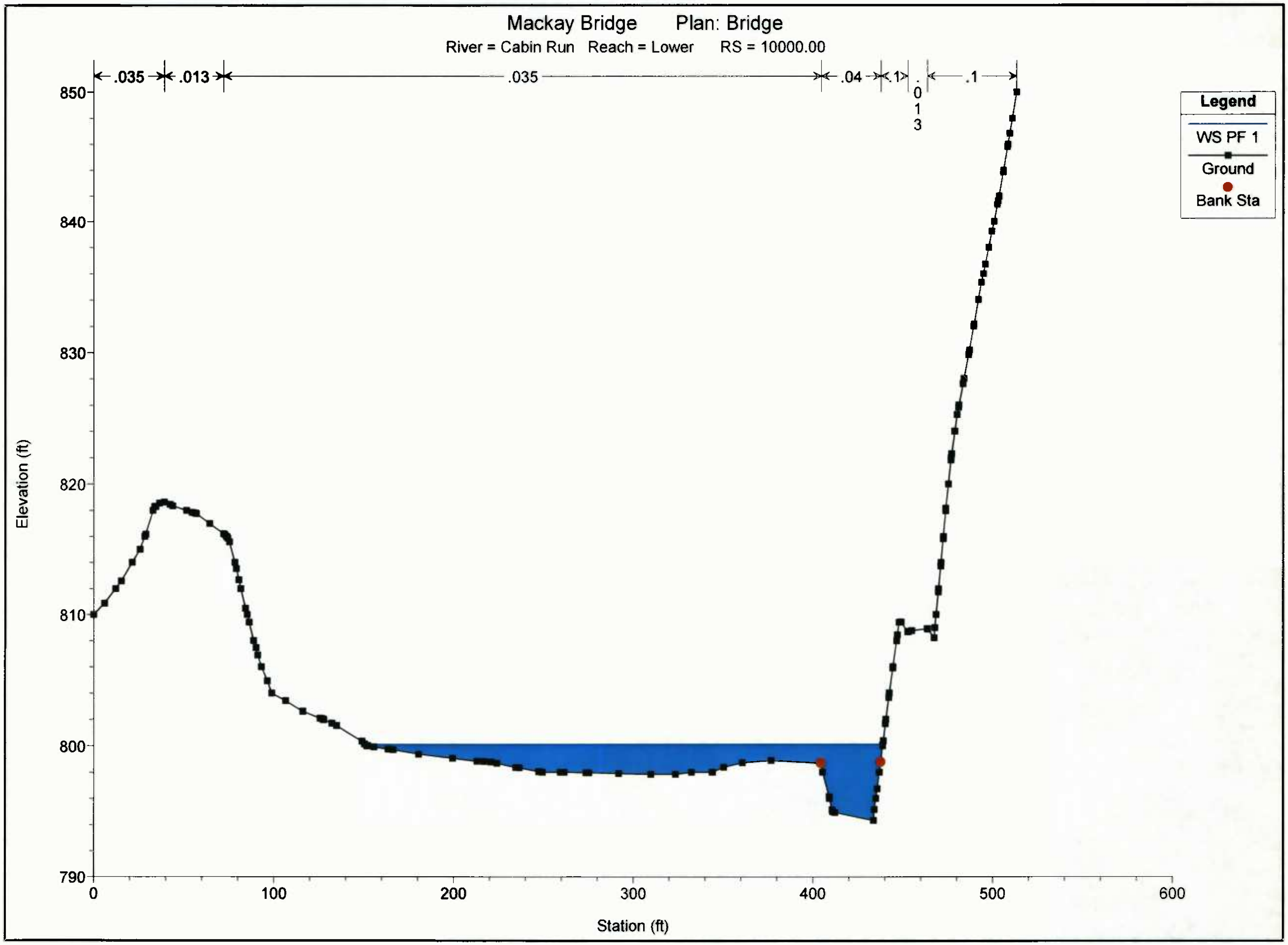
825
820
815
810
805
800
795
790
0
100
200
300
400
500
600


Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Lower RS = 10106.50
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
840
830
820
810
800
790
Elevation (ft)
0
100
200
300
400
500
600
Station (ft)



Mackay Bridge Plan: Bridge
River = Cabin Run Reach = Lower RS = 10000.00
.035
.013
.035
.04
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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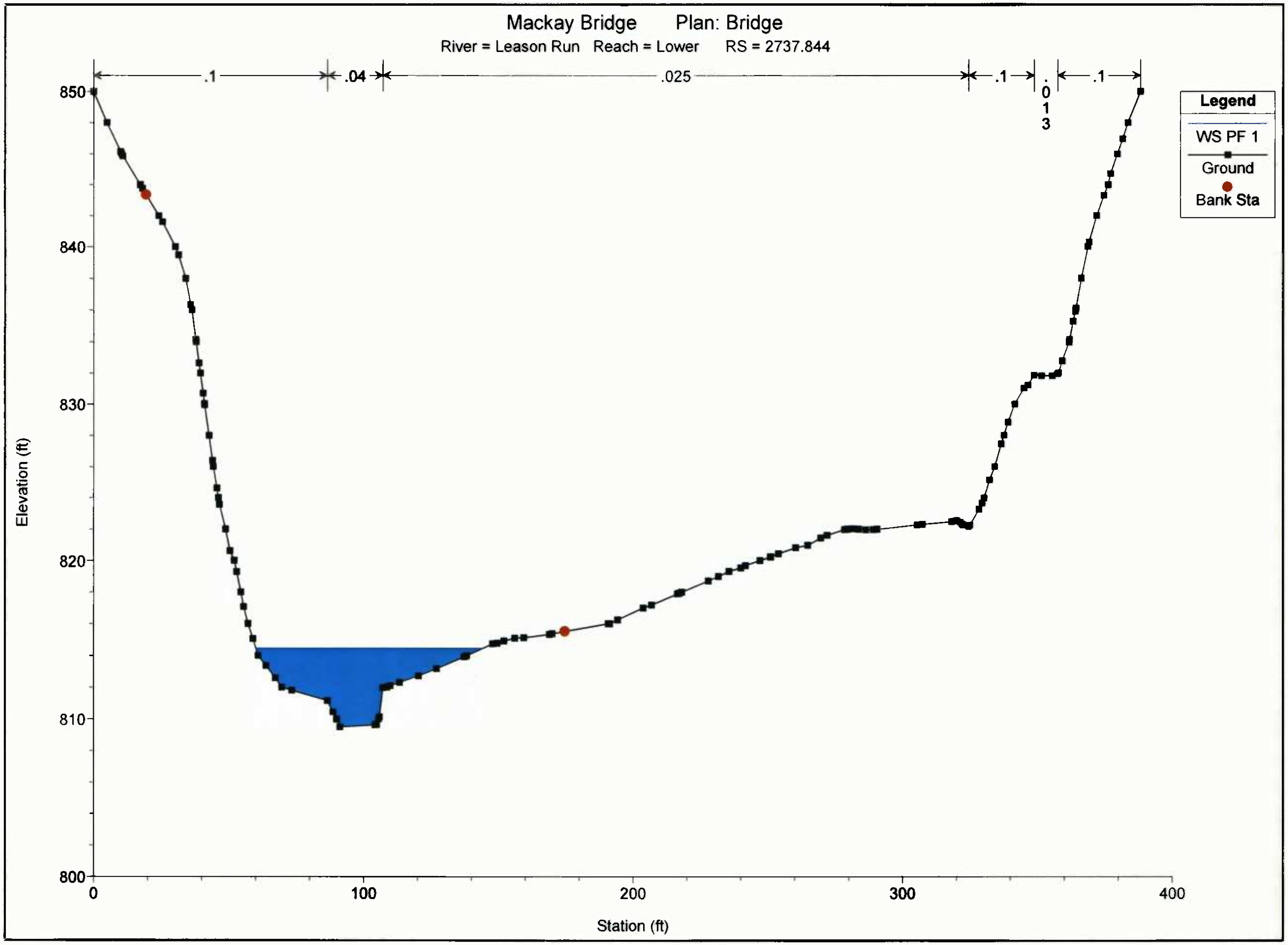
840
830
820
810
800
790
Station (ft)
0
100
200
300
400
500
600


