CERTIFIED MAIL™

George Eidel
Doddridge County FloodPlain MGT
108 Court St., Ste 1
West Union, WV 26456

7013 2250 0001 6914 9824

HASLER
015H14161808
$6.74
11/16/15
Mailed From 26456
US POSTAGE

#15-398

RETURNED TO SENDER

Denise W Donahoo
Box 25 DD
WV 26411

- ☐ MOVED, LEFT NO ADDRESS
- ☐ FORWARDING ORDER EXPIRED
- ☐ ATTEMPTED - NOT KNOWN
- ☐ UNCLAIMED ☐ REFUSED
- ☐ NO SUCH STREET
- ☐ NO SUCH NUMBER
- ☐ INSUFFICIENT ADDRESS

26411$9707 R001

PLACE STICKER AT TOP OF ENVELOPE TO THE RIGHT
OF THE RETURN ADDRESS, FOLD AT DOTTED LINE

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- 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.

1. Article Addressed to:

#15-398

Denise W Donahoo
RR 1, Box 25 DD
New Milton, WV 26411

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X ☐ Agent ☐ Addressee

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

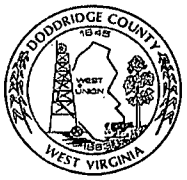
D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number
(Transfer from service label) 7013 2250 0001 6914 9824

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540



Doddridge County FPM
108 Court Street, Ste. 1
West Union, WV 26456

Dear Sir or Ma'am,

You are receiving this letter because you have been identified as a land surface and/or mineral rights owner for property or adjacent property related to the proposed development project identified by the following page.

No action is required of you. This letter is simply to inform you of the proposed development.

If you would like to comment on this proposed project, or would like additional information, you may contact the Doddridge County Floodplain Manager at the above address.

Respectfully yours,

Doddridge County Floodplain Manager
304.873.2631
doddridgecountyfpm@gmail.com

15-398

CESO
CREATION TO COMPLETION

800 Bursca Drive, Suite 804
Bridgeville, Pennsylvania 15017-1451
(412) 221-2236
www.cesoinc.com

FILED
2015 NOV -9 PM 3:04
CIRCUIT CLERK
DODDRIDGE COUNTY, WV

November 6, 2015

Mr. George Edel
Doddridge County Floodplain Manager
118 East Court Street
West Union, WV 26456

RE: Cone Gathering, LLC- Donahoo Access Road
Doddridge County Floodplain Permit

Dear Mr. Edel:

CESO, Inc. is pleased to submit this information for a Doddridge County Floodplain Permit, for the proposed Donahoo Access Road. **Cone Gathering, LLC** (Cone), is proposing to construct a new access road off of Lick Run Road in New Milton District, Doddridge County, West Virginia. The proposed project will begin at Lick Run Road (CR 40) near 39.256090 N Latitude, 80.711156 W Longitude (NAD83) and will include the installation of a prefabricated modular steel bridge with abutment and spread footer foundation.

The Doddridge County Development Permit Application further describing project characteristics is attached. A map depicting the proposed access road location and a map identifying the Lick Run crossing are also provided.

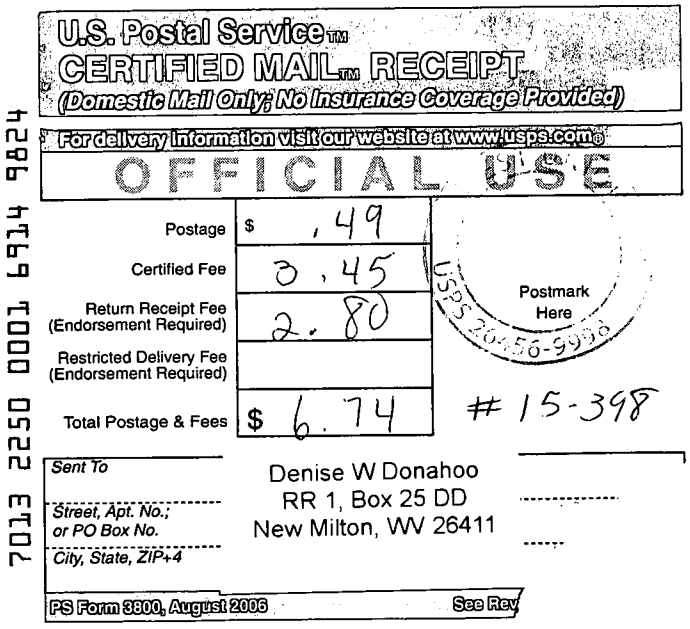
Proper construction sequencing and implementation of an approved erosion and sediment control plan will ensure water quality impacts are minimized throughout the project area and the proposed activities are in compliance with Nationwide Permit General Conditions and Regional General Conditions.

Should you have any questions or comments please contact me at 412-552-4580 or through email at boydston@cesoinc.com.

Sincerely,

CESO, Inc.

Natalie Boydston
Staff Biologist


U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)
For delivery information visit our website at www.usps.com®
OFFICIAL USE
Postage $ .49
Certified Fee 3.45
Return Receipt Fee (Endorsement Required) 2.80
Restricted Delivery Fee (Endorsement Required)
Total Postage & Fees $ 6.74
Postmark Here
USPS 26456-9998
#15-398
7013 2250 0001 6914 9824
Sent To
Denise W Donahoo
Street, Apt. No.; or PO Box No.
RR 1, Box 25 DD
City, State, ZIP+4
New Milton, WV 26411
PS Form 3800, August 2006
See Rev

7013 2250 0001 6914 9817

U.S. Postal Service
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

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

OFFICIAL USE

Postage	$ .49
Certified Fee	3.45
Return Receipt Fee (Endorsement Required)	2.80
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 6.74

Postmark Here

#15-398

Sent To
Street, Apt. No.; or PO Box No.
City, State, ZIP+4

Doit L & Donna D Koppler
3 Lick Run Rd
New Milton, WV 26411

PS Form 3800, August 2006 — See Reverse for Instructions

7013 2250 0001 6914 9800

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

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

OFFICIAL USE

Postage	$ .49
Certified Fee	3.45
Return Receipt Fee (Endorsement Required)	2.80
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 6.74

WEST UNION, WV
NOV
Postmark Here
USPS

Sent To
Street, Apt. No.; or PO Box No.
City, State, ZIP+4

Haessly Hardwood Lumber Co
Route 1 Box 185
Marietta OH 45750

PS Form 3800, Au... nstructions

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- 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.

1. Article Addressed to: #15-398

Haessly Hardwood Lumber Co
Route 1 Box 185
Marietta OH 45750

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Patty Tidd ☐ Agent ☐ Addressee

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

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

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number
(Transfer from service label) 7013 2250 0001 6914 9800

COLUMBUS

UNITED STATES POSTAL SERVICE

19 NOV '15

PM 3 L

First-Class Mail
Postage & Fees Paid
USPS
Permit No. G-10

• Sender: Please print your name, address, and ZIP+4 in this box •

2015 NOV 23 PM 1:3

BETTY A. ROGI
DODDRIDGE COUNTY CLE
DODDRIDGE COUN

George Eidel
Doddridge County FloodPlain MGT
108 Court St., Ste 1
West Union, WV 26456

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- 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.

1. Article Addressed to: #15-398

Doit L & Donna D Koppler
3 Lick Run Rd
New Milton, WV 26411

COMPLETE THIS SECTION ON DELIVERY

A. Signature
x Doit L Koppler ☐ Agent ☐ Addressee

B. Received by (Printed Name) DOIT KOPPLER C. Date of Delivery 11-18-15

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

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7013 2250 0001 6914 9817

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

UNITED STATES POSTAL SERVICE

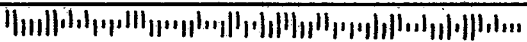
First-Class Mail
Postage & Fees Paid
USPS
Permit No. G-10

• Sender: Please print your name, address, and ZIP+4 in this box •

2015 NOV 23 PM 1:31

BETH A. ROGERS
COUNTY CLERK
DODRIDGE COUNTY

George Eidel
Doddridge County FloodPlain MGT
108 Court St., Ste 1
West Union, WV 26456



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: # 15-398

Date Approved: 12/08/2015 **Expires: 12/08/2016**

Issued to: Cone Gathering, LLC **POC: Adam White – 304-884-2000**

Company Address: One Energy Drive
P.O. Box 1248
Jane Lew, WV 26378

Project Address: Off Lick Run Rd, New Milton

Firm: **Lat/Long:**

Purpose of development: Access Road/bridge

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

_____ **Date: 12/08/2015**

For additional information regarding this permit, please contact Doddridge County Floodplain Manager at 304.873.2631, or via email at doddridgecountyfpm@gmail.com
118 East Court Street; West Union, WV 26456

15-398

CREATION TO COMPLETION

800 Bursca Drive, Suite 804
Bridgeville, Pennsylvania 15017-1451
(412) 221-2236
www.cesoinc.com

November 6, 2015

Mr. George Edel
Doddridge County Floodplain Manager
118 East Court Street
West Union, WV 26456

RE: Cone Gathering, LLC- Donahoo Access Road
Doddridge County Floodplain Permit

Dear Mr. Edel:

CESO, Inc. is pleased to submit this information for a Doddridge County Floodplain Permit, for the proposed Donahoo Access Road. **Cone Gathering, LLC** (Cone), is proposing to construct a new access road off of Lick Run Road in New Milton District, Doddridge County, West Virginia. The proposed project will begin at Lick Run Road (CR 40) near 39.256090 N Latitude, 80.711156 W Longitude (NAD83) and will include the installation of a prefabricated modular steel bridge with abutment and spread footer foundation.

The Doddridge County Development Permit Application further describing project characteristics is attached. A map depicting the proposed access road location and a map identifying the Lick Run crossing are also provided.

Proper construction sequencing and implementation of an approved erosion and sediment control plan will ensure water quality impacts are minimized throughout the project area and the proposed activities are in compliance with Nationwide Permit General Conditions and Regional General Conditions.

Should you have any questions or comments please contact me at 412-552-4580 or through email at boydston@cesoinc.com.

Sincerely,

CESO, Inc.

Natalie Boydston
Staff Biologist

DODDRIDGE COUNTY
FLOODPLAIN DEVELOPMENT PERMIT APPLICATION

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 _____

DATE 11/05/2015

SECTION 2: PROPOSED DEVELOPMENT (TO BE COMPLETED BY APPLICANT).

IF THE APPLICANT IS NOT A NATURAL PERSON, THE NAME, ADDRESS, AND TELEPHONE NUMBER OF A NATURAL PERSON WHO SHALL BE APPOINTED BY THE APPLICANT TO RECEIVE NOTICE PURSUANT TO ANY PROVISION OF THE CURRENT DODDRIDGE COUNTY FLOODPLAIN ORDINANCE.

APPLICANT'S NAME: Cone Gathering, LLC
ADDRESS: c/o Adam White, One Energy Drive PO Box 1248 Jane Lew, WV 26378
TELEPHONE NUMBER: 304.884.2000

CONTRACTOR NAME: _____
ADDRESS: _____
TELEPHONE # _____
WV CONTRACTOR LICENCE # _____

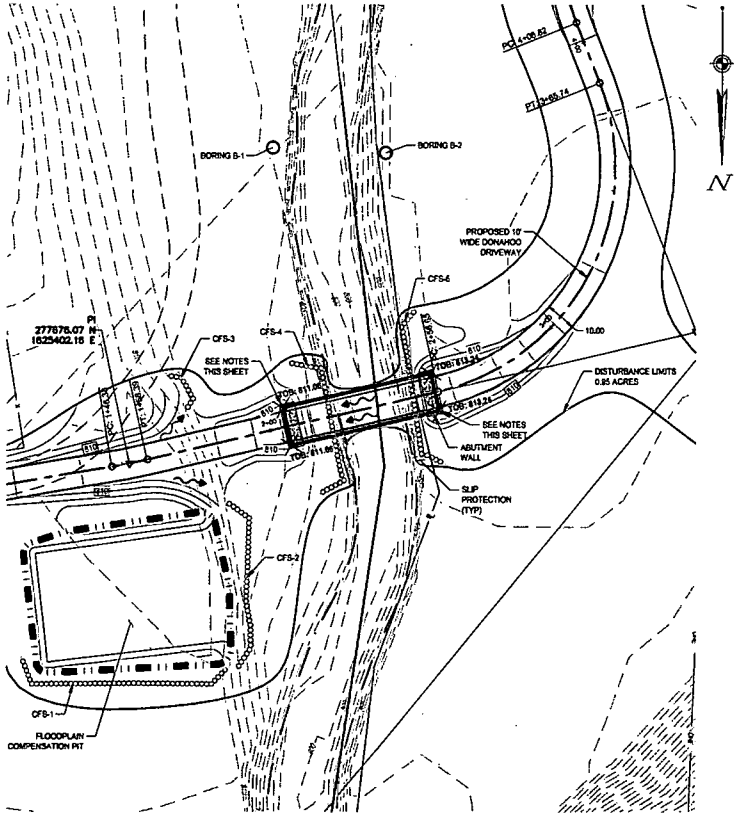
ENGINEER'S NAME: CESO, Inc.
ADDRESS: 2800 Corporate Exchange Drive, Suite 160, Columbus, OH 43231
TELEHONE NUMBER: 614.794.7080

PROJECT LOCATION:

NAME OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) Please see Attachment A.

ADDRESS OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) Please see Attachment A.

DISTRICT: Please see Attachment A.
LAND BOOK DESCRIPTION: Please see Attachment A.
DEED BOOK REFERENCE: Please see Attachment A.



LEGEND

EXISTING

- MAJOR CONTOUR
- MINOR CONTOUR
- RIGHT OF WAY
- PROPERTY LINE
- BUILDING
- PAVEMENT
- FENCE
- TREE LINE
- STREAM
- GAS LINE
- WATER LINE
- STORM SEWER
- BURIED ELECTRIC
- OVERHEAD ELECTRIC
- UTILITY POLE
- GATE

PROPOSED

- MAJOR CONTOUR
- MINOR CONTOUR
- DISTURBANCE LIMITS
- COMPOST FILTER SOCK
- CENTERLINE ROAD
- GRADE BREAK
- FLOW ARROW
- TOB TOP OF BRIDGE
- TWE TOP WALL ELEVATION
- BWE BOTTOM WALL ELEVATION
- SLIP PROTECTION

BORING LOCATIONS AND DEPTHS

BORE NUMBER	NORTHING (NAD83 WV NORTH)	EASTING (NAD83 WV NORTH)	BORE DEPTH
B-1	277572.91	1625352.08	16.5
B-2	277574.45	1625314.82	16.5

NOTES:

1. PRE-FABRICATED MODULAR STEEL BRIDGE AND ABUTMENT DESIGN PER BRIDGE ENGINEER DRAWINGS.
2. FOUNDATION DESIGNED FOR BRIDGE SHALL FOLLOW THE DESIGN REQUIREMENTS DESCRIBED IN GTA'S GEOTECHNICAL ENGINEERING REPORT DATED OCTOBER 7TH, 2015 AND SHALL BE CONSIDERED A PART OF THESE CONSTRUCTION DOCUMENTS.

WEST VIRGINIA 811

GRAPHIC SCALE (IN FEET)
1 inch = 20 ft.

REVISIONS NO.	DATE	DESCRIPTION

Gathering LLC

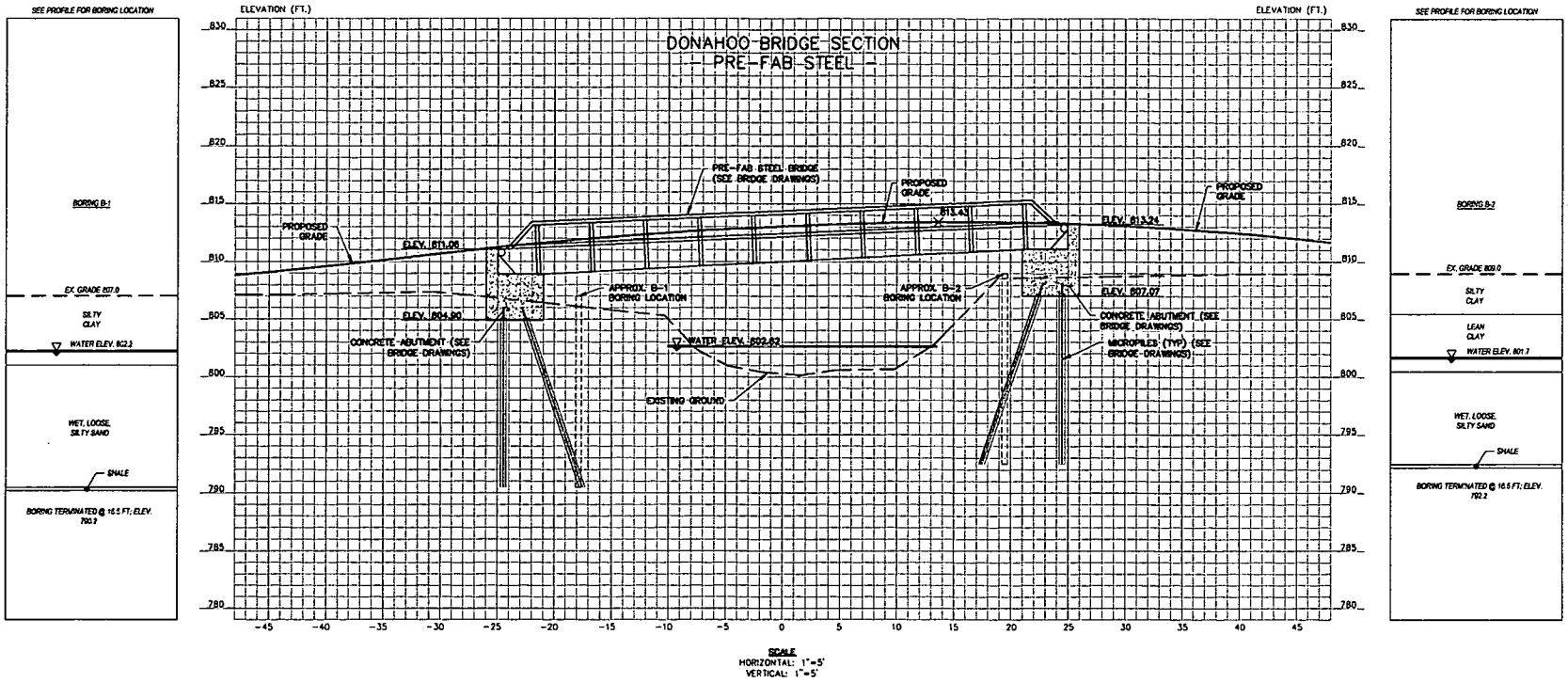
BRIDGE PLAN DETAIL

DONAHOO ACCESS ROAD

BLANDVILLE, DODDRIDGE COUNTY, WEST VIRGINIA

cesa
CREATION TO COMPLETION
www.cesainc.com
Engineering • Architecture • Surveying • Construction Mgt • Environmental

ISSUE:	CONSTRUCTION
DATE:	11.04.2015
JOB NO.:	751001
DESIGN:	BEM
DRAWN:	BEM
CHECKED:	BJM
SHEET NO.	6



NOTES

1. REFER TO THE GEOTECHNICAL REPORT BY GTA ENERGY ENTITLED "GEOTECHNICAL ENGINEERING REPORT: DONAHOO ACCESS BRIDGE" DATED JULY 28, 2015 (REVISED OCTOBER 7, 2015) FOR ALL EARTHWORK INFORMATION. THIS REPORT SHALL ALSO BE CONSIDERED A PART OF THESE CONSTRUCTION DOCUMENTS.
2. SEE BRIDGE ENGINEER DRAWINGS FOR BRIDGE FOUNDATION AND ABUTMENT DETAILS.

REVISIONS NO.	DATE	DESCRIPTION

Gathering LLC

BRIDGE SECTION

DONAHOO ACCESS ROAD

BLANDVILLE, DODDRIDGE COUNTY, WEST VIRGINIA

cesq
CREATION TO COMPLETION
www.cesqinc.com
Engineering • Architecture • Surveying • Construction Mgt • Environmental

ISSUE:	CONSTRUCTION
DATE:	11.04.2015
JOB NO.:	751001
DESIGN:	BEM
DRAWN:	BEM
CHECKED:	BJM
SHEET NO.	7

N

SOIL DATA TABLE

SOIL NAME	SOIL MAPPING UNIT	ERODIBILITY (K FACTOR, WHOLE SOIL)	HYDRAULIC SOIL GROUP	PERMEABILITY	DEPTH TO ANY RESTRICTIVE LAYER (cm)	TEXTURE
CHAGRIN SILT LOAM, 0 TO 3 PERCENT SLOPES, OCCASIONALLY FLOODED	Ch	0.37	B	WELL DRAINED	>200	SILT LOAM
GILPIN-UPSHUR SILT LOAMS, 15 TO 25 PERCENT SLOPES	GuD	0.37	C	WELL DRAINED	76	SILT LOAM
MONONGAHELA SILT LOAM, 8 TO 15 PERCENT SLOPES	MoC	0.43	D	MODERATELY WELL DRAINED	56	SILT LOAM
VANDALIA SILT LOAM, 25 TO 35 PERCENT SLOPES	VaE	0.43	C	WELL DRAINED	>200	SILT LOAM

LEGEND

EXISTING

SOIL DEFINITION BOUNDARY

DkF — SOIL TYPE

PROPOSED

DISTURBANCE LIMITS

50 0 50 100

GRAPHIC SCALE (IN FEET)
1 inch = 50 ft.

REVISIONS NO.	DATE	DESCRIPTION

Geona Gathering LLC

SOIL OVERLAY PLAN

DONAHOO ACCESS ROAD

BLANDVILLE, DODDRIDGE COUNTY, WEST VIRGINIA

cesc

CREATION TO COMPLETION

www.cescinc.com

Engineering • Architecture • Surveying • Construction Mgt. • Environmental

ISSUED: CONSTRUCTION	
DATE:	11.04.2015
JOB NO.:	751001
DESIGN:	BEM
DRAWN:	BEM
CHECKED:	BJM
SHEET NO.	8

TAX MAP REFERENCE: Please see Attachment A.

EXISTING BUILDINGS/USES OF PROPERTY: Please see Attachment A.

NAME OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY Please see Attachment A.

ADDRESS OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY Please see Attachment A.

To avoid delay in processing the application, please provide enough information to easily identify the project location.

Cone Gathering, LLC (Cone) is proposing to install one prefabricated modular steel bridge with abutment and spread footer foundation bridge spanning Lick Run at 39.255733, -80.711914 in Doddridge County, West Virginia. The anticipated linear footage of stream impact is 15.2 feet. No in stream work will be needed to install this spanning bridge. The bridge will remain in place at the request of the property owner.

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)

_____

C. STANDARD SITE PLAN OR SKETCH

1. SUBMIT ALL STANDARD SITE PLANS, IF ANY HAVE BEEN PREPARED (ENGINEERING PLANS MUST BE SIGNED AND SEALED).

2. IF STANDARD SITE PLANS HAVE NOT BEEN PREPARED:

SKETCH ON A SEPARATE 8 ½ X 11 INCH SHEET OF PAPER THE SHAPE AND LOCATION OF THE LOT. SHOW THE LOCATION OF THE INTENDED CONSTRUCTION OR LAND USE INDICATING BUILDING SETBACKS, SIZE & HEIGHT. IDENTIFY EXISTING BUILDINGS, STRUCTURES OR LAND USES ON THE PROPERTY.

3. SIGN AND DATE THE SKETCH. Please see Construction Plan and Erosion & Sediment Control Plan.

ACTUAL TOTAL CONSTRUCTION COSTS OF THE COMPLETE DEVELOPMENT/ PROPOSED CONSTRUCTION PROJECT WITHIN THE FLOODPLAIN $ 100,000

D. ADJACENT AND/OR AFFECTED LANDOWNERS:

1. NAME AND ADDRESS OF ALL OWNERS OF SURFACE TRACTS ADJACENT TO THE AREA OF THE SURFACE TRACT (UP & DOWN STREAM) UPON WHICH THE PROPOSED ACTIVITY WILL OCCUR AND ALL OTHER SURFACE OWNERS UP & DOWN STREAM) WHO OWN PROPERTY THAT MAY BE AFFECTED BY FLOODING AS IS DEMONSTRATED BY A FLOODPLAIN STUDY OR SURVEY (IF ONE HAS BEEN COMPLETED.

NAME: Please see Attachment B
ADDRESS: Please see Attachment B

NAME:
ADDRESS:

NAME:
ADDRESS:

NAME:
ADDRESS:

1. NAME AND ADDRESS OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON ANY ADJACENT PROPERTY AT THE TIME THE FLOODPLAIN PERMIT APPLICATION IS FILED AND THE NAME AND ADDRESS OF AT LEAST ONE ADULT RESIDING IN ANY HOME ON ANY PROPERTY THAT MAY BE AFFECTED BY FLOODING AS IS DEMONSTRATED BY A FLOODPLAIN STUDY OR SURVEY.

NAME: Refer to Attachment B
ADDRESS:

NAME:
ADDRESS:

E. CONFIRMATION FORM

THE APPLICANT ACKNOWLEDGES, AGREES, AND CONFIRMS THAT HE/IT WILL PAY WITHIN 30 DAYS OF RECEIPT OF INVOICE BY THE COUNTY FOR ALL EXPENSES RELATIVE TO THE PERMIT APPLICATION PROCESS GREATER THAN THE REQUIRED DEPOSIT FOR EXPENSES INCLUDING:

(A) PERSONAL SERVICE OF PROCESS BY THE DODDRIDGE COUNTY SHERIFF AT THE RATES PERMITTED BY LAW FOR SUCH SERVICE.

(B) SERVICE BY CERTIFIED MAIL RETURN RECEIPT REQUESTED.

(C) PUBLICATION.

(D) COURT REPORTING SERVICES AT ANY HEARINGS REQUESTED BY THE APPLICANT.

(E) CONSULTANTS AND/OR HEARING EXPERTS UTILIZED BY DODDRIDGE COUNTY FLOODPLAIN ADMINISTRATOR/MANAGER OR FLOODPLAIN APPEALS BOARD FOR REVIEW OF MATERIALS AND/OR TESTIMONY REGARDING THE EFFICACY OF GRANTING OR DENYING THE APPLICANT'S FLOODPLAIN PERMIT.

NAME (PRINT): Natalie Boydston for CESO, Inc

SIGNATURE: Natalie S. Boydston DATE: 11/4/2015

After completing SECTION 2, APPLICANT should submit form and fees to Clerk of Doddridge County Court or his/her representative for review.

SECTION 3: FLOODPLAIN DETERMINATION (to be completed by Floodplain Administrator/Manager or his/her representative)

THE PROPOSED DEVELOPMENT:

THE PROPOSED DEVELOPMENT IS LOCATED ON:
FIRM Panel:____
Dated:____

[] Is NOT located in a Specific Flood Hazard Area (Notify applicant that the application review is complete and NO FLOOPLAIN DEVELOPMENT PERMIT IS REQUIRED).

[] Is located in Special Flood Hazard Area.
FIRM zone designation____________________________________
100-Year flood elevation is ____________________________NGVD .
Stream name ____.
Profile # ____.

[] Unavailable

[] The proposed development is located in a floodway.

[] See section 4 for additional instructions.

SIGNED____________________________ DATE________________

SECTION 4: ADDITIONAL INFORMATION REQUIRED FOR DEVELOPMENT IN SPECIAL FLOOD HAZARD AREA (To be completed by Floodplain Administrator/Manager or his/her representative)

The applicant must submit the documents checked below before the application can be processed.

[] A plan showing the location of all existing structures, water bodies, adjacent roads and proposed development.

[] Development plans, drawn to scale, and specifications, including where applicable: details for anchoring structures, storage tanks, proposed elevation of lowest floor, (including basement or crawl space), types of water resistant materials used below the first floor, details of flood proofing of utilities located below the first floor and details of enclosures below the first floor.
Also____
____

[] Subdivision or other development plans (If the subdivision or development exceeds 10 lots or 2 acres, whichever is the lesser, the applicant must provide 100-year flood elevations if they are not otherwise available).

[] Plans showing the extent of watercourse relocation and/or landform alterations.

[] Top of new fill elevation _____Ft. NGVD.
For floodproofing structures applicant must attach certification from registered engineer or architect.

[] Certification from a registered engineer that the proposed activity in a regulatory floodway will not result in any increase in the height of the 100-year flood. A copy of all data and calculations supporting this finding must also be submitted.

[] Manufactured homes located in a Flood Hazard Area must have a West Virginia Contractor's License and a Manufactured Home Installation License as required by the Federal Emergency Management Agency (FEMA).

[] Other:_____

SECTION 5: PERMIT DETERMINATION (To be completed by Floodplain Administrator/Manager or his/her representative)

I have determined that the proposed activity (type is or is not) in conformance with provisions of the Floodplain Ordinance adopted by the County Commission of Doddridge County on May 21, 2013. The permit is issued subject to the conditions attached to and made part of this permit.

SIGNED_____DATE_____

If the Floodplain Administrator/Manager found that the above was not in conformance with the provisions of the Doddridge County Floodplain Ordinance and/or denied that application, the applicant may appeal.

APPEALS: Appealed to the County Commission of Doddridge County? [] Yes {} No
Hearing Date:_____
County Commission Decision - Approved [] Yes [] No

CONDITIONS:_____
_____
_____

SECTION 6: AS-BUILT ELEVATIONS (To be submitted by APPLICANT before Certificate of Compliance is issued).

The following information must be provided for project structures. This section must be completed by a registered professional engineer or a licensed land surveyor (or attach a certification to this application).

COMPLETE 1 OR 2 BELOW:

1 Actual (As-Built) Elevation of the top of the lowest floor (including basement or crawl space is _____FT. NGVD.
2 Actual (As Built) elevation of floodproofing is _____FT. NGVD.

Note: Any work performed prior to submittal of the above information is at risk of the applicant.
SECTION 7: COMPLIANCE ACTION (To be completed by the Floodplain Administrator/Manager or his/her representative).

The Floodplain Administrator/Manager or his/her representative will complete this section as applicable based on inspection of the project to ensure compliance with the Doddridge County Floodplain Ordinance.
INSPECTIONS:

DATE:_____ BY:_____
DEFICIENCIES ? Y/N

COMMENTS_____
_____
_____
_____

SECTION 8: CERTIFICATE OF COMPLIANCE (To be completed by Floodplain Administrator/Manager or his/her representative).

Certificate of Compliance issued: DATE:_____ BY:_____

CERTIFICATE OF COMPLIANCE
FOR DEVELOPMENT IN SPECIAL FLOOD HAZARD AREA (OWNER MUST RETAIN)

PERMIT NUMBER:_____
PERMIT DATE:_____

PURPOSE –

CONSTRUCTION LOCATION:_____

OWNER'S ADDRESS:_____

_____

_____

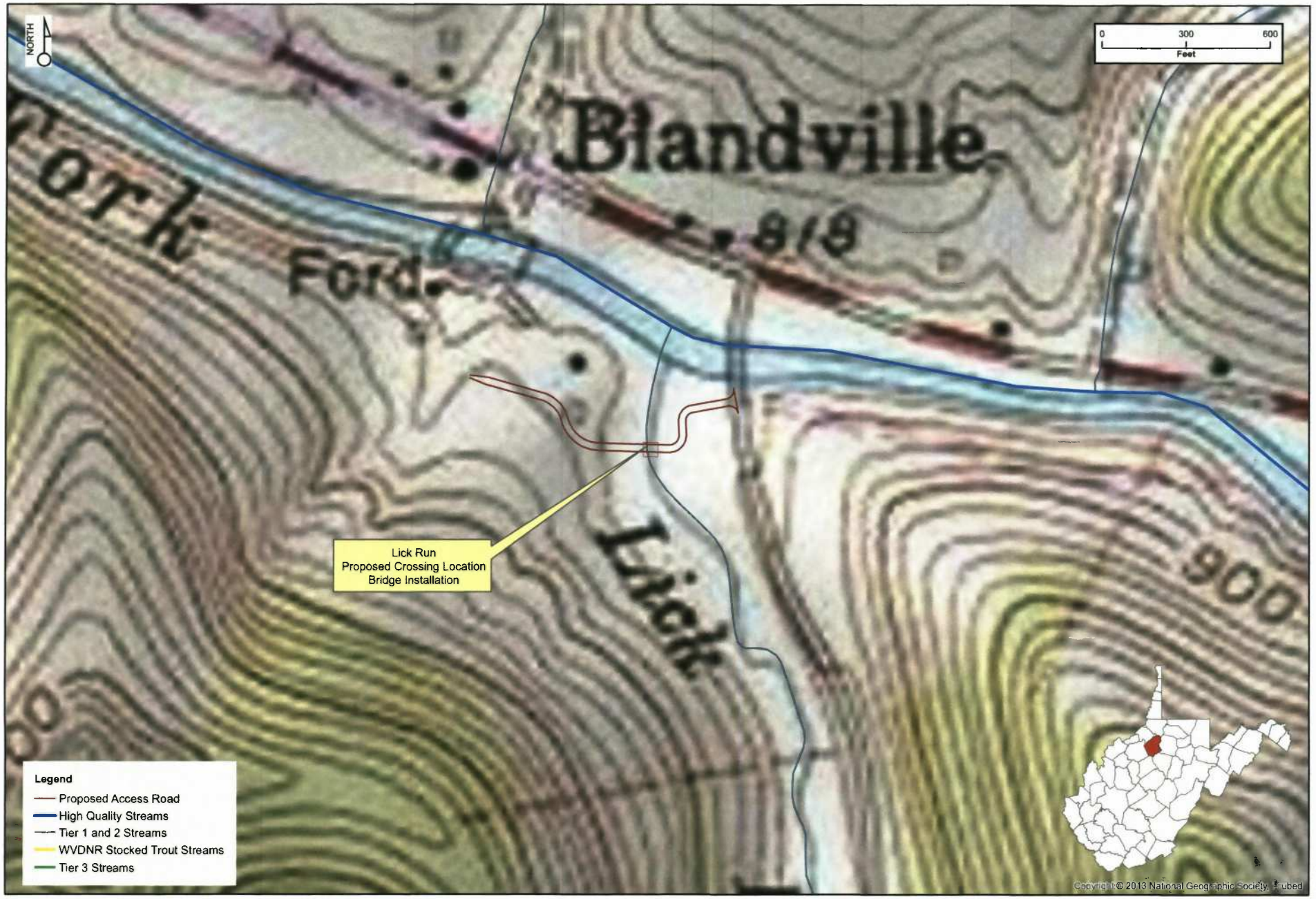
THE FOLLOWING MUST BE COMPLETED BY THE FLOODPLAIN ADMINISTRATOR/MANAGER OR HIS/HER AGENT.

COMPLIANCE IS HEREBY CERTIFIED WITH THE REQUIREMENT OF THE FLOODPLAIN ORDINANCE ADOPTED BY THE COUNTY COMMISSION OF DODDRIDGE COUNTY ON MAY 21, 2013.

SIGNED_____DATE_____

Donahoo Access Road
Location Map (Smithburg, WV Quad)
Doddridge County, West Virginia

Date: 06/18/15
By: N. Hooton



Donahoo Access Road
Stream Crossing Map
Doddridge County, West Virginia

Gone Gathering LLC

CESO
CREATION TO COMPLETION

Date: 06/18/15
By: N. Hooton

Donahoo Access Road

FEMA Floodplain Map

(FIRM Map No.54017C0140C eff. 10/04/2011)

Doddridge County, West Virginia

Antero Gathering LLC

CESO CREATION TO COMPLETION

Date: 10/30/2015

N. Boydston

Cone Gathering LLC

CONSTRUCTION PLAN AND EROSION & SEDIMENT CONTROL PLAN

DONAHOO ACCESS ROAD - PRE-FAB MODULAR STEEL BRIDGE

BLANDVILLE
DODDRIDGE COUNTY, WEST VIRGINIA

ACCESS LOCATION
(NAD 83) LAT: 39.256090 N; LONG: 80.711156 W
(NAD 27) LAT: 39.256005 N; LONG: 80.711331 W

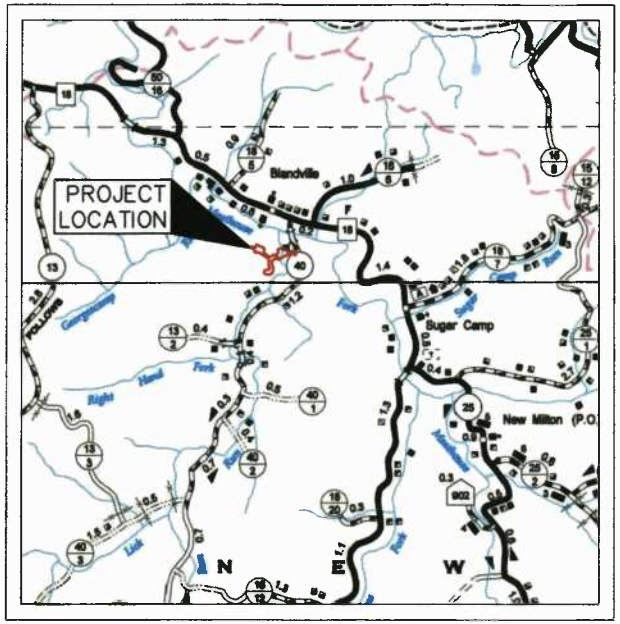
1. LAND OWNER:
KOPPLER DOIT L & DONNA D
PID: 422904020.0000
0.34 ACRES DISTURBED

2. LAND OWNER:
DONAHOO DENISE W
PID: 422904046.0000
0.61 ACRES DISTURBED

DISTURBANCE LIMITS:
0.95 ACRES DISTURBED

ENGINEER:
CESO, INC.
2800 CORPORATE EXCHANGE DRIVE,
SUITE 160
COLUMBUS, OH 43231
CONTACT: BENJAMIN J. MILLER
P: 614.794.7080
E: MILLER@CESOINC.COM

OPERATOR:
CONE GATHERING, LLC
ONE ENERGY DRIVE
JANE LEW, WV 26378
CONTACT: ADAM WHITE
P: 240.506.7299
E: ADAMWHITE@CONSOLENERGY.COM



LOCATION MAP
NOT TO SCALE

SIGNATURE: Kevin Bohman DATE: 11.04.2015
KEVIN M. BOHMAN, P.E.

INDEX OF SHEETS:

WEST VIRGINIA 811

REVISIONS
NO. | DATE | DESCRIPTION

Cone Gathering LLC

TITLE SHEET

DONAHOO ACCESS ROAD

BLANDVILLE, DODDRIDGE COUNTY, WEST VIRGINIA

ceso
CREATION TO COMPLETION
www.cesoinc.com

ISSUE:	CONSTRUCTION
DATE:	11.04.2015
JOB NO.:	751001
DESIGN:	BEM
DRAWN:	BEM
CHECKED:	BJM
SHEET NO.	1

GENERAL NOTES:

1. ALL WORK AND MATERIALS SHALL COMPLY WITH ALL LOCAL REGULATIONS AND CODES AND O.S.H.A. STANDARDS. THE CONTRACTOR SHALL OBTAIN FINAL PERMITTING AND APPROVAL/INSPECTIONS AS REQUIRED FROM THE LOCALITY.
2. THIS PLAN DOES NOT PURPORT TO BE A COMPREHENSIVE REPRESENTATION OF EXISTING UTILITIES IN THE PROJECT AREA. UTILITIES SHOWN ARE BEING PROVIDED FOR INFORMATIONAL PURPOSES ONLY, BASED ON SURFACE FEATURES OBSERVED IN THE FIELD. CESO, INC. MAKES NO GUARANTEE TO THEIR ACCURACY AND/OR COMPLETENESS. FOURTY-EIGHT (48) HOURS BEFORE DIGGING IS TO COMMENCE, THE CONTRACTOR SHALL NOTIFY THE MISS UTILITY OF WEST VIRGINIA, INC. (WV811) AT 1-800-245-4848 OR 811. THE CONTRACTOR SHALL ALSO NOTIFY ALL OTHER AGENCIES WHICH MIGHT HAVE UNDERGROUND UTILITIES IN THE PROJECT AREA AND ARE NON-MEMBERS OF WV811.
3. THE CONTRACTOR SHALL MAINTAIN ALL EROSION & SEDIMENT CONTROL MEASURES LISTED ON THIS PLAN. ALL LAND DISTURBING ACTIVITIES ARE SUBJECT TO INSPECTION BY THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP) TO DETERMINE COMPLIANCE WITH THEIR STANDARDS AND REGULATIONS.
4. ALL EXPOSED SUBGRADE SHALL BE EVALUATED BY THE CONTRACTOR PRIOR TO EMBANKMENT OR PAVEMENT CONSTRUCTION. ANY UNSUITABLE SOILS ENCOUNTERED SHALL BE REMOVED AND REPLACED OR REMEDIATED PER ENGINEER'S RECOMMENDATION.
5. PROPOSED EARTHWORK EMBANKMENT MATERIALS AND METHODS SHALL CONFORM TO WVDOH ITEM 207; CONFORMANCE TO BE DETERMINED/VERIFIED BY THE CONTRACTOR. UNLESS OTHERWISE DIRECTED BY THE FIELD REPRESENTATIVE, ACCEPTABLE MOISTURE CONTENT AND COMPACTION SHALL BE DEFINED AS A LIQUID LIMIT LESS THAN 65 AND 98 PERCENT STANDARD PROCTOR, RESPECTIVELY.
6. STORM SEWERS SHALL BE HIGH-DENSITY POLYETHYLENE PIPE (HDPE) – AASHTO M 252, M 294, TYPE S. STORM SEWERS SHALL BE INSPECTED AND APPROVED PRIOR TO BACKFILLING.
7. ALL PLAN COORDINATES, UNLESS OTHERWISE NOTED ARE IN STATE PLANE COORDINATE SYSTEM (WEST VIRGINIA NORTH ZONE NAD83).

CONSTRUCTION SEQUENCE

1. AREAS THAT ARE NOT TO BE DISTURBED DURING CONSTRUCTION ARE TO BE CLEARLY MARKED BEFORE BEGINNING WORK ON THE SITE.
2. MAKE ONE CALL TO HAVE ALL UTILITIES MARKED.
3. EROSION AND SEDIMENT CONTROL DEVICES, AS REQUIRED BY THE EROSION AND SEDIMENT CONTROL PLAN AND DICTATED BY FIELD CONDITIONS, ARE TO BE INSTALLED PRIOR TO CONDUCTING ANY CONSTRUCTION ACTIVITY ON THE SITE.

3.1. INSTALL A STABILIZED CONSTRUCTION ENTRANCE.

3.2. INSTALL ALL FILTER SOCKS PER THE PLAN.

4. CLEAR AND GRUB THE APPLICABLE AREA.

4.1. TOPSOIL SHALL BE STRIPPED TO LIMITS OF CONSTRUCTION.

5. INSTALL SHORING AND BRACING PRIOR TO ANY BRIDGE ACTIVITY.
6. INSTALL THE ALUMINUM BOX CULVERT PER THE PLAN. BACKFILL PER THE PLAN AND THE GEOTECHNICAL REPORT. ALL WORK IN STREAMBED AREAS IS STRICTLY PROHIBITED.
7. COMPLETE FINAL GRADING, PLACE GRAVEL ON THE DRIVEWAY, INSTALL EROSION CONTROL BLANKETS, AND FERTILIZE, SEED, AND MULCH SOIL AREAS. SEEDING AND MULCHING SHALL BE PLACED TO LIMITS OF DISTURBANCE.
8. TEMPORARY EROSION CONTROLS SHALL REMAIN IN PLACE UNTIL A UNIFORM 70 PERCENT VEGETATIVE COVER IS ESTABLISHED.

UTILITY RIGHT-OF-WAY RESTRICTIONS

1. CONSTRUCTION VEHICLES, VEHICLES WITH BOOMS, AND EQUIPMENT OPERATING WITHIN OR ADJACENT TO A UTILITY RIGHT-OF-WAY MUST BE PROPERLY GROUNDED.
2. CHANGES TO GRADE ELEVATION WITHIN THE UTILITY RIGHT-OF-WAY ARE NOT PERMITTED.
3. GROUND DISTURBANCE OR EXCAVATIONS ARE NOT PERMITTED WITHIN 50 FEET OF ANY UTILITY STRUCTURES (POLES, TOWERS, GUYS, ETC.)
4. EXPLOSIVES OR COMBUSTIBLE LIQUIDS, SUBSTANCES, OR MATERIALS ARE NOT PERMITTED WITHIN THE RIGHT-OF-WAY. PROHIBITED MATERIALS INCLUDE BUT ARE NOT LIMITED TO FUEL, WOOD CHIPS, MULCH, BRUSH, AND TIRES.

EROSION AND SEDIMENT CONTROL NARRATIVE:

PLAN DESIGNER:
CESO, INC.
2800 CORPORATE EXCHANGE DRIVE, SUITE 180
COLUMBUS, OH 43231

CONTACT: BENJAMIN J. MILLER, PE
P: 614-794-7080
E: MILLER@CESOINC.COM

OWNER:
CONE GATHERING, LLC
ONE ENERGY DRIVE
JANE LEW, WV 26378

CONTACT: ADAM WHITE
P: 240-506-7299
E: ADAMWHITE@CONSOLENERGY.COM

WV DEP PERMIT #: XXXXXXXX

PROJECT DESCRIPTION: THE PROPOSED PROJECT IS THE CONSTRUCTION OF A LANDOWNER DRIVEWAY AND BRIDGE. THIS PROJECT WILL DISTURB 0.95± ACRES.

EXISTING SITE CONDITIONS: THE EXISTING CONDITIONS ON SITE ARE GRAVEL DRIVEWAY, RESIDENTIAL YARD, AND A STREAM. THE SITE DRAINS TO THE EAST AND WEST TO LICK RUN WHICH DUMPS DIRECTLY INTO MEATHOUSE FORK.

ADJACENT AREAS: ADJACENT AREAS THAT MAY BE AFFECTED BY SITE DISTURBANCE INCLUDE LICK RUN AND MEATHOUSE FORK.

CRITICAL AREAS: THE CRITICAL AREA FOR THIS PROJECT IS WHERE THE PROPOSED DRIVEWAY CROSSES LICK RUN.

REQUIREMENTS FOR WORKING IN OR NEAR CRITICAL AREAS CAN BE FOUND ON SHEETS 2-3 AND 9.

SITE SOILS:

Ch	– CHAGRIN SILT LOAM	–	57.5%
GuD	– GILPIN-UPSHUR SILT LOAMS	–	11.1%
MoC	– MONONGAHELA SILT LOAM	–	25.2%
VcE	– VANDALIA SILT LOAM	–	6.2%

THERE IS AN AVERAGE OF 4" OF TOPSOIL IN THE PROJECT LOCATION. TOPSOIL REPLACEMENT THROUGHOUT THE SITE SHALL CONSIST OF 4".

EROSION PROBLEM AREAS: POTENTIAL EROSION PROBLEMS ON THIS SITE EXIST ALONG THE STEEP STREAM BANKS WHERE THE DRIVEWAY WILL BE CONSTRUCTED.

CONSTRUCTION STORMWATER POLLUTION PREVENTION ELEMENTS:
THE EROSION AND SEDIMENT CONTROL PLAN SHOWS ALL CLEARING LIMITS AND PROPOSED SEDIMENT CONTROLS. THE GENERAL NOTES ADDRESS THE STABILIZATION OF SOILS, SLOPE PROTECTION, CONTROL OF OTHER POLLUTANTS, DEWATERING CONTROL, MAINTENANCE OF BMPs, MANAGEMENT OF THE PROJECT, AND STABILIZATION. TYPES OF BMPs USED ON THIS PROJECT INCLUDE A STABILIZED CONSTRUCTION ENTRANCE, FILTER SOCKS, AND EROSION CONTROL BLANKETS.

TEMPORARY SEEDING CHART

Common Name	Scientific Name	Planting Dates	PLS Lbs/Acre
Annual Ryegrass	Lolium multiflorum	2/16-5/15, 8/1-11/1	40
Field Bromegrass	Bromus ciliatus	3/1-6/15, 8/1-9/15	40
Spring Oats	Avena sativa	3/1-6/15	100
Winter Rye	Secale cereale	8/15-2/28	170
Winter Wheat	Triticum aestivum	8/18-2/28	180
Japanese Millet	Echinochloa crusgalli	5/15-8/15	30
Redtop	Agrostis alba	3/1-6/15	10
Annual Ryegrass and Spring Oats	Lolium multiflorum, Avena sativa	3/1-6/15	30, 70
German, Foxtail Millet	Setaria italica	5/1-8/1	40
Hairy Vetch	Vicia villosa	8/15-4/1	60

1. PRIOR TO SEEDING, INSTALL NECESSARY EROSION CONTROL PRACTICES SUCH AS DIKES, WATERWAYS, AND BASINS.
2. SEED SHALL BE EVENLY APPLIED WITH A BROADCAST SEEDER, DRILL, CULTIPACKER SEEDER, OR HYDROSEEDER. SMALL GRAINS SHALL BE PLANTED NO MORE THAN 1.5 INCHES DEEP. SMALL SEEDS, SUCH AS ANNUAL RYE, SHALL BE PLANTED NO MORE THAN A QUARTER INCH DEEP. OTHER GRASSES AND LEGUMES SHALL BE PLANTED NO MORE THAN A HALF INCH DEEP.
3. TEMPORARY SEEDING CONDUCTED IN FALL FOR WINTER COVER AND DURING HOT AND DRY SUMMER MONTHS SHALL BE MULCHED WITH STRAW AND HAY ACCORDING TO THE STANDARD FOR MULCHING. HYDROMULCHES (FIBER MULCH) MAY NOT PROVIDE ADEQUATE TEMPERATURE AND MOISTURE CONTROL.

PERMANENT SEEDING CHART

Seed Mix	Common Name	Scientific Name	PLS Lbs/Acre
O	Perennial Ryegrass	Lolium perenne	40
	Birdsfoot Trefoil	Lotus corniculatus	15
	Redtop	Agrostis alba	5
P	Sericia Lespedeza	Lespadeza cunata	40
	Orchardgrass	Dactylis glomerata	30
	Redtop	Agrostis alba	5

1. ALL PERMANENT SEEDING SHALL CONFORM TO WV DEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL, SECTION 3.10-1.
2. SEED MIX O OR P SHALL BE USED FOR PERMANENT SEEDING.

GENERAL EROSION AND SEDIMENT CONTROL METHODS/PROCEDURES

1. EROSION AND SEDIMENT CONTROL FACILITIES SHALL BE CONSTRUCTED, STABILIZED, AND FUNCTIONAL BEFORE ANY SITE DISTURBANCE BEGINS WITHIN THE TRIBUTARY AREAS OF THOSE FACILITIES.
2. IN ALL CASES, THE SMALLEST PRACTICAL AREA OF STABLE LAND SURFACE WILL BE DISTURBED.
3. AT NO TIME WILL SEDIMENT OR SEDIMENT-LADEN RUNOFF BE ALLOWED TO LEAVE THE SITE AND ENTER STATE WATERS WITHOUT FIRST PASSING THROUGH A SEDIMENT FILTERING DEVICE. SHOULD SITE CONDITIONS, CONSTRUCTION PROCEDURES, ETC. ALTER THE APPROVED PLAN TO THE POINT WHERE SEDIMENT AND SEDIMENT-LADEN RUNOFF IS NOT BEING CONTROLLED AND FILTERED BEFORE IT LEAVES THE SITE, ADDITIONAL EROSION CONTROL FACILITIES ARE TO BE IMPLEMENTED.
4. ALTHOUGH THE STAGING OF EARTHMOVING ACTIVITIES HAS BEEN DESCRIBED WITHIN CERTAIN AREAS, THE WORK MAY OCCUR OVER THE ENTIRE PROJECT AREA SIMULTANEOUSLY. MEASURES SHALL BE IMPLEMENTED AS NECESSARY TO CONTINUE THE INTEGRITY OF THE EROSION AND SEDIMENTATION CONTROL PLAN.
5. EARTH DISTURBANCE ACTIVITIES, INCLUDING MOVEMENT OF CONSTRUCTION VEHICLES, SHALL BE AVOIDED/MINIMIZED BELOW THE LOCATION OF THE PERIMETER EROSION CONTROL FACILITIES. SHOULD EARTH DISTURBANCE OCCUR BELOW THE PERIMETER EROSION CONTROL FACILITIES, PERMANENT STABILIZATION SHALL BE IMMEDIATELY APPLIED TO THOSE DISTURBED AREAS.
6. WASTE AND EXCESS MATERIALS SHALL BE STOCKPILED OR DISPOSED OF IN A LAWFUL MANNER ON-SITE OR AT AN APPROVED FACILITY.
7. ALL OFF-SITE BORROW AREAS, WASTE DISPOSAL AREAS, AND/OR STORAGE AREAS SHALL HAVE AN APPROVED EROSION AND SEDIMENT POLLUTION CONTROL PLAN PRIOR TO THE START OF ANY EARTHMOVING ACTIVITIES IN THESE OFF-SITE AREAS.
8. TOPSOIL AND EXCESS MATERIAL STOCKPILES SHALL BE SEEDED AND MULCHED IF THEY ARE TO REMAIN FOR MORE THAN 4 DAYS. STOCKPILES ARE TO BE PLACED IN A LOCATION WHERE THEY WILL NOT INTERFERE WITH CONSTRUCTION ACTIVITIES AND ARE NOT TO BE LOCATED WITHIN THE FLOW PATH OF A NATURAL OR CONSTRUCTED WATERWAY. STOCKPILE AREAS ARE TO HAVE SIDE SLOPES OF 2H:1V OR FLATTER AND SHALL NOT EXCEED 32 FEET IN HEIGHT.
9. PERMANENT STABILIZATION IS REQUIRED AS SOON AS A DISTURBED AREA IS BROUGHT TO GRADE OR FINAL EARTHMOVING HAS BEEN COMPLETED. WHERE IT IS NOT POSSIBLE TO PERMANENTLY STABILIZE A DISTURBED AREA IMMEDIATELY AFTER THE FINAL EARTHMOVING HAS BEEN COMPLETED OR WHERE THE ACTIVITY CEASES FOR MORE THAN 4 DAYS, TEMPORARY STABILIZATION MEASURES SHALL BE IMPLEMENTED PROMPTLY.
10. ANY EROSION AND SEDIMENTATION CONTROL FACILITY REQUIRED OR NECESSARY TO PROTECT AREAS FROM EROSION DURING THE STABILIZATION PERIOD SHALL BE MAINTAINED UNTIL PERMANENT STABILIZATION OF THE CONTRIBUTING DRAINAGE AREA IS COMPLETED. UPON COMPLETION OF PERMANENT STABILIZATION, ALL UNNECESSARY OR UNUSABLE CONTROL MEASURES AND FACILITIES SHALL BE REMOVED, THE DISTURBED AREAS CREATED BY THIS ACTIVITY SHALL BE BROUGHT TO FINAL GRADE AND THE SOILS SHALL BE IMMEDIATELY STABILIZED.
11. SCHEDULE CONSTRUCTION SO THAT GRADING OPERATIONS CAN BEGIN AND END AS QUICKLY AS POSSIBLE.
12. CLEARLY MARK AREAS THAT ARE NOT TO BE DISTURBED BY FLAGS, SIGNS, ETC.

EROSION & SEDIMENT CONTROL MAINTENANCE NOTES

ALL CONTROL MEASURES STATED IN THIS PLAN SHALL BE MAINTAINED IN FULLY FUNCTIONAL CONDITION UNTIL TEMPORARY OR PERMANENT STABILIZATION OF THE SITE IS ACHIEVED. ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED BY A QUALIFIED PERSON IN ACCORDANCE TO THE CONTRACT DOCUMENTS OR THE APPLICABLE PERMIT, WHICHEVER IS MORE STRINGENT, AND REPAIRED ACCORDING TO THE FOLLOWING:

1. ALL SEEDED AREAS SHALL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STANDING OF GRASS IS MAINTAINED. AREAS SHOULD BE FERTILIZED, WATERED, AND RESEEDED AS NEEDED.
2. SEDIMENTATION TRAPS SHALL BE MAINTAINED IN OPERATIONAL CONDITIONS AT ALL TIMES. SEDIMENT MUST BE REMOVED FROM TRAPS WHEN THE DESIGN CAPACITY HAS BEEN REDUCED BY 40%.
3. MINIMIZE OFF-SITE SEDIMENT TRACKING OF VEHICLES BY THE USE OF STONE MATERIAL IN ALL CONSTRUCTION ENTRANCES, ALONG WITH REGULARLY SCHEDULED SWEEPING/GOOD HOUSEKEEPING. STABILIZED CONSTRUCTION ENTRANCES TO BE PROPERLY MAINTAINED BY GENERAL CONTRACTOR AND IN GOOD WORKING ORDER AT ALL TIMES; THIS MAY REQUIRE PERIODIC TOP DRESSING OF THE STONE AS CONDITIONS DEMAND.
4. THE TEMPORARY PARKING AND STORAGE AREA SHALL BE KEPT IN GOOD CONDITION (SUITABLE FOR PARKING AND STORAGE) BY GENERAL CONTRACTOR. THIS MAY REQUIRE PERIODIC TOP DRESSING OF THE TEMPORARY PARKING AS CONDITIONS DEMAND.
5. CONTRACTORS AND SUBCONTRACTORS WILL BE RESPONSIBLE FOR REMOVING ALL SEDIMENT FROM THE SITE, INCLUDING SEDIMENT TRAPS AND STORM SEWER PIPES. SEDIMENT DEPOSITION DURING SITE STABILIZATION MUST ALSO BE REMOVED.
6. ALL ROCK CHANNEL PROTECTION MUST BE PLACED OVER GEOTEXTILE FILTER.
7. CONTAINERS SHALL BE AVAILABLE FOR DISPOSAL OF DEBRIS, TRASH, HAZARDOUS OR PETROLEUM WASTES. ALL CONTAINERS MUST BE COVERED AND LEAK-PROOF. ALL WASTE MATERIAL SHALL BE DISPOSED OF AT FACILITIES APPROVED FOR THE PERTINENT MATERIAL.
8. AREA SHALL BE DESIGNATED BY CONTRACTOR AND SHOWN ON SWPPP MAP FOR MIXING OR STORAGE OF COMPOUNDS SUCH AS FERTILIZERS, LIME, ASPHALT, OR CONCRETE. THESE DESIGNATED AREAS SHALL BE LOCATED AWAY FROM WATERCOURSES, DRAINAGE DITCHES, FIELD DRAINS, OR OTHER STORMWATER DRAINAGE AREA.
9. EQUIPMENT FUELING & MAINTENANCE SHALL BE IN DESIGNATED AREAS ONLY.
10. A SPILL PREVENTION CONTROL AND COUNTERMEASURE (SPCC) PLAN MUST BE DEVELOPED FOR SITES WITH ONE ABOVE-GROUND STORAGE TANK OF 660 GALLONS OR MORE, TOTAL ABOVE-GROUND STORAGE OF 1,320 GALLONS OR BELOW-GROUND STORAGE OF 4,200 GALLONS OF FUEL.
11. ALL CONTAMINATED SOIL MUST BE TREATED AND/OR DISPOSED IN AN WVDEP APPROVED SOLID WASTE MANAGEMENT FACILITY OR HAZARDOUS WASTE TREATMENT, STORAGE OR DISPOSAL FACILITIES.
12. THE CONTRACTOR SHALL CONTACT THE WVDEP, THE LOCAL FIRE DEPARTMENT AND THE LOCAL EMERGENCY PLANNING COMMITTEE IN THE EVENT OF A PETROLEUM SPILL (>25 GALLONS) OR THE PRESENCE OF SHEEN.
13. ALL EROSION AND SEDIMENT CONTROLS ON THE SITE SHALL BE INSPECTED AT LEAST ONCE EVERY SEVEN CALENDAR DAYS AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.5 INCHES PER 24 HOUR PERIOD. ANY REQUIRED REPAIRS OR MAINTENANCE SHALL BE MADE IMMEDIATELY.

MAINTENANCE/CONTRACTOR'S RESPONSIBILITIES

1. CONTRACTOR SHALL IMPLEMENT THE EROSION AND SEDIMENT POLLUTION CONTROL PLAN IN ACCORDANCE WITH THE DRAWINGS AND PROJECT NARRATIVE.
2. ALL FACILITIES/EROSION AND SEDIMENT CONTROLS SHALL BE INSPECTED AND REPAIRED, IF NECESSARY, AT LEAST ONCE EVERY SEVEN CALENDAR DAYS AND WITHIN 24 HOURS AFTER EACH RAINFALL EVENT GREATER THAN 0.5 INCHES PER 24 HOUR PERIOD. ALL PREVENTATIVE MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING AND ANCHORING OF THE MULCH SHALL BE PERFORMED IMMEDIATELY. SEDIMENT REMOVED FROM THE EROSION CONTROL STRUCTURES SHALL BE PLACED UPSTREAM OF THOSE CONTROLS AND IMMEDIATELY STABILIZED WITH SEED AND AN ANCHORED MULCH OR HAULED OFFSITE TO A DISPOSAL AREA WITH AN APPROVED EROSION AND SEDIMENT POLLUTION CONTROL PLAN.
3. AT NO TIME WILL SEDIMENT-LADEN RUNOFF BE ALLOWED TO LEAVE THE SITE AND ENTER STATE WATERS WITHOUT FIRST PASSING THROUGH A SEDIMENT FILTERING DEVICE. IF EROSION CONTROL FACILITIES FAIL TO PERFORM AS EXPECTED, ALTERNATIVE FACILITIES OR MODIFICATIONS OF THOSE FACILITIES INSTALLED WILL BE REQUIRED.
4. ALL PERMANENTLY SEEDED AREAS THAT BECOME ERODED SHALL HAVE THE TOPSOIL REPLACED, THE EROSION CONTROL MATTING REPLACED (IF APPLICABLE), THE GRASS RESOWN AND MULCH REAPPLIED AND ANCHORED. IF EROSION PERSISTS, THE AREA SHALL BE EITHER LINED WITH SOD OR STABILIZED WITH ROCK RIPRAP.
5. A COPY OF THE APPROVED EROSION AND SEDIMENT POLLUTION CONTROL PLAN SHALL BE KEPT AVAILABLE FOR INSPECTION ON THE CONSTRUCTION SITE AT ALL TIMES THROUGHOUT THE TERM OF THE PROJECT.
6. THE INTENT OF THIS PLAN IS TO INDICATE GENERAL MEANS OF COMPLIANCE WITH THE REQUIREMENTS OF THE RULES AND REGULATIONS OF THE DEPARTMENT OF ENVIRONMENTAL PROTECTION (AS AUTHORIZED UNDER THE CLEAN WATER ACT). IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO IMPLEMENT THESE METHODS, PLUS ADDITIONAL METHODS, AS MAY BE NECESSARY BECAUSE OF CONDITIONS CREATED BY LOCALIZED SITE CONDITIONS AND/OR CONSTRUCTION PROCEDURES IN ORDER TO ASSURE COMPLIANCE WITH APPLICABLE LAW. IT WILL FURTHER BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN ALL EROSION AND SEDIMENT CONTROL FACILITIES SO THAT THEY PERFORM AS REQUIRED BY APPLICABLE LAW.
7. FINES AND RELATED COSTS RESULTING FROM THE CONTRACTOR'S FAILURE TO PROVIDE ADEQUATE PROTECTION AGAINST SOIL EROSION AND FOR ANY VIOLATIONS OF THE CLEAN STREAMS LAW AND THE RULES AND REGULATIONS PROMULGATED THEREUNDER SHALL BE BORNE BY THE CONTRACTOR.

RECYCLING AND DISPOSAL METHODS

1. REMOVE WASTE MATERIALS INCLUDING TRASH AND DEBRIS, AND LEGALLY DISPOSE OF THEM OFF THE SITE TO AN APPROVED DUMP SITE. SEPARATE RECYCLABLE MATERIALS PRODUCED DURING SITE CLEARING FROM OTHER NON-RECYCLABLE MATERIALS. STORE OR STOCKPILE WITHOUT INTERMIXING WITH OTHER MATERIALS AND TRANSPORT THEM TO RECYCLING FACILITIES. MATERIAL TO BE REMOVED SHALL BE REMOVED DAILY AND SHALL NOT BE ALLOWED TO ACCUMULATE AT THE SITE.

REVISIONS NO.	DATE	DESCRIPTION

cone Gathering LLC

GENERAL NOTES & SWPPP NOTES

DONAHOO ACCESS ROAD

BLANDVILLE, DODDRIDGE COUNTY, WEST VIRGINIA

cesa
CREATION to COMPLETION
www.cesoinc.com
Engineering • Architecture • Surveying • Construction Mgmt • Environmental

ISSUE:	CONSTRUCTION
DATE:	11.04.2015
JOB NO.:	751001
DESIGN:	BEM
DRAWN:	BEM
CHECKED:	BJM
SHEET NO.	2

EROSION & SEDIMENT CONTROL PLAN NOTES

1. ALL EROSION AND SEDIMENTATION CONTROL SHALL BE PERFORMED ACCORDING TO: THIS PLAN; WEST VIRGINIA GENERAL WATER POLLUTION CONTROL PERMIT; ANY AND ALL REQUIRED PERMITS, REPORTS, AND RELATED DOCUMENTS. ALL CONTRACTORS AND SUBCONTRACTORS MUST BECOME FAMILIAR WITH ALL OF THE ABOVE.

2. CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES AS REQUIRED BY THE EROSION CONTROL PLAN. ADDITIONAL BEST MANAGEMENT PRACTICES SHALL BE IMPLEMENTED AS DICTATED BY CONDITIONS AND GRADE CHANGES TO THE SITE AT NO ADDITIONAL COST TO OWNER THROUGHOUT ALL PHASES OF CONSTRUCTION.

3. CONTRACTOR SHALL MINIMIZE CLEARING AND DISTURBANCE TO THE ENVIRONMENT TO THE EXTENT POSSIBLE OR AS REQUIRED BY THE GENERAL PERMIT.

4. PERIMETER SEDIMENT BARRIERS SHALL BE IMPLEMENTED AS THE FIRST STEP OF GRADING WITHIN SEVEN (7) DAYS FROM THE START OF CLEARING AND GRUBBING, AND SHALL CONTINUE TO FUNCTION UNTIL THE SLOPE DEVELOPMENT AREA IS RESTABILIZED.

5. TEMPORARY SEEDING SHALL BE IN ACCORDANCE WITH WVDEP'S OFFICE OF CONSTRUCTION STORMWATER EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL, CHAPTER 3.10.

6. PERMANENT SEEDING SHALL BE IN ACCORDANCE WITH WVDEP'S OFFICE OF CONSTRUCTION STORMWATER EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL, CHAPTER 3.11.

7. SLOPES SHALL BE LEFT IN A ROUGHENED CONDITION DURING THE GRADING PHASE TO REDUCE RUNOFF VELOCITIES AND EROSION. ALL SLOPES 3:1 OR GREATER SHALL BE FERTILIZED, SEEDED, AND MULCHED. ALTERNATIVE EROSION CONTROL MEASURES MAY BE IMPLEMENTED TO ESTABLISH SOIL STABILIZATION. ALTERNATIVES SHALL INCLUDE:
   - 7.1. SEED AIDE BY PROFILE PRODUCTS
   - 7.2. HYDRO SEED BY TERRA NOVO
   - 7.3. EROSION CONTROL BLANKETS – CURLEX BLANKETS BY AMERICAN EXCELSIOR COMPANY, NORTH AMERICAN GREEN, INC. OR AN APPROVED EQUAL AS SPECIFIED IN THE PLANS SHALL BE INSTALLED ON THE SLOPES.
   - 7.4. OR APPROVED EQUAL

8. SLOPES AT OR GREATER THAN 1.73H:1V (30° OR GREATER) SHALL BE PROTECTED TO MINIMIZE FURTHER SOIL EROSION AND/OR SLIPS DUE TO SEEPS OR SPRINGS THAT DO NOT SHOW CONNECTIVITY TO A JURISDICTIONAL FEATURE. SEEPS OR SPRINGS IDENTIFIED ON THE E&S PLANS OR IDENTIFIED DURING CONSTRUCTION ACTIVITIES SHALL BE REMEDIATED THROUGH USE OF FRENCH DRAINS. FOR AREAS THAT DO NOT HAVE A SEEP OR SPRING IDENTIFIED, REMEDIATE WITH BONDED FIBER MATRIX.

9. NO SOLID (OTHER THAN SEDIMENT) OR LIQUID WASTE, INCLUDING BUILDING MATERIALS, SHALL BE DISCHARGED IN STORM WATER RUNOFF. ALL NON-SEDIMENT POLLUTANTS MUST BE DISPOSED OF IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL GUIDELINES. WASH OUT OF CEMENT TRUCKS SHOULD OCCUR IN DESIGNATED PIT OR DIKED AREAS, WHERE WASHINGS CAN BE REMOVED AND PROPERLY DISPOSED OFF-SITE WHEN THEY HARDEN. STORAGE TANKS SHOULD ALSO BE LOCATED IN PIT OR DIKED AREAS. IN ADDITION, SUFFICIENT OIL AND GREASE ABSORBING MATERIALS AND FLOTATION BOOMS TO CLEAN AND CONTAIN FUEL AND CHEMICAL SPILLS MUST BE KEPT ON SITE.

10. IF THE ACTION OF VEHICLES TRAVELING OVER THE STABILIZED CONSTRUCTION EXIT DOES NOT SUFFICIENTLY REMOVE MOST OF THE DIRT AND MUD, THEN THE TIRES MUST BE WASHED BEFORE VEHICLES ENTER A PUBLIC ROAD. PROVISIONS MUST BE MADE TO INTERCEPT THE WATER AND TRAP THE SEDIMENT BEFORE IT IS CARRIED OFF THE SITE.

11. RUBBISH, TRASH, GARBAGE, LITTER, OR OTHER SUCH MATERIALS SHALL BE DISPOSED INTO SEALED CONTAINERS. MATERIALS SHALL BE PREVENTED FROM LEAVING THE SITE THROUGH THE ACTION OF WIND OR STORM WATER DISCHARGE INTO DRAINAGE DITCHES OR WATERS OF THE STATE.

12. DUST CONTROL USING APPROVED MATERIALS MUST BE PERFORMED AT ALL TIMES. THE USE OF MOTOR OILS AND OTHER PETROLEUM BASED OR TOXIC LIQUIDS FOR DUST SUPPRESSION IS PROHIBITED.

13. ALL MATERIALS SPILLED, DROPPED, WASHED, OR TRACKED ONTO THE ROADWAYS OR INTO THE STORM SEWERS MUST BE REMOVED IMMEDIATELY.