Mackay Bridge Plan: Bridge
River = Leason Run Reach = Lower RS = 2737.844
.1
.04
.025
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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830
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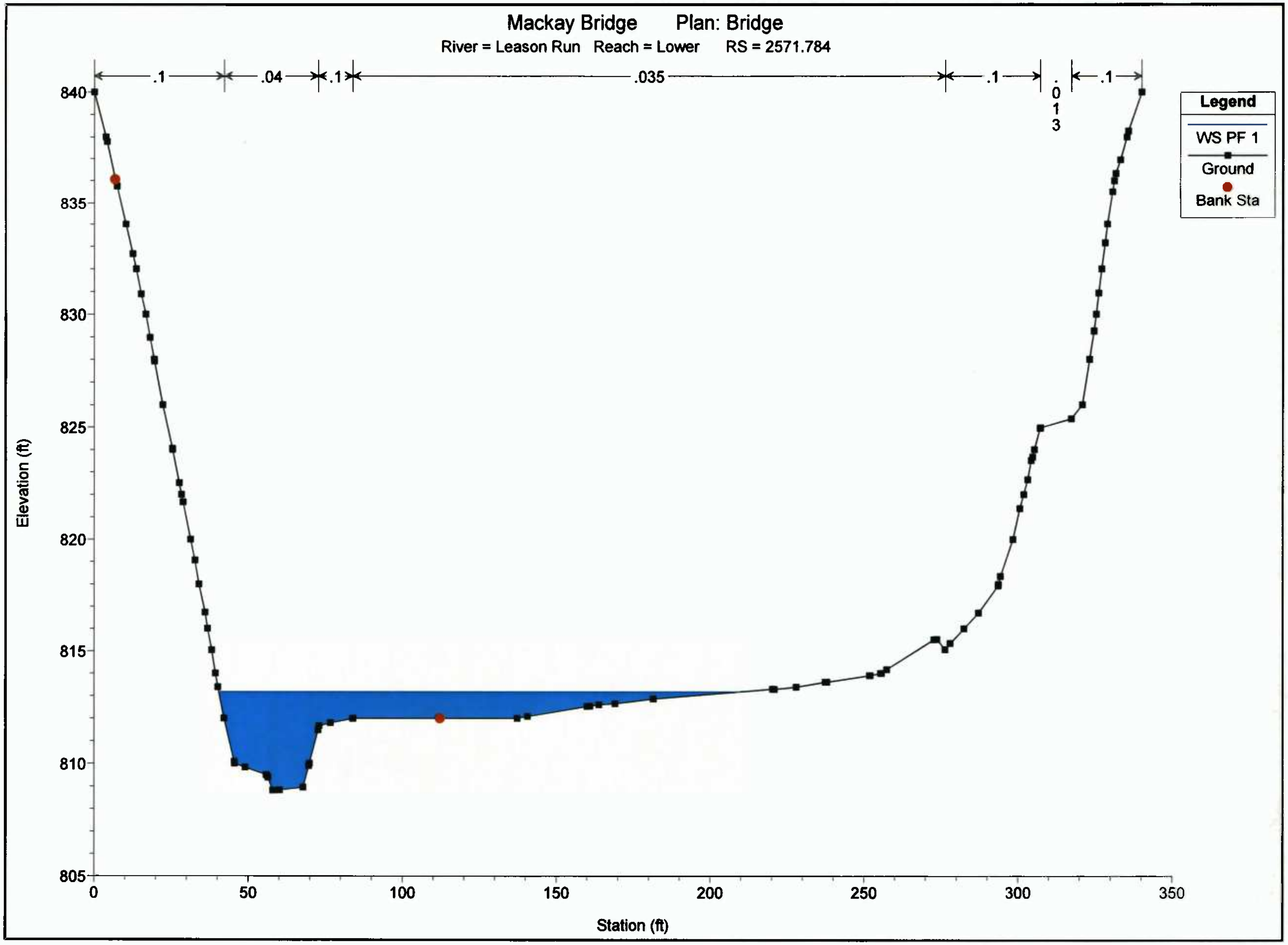
800
0
100
200
300
400
Station (ft)


Mackay Bridge Plan: Bridge
River = Leason Run Reach = Lower RS = 2571.784
.1
.04
.1
.035
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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820
815
810
805
0
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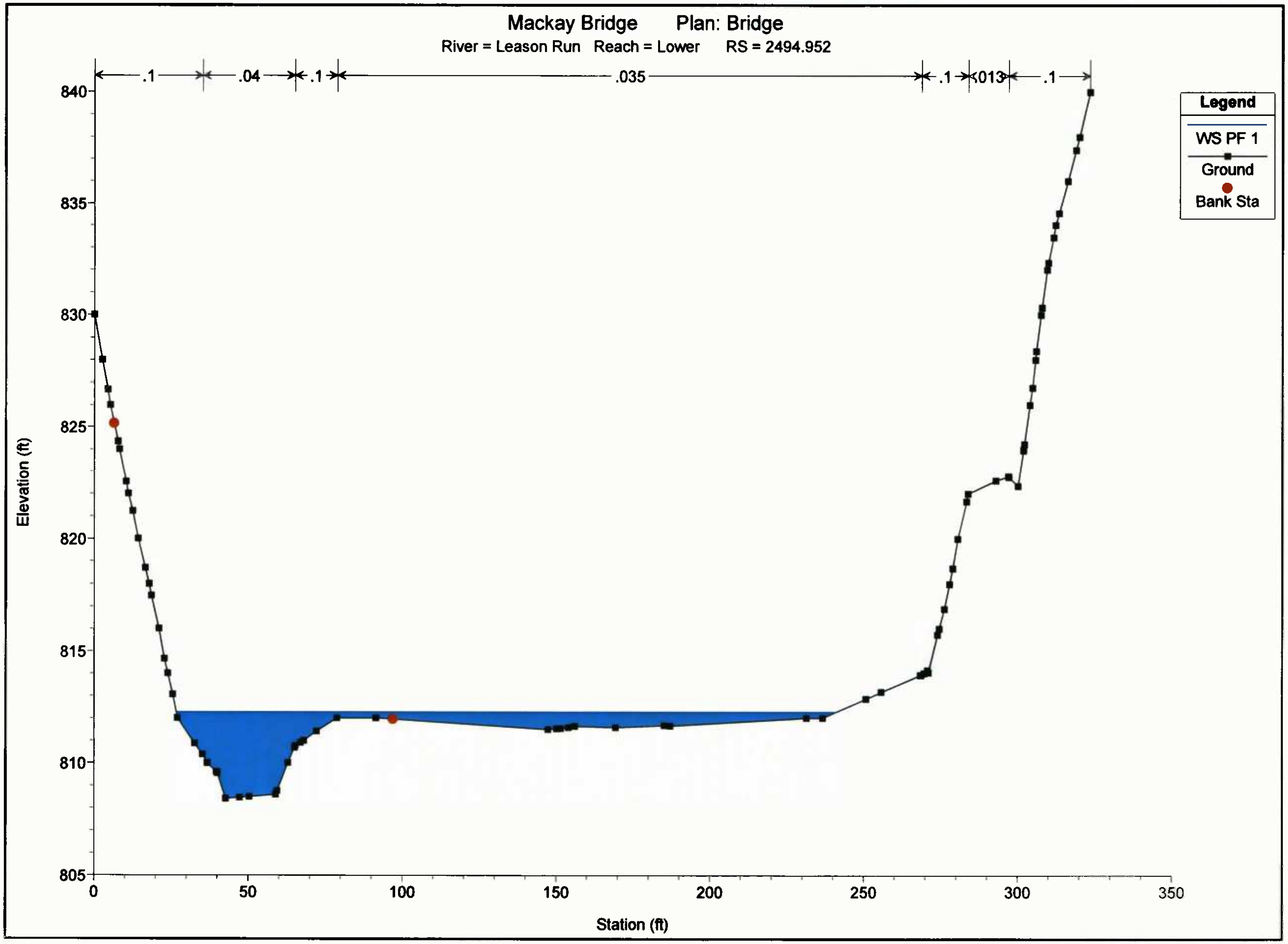
100
150
200
250
300
350
Station (ft)



Mackay Bridge Plan: Bridge
River = Leason Run Reach = Lower RS = 2494.952
.1
.04
.1
.035
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
840
835
830
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815
810
805
Elevation (ft)
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100
150
200
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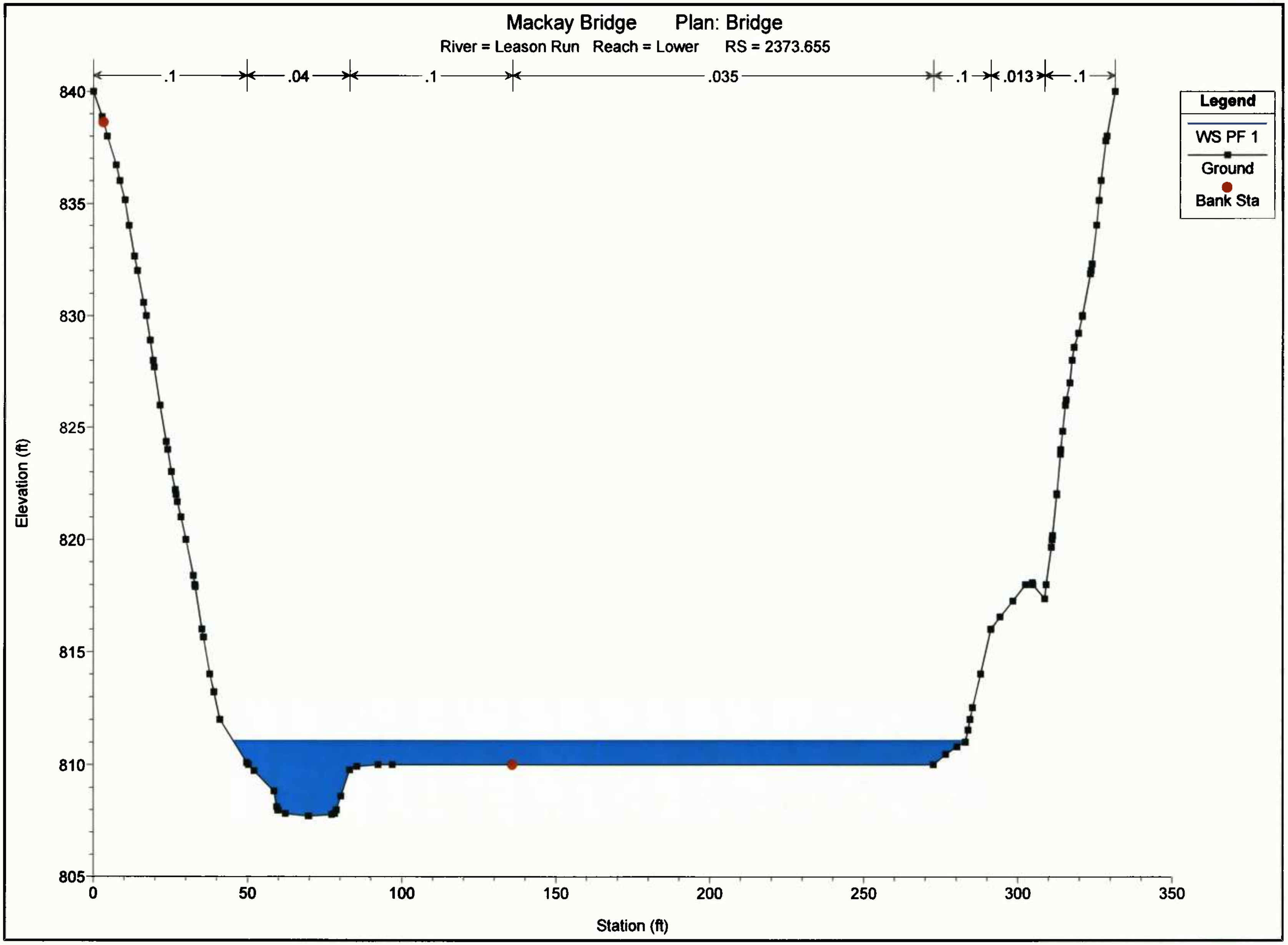
300
350
Station (ft)