TEMPORARY CONTROL MEASURES AND FACILITIES

1. GENERAL – SEE PLANS AND DETAILS FOR PROPOSED LOCATIONS AND CONSTRUCTION DETAILS FOR BMPs.

2. ROCK CONSTRUCTION ENTRANCE – A ROCK CONSTRUCTION ENTRANCE SHALL BE INSTALLED FOR USE IN ACCESSING THE SITE AT THE INDICATED LOCATION. THE PURPOSE OF THIS ENTRANCE IS TO REDUCE THE AMOUNT OF SEDIMENT DEPOSITED ON THE ROADWAYS.

3. COMPOST FILTER SOCK – SHALL BE PLACED ALONG THE SLOPES OF THE DISTURBED AREAS AS SHOWN ON THE EROSION AND SEDIMENTATION CONTROL PLAN AND IN ACCORDANCE WITH THE EROSION AND SEDIMENTATION CONTROL PLAN DETAILS.

4. VEGETATIVE COVER – STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN SEVEN DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS PERMANENTLY CEASED.
   - 4.1. WHERE THE INITIATION OF STABILIZATION MEASURES BY THE SEVENTH DAY AFTER CONSTRUCTION ACTIVITY TEMPORARILY OR PERMANENTLY CEASES IS PRECLUDED BY SNOW COVER, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS CONDITIONS ALLOW.
   - 4.2. WHERE CONSTRUCTION ACTIVITY WILL RESUME ON A PORTION OF THE SITE WITHIN 21 DAYS FROM WHEN ACTIVITIES CEASED (e.g., THE TOTAL TIME PERIOD THAT CONSTRUCTION ACTIVITY IS TEMPORARILY HALTED IS LESS THAN 21 DAYS) THEN STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF THE SITE BY THE SEVENTH DAY AFTER CONSTRUCTION ACTIVITIES HAVE TEMPORARILY CEASED.
   - 4.3. AREAS WHERE THE SEED HAS FAILED TO GERMINATED ADEQUATELY (UNIFORM PERENNIAL VEGETATIVE COVER WITH A DENSITY OF 70%) WITHIN 30 DAYS AFTER SEEDING AND MULCHING MUST BE RESEEDED IMMEDIATELY, OR AS SOON AS WEATHER CONDITIONS ALLOW.

5. INLET PROTECTION (ROCK FILTER) – ROCK FILTER INLET PROTECTION IS TO BE USED TO TRAP SEDIMENT BEFORE IT ENTERS A PERMANENT CROSS DRAIN CULVERT.

6. SEEDING – PROVIDE TEMPORARY SEEDING OF TOPSOIL STOCKPILES. SEEDING SHALL CONFORM TO WVDOH ITEM 652.

7. PLACE A SILT FENCE AROUND THE PERIMETER OF ALL TOPSOIL STOCKPILES, AS SHOWN ON THE PLANS.

MAINTENANCE OF TEMPORARY CONTROL MEASURES AND FACILITIES

1. GENERAL
   - 1.1. THE MAINTENANCE FOR THE PROJECT SHALL BE IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENTATION CONTROL PLAN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTINUOUS MAINTENANCE OF ALL E&S MEASURES AND DEVICES FOR THE DURATION OF THE PROJECT AND UNTIL WHICH TIME THE AREA IS STABILIZED WITH A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER.
   - 1.2. THE CONTRACTOR SHALL INSPECT ALL DEVICES WEEKLY (MINIMUM) AND AFTER EVERY RAINFALL EVENT AND PERFORM MAINTENANCE AS REQUIRED. ANY DEVICE FOUND TO BE CLOGGED, DAMAGED, HALF-FULL OF SILT OR NOT FULLY OPERATIONAL SHALL BE CLEANED OF ALL DEBRIS. THE SOLID WASTE DISPOSAL IS THE RESPONSIBILITY OF THE CONTRACTOR. ALL DEPOSITED SEDIMENT FROM THE TRAP SHALL BE REMOVED AND SPREAD ACCORDINGLY OR USED AS FILL MATERIAL ON THE PROJECT SITE.

2. VEGETATION
   - 2.1. MAINTAIN GRASS AREAS WITHIN THE GRADING LIMITS OF THE PROJECT UNTIL THE ENTIRE PROJECT HAS BEEN COMPLETED. CONTROL PROHIBITED AND NOXIOUS WEED GROWTH WITHIN THE RIGHT-OF-WAY BY HERBICIDE SPRAYING OR CUTTING (THESE PLANTS ARE DEFINED BY LAW).
   - 2.2. IF A SLOPE FAILURE OCCURS (AFTER THE SEEDING AND SOIL SUPPLEMENT WORK ON A SLOPE HAS BEEN SATISFACTORILY COMPLETED) THE CONTRACTOR IS TO REDRESS THE SLOPE AND REAPPLY SOIL SUPPLEMENTS AND RESEED AS SPECIFIED FOR THE ORIGINAL TREATMENT.
   - 2.3. INSPECT ANY REVEGETATED AREAS WITHIN THE PROJECT LIMITS WEEKLY AND AFTER EACH RAINFALL EVENT TO DETERMINE IF RILLS AND GULLIES HAVE BEEN FORMED AND FOR EXISTENCE OF BARE PATCHES. AREAS OF INADEQUATE VEGETATION SHALL BE RESEEDED AND REMULCHED. AREAS WHERE RILLS AND GULLIES HAVE FORMED SHALL BE FILLED, SEEDED AND REMULCHED.

3. ROCK CONSTRUCTION ENTRANCE
   - 3.1. INSPECT ROCK CONSTRUCTION ENTRANCE INSTALLATION WEEKLY AND AFTER EVERY PRECIPITATION EVENT.
   - 3.2. THE STRUCTURE THICKNESS SHALL BE MAINTAINED TO THE SPECIFIED DIMENSION BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON THE SITE FOR THIS PURPOSE.
   - 3.3. AT THE END OF EACH CONSTRUCTION DAY, SEDIMENT DEPOSITED ON PUBLIC ROADWAYS SHALL BE IMMEDIATELY REMOVED AND RETURNED TO THE CONSTRUCTION SITE. WASHING OF THE ROADWAY WITH WATER SHALL NOT BE PERMITTED.

4. COMPOST FILTER SOCK
   - 4.1. INSPECT COMPOST FILTER SOCK AT LEAST ONCE A WEEK AND AFTER EACH RAINFALL EVENT. MAKE ALL REQUIRED REPAIRS IMMEDIATELY.
   - 4.2. ACCUMULATED SEDIMENTS SHALL BE REMOVED AS REQUIRED TO KEEP THE SOCK FUNCTIONAL. IN ALL CASES REMOVE DEPOSITS WHERE ACCUMULATIONS REACH 1/2 THE ABOVE-GROUND HEIGHT OF THE SOCK.
   - 4.3. THE REMOVED SEDIMENT SHALL BE USED FOR ON-SITE GRADING AND IMMEDIATELY STABILIZED WITH SEED AND AN ANCHORED MULCH.
   - 4.4. ADHERE TO MANUFACTURER'S RECOMMENDATIONS FOR REPLACING COMPOST FILTER SOCK DUE TO WEATHERING.
   - 4.5. ALL UNDERCUTTING OR EROSION OF THE TOE OF THE ANCHOR SHALL BE REPAIRED IMMEDIATELY BY ENTRENCHING THE MESH TO PROPER DEPTH, BACKFILL AND COMPACT AS PER DETAIL.
   - 4.6. ANY SOCK SECTION THAT HAS COLLAPSED OR EXPERIENCED A FAILURE DUE TO CONCENTRATED SURFACE FLOW SHALL BE IMMEDIATELY REPLACED WITH A NEW SECTION OF COMPOST FILTER SOCK OF THE SAME DIAMETER FOR THE LENGTH OF COLLAPSED AREA OR REPLACED WITH A MORE EFFECTIVE ALTERNATIVE.
   - 4.7. AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PERMANENTLY STABILIZED, FILTER SOCKS WILL BE DISPERSED ON SITE WHEN NO LONGER REQUIRED IN SUCH A WAY AS TO FACILITATE AND NOT OBSTRUCT SEEDINGS.

5. TEMPORARY VEGETATIVE COVER
   - 5.1. SOW ANNUAL RYE GRASS AT 88 POUNDS PER ACRE. (2.02 POUNDS PER 1,000 SQ. FT.) BY BROADCASTING OR HYDROSEEDING PLUS A STRAW OR HAY MULCH TO PREVENT LOSS.
   - 5.2. COVER GRASS SEED WITH 1/4" OF SOIL USING SUITABLE EQUIPMENT FOR THAT PURPOSE.
   - 5.3. MULCHING WITHOUT SEEDING IS TO BE USED AS AN INTERIM STABILIZATION CONTROL DURING NON-GROWING SEASONS OF THE YEAR.
   - 5.4. REFER TO WVDOH ITEM 652 FOR ADDITIONAL INFORMATION.

PERMANENT CONTROL MEASURES AND FACILITIES

1. VEGETATIVE COVER
   - 1.1. THE PERMANENT SEEDING RATE SHALL BE PER WVDOH ITEM 652.5.
   - 1.2. PROVIDE LIMING RATES AS RECOMMENDED BY THE SOIL TEST RESULT. IN LIEU OF A SOIL TEST, LIME SHALL BE APPLIED AT THE RATE OF 2 TONS PER ACRE.
   - 1.3. PROVIDE FERTILIZER RATES AS RECOMMENDED BY THE SOIL TEST RESULT. IN LIEU OF A SOIL TEST, FERTILIZER SHALL BE APPLIED AT THE STANDARD DRY APPLICATION RATE OF 875 POUNDS PER ACRE OF A 10-20-10 ANALYSIS AND 440 POUNDS PER ACRE OF A 12-12-12 ANALYSIS, FOR SECOND APPLICATION METHOD.
   - 1.4. INSPECT SEEDED AREAS AFTER EACH RAINFALL EVENT. ERODED AREAS SHALL HAVE THE TOPSOIL REPLACED, SEED RESOWN AND MULCH REAPPLIED AND ANCHORED. IF EROSION PERSISTS THE AREA WILL BE EITHER LINED WITH SOD OR STABILIZED WITH ROCK RIPRAP.

2. MULCH – STRAW OR HAY
   - 2.1. MULCH SHALL BE APPLIED OVER SEEDED AREAS IMMEDIATELY. DORMANT SEEDING SHALL BE MULCHED. 100% OF THE GROUND SURFACE SHALL BE COVERED WITH AN APPROVED MATERIAL.
   - 2.2. SPREAD MULCH UNIFORMLY, IN A CONTINUOUS BLANKET, AT A MINIMUM RATE OF 2 TONS PER ACRE DURING SEEDING PERIOD FROM MARCH 15 TO OCTOBER 30 AND MINIMUM RATE OF 3 TONS PER ACRE DURING SEEDING PERIOD FROM OCTOBER 31 TO MARCH 14.
   - 2.3. MULCH MAY BE SPREAD BY HAND OR WITH AN ACCEPTABLE MECHANICAL BLOWER. MACHINES WHICH CUT MULCH INTO SHORT PIECES WILL NOT BE PERMITTED. IF HYDROSEEDING WITH WOOD CELLULOSE FIBER, PLACE AT A RATE OF 2,000 LB PER ACRE.
   - 2.4. MULCH SHALL BE ANCHORED BY USE OF CRIMPING, NETTING, ASPHALTIC OR A NONASPHALTIC EMULSION MULCH BINDER IMMEDIATELY FOLLOWING MULCH SPREADING. IF AN ASPHALTIC OR NONASPHALTIC EMULSION MULCH BINDER IS USED, THE NUMBER OF PASSES OVER THE MULCH AS NEEDED TO SECURE IT FIRMLY SHALL NOT EXCEED THREE PASSES WITH MAXIMUM APPLIED BINDER NOT EXCEEDING 160 GALLONS PER ACRE.

3. STEEP SLOPE STABILIZATION
   - 3.1. EROSION CONTROL MATTING SHALL BE USED ON ALL PERMANENT SLOPES STEEPER THAN 3H:1V.
   - 3.2. ALL SLOPES ARE TO BE INSPECTED AFTER EACH RAINFALL EVENT. ERODED AREAS ARE TO HAVE THE SOIL/TOPSOIL REPLACED, THE SEED RESOWN, AND THE EROSION CONTROL MATTING IS TO BE REPLACED AND ANCHORED.
   - 3.3. IF EROSION PERSISTS, THE PROBLEM AREA IS TO BE LINED WITH SOD OR STABILIZED WITH ROCK.
   - 3.4. STEEP SLOPE STABILIZATION CAN BE EITHER E&S BLANKET OR SPRAYED ON EROSION CONTROL MATTING. FOLLOW MANUFACTURER SPECIFICATIONS.

REVISIONS		
NO.	DATE	DESCRIPTION

one Gathering LLC

SWPPP NOTES

DONAHOO ACCESS ROAD

BLANDVILLE, DODDRIDGE COUNTY, WEST VIRGINIA

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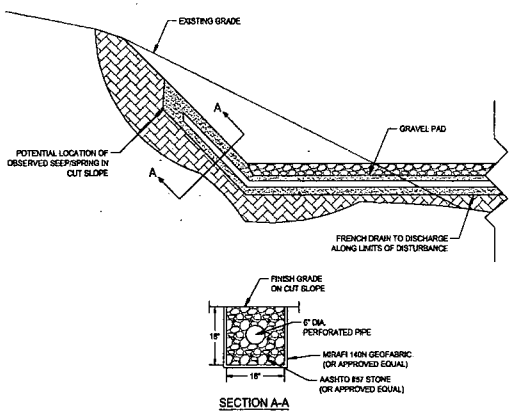


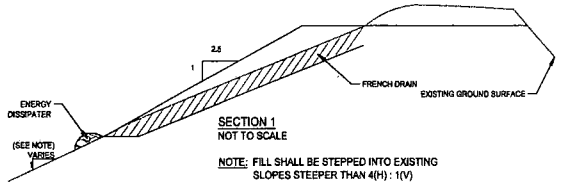
SECTION A-A

NOTE:

IF EVIDENCE OF A SEEP/SPRING IN A CUT SLOPE IS OBSERVED, THE CONTRACTOR SHOULD INSTALL A FRENCH DRAIN PER DETAIL 3B ABOVE.

FRENCH DRAIN AT OBSERVED SEEP/SPRING IN CUT SLOPES

NOT TO SCALE



SECTION 1
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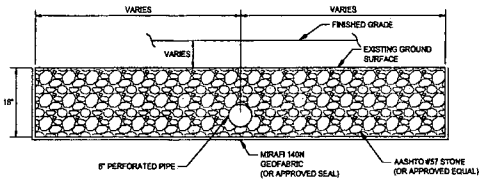
NOTE: FILL SHALL BE STEPPED INTO EXISTING SLOPES STEEPER THAN 4(H) : 1(V)



NOTES:

1. WHERE SPRINGS OR SEEPS ARE ENCOUNTERED DURING CONSTRUCTION, DRAINABLE FILL AND PERFORATED PIPES (FRENCH DRAINS) SHOULD BE INSTALLED TO PROVIDE A DRAINAGE PATH FOR SEEPAGE FROM THE EXISTING SLOPE.
2. THE FRENCH DRAIN SHOULD CONSIST OF A 6 INCH DIAMETER PERFORATED PIPE SURROUNDED BY DRAINABLE FILL, INSTALLED IN AN 18 INCH DEEP TRENCH ALONG THE EXISTING DRAINAGE FEATURE OR SEEP, PRIOR TO DRAINABLE FILL PLACEMENT. THE TRENCH SHOULD BE LINED WITH A LAYER OF GEOFABRIC SUCH AS MIRAFI 140N, OR APPROVED EQUAL, WITH SUFFICIENT OVERLAP TO PROVIDE AND ENVELOPE AROUND THE PIPE TRENCH TO PREVENT THE MIGRATION OF FINES INTO THE FRENCH DRAIN.
3. THE FRENCH DRAIN SHOULD DAYLIGHT BEYOND THE TOE OR SIDE OF THE SLOPE AND EXTEND UP TO THE CREST OF THE SLOPE TO FACILITATE DRAINAGE THROUGH THE FILL SECTION. THE ASSAULT WIDTH OF THE FRENCH DRAIN SHOULD BE A FUNCTION OF THE WIDTH OF THE SPRING, SEEP OR DRAINAGE FEATURE OBSERVED DURING CONSTRUCTION.
4. THE FRENCH DRAIN SHOULD BE CONSTRUCTED TO SPAN THE ENTIRE WIDTH THE OBSERVED SPRING OR SEEP.

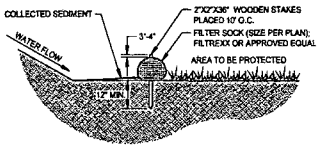
FRENCH DRAIN AND DRAINABLE FILL SECTION AT OBSERVED SEEP/SPRING OR EXISTING DRAINAGE FEATURE LOCATION ON FILL SLOPES

NOT TO SCALE

COMPOST FILTER SOCK SIZE CHART

SOCK NO.	SIZE	% SLOPE	ACTUAL SLOPE LENGTH (FT)	MAX SLOPE LENGTH (FT)	SOCK LENGTH (FT)	LOCATION
CFS-1	18"	1%	56	1000	77	FLOOD PLAIN COMPENSATION PIT
CFS-2	18"	16%	33	140	50	FLOOD PLAIN COMPENSATION PIT
CFS-3	18"	13%	35	200	17	ACCESS ROAD
CFS-4	32"	10%	61	200	56	BRIDGE
CFS-5	32"	2%	58	600	58	BRIDGE
CFS-6	18"	50%	28	40	135	SOIL STOCKPILE
CFS-7	18"	50%	34	40	36	SOIL STOCKPILE

NOTE: SLOPE LENGTH MEASURED FROM FURTHEST POINT OF CONTRIBUTING DRAINAGE AREA



SECTION

MATERIAL NOTES:

1. COMPOST USED FOR FILTER SOCKS SHALL BE WEED, PATHOGEN, AND INSECT FREE . FREE OF ANY REFUSE, CONTAMINANTS, OR OTHER MATERIALS TOXIC TO PLANT GROWTH. THEY SHALL BE DERIVED FROM A WELL-DECOMPOSED SOURCE OF ORGANIC MATTER AND CONSIST OF PARTICLES RANGING FROM 3/8" TO 2".
2. FILTER SOCKS SHALL BE 3 OR 6 MIL CONTINUOUS, TABULAR, HDPE 3/8" KNITTED MESH NETTING MATERIAL FILLED WITH COMPOST PASSING THE ABOVE SPECIFICATIONS FOR COMPOST PRODUCTS.

INSTALLATION NOTES:

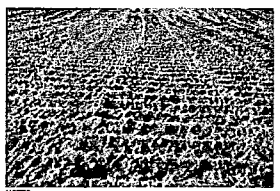
1. FILTER SOCKS SHALL BE PLACED ON A LEVEL LINE ACROSS SLOPES.
2. FILTER SOCKS INTENDED TO BE PERMANENT SHALL BE SEEDED AT TIME OF INSTALLATION.
3. FILTER SOCKS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER SPECIFICATIONS.

MAINTENANCE NOTES:

1. ROUTINELY INSPECT FILTER SOCKS AFTER A RUNOFF EVENT, MAINTAINING FUNCTIONALITY AT ALL TIMES.
2. REMOVE SEDIMENT COLLECTED AT THE BASE OF THE UPSLOPE SIDE OF THE FILTER SOCK WHEN SEDIMENT ACCUMULATION HAS REACHED 1/3 OF THE EXPOSED HEIGHT OF THE SOCK.
3. WHERE THE FILTER SOCK IS DAMAGED, DETERIORATED, OR FAILS, IT SHALL BE REPAIRED OR REPLACED WITH A MORE EFFECTIVE ALTERNATIVE.
4. THE FILTER MEDIA WITHIN THE FILTER SOCK SHALL BE DISPERSED ON SITE ONCE THE DISTURBED AREA HAS BEEN PERMANENTLY STABILIZED, OR WHEN NO LONGER REQUIRED IN SUCH A WAY AS TO FACILITATE AND NOT OBSTRUCT SEEDING.

FILTER SOCK

NOT TO SCALE



TYPICAL POLYMER STABILIZED FIBER MATRIX APPLICATION RATES							
MAXIMUM RAINFALL OF ≤ 20"							
SLOPE	6:1	5:1	4:1	3:1	2:1	1.5:1	1:1
SOIL STABILIZER (GALS/ACRE)	4	5	6	7	8	9	10
FIBER (LB/ACRE)	1,500	1,500	1,600	1,800	2,000	2,500	3,000
MAXIMUM RAINFALL OF > 20" AND FOR SITE WINTERIZATION							
SLOPE		≤ 5:1		4 : 1		≥ 3 : 1	
SOIL STABILIZER (GALS/ACRE)		8		8		10	
FIBER (LBS/ACRE)		2,000		2,500		3,000	

NOTES:

1. A BONDED FIBER MATRIX (BMF) IS AN EFFECTIVE METHOD OF STABILIZING STEEP SLOPES WHEN USED PROPERLY. BMFs MAKE USE OF A CROSS-LINKED HYDROCOLLOID TACKIFIER TO BOND THERMALLY PROCESSED WOOD FIBERS. APPLICATION RATES VARY ACCORDING TO SITE CONDITIONS. FOR SLOPES UP TO 3H:1V THE BMF SHOULD BE APPLIED AT A RATE OF 3,000 LB/ACRE. STEEPER SLOPES MAY NEED AS MUCH AS 4,000 LB/ACRE.
2. BFMs SHOULD ONLY BE USED WHEN NO RAIN IS FORECASTED FOR AT LEAST 48 HOURS FOLLOWING THE APPLICATION. THIS IS TO ALLOW THE TACKIFIER SUFFICIENT TIME TO CURE PROPERTY. ONCE PROPERLY APPLIED, A BFM IS TYPICALLY 90% EFFECTIVE IN PREVENTING ACCELERATED EROSION. BFMs SHOULD NOT BE APPLIED BETWEEN SEPTEMBER 30 AND APRIL 1.
3. A POLYMER STABILIZED FIBER MATRIX (PSFM) CAN ALSO BE AN EFFECTIVE METHOD OF STABILIZING STEEP SLOPES WHEN USED PROPERLY. PSFMs MAKE USE OF A LINEAR SOIL STABILIZING TACKIFIER THAT WORKS DIRECTLY ON SOIL TO MAINTAIN SOIL STRUCTURE, MAINTAIN PORE SPACE CAPACITY AND FLOCCULATE DISLODGED SEDIMENT THAT WILL SIGNIFICANTLY REDUCE RUN OFF TURBIDITY. PROPERLY APPLIED, A PSFM MAY BE AS MUCH AS 95% EFFECTIVE.
4. UNLIKE ROLLED BLANKETS, THERE IS NO NEED TO SMOOTH THE SLOPE PRIOR TO THE APPLICATION OF HYDRAULICALLY APPLIED BLANKETS. IN FACT SOME ROUGHENING OF THE SURFACE, EITHER NATURAL OR MECHANICALLY INDUCED, IS PREFERABLE. HOWEVER, LARGE ROCKS, THOSE >9 INCHES AND EXISTING RILLS SHOULD BE REMOVED PRIOR TO APPLICATION. TRACKING OR GROOVING OF SLOPES SHOULD BE CONSIDERED TO SLOW WATER FLOWS DURING A STORM EVENT. SLOPE INTERRUPTION DEVICES SUCH AS STAIR STEP GRADING OR BENCHING SHOULD BE APPLIED PRIOR TO THE APPLICATION. MIXING AND APPLICATION RATES SHOULD FOLLOW MANUFACTURER'S RECOMMENDATIONS.
5. HYDRAULICALLY APPLIED BLANKETS ARE TYPICALLY APPLIED IN TWO STAGES, UNLESS SPECIFICALLY RECOMMENDED TO BE APPLIED IN ONE APPLICATION BY THE MANUFACTURER. THE SEED MIXTURE AND SOIL AMENDMENTS SHOULD BE APPLIED FIRST. IF THE SEED IS APPLIED AT THE SAME TIME AS THE HYDRAULICALLY APPLIED BLANKET, THE BONDED FIBERS MAY KEEP THE SEED FROM MAKING SUFFICIENT CONTACT WITH THE SOIL TO GERMINATE. AFTER THE SEED MIXTURE IS APPLIED, THE BFM, FGM, OR PSFM SHOULD BE SPRAYED OVER THE AREA AT THE REQUIRED APPLICATION RATE. (SEE ABOVE TABLE).

BONDED FIBER MATRIX

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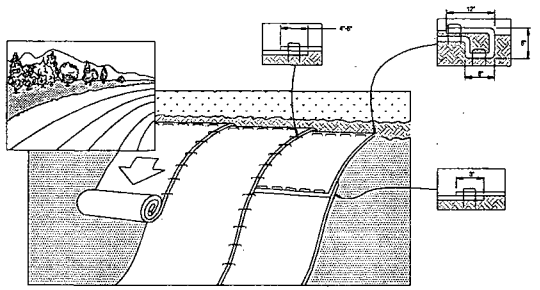
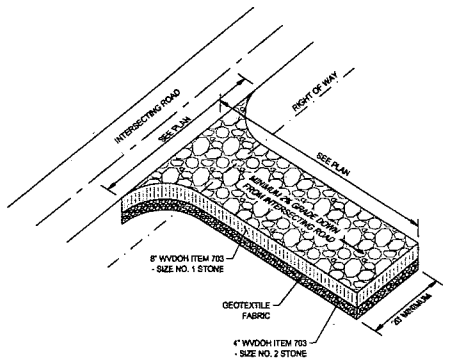


NOTES:

1. GRADE AND COMPACT AREA OF INSTALLATION BY LOOSENING 2"-3" OF TOPSOIL ABOVE FINAL GRADE. INCORPORATE LIME AND FERTILIZER INTO SOIL. REMOVE ROCKS AND OTHER DEBRIS TO INSURE BLANKET WILL HAVE DIRECT CONTACT WITH SOIL SURFACE.
2. APPLY SEED TO SOIL SURFACE PRIOR TO INSTALLATION. ALL CHECK SLOTS, ANCHOR TRENCHES, AND OTHER DISTRIBUTED AREAS MUST BE RESEEDED. REFER TO THE PERMANENT SEEDING SPECIFICATION FOR SEEDING RECOMMENDATIONS.
3. EXCAVATE TOP AND BOTTOM TRENCHES (12"X6"). INTERMITTENT EROSION CHECK SLOTS (6"X6") MAY BE REQUIRED BASED ON SLOPE LENGTH. EXCAVATE TOP ANCHOR TRENCH 2'X3' OVER CREST OF THE SLOPE.
4. IF INTERMITTENT EROSION CHECK SLOTS ARE REQUIRED, INSTALL BLANKET IN 6"X6" SLOT AT A MAXIMUM OF 10' CENTERS OR THE MIDPOINT OF THE SLOP. BLANKET SHOULD BE STAPLED INTO TRENCH ON 12" CENTERS.
5. INSTALL BLANKET IN TOP ANCHOR TRENCH, ANCHOR ON 12" SPACINGS, BACKFILL AND COMPACT SOIL.
6. UNROLL BLANKET DOWN SLOPE WITH ADJACENT ROLLS OVERLAPPED A MINIMUM OF 3". ANCHOR THE SEAM EVERY 18". LAY THE BLANKET LOOSE TO MAINTAIN DIRECT SOIL CONTACT, SO NOT PULL TAUGHT.
7. OVERLAP ROLL ENDS A MINIMUM OF 12" WITH UPSLOPE BLANKET ON TOP FOR A SHINGLE EFFECT. BEGIN NEW ROLLS IN AN EROSION CHECK SLOT, IF REQUIRED, DOUBLE ANCHOR ACROSS ROLL EVERY 12'.
8. INSTALL BLANKET IN BOTTOM ANCHOR TRENCH (12"X6"), ANCHOR EVERY 12", PLACE ALL OTHER STAPLES THROUGHOUT SLOPE AT 1 TO 2.5 PER SQUARE YARD DEPENDANT ON SLOPE. REFER TO MANUFACTURE'S ANCHOR GUIDE.

EROSION CONTROL BLANKET DETAIL

NOT TO SCALE



STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE

REVISIONS NO.	DATE	DESCRIPTION

Fone Gathering LLC

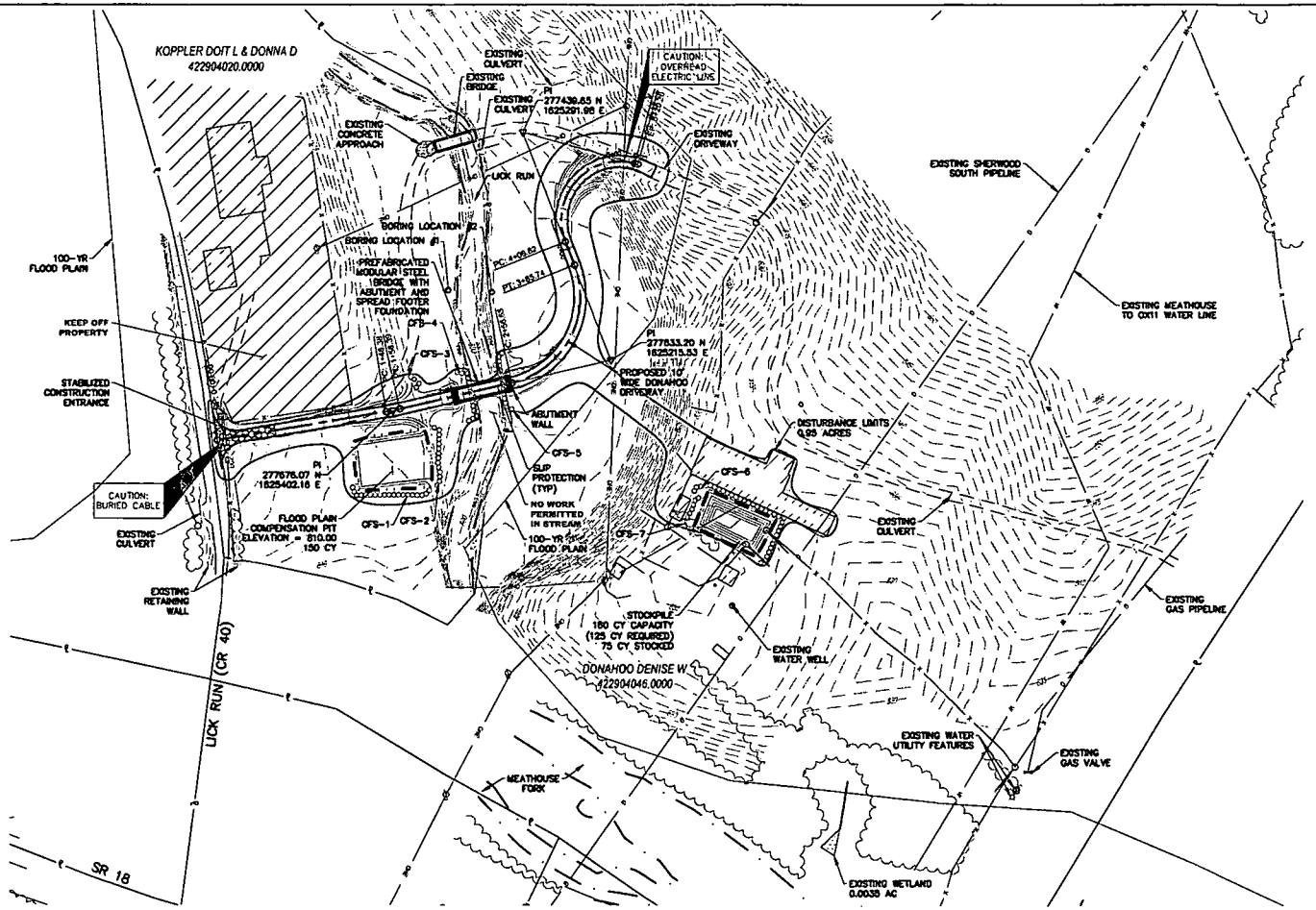
SWPPP DETAILS

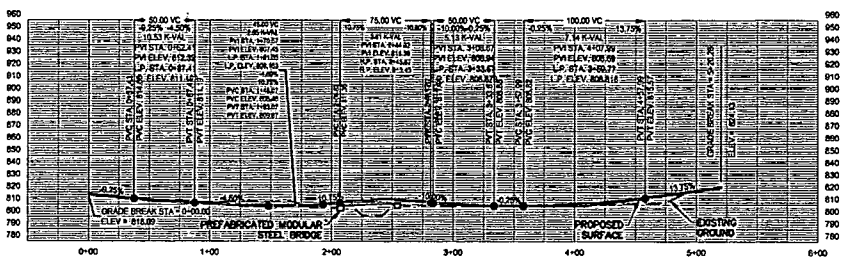
DONAHOO ACCESS ROAD

BLANDVILLE, DOODDRIDGE COUNTY, WEST VIRGINIA

cesq
CREATION TO COMPLETION
www.cesqinc.com
Engineering • Architecture • Surveying • Construction Mgt • Environmental

ISSUE:	CONSTRUCTION
DATE:	11.04.2015
JOB NO.:	751001
DESIGN:	BEM
DRAWN:	BEM
CHECKED:	BJM
SHEET NO.	4





DONAHOO DRIVEWAY OP 2 PROFILE
Scale: 1" = 50' Horiz.;1" = 50' Vert.

LEGEND

EXISTING

- MAJOR CONTOUR
- MINOR CONTOUR
- RIGHT OF WAY
- PROPERTY LINE
- BUILDING
- PAVEMENT
- FENCE
- TREE LINE
- STREAM
- GAS LINE
- WATER LINE
- STORM SEWER
- BURIED ELECTRIC
- OVERHEAD ELECTRIC
- UTILITY POLE
- GATE

PROPOSED

- MAJOR CONTOUR
- MINOR CONTOUR
- DISTURBANCE LIMITS
- COMPOST FILTER SOCK
- CENTERLINE ROAD
- GRADE BREAK
- STABILIZED CONSTRUCTION ENTRANCE
- SILT PROTECTION

NOTES:
1. ALL PLAN COORDINATES ARE IN STATE PLANE COORDINATE SYSTEM: NAD 83, WEST VIRGINIA (NORTH), US SURVEY FOOT, UNLESS SPECIFIED OTHERWISE.
2. FEMA FIRM MAP NUMBER 54017C0140C, PANEL 140 OF 325, DATED OCTOBER 4, 2011 AND DETERMINED TO BE LOCATED IN ZONE A, AN AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD.
3. 100-YEAR FLOOD PLAIN BOUNDARY DETERMINED FROM FEMA FIRM MAP NUMBER 54017C0140C (REVISED 10.04.2011) - DODDRIDGE COUNTY, W.V.
4. LICK RUN 1% ANNUAL CHANCE OF FLOOD (100-YEAR) ELEVATION DETERMINED TO BE 818.00' IN FIS DODDRIDGE COUNTY, WEST VIRGINIA, AND INCORPORATED AREAS 54017CV000A.
5. SEE FLOODPLAIN EARTHWORK TABLE, THIS SHEET, INDICATING THAT A NET 5 CY OF CUT MATERIAL IS THE BALANCE OF EARTHWORK OPERATIONS WITHIN THE 100-YEAR FLOODPLAIN.

SITE TOPSOIL EARTHWORK BALANCE	
TOPSOIL STRIPPED (4")	120 CY
TOPSOIL PLACED (4")	50 CY
TOPSOIL STOCKPILED	70 CY

DRIVEWAY EARTHWORK BALANCE	
CUT	115 CY
FILL	260 CY
NET	145 CY (FILL)

FLOODPLAIN EARTHWORK BALANCE	
CUT (COMPENSATION PIT)	150 CY
CUT (FROM DRIVEWAY)	115 CY
FILL (FROM DRIVEWAY)	260 CY
NET	5 CY (SPOIL)**

** 5 CY OF SPOIL TO BE PLACED OUTSIDE OF 100-YR FLOODPLAIN WITHIN STOCKPILE.

WEST VIRGINIA 811

GRAPHIC SCALE (IN FEET)
1 inch = 50 ft.

REVISIONS
NO. | DATE | DESCRIPTION

Gathering LLC

PROPOSED SITE PLAN AND PROFILE

DONAHOO ACCESS ROAD

BLANDVILLE, DODDRIDGE COUNTY, WEST VIRGINIA

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N

LEGEND

PROPOSED

SEED AND MULCH ONLY

SLOPE MATTING / SEED AND MULCH

GRAPHIC SCALE (IN FEET)
1 inch = 50 ft

REVISIONS NO.	DATE	DESCRIPTION

Gathering LLC

SEED AND MULCH PLAN

DONAHOO ACCESS ROAD

BLANDVILLE, DODDRIDGE COUNTY, WEST VIRGINIA

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ISSUE:	CONSTRUCTION
DATE:	11.04.2015
JOB NO.:	751001
DESIGN:	BEM
DRAWN:	BEM
CHECKED:	BJM
SHEET NO.	9

CREATION TO COMPLETION

Attachment A- Project Location-
Surface Owner Information

TAX ID: 09-06-0003-0007-0001-0000

NAME OF SURFACE OWNER/OWNERS: Denise W Donahoo

ADDRESS OF PROPERTY: Route 18 / Blandville, New Milton, WV 26411

ADDRESS OF SURFACE OWNER/OWNERS: RR 1 Box 25DD New Milton WV 26411

DISTRICT: New Milton

LAND BOOK DESCRIPTION:

DEED BOOK REFERENCE: Book 260/ Page 643

TAX MAP REFERENCE: MAP 3/ Parcel 7

EXISTING BUILDINGS/USES OF PROPERTY: Unknown

NAME OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY: Unknown

ADDRESS OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY: Unknown

---

TAX ID: 09-06-0004-0042-0000-0000

NAME OF SURFACE OWNER/OWNERS: Doit L & Donna D Koppler

ADDRESS OF PROPERTY: Route 40, New Milton, WV 26411

ADDRESS OF SURFACE OWNER/OWNERS: 3 Lick Run Rd, New Milton WV 26411

DISTRICT: New Milton

LAND BOOK DESCRIPTION:

DEED BOOK REFERENCE: Book 186/ Page 177

TAX MAP REFERENCE: MAP 4/ Parcel 42

EXISTING BUILDINGS/USES OF PROPERTY: Unknown

NAME OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY: Unknown

ADDRESS OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY: Unknown

CREATION TO COMPLETION

Attachment B- Project Location- Adjacent and/or Affected Landowners

TAX ID: 09-06-0004-0009-0000-6001

NAME OF SURFACE OWNER/OWNERS: Haessly Hardwood Lumber Co

ADDRESS OF PROPERTY: Blandville RT 18, New Milton, WV 26411

ADDRESS OF SURFACE OWNER/OWNERS: Route 1 Box 185 Marietta OH 45750

CREATION TO COMPLETION

Attachment C- H & H Study

H&H STUDY

FOR

DONAHOO ACCESS ROAD SITE

NEW MILTON DISTRICT
DODDRIDGE COUNTY
WEST VIRGINIA

PROJECT NUMBER 751001

Prepared for:

CONSOL ENERGY
1000 Consol Energy Drive
Canonsburg, PA 15317

Prepared by:

CESO, Inc.
2800 Corporate Exchange Drive
Suite 160
Columbus, OH 43231

November 6, 2015

TABLE OF CONTENTS

I. INTRODUCTION

CESO, Inc. has prepared this hydrology and hydraulic study for the proposed Donahoo Access Road Site. The site is located roughly 0.1 miles south of State Route 18 along County Route 40. The intersection of SR 18 and CR 40 is located in Blandville, WV.

A. SCOPE OF STUDY/PURPOSE

This is a detailed hydrology and hydraulic study of existing conditions along Lick Run, beginning at near the crossing of SR-18 and CR 40 and extending upstream approximately 600 feet. The purpose of this study is to determine if adding the proposed bridge structure and private access road will significantly raise the 100-yr water surface elevation (WSE). Also, to delineate the water surface elevation for this reach of Lick Run to determine if a proposed bridge structure crossing the stream will induce flooding of the bridge deck and roadway. The hydrology was calculated using the TR-55 method. The drainage area was determined to be 3975 acres and is composed mostly of wooded area. The hydrology calculations and FEMA Flood Insurance Rate Map (FIRM) can be found in the appendices. The modeling of this portion of Lick Run was completed by utilizing HEC-RAS program version 4.1.0.

B. EXISTING CONDITIONS

The existing conditions consist of a shallow stream with light brush and trees running along the banks. The existing conditions were modeled using the calculated flow data along with the cross sections created from the topography gathered.

C. PROPOSED CONDITIONS

The post condition consist of a portable bridge structure to cross Lick Run at HEC-RAS station 175. The cross sectional data for the proposed structure was provided by the manufacturer. The proposed bridge is shown in the post-development floodplain map within the appendices. The model was run with the same flow as pre-development.

D. METHODS USED FOR ANALYSIS

Hydrology was calculated using flown topography and SCS TR 55 Method. The table below summarizes the drainage areas and flow. Calculations for this flow are provided in the appendices.

Flooding Source & Location	Drainage Area (sq. mile)	Drainage Area (Acres)	Peak Discharge (10 yr- CFS)	Peak Discharge (100 yr- CFS)
Lick Run above confluence of Meathouse Fork (SR 18)	6.21	3,975.18	1,203	2,557

E. SUMMARY CHART OUTPUT & CONCLUSION

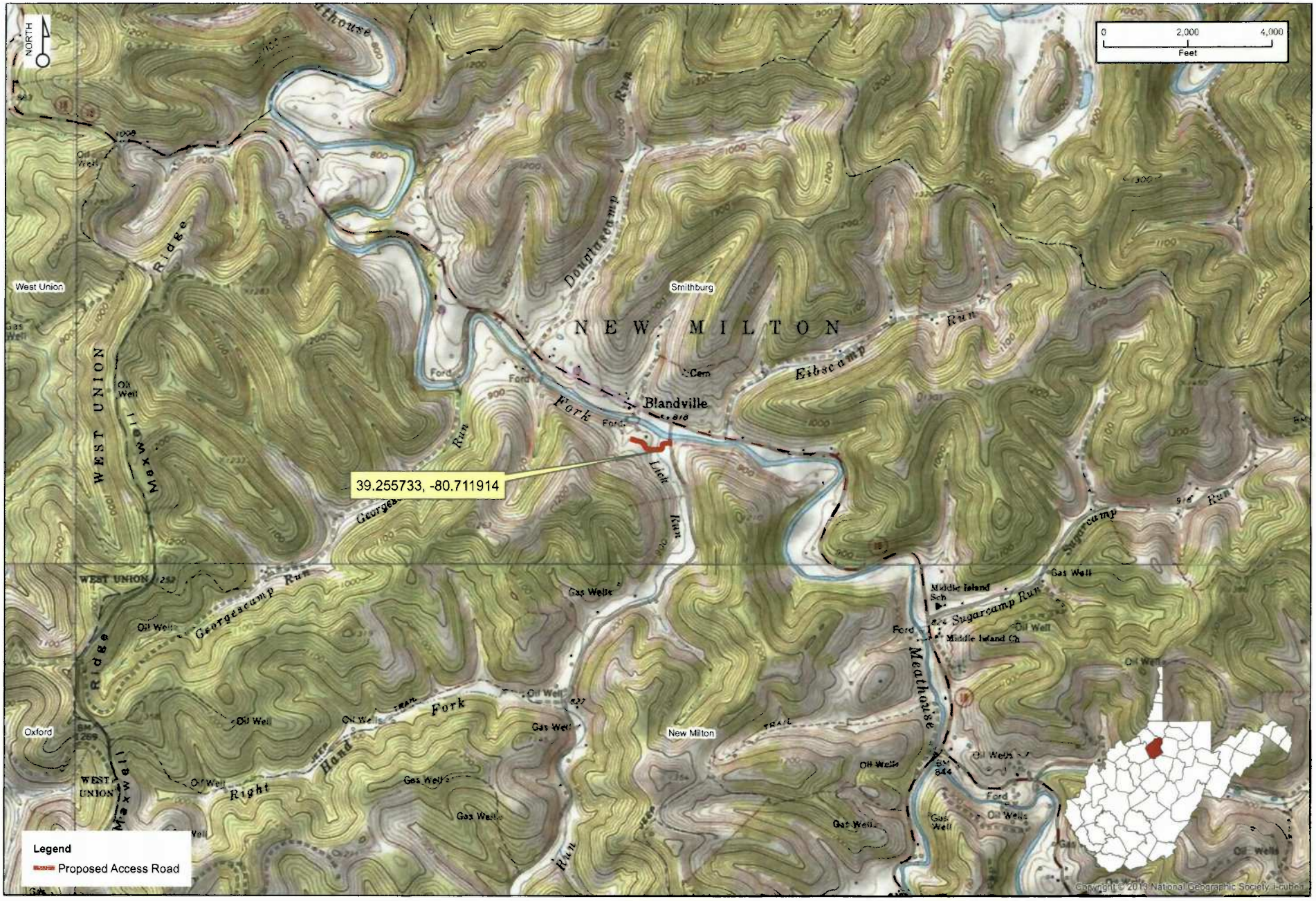
The following charts show the delta for the several cross sections on the Donahoo Access Road Site. None of the affected cross sections will overtop the bridge deck and road for the 10-yr storm event. The water surface elevation at the upstream side of the proposed bridge negligibly increased to 808.44 feet. The water elevation returns to its pre-developed condition shortly downstream of the proposed bridge which is located at station 175. Therefore, we conclude that the proposed bridge does not adversely impact the surrounding area for the 10-year storm event.

SUMMARY OF WATER SURFACE ELEVATIONS (10-YR)			
STATION	PRE DEVELOPMENT WSE	POST DEVELOPMENT WSE	CHANGE IN WSE
25	807.77	808.77	0.00
50	807.99	808.99	0.00
75	808.14	808.14	0.00
100	808.17	808.17	0.00
125	808.24	808.24	0.00
150	808.27	808.27	0.00
175 – PROPOSED BRIDGE			
200	808.38	808.44	0.06
225	808.44	808.49	0.05
250	808.52	808.58	0.06
275	808.58	808.63	0.05
300	808.56	808.61	0.05
325	808.56	808.61	0.05
350	808.74	808.79	0.05
375	808.86	808.89	0.03
387 – EXISTING BRIDGE			
400	809.11	809.13	0.02
425	809.36	809.38	0.02
450	809.30	809.33	0.03
475	809.30	809.32	0.02
500	809.26	809.28	0.02

The following chart shows the summary of water surface elevations for the 100-yr storm event. The change in WSE is minimal due to the construction of a borrow pit located between HEC-RAS stations 100 and 150. The negligible WSE change does not affect any additional landowners, nor does it affect any existing structures.

SUMMARY OF WATER SURFACE ELEVATIONS (100-YR)			
STATION	**PRE DEVELOPMENT WSE**	**POST DEVELOPMENT WSE**	**CHANGE IN WSE**
25	816.00	816.00	0.00
50	816.01	816.01	0.00
75	816.02	816.02	0.00
100	816.03	816.04	0.01
125	816.04	816.04	0.00
150	816.04	816.05	0.01
175 – PROPOSED BRIDGE			
200	816.05	816.05	0.00
225	816.05	816.06	0.01
250	816.05	816.06	0.01
275	816.05	816.06	0.01
300	816.05	816.06	0.01
325	816.05	816.06	0.01
350	816.05	816.05	0.00
375	816.05	816.05	0.00
387 – EXISTING BRIDGE			
400	816.06	816.06	0.00
425	816.07	816.08	0.01
450	816.07	816.07	0.00
475	816.07	816.08	0.01
500	816.07	816.07	0.00

APPENDIX A: USGS LOCATION MAP



Donahoo Access Road
Location Map (Smithburg, WV Quad)
Doddridge County, West Virginia

one Gathering LLC

ceso
CREATION TO COMPLETION

Date: 06/18/15
By: N. Hooton

APPENDIX B: FIRMETTE

elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0140C

FIRM

FLOOD INSURANCE RATE MAP

DODDRIDGE COUNTY, WEST VIRGINIA AND INCORPORATED AREAS

PANEL 140 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

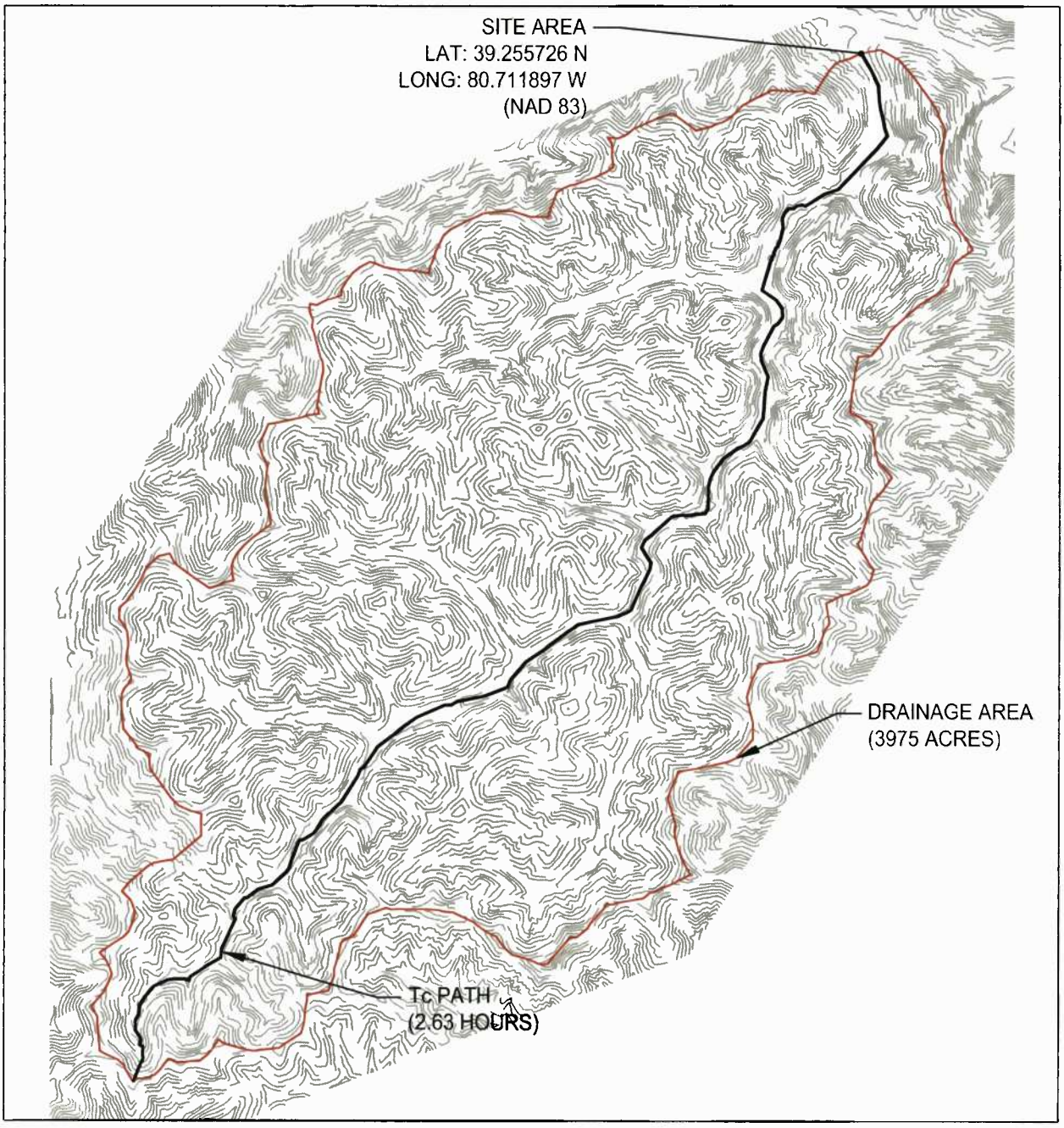
COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0140	C

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
54017C0140C
MAP REVISED
OCTOBER 4, 2011

Federal Emergency Management Agency

APPENDIX C: HYDROLOGY CALCULATIONS (TR-55)



N

SCALE: 1 INCH = 3000 FEET

OVERALL DRAINAGE AREA MAP
NEW MILTON DISTRICT, DODDRIDGE COUNTY, WEST VIRGINIA

PREPARED FOR: Antero Gathering LLC	PREPARED BY: CESO CREATION TO COMPLETION www.cesoinc.com	JOB NO.:	751001
		DESIGN:	APM
		DRAWN:	APM
		DATE:	11/06/2015

Hydrograph Report

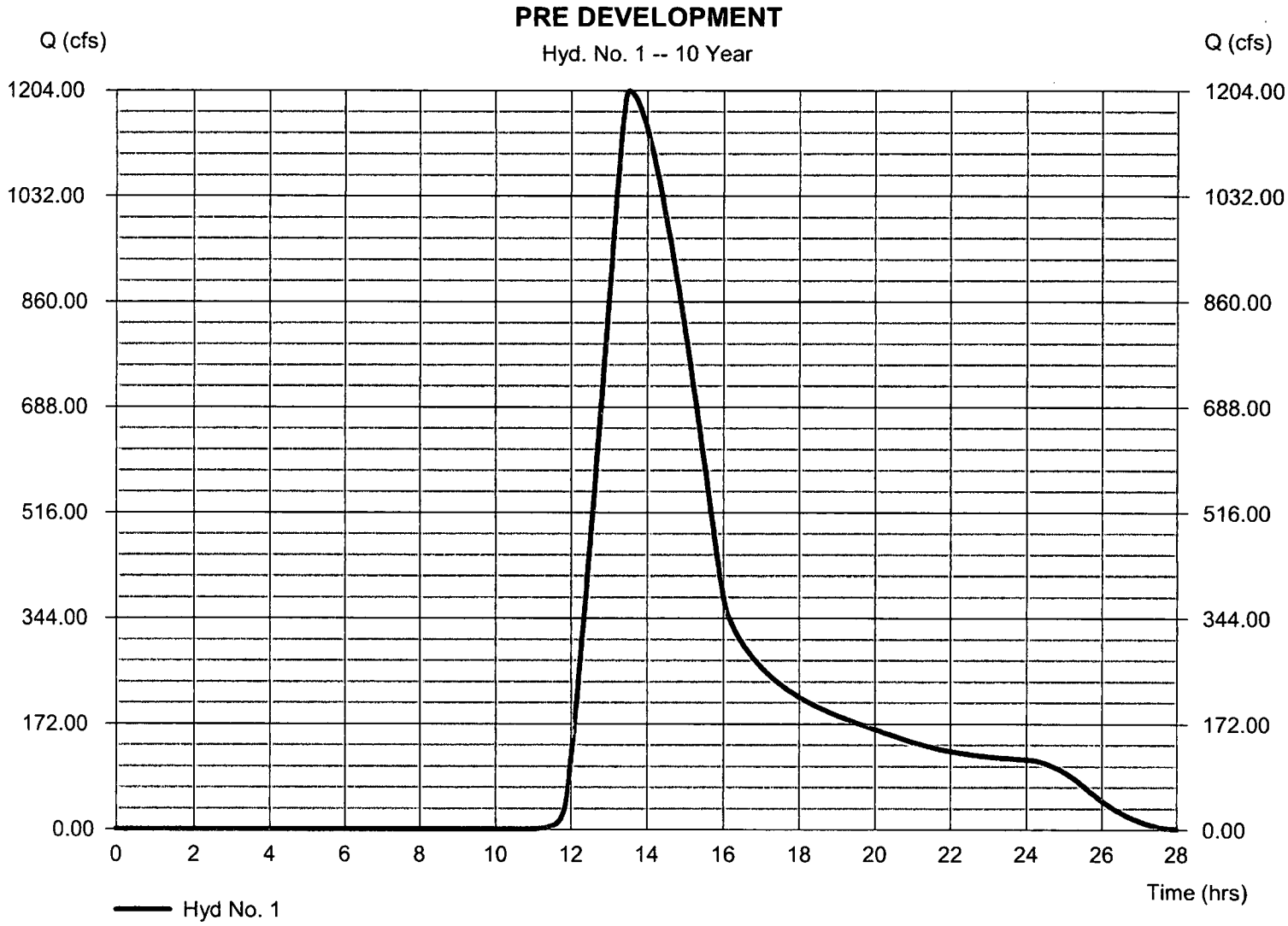
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Thursday, 07 / 23 / 2015

Hyd. No. 1

PRE DEVELOPMENT

Hydrograph type	= SCS Runoff	Peak discharge	= 1203.24 cfs
Storm frequency	= 10 yrs	Time to peak	= 13.53 hrs
Time interval	= 2 min	Hyd. volume	= 17,462,032 cuft
Drainage area	= 3975.180 ac	Curve number	= 73*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 157.90 min
Total precip.	= 3.55 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(49.790 x 49) + (44.460 x 43) + (481.330 x 79) + (3399.600 x 73)] / 3975.180



Hydrograph Report

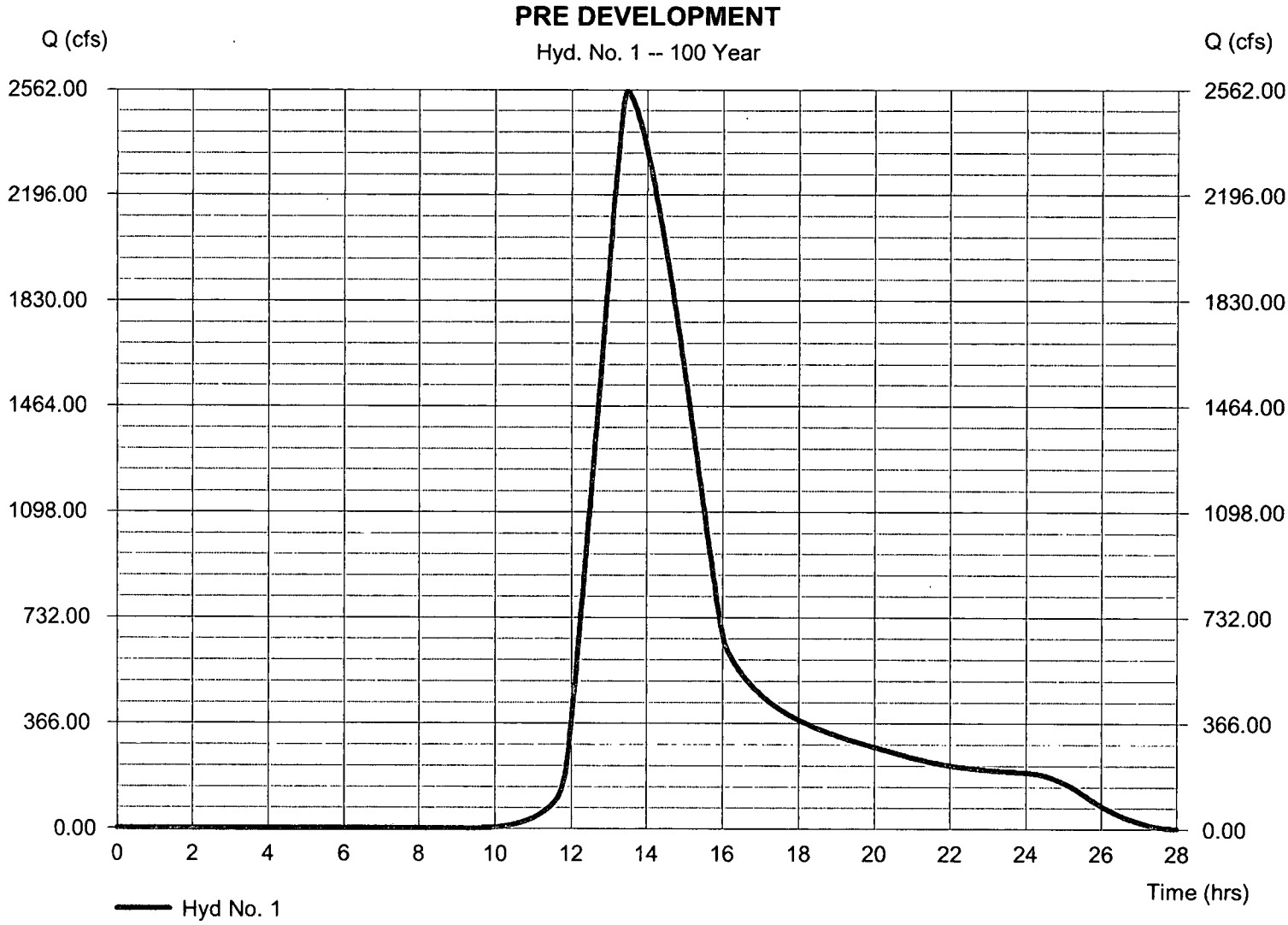
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Monday, 07 / 20 / 2015

Hyd. No. 1

PRE DEVELOPMENT

Hydrograph type	= SCS Runoff	Peak discharge	= 2556.67 cfs
Storm frequency	= 100 yrs	Time to peak	= 13.50 hrs
Time interval	= 2 min	Hyd. volume	= 34,748,460 cuft
Drainage area	= 3975.180 ac	Curve number	= 73*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 157.90 min
Total precip.	= 5.17 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(49.790 x 49) + (44.460 x 43) + (481.330 x 79) + (3399.600 x 73)] / 3975.180



TR55 Tc Worksheet

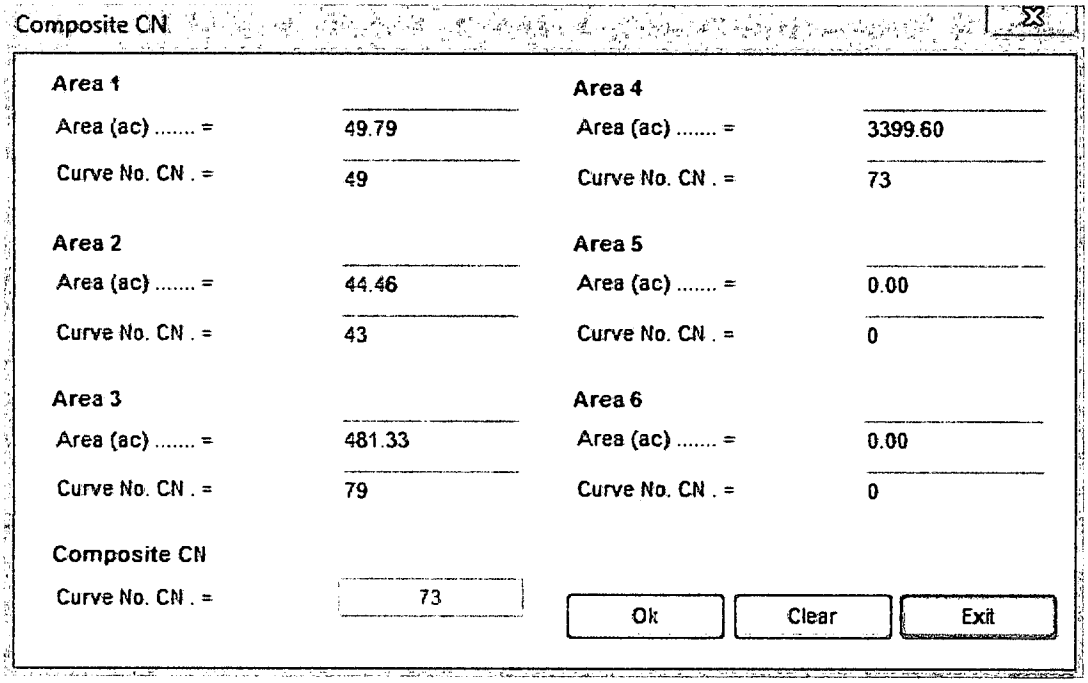
Hyd. No. 1

PRE DEVELOPMENT

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.400		0.011		
Flow length (ft)	= 86.0		148.0		0.0		
Two-year 24-hr precip. (in)	= 2.56		2.56		0.00		
Land slope (%)	= 17.44		40.54		0.00		
Travel Time (min)	**= 4.08**	**+**	**9.86**	**+**	**0.00**	**=**	**13.94**
Shallow Concentrated Flow							
Flow length (ft)	= 261.00		0.00		0.00		
Watercourse slope (%)	= 30.65		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=8.93		0.00		0.00		
Travel Time (min)	**= 0.49**	**+**	**0.00**	**+**	**0.00**	**=**	**0.49**
Channel Flow							
X sectional flow area (sqft)	= 3.00		25.00		0.00		
Wetted perimeter (ft)	= 14.00		18.00		0.00		
Channel slope (%)	= 6.25		0.76		0.00		
Manning's n-value	= 0.050		0.050		0.015		
Velocity (ft/s)	=2.65						
			3.23				
					0.00		
Flow length (ft)	({0})2221.0		25110.0		0.0		
Travel Time (min)	**= 13.95**	**+**	**129.52**	**+**	**0.00**	**=**	**143.47**

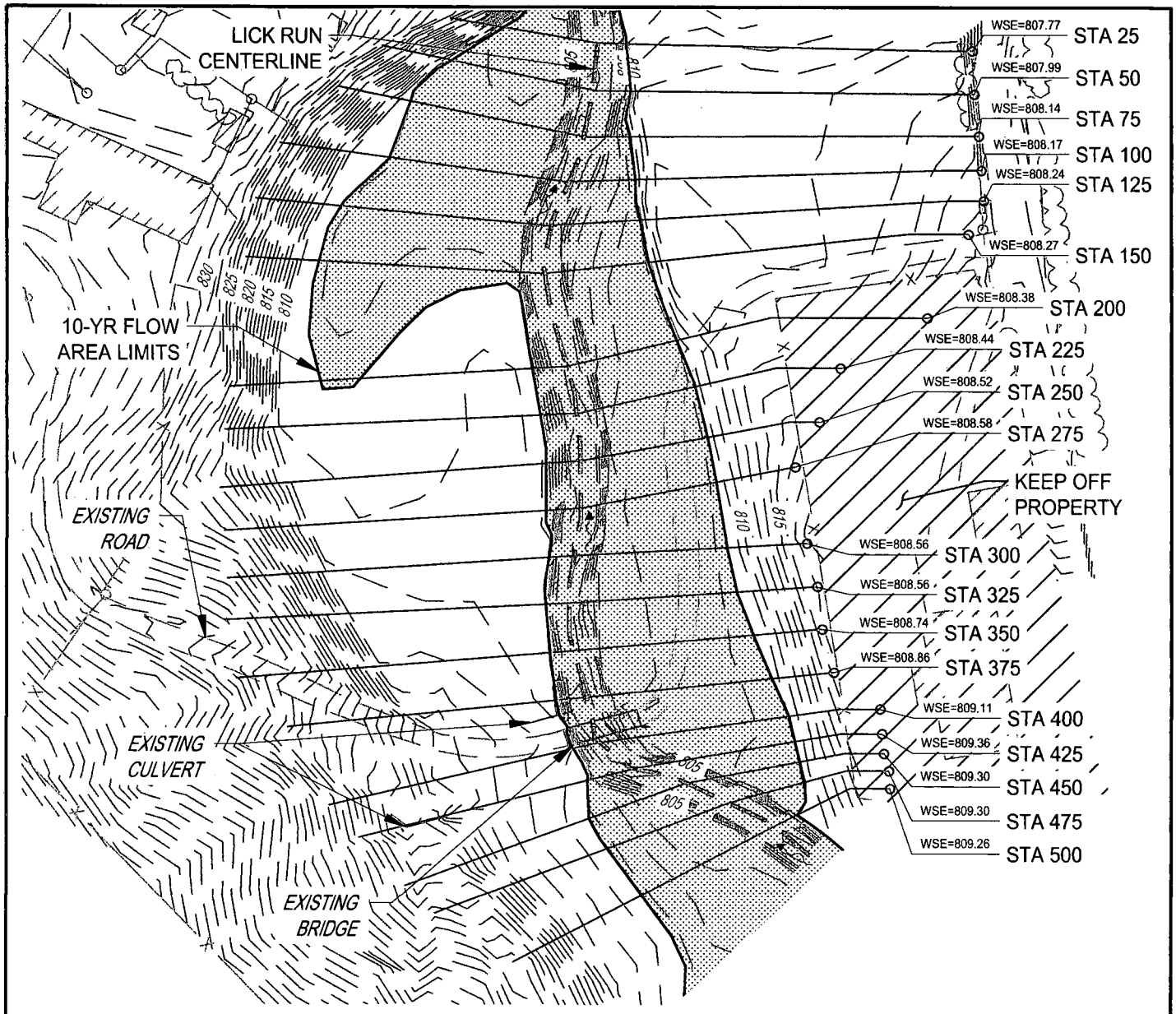
Total Travel Time, Tc ..... **157.90 min**

DRAINAGE AREA CURVE NUMBER CALCULATIONS



APPENDIX D: HEC-RAS INPUT AND OUTPUT
PRE-DEVELOPMENT CONDITION

PRE DEVELOPMENT FLOODPLAIN MAP (10-YR)