Mackay Bridge Plan: Bridge
River = Leason Run Reach = Lower RS = 2373.655
.1
.04
.1
.035
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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820
815
810
805
0
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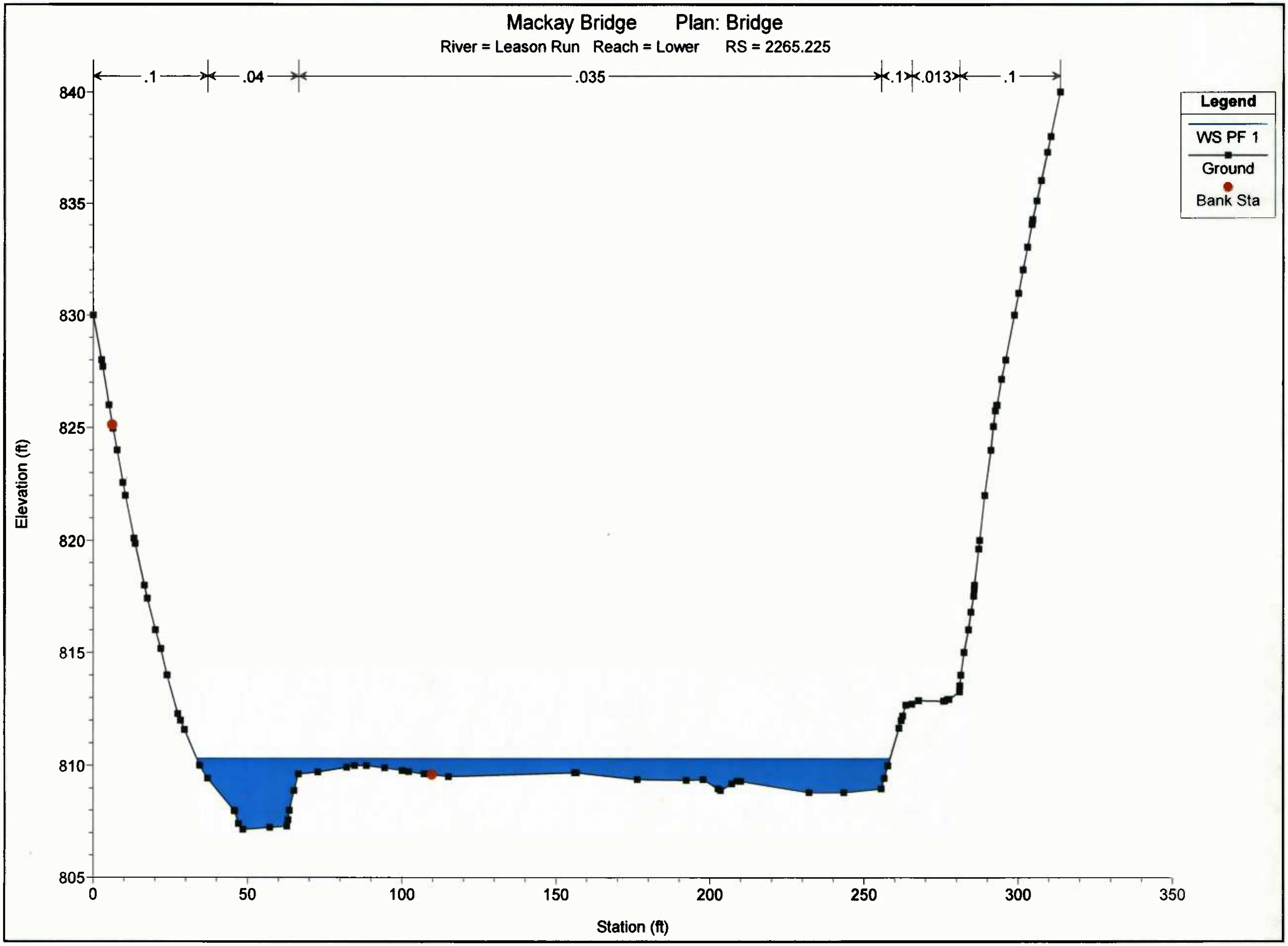
100
150
200
250
300
350
Station (ft)



Mackay Bridge Plan: Bridge
River = Leason Run Reach = Lower RS = 2265.225
.1
.04
.035
.1
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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825
820
815
810
805
0
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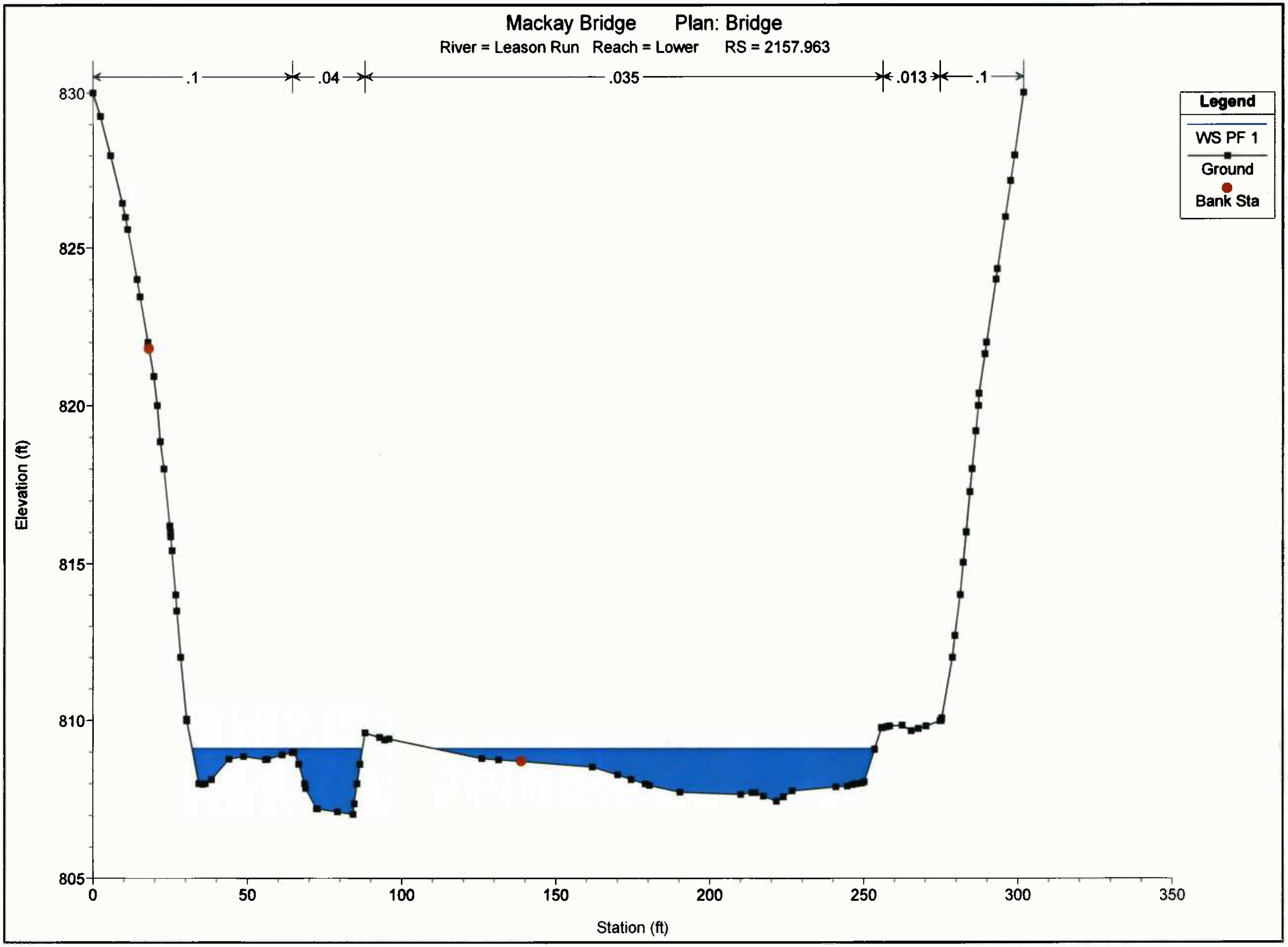
100
150
200
250
300
350
Station (ft)