PRE DEVELOPMENT FLOODPLAIN MAP
NEW MILTON DISTRICT, DODDRIDGE COUNTY, WEST VIRGINIA

SCALE: 1 INCH = 80 FEET

PREPARED FOR: Gone Gathering LLC

PREPARED BY: CESO
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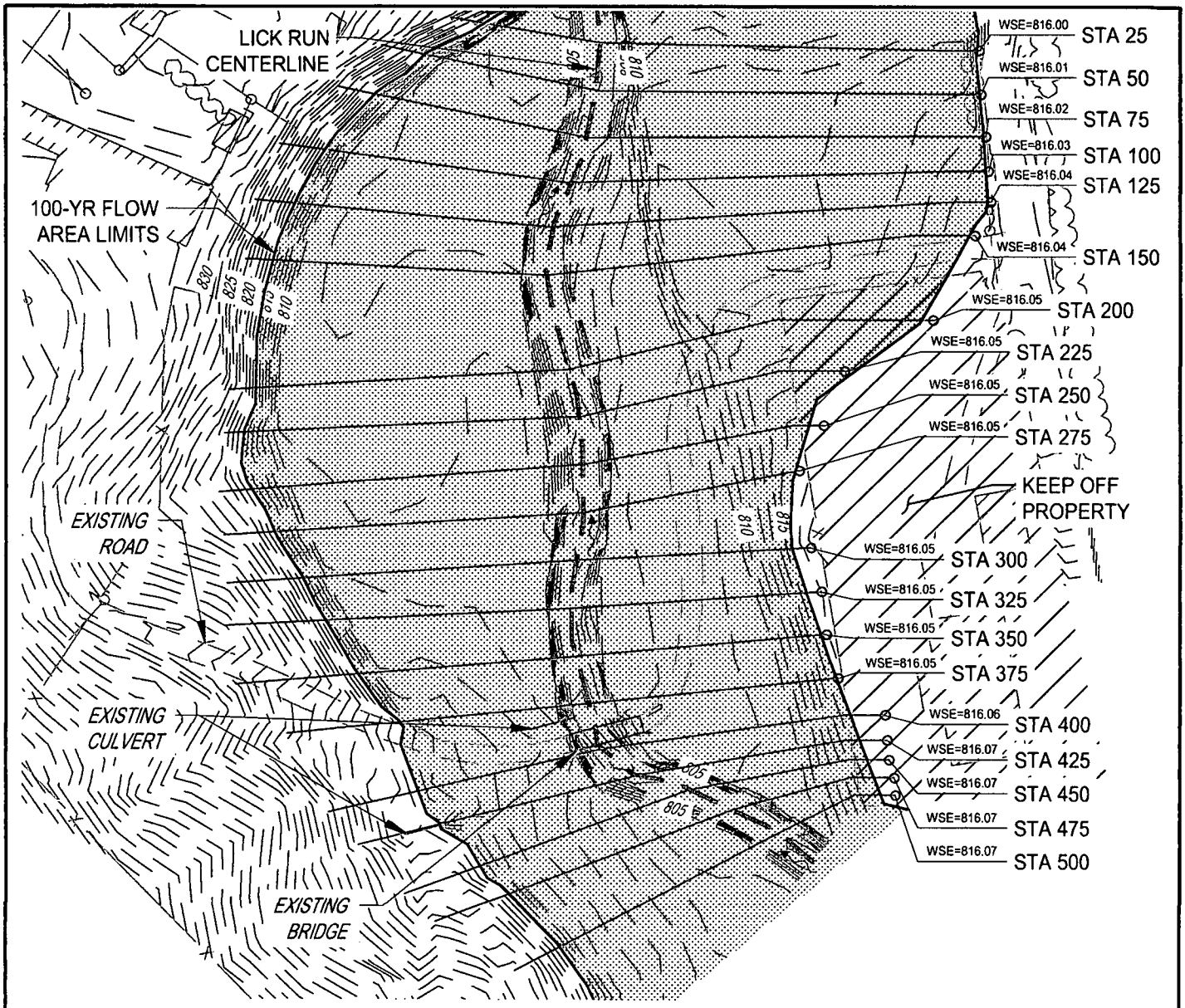
DATE:	11/06/2015

PRE DEVELOPMENT FLOODPLAIN MAP (100-YR)



PRE DEVELOPMENT FLOODPLAIN MAP
NEW MILTON DISTRICT, DODDRIDGE COUNTY, WEST VIRGINIA

SCALE: 1 INCH = 80 FEET

PREPARED FOR:

EQT Gathering LLC

PREPARED BY:

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DESIGN:	APM
DRAWN:	APM
DATE:	11/06/2015

PROFILE OUTPUT – PRE DEVELOPMENT (10-YR)

HEC-RAS Plan: PRE-DEV 10YR River: LICK RUN Reach: Site 1 Profile: PF 1

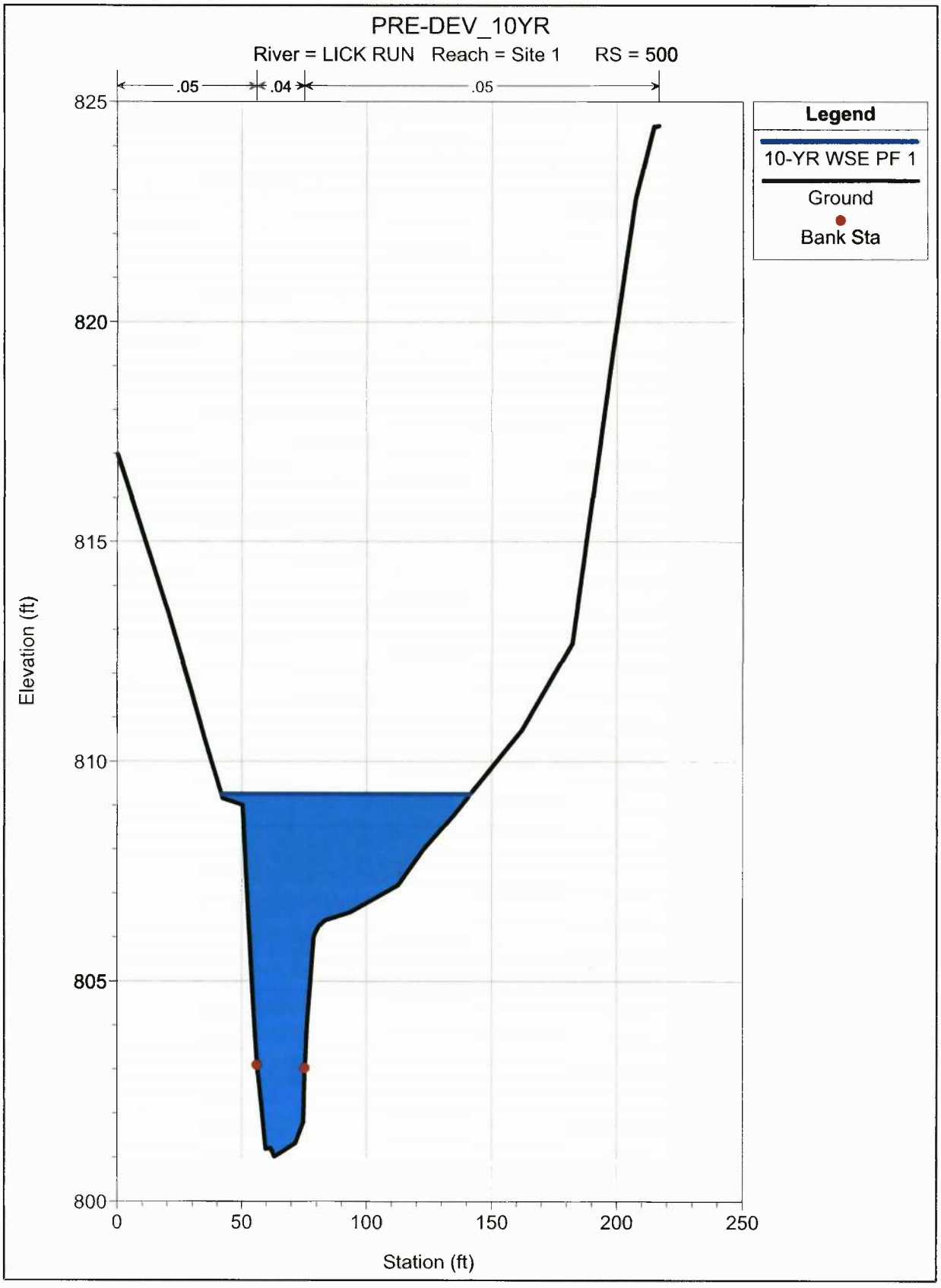
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Site 1	500	PF 1	1203.00	801.02	809.26		809.70	0.001872	6.06	302.22	99.73	0.38
Site 1	475	PF 1	1203.00	801.31	809.30		809.62	0.001336	5.14	344.04	107.96	0.33
Site 1	450	PF 1	1203.00	801.31	809.30		809.58	0.001035	4.59	366.41	114.97	0.29
Site 1	425	PF 1	1203.00	800.17	809.36		809.53	0.000542	3.52	439.92	113.50	0.21
Site 1	400	PF 1	1203.00	799.35	809.11	805.16	809.49	0.001345	5.42	328.93	111.70	0.32
Site 1	387		Bridge									
Site 1	375	PF 1	1203.00	799.73	808.86		809.36	0.001970	6.32	296.05	112.33	0.39
Site 1	350	PF 1	1203.00	800.18	808.74		809.30	0.002353	6.70	281.14	107.91	0.43
Site 1	325	PF 1	1203.00	800.15	808.56		809.22	0.002921	7.31	256.68	102.30	0.47
Site 1	300	PF 1	1203.00	799.86	808.56		809.13	0.002163	6.50	262.87	96.51	0.41
Site 1	275	PF 1	1203.00	799.46	808.58		809.06	0.001672	5.89	278.70	92.23	0.36
Site 1	250	PF 1	1203.00	799.49	808.52		809.02	0.001757	5.99	269.45	85.79	0.37
Site 1	225	PF 1	1203.00	799.62	808.44		808.97	0.001948	6.25	260.20	81.76	0.39
Site 1	200	PF 1	1203.00	799.85	808.38		808.91	0.002097	6.29	262.19	125.62	0.41
Site 1	150	PF 1	1203.00	800.27	808.27		808.80	0.002350	6.35	269.88	177.35	0.41
Site 1	125	PF 1	1203.00	799.87	808.24		808.74	0.002158	6.29	292.51	162.12	0.40
Site 1	100	PF 1	1203.00	799.84	808.17		808.68	0.002277	6.26	278.81	145.92	0.42
Site 1	75	PF 1	1203.00	799.82	808.14		808.61	0.002230	5.74	267.46	118.41	0.39
Site 1	50	PF 1	1203.00	799.71	807.99		808.55	0.002376	6.38	253.96	94.30	0.42
Site 1	25	PF 1	1203.00	800.36	807.77	805.45	808.47	0.003002	7.06	216.73	64.28	0.48

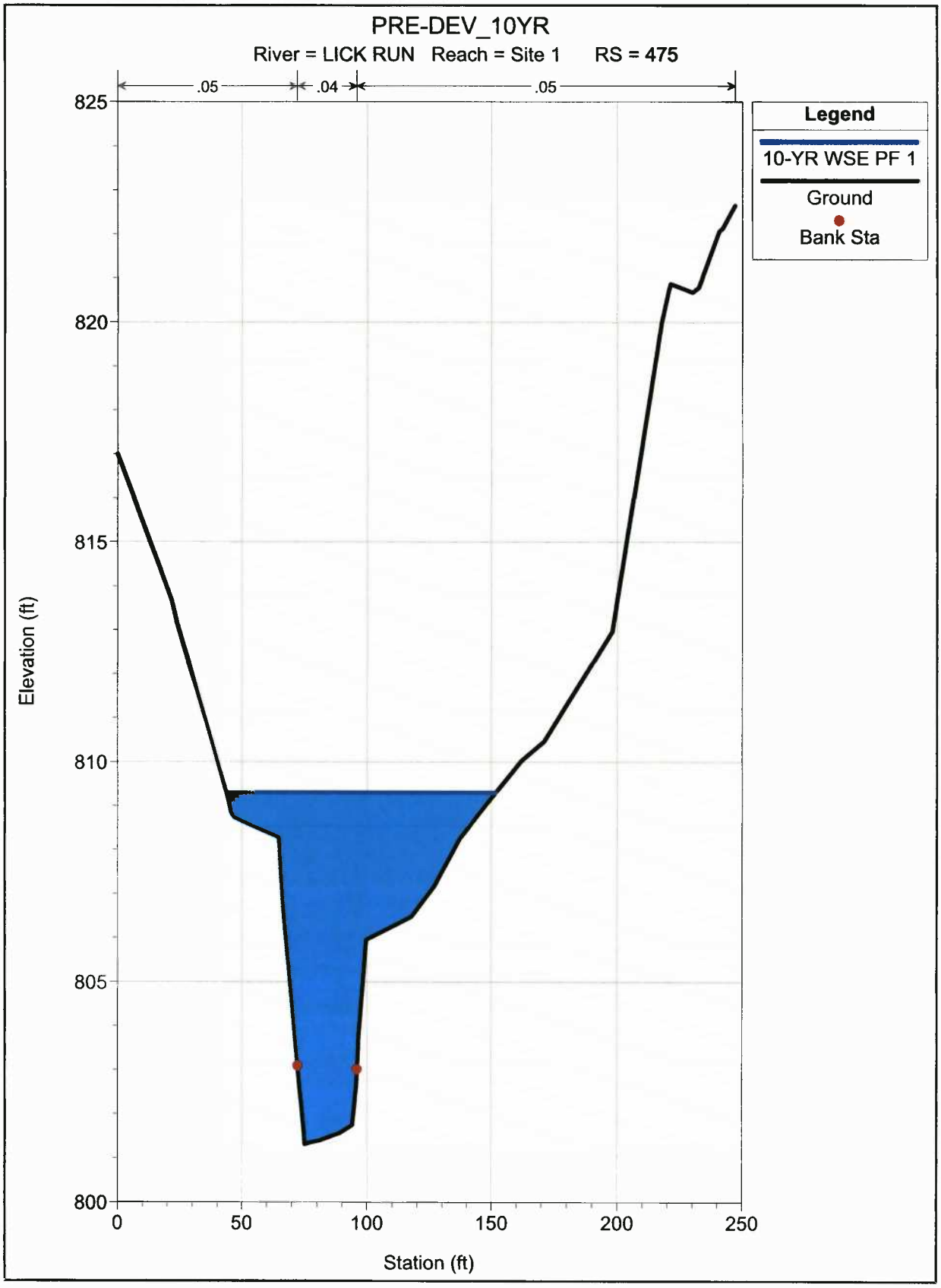
PROFILE OUTPUT – PRE DEVELOPMENT (100-YR)

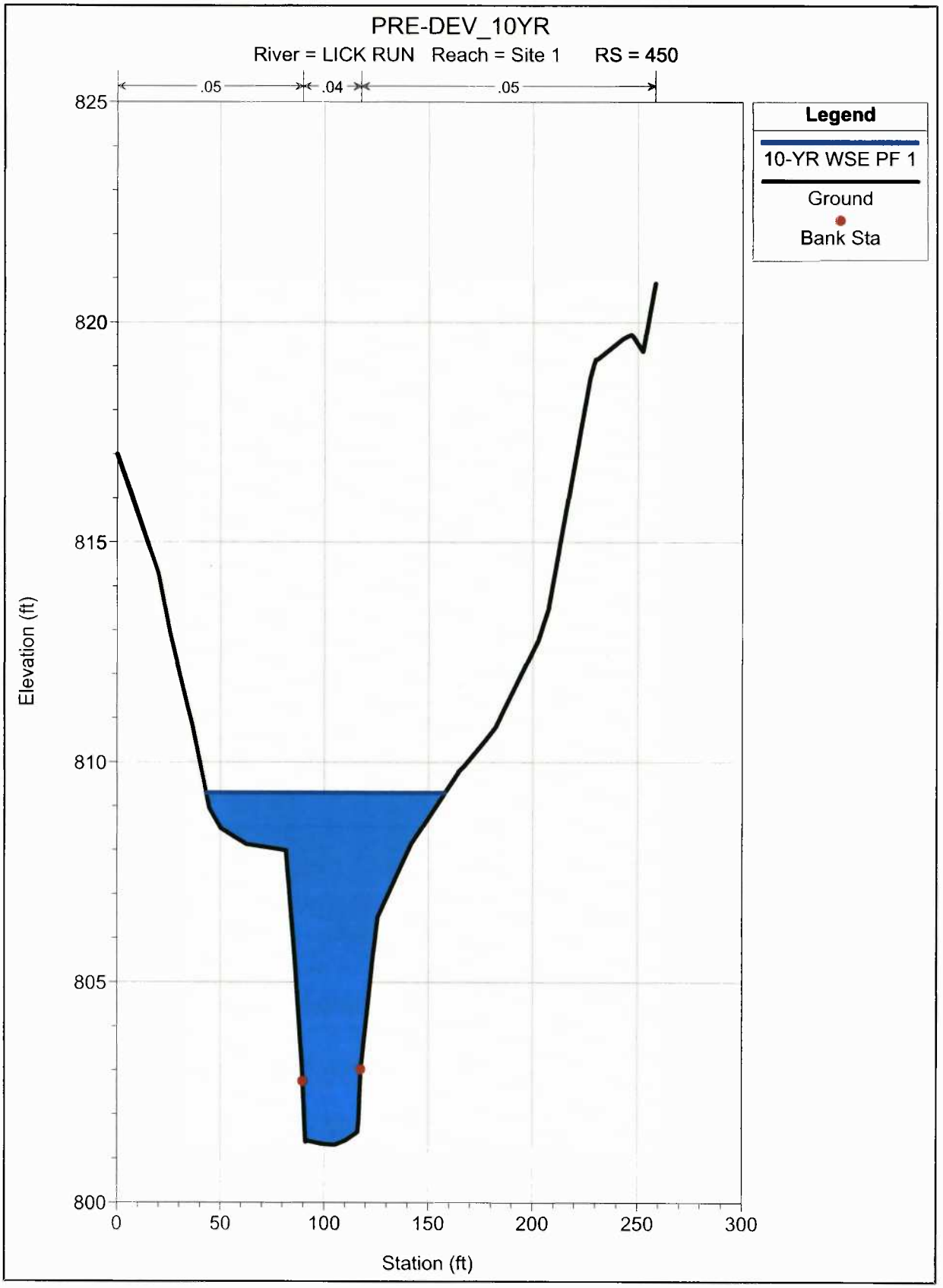
HEC-RAS Plan: PRE-DEV 100YR River: LICK RUN Reach: Site 1 Profile: PF 1

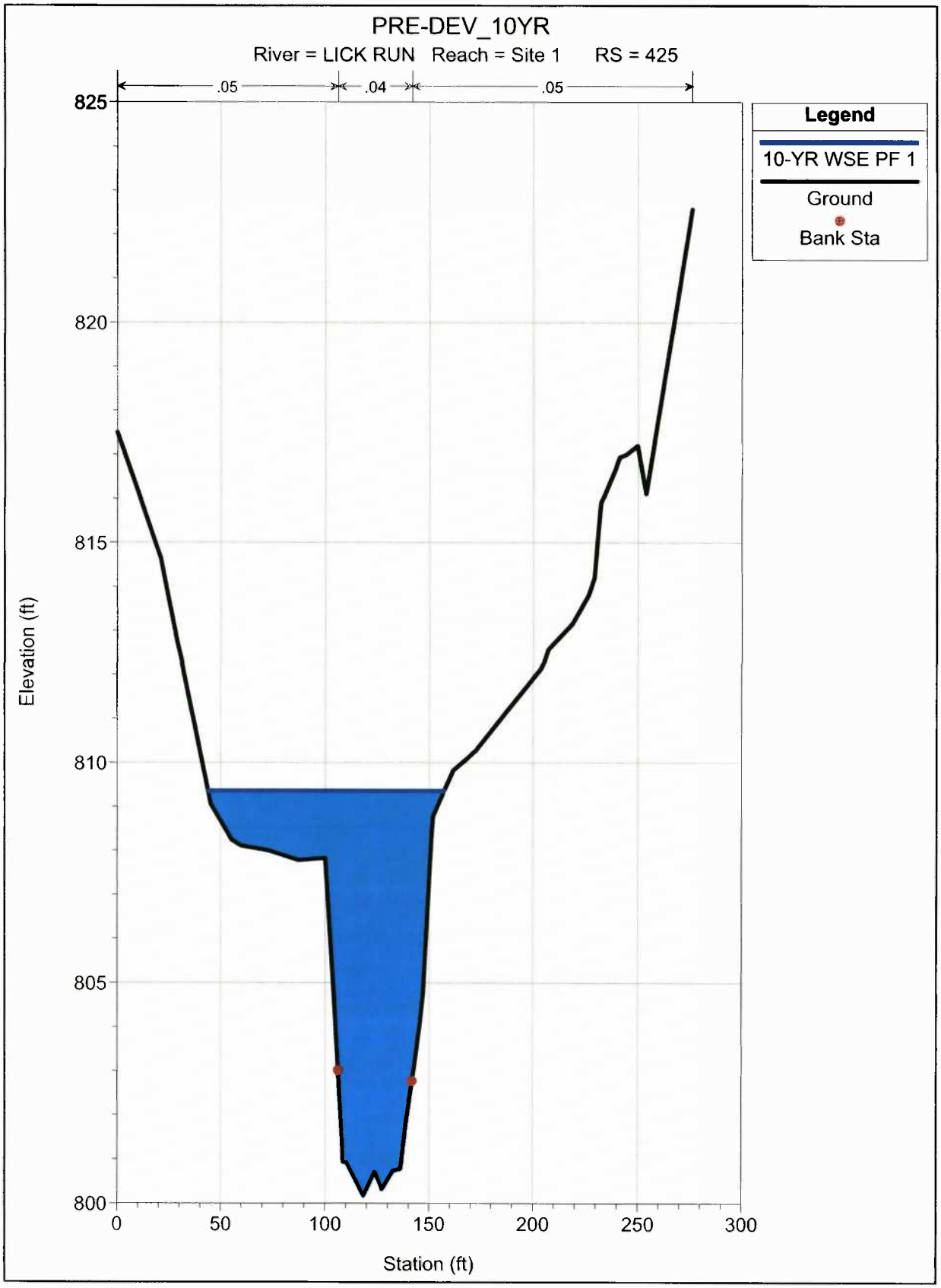
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Site 1	500	PF 1	2557.00	801.02	816.07		816.15	0.000235	3.26	1310.08	169.98	0.15
Site 1	475	PF 1	2557.00	801.31	816.07		816.14	0.000191	2.96	1426.09	184.81	0.14
Site 1	450	PF 1	2557.00	801.31	816.07		816.14	0.000165	2.78	1502.66	197.28	0.13
Site 1	425	PF 1	2557.00	800.17	816.07		816.13	0.000128	2.52	1619.67	212.83	0.11
Site 1	400	PF 1	2557.00	799.35	816.06	809.19	816.13	0.000180	2.94	1511.11	218.24	0.13
Site 1	387		Bridge									
Site 1	375	PF 1	2557.00	799.73	816.05		816.11	0.000177	2.90	1557.20	219.69	0.13
Site 1	350	PF 1	2557.00	800.18	816.05		816.10	0.000150	2.66	1710.04	237.50	0.12
Site 1	325	PF 1	2557.00	800.15	816.05		816.10	0.000140	2.54	1792.67	246.77	0.12
Site 1	300	PF 1	2557.00	799.86	816.05		816.09	0.000124	2.42	1867.99	251.53	0.11
Site 1	275	PF 1	2557.00	799.46	816.05		816.09	0.000110	2.31	1981.00	269.41	0.10
Site 1	250	PF 1	2557.00	799.49	816.05		816.09	0.000104	2.25	2049.07	279.89	0.10
Site 1	225	PF 1	2557.00	799.62	816.05		816.08	0.000095	2.16	2114.83	278.00	0.10
Site 1	200	PF 1	2557.00	799.85	816.05		816.08	0.000096	2.16	2086.42	269.21	0.10
Site 1	150	PF 1	2557.00	800.27	816.04		816.07	0.000096	2.08	2239.78	329.56	0.09
Site 1	125	PF 1	2557.00	799.87	816.04		816.07	0.000101	2.19	2207.54	338.23	0.10
Site 1	100	PF 1	2557.00	799.84	816.03		816.07	0.000107	2.24	2103.48	322.29	0.10
Site 1	75	PF 1	2557.00	799.82	816.02		816.06	0.000125	2.26	1911.48	295.72	0.10
Site 1	50	PF 1	2557.00	799.71	816.01		816.06	0.000150	2.64	1734.42	266.75	0.12
Site 1	25	PF 1	2557.00	800.36	816.00	808.60	816.06	0.000154	2.71	1676.87	236.32	0.12

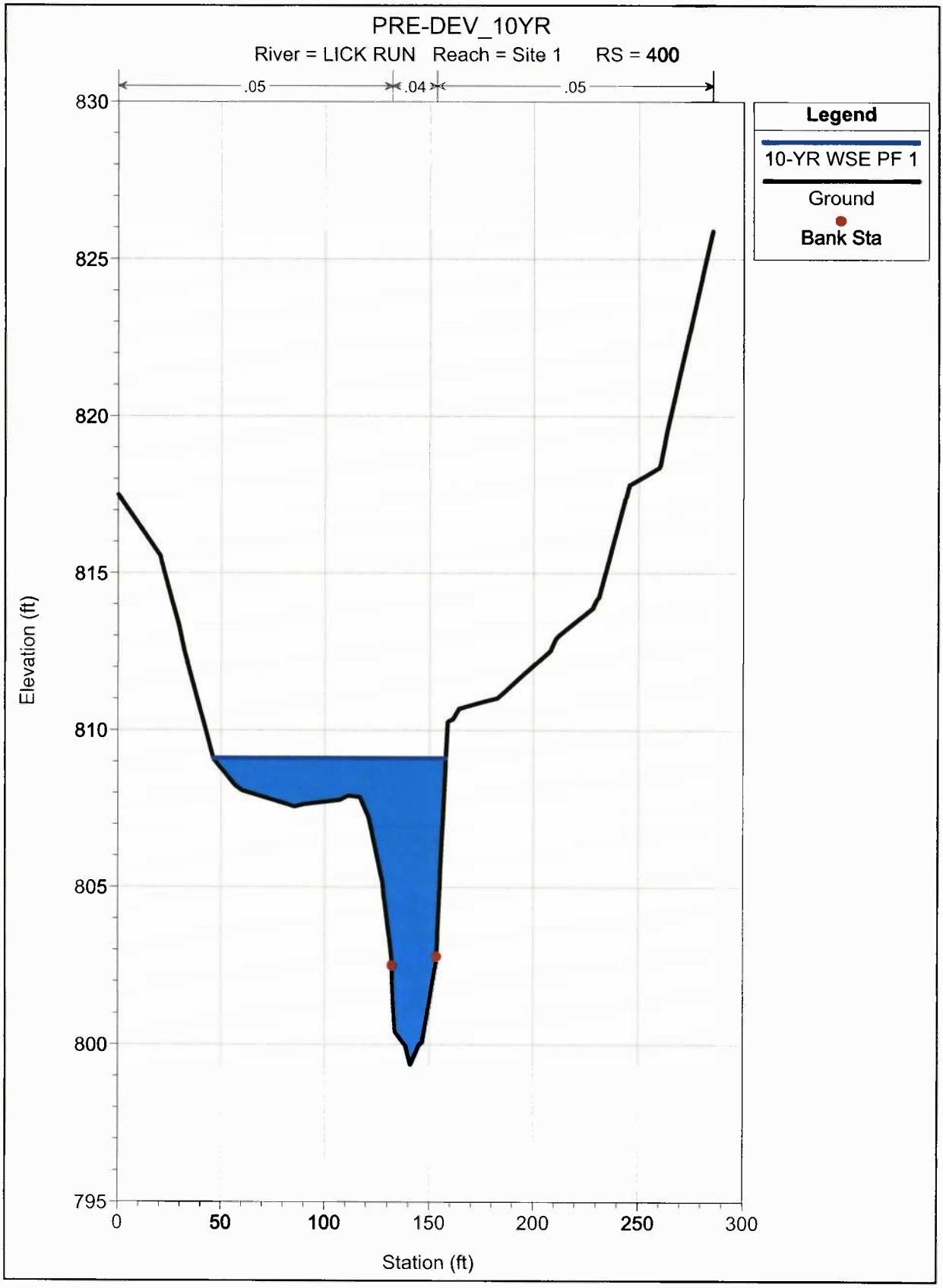
CROSS SECTIONS – PRE DEVELOPMENT (10-YR)

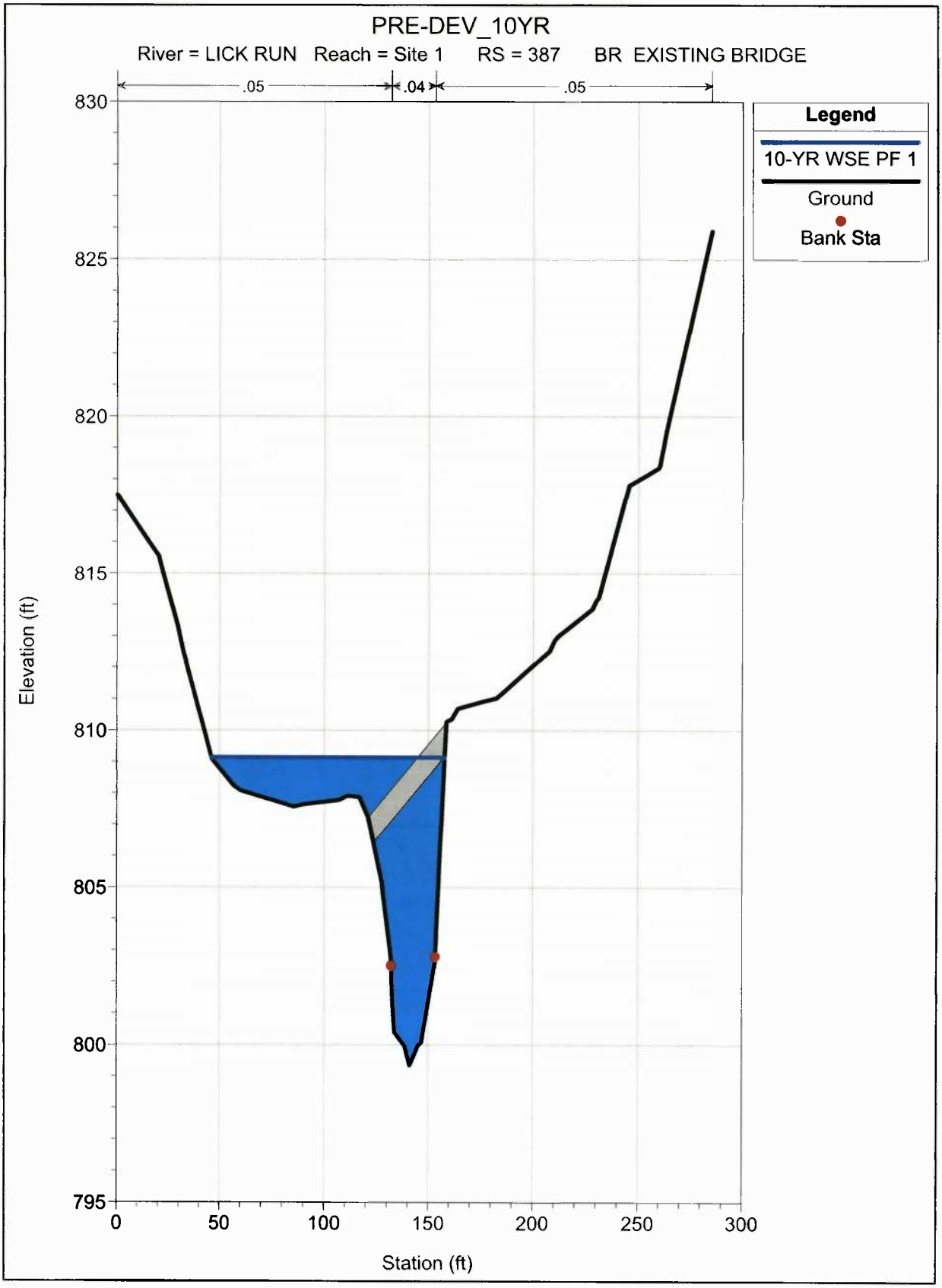

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 500
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
Station (ft)

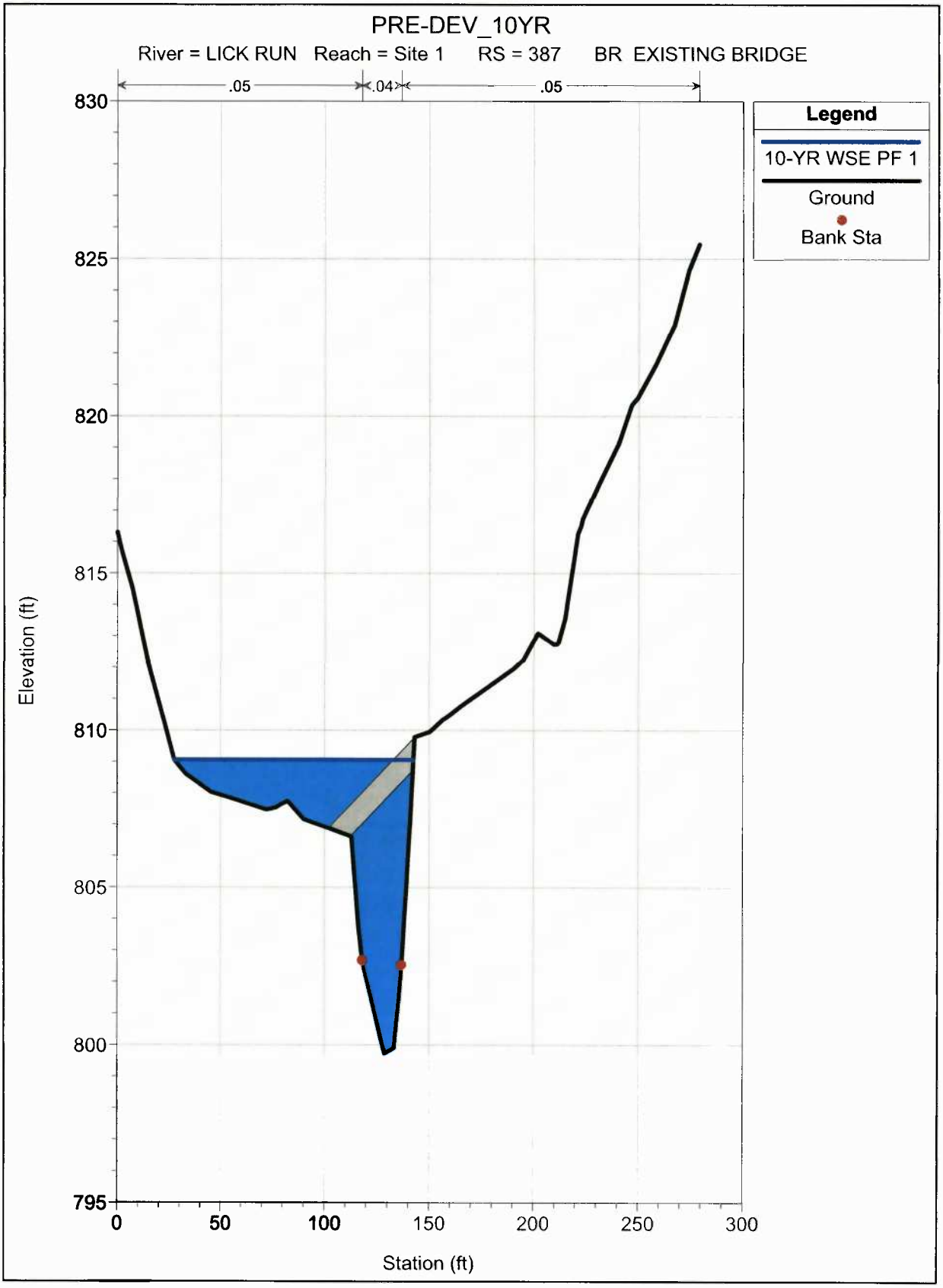

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 475
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
Station (ft)

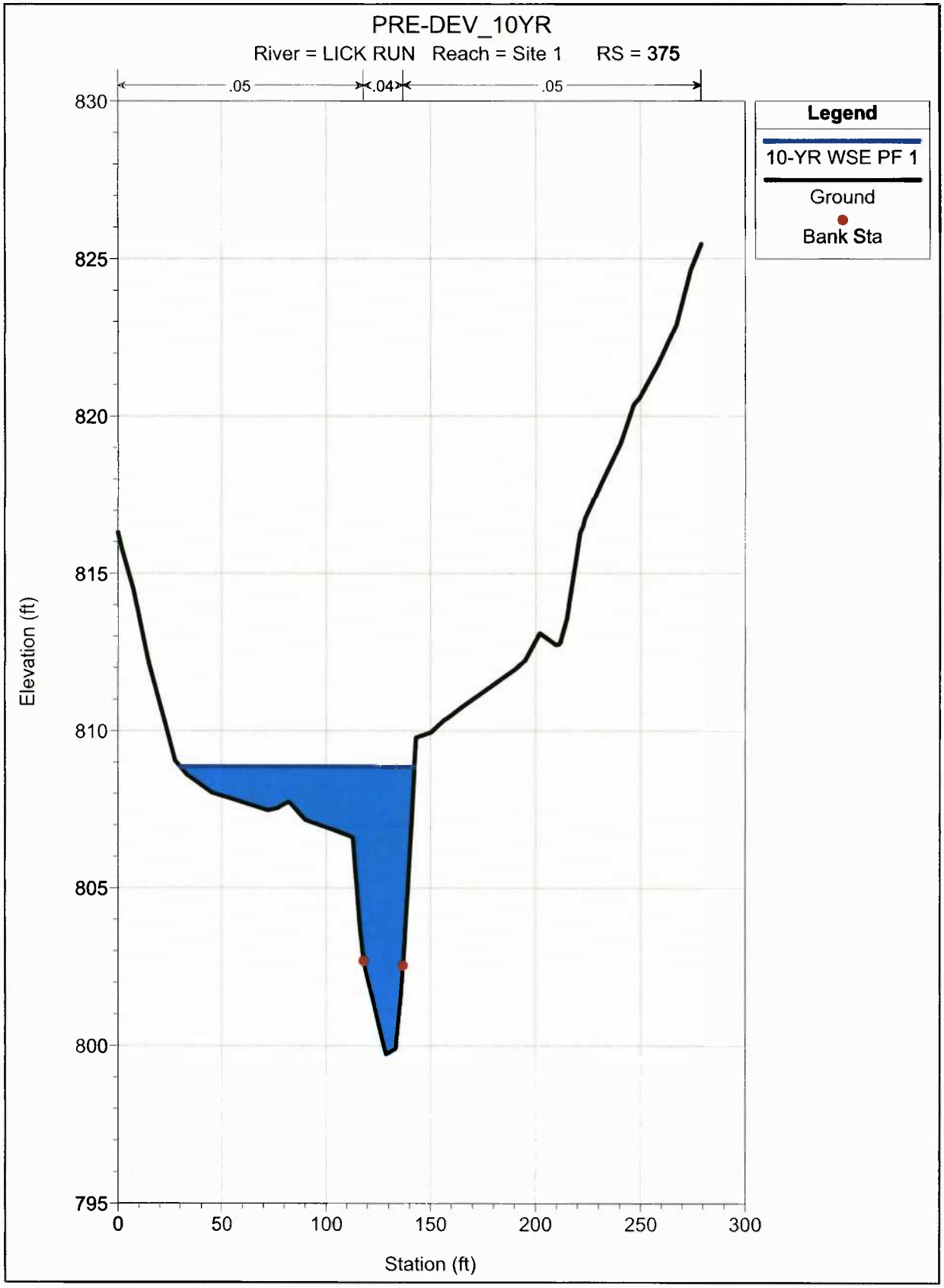

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 450
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)

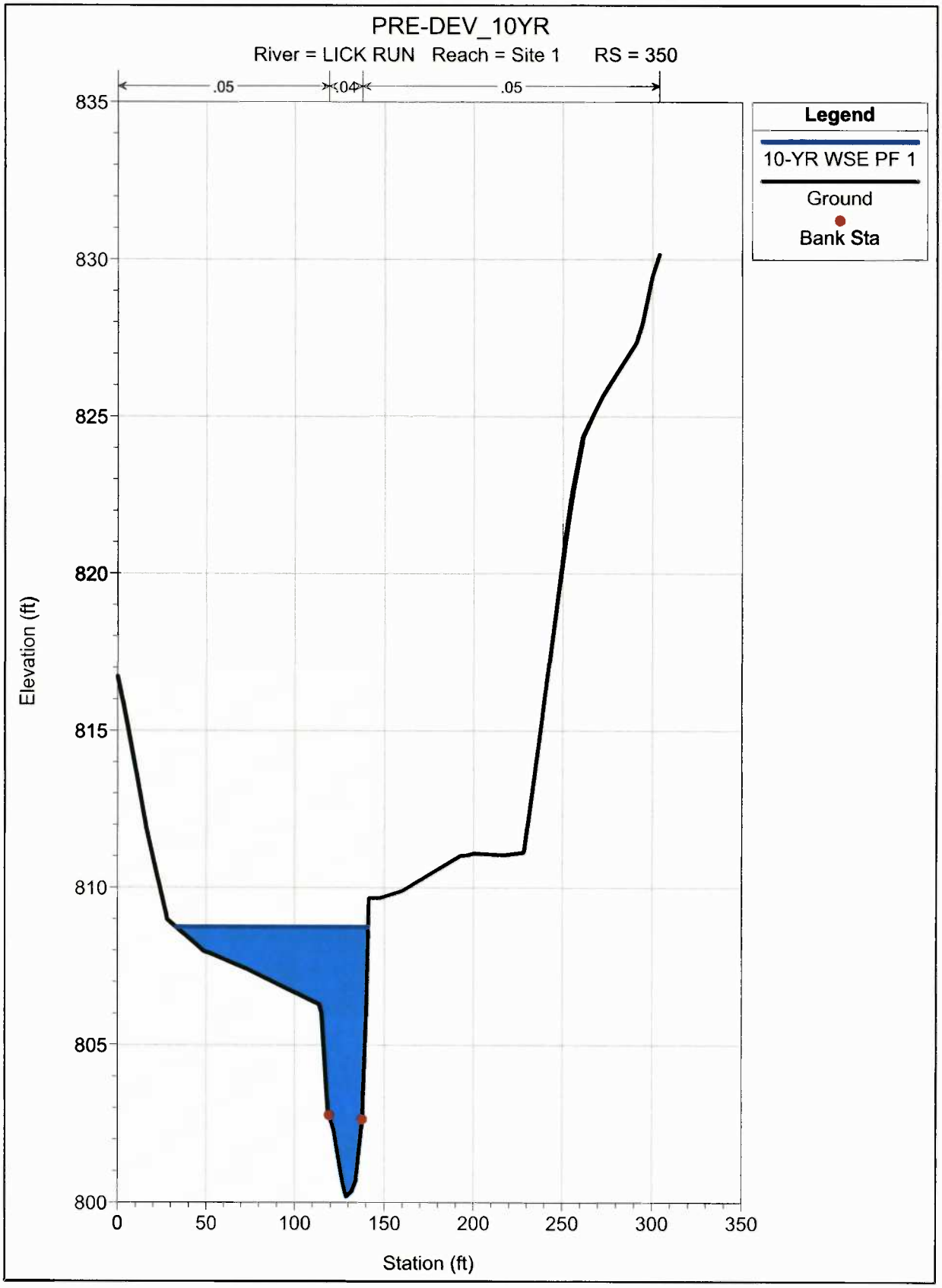

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 425
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)

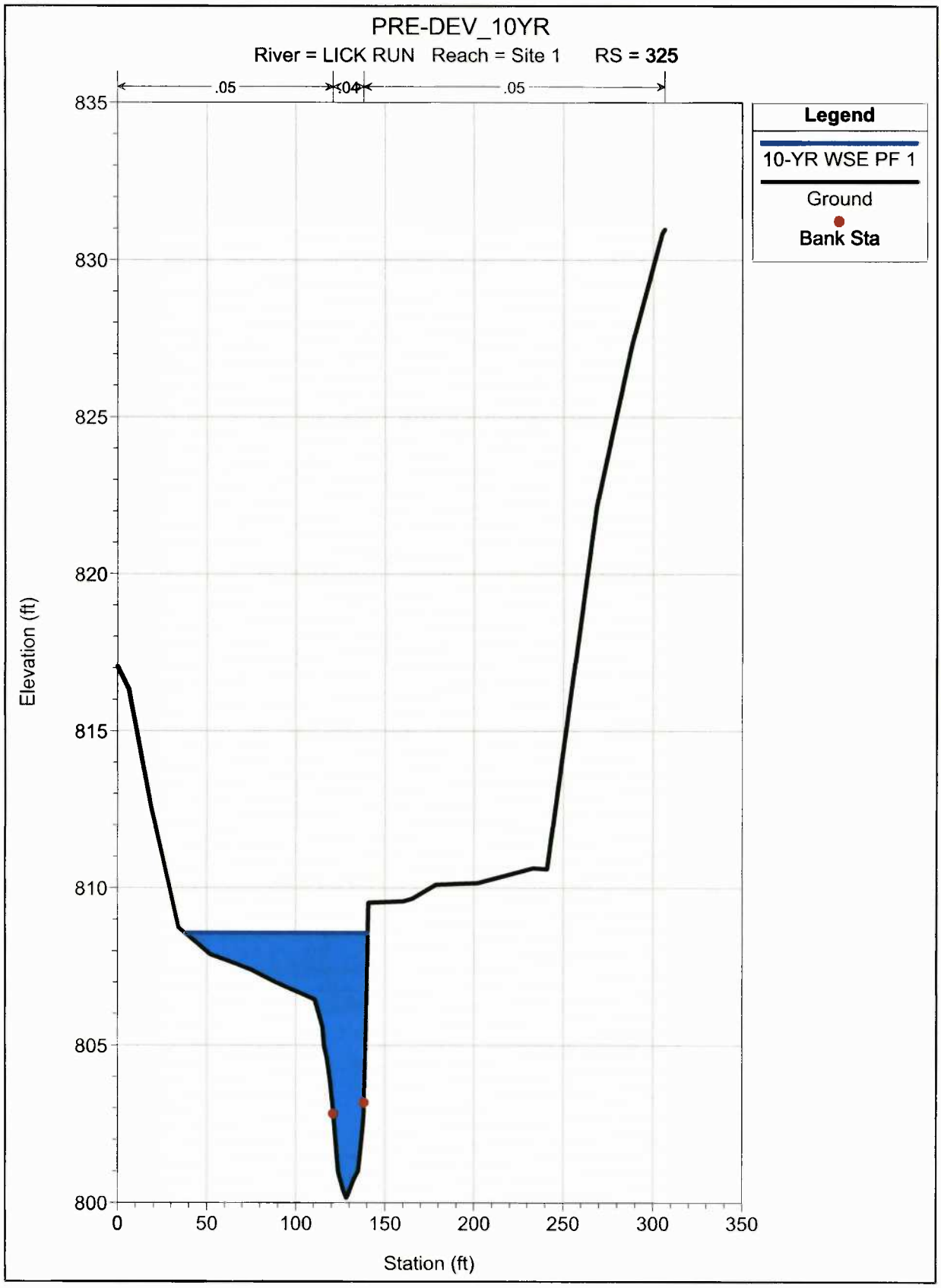

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 400
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
Station (ft)

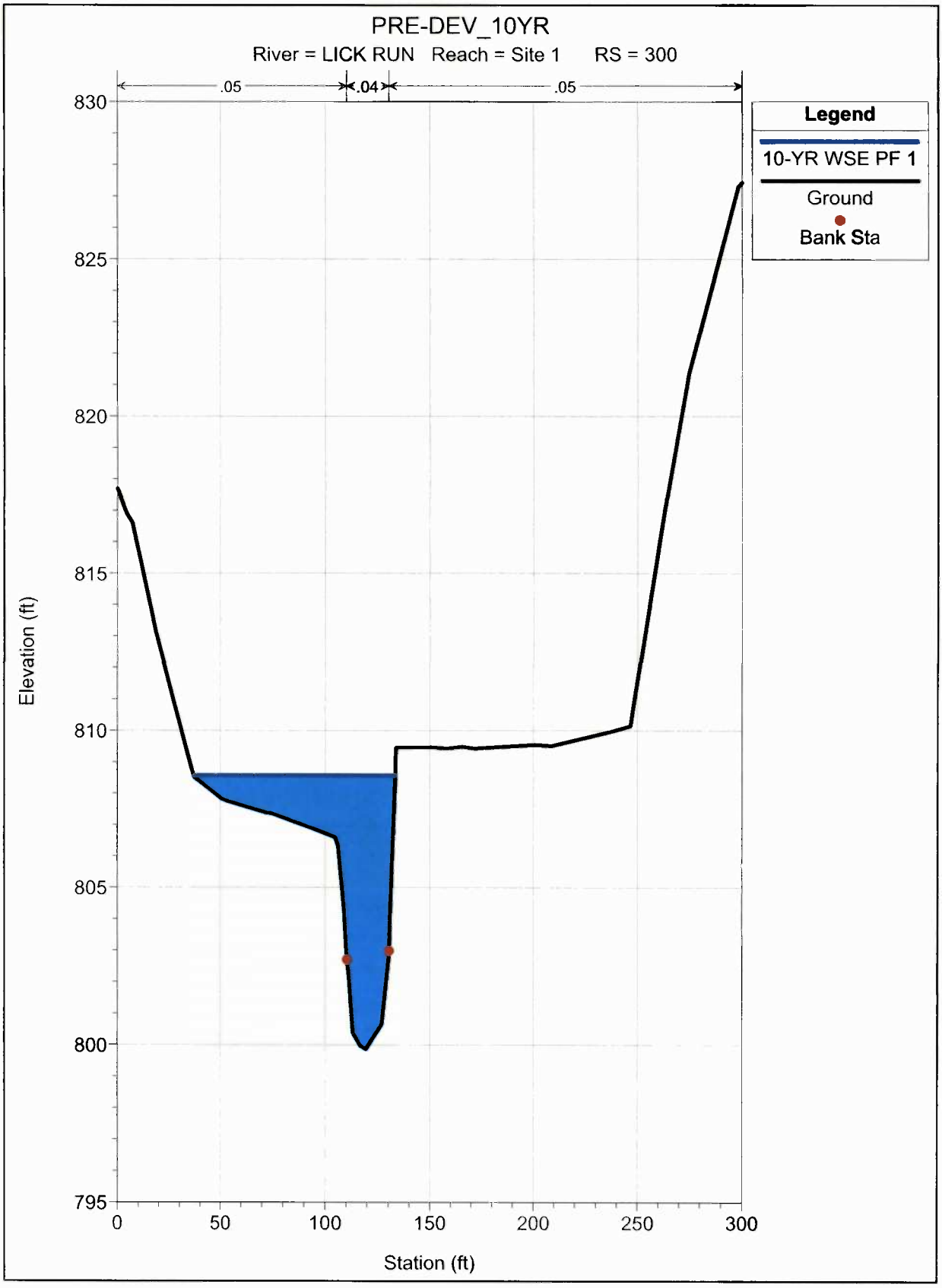

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 387 BR EXISTING BRIDGE
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
Station (ft)

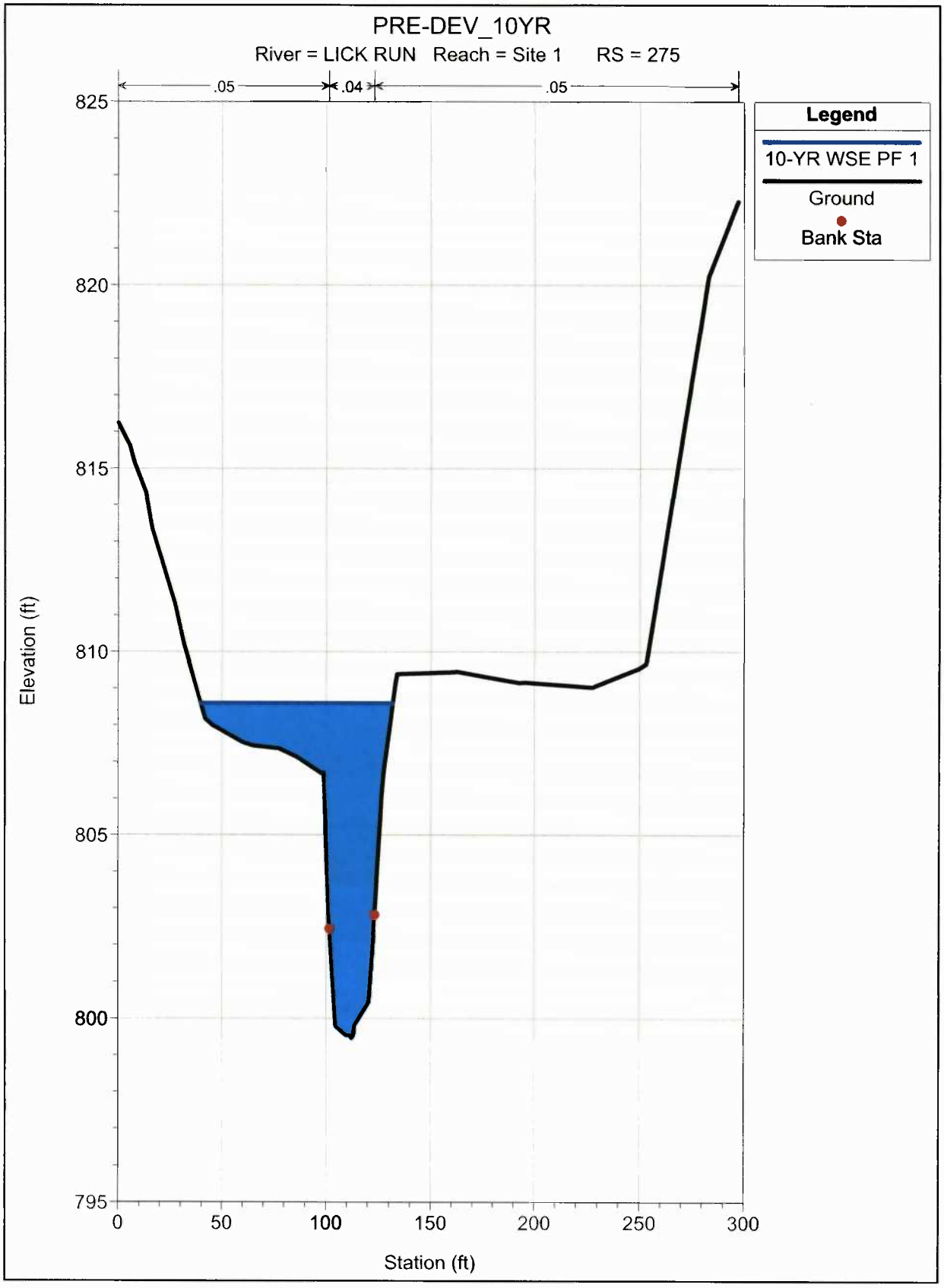

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 387 BR EXISTING BRIDGE
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
830
825
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)

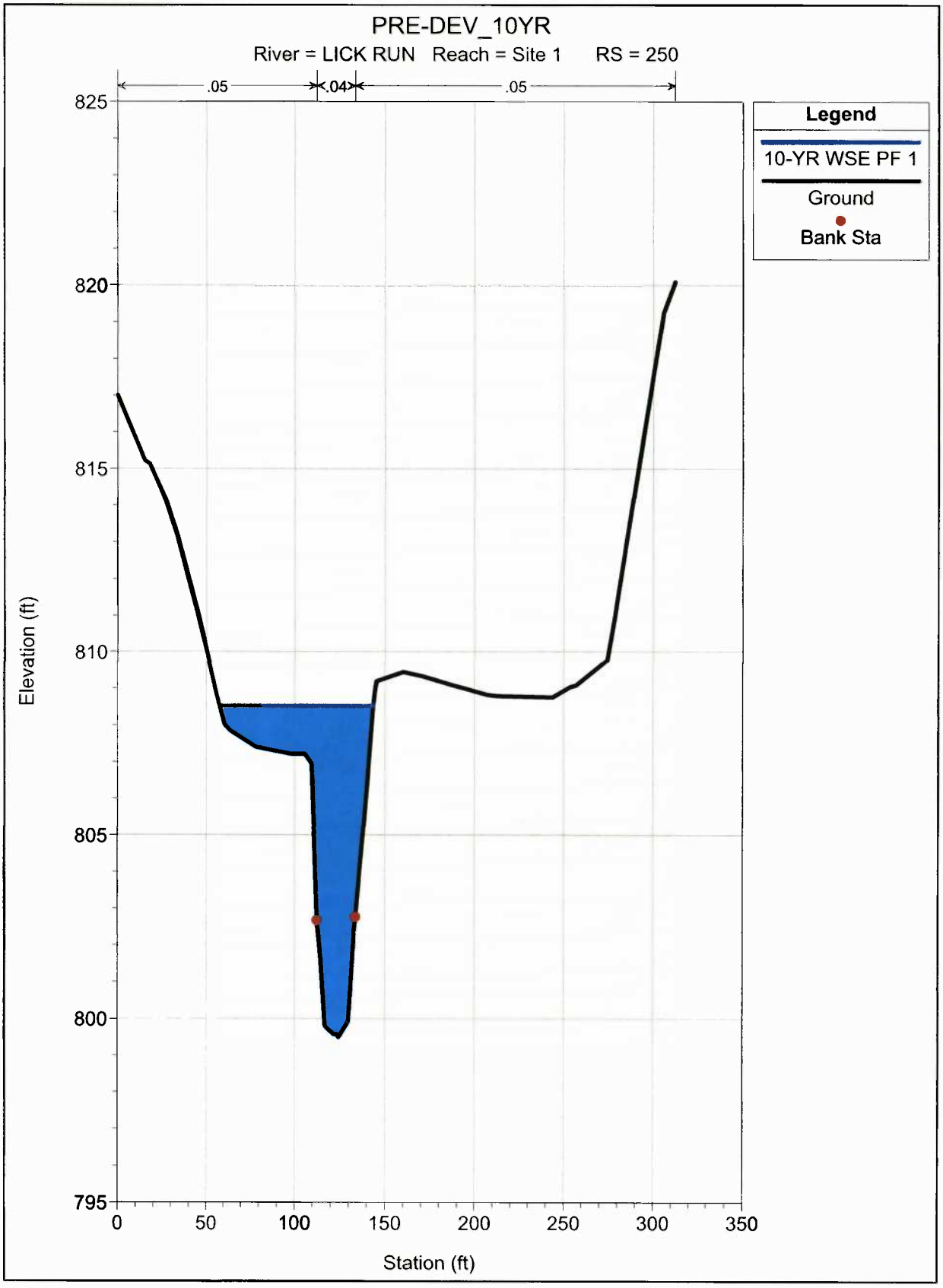

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 375
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
Station (ft)

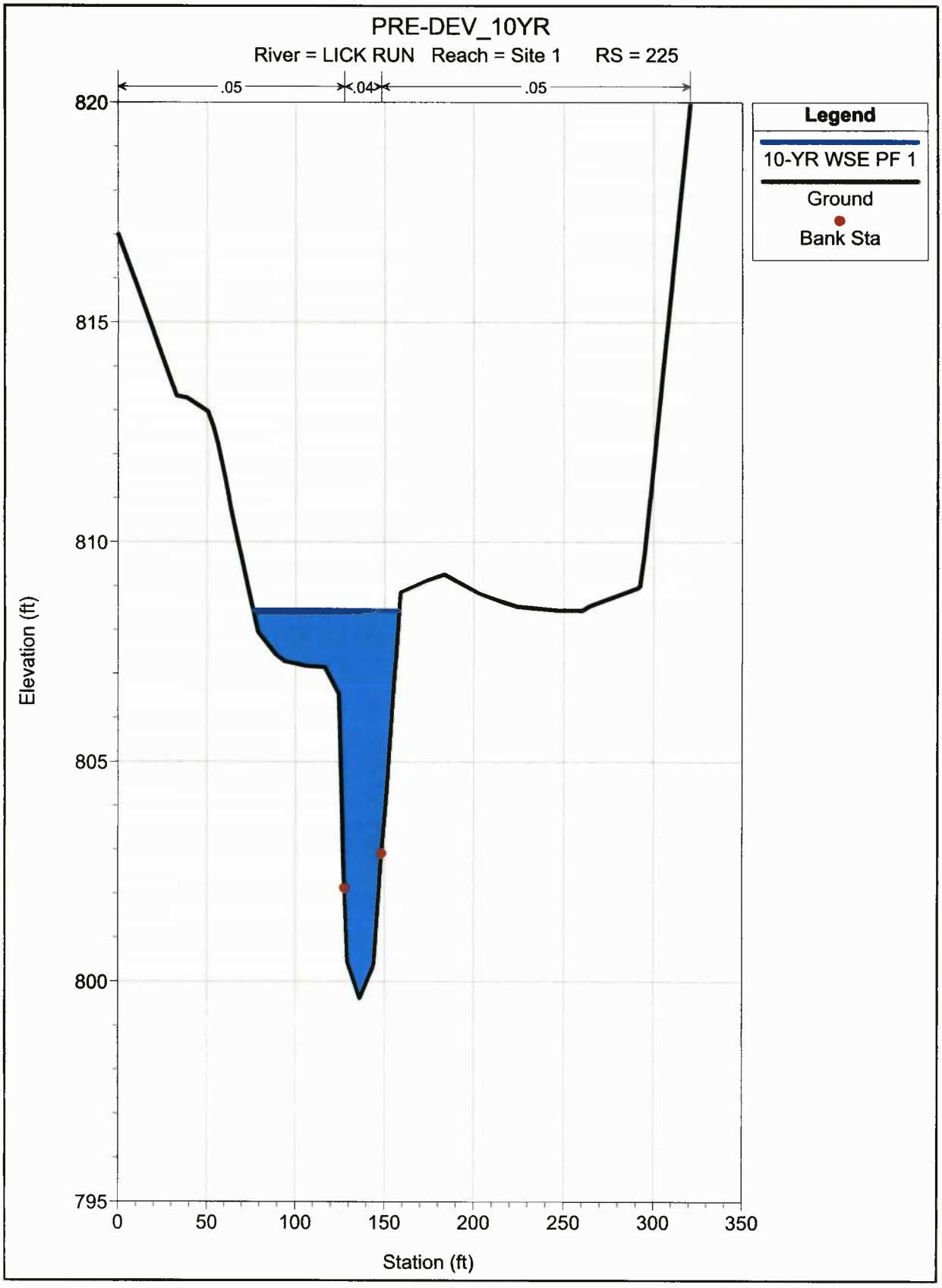

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 350
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
835
830
825
820
815
810
805
800
0
50
100
150
200
250
300
350
Station (ft)

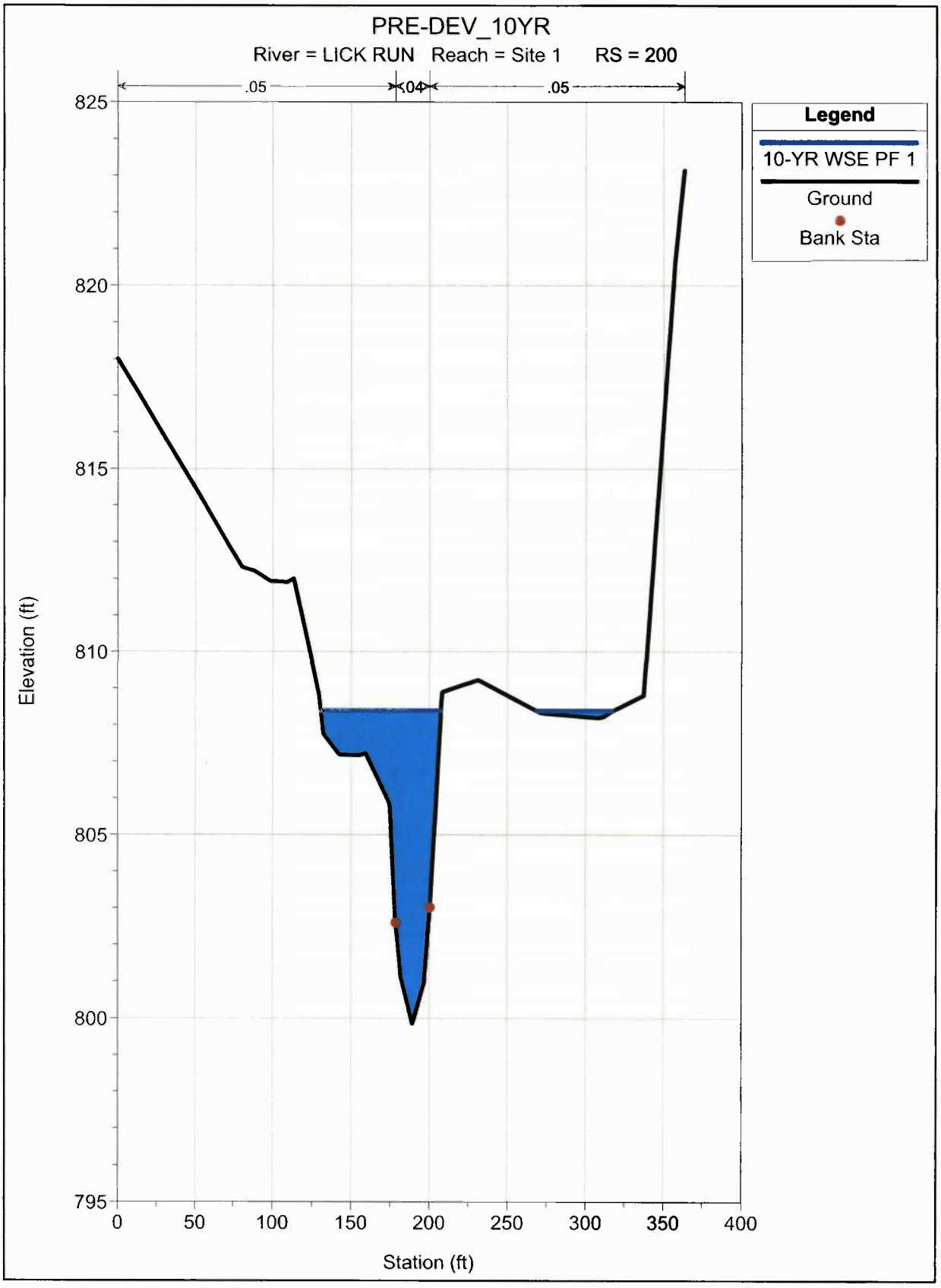

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 325
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
835
830
825
820
815
810
805
800
0
50
100
150
200
250
300
350
Station (ft)

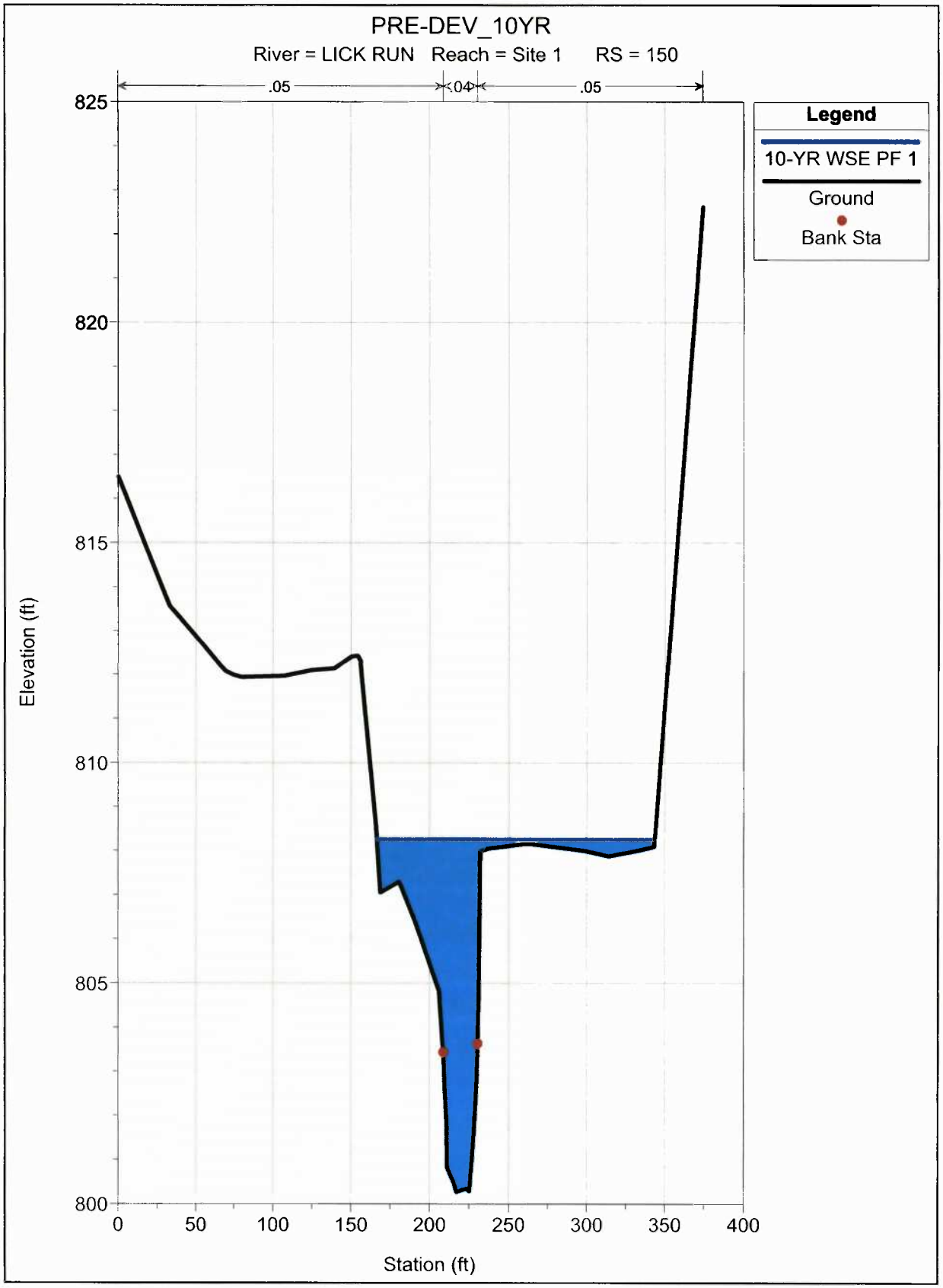

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 300
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
Station (ft)

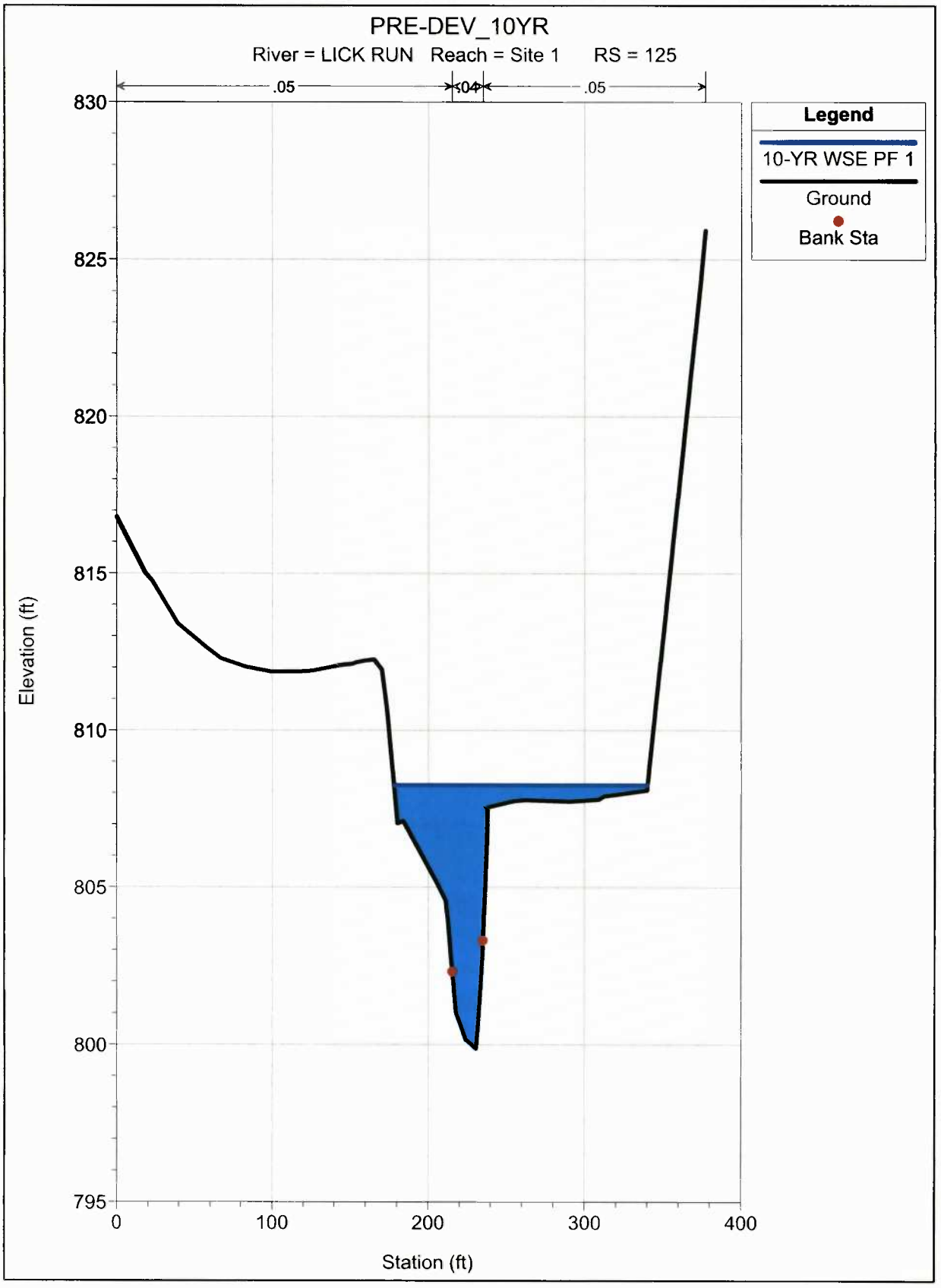

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 275
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)

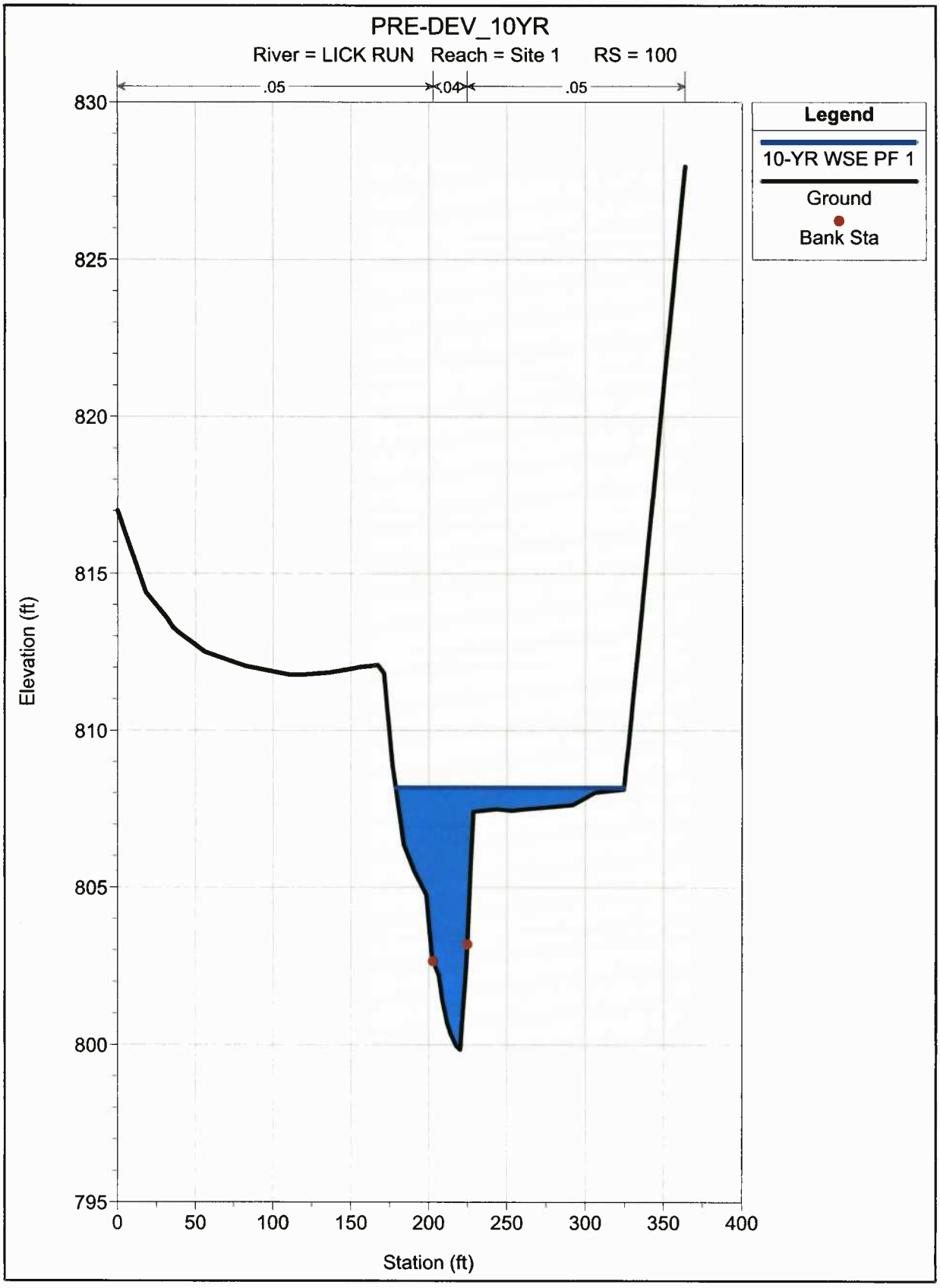

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 250
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
350
Station (ft)

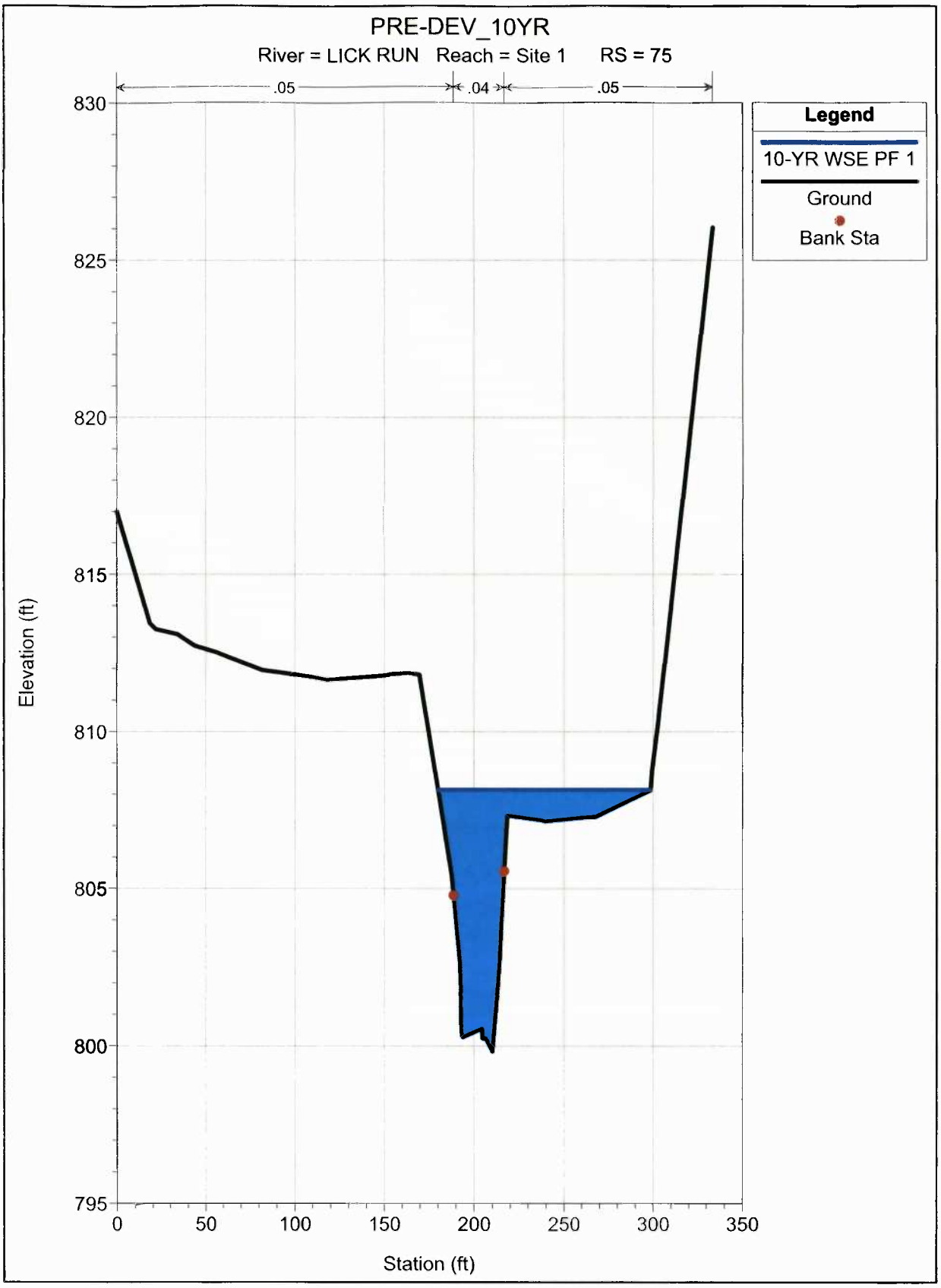

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 225
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
350
Station (ft)

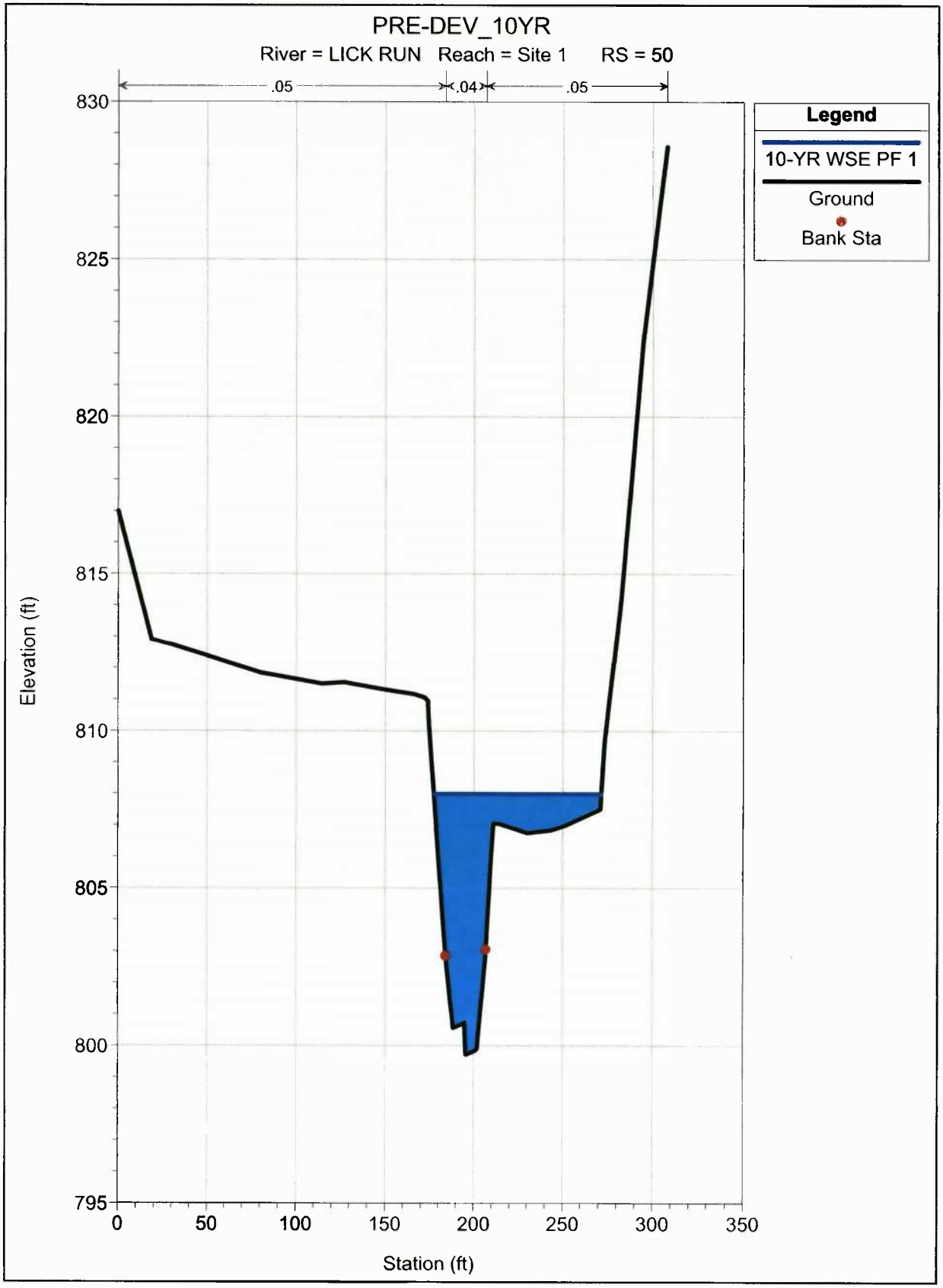

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 200
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
350
400
Station (ft)

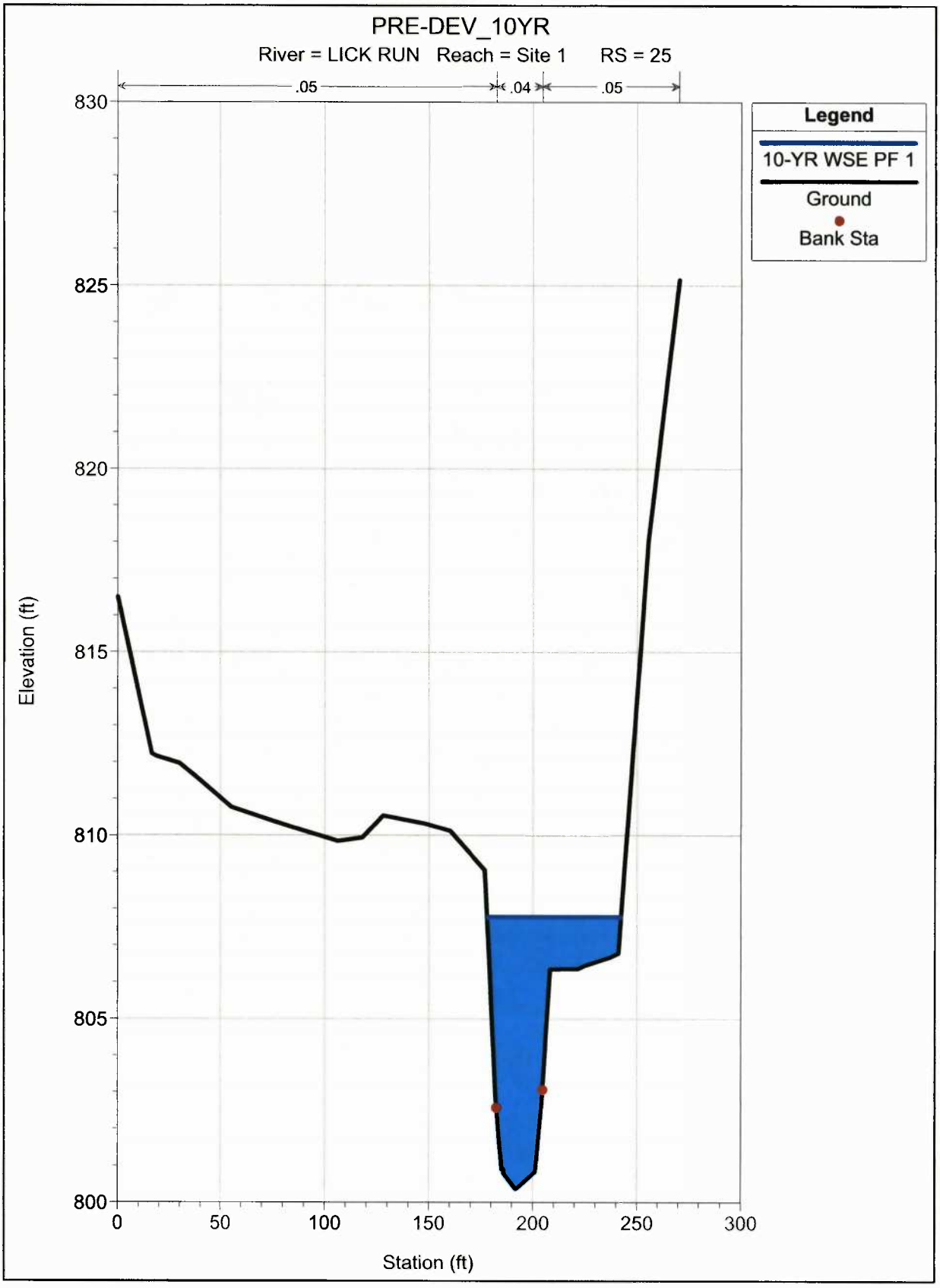

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 150
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
300
350
400
Station (ft)


PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 125
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
100
200
300
400
Station (ft)

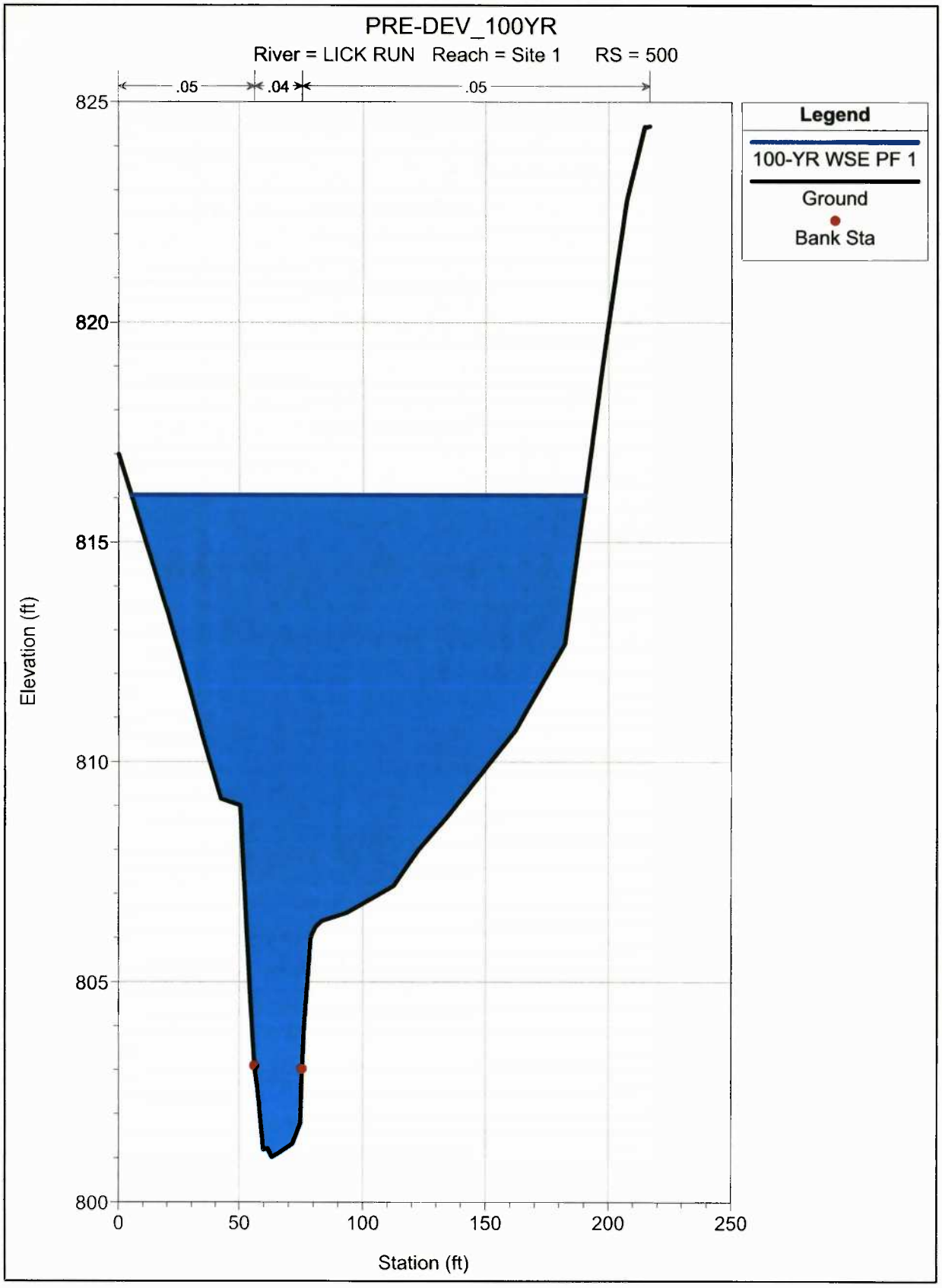

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 100
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
350
400
Station (ft)

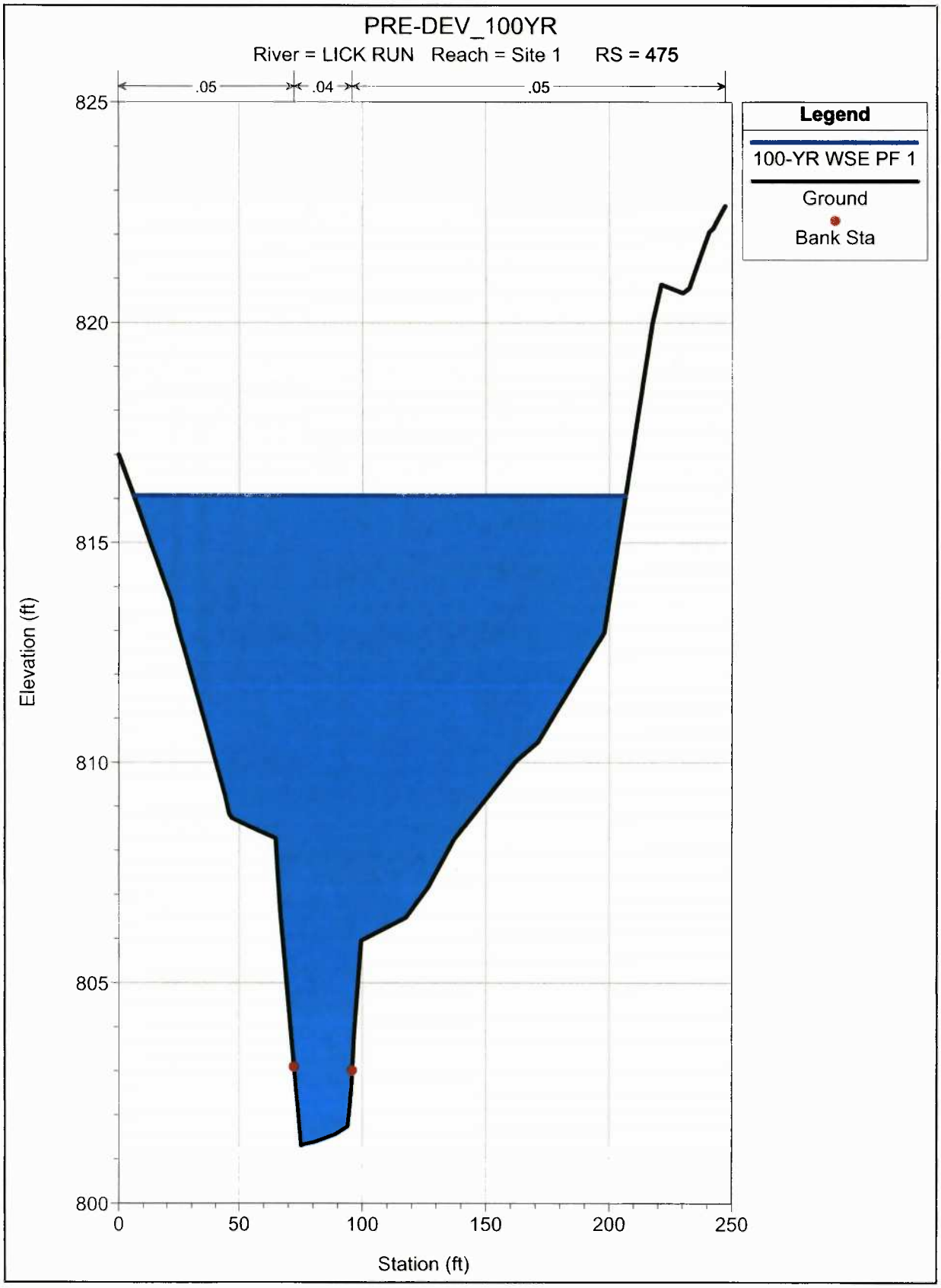

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 75
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
350
Station (ft)

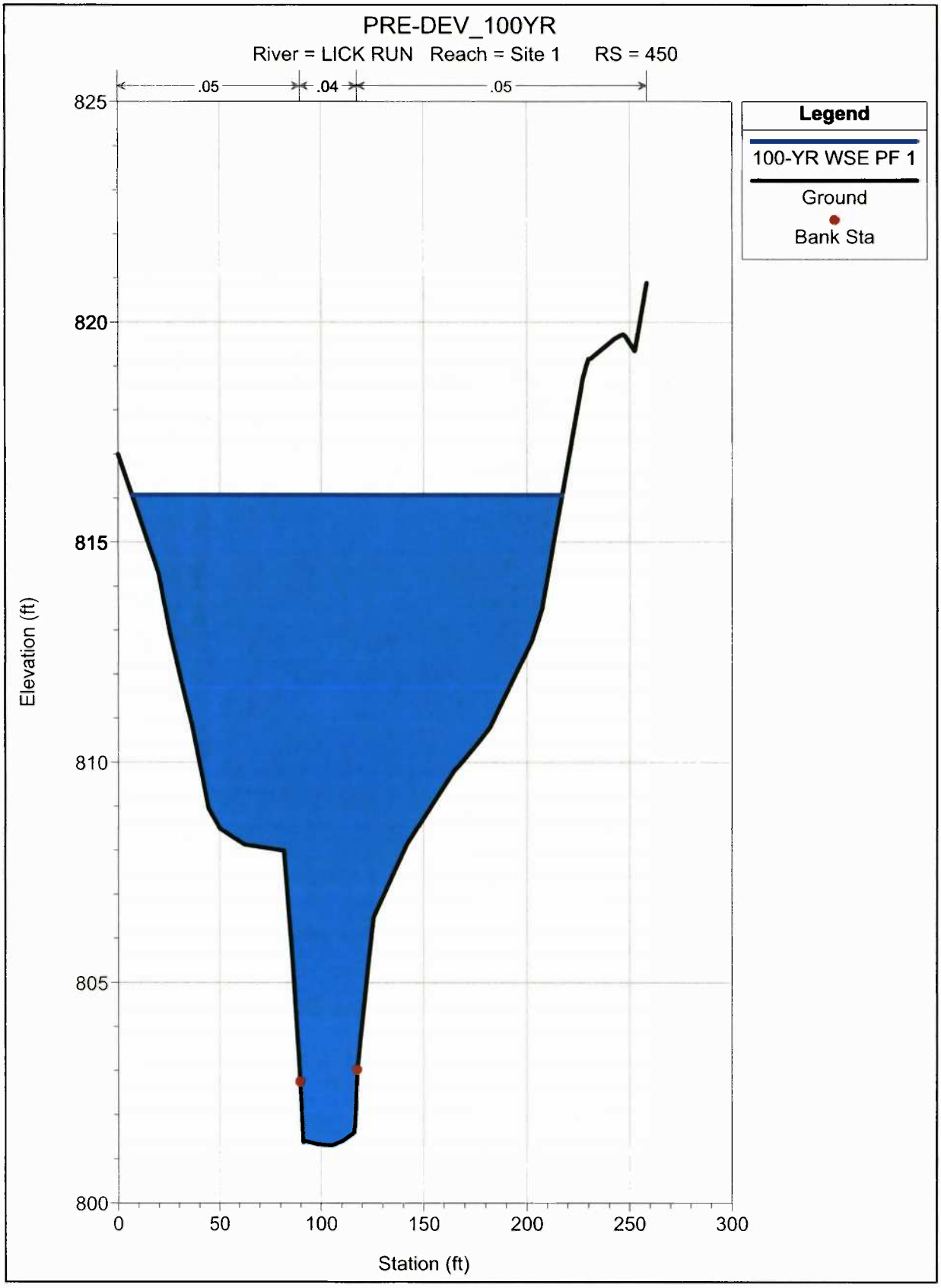

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 50
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
350
Station (ft)

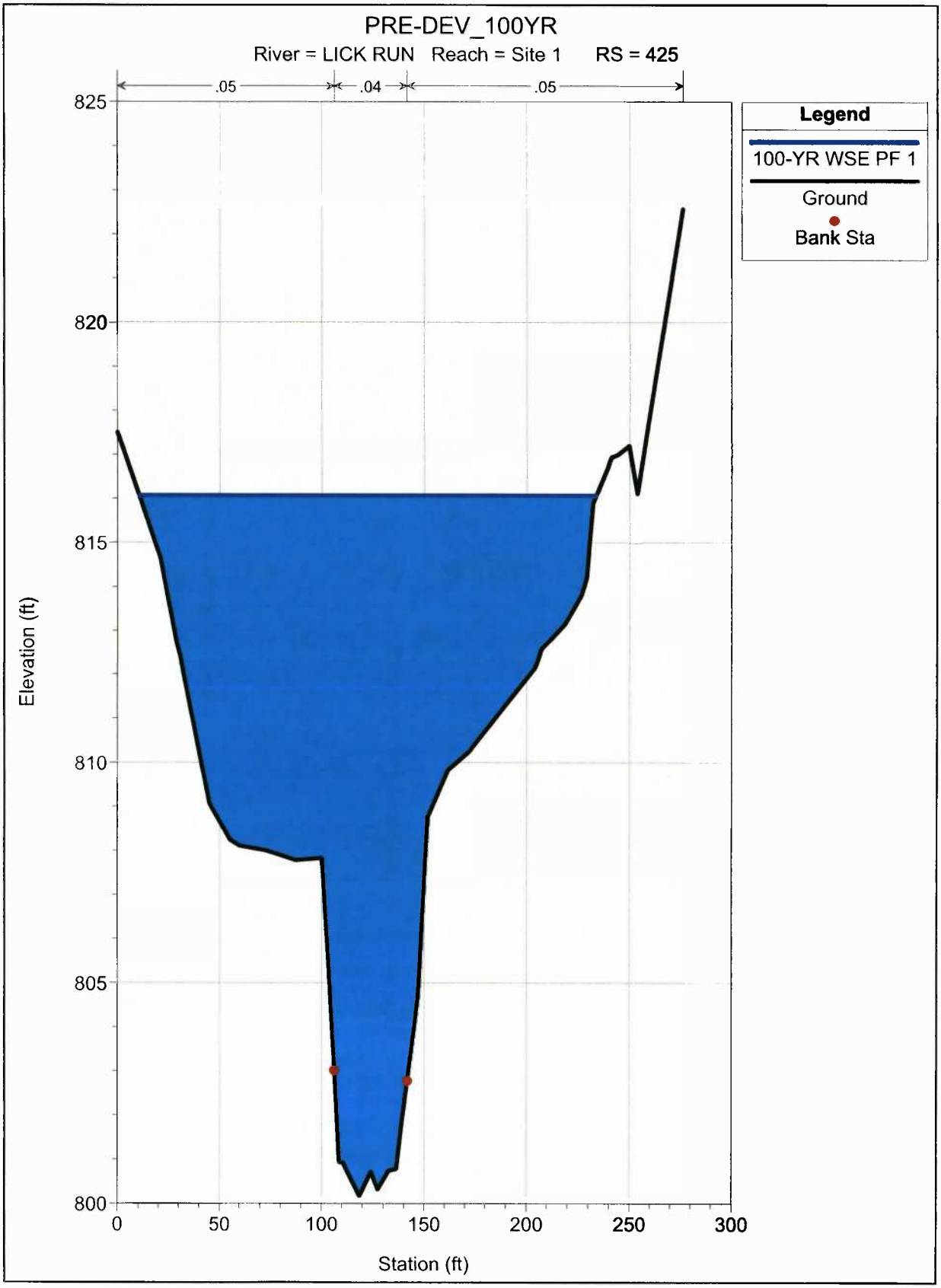

PRE-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 25
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
0
50
100
150
200
250
300
Station (ft)

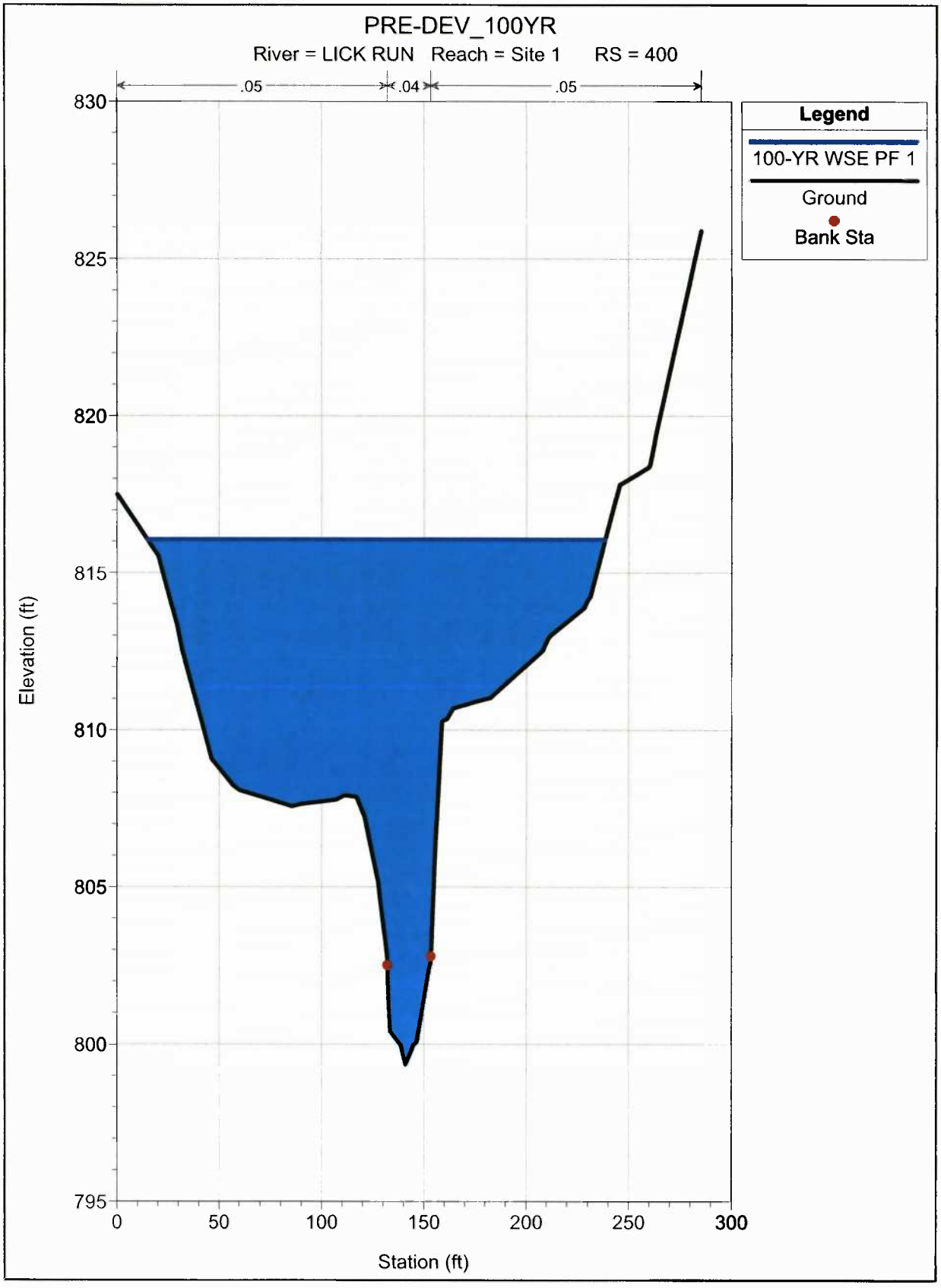
CROSS SECTIONS – PRE DEVELOPMENT (100-YR)

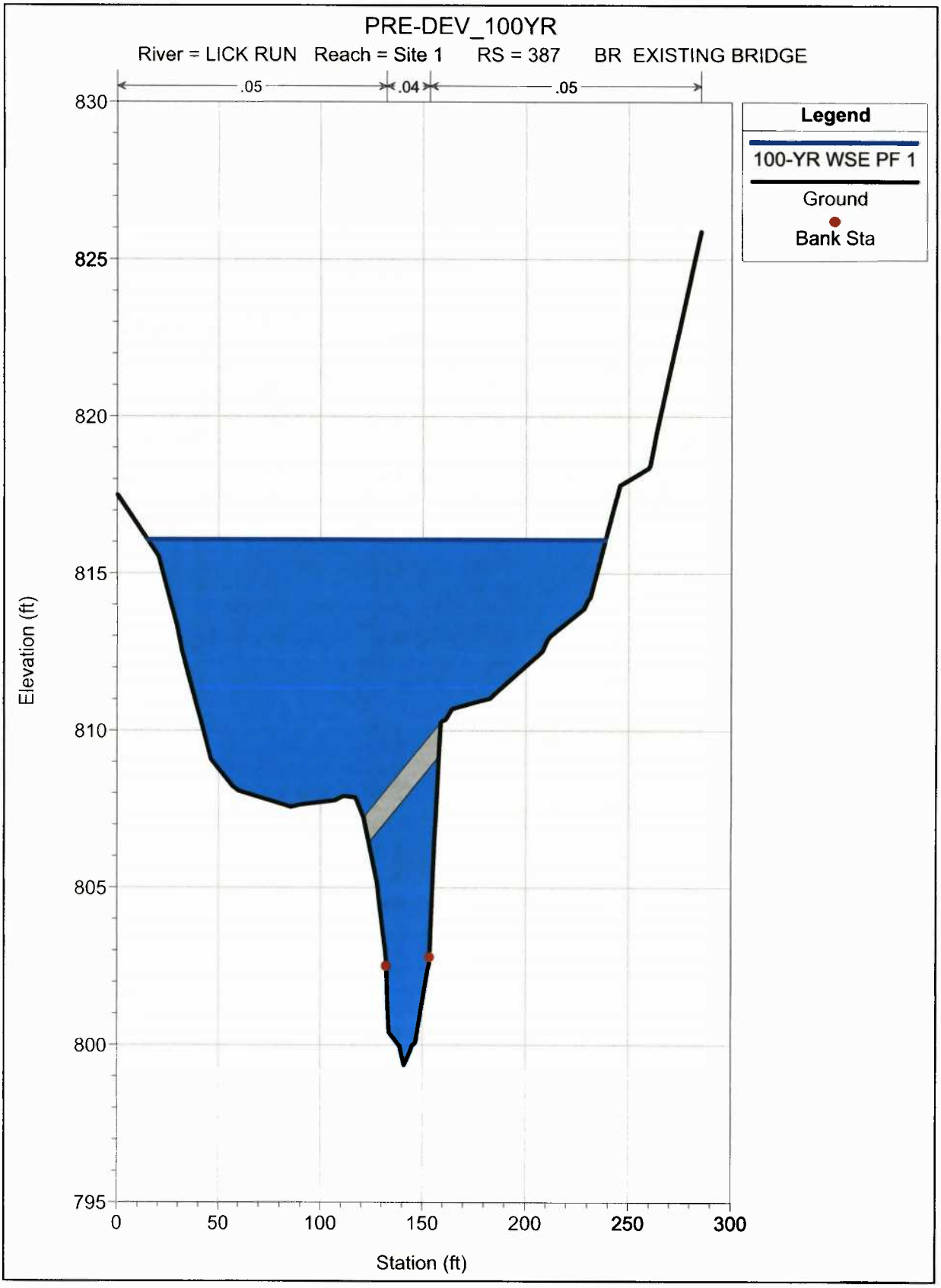

PRE-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 500
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
Station (ft)

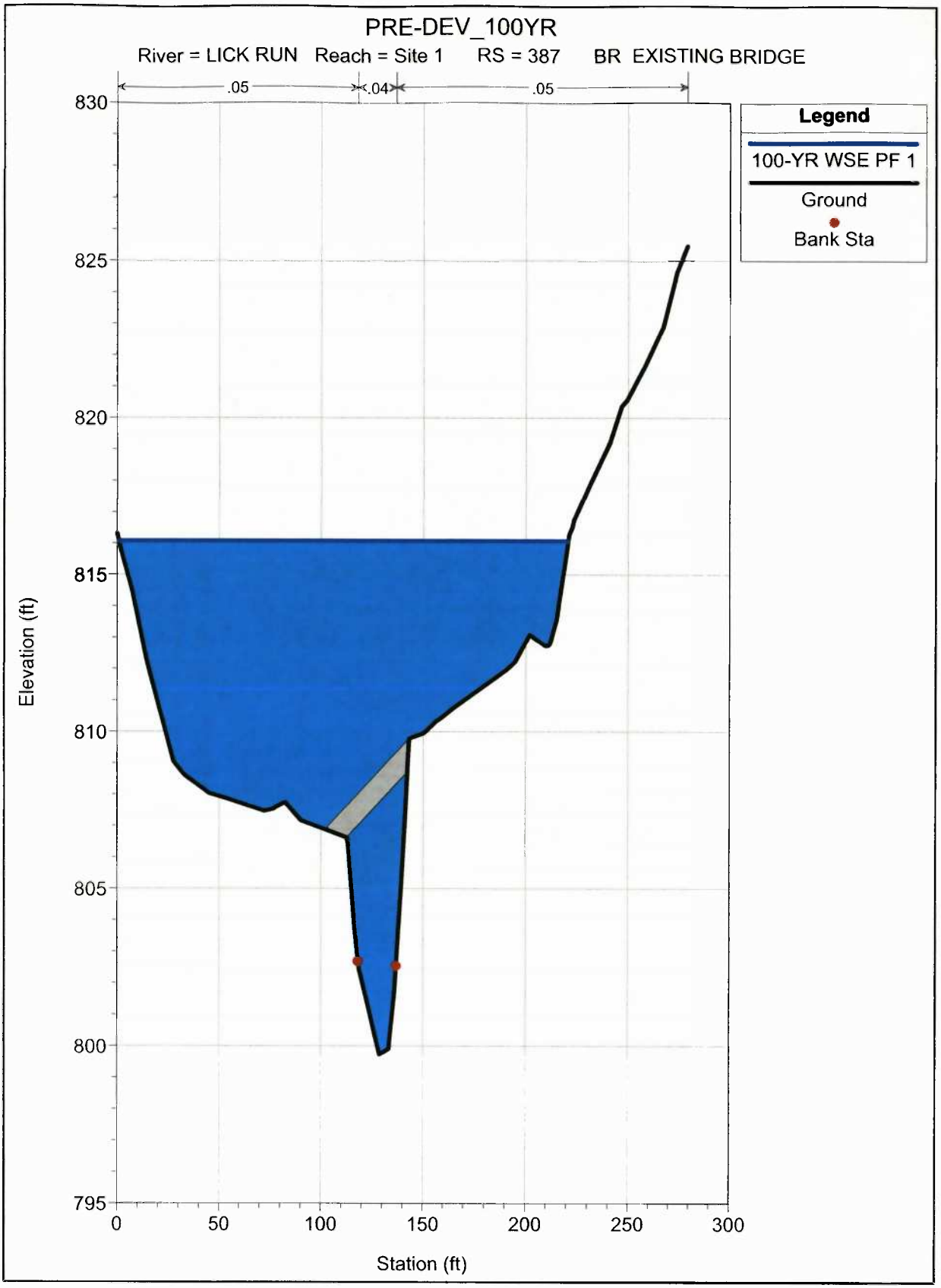

PRE-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 475
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
Station (ft)

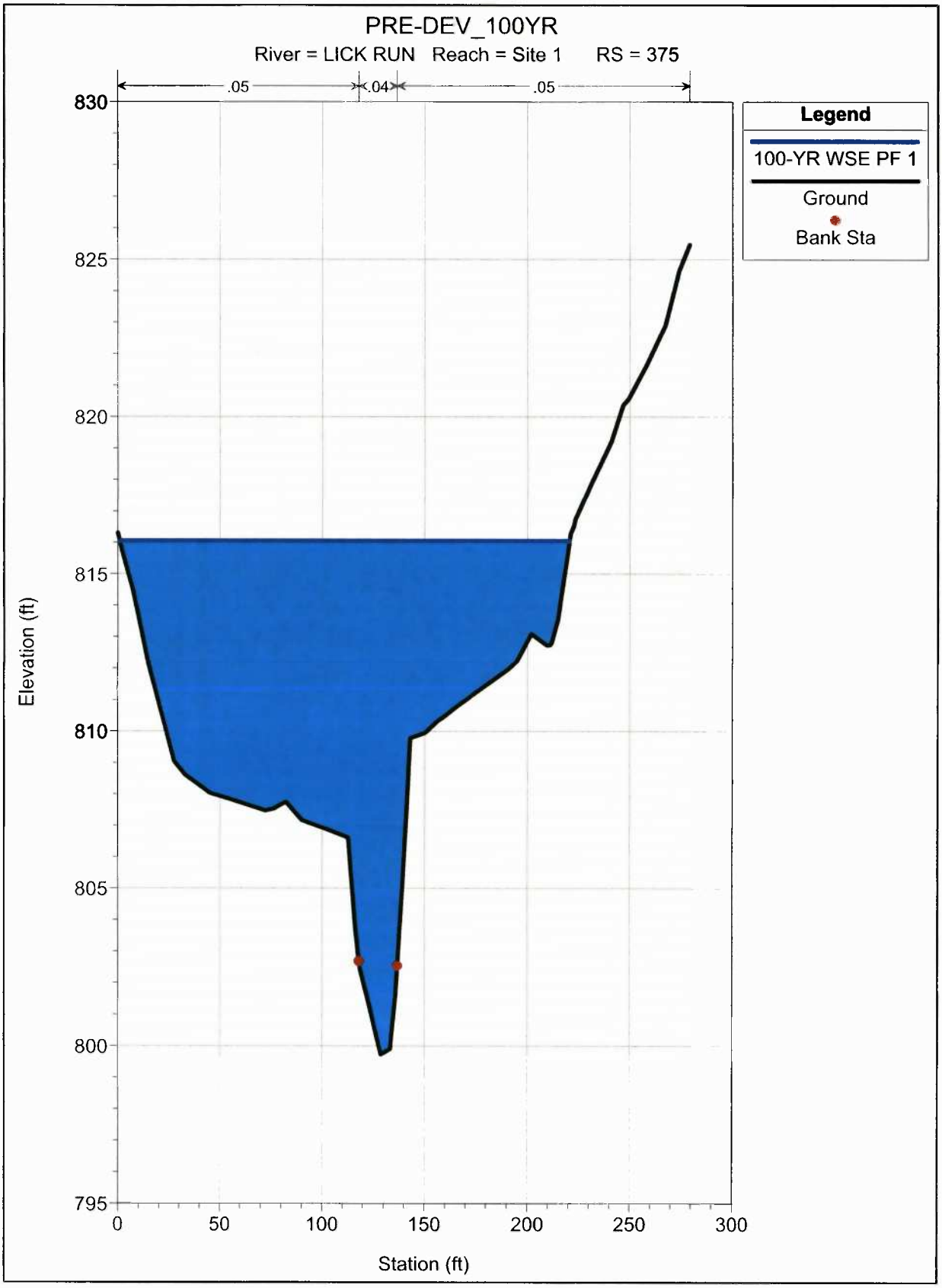

PRE-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 450
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)

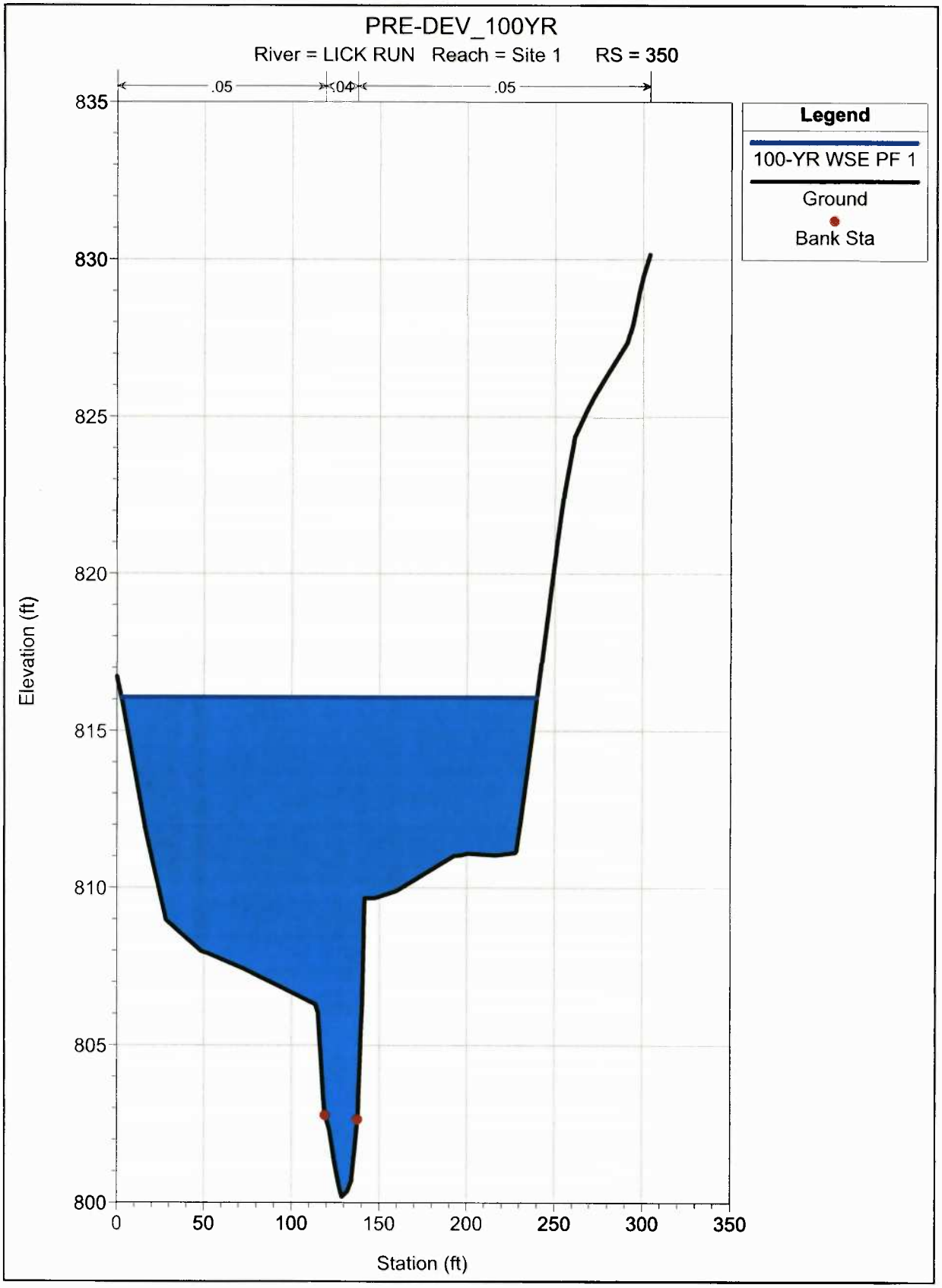

PRE-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 425
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)

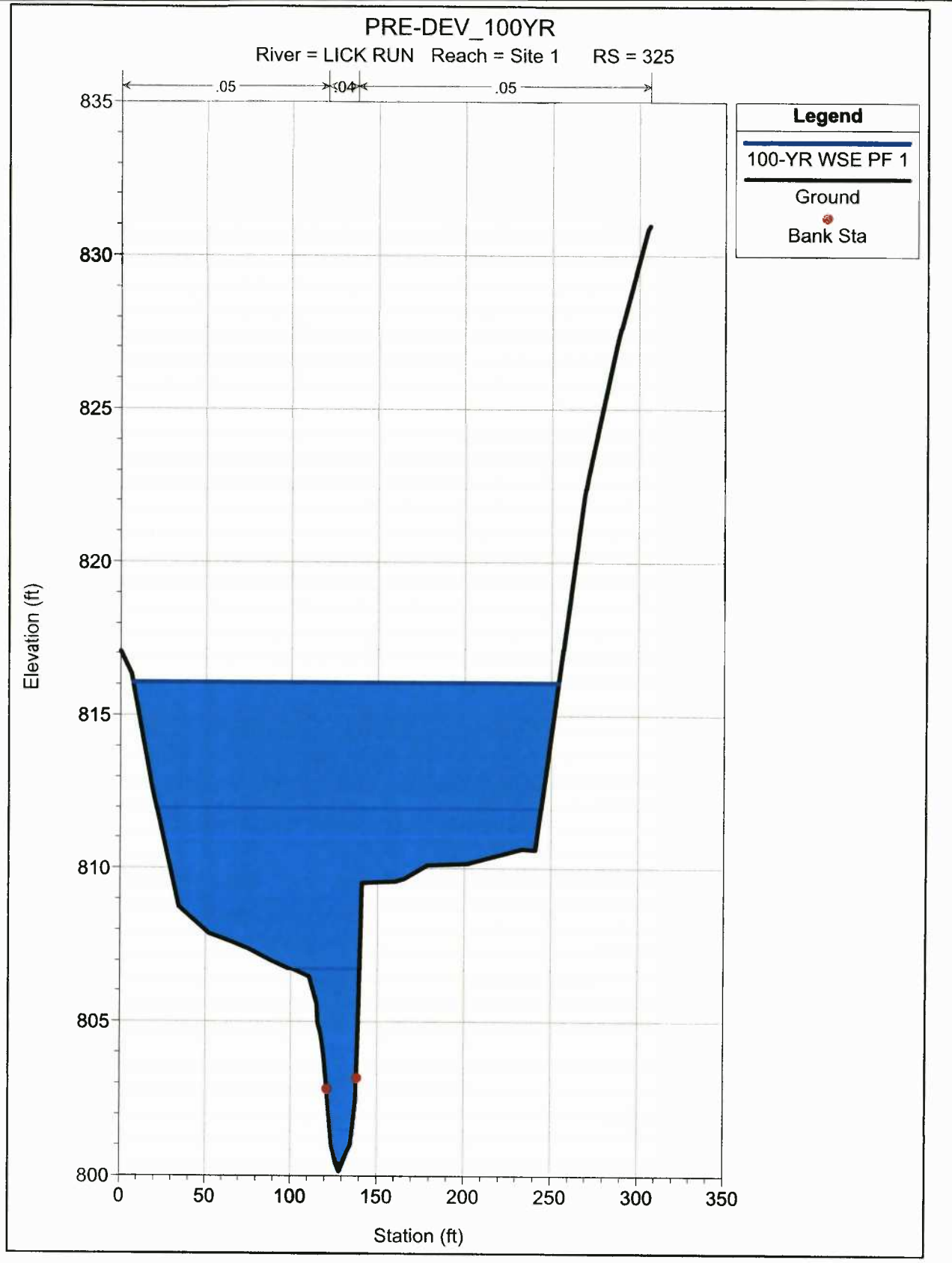

PRE-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 400
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
Station (ft)

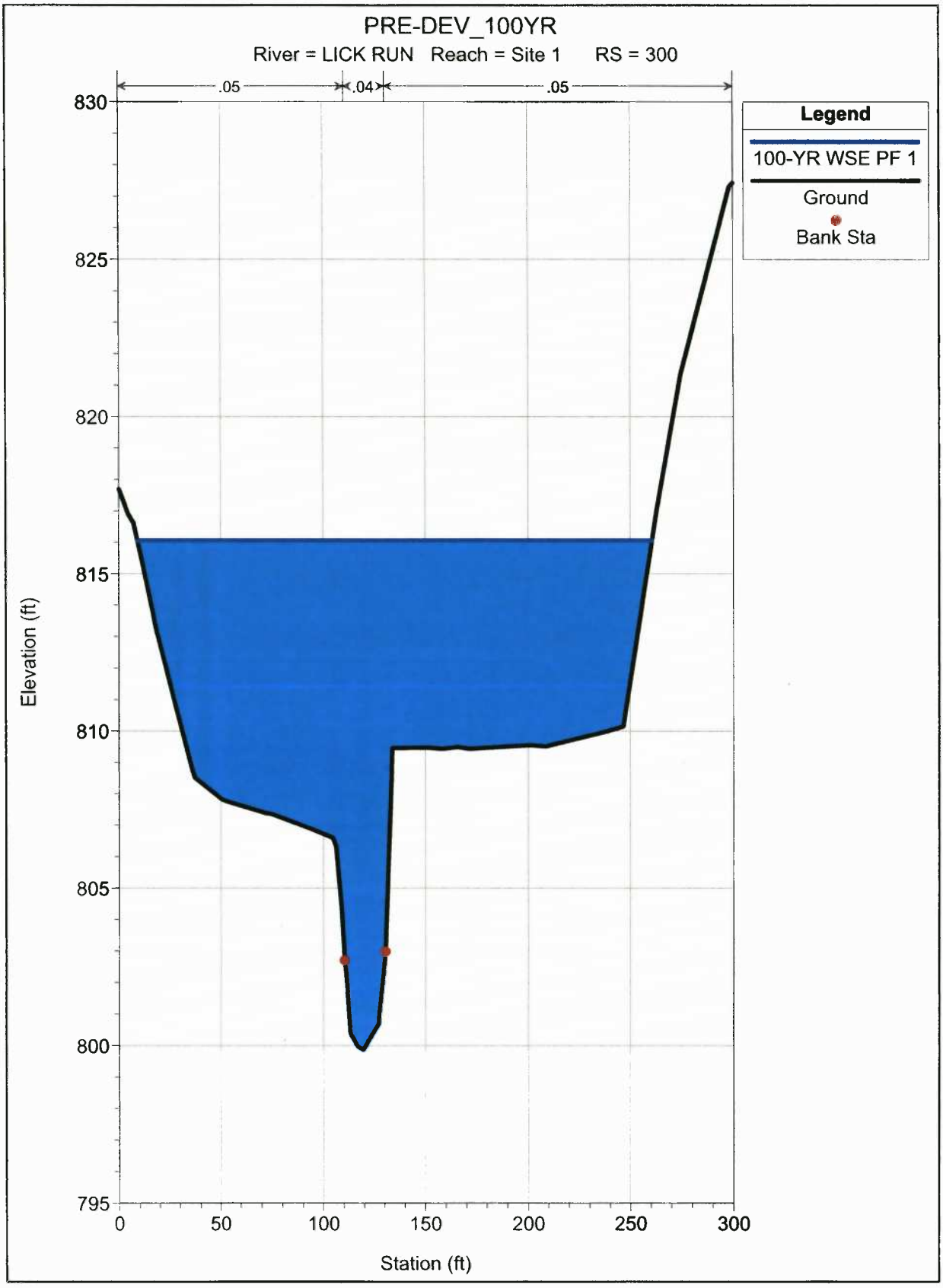

PRE-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 387 BR EXISTING BRIDGE
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
Station (ft)

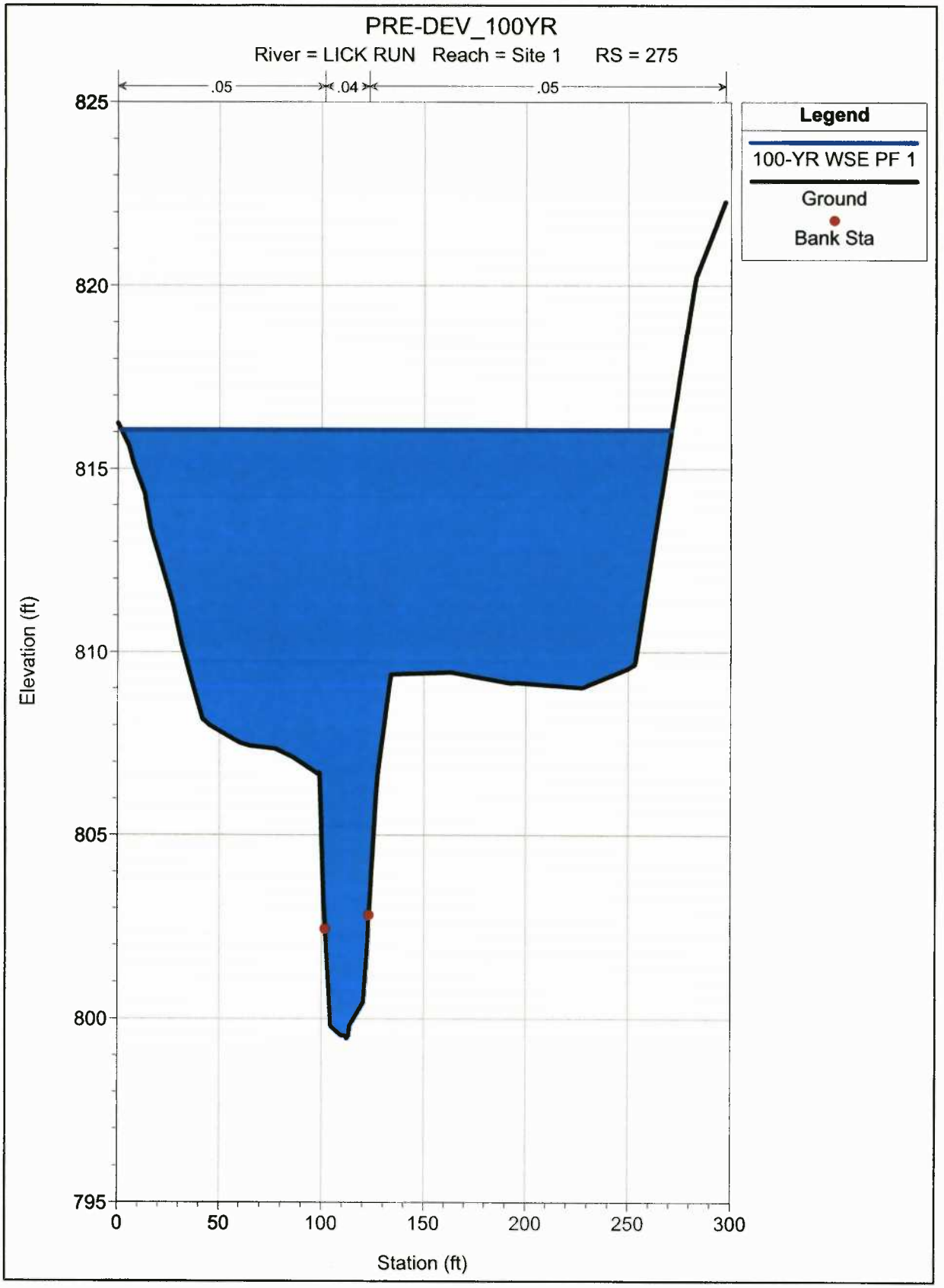

PRE-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 387 BR EXISTING BRIDGE
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
Station (ft)


PRE-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 375
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
830
825
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)


PRE-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 350
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
835
830
825
820
815
810
805
800
0
50
100
150
200
250
300
350
Station (ft)


PRE-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 325
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
835
830
825
820
815
810
805
800
0
50
100
150
200
250
300
350
Station (ft)