Mackay Bridge Plan: Bridge
River = Leason Run Reach = Lower RS = 2157.963
.1
.04
.035
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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820
815
810
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0
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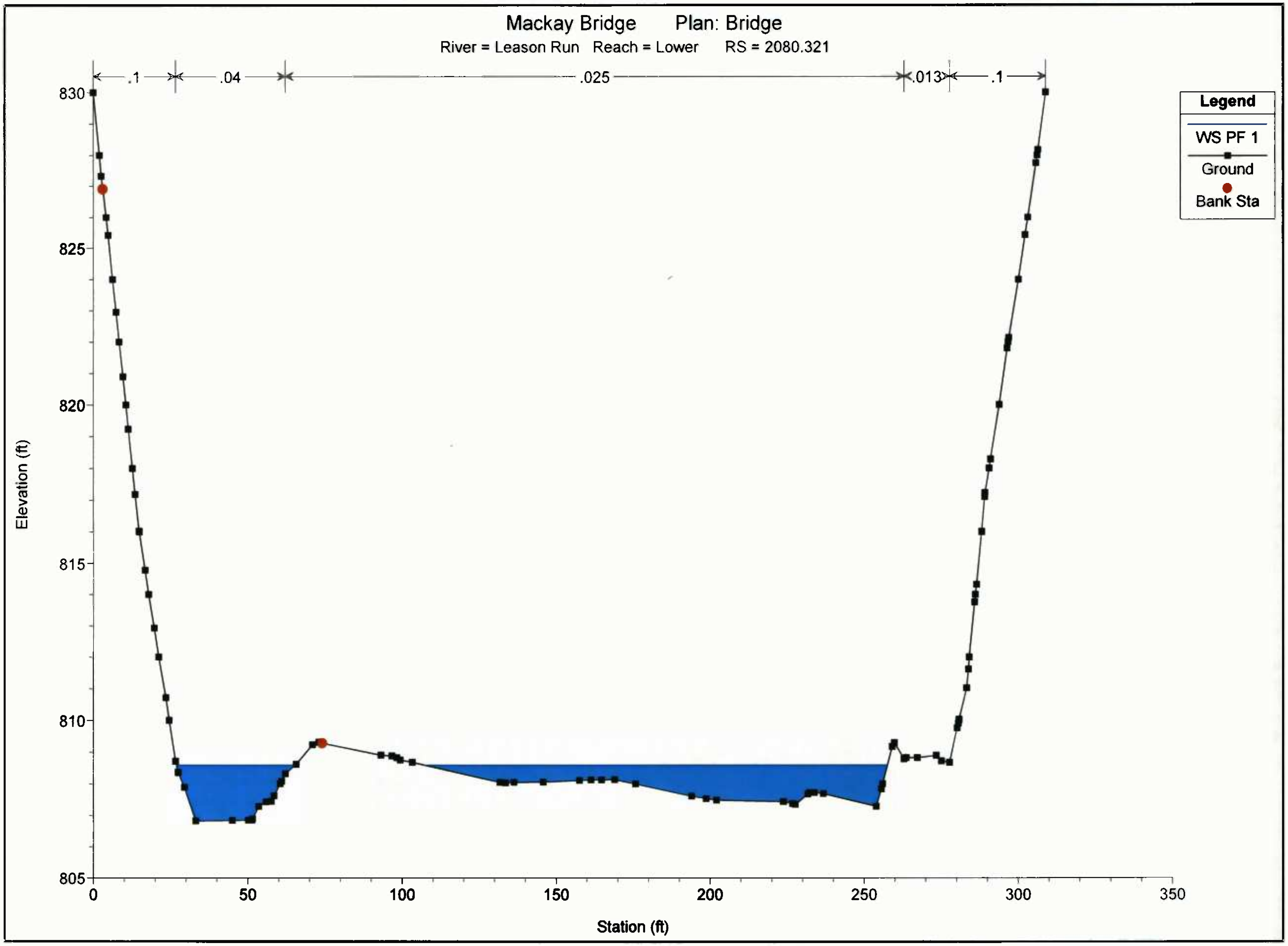
100
150
200
250
300
350
Station (ft)



Mackay Bridge Plan: Bridge
River = Leason Run Reach = Lower RS = 2080.321
.1
.04
.025
.013
.1
Legend
WS PF 1
Ground
Bank Sta
830
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815
810
805
Elevation (ft)
0
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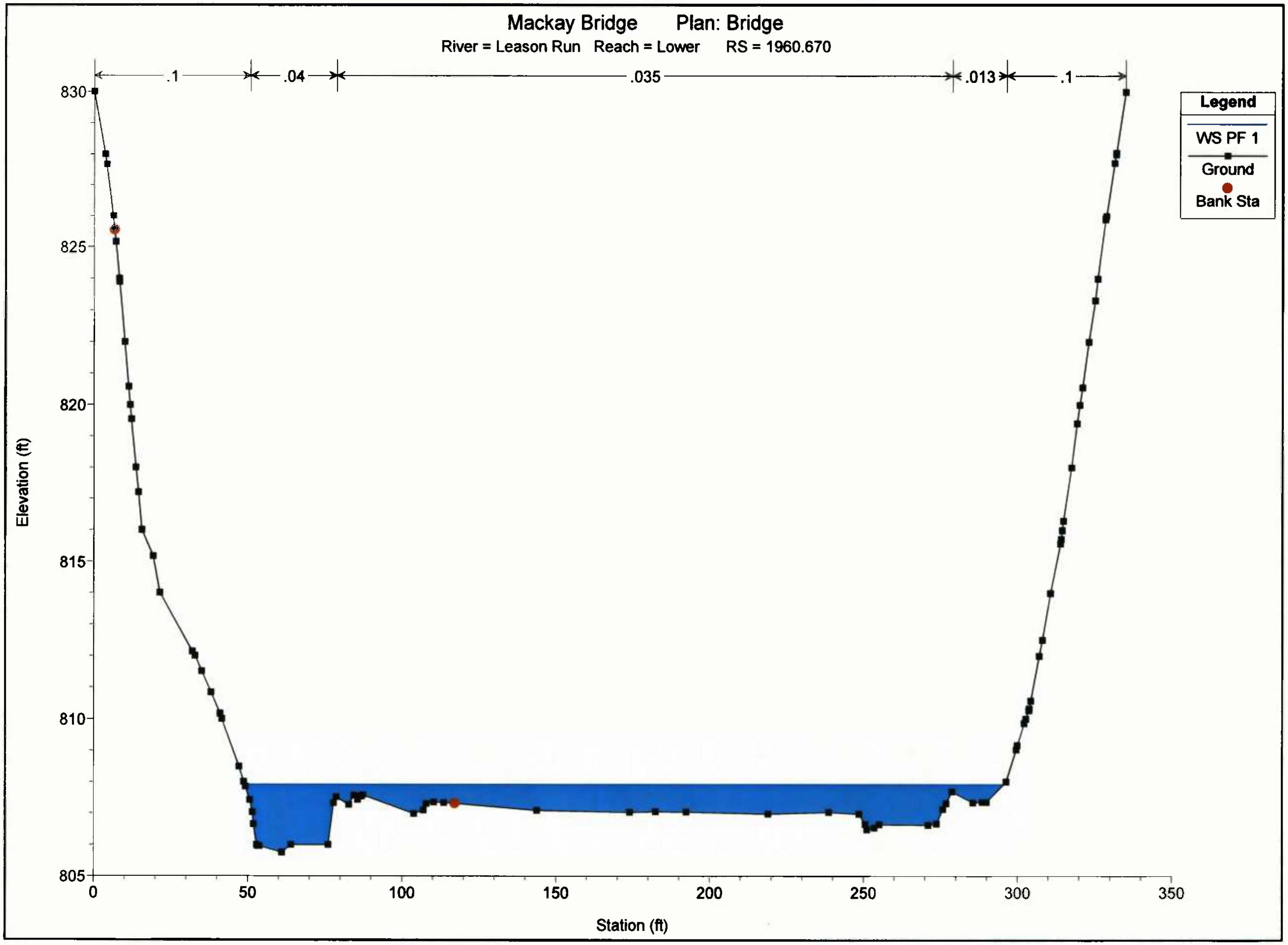
100
150
200
250
300
350
Station (ft)