PRE-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 300
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
Station (ft)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.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
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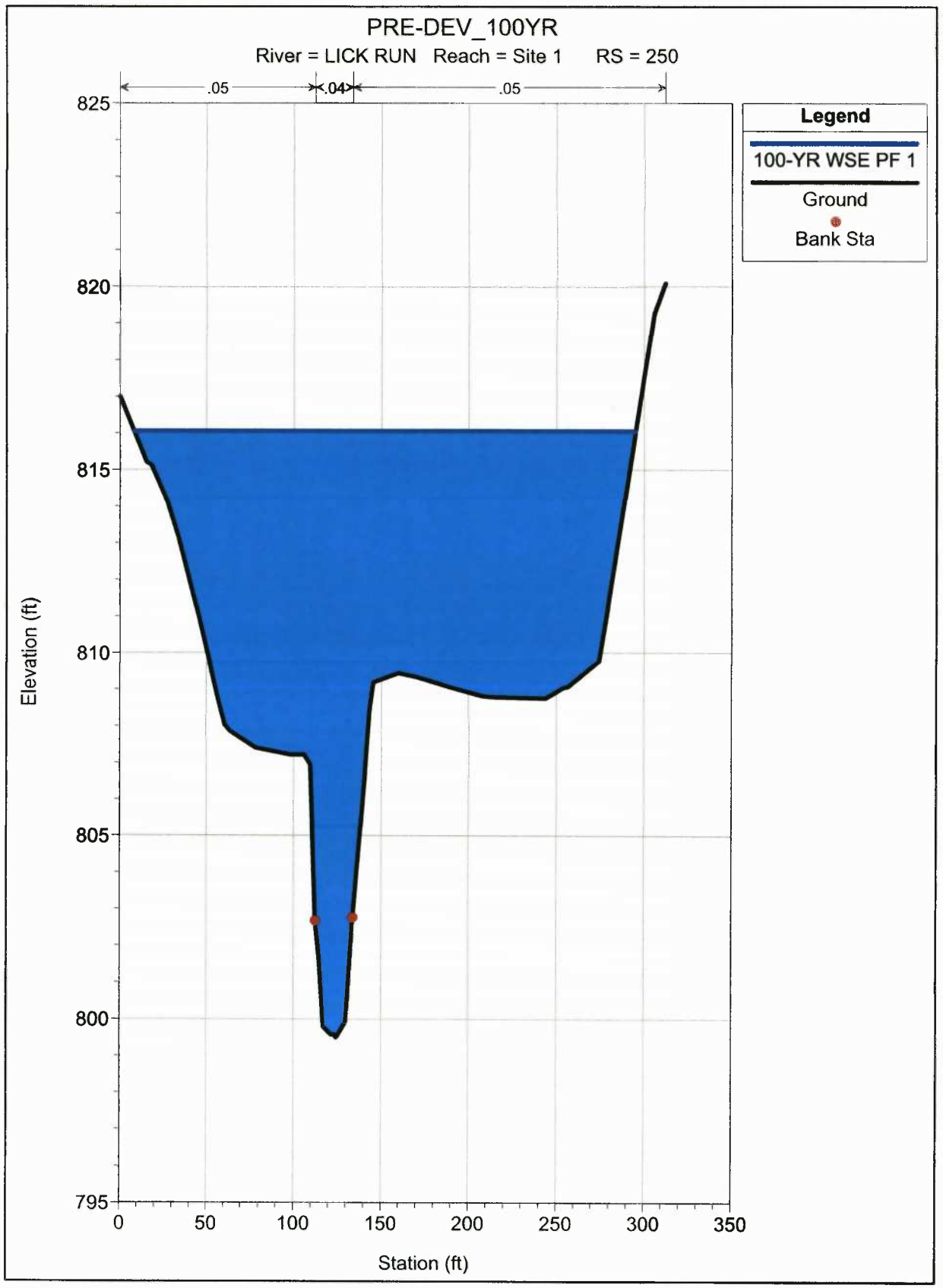
795
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)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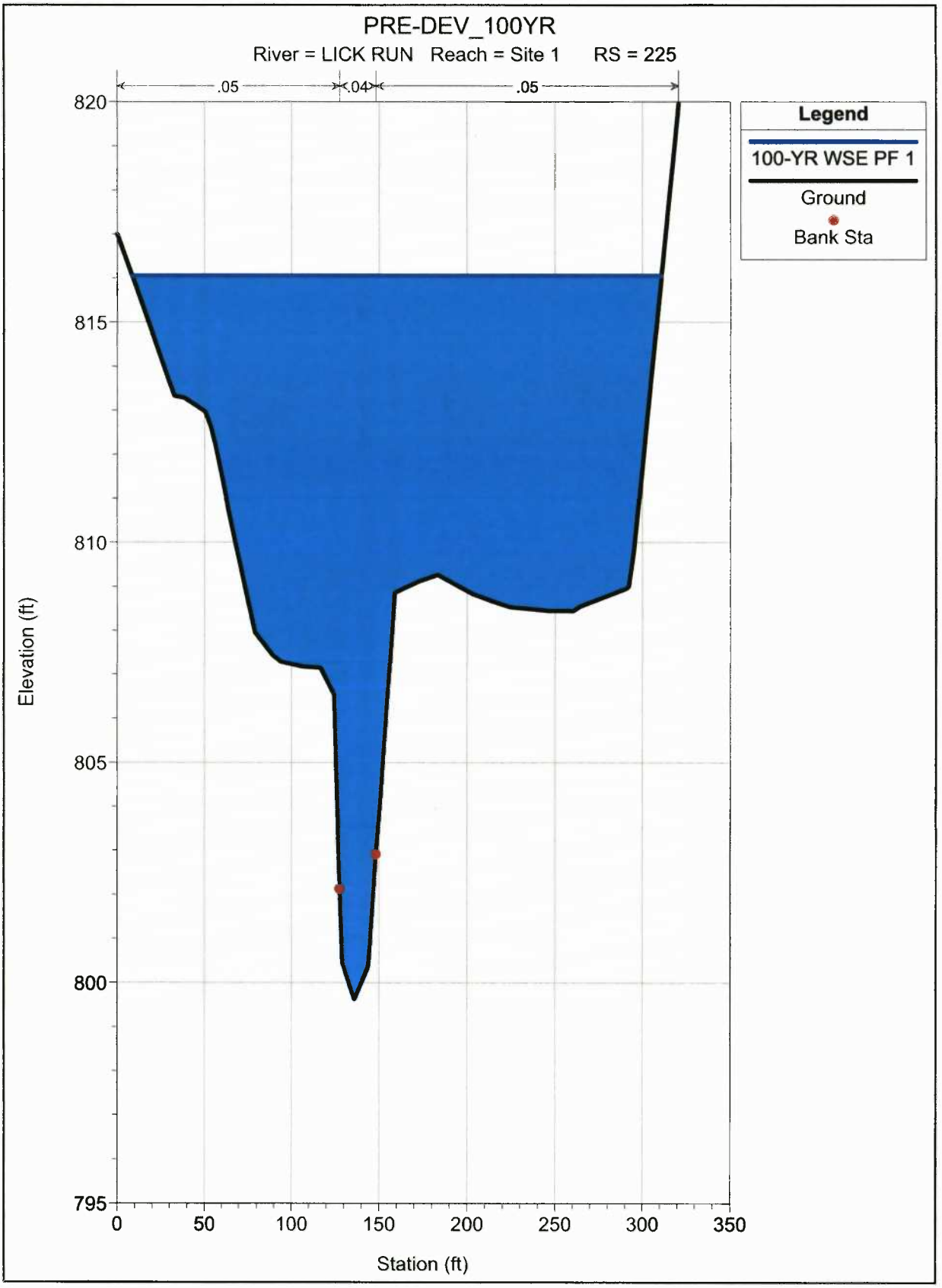
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
350
Station (ft)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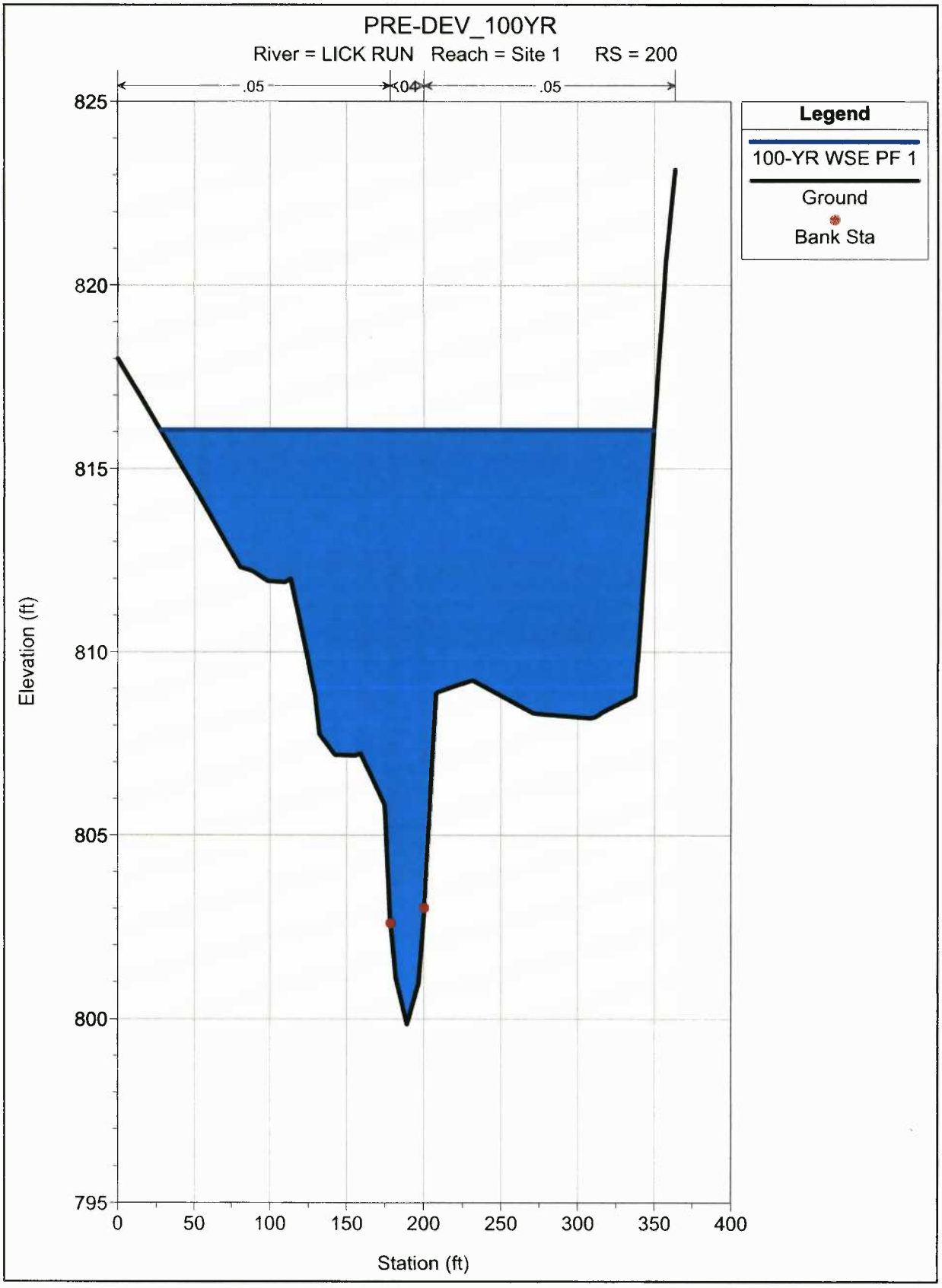
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
350
Station (ft)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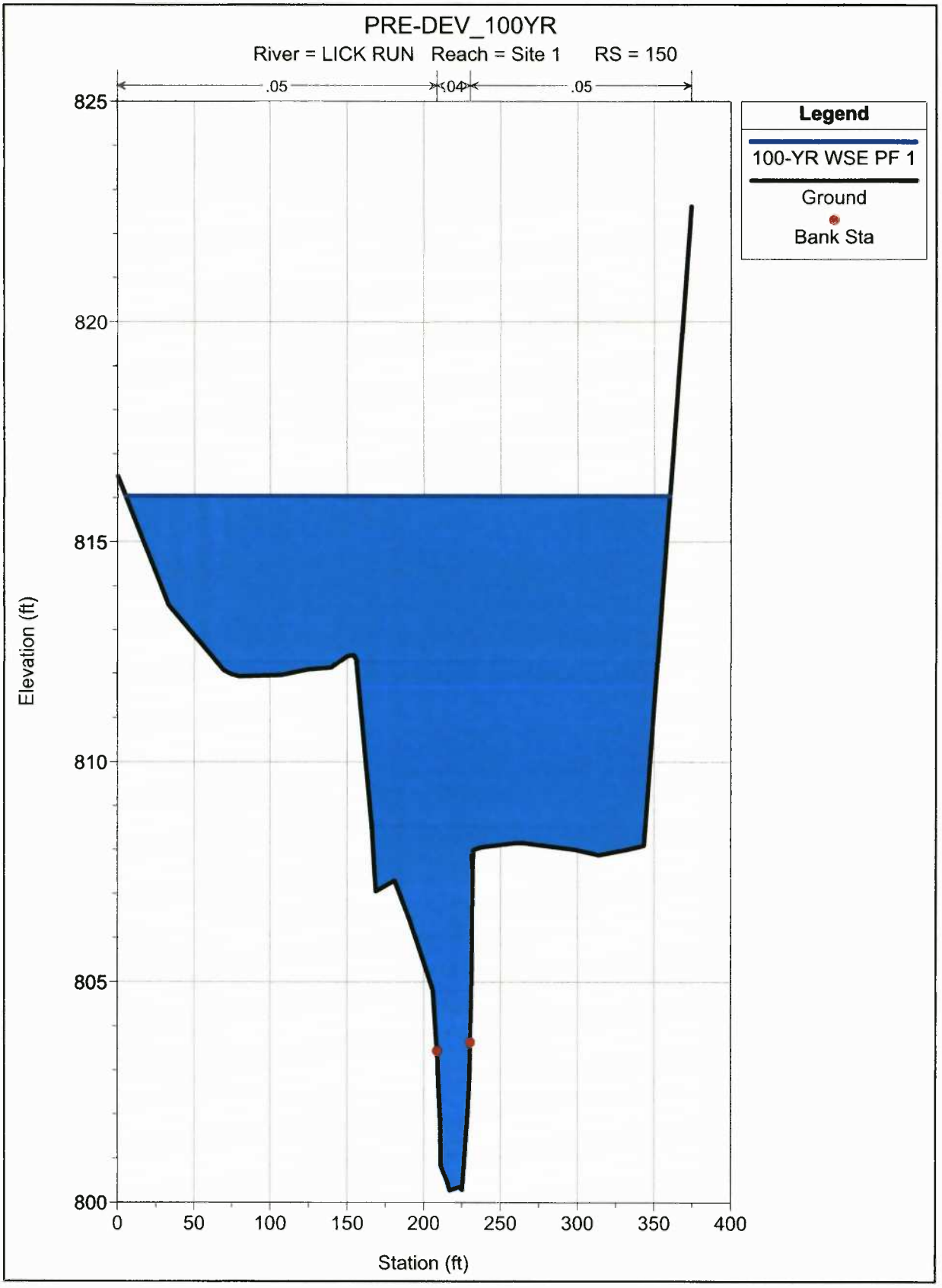
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
350
400
Station (ft)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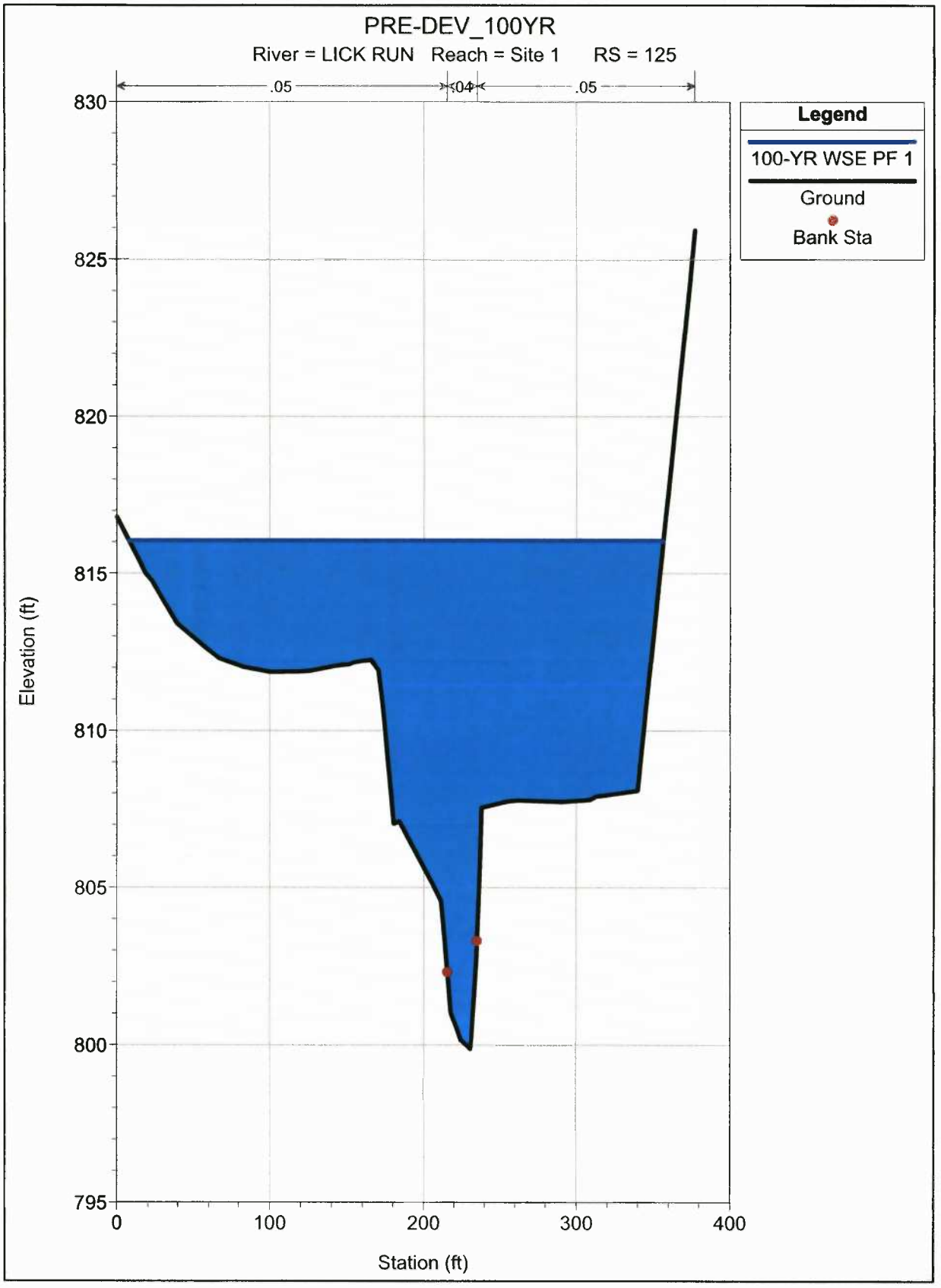
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
300
350
400
Station (ft)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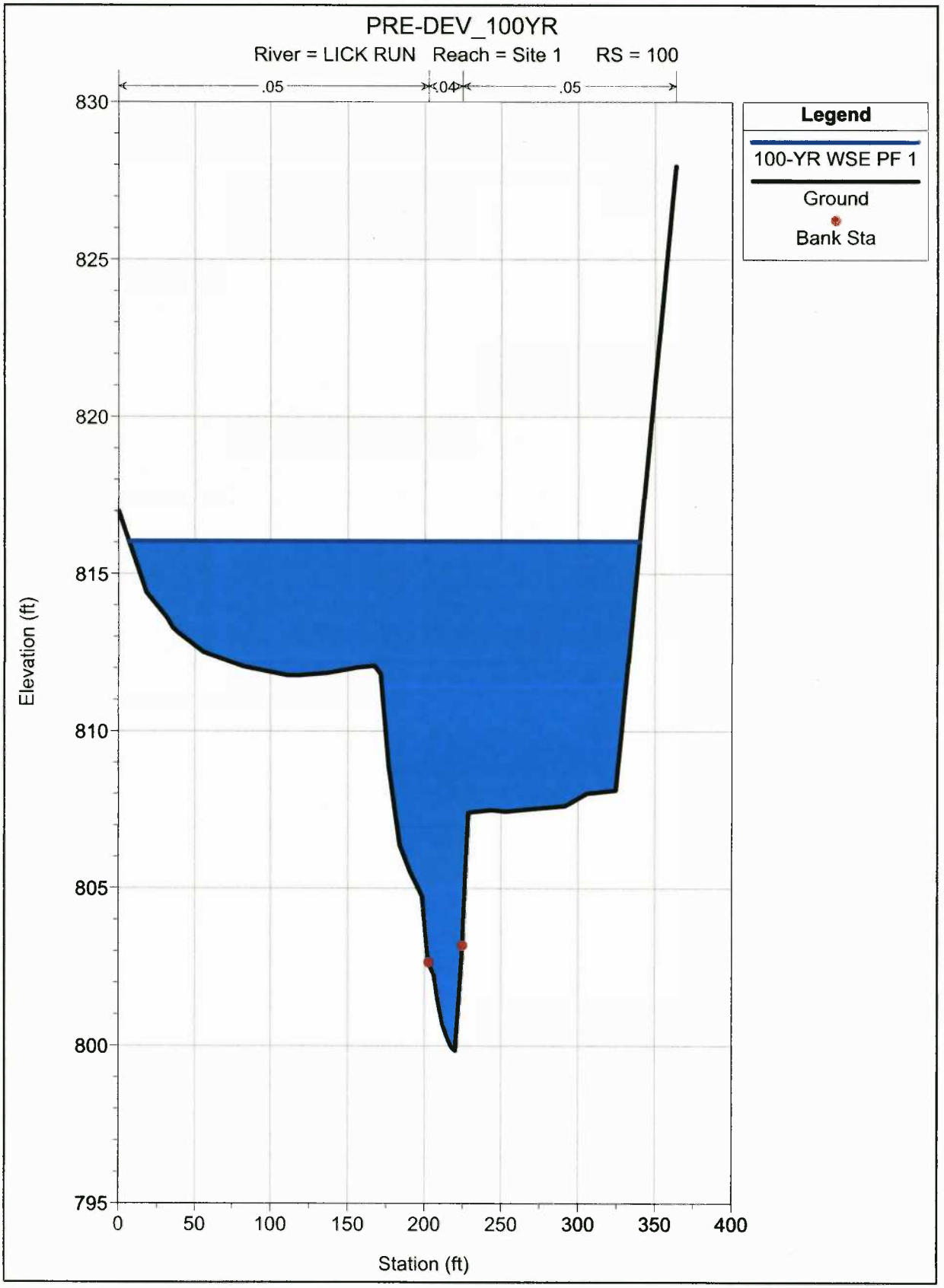
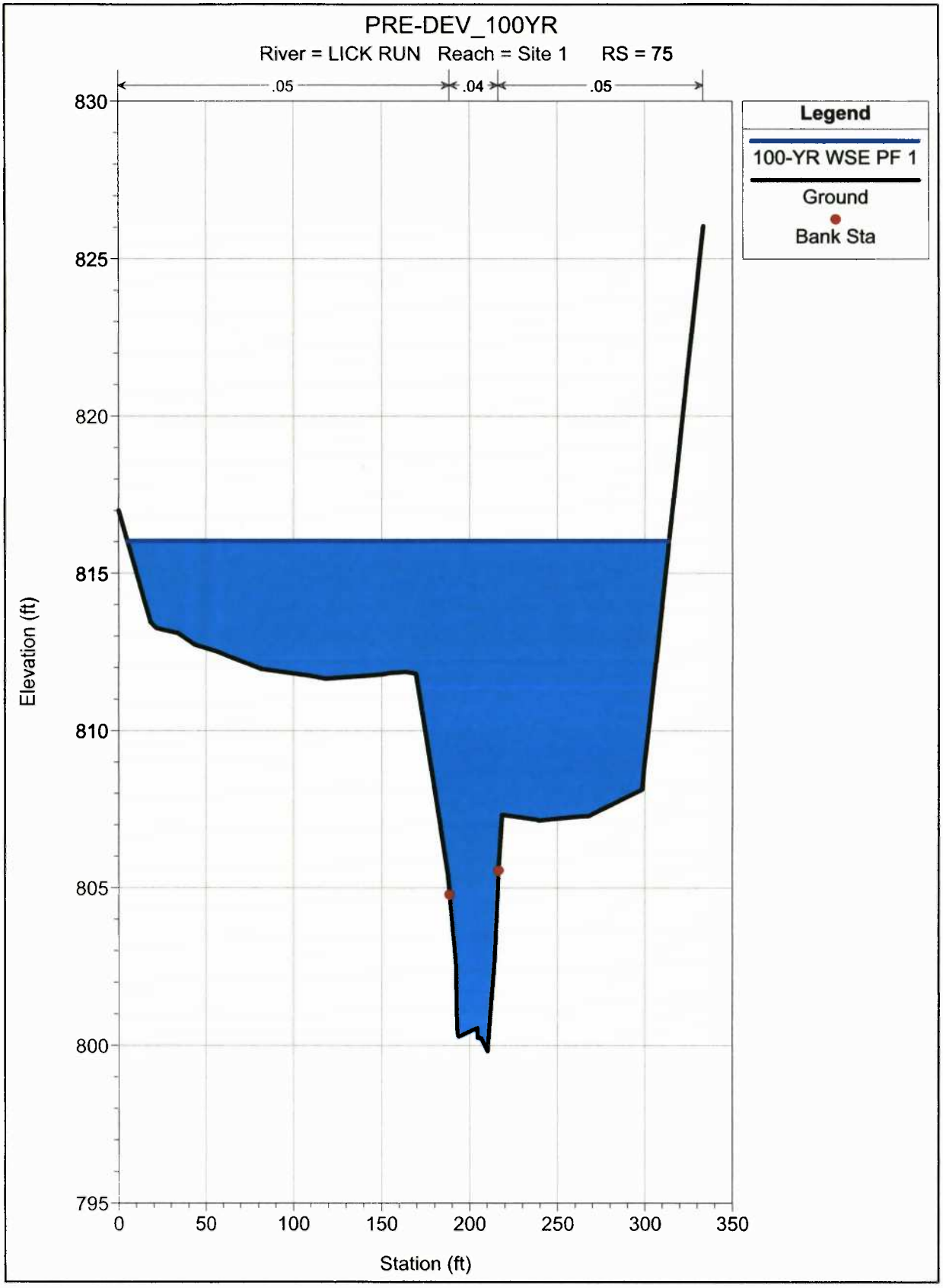
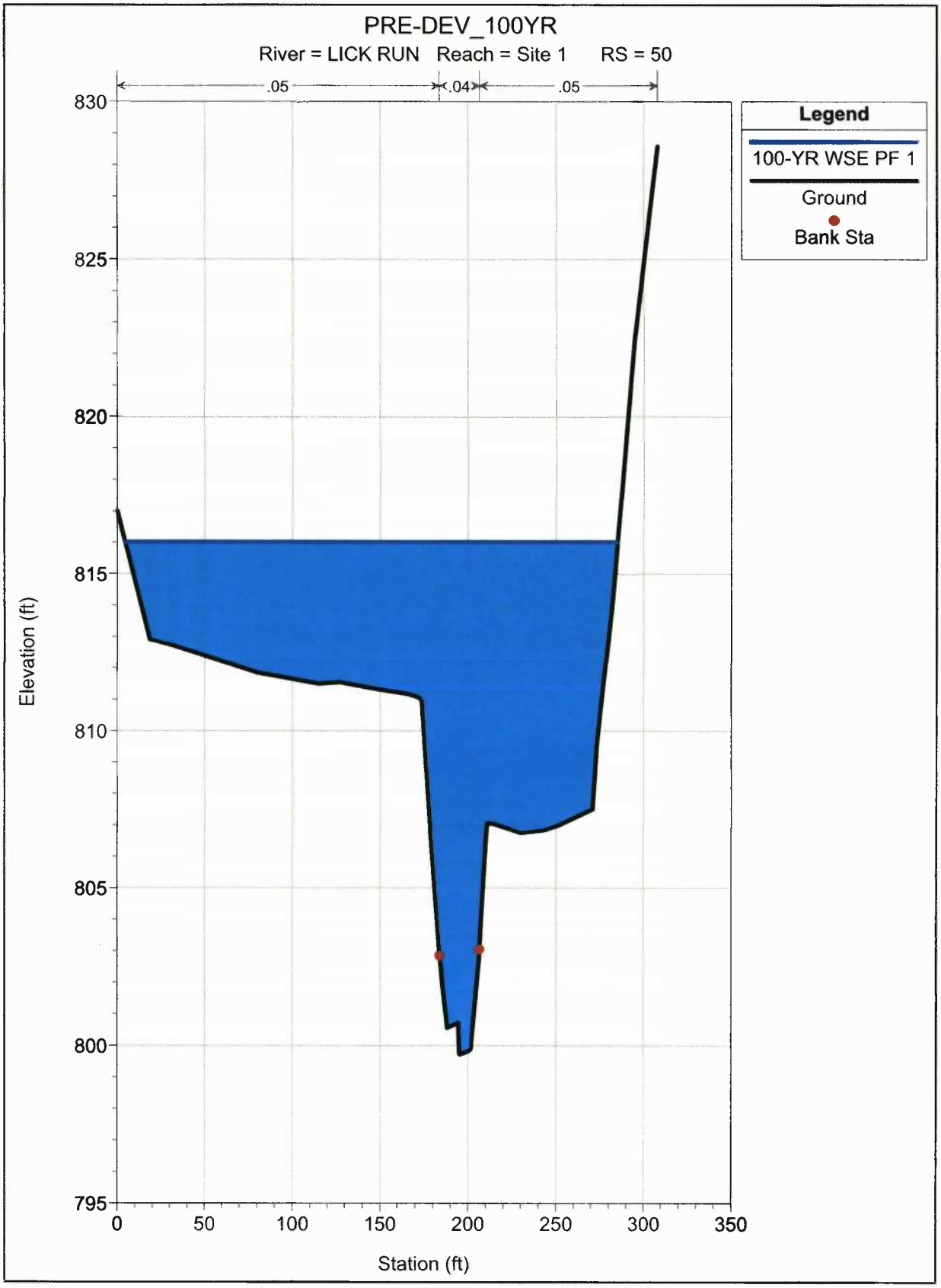
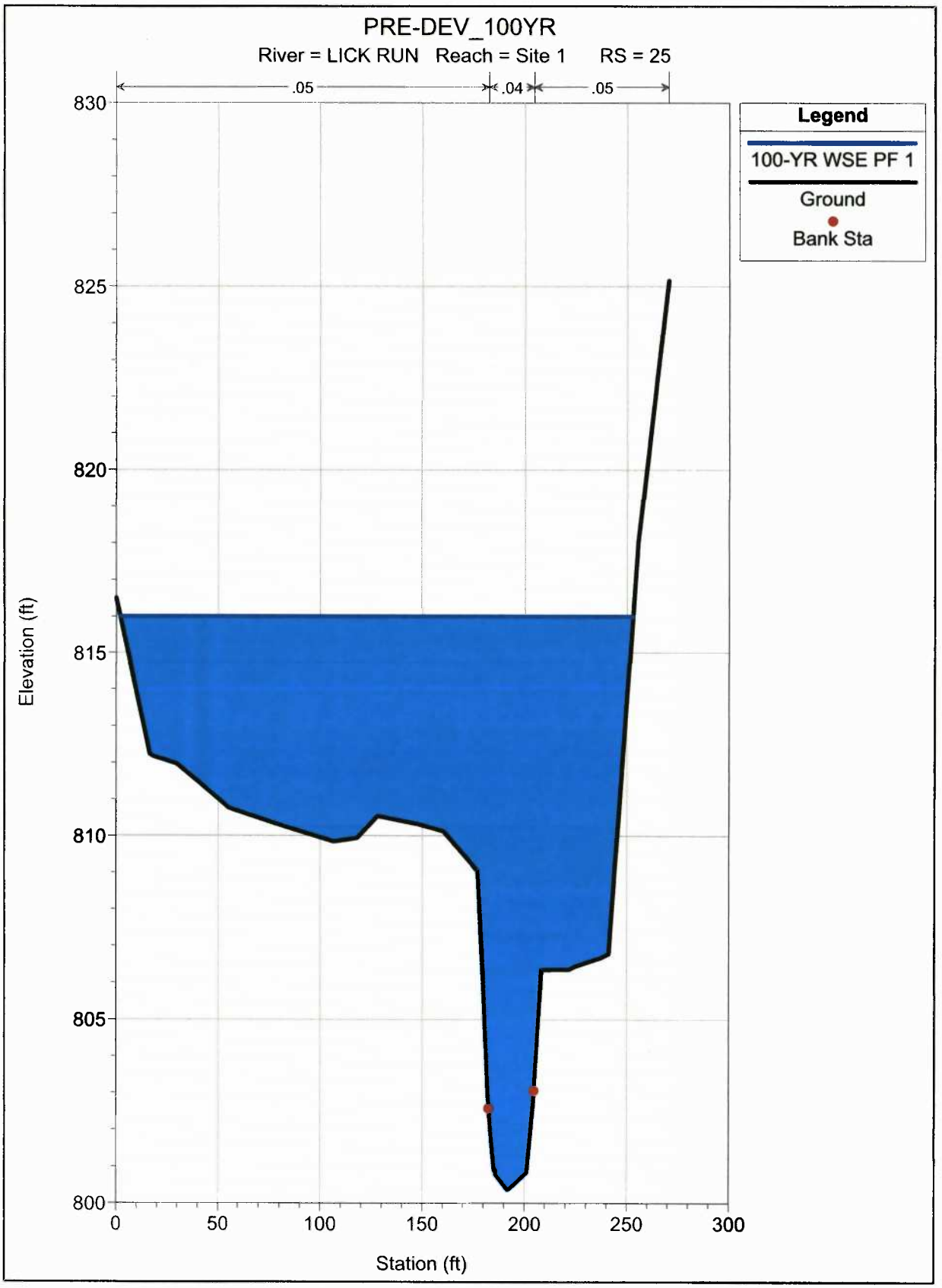
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
100
200
300
400
Station (ft)


PRE-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 100
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
350
400
Station (ft)


PRE-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 75
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
350
Station (ft)


PRE-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 50
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
350
Station (ft)


PRE-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 25
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
0
50
100
150
200
250
300
Station (ft)

CROSS SECTIONS OUTPUT – PRE DEVELOPMENT (10-YR)

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 500 Profile: PF 1

E.G. Elev (ft)	809.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	809.26	Reach Len. (ft)	22.11	25.00	27.53
Crit W.S. (ft)		Flow Area (sq ft)	20.38	149.82	132.02
E.G. Slope (ft/ft)	0.001872	Area (sq ft)	20.38	149.82	132.02
Q Total (cfs)	1203.00	Flow (cfs)	29.65	907.41	265.95
Top Width (ft)	99.73	Top Width (ft)	14.43	19.23	66.07
Vel Total (ft/s)	3.98	Avg. Vel. (ft/s)	1.45	6.06	2.01
Max Chl Dpth (ft)	8.24	Hydr. Depth (ft)	1.41	7.79	2.00
Conv. Total (cfs)	27806.9	Conv. (cfs)	685.3	20974.4	6147.3
Length Wtd. (ft)	25.39	Wetted Per. (ft)	16.94	20.48	67.31
Min Ch El (ft)	801.02	Shear (lb/sq ft)	0.14	0.85	0.23
Alpha	1.81	Stream Power (lb/ft s)	196.21	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.85	1.87	0.47
C & E Loss (ft)	0.04	Cum SA (acres)	0.55	0.24	0.48

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 475 Profile: PF 1

E.G. Elev (ft)	809.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	809.30	Reach Len. (ft)	22.46	25.00	26.68
Crit W.S. (ft)		Flow Area (sq ft)	43.76	181.06	119.22
E.G. Slope (ft/ft)	0.001336	Area (sq ft)	43.76	181.06	119.22
Q Total (cfs)	1203.00	Flow (cfs)	60.78	930.34	211.88
Top Width (ft)	107.96	Top Width (ft)	28.55	23.66	55.75
Vel Total (ft/s)	3.50	Avg. Vel. (ft/s)	1.39	5.14	1.78
Max Chl Dpth (ft)	7.99	Hydr. Depth (ft)	1.53	7.65	2.14
Conv. Total (cfs)	32916.5	Conv. (cfs)	1663.2	25455.9	5797.4
Length Wtd. (ft)	25.07	Wetted Per. (ft)	30.26	24.59	56.96
Min Ch El (ft)	801.31	Shear (lb/sq ft)	0.12	0.61	0.17
Alpha	1.72	Stream Power (lb/ft s)	225.34	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.83	1.78	0.39
C & E Loss (ft)	0.01	Cum SA (acres)	0.54	0.23	0.44

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 450 Profile: PF 1

E.G. Elev (ft)	809.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	809.30	Reach Len. (ft)	19.77	25.00	26.95
Crit W.S. (ft)		Flow Area (sq ft)	69.96	218.60	77.85
E.G. Slope (ft/ft)	0.001035	Area (sq ft)	69.96	218.60	77.85
Q Total (cfs)	1203.00	Flow (cfs)	85.39	1003.60	114.01
Top Width (ft)	114.97	Top Width (ft)	46.86	27.89	40.22
Vel Total (ft/s)	3.28	Avg. Vel. (ft/s)	1.22	4.59	1.46
Max Chl Dpth (ft)	7.99	Hydr. Depth (ft)	1.49	7.84	1.94
Conv. Total (cfs)	37393.6	Conv. (cfs)	2654.2	31195.5	3543.9
Length Wtd. (ft)	24.77	Wetted Per. (ft)	48.51	29.03	41.06
Min Ch El (ft)	801.31	Shear (lb/sq ft)	0.09	0.49	0.12
Alpha	1.66	Stream Power (lb/ft s)	238.42	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.80	1.66	0.33
C & E Loss (ft)	0.03	Cum SA (acres)	0.52	0.21	0.41

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 425 Profile: PF 1

E.G. Elev (ft)	809.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	809.36	Reach Len. (ft)	33.63	25.00	21.85
Crit W.S. (ft)		Flow Area (sq ft)	94.66	301.64	43.62
E.G. Slope (ft/ft)	0.000542	Area (sq ft)	94.66	301.64	43.62
Q Total (cfs)	1203.00	Flow (cfs)	84.77	1062.39	55.84
Top Width (ft)	113.50	Top Width (ft)	62.58	35.48	15.44
Vel Total (ft/s)	2.73	Avg. Vel. (ft/s)	0.90	3.52	1.28
Max Chl Dpth (ft)	9.19	Hydr. Depth (ft)	1.51	8.50	2.82
Conv. Total (cfs)	51650.8	Conv. (cfs)	3639.5	45613.7	2397.5
Length Wtd. (ft)	25.89	Wetted Per. (ft)	64.32	36.73	17.35
Min Ch El (ft)	800.17	Shear (lb/sq ft)	0.05	0.28	0.09
Alpha	1.48	Stream Power (lb/ft s)	255.19	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.77	1.51	0.29
C & E Loss (ft)	0.02	Cum SA (acres)	0.50	0.20	0.39

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 400 Profile: PF 1

E.G. Elev (ft)	809.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	809.11	Reach Len. (ft)	2.50	2.50	2.50
Crit W.S. (ft)	805.16	Flow Area (sq ft)	132.67	182.91	13.35
E.G. Slope (ft/ft)	0.001345	Area (sq ft)	132.67	182.91	13.35
Q Total (cfs)	1203.00	Flow (cfs)	191.17	990.83	21.00
Top Width (ft)	111.70	Top Width (ft)	86.12	21.19	4.39
Vel Total (ft/s)	3.66	Avg. Vel. (ft/s)	1.44	5.42	1.57
Max Chl Dpth (ft)	9.76	Hydr. Depth (ft)	1.54	8.63	3.04
Conv. Total (cfs)	32798.7	Conv. (cfs)	5212.1	27014.1	572.5
Length Wtd. (ft)	2.50	Wetted Per. (ft)	87.30	23.07	7.69
Min Ch El (ft)	799.35	Shear (lb/sq ft)	0.13	0.67	0.15
Alpha	1.83	Stream Power (lb/ft s)	264.95	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.68	1.37	0.28
C & E Loss (ft)	0.01	Cum SA (acres)	0.44	0.18	0.39

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 387 BR U Profile: PF 1

E.G. Elev (ft)	809.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	809.12	Reach Len. (ft)	9.00	9.00	9.00
Crit W.S. (ft)	805.15	Flow Area (sq ft)	124.22	165.27	12.91
E.G. Slope (ft/ft)	0.004952	Area (sq ft)	124.22	165.27	12.91
Q Total (cfs)	1203.00	Flow (cfs)	291.55	881.92	29.53
Top Width (ft)	99.31	Top Width (ft)	86.19	12.30	0.83
Vel Total (ft/s)	3.98	Avg. Vel. (ft/s)	2.35	5.34	2.29
Max Chl Dpth (ft)	9.77	Hydr. Depth (ft)	1.44	13.44	15.55
Conv. Total (cfs)	17095.1	Conv. (cfs)	4143.1	12532.5	419.6
Length Wtd. (ft)	9.00	Wetted Per. (ft)	104.78	56.67	11.30
Min Ch El (ft)	799.35	Shear (lb/sq ft)	0.37	0.90	0.35
Alpha	1.41	Stream Power (lb/ft s)	264.95	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.67	1.36	0.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.43	0.18	0.39

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 387 BR D Profile: PF 1

E.G. Elev (ft)	809.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	809.05	Reach Len. (ft)	13.50	13.50	13.50
Crit W.S. (ft)	805.88	Flow Area (sq ft)	134.16	135.81	16.40
E.G. Slope (ft/ft)	0.006680	Area (sq ft)	134.16	135.81	16.40
Q Total (cfs)	1203.00	Flow (cfs)	388.98	768.81	45.21
Top Width (ft)	105.12	Top Width (ft)	90.59	14.53	
Vel Total (ft/s)	4.20	Avg. Vel. (ft/s)	2.90	5.66	2.76
Max Chl Dpth (ft)	9.32	Hydr. Depth (ft)	1.48	9.35	
Conv. Total (cfs)	14718.8	Conv. (cfs)	4759.2	9406.4	553.2
Length Wtd. (ft)	13.50	Wetted Per. (ft)	103.66	53.34	13.57
Min Ch El (ft)	799.73	Shear (lb/sq ft)	0.54	1.06	0.50
Alpha	1.33	Stream Power (lb/ft s)	279.10	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.64	1.33	0.27
C & E Loss (ft)	0.01	Cum SA (acres)	0.41	0.18	0.39

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 375 Profile: PF 1

E.G. Elev (ft)	809.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.86	Reach Len. (ft)	24.98	25.00	25.22
Crit W.S. (ft)		Flow Area (sq ft)	127.64	150.25	18.15
E.G. Slope (ft/ft)	0.001970	Area (sq ft)	127.64	150.25	18.15
Q Total (cfs)	1203.00	Flow (cfs)	213.25	949.65	40.11
Top Width (ft)	112.33	Top Width (ft)	88.15	18.71	5.47
Vel Total (ft/s)	4.06	Avg. Vel. (ft/s)	1.67	6.32	2.21
Max Chl Dpth (ft)	9.13	Hydr. Depth (ft)	1.45	8.03	3.32
Conv. Total (cfs)	27106.5	Conv. (cfs)	4805.0	21397.8	903.7
Length Wtd. (ft)	25.00	Wetted Per. (ft)	89.54	20.02	8.37
Min Ch El (ft)	799.73	Shear (lb/sq ft)	0.18	0.92	0.27
Alpha	1.95	Stream Power (lb/ft s)	279.10	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.60	1.29	0.27
C & E Loss (ft)	0.01	Cum SA (acres)	0.39	0.17	0.39

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 350 Profile: PF 1

E.G. Elev (ft)	809.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.74	Reach Len. (ft)	25.24	25.00	25.33
Crit W.S. (ft)		Flow Area (sq ft)	130.03	139.47	11.63
E.G. Slope (ft/ft)	0.002353	Area (sq ft)	130.03	139.47	11.63
Q Total (cfs)	1203.00	Flow (cfs)	244.57	934.93	23.50
Top Width (ft)	107.91	Top Width (ft)	86.01	18.54	3.36
Vel Total (ft/s)	4.28	Avg. Vel. (ft/s)	1.88	6.70	2.02
Max Chl Dpth (ft)	8.56	Hydr. Depth (ft)	1.51	7.52	3.46
Conv. Total (cfs)	24799.0	Conv. (cfs)	5041.7	19273.0	484.4
Length Wtd. (ft)	25.05	Wetted Per. (ft)	87.26	19.44	7.01
Min Ch El (ft)	800.18	Shear (lb/sq ft)	0.22	1.05	0.24
Alpha	1.95	Stream Power (lb/ft s)	303.83	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.53	1.20	0.26
C & E Loss (ft)	0.01	Cum SA (acres)	0.34	0.16	0.38

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 325 Profile: PF 1

E.G. Elev (ft)	809.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.56	Reach Len. (ft)	25.36	25.00	24.66
Crit W.S. (ft)		Flow Area (sq ft)	121.13	128.95	6.60
E.G. Slope (ft/ft)	0.002921	Area (sq ft)	121.13	128.95	6.60
Q Total (cfs)	1203.00	Flow (cfs)	248.92	942.60	11.48
Top Width (ft)	102.30	Top Width (ft)	82.88	17.16	2.27
Vel Total (ft/s)	4.69	Avg. Vel. (ft/s)	2.06	7.31	1.74
Max Chl Dpth (ft)	8.41	Hydr. Depth (ft)	1.46	7.51	2.92
Conv. Total (cfs)	22258.5	Conv. (cfs)	4605.6	17440.4	212.5
Length Wtd. (ft)	25.06	Wetted Per. (ft)	83.70	18.56	5.86
Min Ch El (ft)	800.15	Shear (lb/sq ft)	0.26	1.27	0.21
Alpha	1.95	Stream Power (lb/ft s)	306.36	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.46	1.13	0.26
C & E Loss (ft)	0.03	Cum SA (acres)	0.29	0.15	0.38

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 300 Profile: PF 1

E.G. Elev (ft)	809.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.56	Reach Len. (ft)	27.04	25.00	24.95
Crit W.S. (ft)		Flow Area (sq ft)	95.74	158.90	8.23
E.G. Slope (ft/ft)	0.002163	Area (sq ft)	95.74	158.90	8.23
Q Total (cfs)	1203.00	Flow (cfs)	155.87	1033.57	13.56
Top Width (ft)	96.51	Top Width (ft)	73.46	20.09	2.97
Vel Total (ft/s)	4.58	Avg. Vel. (ft/s)	1.63	6.50	1.65
Max Chl Dpth (ft)	8.70	Hydr. Depth (ft)	1.30	7.91	2.78
Conv. Total (cfs)	25865.6	Conv. (cfs)	3351.3	22222.7	291.6
Length Wtd. (ft)	25.23	Wetted Per. (ft)	74.89	21.75	6.32
Min Ch El (ft)	799.86	Shear (lb/sq ft)	0.17	0.99	0.18
Alpha	1.75	Stream Power (lb/ft s)	299.85	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.39	1.04	0.25
C & E Loss (ft)	0.03	Cum SA (acres)	0.24	0.14	0.38

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 275 Profile: PF 1

E.G. Elev (ft)	809.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.58	Reach Len. (ft)	25.02	25.00	24.94
Crit W.S. (ft)		Flow Area (sq ft)	79.63	179.21	19.87
E.G. Slope (ft/ft)	0.001672	Area (sq ft)	79.63	179.21	19.87
Q Total (cfs)	1203.00	Flow (cfs)	111.41	1054.90	36.69
Top Width (ft)	92.23	Top Width (ft)	62.12	21.40	8.71
Vel Total (ft/s)	4.32	Avg. Vel. (ft/s)	1.40	5.89	1.85
Max Chl Dpth (ft)	9.12	Hydr. Depth (ft)	1.28	8.37	2.28
Conv. Total (cfs)	29418.3	Conv. (cfs)	2724.5	25796.7	897.2
Length Wtd. (ft)	25.00	Wetted Per. (ft)	64.45	23.49	10.61
Min Ch El (ft)	799.46	Shear (lb/sq ft)	0.13	0.80	0.20
Alpha	1.65	Stream Power (lb/ft s)	297.30	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.34	0.95	0.24
C & E Loss (ft)	0.00	Cum SA (acres)	0.20	0.13	0.38

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 250 Profile: PF 1

E.G. Elev (ft)	809.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.52	Reach Len. (ft)	25.27	25.00	25.28
Crit W.S. (ft)		Flow Area (sq ft)	65.89	174.75	28.80
E.G. Slope (ft/ft)	0.001757	Area (sq ft)	65.89	174.75	28.80
Q Total (cfs)	1203.00	Flow (cfs)	90.50	1045.92	66.58
Top Width (ft)	85.79	Top Width (ft)	54.60	21.38	9.82
Vel Total (ft/s)	4.46	Avg. Vel. (ft/s)	1.37	5.99	2.31
Max Chl Dpth (ft)	9.03	Hydr. Depth (ft)	1.21	8.17	2.93
Conv. Total (cfs)	28699.8	Conv. (cfs)	2159.0	24952.5	1588.3
Length Wtd. (ft)	25.04	Wetted Per. (ft)	56.92	23.19	11.40
Min Ch El (ft)	799.49	Shear (lb/sq ft)	0.13	0.83	0.28
Alpha	1.58	Stream Power (lb/ft s)	296.90	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.30	0.85	0.23
C & E Loss (ft)	0.00	Cum SA (acres)	0.17	0.11	0.37

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 225 Profile: PF 1

E.G. Elev (ft)	808.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.44	Reach Len. (ft)	25.12	25.00	25.08
Crit W.S. (ft)		Flow Area (sq ft)	66.73	165.43	28.04
E.G. Slope (ft/ft)	0.001948	Area (sq ft)	66.73	165.43	28.04
Q Total (cfs)	1203.00	Flow (cfs)	101.24	1034.18	67.58
Top Width (ft)	81.76	Top Width (ft)	51.23	20.73	9.80
Vel Total (ft/s)	4.62	Avg. Vel. (ft/s)	1.52	6.25	2.41
Max Chl Dpth (ft)	8.82	Hydr. Depth (ft)	1.30	7.98	2.86
Conv. Total (cfs)	27257.8	Conv. (cfs)	2294.0	23432.7	1531.2
Length Wtd. (ft)	25.02	Wetted Per. (ft)	53.63	22.22	11.26
Min Ch El (ft)	799.62	Shear (lb/sq ft)	0.15	0.91	0.30
Alpha	1.60	Stream Power (lb/ft s)	287.82	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.26	0.75	0.21
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	0.10	0.37

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 200 Profile: PF 1

E.G. Elev (ft)	808.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.38	Reach Len. (ft)	48.77	50.00	51.03
Crit W.S. (ft)		Flow Area (sq ft)	74.71	162.72	24.76
E.G. Slope (ft/ft)	0.002097	Area (sq ft)	74.71	162.72	24.76
Q Total (cfs)	1203.00	Flow (cfs)	134.01	1024.25	44.74
Top Width (ft)	125.62	Top Width (ft)	47.96	21.81	55.85
Vel Total (ft/s)	4.59	Avg. Vel. (ft/s)	1.79	6.29	1.81
Max Chl Dpth (ft)	8.53	Hydr. Depth (ft)	1.56	7.46	0.44
Conv. Total (cfs)	26273.3	Conv. (cfs)	2926.7	22369.4	977.2
Length Wtd. (ft)	49.87	Wetted Per. (ft)	49.36	22.86	57.65
Min Ch El (ft)	799.85	Shear (lb/sq ft)	0.20	0.93	0.06
Alpha	1.63	Stream Power (lb/ft s)	283.23	0.00	0.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.22	0.65	0.20
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	0.09	0.35

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 150 Profile: PF 1

E.G. Elev (ft)	808.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.27	Reach Len. (ft)	24.75	25.00	25.36
Crit W.S. (ft)		Flow Area (sq ft)	80.68	158.92	30.28
E.G. Slope (ft/ft)	0.002350	Area (sq ft)	80.68	158.92	30.28
Q Total (cfs)	1203.00	Flow (cfs)	176.52	1008.70	17.78
Top Width (ft)	177.35	Top Width (ft)	42.35	21.61	113.39
Vel Total (ft/s)	4.46	Avg. Vel. (ft/s)	2.19	6.35	0.59
Max Chl Dpth (ft)	8.00	Hydr. Depth (ft)	1.90	7.35	0.27
Conv. Total (cfs)	24814.1	Conv. (cfs)	3641.1	20806.2	366.8
Length Wtd. (ft)	24.97	Wetted Per. (ft)	43.11	24.02	116.38
Min Ch El (ft)	800.27	Shear (lb/sq ft)	0.27	0.97	0.04
Alpha	1.74	Stream Power (lb/ft s)	343.56	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.13	0.47	0.17
C & E Loss (ft)	0.01	Cum SA (acres)	0.06	0.07	0.25

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 125 Profile: PF 1

E.G. Elev (ft)	808.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.24	Reach Len. (ft)	25.28	25.00	25.21
Crit W.S. (ft)		Flow Area (sq ft)	90.57	148.56	53.38
E.G. Slope (ft/ft)	0.002158	Area (sq ft)	90.57	148.56	53.38
Q Total (cfs)	1203.00	Flow (cfs)	221.75	935.02	46.23
Top Width (ft)	162.12	Top Width (ft)	37.35	19.73	105.04
Vel Total (ft/s)	4.11	Avg. Vel. (ft/s)	2.45	6.29	0.87
Max Chl Dpth (ft)	8.37	Hydr. Depth (ft)	2.42	7.53	0.51
Conv. Total (cfs)	25894.3	Conv. (cfs)	4773.2	20126.0	995.1
Length Wtd. (ft)	25.05	Wetted Per. (ft)	38.35	21.33	107.43
Min Ch El (ft)	799.87	Shear (lb/sq ft)	0.32	0.94	0.07
Alpha	1.89	Stream Power (lb/ft s)	358.81	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.08	0.38	0.14
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	0.05	0.18

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 100 Profile: PF 1

E.G. Elev (ft)	808.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.17	Reach Len. (ft)	24.40	25.00	25.60
Crit W.S. (ft)		Flow Area (sq ft)	63.02	156.19	59.60
E.G. Slope (ft/ft)	0.002277	Area (sq ft)	63.02	156.19	59.60
Q Total (cfs)	1203.00	Flow (cfs)	165.70	978.12	59.18
Top Width (ft)	145.92	Top Width (ft)	24.05	22.12	99.76
Vel Total (ft/s)	4.31	Avg. Vel. (ft/s)	2.63	6.26	0.99
Max Chl Dpth (ft)	8.33	Hydr. Depth (ft)	2.62	7.06	0.60
Conv. Total (cfs)	25212.1	Conv. (cfs)	3472.6	20499.1	1240.3
Length Wtd. (ft)	24.99	Wetted Per. (ft)	24.96	23.52	101.71
Min Ch El (ft)	799.84	Shear (lb/sq ft)	0.36	0.94	0.08
Alpha	1.77	Stream Power (lb/ft s)	345.72	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.04	0.29	0.11
C & E Loss (ft)	0.01	Cum SA (acres)	0.02	0.04	0.12

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 75 Profile: PF 1

E.G. Elev (ft)	808.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.14	Reach Len. (ft)	24.78	25.00	25.07
Crit W.S. (ft)		Flow Area (sq ft)	13.14	193.39	60.93
E.G. Slope (ft/ft)	0.002230	Area (sq ft)	13.14	193.39	60.93
Q Total (cfs)	1203.00	Flow (cfs)	23.29	1109.86	69.85
Top Width (ft)	118.41	Top Width (ft)	8.59	28.09	81.73
Vel Total (ft/s)	4.50	Avg. Vel. (ft/s)	1.77	5.74	1.15
Max Chl Dpth (ft)	8.32	Hydr. Depth (ft)	1.53	6.88	0.75
Conv. Total (cfs)	25476.2	Conv. (cfs)	493.3	23503.8	1479.1
Length Wtd. (ft)	25.00	Wetted Per. (ft)	9.26	32.68	82.52
Min Ch El (ft)	799.82	Shear (lb/sq ft)	0.20	0.82	0.10
Alpha	1.51	Stream Power (lb/ft s)	315.25	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.02	0.19	0.07
C & E Loss (ft)	0.01	Cum SA (acres)	0.01	0.03	0.07

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 50 Profile: PF 1

E.G. Elev (ft)	808.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	807.99	Reach Len. (ft)	24.84	25.00	24.40
Crit W.S. (ft)		Flow Area (sq ft)	17.50	165.04	71.42
E.G. Slope (ft/ft)	0.002376	Area (sq ft)	17.50	165.04	71.42
Q Total (cfs)	1203.00	Flow (cfs)	41.08	1053.48	108.44
Top Width (ft)	94.30	Top Width (ft)	6.75	22.80	64.74
Vel Total (ft/s)	4.74	Avg. Vel. (ft/s)	2.35	6.38	1.52
Max Chl Dpth (ft)	8.28	Hydr. Depth (ft)	2.59	7.24	1.10
Conv. Total (cfs)	24679.1	Conv. (cfs)	842.8	21611.7	2224.6
Length Wtd. (ft)	24.94	Wetted Per. (ft)	8.49	24.94	66.56
Min Ch El (ft)	799.71	Shear (lb/sq ft)	0.31	0.98	0.16
Alpha	1.61	Stream Power (lb/ft s)	289.54	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.01	0.09	0.04
C & E Loss (ft)	0.01	Cum SA (acres)	0.00	0.01	0.03

Plan: PRE-DEV 10YR LICK RUN Site 1 RS: 25 Profile: PF 1

E.G. Elev (ft)	808.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.69	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	807.77	Reach Len. (ft)			
Crit W.S. (ft)	805.45	Flow Area (sq ft)	11.83	151.17	53.73
E.G. Slope (ft/ft)	0.003002	Area (sq ft)	11.83	151.17	53.73
Q Total (cfs)	1203.00	Flow (cfs)	27.62	1067.63	107.75
Top Width (ft)	64.28	Top Width (ft)	4.51	22.09	37.68
Vel Total (ft/s)	5.55	Avg. Vel. (ft/s)	2.33	7.06	2.01
Max Chl Dpth (ft)	7.41	Hydr. Depth (ft)	2.63	6.84	1.43
Conv. Total (cfs)	21957.5	Conv. (cfs)	504.2	19486.8	1966.6
Length Wtd. (ft)		Wetted Per. (ft)	6.89	23.39	39.30
Min Ch El (ft)	800.36	Shear (lb/sq ft)	0.32	1.21	0.26
Alpha	1.45	Stream Power (lb/ft s)	253.93	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTIONS OUTPUT – PRE DEVELOPMENT (100-YR)

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 500 Profile: PF 1

E.G. Elev (ft)	816.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.07	Reach Len. (ft)	22.11	25.00	27.53
Crit W.S. (ft)		Flow Area (sq ft)	220.29	280.80	808.99
E.G. Slope (ft/ft)	0.000235	Area (sq ft)	220.29	280.80	808.99
Q Total (cfs)	2557.00	Flow (cfs)	306.03	915.26	1335.71
Top Width (ft)	169.98	Top Width (ft)	35.71	19.23	115.04
Vel Total (ft/s)	1.95	Avg. Vel. (ft/s)	1.39	3.26	1.65
Max Chl Dpth (ft)	15.05	Hydr. Depth (ft)	6.17	14.60	7.03
Conv. Total (cfs)	166950.4	Conv. (cfs)	19981.2	59758.6	87210.6
Length Wtd. (ft)	25.76	Wetted Per. (ft)	41.31	20.48	117.10
Min Ch El (ft)	801.02	Shear (lb/sq ft)	0.08	0.20	0.10
Alpha	1.43	Stream Power (lb/ft s)	196.21	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	8.03	3.68	8.58
C & E Loss (ft)	0.00	Cum SA (acres)	1.32	0.24	1.28

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 475 Profile: PF 1

E.G. Elev (ft)	816.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.07	Reach Len. (ft)	22.46	25.00	26.68
Crit W.S. (ft)		Flow Area (sq ft)	338.66	341.28	746.15
E.G. Slope (ft/ft)	0.000191	Area (sq ft)	338.66	341.28	746.15
Q Total (cfs)	2557.00	Flow (cfs)	466.51	1010.58	1079.91
Top Width (ft)	184.81	Top Width (ft)	50.48	23.66	110.67
Vel Total (ft/s)	1.79	Avg. Vel. (ft/s)	1.38	2.96	1.45
Max Chl Dpth (ft)	14.76	Hydr. Depth (ft)	6.71	14.42	6.74
Conv. Total (cfs)	185258.4	Conv. (cfs)	33799.5	73217.7	78241.2
Length Wtd. (ft)	25.05	Wetted Per. (ft)	55.03	24.59	112.58
Min Ch El (ft)	801.31	Shear (lb/sq ft)	0.07	0.17	0.08
Alpha	1.46	Stream Power (lb/ft s)	225.34	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	7.88	3.50	8.09
C & E Loss (ft)	0.00	Cum SA (acres)	1.30	0.23	1.21

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 450 Profile: PF 1

E.G. Elev (ft)	816.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.07	Reach Len. (ft)	19.77	25.00	26.95
Crit W.S. (ft)		Flow Area (sq ft)	485.46	407.33	609.87
E.G. Slope (ft/ft)	0.000165	Area (sq ft)	485.46	407.33	609.87
Q Total (cfs)	2557.00	Flow (cfs)	651.30	1132.13	773.57
Top Width (ft)	197.28	Top Width (ft)	69.86	27.89	99.53
Vel Total (ft/s)	1.70	Avg. Vel. (ft/s)	1.34	2.78	1.27
Max Chl Dpth (ft)	14.76	Hydr. Depth (ft)	6.95	14.60	6.13
Conv. Total (cfs)	198795.0	Conv. (cfs)	50635.8	88017.8	60141.5
Length Wtd. (ft)	24.06	Wetted Per. (ft)	73.83	29.03	100.89
Min Ch El (ft)	801.31	Shear (lb/sq ft)	0.07	0.14	0.06
Alpha	1.51	Stream Power (lb/ft s)	238.42	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	7.67	3.28	7.67
C & E Loss (ft)	0.00	Cum SA (acres)	1.27	0.22	1.15

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 425 Profile: PF 1

E.G. Elev (ft)	816.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.07	Reach Len. (ft)	33.63	25.00	21.85
Crit W.S. (ft)		Flow Area (sq ft)	607.03	539.79	472.85
E.G. Slope (ft/ft)	0.000128	Area (sq ft)	607.03	539.79	472.85
Q Total (cfs)	2557.00	Flow (cfs)	733.19	1359.75	464.07
Top Width (ft)	212.83	Top Width (ft)	85.23	35.48	92.12
Vel Total (ft/s)	1.58	Avg. Vel. (ft/s)	1.21	2.52	0.98
Max Chl Dpth (ft)	15.90	Hydr. Depth (ft)	7.12	15.21	5.13
Conv. Total (cfs)	226258.5	Conv. (cfs)	64876.7	120318.4	41063.3
Length Wtd. (ft)	27.82	Wetted Per. (ft)	89.01	36.73	94.66
Min Ch El (ft)	800.17	Shear (lb/sq ft)	0.05	0.12	0.04
Alpha	1.59	Stream Power (lb/ft s)	255.19	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	7.42	3.01	7.34
C & E Loss (ft)	0.00	Cum SA (acres)	1.23	0.20	1.09

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 400 Profile: PF 1

E.G. Elev (ft)	816.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.06	Reach Len. (ft)	2.50	2.50	2.50
Crit W.S. (ft)	809.19	Flow Area (sq ft)	827.61	330.21	353.29
E.G. Slope (ft/ft)	0.000180	Area (sq ft)	827.61	330.21	353.29
Q Total (cfs)	2557.00	Flow (cfs)	1234.99	970.12	351.90
Top Width (ft)	218.24	Top Width (ft)	111.82	21.19	85.23
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)	1.49	2.94	1.00
Max Chl Dpth (ft)	16.71	Hydr. Depth (ft)	7.40	15.58	4.15
Conv. Total (cfs)	190581.7	Conv. (cfs)	92047.7	72306.0	26228.1
Length Wtd. (ft)	2.50	Wetted Per. (ft)	114.31	23.07	89.48
Min Ch El (ft)	799.35	Shear (lb/sq ft)	0.08	0.16	0.04
Alpha	1.57	Stream Power (lb/ft s)	264.95	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	6.87	2.76	7.13
C & E Loss (ft)	0.01	Cum SA (acres)	1.15	0.18	1.04

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 387 BR U Profile: PF 1

E.G. Elev (ft)	816.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.07	Reach Len. (ft)	9.00	9.00	9.00
Crit W.S. (ft)	809.46	Flow Area (sq ft)	819.10	309.30	349.59
E.G. Slope (ft/ft)	0.000324	Area (sq ft)	819.10	309.30	349.59
Q Total (cfs)	2557.00	Flow (cfs)	1532.25	581.97	442.78
Top Width (ft)	218.29	Top Width (ft)	111.82	21.19	85.28
Vel Total (ft/s)	1.73	Avg. Vel. (ft/s)	1.87	1.88	1.27
Max Chl Dpth (ft)	16.72	Hydr. Depth (ft)	7.33	14.59	4.10
Conv. Total (cfs)	141954.2	Conv. (cfs)	85064.2	32308.4	24581.6
Length Wtd. (ft)	9.00	Wetted Per. (ft)	131.73	65.60	97.94
Min Ch El (ft)	799.35	Shear (lb/sq ft)	0.13	0.10	0.07
Alpha	1.06	Stream Power (lb/ft s)	264.95	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	6.82	2.74	7.11
C & E Loss (ft)	0.00	Cum SA (acres)	1.15	0.18	1.04

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 387 BR D Profile: PF 1

E.G. Elev (ft)	816.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.07	Reach Len. (ft)	13.50	13.50	13.50
Crit W.S. (ft)	809.39	Flow Area (sq ft)	864.90	266.48	395.14
E.G. Slope (ft/ft)	0.000289	Area (sq ft)	864.90	266.48	395.14
Q Total (cfs)	2557.00	Flow (cfs)	1576.78	467.83	512.38
Top Width (ft)	219.82	Top Width (ft)	117.17	18.71	83.93
Vel Total (ft/s)	1.68	Avg. Vel. (ft/s)	1.82	1.76	1.30
Max Chl Dpth (ft)	16.34	Hydr. Depth (ft)	7.38	14.24	4.71
Conv. Total (cfs)	150339.3	Conv. (cfs)	92707.3	27506.4	30125.7
Length Wtd. (ft)	13.50	Wetted Per. (ft)	131.17	57.53	98.25
Min Ch El (ft)	799.73	Shear (lb/sq ft)	0.12	0.08	0.07
Alpha	1.05	Stream Power (lb/ft s)	279.10	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	6.65	2.68	7.03
C & E Loss (ft)	0.00	Cum SA (acres)	1.12	0.18	1.02

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 375 Profile: PF 1

E.G. Elev (ft)	816.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.05	Reach Len. (ft)	24.98	25.00	25.22
Crit W.S. (ft)		Flow Area (sq ft)	873.30	284.79	399.11
E.G. Slope (ft/ft)	0.000177	Area (sq ft)	873.30	284.79	399.11
Q Total (cfs)	2557.00	Flow (cfs)	1299.52	825.44	432.04
Top Width (ft)	219.69	Top Width (ft)	117.09	18.71	83.88
Vel Total (ft/s)	1.64	Avg. Vel. (ft/s)	1.49	2.90	1.08
Max Chl Dpth (ft)	16.32	Hydr. Depth (ft)	7.46	15.22	4.76
Conv. Total (cfs)	192412.9	Conv. (cfs)	97788.0	62114.3	32510.7
Length Wtd. (ft)	25.03	Wetted Per. (ft)	119.40	20.02	87.95
Min Ch El (ft)	799.73	Shear (lb/sq ft)	0.08	0.16	0.05
Alpha	1.50	Stream Power (lb/ft s)	279.10	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	6.38	2.60	6.91
C & E Loss (ft)	0.00	Cum SA (acres)	1.09	0.17	0.99

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 350 Profile: PF 1

E.G. Elev (ft)	816.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.05	Reach Len. (ft)	25.24	25.00	25.33
Crit W.S. (ft)		Flow Area (sq ft)	889.81	274.97	545.26
E.G. Slope (ft/ft)	0.000150	Area (sq ft)	889.81	274.97	545.26
Q Total (cfs)	2557.00	Flow (cfs)	1239.84	731.81	585.35
Top Width (ft)	237.50	Top Width (ft)	116.59	18.54	102.37
Vel Total (ft/s)	1.50	Avg. Vel. (ft/s)	1.39	2.66	1.07
Max Chl Dpth (ft)	15.87	Hydr. Depth (ft)	7.63	14.83	5.33
Conv. Total (cfs)	208754.3	Conv. (cfs)	101220.9	59745.2	47788.2
Length Wtd. (ft)	25.20	Wetted Per. (ft)	118.82	19.44	107.66
Min Ch El (ft)	800.18	Shear (lb/sq ft)	0.07	0.13	0.05
Alpha	1.45	Stream Power (lb/ft s)	303.83	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	5.87	2.44	6.64
C & E Loss (ft)	0.00	Cum SA (acres)	1.02	0.16	0.94

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 325 Profile: PF 1

E.G. Elev (ft)	816.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.05	Reach Len. (ft)	25.36	25.00	24.66
Crit W.S. (ft)		Flow Area (sq ft)	874.53	257.58	660.56
E.G. Slope (ft/ft)	0.000140	Area (sq ft)	874.53	257.58	660.56
Q Total (cfs)	2557.00	Flow (cfs)	1184.90	653.40	718.70
Top Width (ft)	246.77	Top Width (ft)	113.72	17.16	115.89
Vel Total (ft/s)	1.43	Avg. Vel. (ft/s)	1.35	2.54	1.09
Max Chl Dpth (ft)	15.90	Hydr. Depth (ft)	7.69	15.01	5.70
Conv. Total (cfs)	216229.8	Conv. (cfs)	100199.8	55254.3	60775.6
Length Wtd. (ft)	25.04	Wetted Per. (ft)	115.53	18.56	121.26
Min Ch El (ft)	800.15	Shear (lb/sq ft)	0.07	0.12	0.05
Alpha	1.39	Stream Power (lb/ft s)	306.36	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	5.36	2.29	6.29
C & E Loss (ft)	0.00	Cum SA (acres)	0.95	0.15	0.88

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 300 Profile: PF 1

E.G. Elev (ft)	816.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.05	Reach Len. (ft)	27.04	25.00	24.95
Crit W.S. (ft)		Flow Area (sq ft)	755.34	309.39	803.26
E.G. Slope (ft/ft)	0.000124	Area (sq ft)	755.34	309.39	803.26
Q Total (cfs)	2557.00	Flow (cfs)	937.24	749.91	869.85
Top Width (ft)	251.53	Top Width (ft)	101.31	20.09	130.14
Vel Total (ft/s)	1.37	Avg. Vel. (ft/s)	1.24	2.42	1.08
Max Chl Dpth (ft)	16.19	Hydr. Depth (ft)	7.46	15.40	6.17
Conv. Total (cfs)	230057.9	Conv. (cfs)	84325.4	67470.4	78262.1
Length Wtd. (ft)	25.65	Wetted Per. (ft)	103.74	21.75	135.32
Min Ch El (ft)	799.86	Shear (lb/sq ft)	0.06	0.11	0.05
Alpha	1.43	Stream Power (lb/ft s)	299.85	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	4.89	2.12	5.87
C & E Loss (ft)	0.00	Cum SA (acres)	0.89	0.14	0.81

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 275 Profile: PF 1

E.G. Elev (ft)	816.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.05	Reach Len. (ft)	25.02	25.00	24.94
Crit W.S. (ft)		Flow Area (sq ft)	676.91	339.08	965.01
E.G. Slope (ft/ft)	0.000110	Area (sq ft)	676.91	339.08	965.01
Q Total (cfs)	2557.00	Flow (cfs)	739.69	782.86	1034.45
Top Width (ft)	269.41	Top Width (ft)	99.96	21.40	148.05
Vel Total (ft/s)	1.29	Avg. Vel. (ft/s)	1.09	2.31	1.07
Max Chl Dpth (ft)	16.59	Hydr. Depth (ft)	6.77	15.84	6.52
Conv. Total (cfs)	243886.9	Conv. (cfs)	70551.4	74669.2	98666.3
Length Wtd. (ft)	24.98	Wetted Per. (ft)	103.07	23.49	151.22
Min Ch El (ft)	799.46	Shear (lb/sq ft)	0.05	0.10	0.04
Alpha	1.47	Stream Power (lb/ft s)	297.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	4.44	1.94	5.37
C & E Loss (ft)	0.00	Cum SA (acres)	0.83	0.13	0.73

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 250 Profile: PF 1

E.G. Elev (ft)	816.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.05	Reach Len. (ft)	25.27	25.00	25.28
Crit W.S. (ft)		Flow Area (sq ft)	632.45	335.65	1080.96
E.G. Slope (ft/ft)	0.000104	Area (sq ft)	632.45	335.65	1080.96
Q Total (cfs)	2557.00	Flow (cfs)	651.61	754.78	1150.61
Top Width (ft)	279.89	Top Width (ft)	97.08	21.38	161.43
Vel Total (ft/s)	1.25	Avg. Vel. (ft/s)	1.03	2.25	1.06
Max Chl Dpth (ft)	16.56	Hydr. Depth (ft)	6.51	15.70	6.70
Conv. Total (cfs)	250881.1	Conv. (cfs)	63932.7	74055.4	112893.0
Length Wtd. (ft)	25.20	Wetted Per. (ft)	100.82	23.19	164.08
Min Ch El (ft)	799.49	Shear (lb/sq ft)	0.04	0.09	0.04
Alpha	1.46	Stream Power (lb/ft s)	296.90	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	4.07	1.74	4.78
C & E Loss (ft)	0.00	Cum SA (acres)	0.77	0.11	0.64

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 225 Profile: PF 1

E.G. Elev (ft)	816.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.05	Reach Len. (ft)	25.12	25.00	25.08
Crit W.S. (ft)		Flow Area (sq ft)	642.43	323.28	1149.12
E.G. Slope (ft/ft)	0.000095	Area (sq ft)	642.43	323.28	1149.12
Q Total (cfs)	2557.00	Flow (cfs)	643.55	699.21	1214.24
Top Width (ft)	278.00	Top Width (ft)	94.69	20.73	162.58
Vel Total (ft/s)	1.21	Avg. Vel. (ft/s)	1.00	2.16	1.06
Max Chl Dpth (ft)	16.43	Hydr. Depth (ft)	6.78	15.59	7.07
Conv. Total (cfs)	261765.9	Conv. (cfs)	65881.9	71579.4	124304.6
Length Wtd. (ft)	25.07	Wetted Per. (ft)	100.22	22.22	165.47
Min Ch El (ft)	799.62	Shear (lb/sq ft)	0.04	0.09	0.04
Alpha	1.41	Stream Power (lb/ft s)	287.82	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	3.70	1.55	4.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.72	0.10	0.54

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 200 Profile: PF 1

E.G. Elev (ft)	816.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.05	Reach Len. (ft)	48.77	50.00	51.03
Crit W.S. (ft)		Flow Area (sq ft)	672.41	329.89	1084.12
E.G. Slope (ft/ft)	0.000096	Area (sq ft)	672.41	329.89	1084.12
Q Total (cfs)	2557.00	Flow (cfs)	681.76	712.02	1163.22
Top Width (ft)	269.21	Top Width (ft)	98.00	21.81	149.40
Vel Total (ft/s)	1.23	Avg. Vel. (ft/s)	1.01	2.16	1.07
Max Chl Dpth (ft)	16.20	Hydr. Depth (ft)	6.86	15.13	7.26
Conv. Total (cfs)	260880.1	Conv. (cfs)	69557.5	72644.5	118678.1
Length Wtd. (ft)	50.09	Wetted Per. (ft)	103.54	22.86	153.35
Min Ch El (ft)	799.85	Shear (lb/sq ft)	0.04	0.09	0.04
Alpha	1.39	Stream Power (lb/ft s)	283.23	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	3.32	1.37	3.49
C & E Loss (ft)	0.00	Cum SA (acres)	0.66	0.09	0.45

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 150 Profile: PF 1

E.G. Elev (ft)	816.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.04	Reach Len. (ft)	24.75	25.00	25.36
Crit W.S. (ft)		Flow Area (sq ft)	936.29	326.98	976.50
E.G. Slope (ft/ft)	0.000096	Area (sq ft)	936.29	326.98	976.50
Q Total (cfs)	2557.00	Flow (cfs)	813.05	678.63	1065.32
Top Width (ft)	329.56	Top Width (ft)	178.00	21.61	129.95
Vel Total (ft/s)	1.14	Avg. Vel. (ft/s)	0.87	2.08	1.09
Max Chl Dpth (ft)	15.77	Hydr. Depth (ft)	5.26	15.13	7.51
Conv. Total (cfs)	260936.6	Conv. (cfs)	82970.4	69252.9	108713.2
Length Wtd. (ft)	25.07	Wetted Per. (ft)	181.83	24.02	134.68
Min Ch El (ft)	800.27	Shear (lb/sq ft)	0.03	0.08	0.04
Alpha	1.44	Stream Power (lb/ft s)	343.56	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	2.42	0.99	2.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.51	0.07	0.29