Mackay Bridge Plan: Bridge
River = Leason Run Reach = Lower RS = 1960.670
.1
.04
.035
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
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820
815
810
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0
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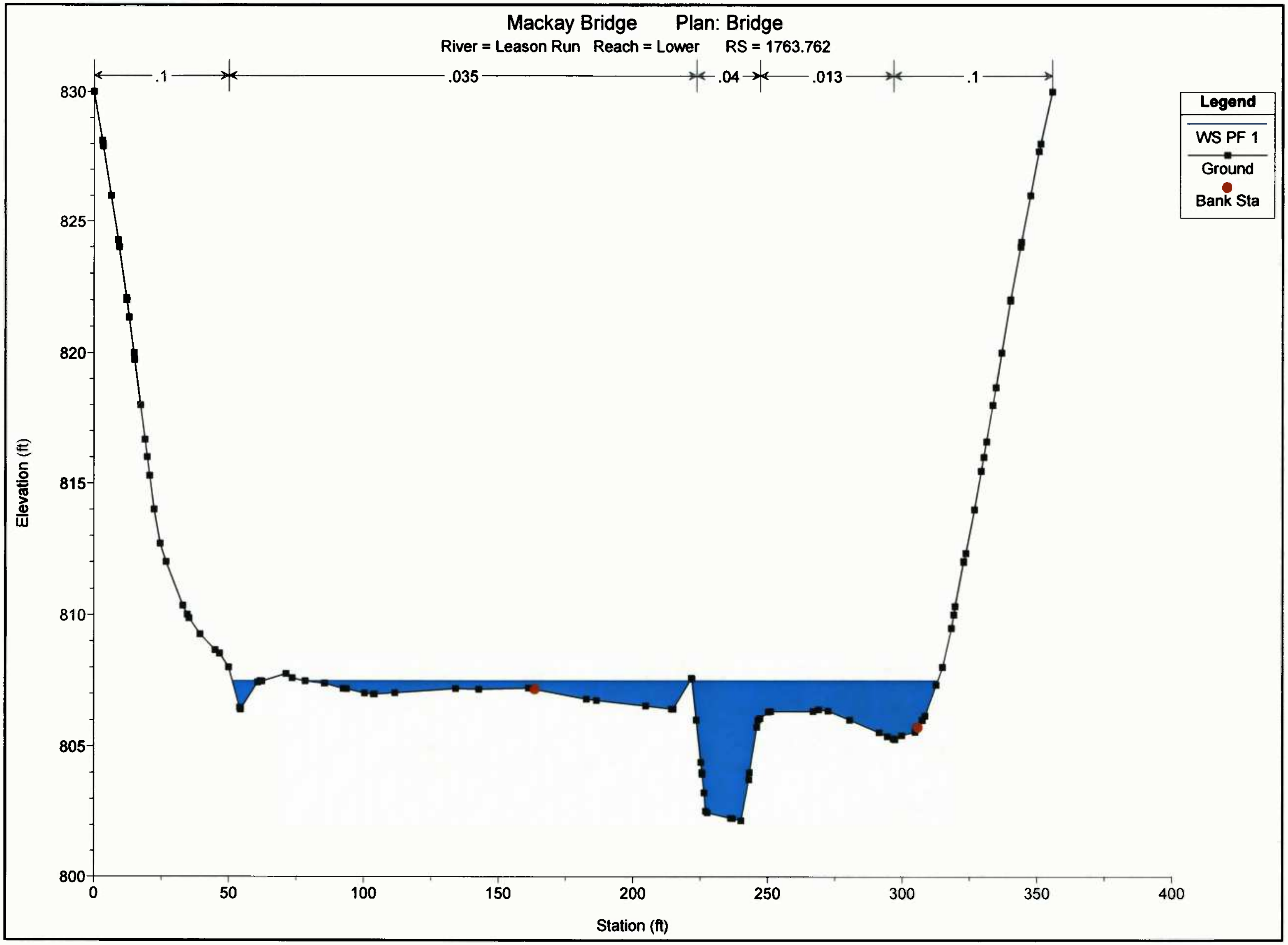
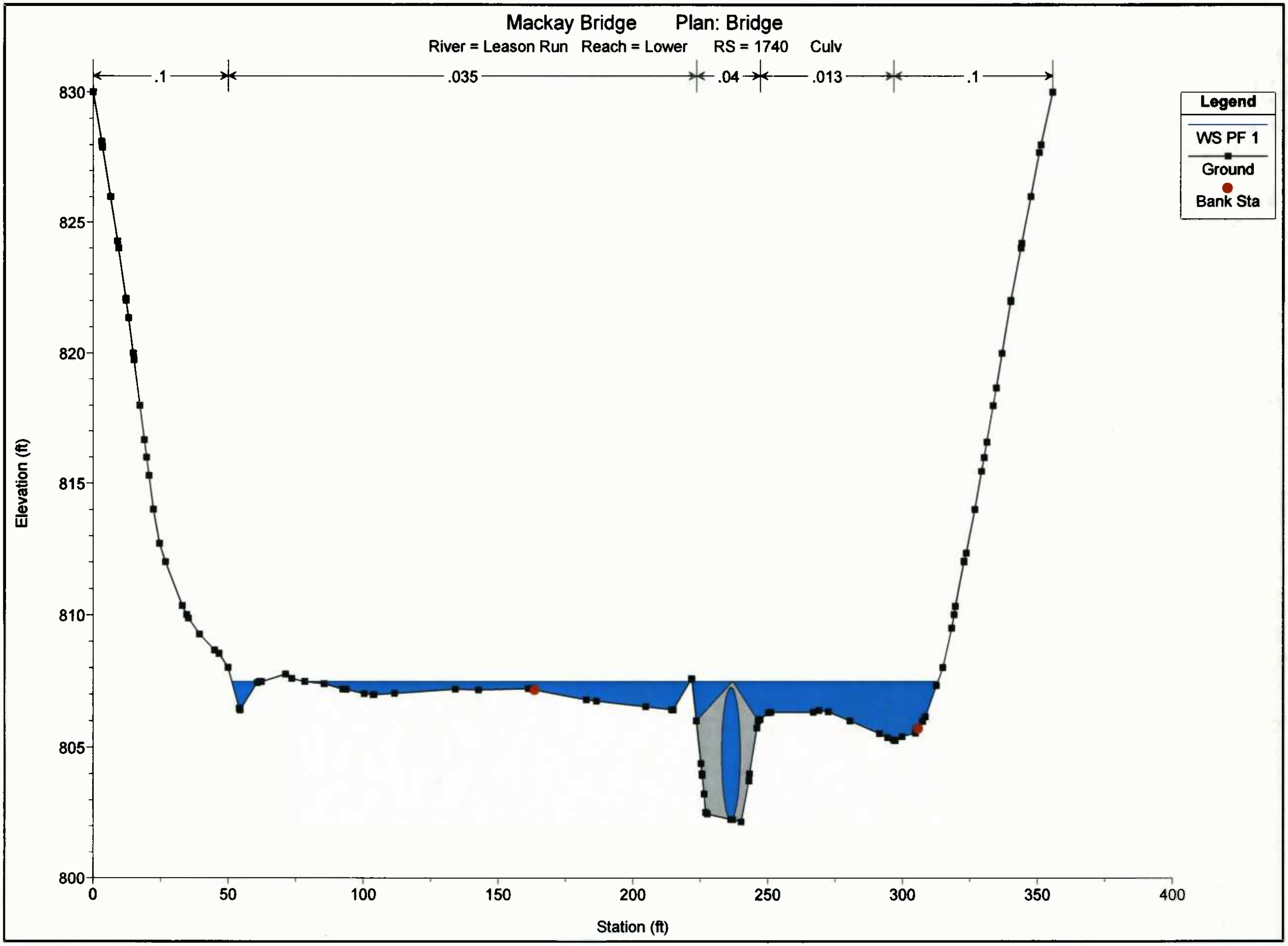
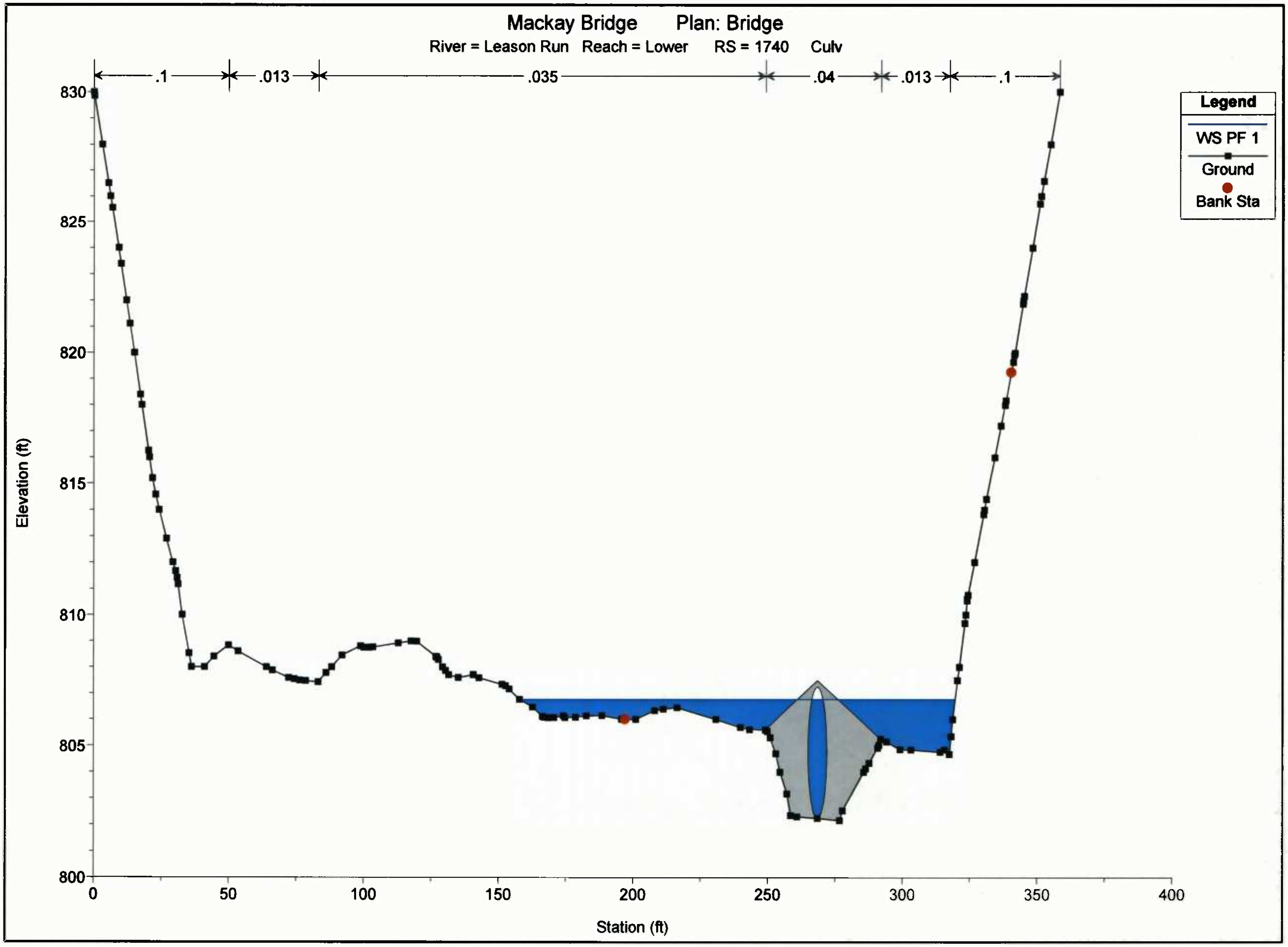
100
150
200
250
300
350
Station (ft)

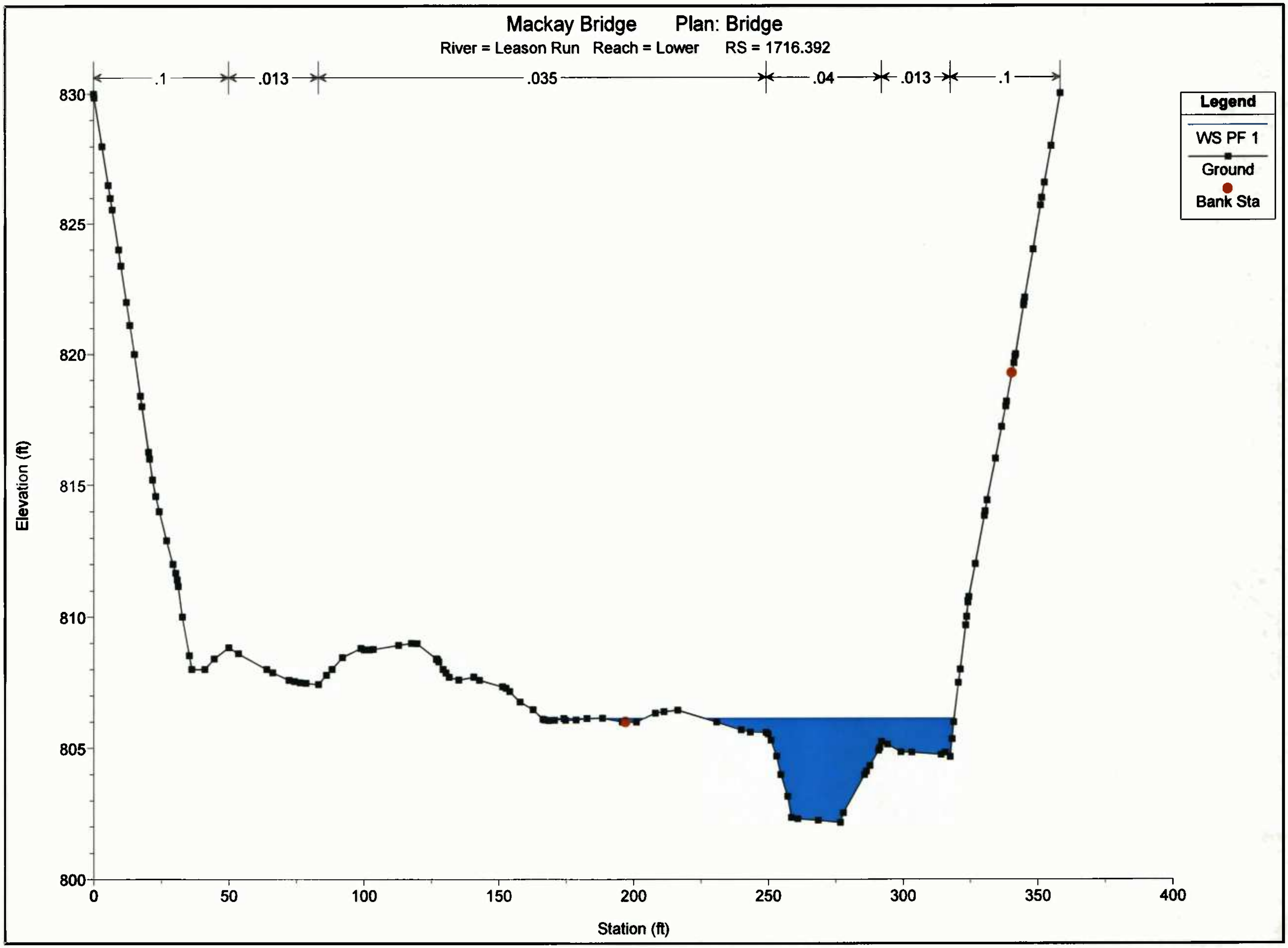


Mackay Bridge Plan: Bridge
River = Leason Run Reach = Lower RS = 1763.762
.1
.035
.04
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
0
50
100
150
200
250
300
350
400
Station (ft)

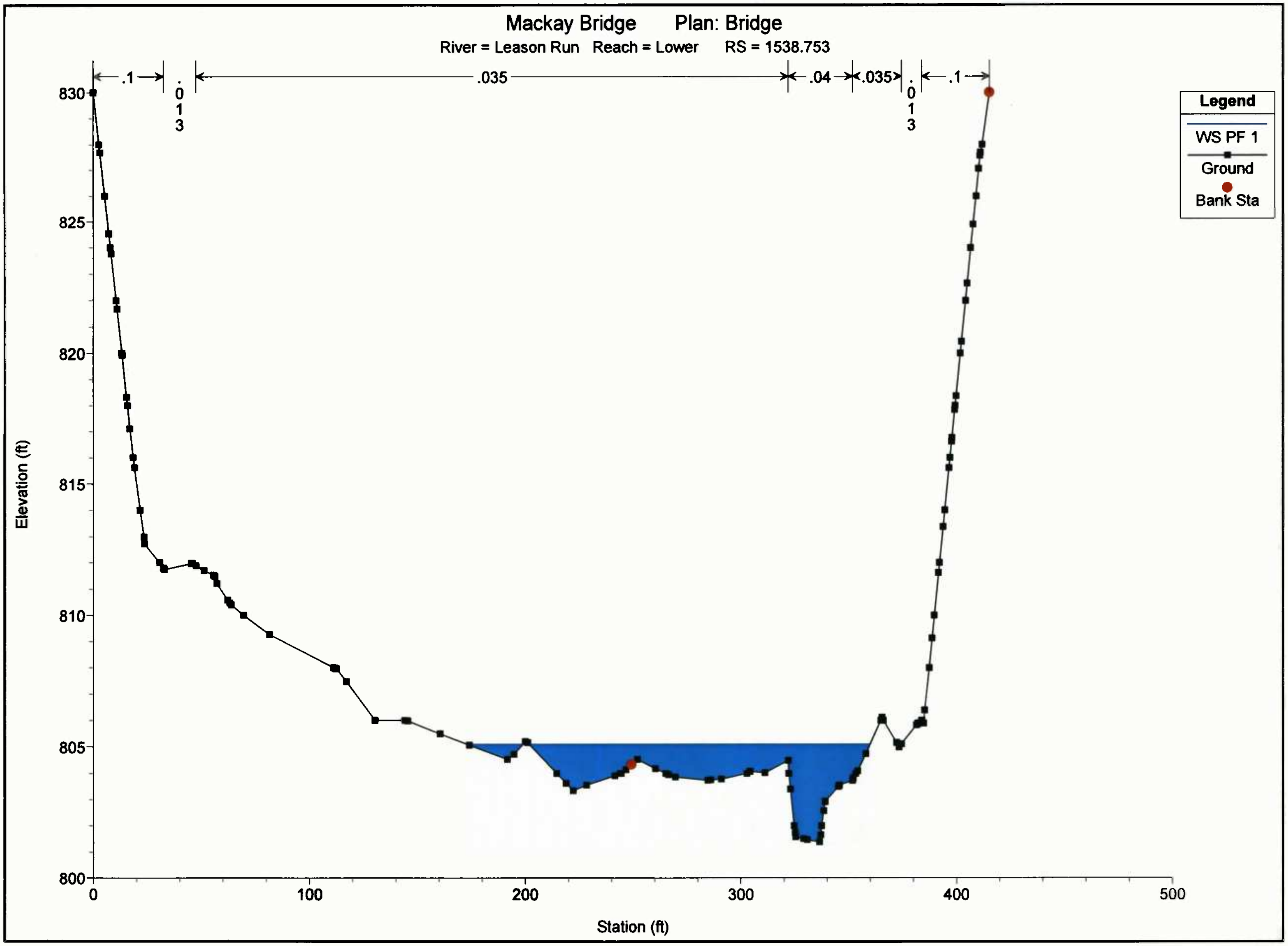


Mackay Bridge Plan: Bridge
River = Leason Run Reach = Lower RS = 1740 Culv
.1
.035
.04
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
0
50
100
150
200
250
300
350
400
Station (ft)