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 125 Profile: PF 1

E.G. Elev (ft)	816.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.04	Reach Len. (ft)	25.28	25.00	25.21
Crit W.S. (ft)		Flow Area (sq ft)	968.33	302.43	936.78
E.G. Slope (ft/ft)	0.000101	Area (sq ft)	968.33	302.43	936.78
Q Total (cfs)	2557.00	Flow (cfs)	827.80	661.42	1067.78
Top Width (ft)	338.23	Top Width (ft)	196.99	19.73	121.51
Vel Total (ft/s)	1.16	Avg. Vel. (ft/s)	0.85	2.19	1.14
Max Chl Dpth (ft)	16.17	Hydr. Depth (ft)	4.92	15.33	7.71
Conv. Total (cfs)	254420.4	Conv. (cfs)	82366.1	65810.6	106243.7
Length Wtd. (ft)	25.17	Wetted Per. (ft)	199.97	21.33	125.65
Min Ch El (ft)	799.87	Shear (lb/sq ft)	0.03	0.09	0.05
Alpha	1.50	Stream Power (lb/ft s)	358.81	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1.88	0.81	1.73
C & E Loss (ft)	0.00	Cum SA (acres)	0.40	0.05	0.22

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 100 Profile: PF 1

E.G. Elev (ft)	816.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.03	Reach Len. (ft)	24.40	25.00	25.60
Crit W.S. (ft)		Flow Area (sq ft)	866.45	330.09	906.95
E.G. Slope (ft/ft)	0.000107	Area (sq ft)	866.45	330.09	906.95
Q Total (cfs)	2557.00	Flow (cfs)	738.58	739.14	1079.28
Top Width (ft)	322.29	Top Width (ft)	184.62	22.12	115.55
Vel Total (ft/s)	1.22	Avg. Vel. (ft/s)	0.85	2.24	1.19
Max Chl Dpth (ft)	16.19	Hydr. Depth (ft)	4.69	14.92	7.85
Conv. Total (cfs)	246809.3	Conv. (cfs)	71290.1	71344.3	104175.0
Length Wtd. (ft)	25.08	Wetted Per. (ft)	188.08	23.52	119.36
Min Ch El (ft)	799.84	Shear (lb/sq ft)	0.03	0.09	0.05
Alpha	1.53	Stream Power (lb/ft s)	345.72	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1.34	0.63	1.19
C & E Loss (ft)	0.00	Cum SA (acres)	0.29	0.04	0.15

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 75 Profile: PF 1

E.G. Elev (ft)	816.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.02	Reach Len. (ft)	24.78	25.00	25.07
Crit W.S. (ft)		Flow Area (sq ft)	730.51	414.86	766.12
E.G. Slope (ft/ft)	0.000125	Area (sq ft)	730.51	414.86	766.12
Q Total (cfs)	2557.00	Flow (cfs)	630.42	937.03	989.55
Top Width (ft)	295.72	Top Width (ft)	170.46	28.09	97.17
Vel Total (ft/s)	1.34	Avg. Vel. (ft/s)	0.86	2.26	1.29
Max Chl Dpth (ft)	16.20	Hydr. Depth (ft)	4.29	14.77	7.88
Conv. Total (cfs)	228848.2	Conv. (cfs)	56421.6	83863.2	88563.4
Length Wtd. (ft)	24.97	Wetted Per. (ft)	174.36	32.68	99.86
Min Ch El (ft)	799.82	Shear (lb/sq ft)	0.03	0.10	0.06
Alpha	1.51	Stream Power (lb/ft s)	315.25	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.90	0.41	0.70
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	0.03	0.09

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 50 Profile: PF 1

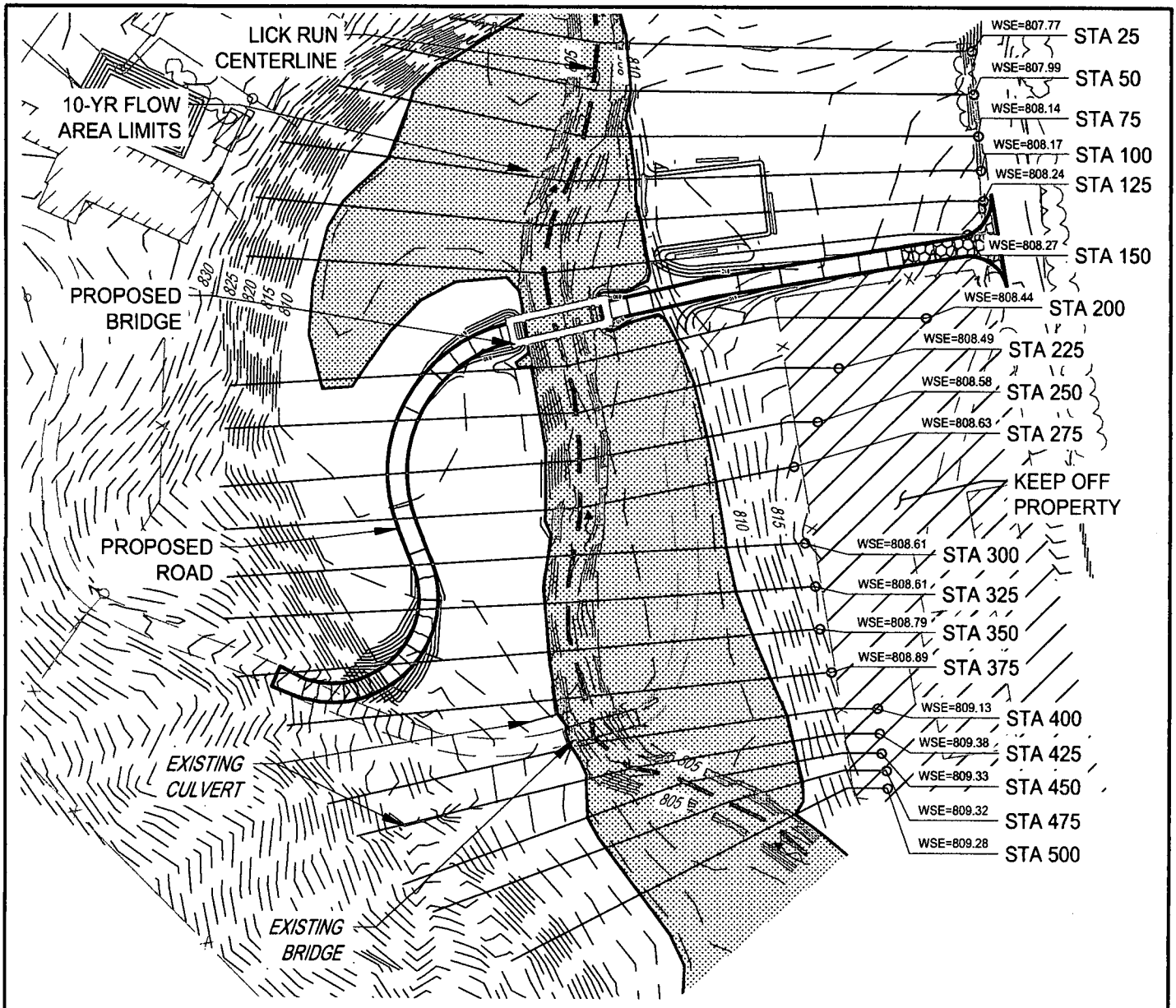
E.G. Elev (ft)	816.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.01	Reach Len. (ft)	24.84	25.00	24.40
Crit W.S. (ft)		Flow Area (sq ft)	742.12	347.88	644.42
E.G. Slope (ft/ft)	0.000150	Area (sq ft)	742.12	347.88	644.42
Q Total (cfs)	2557.00	Flow (cfs)	717.32	916.97	922.71
Top Width (ft)	266.75	Top Width (ft)	165.44	22.80	78.51
Vel Total (ft/s)	1.47	Avg. Vel. (ft/s)	0.97	2.64	1.43
Max Chl Dpth (ft)	16.30	Hydr. Depth (ft)	4.49	15.26	8.21
Conv. Total (cfs)	208836.7	Conv. (cfs)	58585.4	74891.3	75360.0
Length Wtd. (ft)	24.77	Wetted Per. (ft)	171.41	24.94	82.56
Min Ch El (ft)	799.71	Shear (lb/sq ft)	0.04	0.13	0.07
Alpha	1.61	Stream Power (lb/ft s)	289.54	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.48	0.20	0.29
C & E Loss (ft)	0.00	Cum SA (acres)	0.09	0.01	0.04

Plan: PRE-DEV 100YR LICK RUN Site 1 RS: 25 Profile: PF 1

E.G. Elev (ft)	816.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.00	Reach Len. (ft)			
Crit W.S. (ft)	808.60	Flow Area (sq ft)	936.94	332.96	406.97
E.G. Slope (ft/ft)	0.000154	Area (sq ft)	936.94	332.96	406.97
Q Total (cfs)	2557.00	Flow (cfs)	1067.07	902.50	587.43
Top Width (ft)	236.32	Top Width (ft)	166.07	22.09	48.16
Vel Total (ft/s)	1.52	Avg. Vel. (ft/s)	1.14	2.71	1.44
Max Chl Dpth (ft)	15.64	Hydr. Depth (ft)	5.64	15.07	8.45
Conv. Total (cfs)	205856.4	Conv. (cfs)	85906.5	72657.7	47292.3
Length Wtd. (ft)		Wetted Per. (ft)	172.89	23.39	52.63
Min Ch El (ft)	800.36	Shear (lb/sq ft)	0.05	0.14	0.07
Alpha	1.55	Stream Power (lb/ft s)	253.93	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

APPENDIX E: HEC-RAS INPUT AND OUTPUT POST-DEVELOPMENT

POST DEVELOPMENT FLOODPLAIN MAP (10-YR)



SCALE: 1 INCH = 80 FEET

POST DEVELOPMENT FLOODPLAIN MAP
NEW MILTON DISTRICT, DODDRIDGE COUNTY, WEST VIRGINIA

PREPARED FOR:

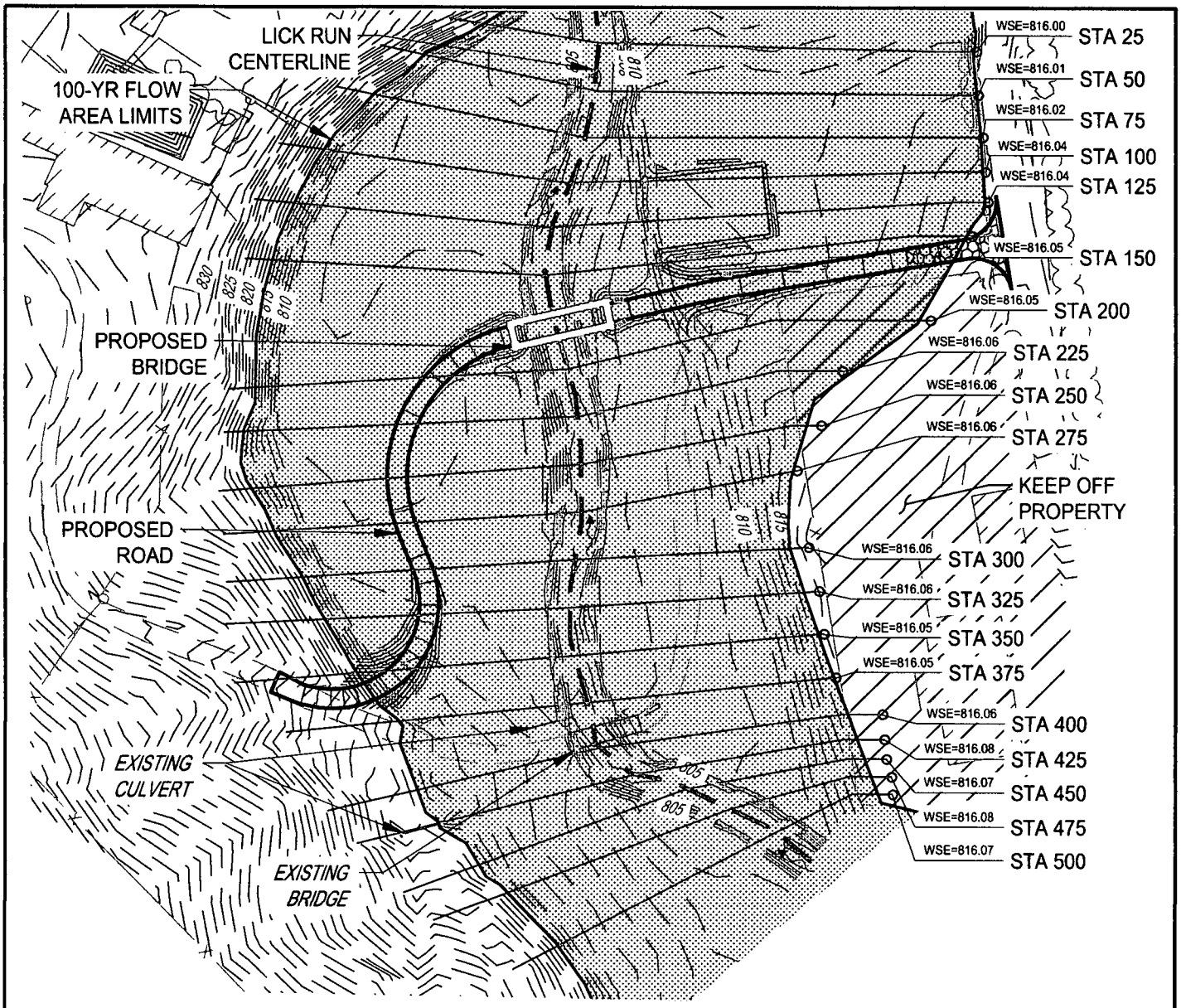
Gathering LLC

PREPARED BY:

CESO
CREATION TO COMPLETION
www.cesoinc.com

JOB NO.:	751001
DESIGN:	APM
DRAWN:	APM
DATE:	11/06/2015

POST DEVELOPMENT FLOODPLAIN MAP (100-YR)



SCALE: 1 INCH = 80 FEET

POST DEVELOPMENT FLOODPLAIN MAP
NEW MILTON DISTRICT, DODDRIDGE COUNTY, WEST VIRGINIA

PREPARED FOR:

EQT Gathering LLC

PREPARED BY:

CESO
CREATION TO COMPLETION
www.cesoinc.com

JOB NO.:	751001
DESIGN:	APM
DRAWN:	APM
DATE:	11/06/2015

PROFILE OUTPUT – POST DEVELOPMENT (10-YR)

HEC-RAS Plan: POST-DEV 10YR River: LICK RUN Reach: Site 1 Profile: PF 1

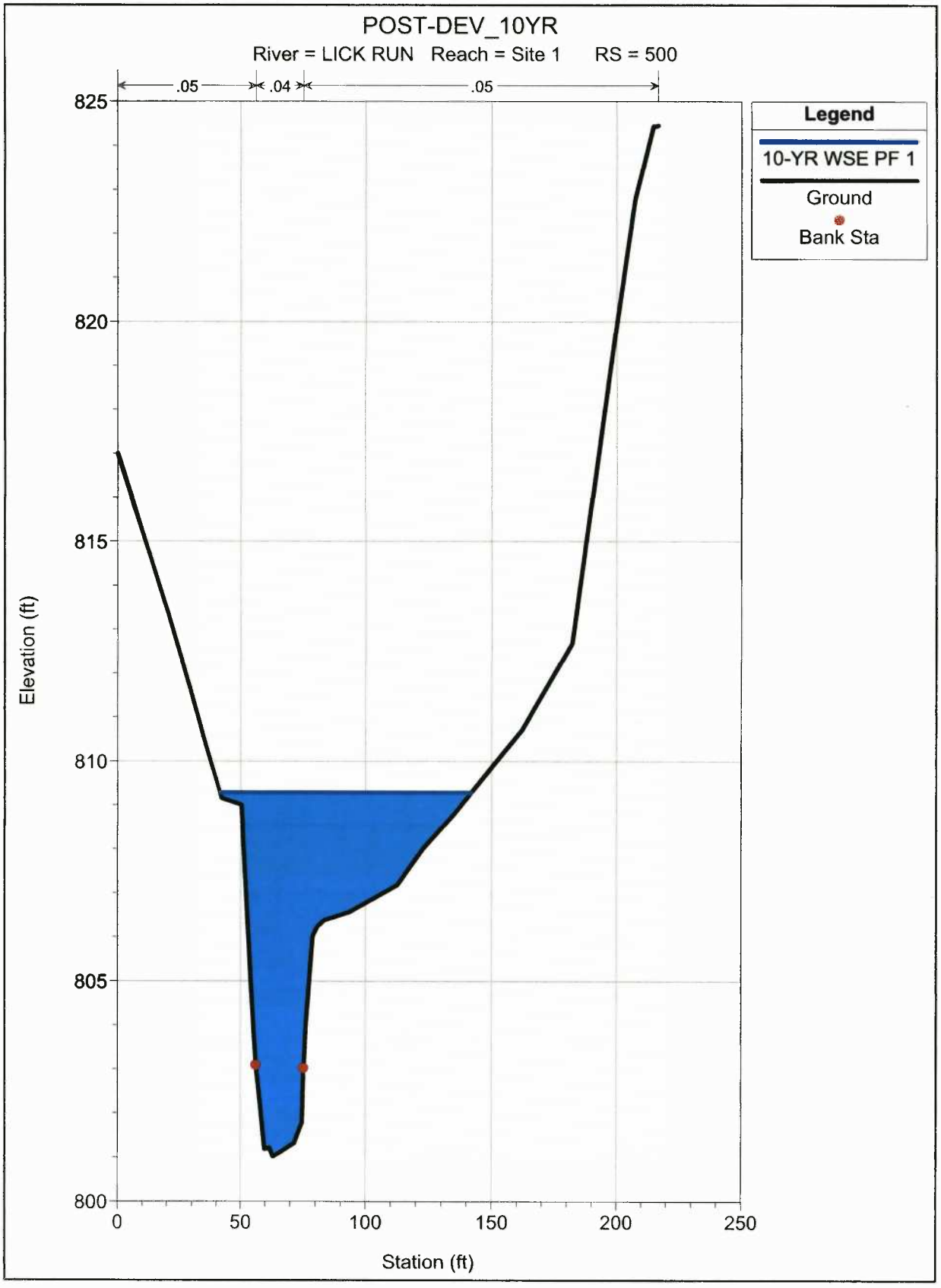
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Site 1	500	PF 1	1203.00	801.02	809.28		809.72	0.001841	6.02	304.65	100.20	0.38
Site 1	475	PF 1	1203.00	801.31	809.32		809.64	0.001316	5.11	346.56	108.41	0.33
Site 1	450	PF 1	1203.00	801.31	809.33		809.60	0.001020	4.57	369.08	115.39	0.29
Site 1	425	PF 1	1203.00	800.17	809.38		809.55	0.000536	3.51	442.43	113.80	0.21
Site 1	400	PF 1	1203.00	799.35	809.13	805.16	809.51	0.001320	5.38	332.05	111.83	0.32
Site 1	387		Bridge									
Site 1	375	PF 1	1203.00	799.73	808.89		809.38	0.001918	6.26	300.13	112.82	0.39
Site 1	350	PF 1	1203.00	800.18	808.79		809.32	0.002282	6.63	285.61	108.76	0.42
Site 1	325	PF 1	1203.00	800.15	808.61		809.25	0.002802	7.19	262.29	103.42	0.46
Site 1	300	PF 1	1203.00	799.86	808.61		809.16	0.002087	6.42	267.90	96.79	0.40
Site 1	275	PF 1	1203.00	799.46	808.63		809.09	0.001622	5.82	283.28	92.59	0.35
Site 1	250	PF 1	1203.00	799.49	808.58		809.05	0.001704	5.92	273.81	86.19	0.36
Site 1	225	PF 1	1203.00	799.62	808.49		809.00	0.001882	6.17	265.68	109.42	0.38
Site 1	200	PF 1	1203.00	799.85	808.44	805.53	808.95	0.002011	6.20	269.73	127.62	0.40
Site 1	175		Bridge									
Site 1	150	PF 1	1203.00	800.27	808.27		808.80	0.002350	6.35	269.88	177.35	0.41
Site 1	125	PF 1	1203.00	799.87	808.24		808.74	0.002158	6.29	292.51	162.12	0.40
Site 1	100	PF 1	1203.00	799.84	808.17		808.68	0.002277	6.26	278.81	145.92	0.42
Site 1	75	PF 1	1203.00	799.82	808.14		808.61	0.002230	5.74	267.46	118.41	0.39
Site 1	50	PF 1	1203.00	799.71	807.99		808.55	0.002376	6.38	253.96	94.30	0.42
Site 1	25	PF 1	1203.00	800.36	807.77	805.45	808.47	0.003002	7.06	216.73	64.28	0.48

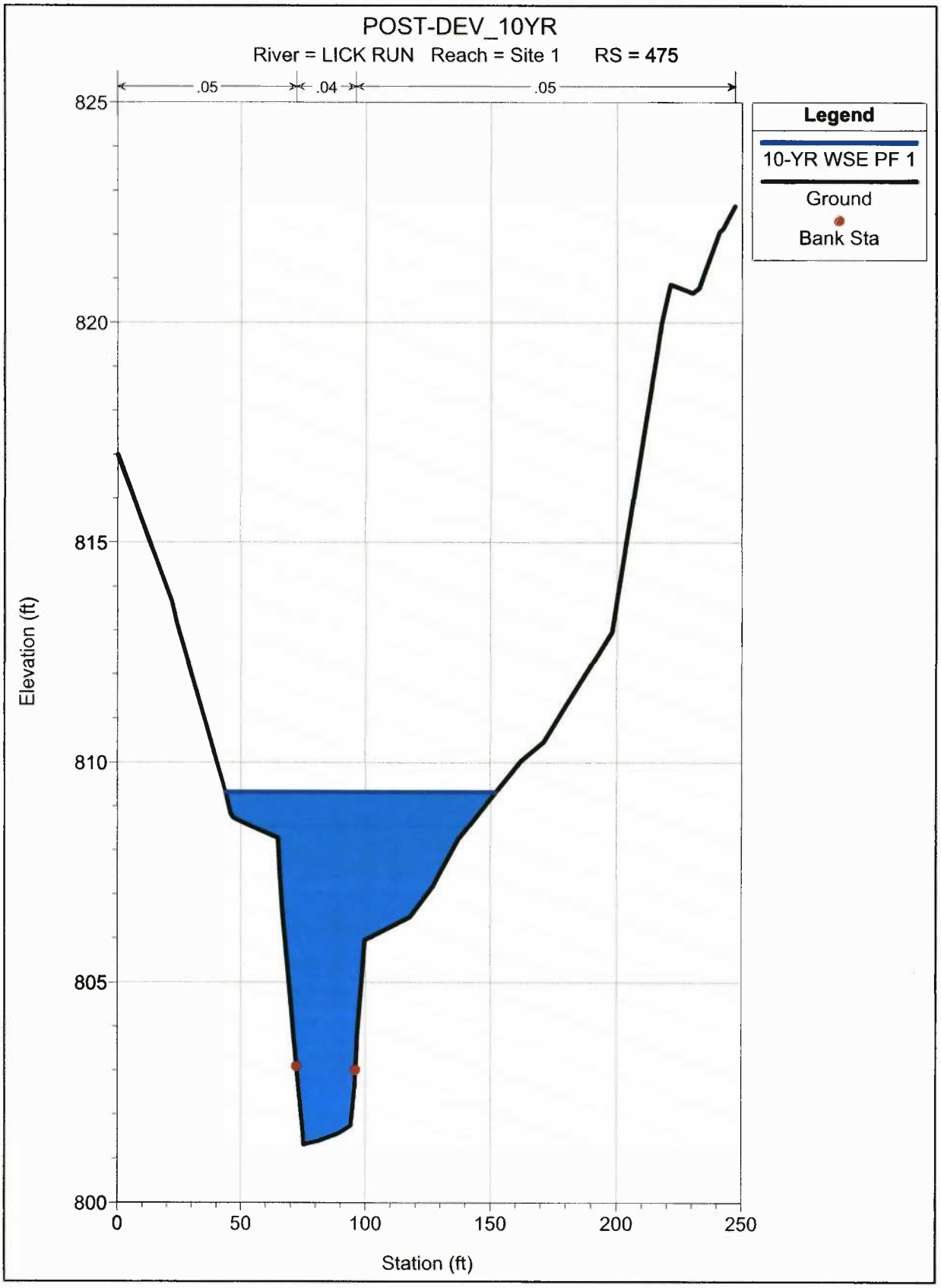
PROFILE OUTPUT – POST DEVELOPMENT (100-YR)

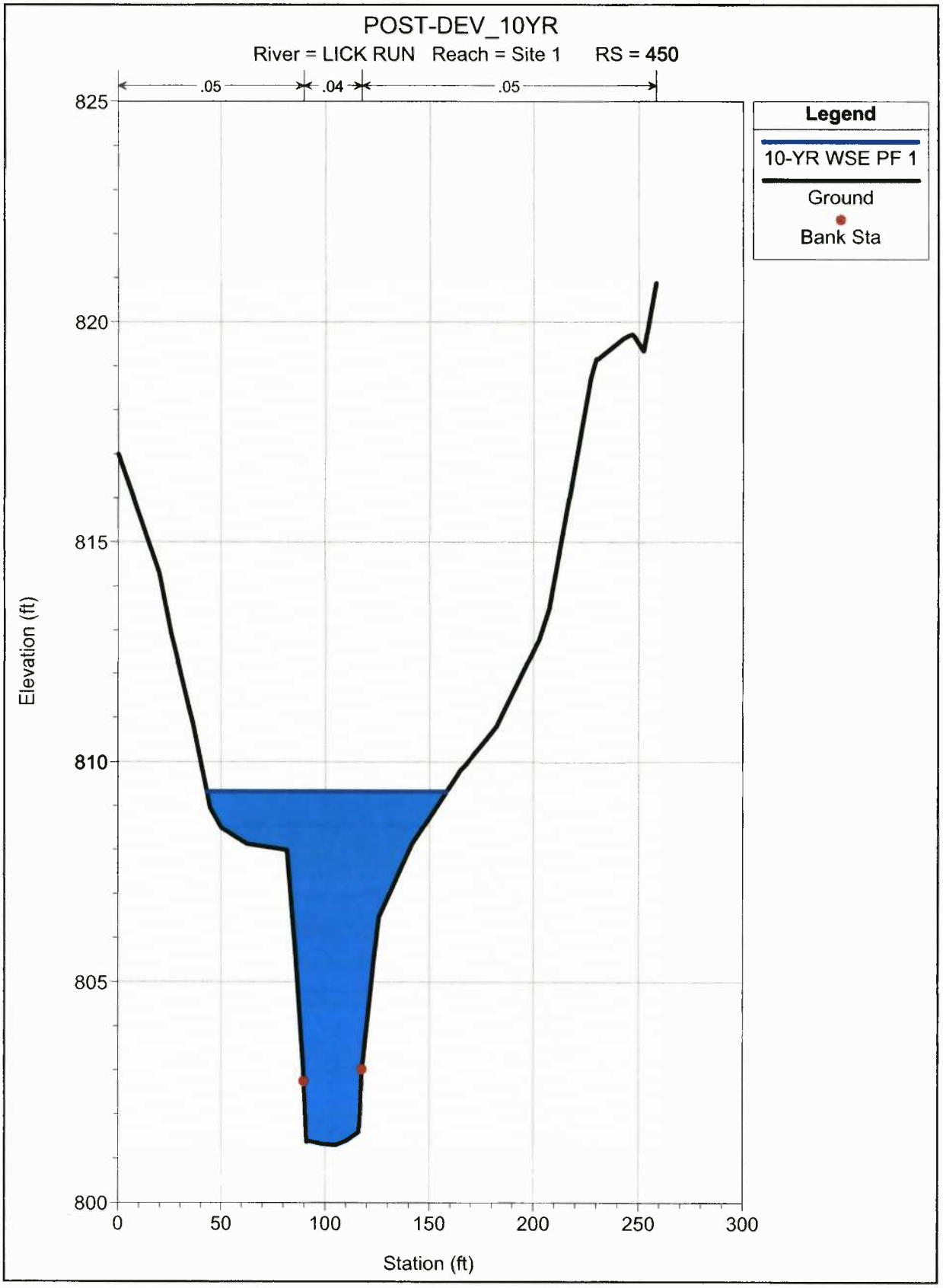
HEC-RAS Plan: POST-DEV 100YR River: LICK RUN Reach: Site 1 Profile: PF 1

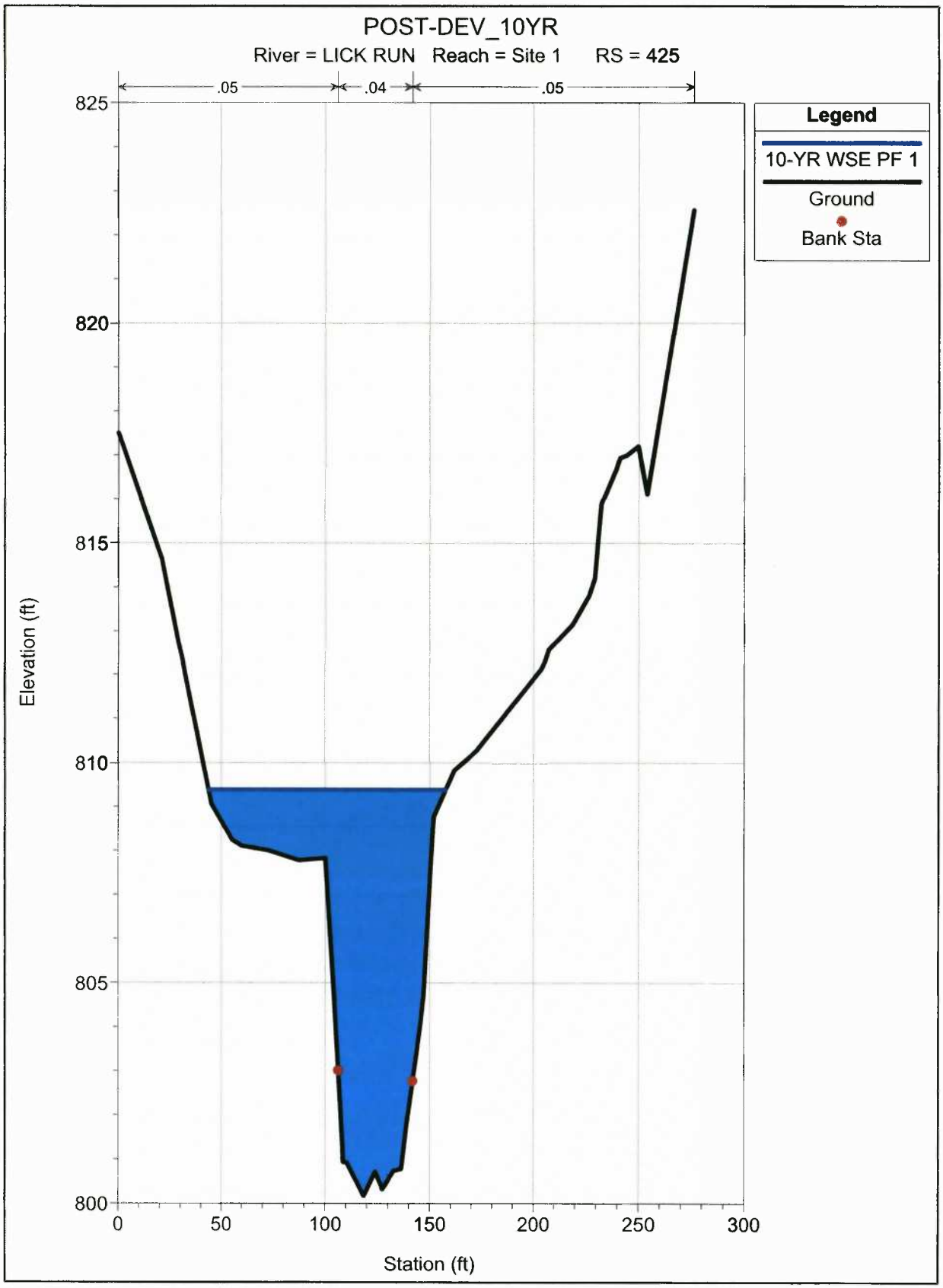
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Site 1	500	PF 1	2557.00	801.02	816.07		816.16	0.000234	3.26	1311.07	170.00	0.15
Site 1	475	PF 1	2557.00	801.31	816.08		816.15	0.000190	2.96	1427.15	184.83	0.14
Site 1	450	PF 1	2557.00	801.31	816.07		816.14	0.000165	2.78	1503.79	197.30	0.13
Site 1	425	PF 1	2557.00	800.17	816.08		816.14	0.000127	2.52	1620.89	212.88	0.11
Site 1	400	PF 1	2557.00	799.35	816.06	809.19	816.13	0.000180	2.94	1512.38	218.26	0.13
Site 1	387		Bridge									
Site 1	375	PF 1	2557.00	799.73	816.05		816.12	0.000176	2.90	1558.48	219.72	0.13
Site 1	350	PF 1	2557.00	800.18	816.05		816.11	0.000171	2.84	1570.70	215.87	0.13
Site 1	325	PF 1	2557.00	800.15	816.06		816.10	0.000149	2.61	1750.69	246.78	0.12
Site 1	300	PF 1	2557.00	799.86	816.06		816.10	0.000125	2.44	1857.47	251.56	0.11
Site 1	275	PF 1	2557.00	799.46	816.06		816.09	0.000110	2.31	1982.35	269.47	0.10
Site 1	250	PF 1	2557.00	799.49	816.06		816.09	0.000104	2.25	2050.48	279.91	0.10
Site 1	225	PF 1	2557.00	799.62	816.06		816.09	0.000095	2.16	2116.24	278.01	0.10
Site 1	200	PF 1	2557.00	799.85	816.05	808.89	816.08	0.000100	2.21	2055.09	269.21	0.10
Site 1	175		Bridge									
Site 1	150	PF 1	2557.00	800.27	816.05		816.07	0.000096	2.08	2239.90	329.56	0.09
Site 1	125	PF 1	2557.00	799.87	816.04		816.07	0.000087	2.03	2338.58	338.24	0.09
Site 1	100	PF 1	2557.00	799.84	816.04		816.07	0.000094	2.10	2220.60	322.30	0.10
Site 1	75	PF 1	2557.00	799.82	816.02		816.06	0.000125	2.26	1911.48	295.72	0.10
Site 1	50	PF 1	2557.00	799.71	816.01		816.06	0.000150	2.64	1734.42	266.75	0.12
Site 1	25	PF 1	2557.00	800.36	816.00	808.60	816.06	0.000154	2.71	1676.87	236.32	0.12

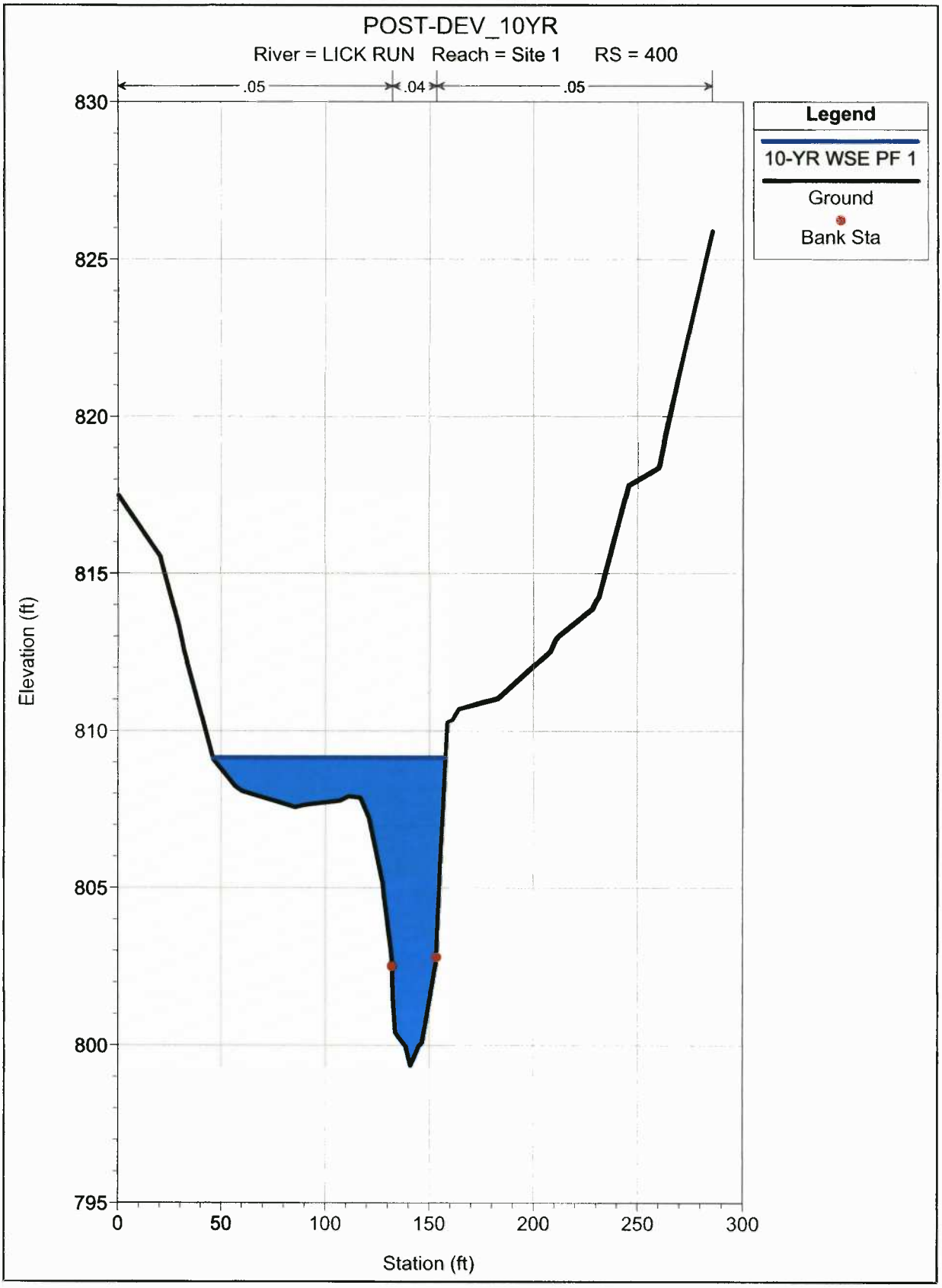
CROSS SECTIONS – POST DEVELOPMENT (10-YR)

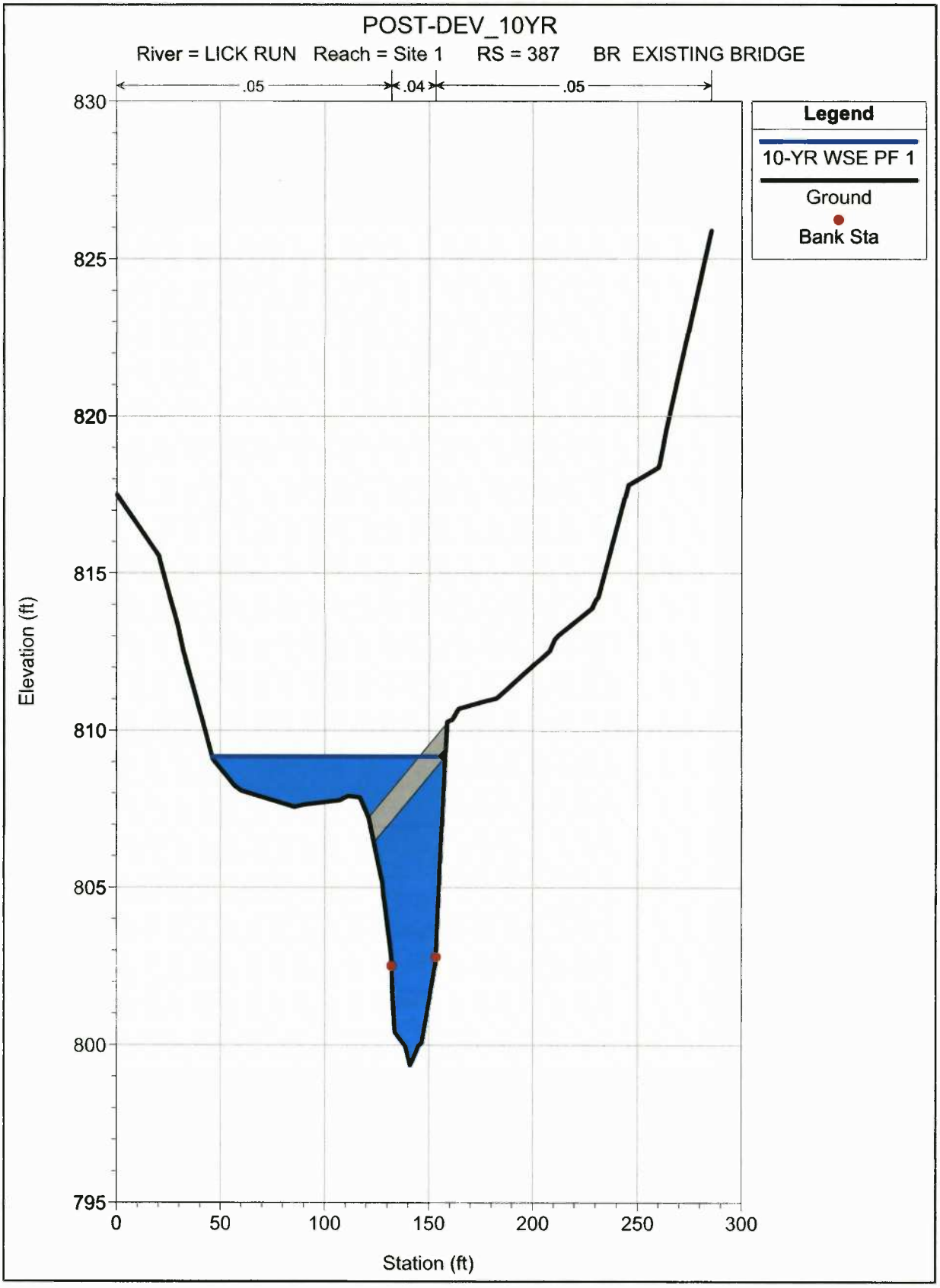

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 500
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
Station (ft)

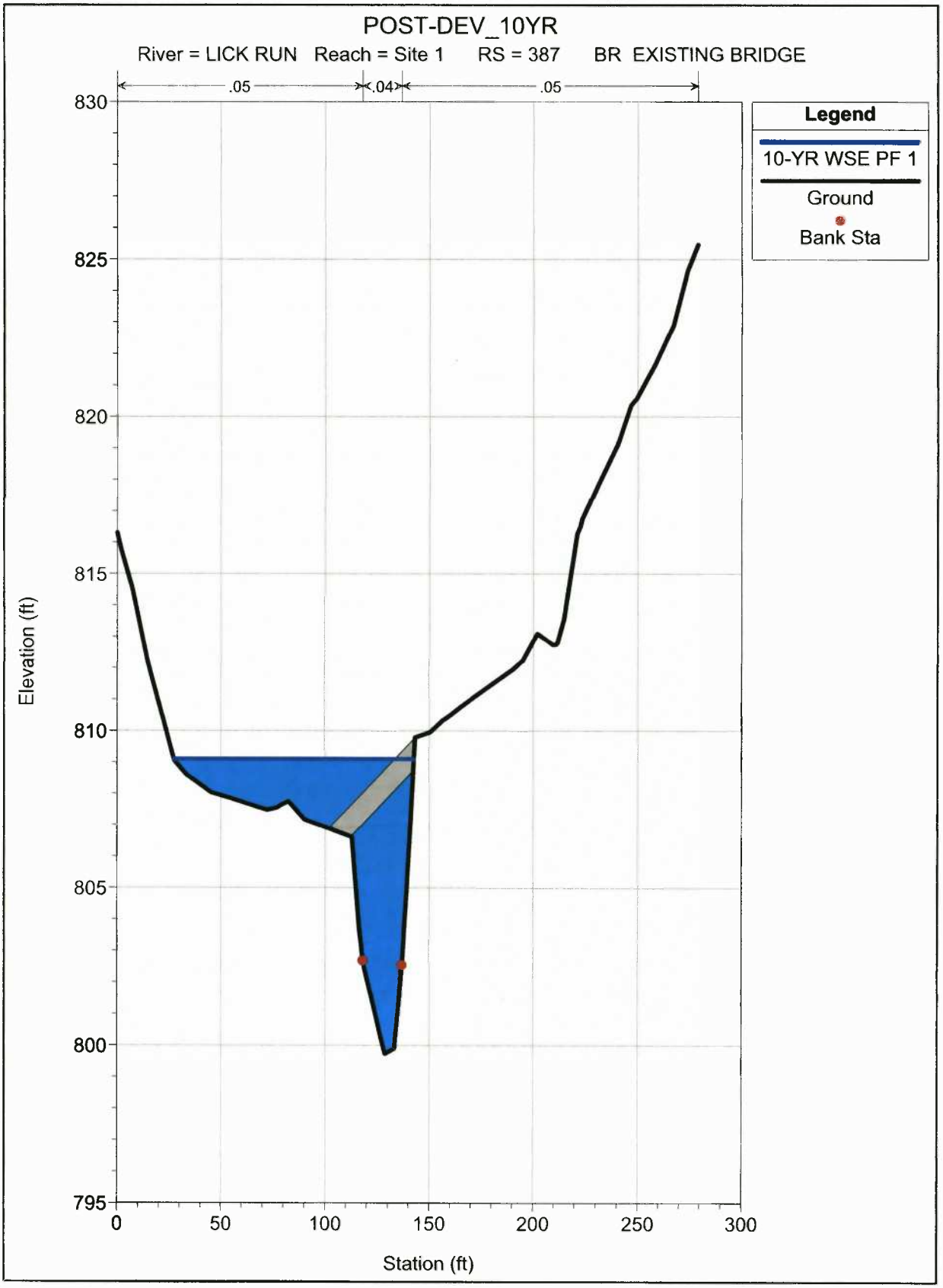

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 475
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
Station (ft)

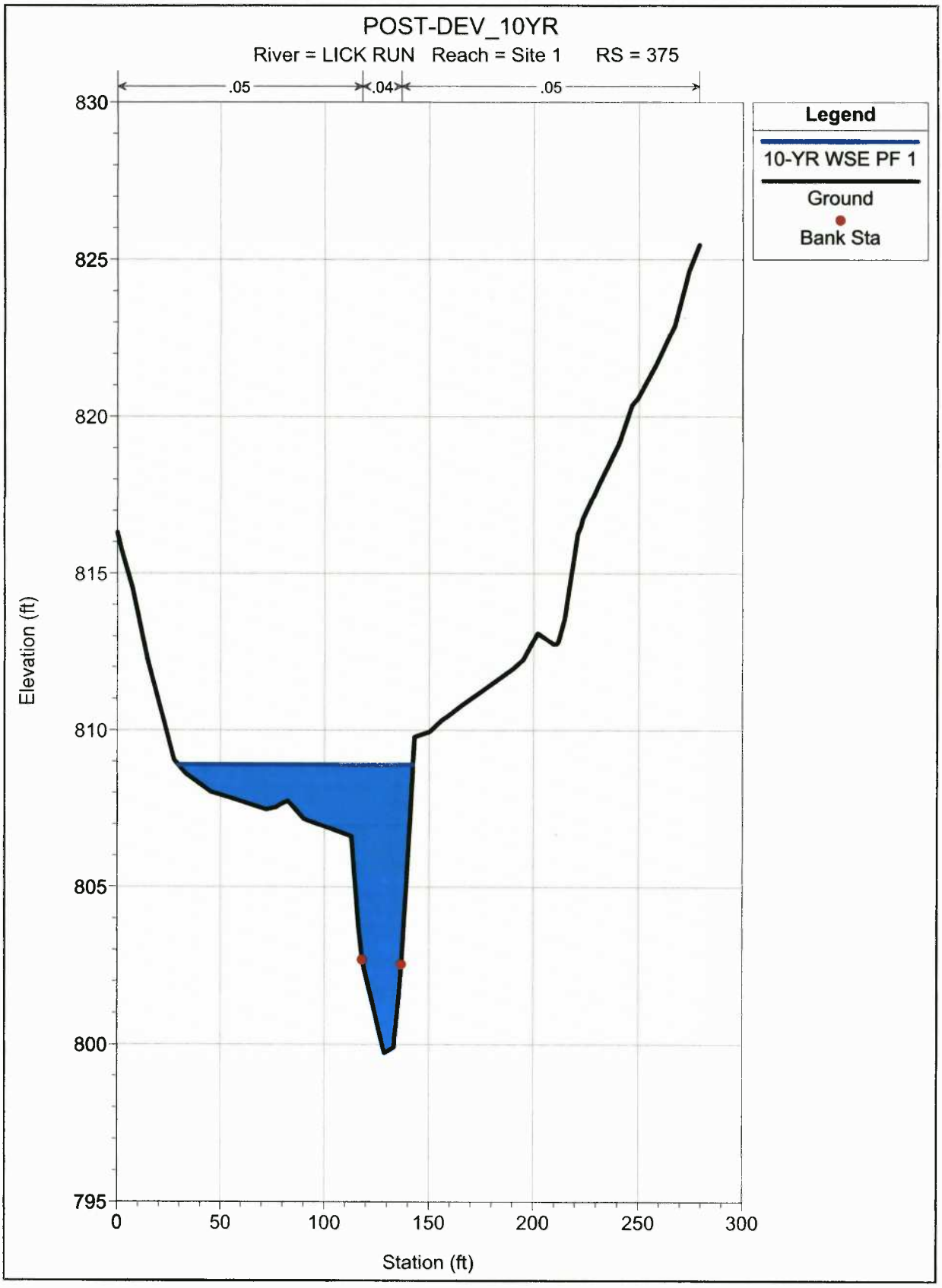

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 450
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)

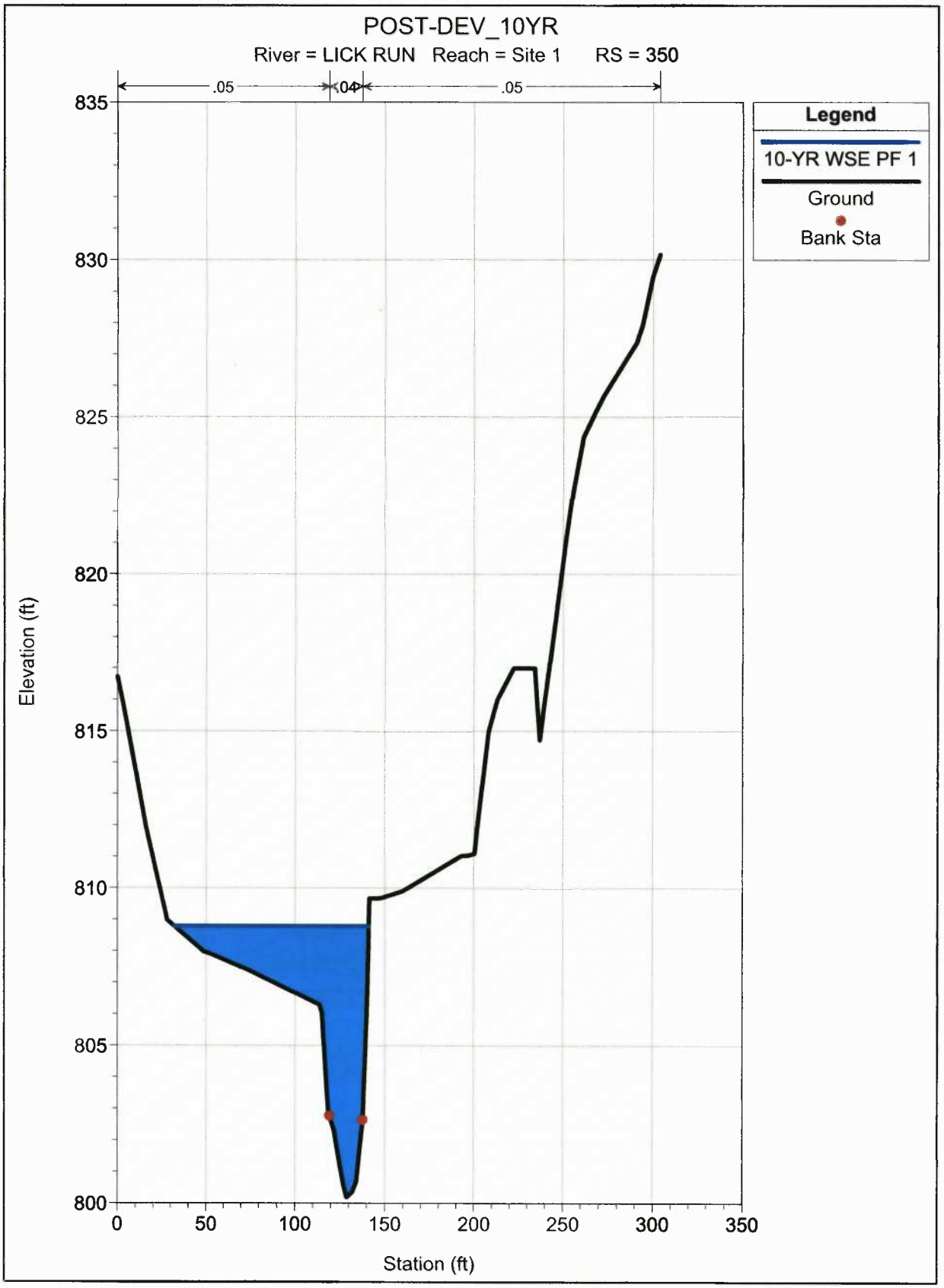

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 425
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)

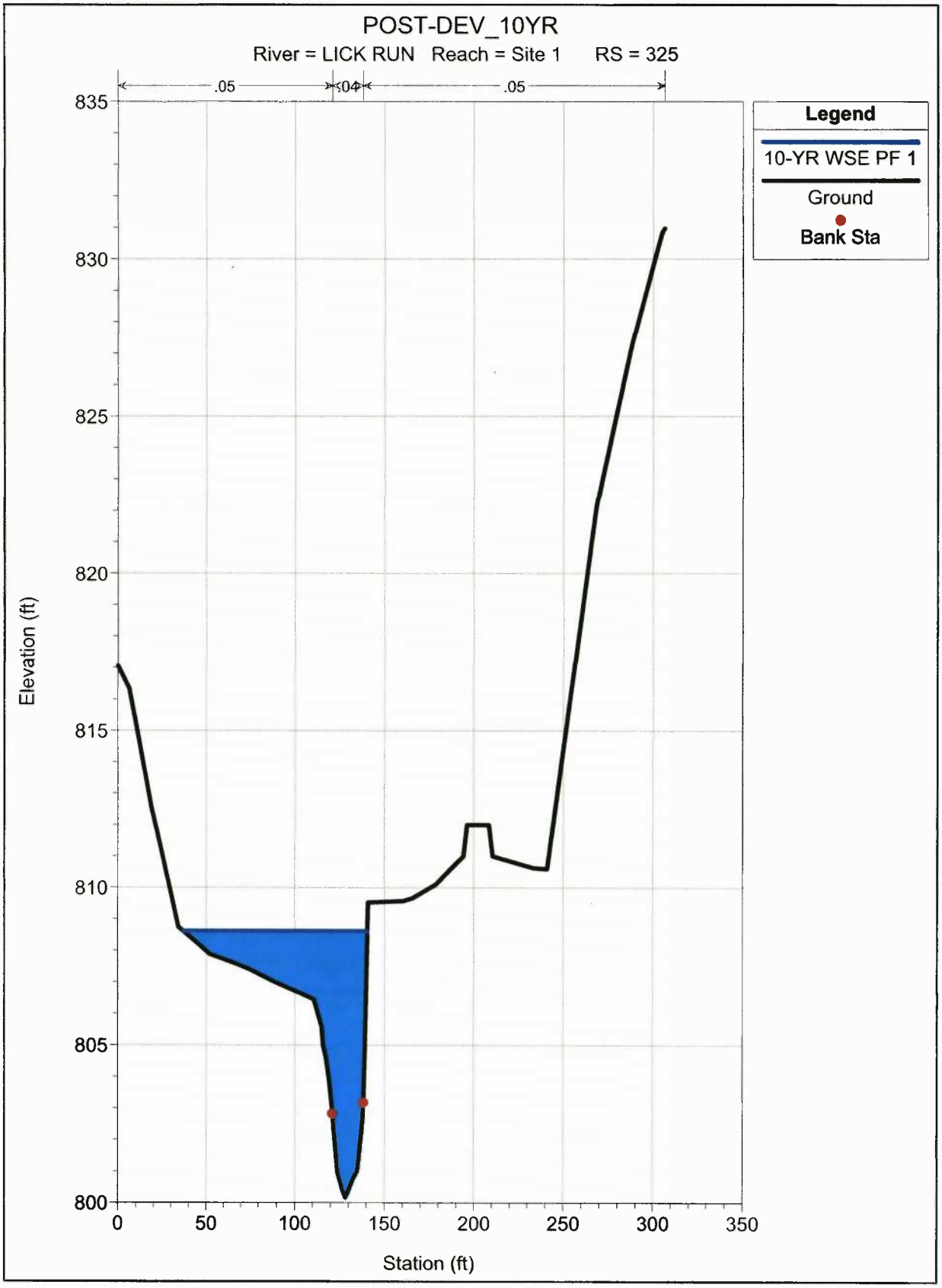

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 400
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
830
825
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)

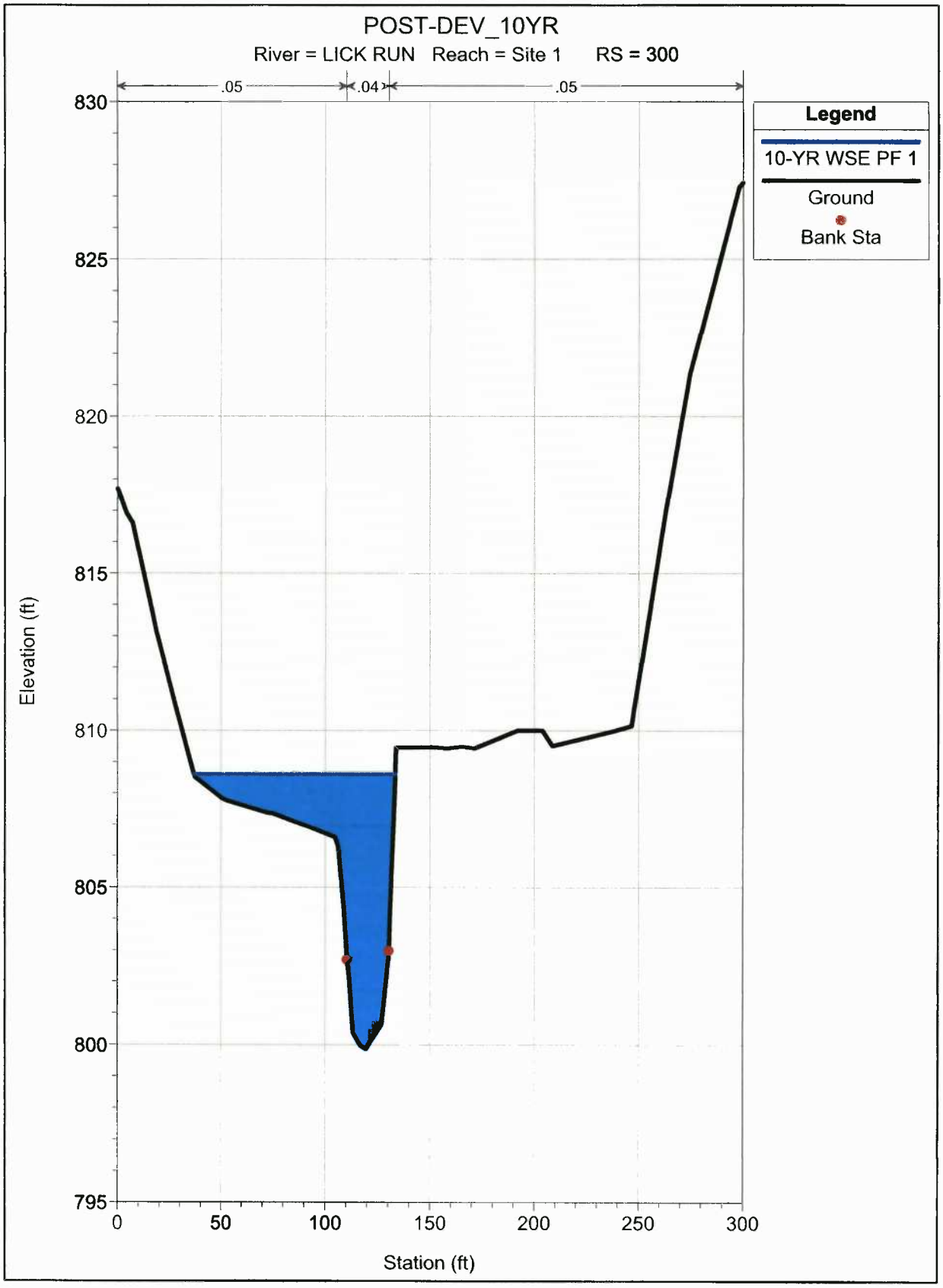

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 387 BR EXISTING BRIDGE
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
Station (ft)

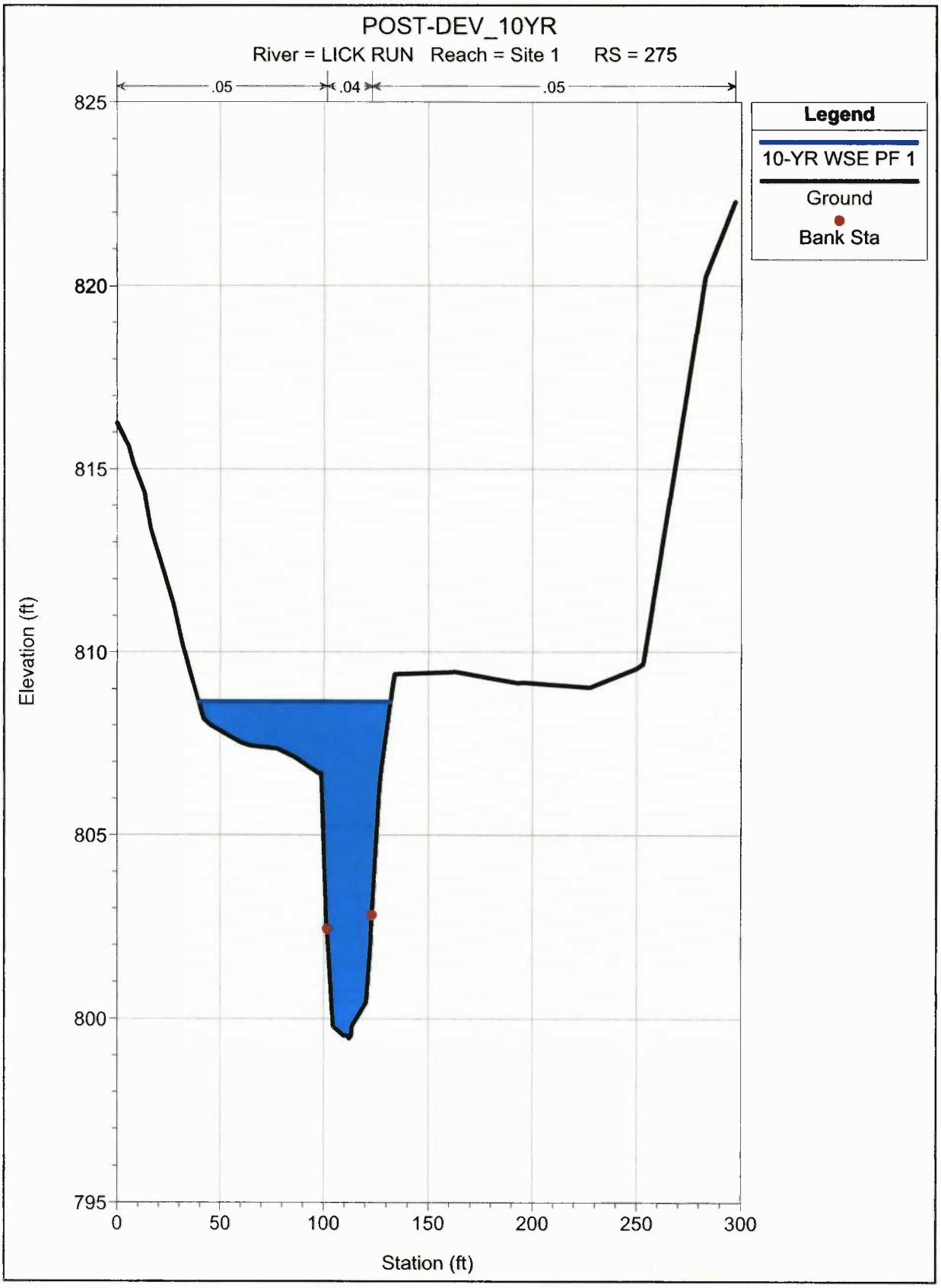

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 387 BR EXISTING BRIDGE
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
Station (ft)

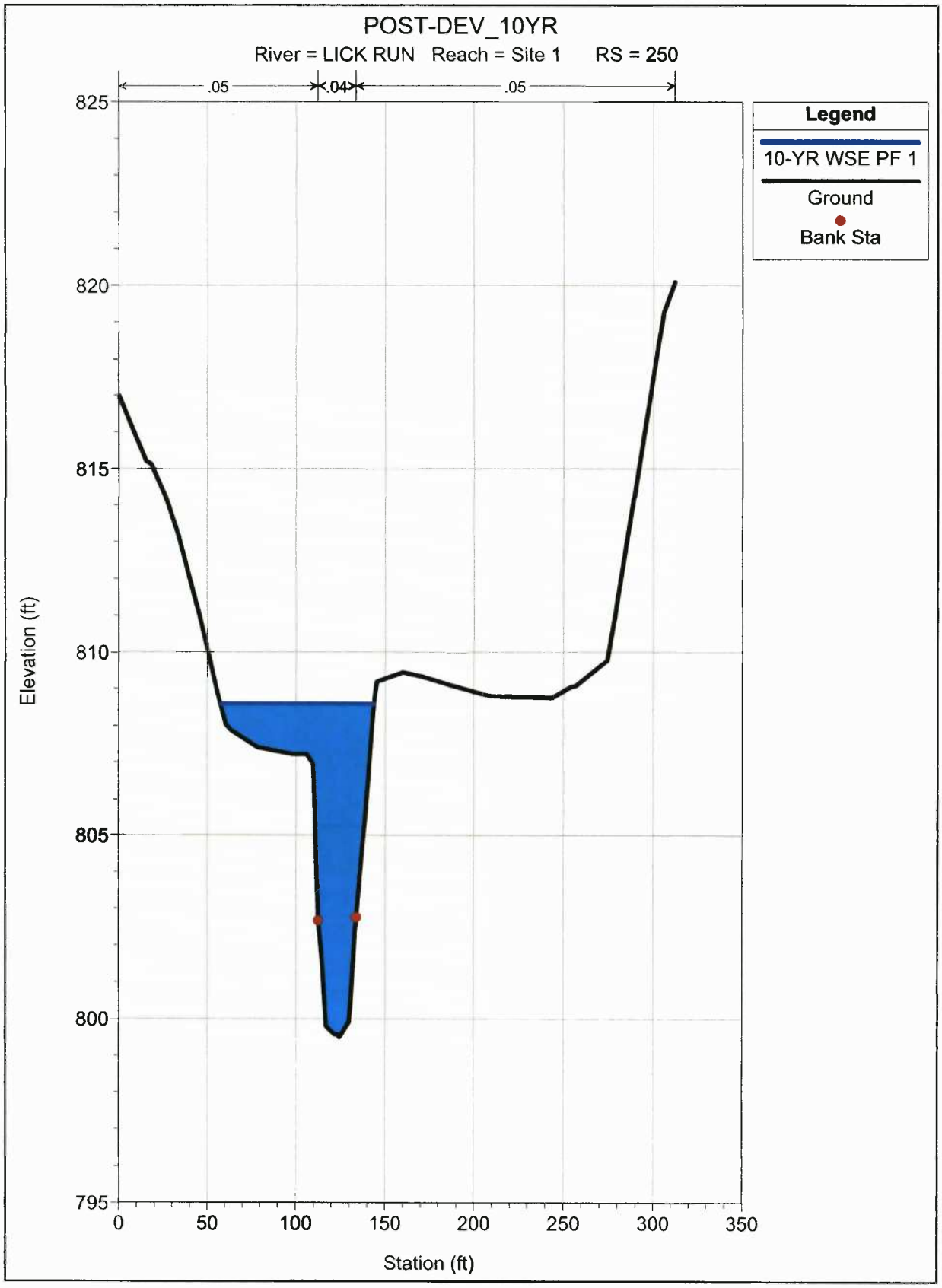

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 375
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
Station (ft)