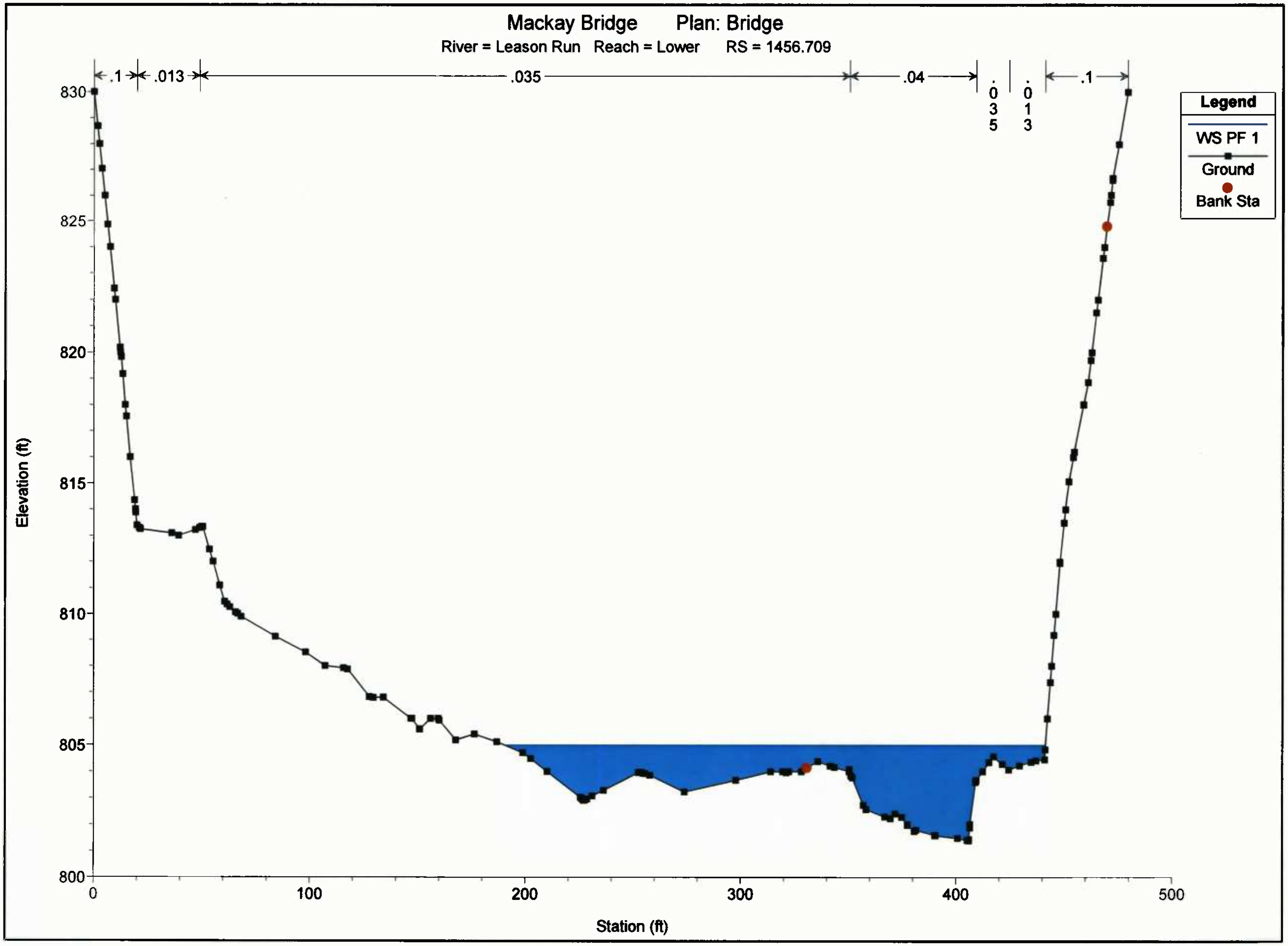

Mackay Bridge Plan: Bridge
River = Leason Run Reach = Lower RS = 1740 Culv
.1
.013
.035
.04
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
0
50
100
150
200
250
300
350
400
Station (ft)

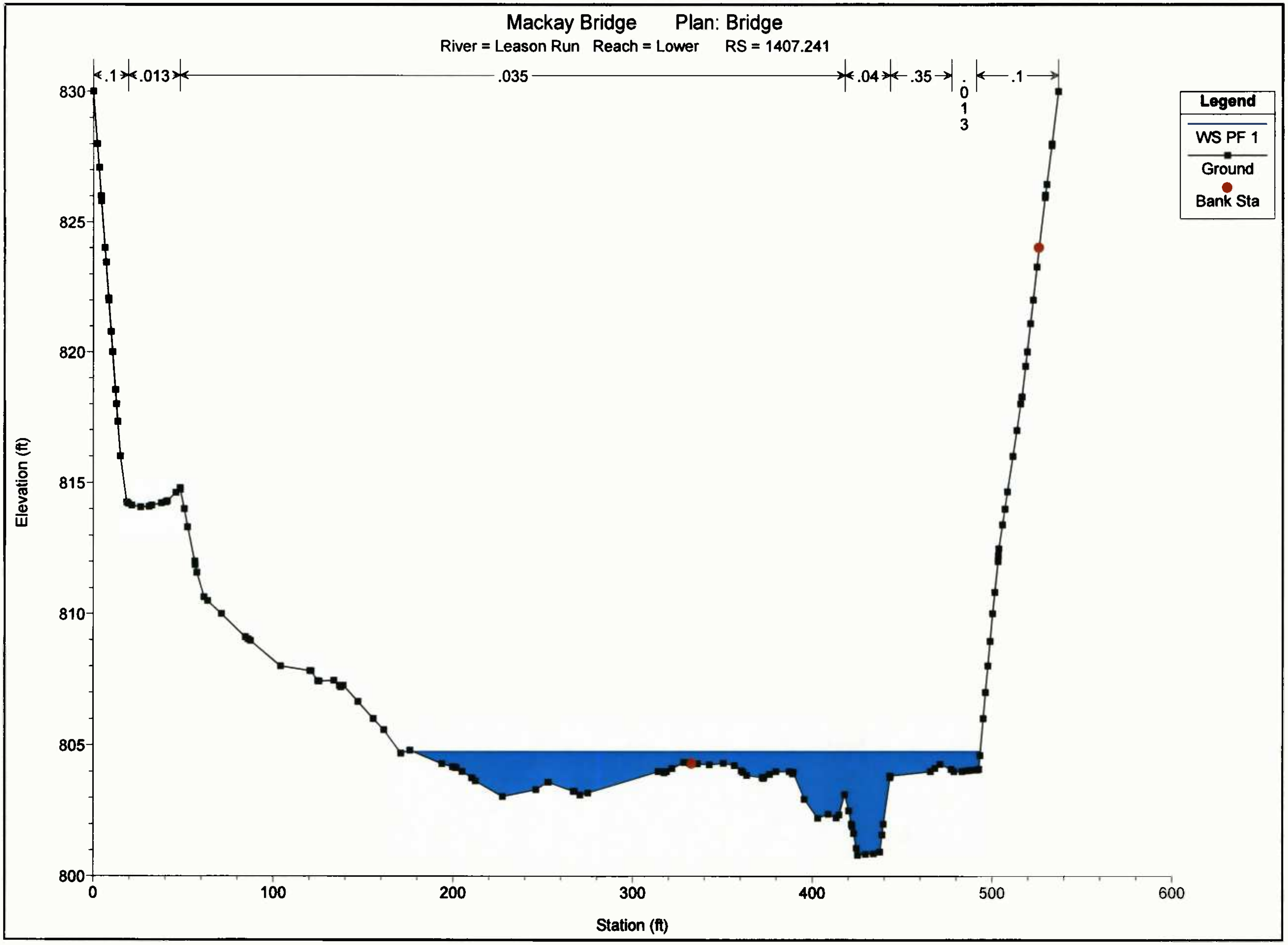


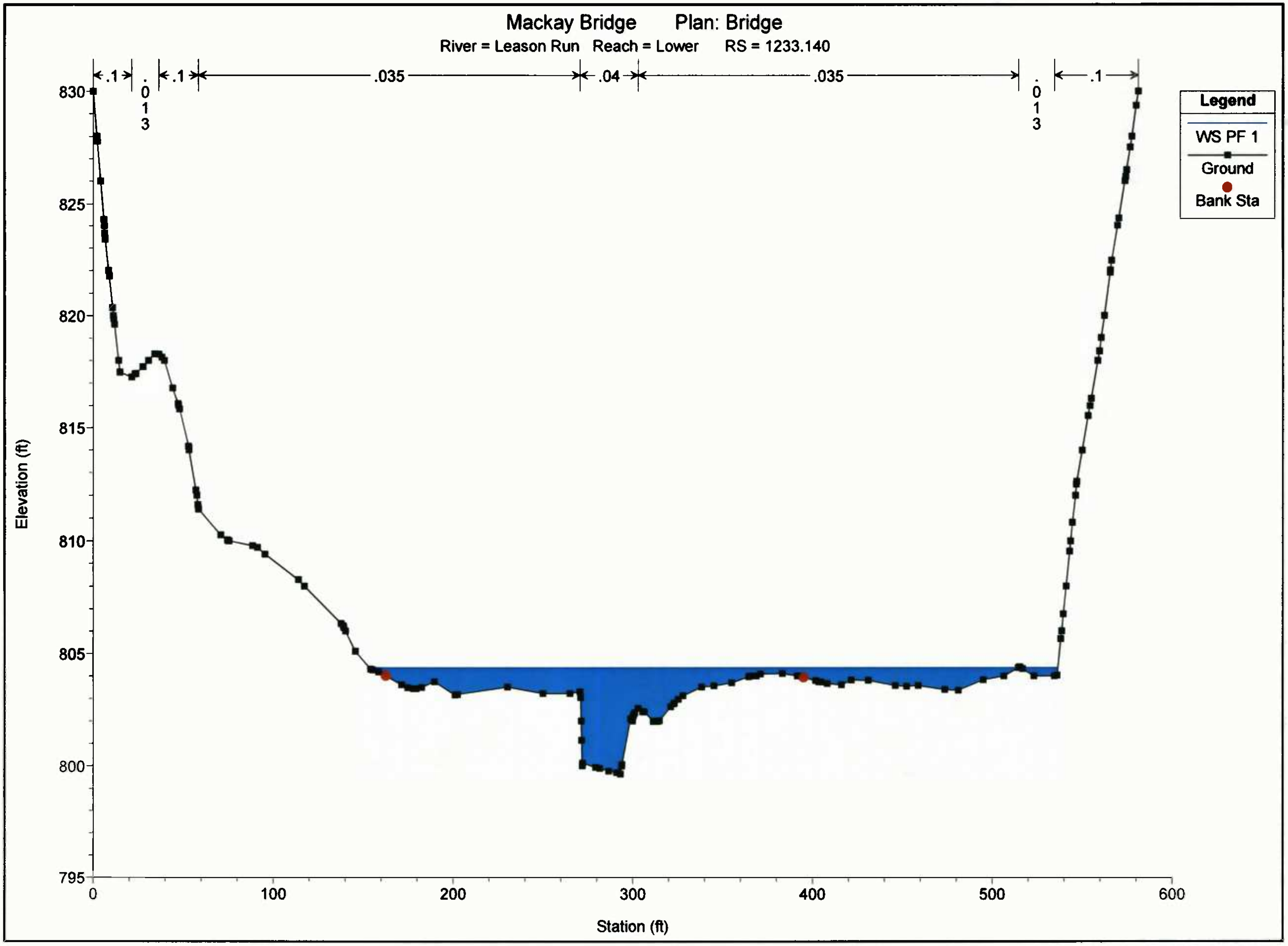
Mackay Bridge Plan: Bridge
River = Leason Run Reach = Lower RS = 1716.392
.1
.013
.035
.04
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
0
50
100
150
200
250
300
350
400
Station (ft)



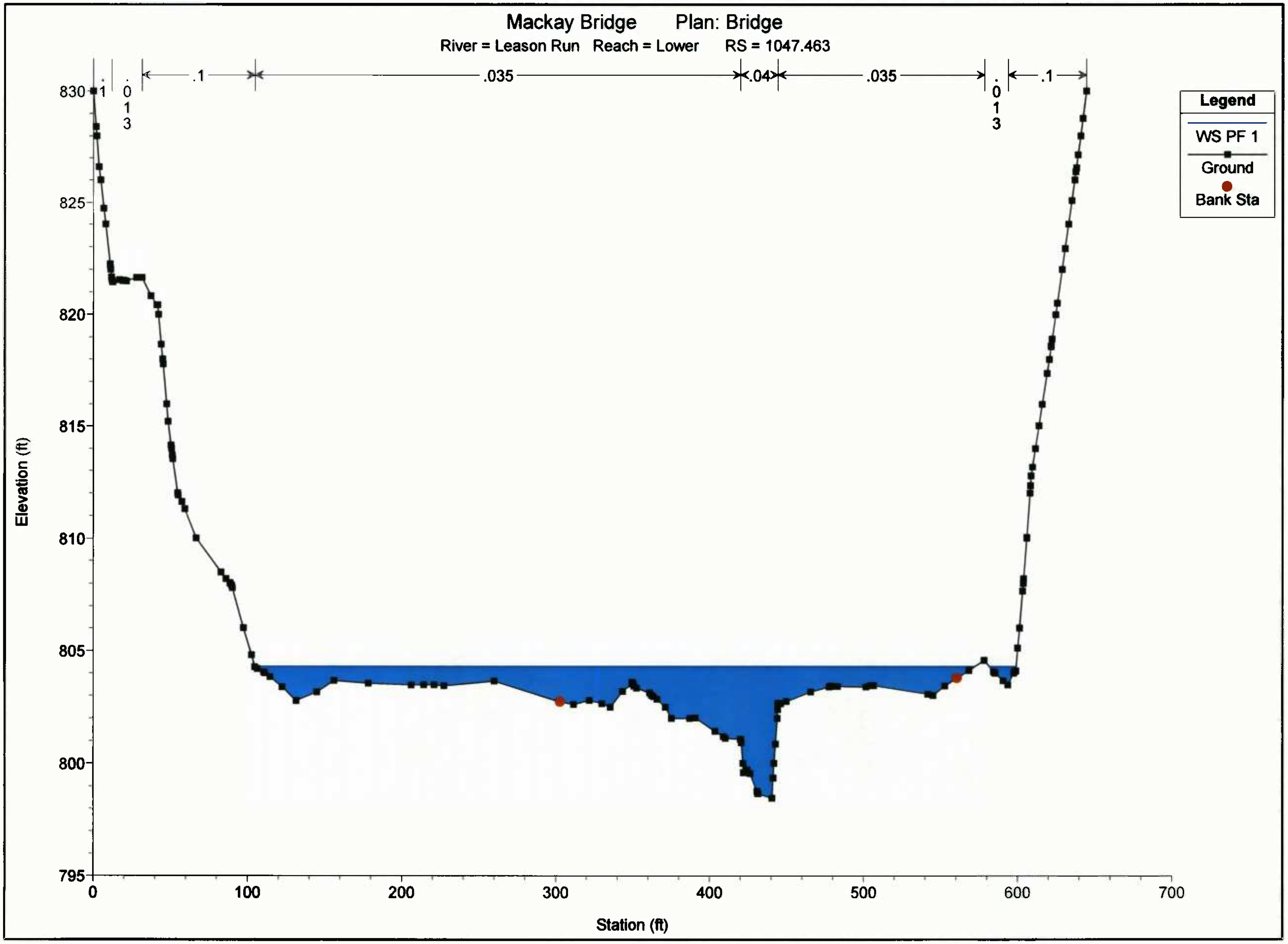
Mackay Bridge Plan: Bridge
River = Leason Run Reach = Lower RS = 1538.753
.1
.013
.035
.04
.035
.013
.1
830
825
820
815
810
805
800
Elevation (ft)
0
100
200
300
400
500
Station (ft)
Legend
WS PF 1
Ground
Bank Sta


Mackay Bridge Plan: Bridge
River = Leason Run Reach = Lower RS = 1456.709
.1
.013
.035
.04
.035
.013
.1
Legend
WS PF 1
Ground
Bank Sta
830
825
820
815
810
805
800
Elevation (ft)
0
100
200
300
400
500
Station (ft)


Mackay Bridge Plan: Bridge
River = Leason Run Reach = Lower RS = 1407.241
.1
.013
.035
.04
.35
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
830
825
820
815
810
805
800
0
100
200
300
400
500
600



Mackay Bridge Plan: Bridge
River = Leason Run Reach = Lower RS = 1233.140
.1
.013
.1
.035
.04
.035
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
100
200
300
400
500
600
Station (ft)


Mackay Bridge Plan: Bridge
River = Leason Run Reach = Lower RS = 1047.463
.1
.013
.1
.035
.04
.035
.013
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
830
825
820
815
810
805
800
795
0
100
200
300
400
500
600
700

#18-502

DIVISION OF NATURAL RESOURCES
324 4th Avenue, Room 200
South Charleston, West Virginia 25303-1228
Telephone 304-558-3225
Fax 304-558-6048
TDD 304-558-1439
TDD 800-354-6087

APR 5 18 11:46AM

Stephen S. McDaniel
Director

February 14, 2018

Division of Natural Resources
RIGHT OF ENTRY

Re: LS-18-VI/09-443

Antero Water LLC
1615 Wynkoop Street
Denver, CO 80202-

Dear Sir or Madam:

The Division of Natural Resources hereby grants to you for a period of ten (10) years from the date hereof, a Right of Entry to install, use and maintain a sixteen foot by fifty foot (16'x50') bridge in order to replace the current bridge (MacKay Bridge Replacement) along Cabin Run near Pennsboro in Doddridge County, West Virginia.

This Right of Entry is subject to the following terms and conditions:

1. No in stream work during the fish-spawning season (April 1-June 30).

2. Work should be completed as quickly as possible during low flows in designated work areas only.

3. Any streambed disturbance should be restricted to the immediate area. In stream use of equipment should be kept to a minimum.

4. All shore areas disturbed by this operation must be reshaped, seeded and mulched immediately upon completion of work. The prompt establishment of vegetative cover will reduce future damage from high water levels.

5. Green concrete must not be put in the stream (highly toxic to aquatic life).

6. Guidance should be obtained from NRCS (formerly SCS) and a registered engineer for the design and construction. Must allow for passage of at least ten-year year flood flow.

7. Best management practices should be followed; measures such as hay bales must be used to reduce downstream siltation.

8. Applicant is responsible for removing debris from in and around the installation periodically to prevent stream flow obstruction.

9. Durable head walls of logs, crossties, rock, or concrete shall be constructed at both the upstream and downstream ends of crossing to prevent erosion of fill material into the stream.

10. The State's issuance of this Right-of-Entry does not provide for the applicant to work outside the requested boundaries nor does the State assume any liability for the applicant's/landowner's construction activities. By accepting this Right-of-Entry, the applicant/landowner assumes liability for any/all damages caused by this activity to both upstream and downstream landowners.

Guidelines of Best Management Practices for Sediment and Erosion Control as outlined by the Section of Water Resources, Division of Environmental Protection must be followed. Copies of those guidelines are available from the Section of Water Resources, Telephone No. (304) 926-0440.

The issuance of this Right of Entry by the Division of Natural Resources does not preclude the necessity for you to obtain a permit from the U.S. Corps of Engineers District Office, Permit Section, or any other state or federal permits which may be required by law, nor does this Right of Entry negate the need to comply with the West Virginia Water Pollution Control Act and/or the State Environmental Quality Board's administrative regulations, applicant is also responsible for determining if the proposed activity is located within an identified flood plain and it is the applicant's responsibility for contacting the local governmental agency in charge of that program and obtaining a flood plain development permit for it. This Right of Entry does not grant any rights or privileges, or permission to enter upon or to cross the property of any other person, nor is permission granted to remove any material that lies upon the property of any other persons. Work should be completed in as brief a period as possible and within one year from the date of this letter. In the event you fail or refuse to comply with any of the terms or conditions herein, this Right of Entry will be canceled and considered null and void and the Division will reject further applications.

Your payment is now due and payable in the amount of $100.00 to the Division of Natural Resources covering the first year's annual fee of this agreement. Your agreement will be effective upon receipt of your payment in full. You must notify this office in writing when this installation has been removed.

Sincerely,

Joe T. Scarberry, Supervisor
Office of Land and Streams

JTS:cb

pc: DNR Fish Biologist
Jeremy Bandy, Environmental Enforcement
DNR Conservation Officers