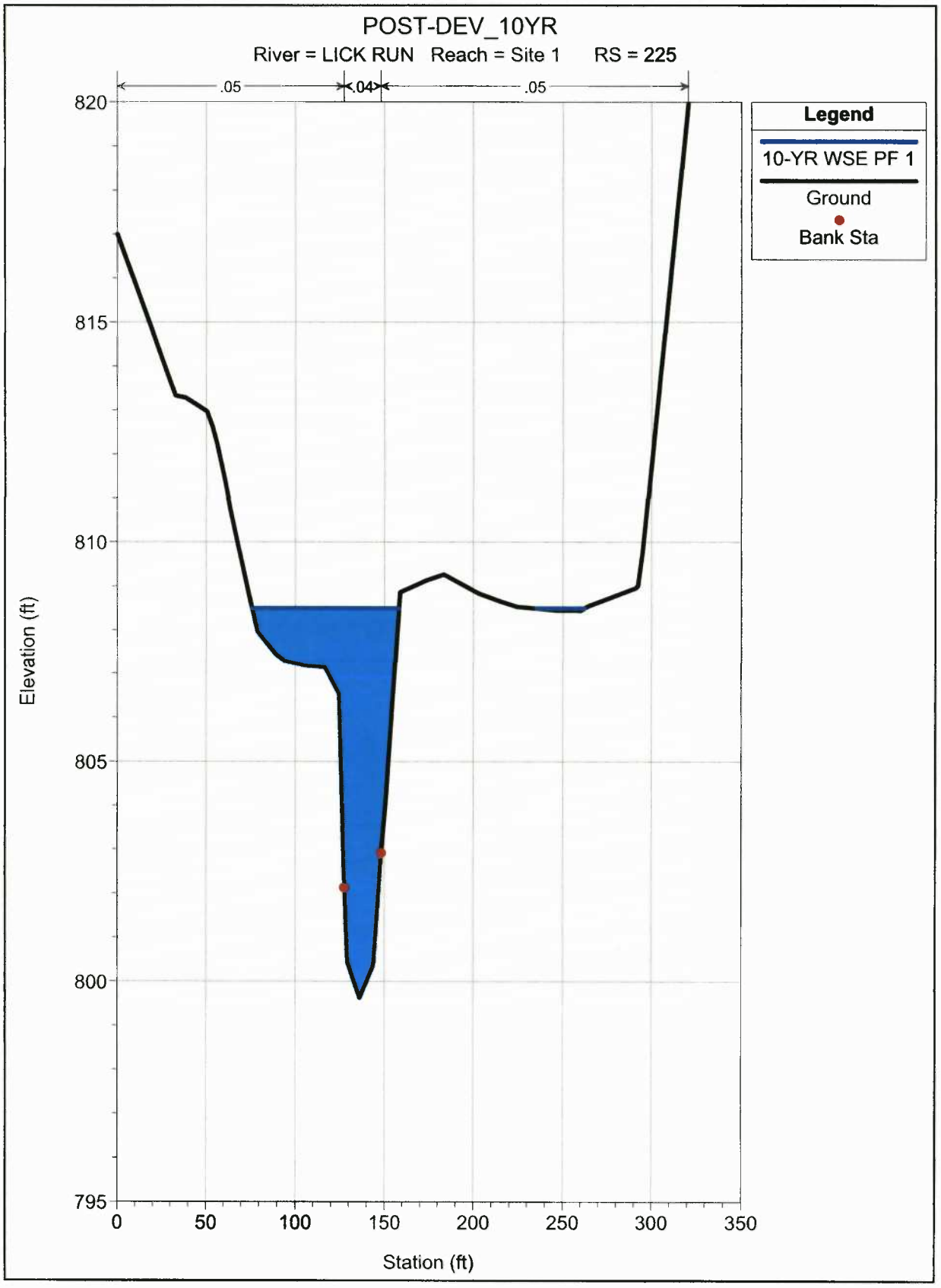

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 350
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
835
830
825
820
815
810
805
800
0
50
100
150
200
250
300
350
Station (ft)

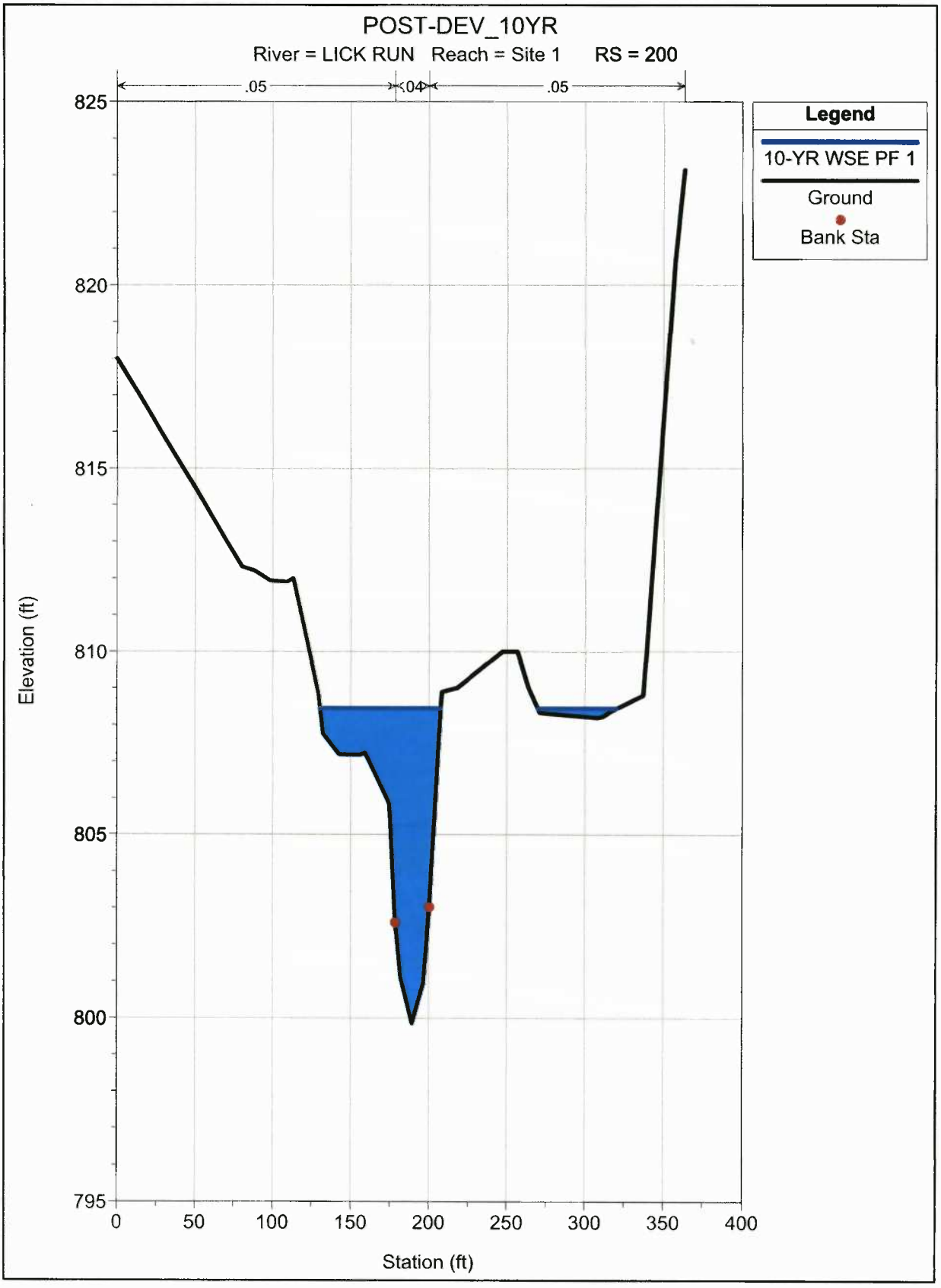

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 325
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
835
830
825
820
815
810
805
800
0
50
100
150
200
250
300
350
Station (ft)

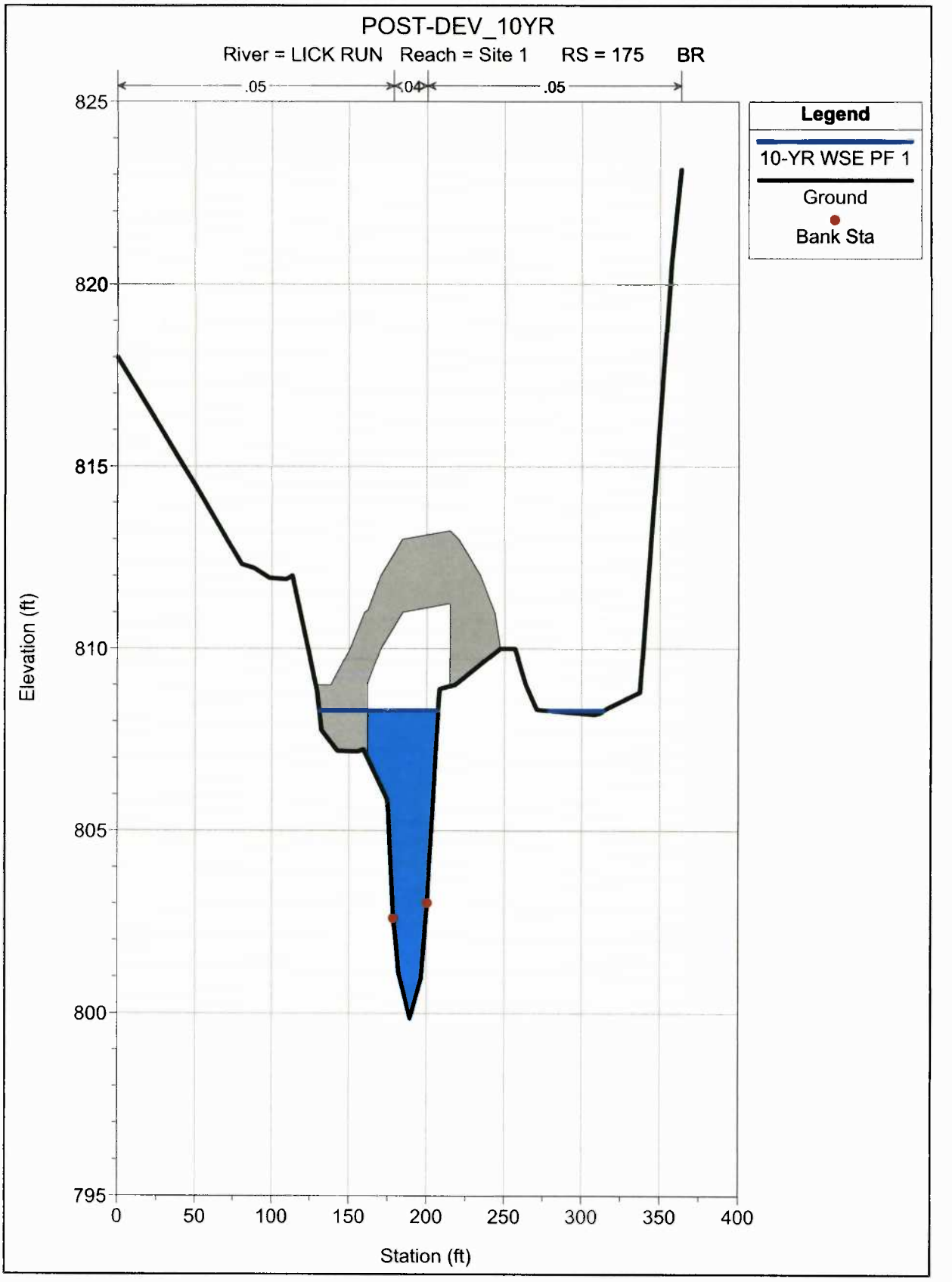

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 300
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
Station (ft)

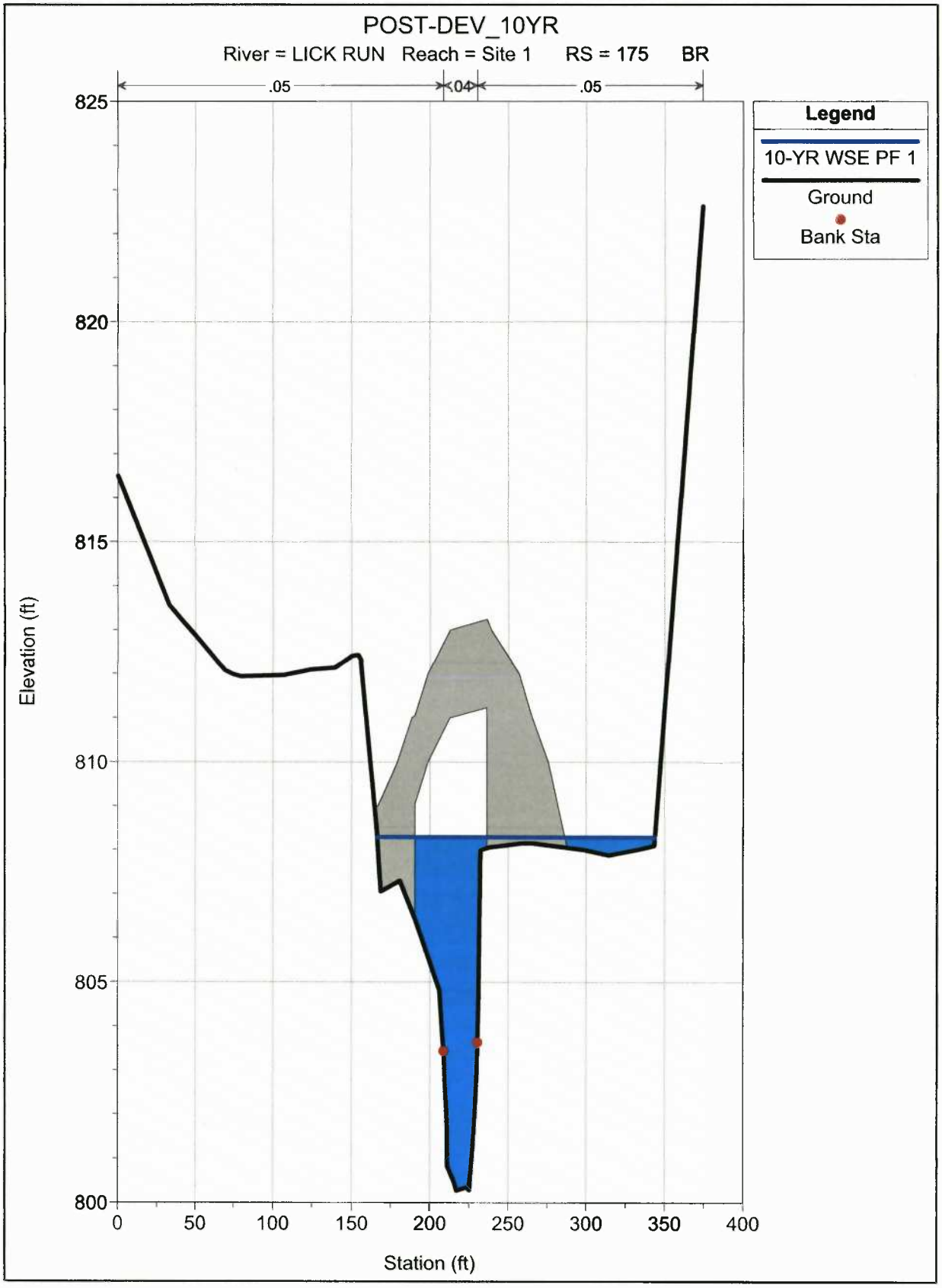

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 275
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)

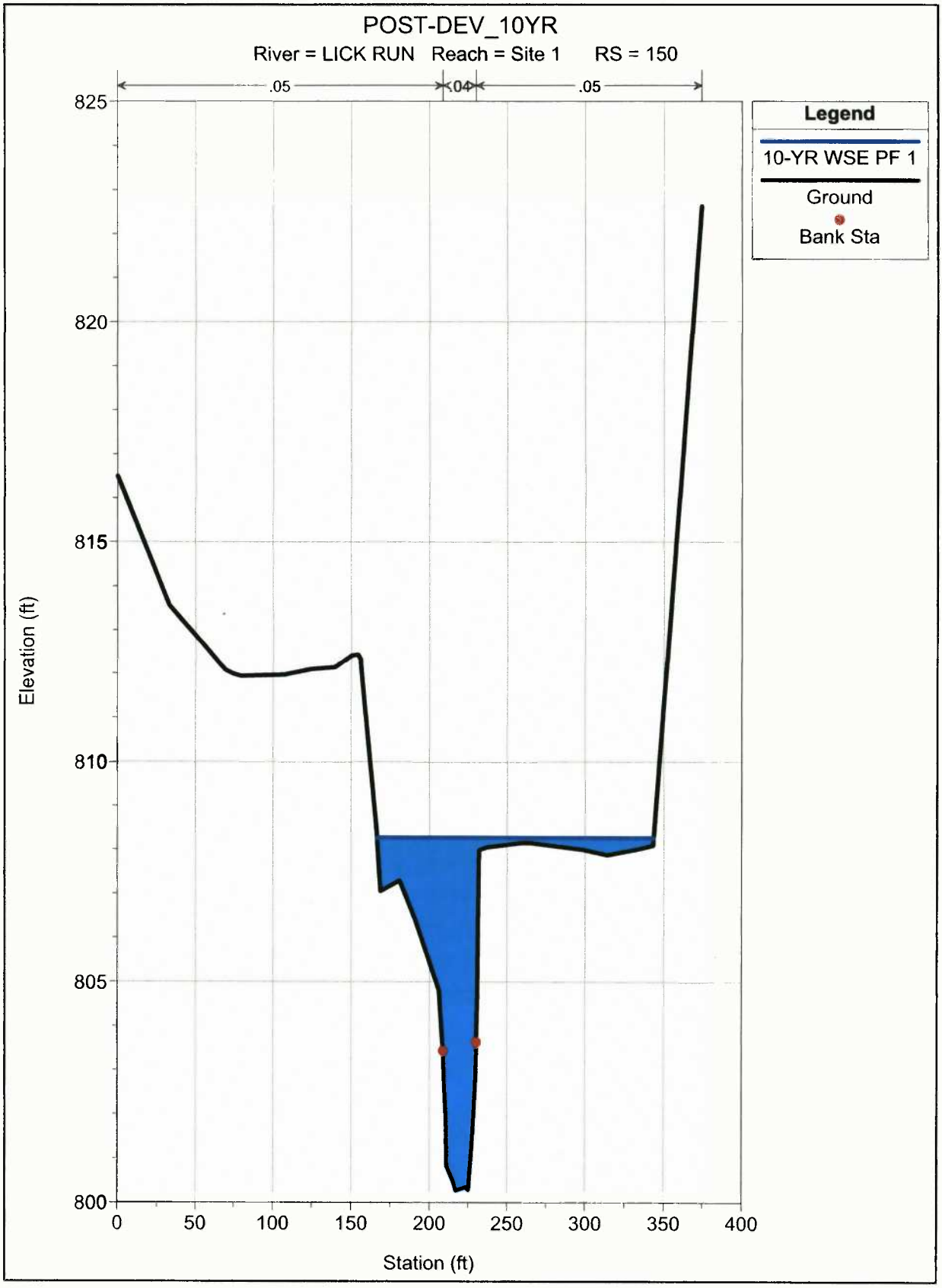

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 250
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
350
Station (ft)

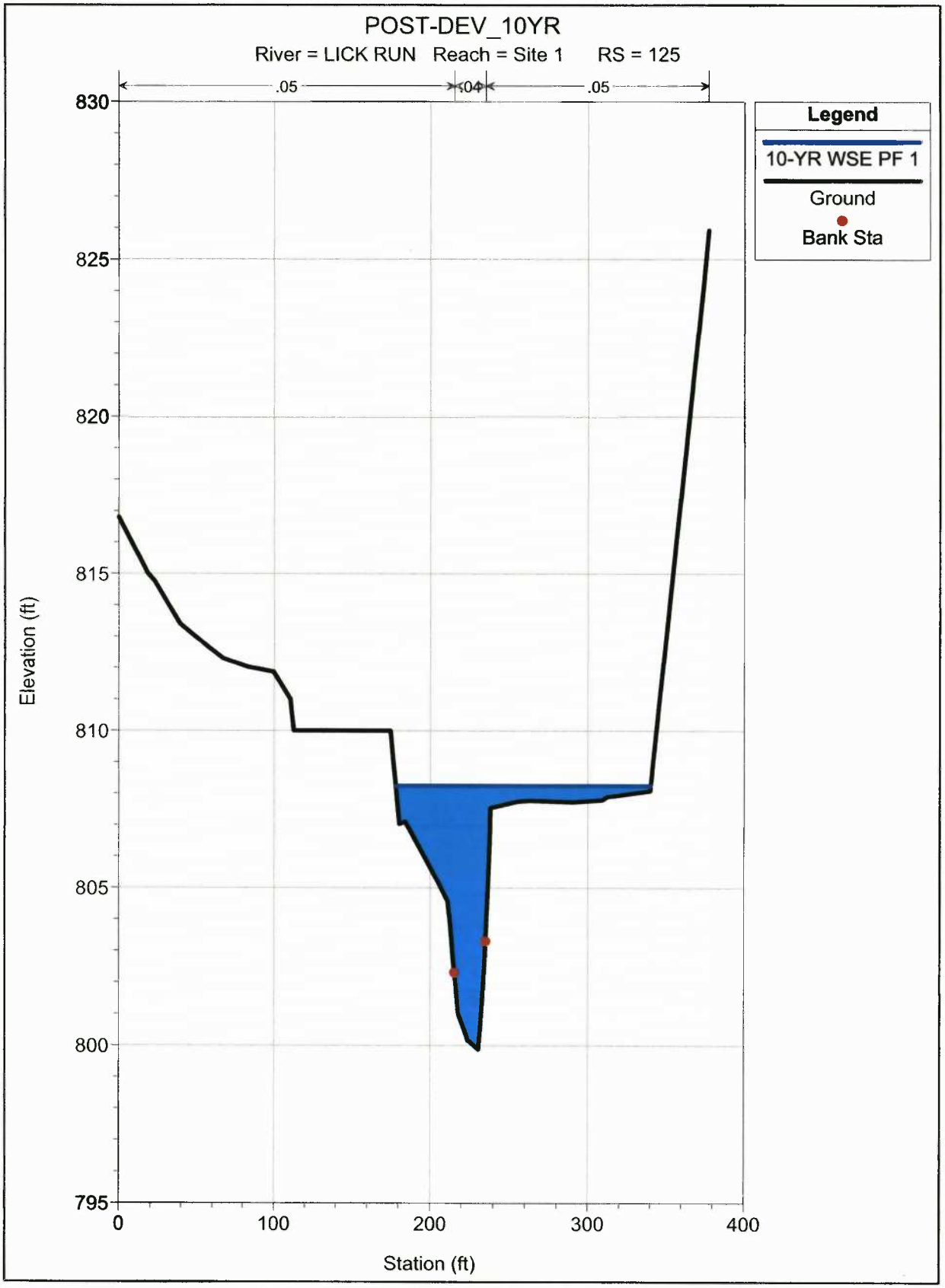

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 225
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
350
Station (ft)

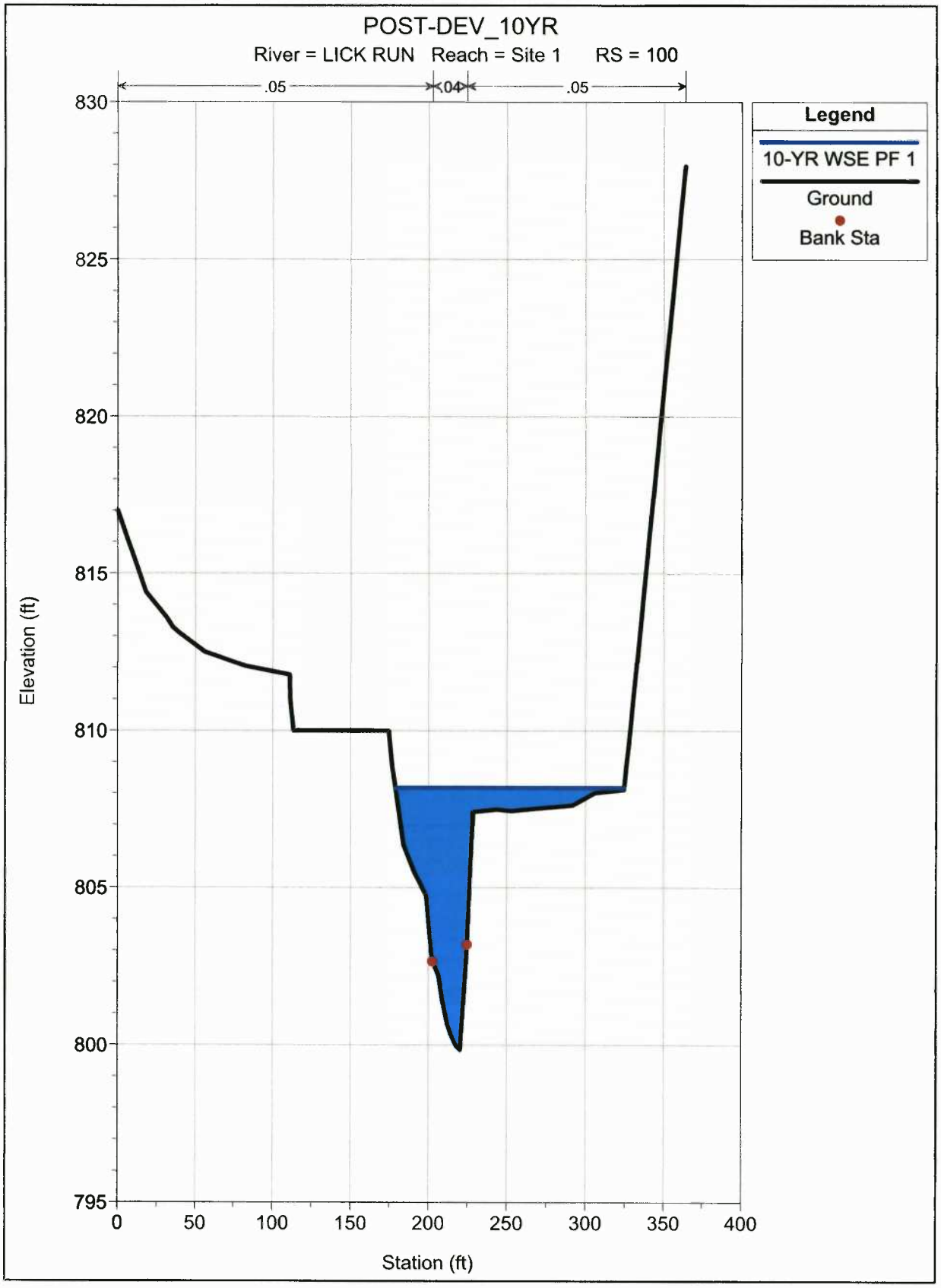

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 200
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
350
400
Station (ft)

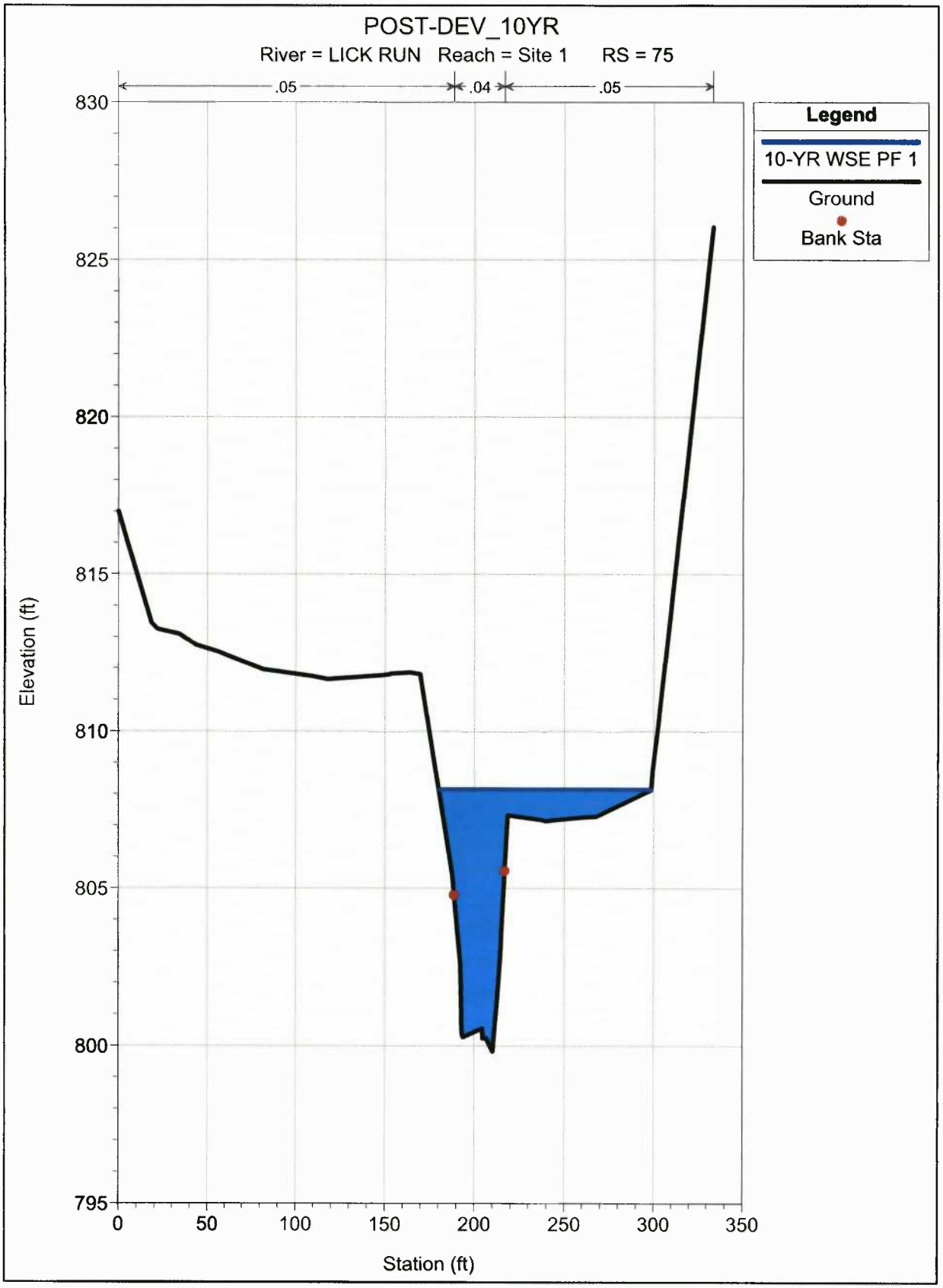

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 175 BR
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
350
400
Station (ft)

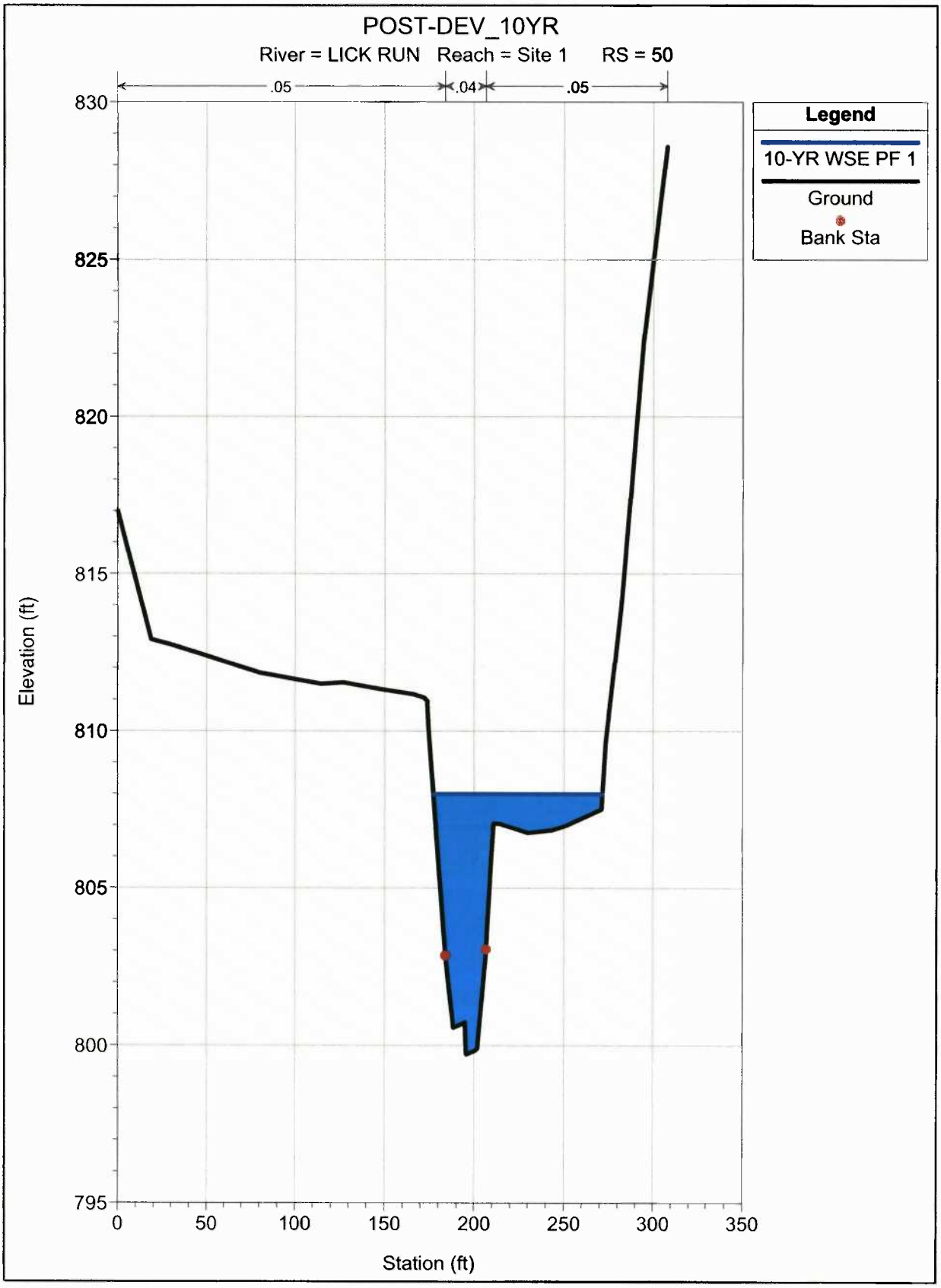

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 175 BR
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
300
350
400
Station (ft)

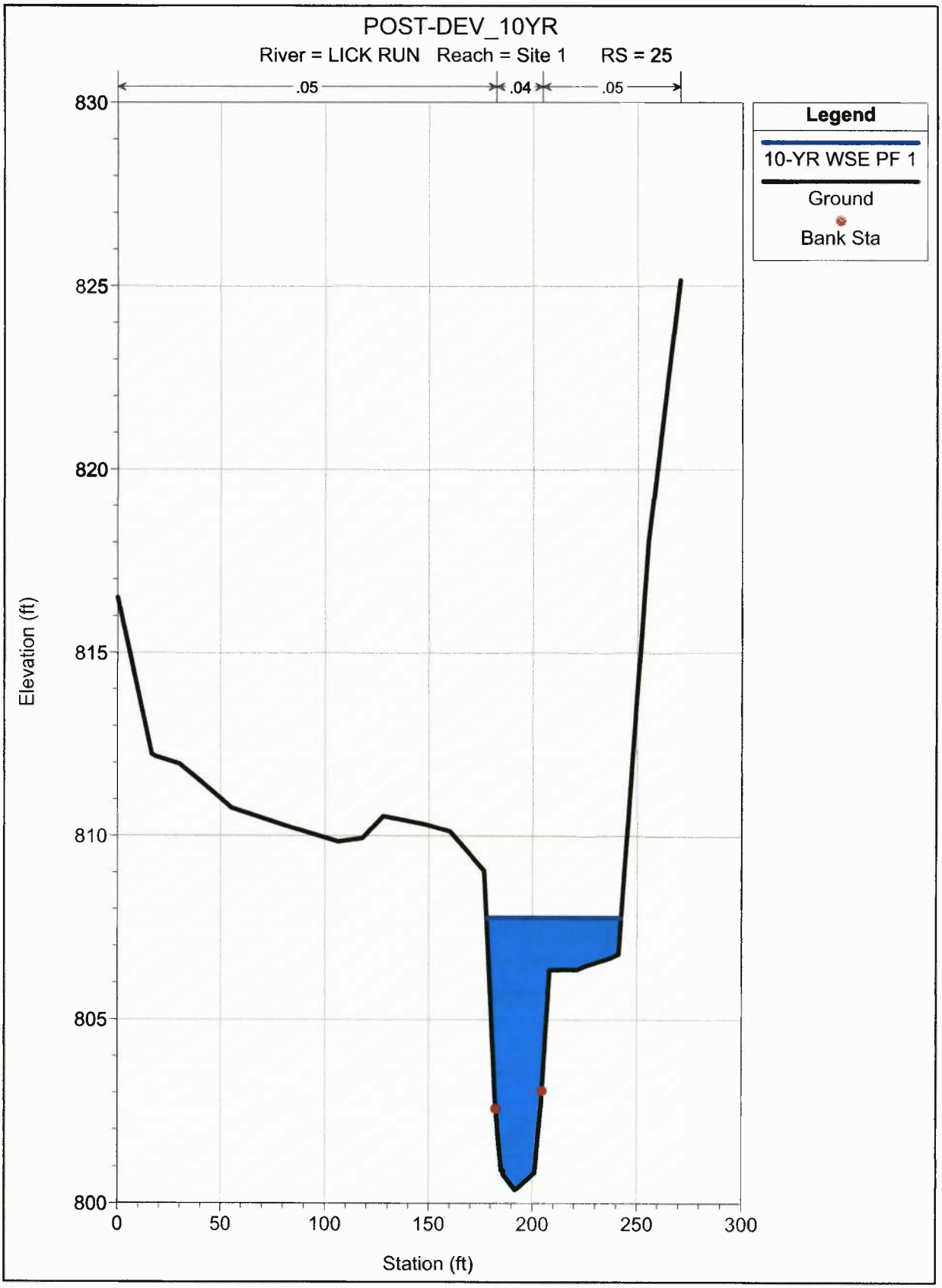

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 150
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
300
350
400
Station (ft)


POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 125
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
100
200
300
400
Station (ft)

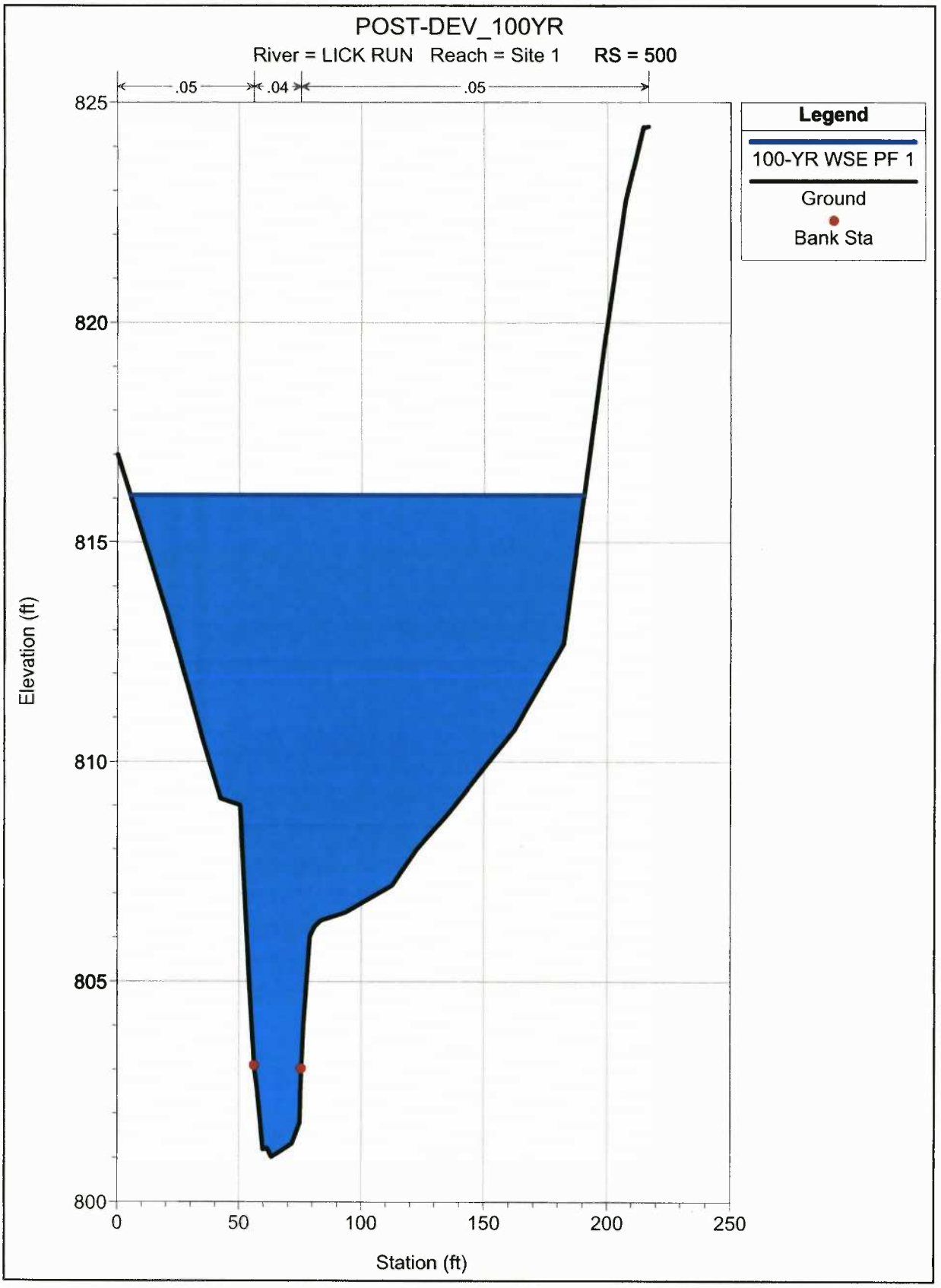

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 100
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
350
400
Station (ft)

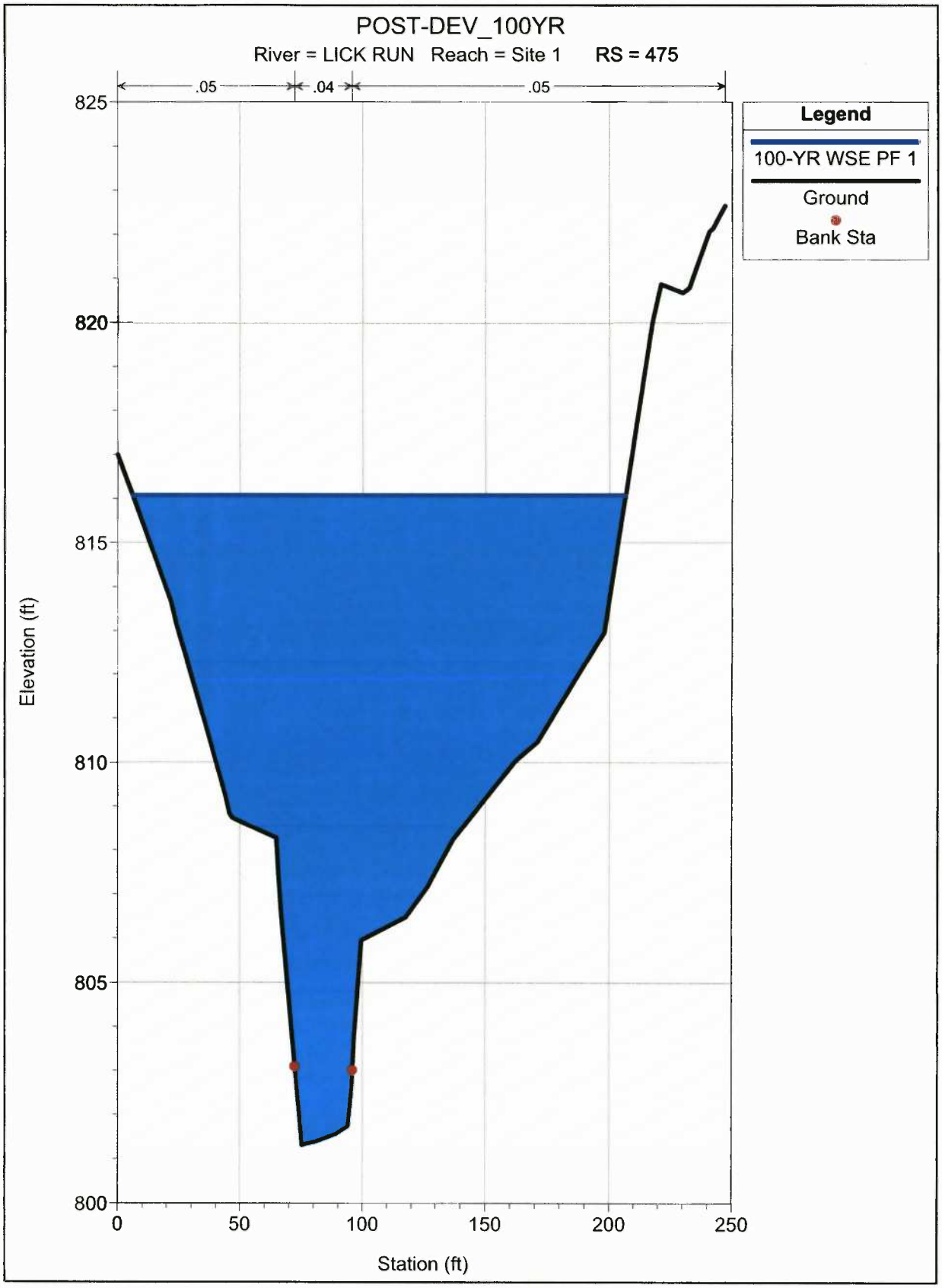

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 75
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
350
Station (ft)

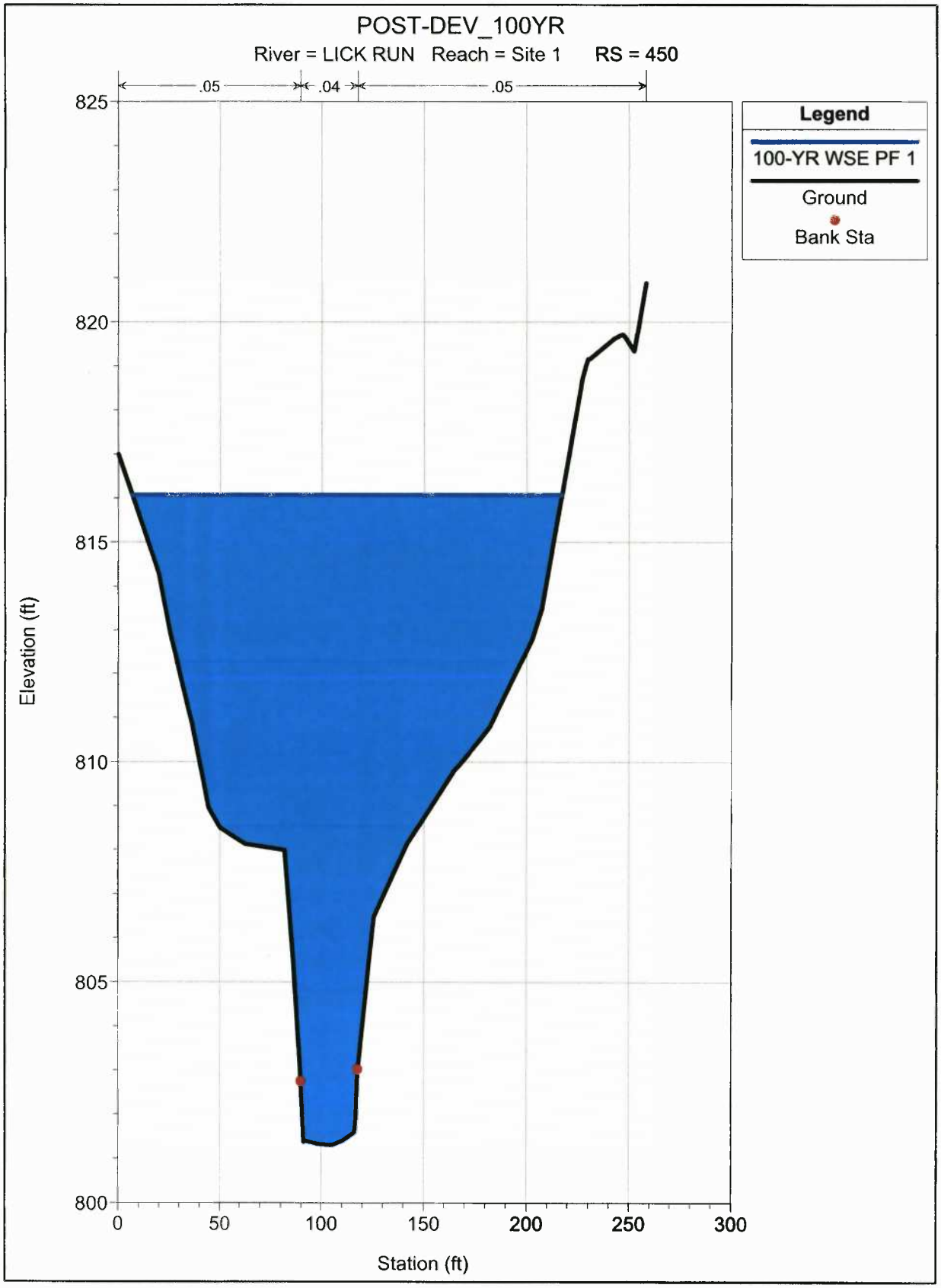

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 50
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
350
Station (ft)

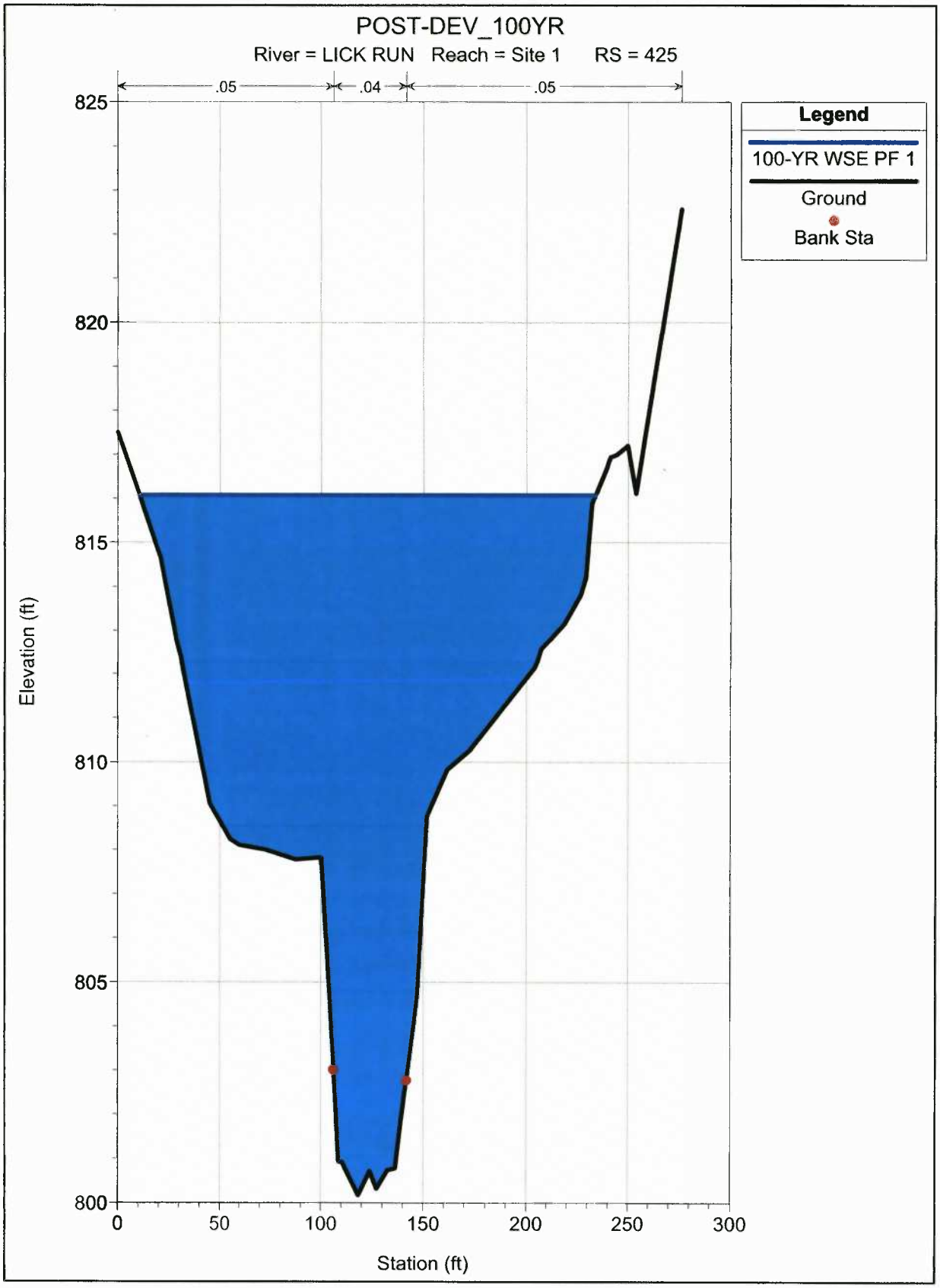

POST-DEV_10YR
River = LICK RUN Reach = Site 1 RS = 25
.05
.04
.05
Legend
10-YR WSE PF 1
Ground
Bank Sta
830
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)

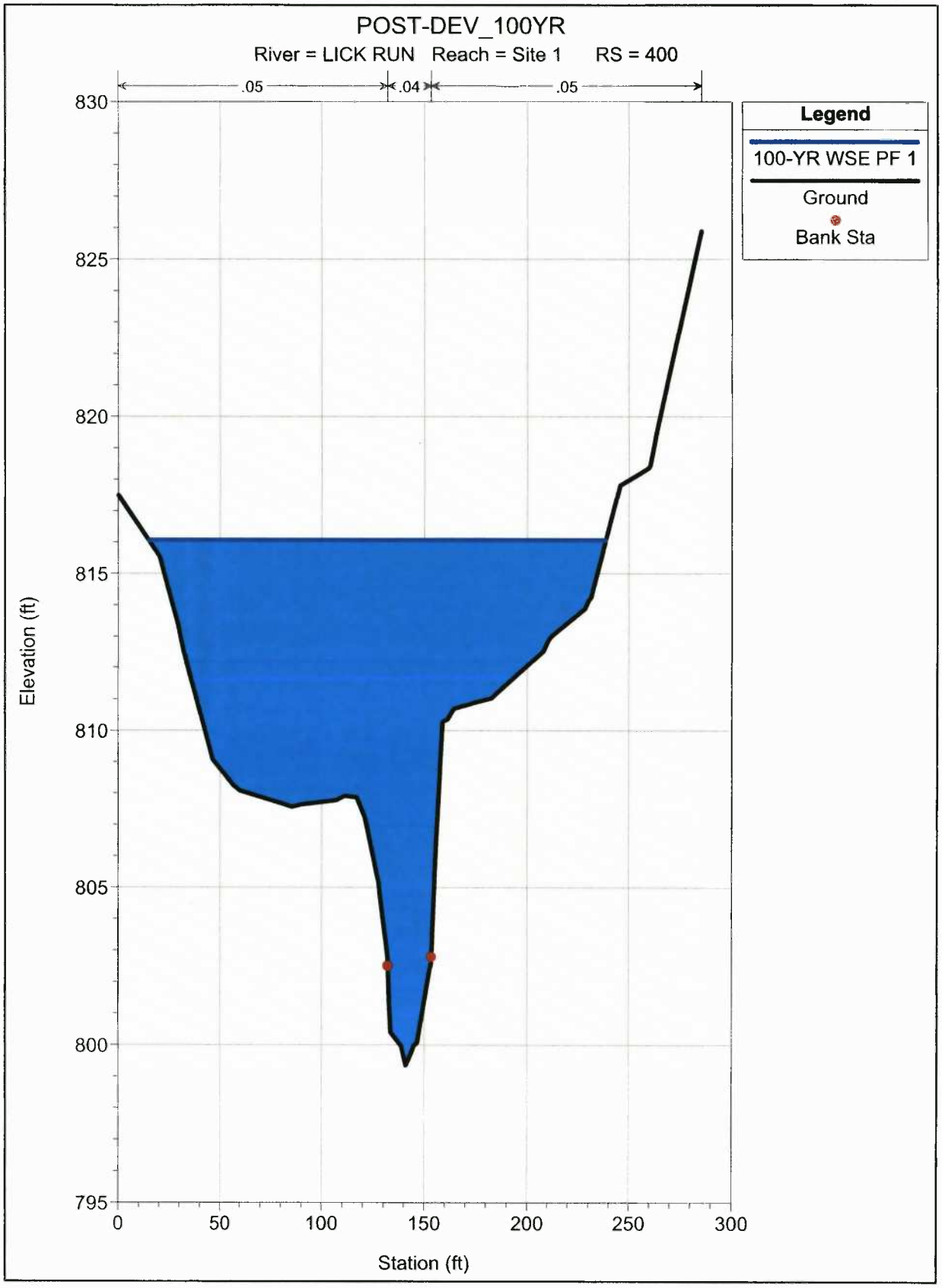
CROSS SECTIONS – POST DEVELOPMENT (100-YR)

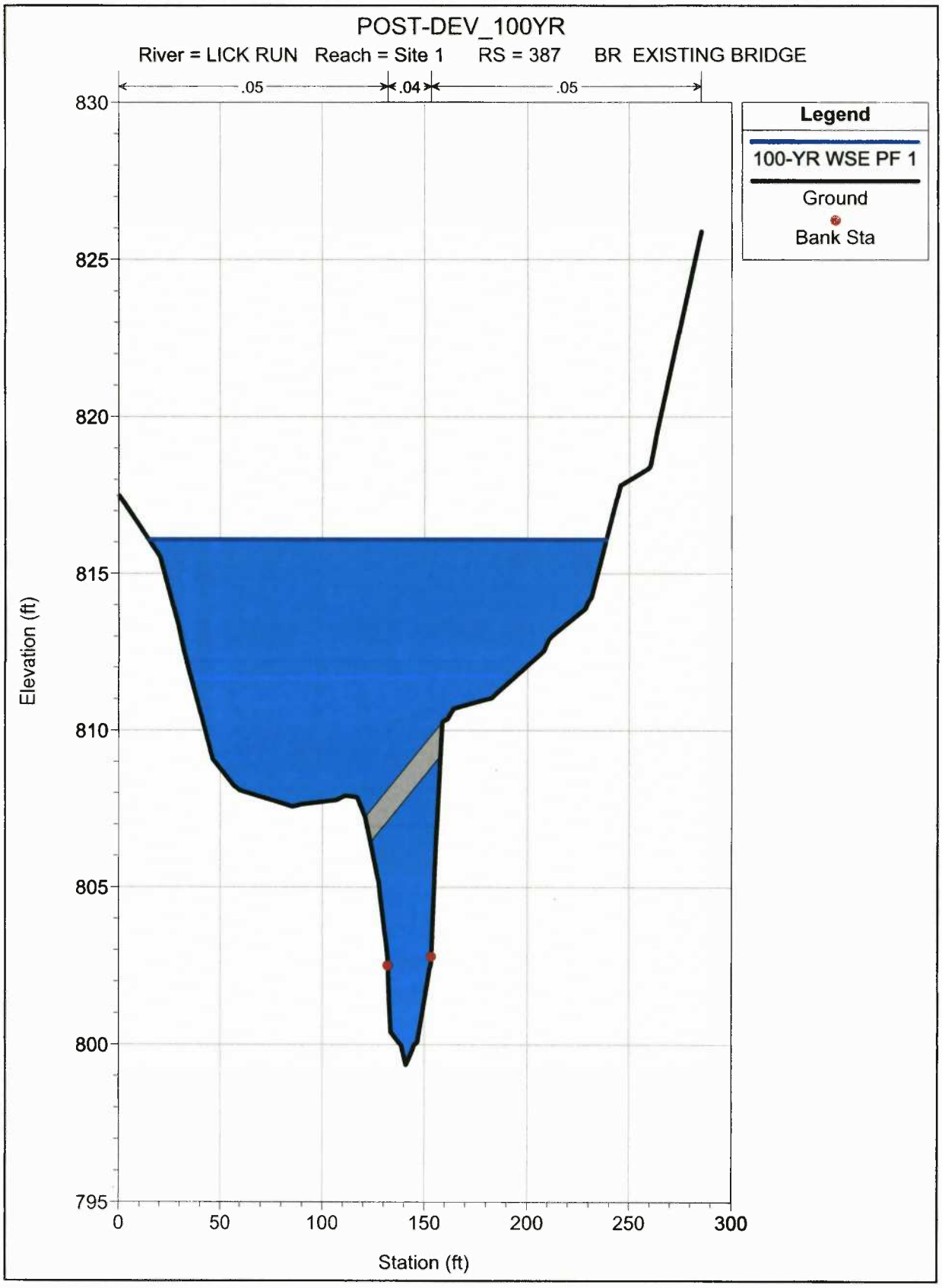

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 500
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
Station (ft)

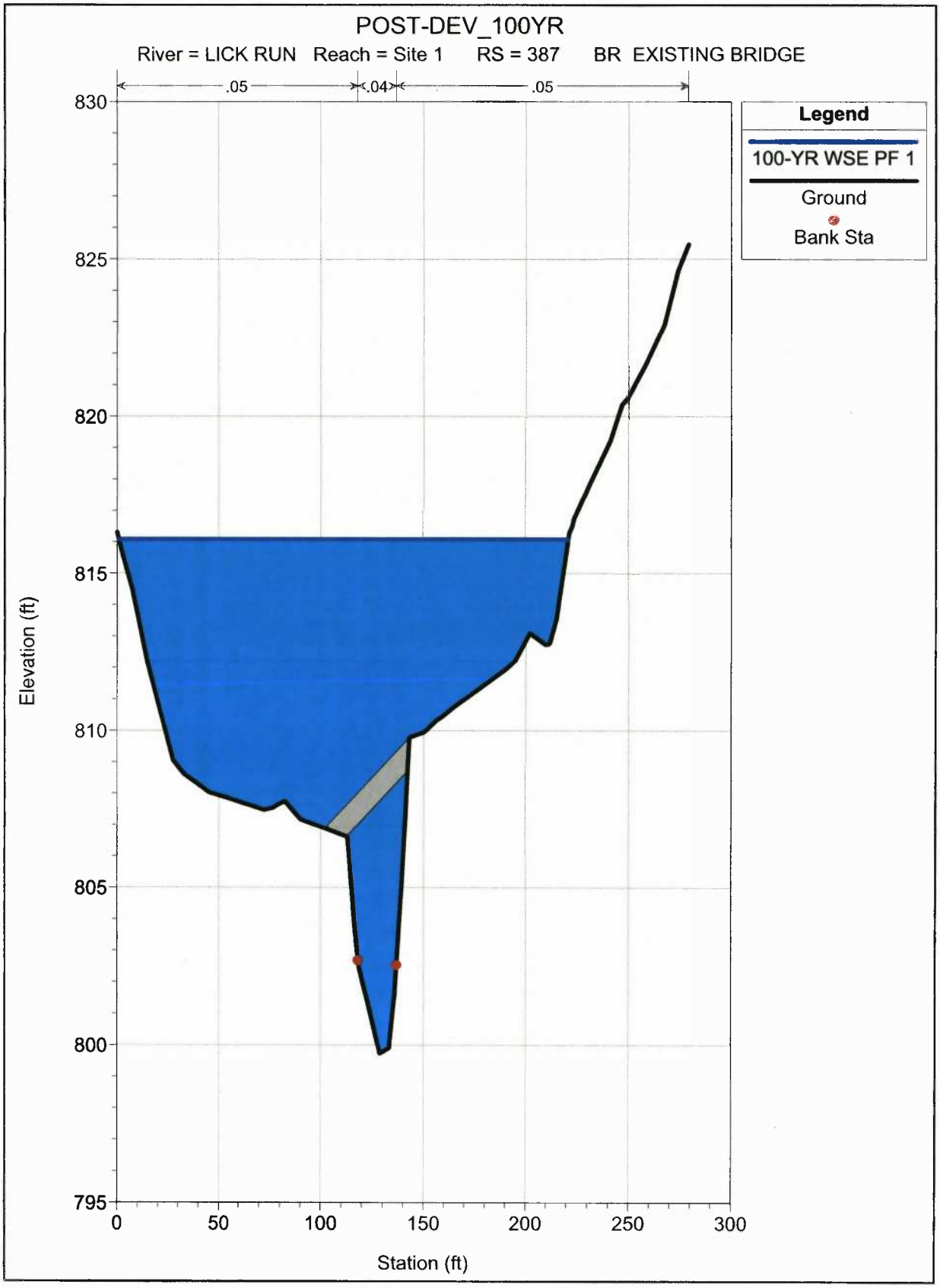

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 475
.05
.04
.05
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
Station (ft)
Legend
100-YR WSE PF 1
Ground
Bank Sta

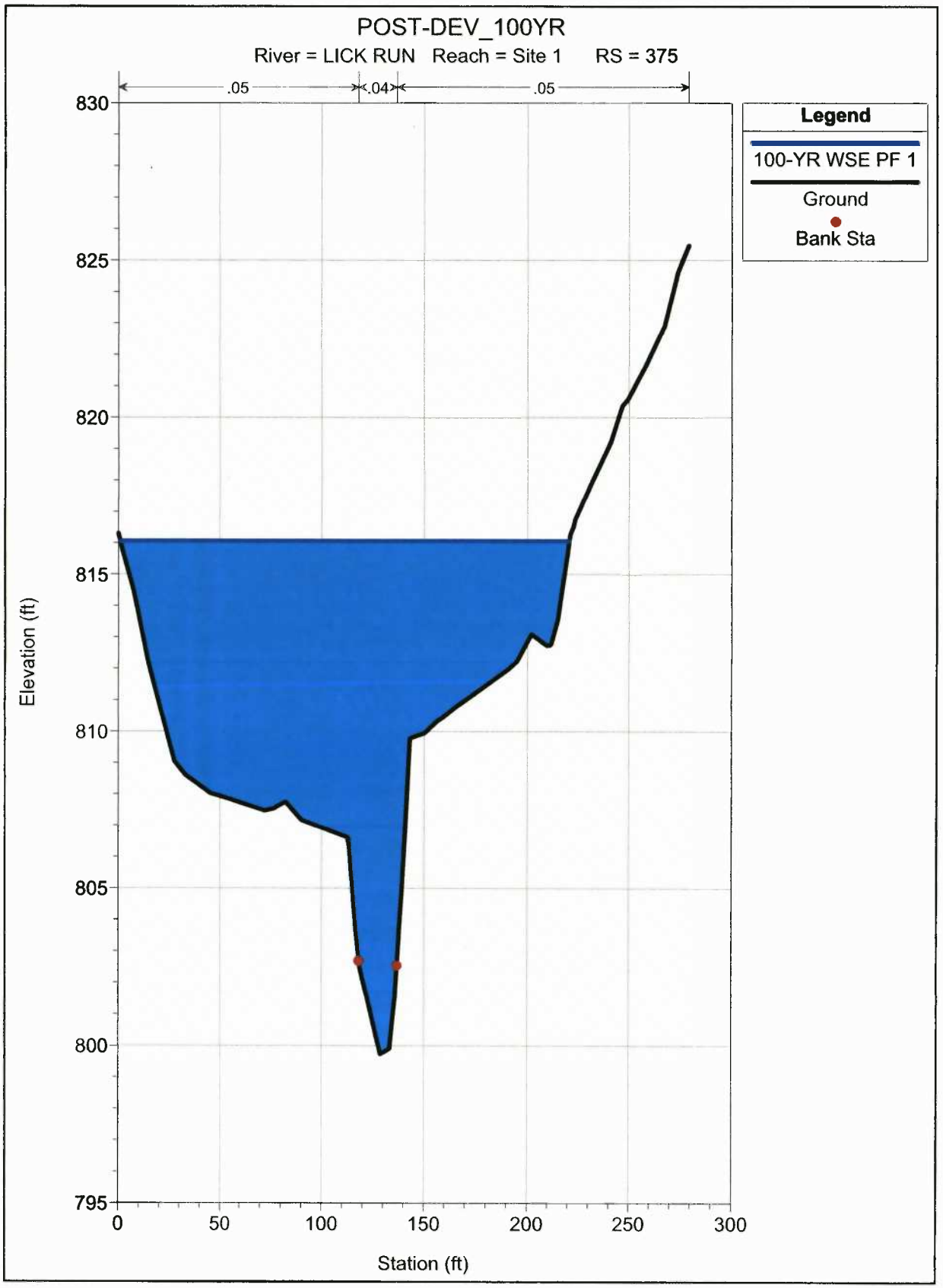

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 450
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)

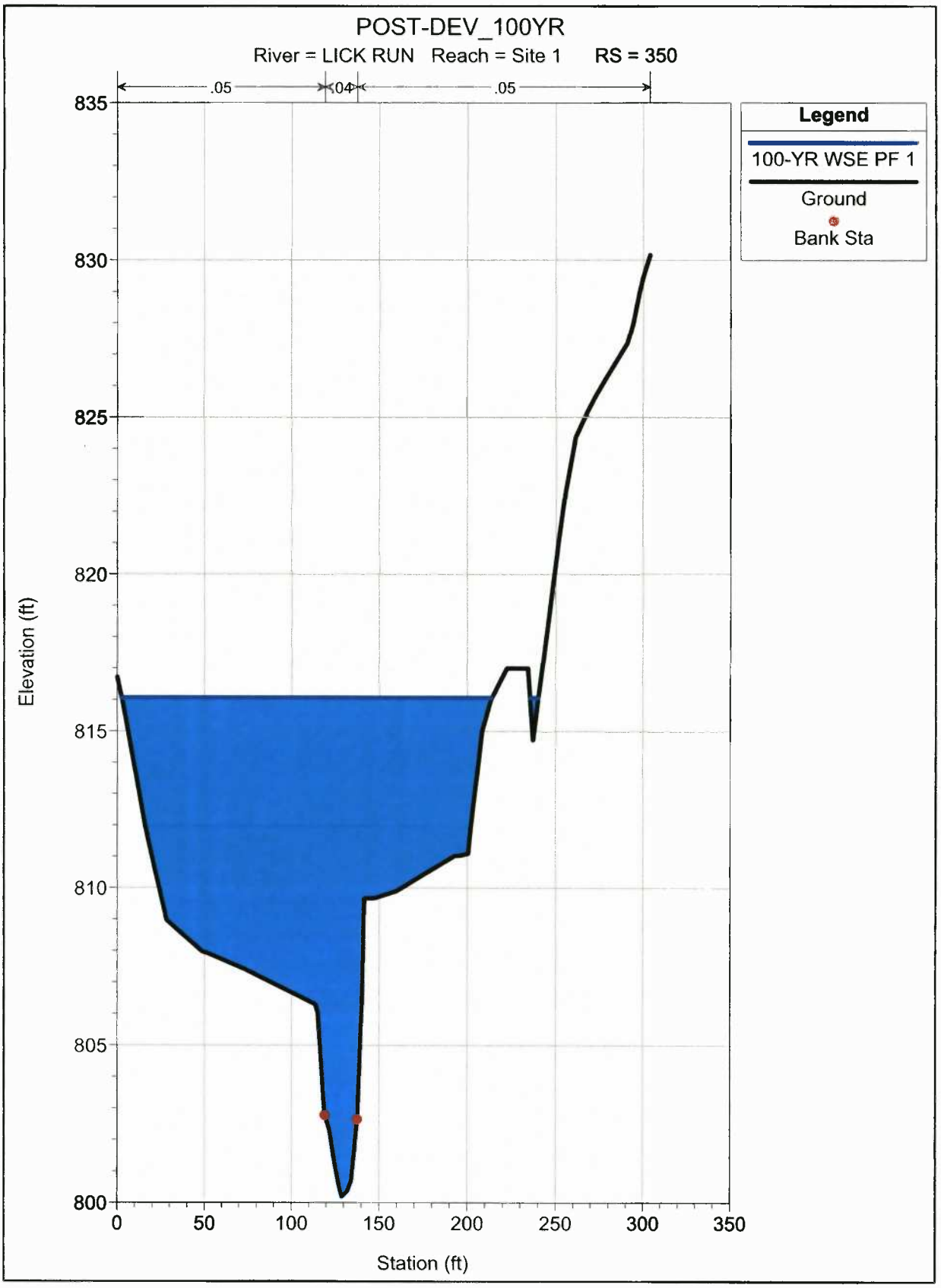

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 425
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)

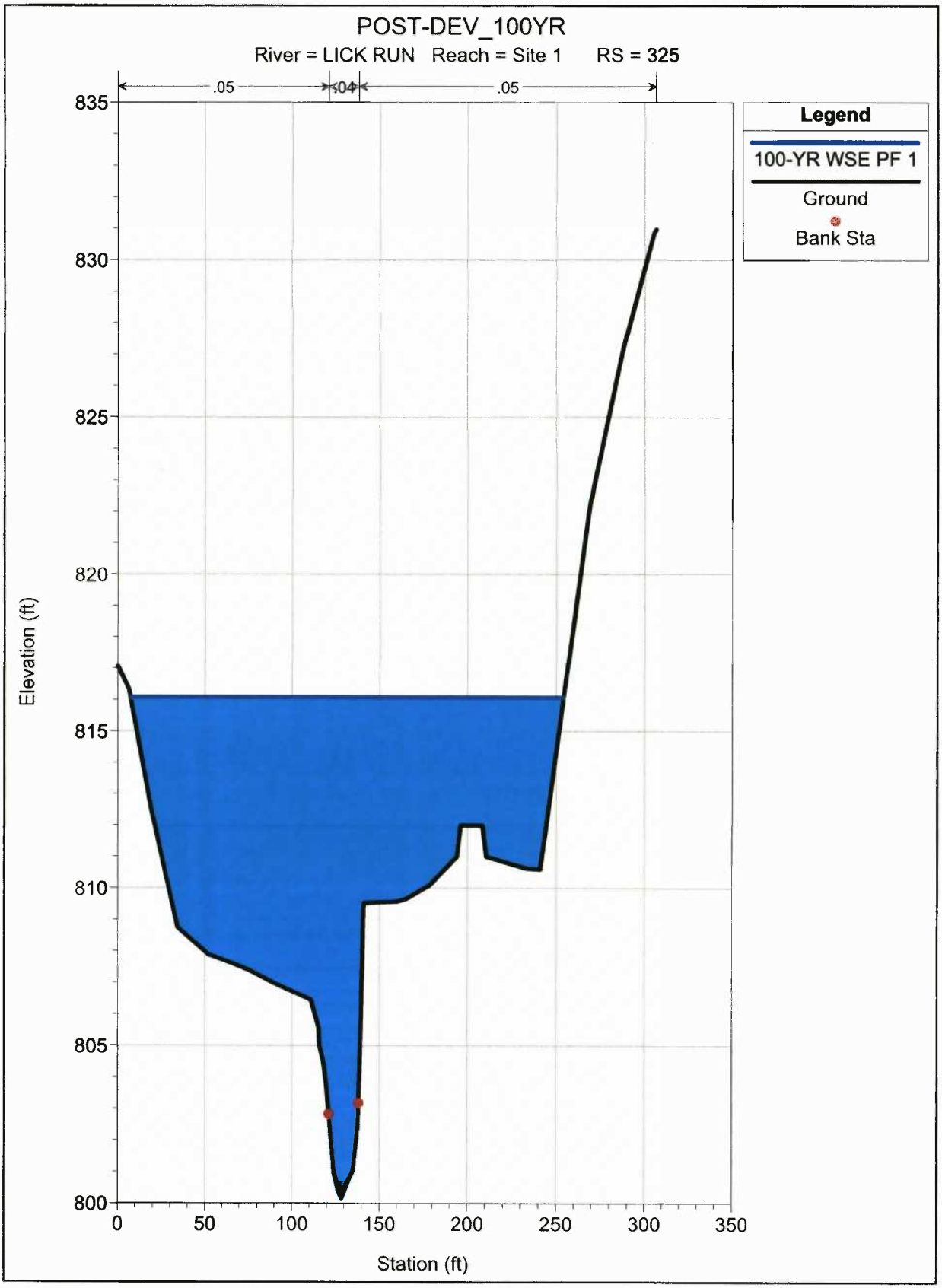

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 400
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
Station (ft)

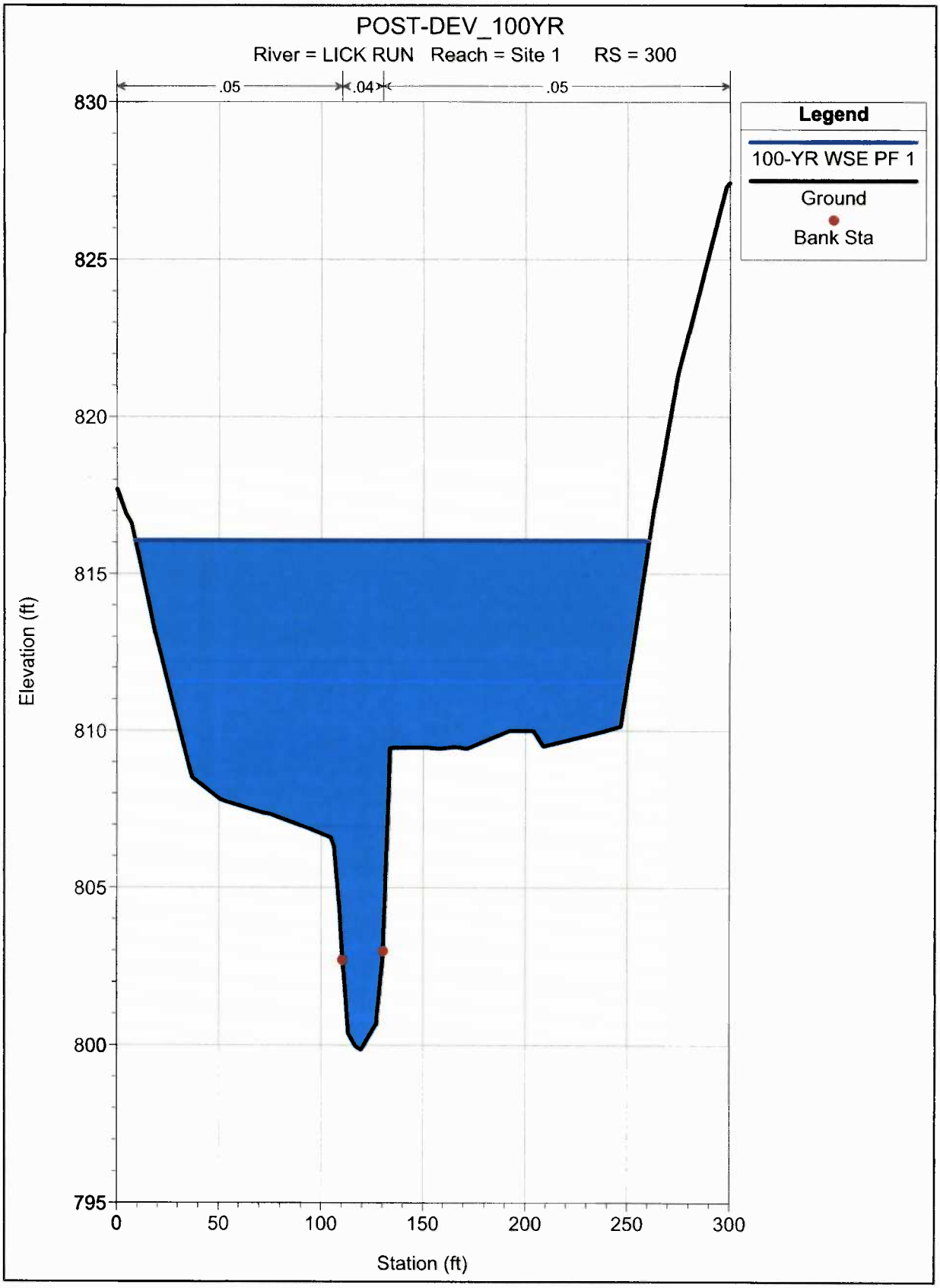

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 387 BR EXISTING BRIDGE
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
Station (ft)

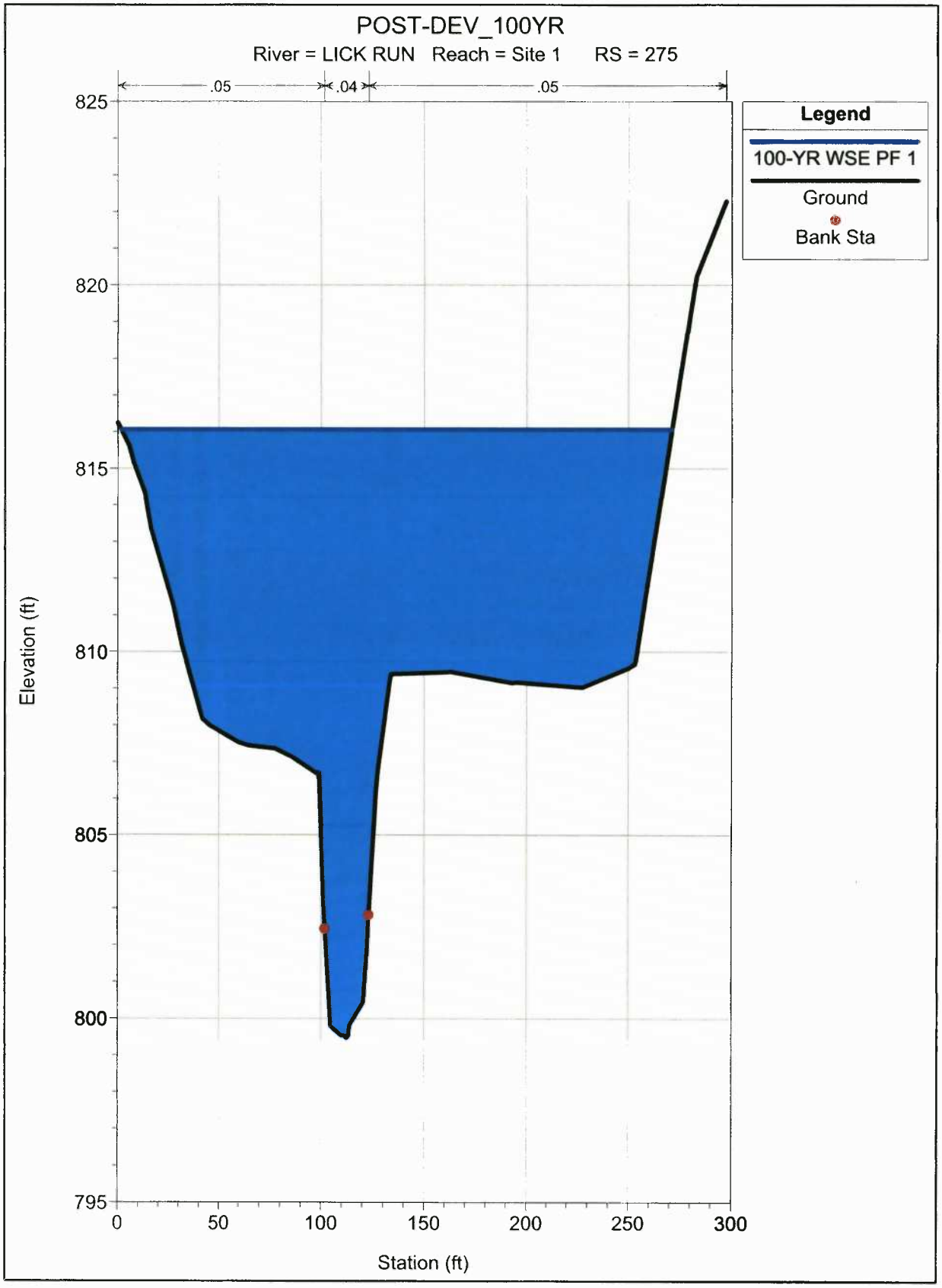

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 387 BR EXISTING BRIDGE
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
Station (ft)

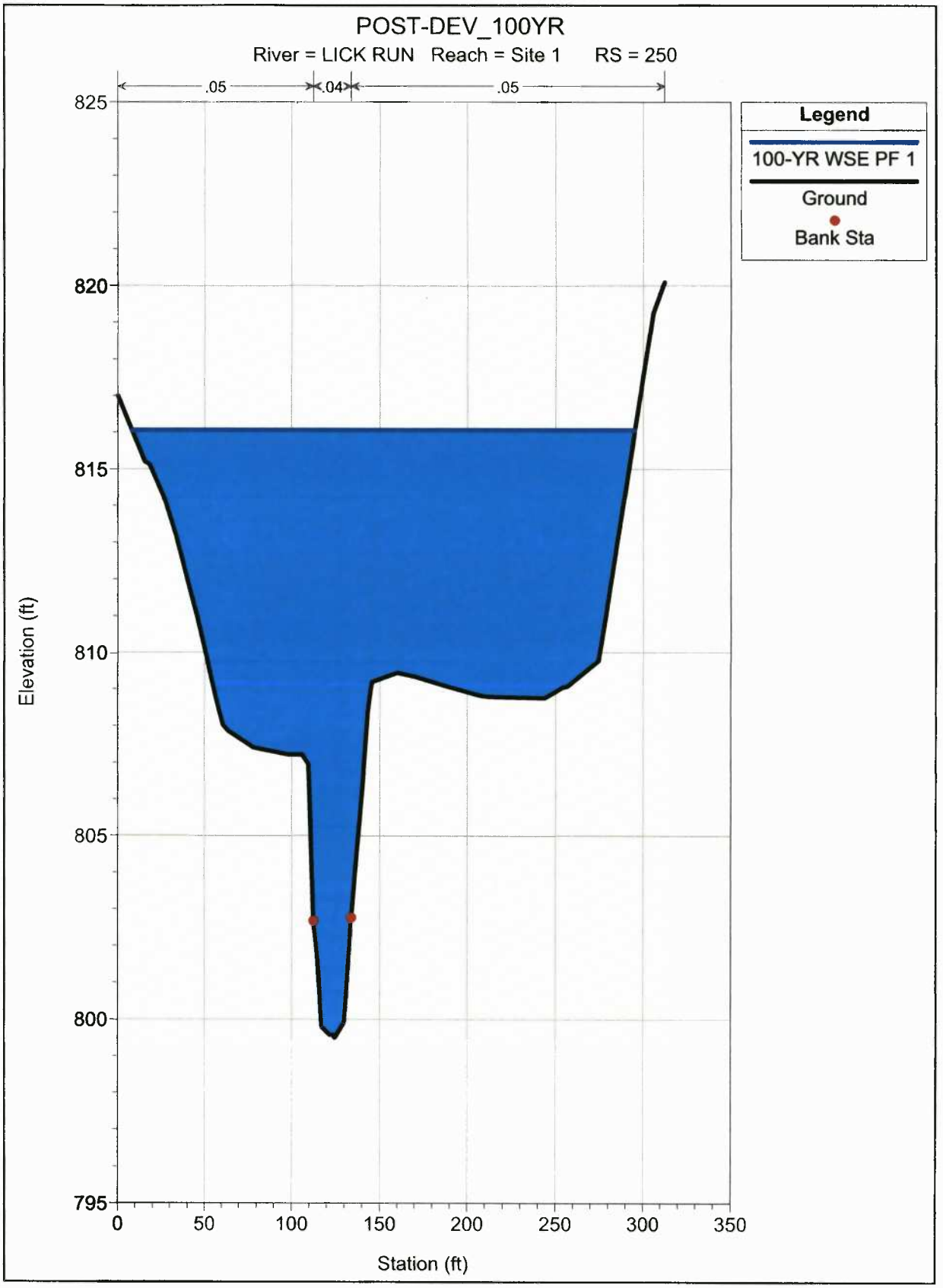

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 375
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
Station (ft)

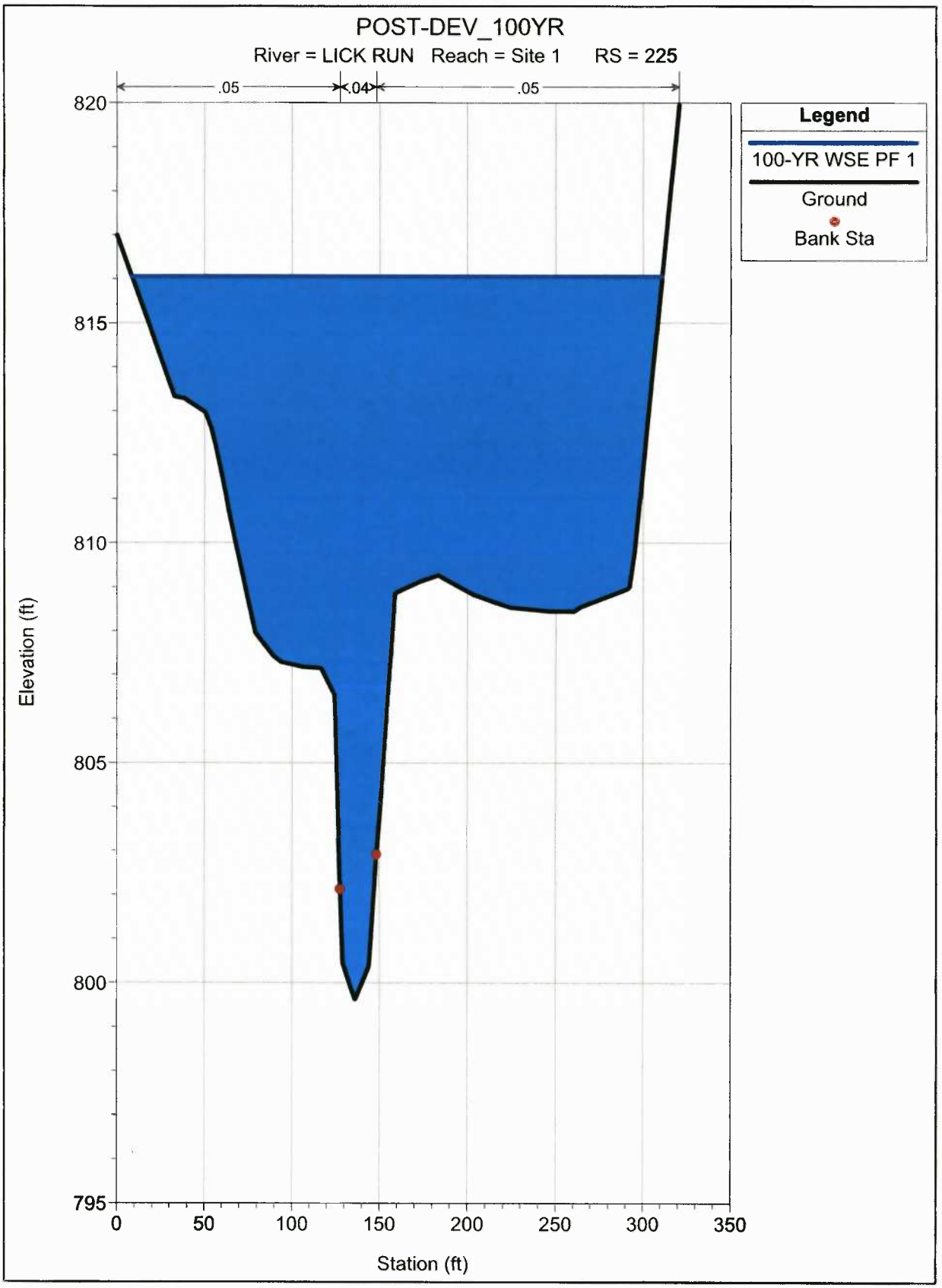

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 350
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
835
830
825
820
815
810
805
800
0
50
100
150
200
250
300
350
Station (ft)

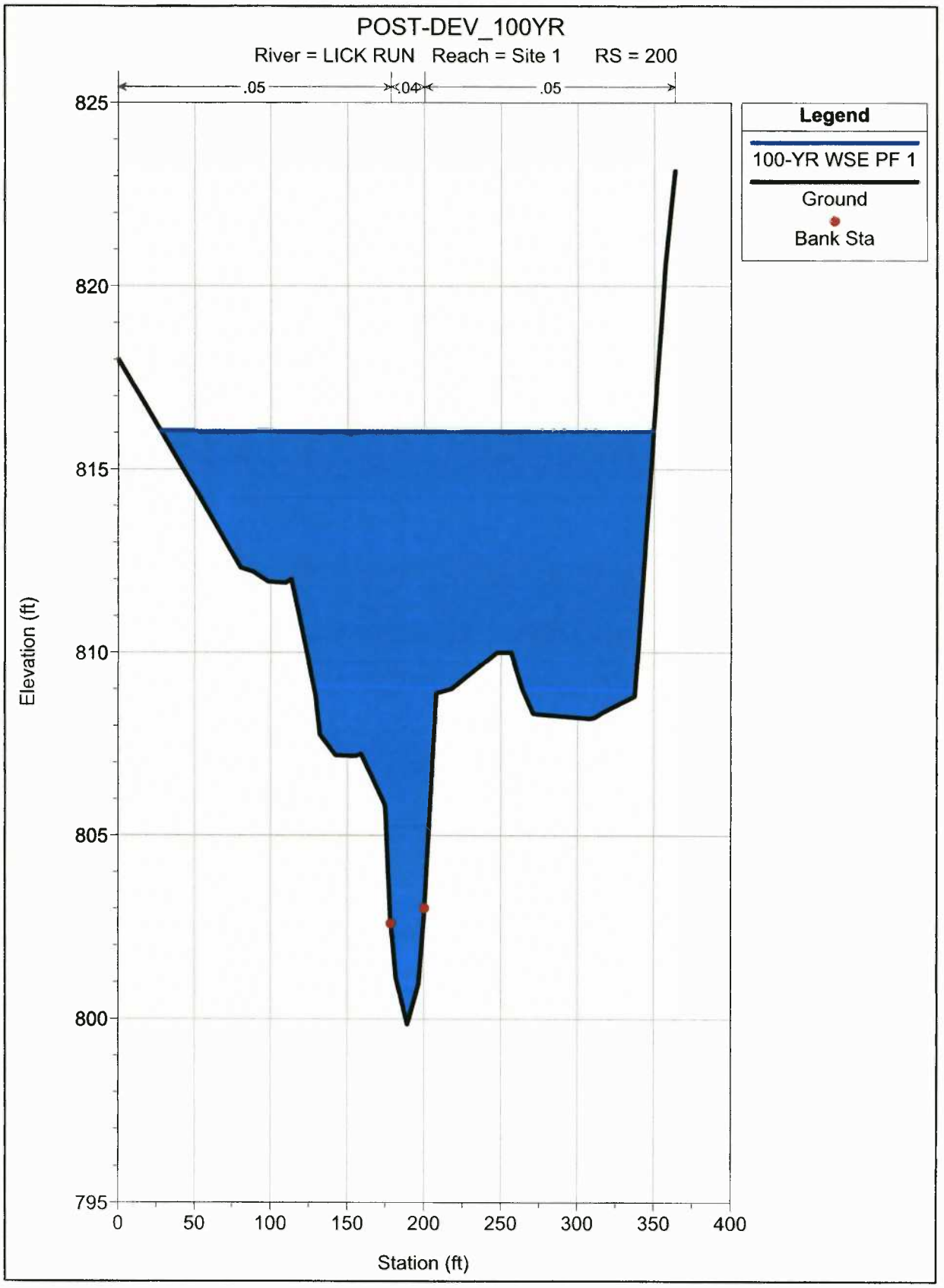

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 325
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
835
830
825
820
815
810
805
800
0
50
100
150
200
250
300
350
Station (ft)

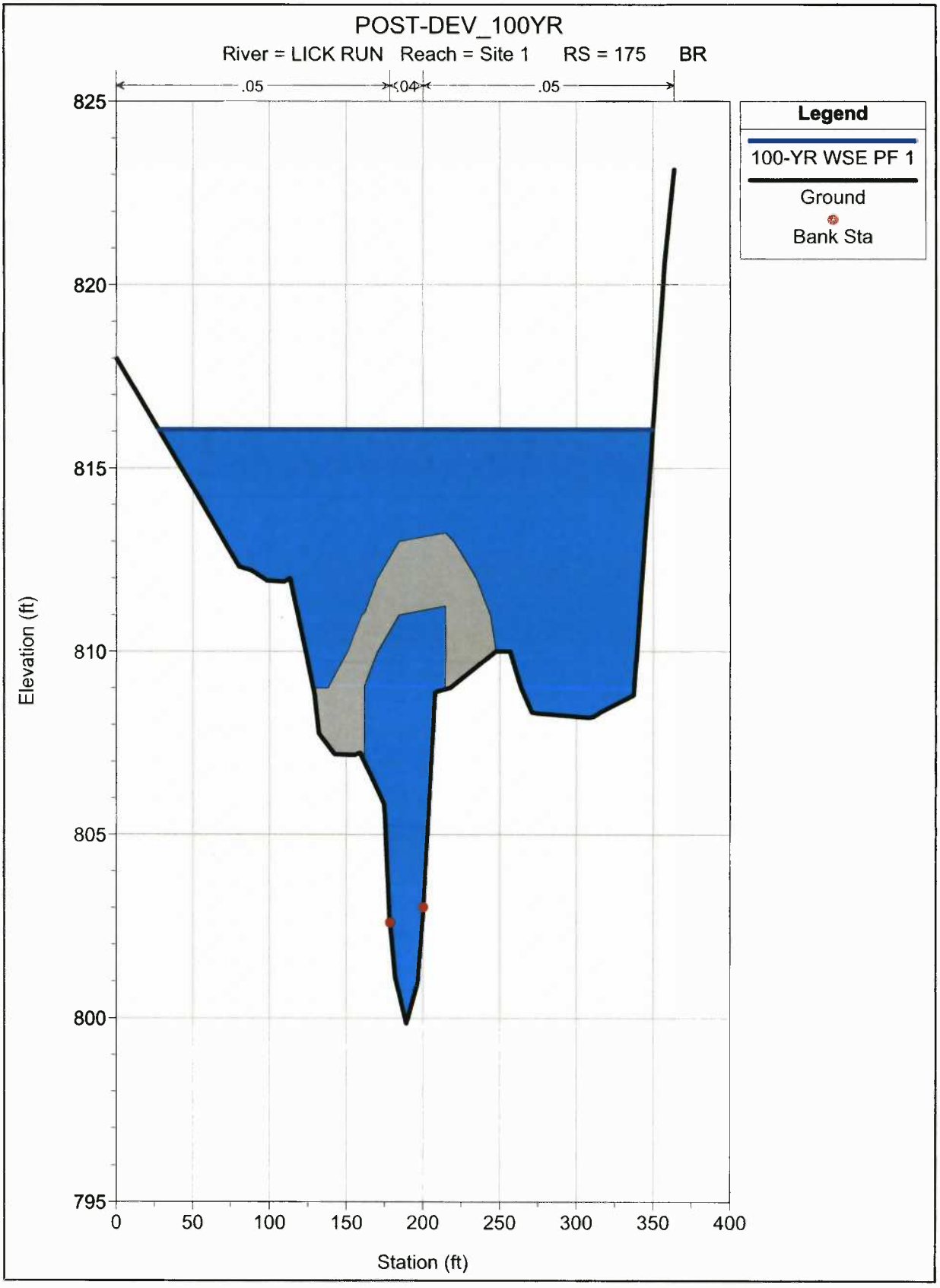

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 300
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
830
825
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)

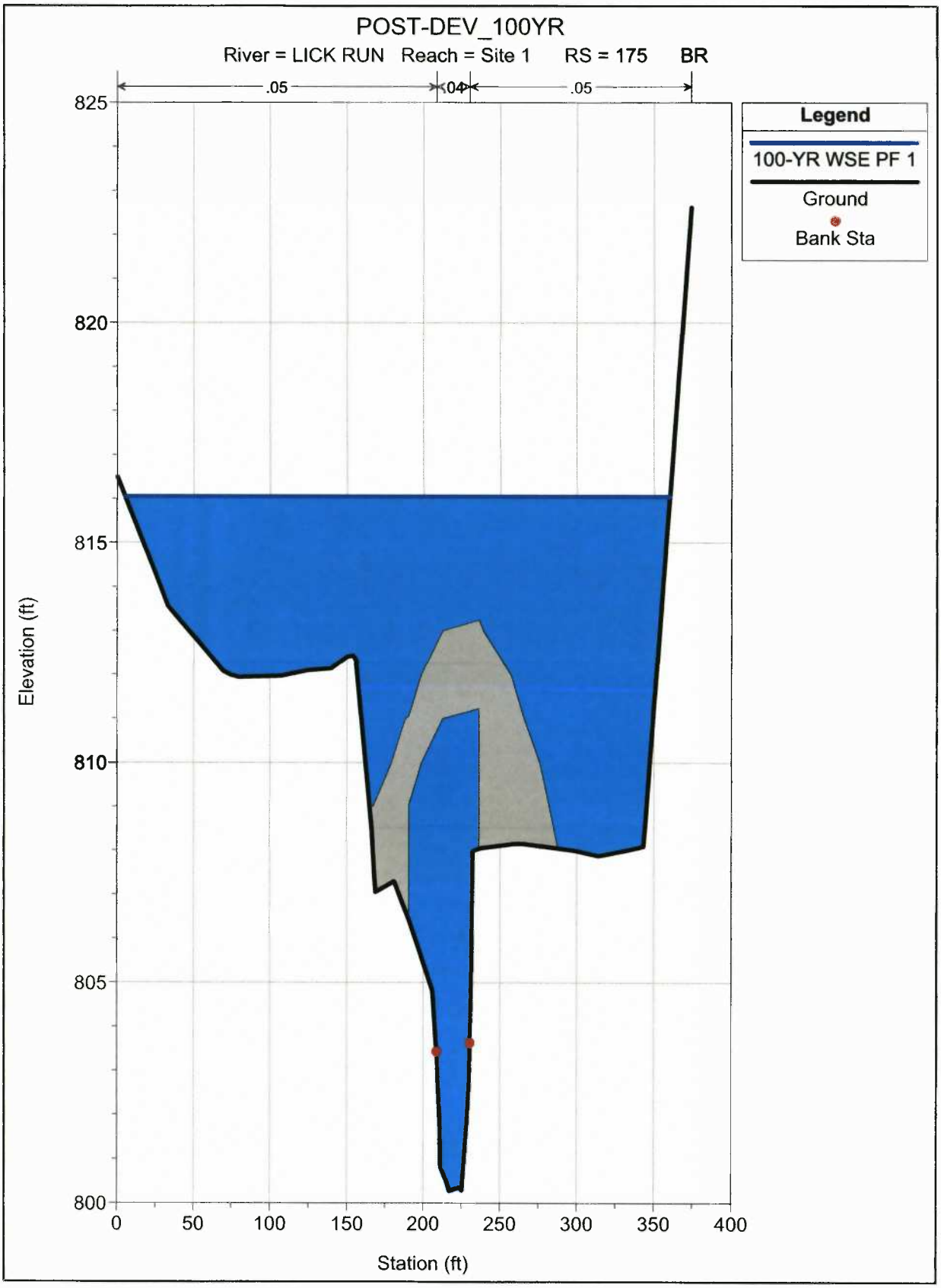

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 275
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)

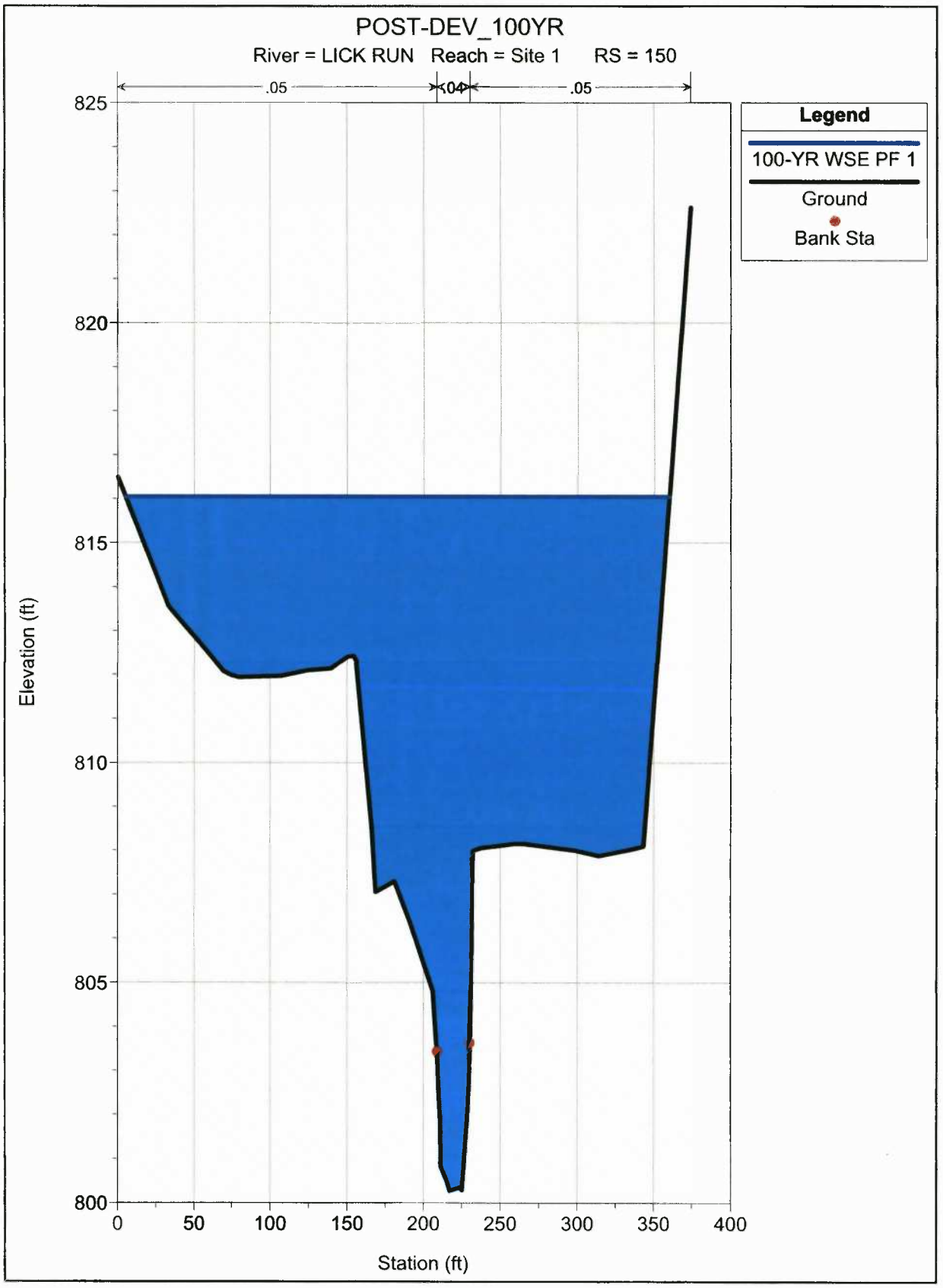

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 250
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
350
Station (ft)

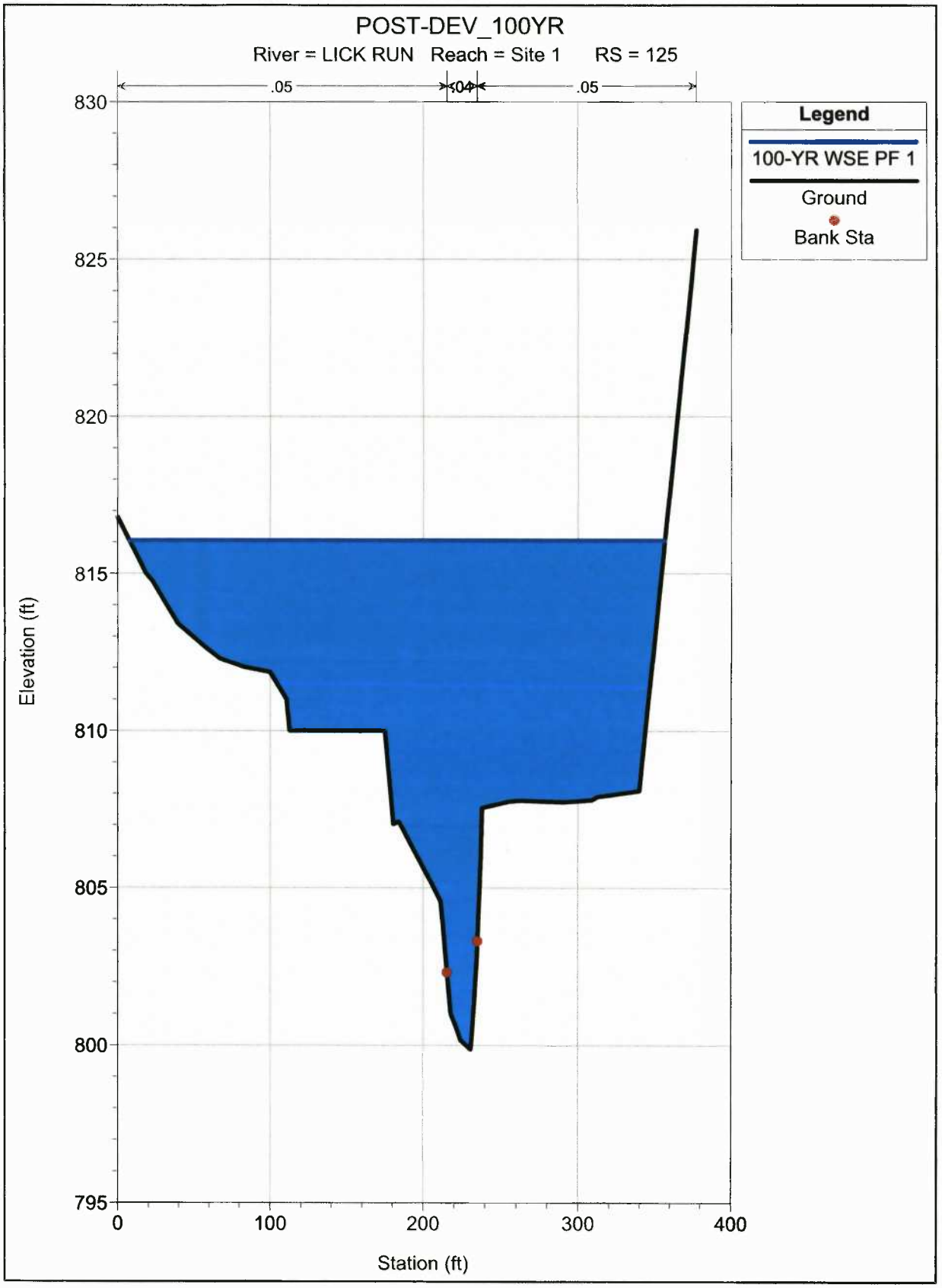

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 225
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
350
Station (ft)

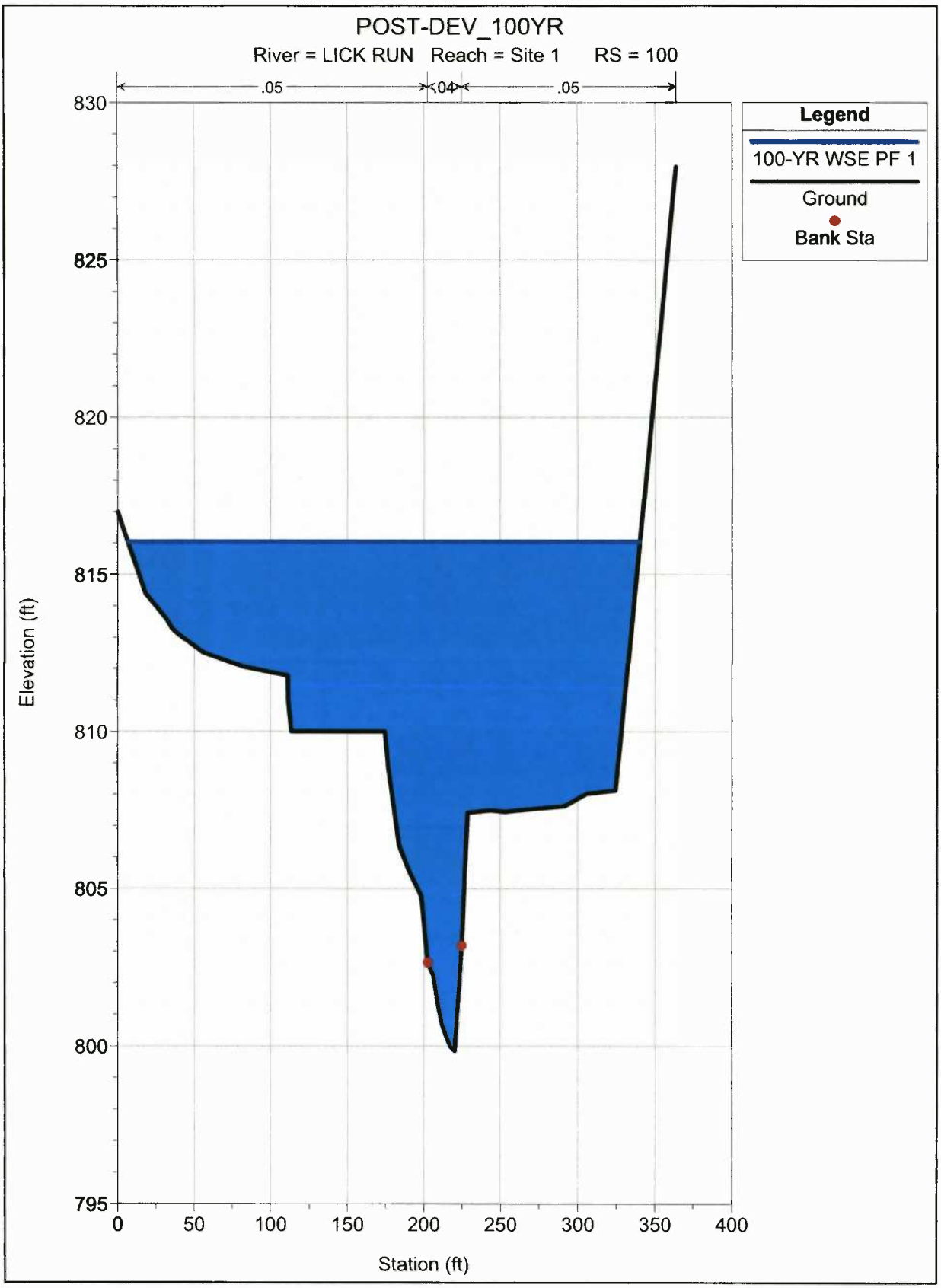

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 200
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
350
400
Station (ft)

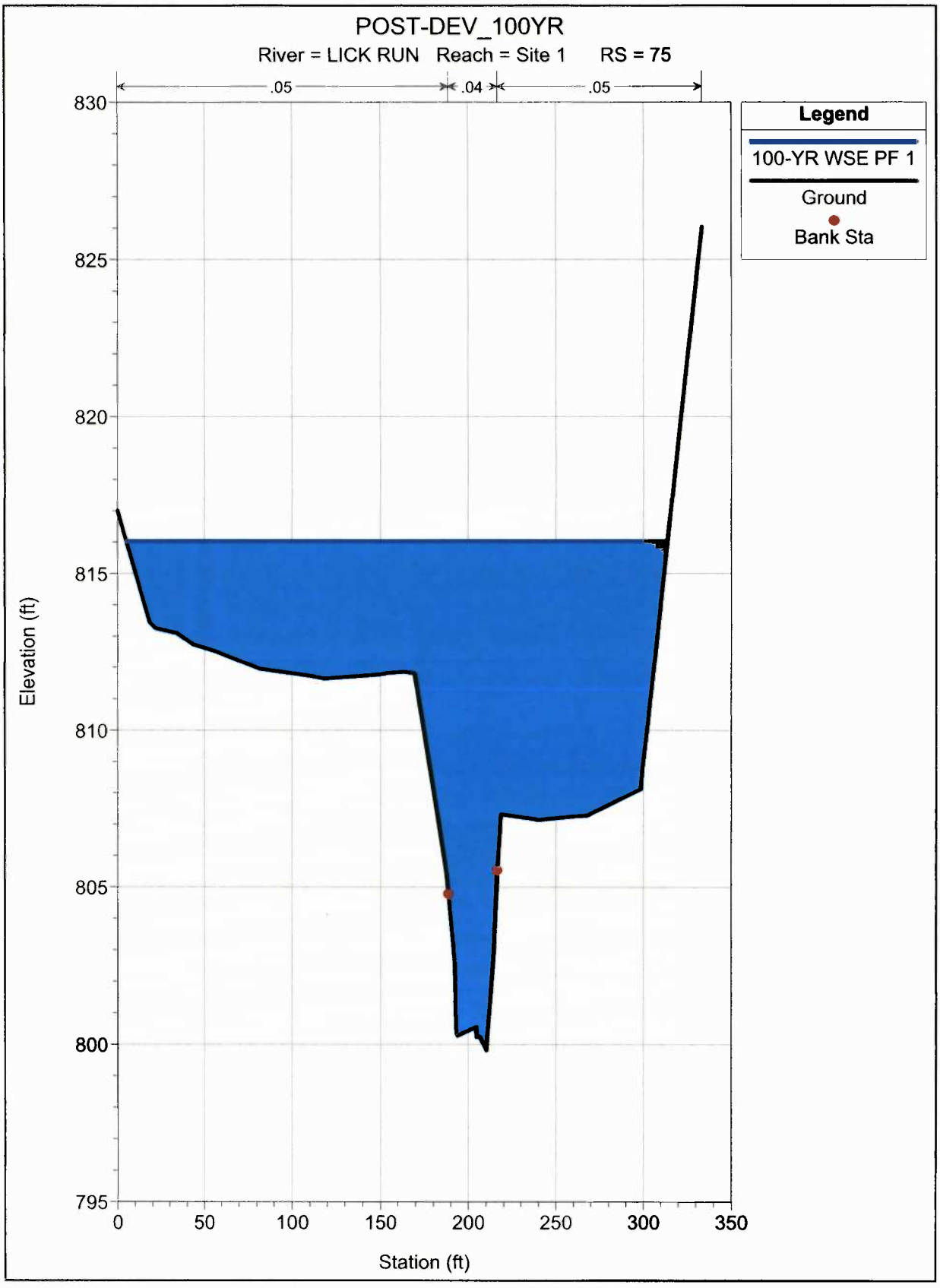

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 175 BR
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
795
Elevation (ft)
0
50
100
150
200
250
300
350
400
Station (ft)

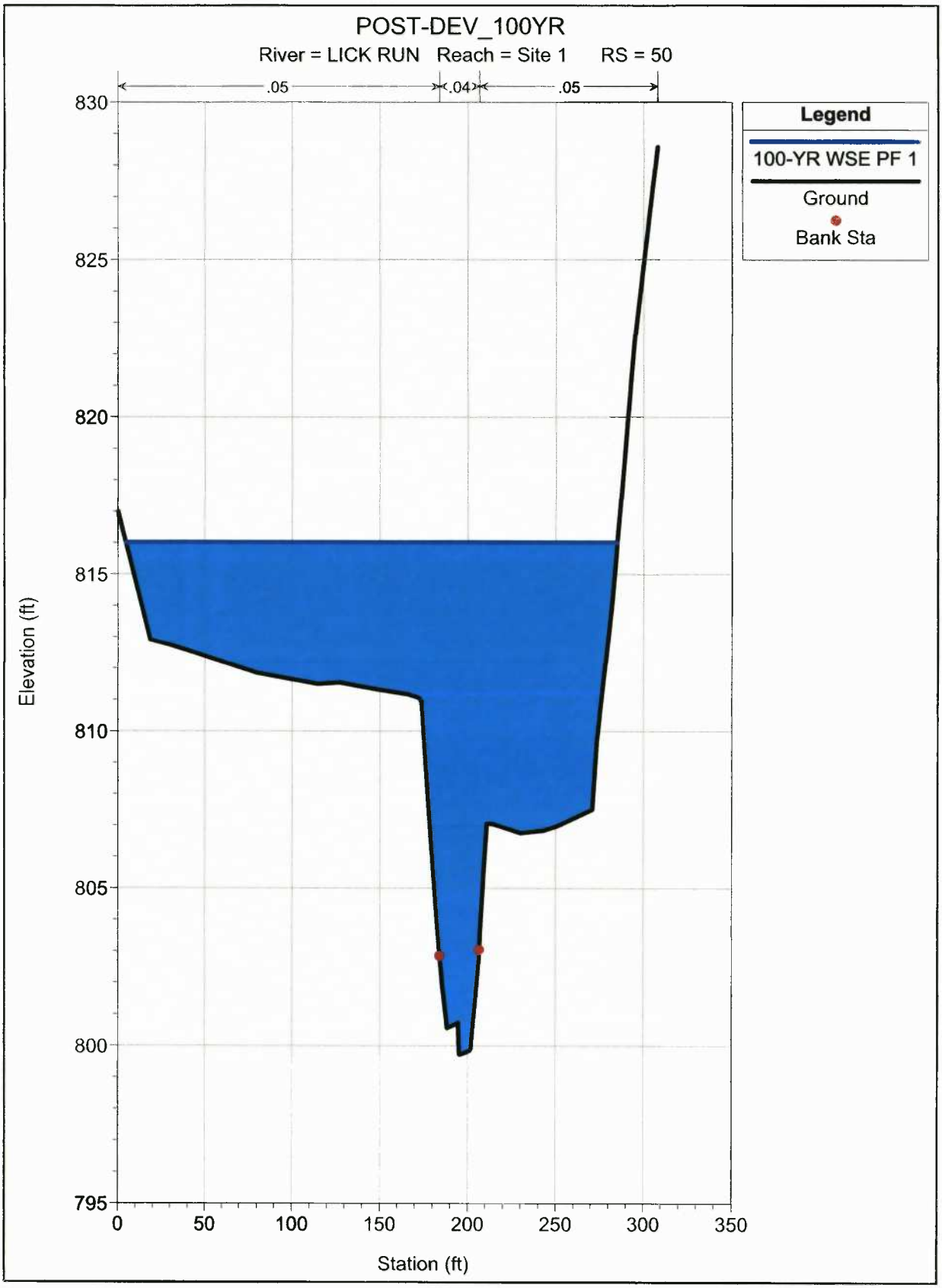

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 175 BR
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
300
350
400
Station (ft)

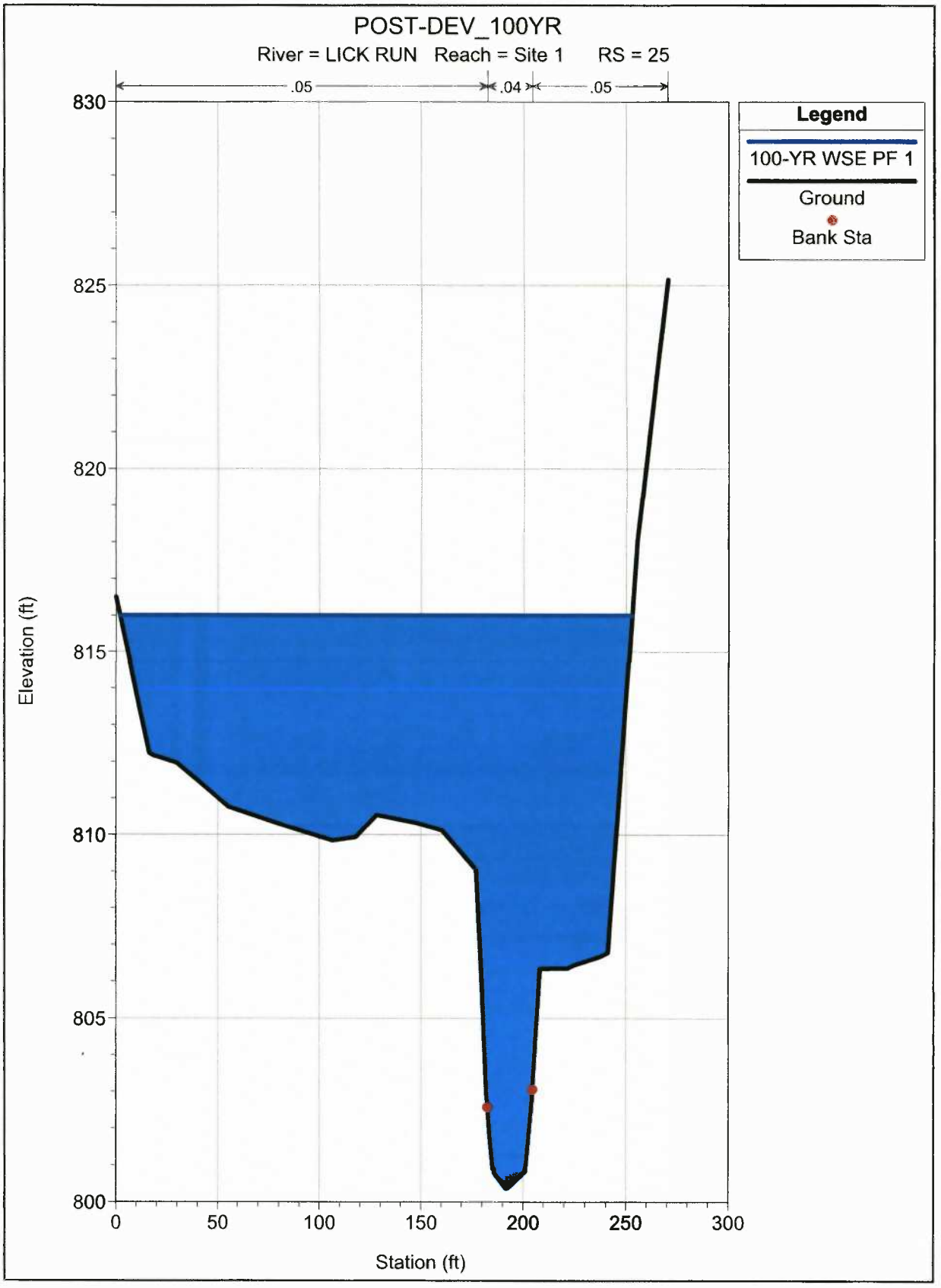

POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 150
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
825
820
815
810
805
800
Elevation (ft)
0
50
100
150
200
250
300
350
400
Station (ft)


POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 125
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
100
200
300
400
Station (ft)


POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 100
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
350
400
Station (ft)


POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 75
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
350
Station (ft)


POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 50
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
0
50
100
150
200
250
300
350
Station (ft)


POST-DEV_100YR
River = LICK RUN Reach = Site 1 RS = 25
.05
.04
.05
Legend
100-YR WSE PF 1
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
0
50
100
150
200
250
300
Station (ft)

CROSS SECTIONS OUTPUT – POST DEVELOPMENT (10-YR)

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 500 Profile: PF 1

E.G. Elev (ft)	809.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	809.28	Reach Len. (ft)	22.11	25.00	27.53
Crit W.S. (ft)		Flow Area (sq ft)	20.74	150.29	133.63
E.G. Slope (ft/ft)	0.001841	Area (sq ft)	20.74	150.29	133.63
Q Total (cfs)	1203.00	Flow (cfs)	30.10	904.66	268.24
Top Width (ft)	100.20	Top Width (ft)	14.56	19.23	66.41
Vel Total (ft/s)	3.95	Avg. Vel. (ft/s)	1.45	6.02	2.01
Max Chl Dpth (ft)	8.26	Hydr. Depth (ft)	1.42	7.82	2.01
Conv. Total (cfs)	28036.3	Conv. (cfs)	701.4	21083.5	6251.4
Length Wtd. (ft)	25.40	Wetted Per. (ft)	17.08	20.48	67.65
Min Ch El (ft)	801.02	Shear (lb/sq ft)	0.14	0.84	0.23
Alpha	1.81	Stream Power (lb/ft s)	196.21	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.85	1.88	0.47
C & E Loss (ft)	0.03	Cum SA (acres)	0.53	0.24	0.47

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 475 Profile: PF 1

E.G. Elev (ft)	809.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	809.32	Reach Len. (ft)	22.46	25.00	26.68
Crit W.S. (ft)		Flow Area (sq ft)	44.43	181.61	120.53
E.G. Slope (ft/ft)	0.001316	Area (sq ft)	44.43	181.61	120.53
Q Total (cfs)	1203.00	Flow (cfs)	61.70	928.00	213.30
Top Width (ft)	108.41	Top Width (ft)	28.67	23.66	56.08
Vel Total (ft/s)	3.47	Avg. Vel. (ft/s)	1.39	5.11	1.77
Max Chl Dpth (ft)	8.01	Hydr. Depth (ft)	1.55	7.68	2.15
Conv. Total (cfs)	33167.0	Conv. (cfs)	1701.1	25585.3	5880.7
Length Wtd. (ft)	25.07	Wetted Per. (ft)	30.38	24.59	57.29
Min Ch El (ft)	801.31	Shear (lb/sq ft)	0.12	0.61	0.17
Alpha	1.73	Stream Power (lb/ft s)	225.34	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.83	1.78	0.39
C & E Loss (ft)	0.01	Cum SA (acres)	0.52	0.23	0.43

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 450 Profile: PF 1

E.G. Elev (ft)	809.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	809.33	Reach Len. (ft)	19.77	25.00	26.95
Crit W.S. (ft)		Flow Area (sq ft)	71.05	219.25	78.78
E.G. Slope (ft/ft)	0.001020	Area (sq ft)	71.05	219.25	78.78
Q Total (cfs)	1203.00	Flow (cfs)	86.86	1001.27	114.87
Top Width (ft)	115.39	Top Width (ft)	46.96	27.89	40.54
Vel Total (ft/s)	3.26	Avg. Vel. (ft/s)	1.22	4.57	1.46
Max Chl Dpth (ft)	8.02	Hydr. Depth (ft)	1.51	7.86	1.94
Conv. Total (cfs)	37665.6	Conv. (cfs)	2719.5	31349.5	3596.6
Length Wtd. (ft)	24.76	Wetted Per. (ft)	48.61	29.03	41.38
Min Ch El (ft)	801.31	Shear (lb/sq ft)	0.09	0.48	0.12
Alpha	1.66	Stream Power (lb/ft s)	238.42	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.80	1.67	0.33
C & E Loss (ft)	0.03	Cum SA (acres)	0.50	0.21	0.40

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 425 Profile: PF 1

E.G. Elev (ft)	809.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	809.38	Reach Len. (ft)	33.63	25.00	21.85
Crit W.S. (ft)		Flow Area (sq ft)	96.04	302.42	43.97
E.G. Slope (ft/ft)	0.000536	Area (sq ft)	96.04	302.42	43.97
Q Total (cfs)	1203.00	Flow (cfs)	86.26	1060.93	55.81
Top Width (ft)	113.80	Top Width (ft)	62.67	35.48	15.65
Vel Total (ft/s)	2.72	Avg. Vel. (ft/s)	0.90	3.51	1.27
Max Chl Dpth (ft)	9.21	Hydr. Depth (ft)	1.53	8.52	2.81
Conv. Total (cfs)	51946.1	Conv. (cfs)	3724.9	45811.5	2409.8
Length Wtd. (ft)	25.91	Wetted Per. (ft)	64.42	36.73	17.56
Min Ch El (ft)	800.17	Shear (lb/sq ft)	0.05	0.28	0.08
Alpha	1.49	Stream Power (lb/ft s)	255.19	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.76	1.52	0.29
C & E Loss (ft)	0.02	Cum SA (acres)	0.48	0.20	0.38

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 400 Profile: PF 1

E.G. Elev (ft)	809.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	809.13	Reach Len. (ft)	2.50	2.50	2.50
Crit W.S. (ft)	805.16	Flow Area (sq ft)	135.08	183.50	13.47
E.G. Slope (ft/ft)	0.001320	Area (sq ft)	135.08	183.50	13.47
Q Total (cfs)	1203.00	Flow (cfs)	194.99	986.95	21.06
Top Width (ft)	111.83	Top Width (ft)	86.23	21.19	4.41
Vel Total (ft/s)	3.62	Avg. Vel. (ft/s)	1.44	5.38	1.56
Max Chl Dpth (ft)	9.78	Hydr. Depth (ft)	1.57	8.66	3.06
Conv. Total (cfs)	33105.8	Conv. (cfs)	5366.1	27160.1	579.6
Length Wtd. (ft)	2.50	Wetted Per. (ft)	87.41	23.07	7.73
Min Ch El (ft)	799.35	Shear (lb/sq ft)	0.13	0.66	0.14
Alpha	1.84	Stream Power (lb/ft s)	264.95	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.67	1.38	0.28
C & E Loss (ft)	0.01	Cum SA (acres)	0.42	0.18	0.38

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 387 BR U Profile: PF 1

E.G. Elev (ft)	809.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	809.15	Reach Len. (ft)	9.00	9.00	9.00
Crit W.S. (ft)	805.15	Flow Area (sq ft)	126.73	165.64	12.93
E.G. Slope (ft/ft)	0.004882	Area (sq ft)	126.73	165.64	12.93
Q Total (cfs)	1203.00	Flow (cfs)	299.18	875.11	28.71
Top Width (ft)	99.45	Top Width (ft)	86.30	12.66	0.49
Vel Total (ft/s)	3.94	Avg. Vel. (ft/s)	2.36	5.28	2.22
Max Chl Dpth (ft)	9.80	Hydr. Depth (ft)	1.47	13.08	26.42
Conv. Total (cfs)	17217.8	Conv. (cfs)	4282.0	12524.8	411.0
Length Wtd. (ft)	9.00	Wetted Per. (ft)	104.90	57.03	11.70
Min Ch El (ft)	799.35	Shear (lb/sq ft)	0.37	0.89	0.34
Alpha	1.40	Stream Power (lb/ft s)	264.95	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.67	1.37	0.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.42	0.18	0.38

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 387 BR D Profile: PF 1

E.G. Elev (ft)	809.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	809.09	Reach Len. (ft)	13.50	13.50	13.50
Crit W.S. (ft)	805.88	Flow Area (sq ft)	137.38	136.33	16.40
E.G. Slope (ft/ft)	0.006510	Area (sq ft)	137.38	136.33	16.40
Q Total (cfs)	1203.00	Flow (cfs)	399.30	759.06	44.64
Top Width (ft)	105.77	Top Width (ft)	90.73	15.04	
Vel Total (ft/s)	4.15	Avg. Vel. (ft/s)	2.91	5.57	2.72
Max Chl Dpth (ft)	9.36	Hydr. Depth (ft)	1.51	9.07	
Conv. Total (cfs)	14909.4	Conv. (cfs)	4948.7	9407.4	553.2
Length Wtd. (ft)	13.50	Wetted Per. (ft)	103.81	53.85	13.57
Min Ch El (ft)	799.73	Shear (lb/sq ft)	0.54	1.03	0.49
Alpha	1.32	Stream Power (lb/ft s)	279.10	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.64	1.34	0.27
C & E Loss (ft)	0.01	Cum SA (acres)	0.40	0.18	0.38

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 375 Profile: PF 1

E.G. Elev (ft)	809.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.89	Reach Len. (ft)	24.98	25.00	25.22
Crit W.S. (ft)		Flow Area (sq ft)	130.85	150.93	18.35
E.G. Slope (ft/ft)	0.001918	Area (sq ft)	130.85	150.93	18.35
Q Total (cfs)	1203.00	Flow (cfs)	218.59	944.25	40.16
Top Width (ft)	112.82	Top Width (ft)	88.61	18.71	5.50
Vel Total (ft/s)	4.01	Avg. Vel. (ft/s)	1.67	6.26	2.19
Max Chl Dpth (ft)	9.16	Hydr. Depth (ft)	1.48	8.07	3.34
Conv. Total (cfs)	27467.2	Conv. (cfs)	4991.0	21559.3	916.9
Length Wtd. (ft)	25.00	Wetted Per. (ft)	90.00	20.02	8.41
Min Ch El (ft)	799.73	Shear (lb/sq ft)	0.17	0.90	0.26
Alpha	1.95	Stream Power (lb/ft s)	279.10	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.60	1.29	0.27
C & E Loss (ft)	0.01	Cum SA (acres)	0.37	0.17	0.38

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 350 Profile: PF 1

E.G. Elev (ft)	809.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.79	Reach Len. (ft)	25.24	25.00	25.33
Crit W.S. (ft)		Flow Area (sq ft)	133.60	140.23	11.77
E.G. Slope (ft/ft)	0.002282	Area (sq ft)	133.60	140.23	11.77
Q Total (cfs)	1203.00	Flow (cfs)	250.37	929.13	23.50
Top Width (ft)	108.76	Top Width (ft)	86.84	18.54	3.38
Vel Total (ft/s)	4.21	Avg. Vel. (ft/s)	1.87	6.63	2.00
Max Chl Dpth (ft)	8.61	Hydr. Depth (ft)	1.54	7.56	3.48
Conv. Total (cfs)	25182.4	Conv. (cfs)	5240.9	19449.5	492.0
Length Wtd. (ft)	25.06	Wetted Per. (ft)	88.10	19.44	7.06
Min Ch El (ft)	800.18	Shear (lb/sq ft)	0.22	1.03	0.24
Alpha	1.96	Stream Power (lb/ft s)	303.83	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.52	1.21	0.26
C & E Loss (ft)	0.01	Cum SA (acres)	0.32	0.16	0.38

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 325 Profile: PF 1

E.G. Elev (ft)	809.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.61	Reach Len. (ft)	25.36	25.00	24.66
Crit W.S. (ft)		Flow Area (sq ft)	125.68	129.89	6.73
E.G. Slope (ft/ft)	0.002802	Area (sq ft)	125.68	129.89	6.73
Q Total (cfs)	1203.00	Flow (cfs)	257.02	934.45	11.53
Top Width (ft)	103.42	Top Width (ft)	83.97	17.16	2.29
Vel Total (ft/s)	4.59	Avg. Vel. (ft/s)	2.05	7.19	1.71
Max Chl Dpth (ft)	8.46	Hydr. Depth (ft)	1.50	7.57	2.94
Conv. Total (cfs)	22724.6	Conv. (cfs)	4855.1	17651.7	217.7
Length Wtd. (ft)	25.06	Wetted Per. (ft)	84.79	18.56	5.92
Min Ch El (ft)	800.15	Shear (lb/sq ft)	0.26	1.22	0.20
Alpha	1.96	Stream Power (lb/ft s)	306.36	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.45	1.13	0.25
C & E Loss (ft)	0.03	Cum SA (acres)	0.27	0.15	0.37

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 300 Profile: PF 1

E.G. Elev (ft)	809.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.61	Reach Len. (ft)	27.04	25.00	24.95
Crit W.S. (ft)		Flow Area (sq ft)	99.57	159.95	8.38
E.G. Slope (ft/ft)	0.002087	Area (sq ft)	99.57	159.95	8.38
Q Total (cfs)	1203.00	Flow (cfs)	163.06	1026.28	13.66
Top Width (ft)	96.79	Top Width (ft)	73.71	20.09	2.99
Vel Total (ft/s)	4.49	Avg. Vel. (ft/s)	1.64	6.42	1.63
Max Chl Dpth (ft)	8.75	Hydr. Depth (ft)	1.35	7.96	2.81
Conv. Total (cfs)	26336.2	Conv. (cfs)	3569.8	22467.4	299.0
Length Wtd. (ft)	25.24	Wetted Per. (ft)	75.15	21.75	6.38
Min Ch El (ft)	799.86	Shear (lb/sq ft)	0.17	0.96	0.17
Alpha	1.76	Stream Power (lb/ft s)	299.85	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.38	1.05	0.25
C & E Loss (ft)	0.03	Cum SA (acres)	0.22	0.14	0.37

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 275 Profile: PF 1

E.G. Elev (ft)	809.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.63	Reach Len. (ft)	25.02	25.00	24.94
Crit W.S. (ft)		Flow Area (sq ft)	82.71	180.27	20.31
E.G. Slope (ft/ft)	0.001622	Area (sq ft)	82.71	180.27	20.31
Q Total (cfs)	1203.00	Flow (cfs)	116.60	1049.24	37.16
Top Width (ft)	92.59	Top Width (ft)	62.37	21.40	8.82
Vel Total (ft/s)	4.25	Avg. Vel. (ft/s)	1.41	5.82	1.83
Max Chl Dpth (ft)	9.17	Hydr. Depth (ft)	1.33	8.42	2.30
Conv. Total (cfs)	29869.0	Conv. (cfs)	2895.0	26051.3	922.7
Length Wtd. (ft)	25.00	Wetted Per. (ft)	64.70	23.49	10.74
Min Ch El (ft)	799.46	Shear (lb/sq ft)	0.13	0.78	0.19
Alpha	1.65	Stream Power (lb/ft s)	297.30	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.33	0.95	0.24
C & E Loss (ft)	0.00	Cum SA (acres)	0.18	0.13	0.37

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 250 Profile: PF 1

E.G. Elev (ft)	809.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.58	Reach Len. (ft)	25.27	25.00	25.28
Crit W.S. (ft)		Flow Area (sq ft)	68.67	175.83	29.30
E.G. Slope (ft/ft)	0.001704	Area (sq ft)	68.67	175.83	29.30
Q Total (cfs)	1203.00	Flow (cfs)	95.17	1040.85	66.98
Top Width (ft)	86.19	Top Width (ft)	54.87	21.38	9.94
Vel Total (ft/s)	4.39	Avg. Vel. (ft/s)	1.39	5.92	2.29
Max Chl Dpth (ft)	9.09	Hydr. Depth (ft)	1.25	8.22	2.95
Conv. Total (cfs)	29138.7	Conv. (cfs)	2305.1	25211.1	1622.4
Length Wtd. (ft)	25.04	Wetted Per. (ft)	57.20	23.19	11.52
Min Ch El (ft)	799.49	Shear (lb/sq ft)	0.13	0.81	0.27
Alpha	1.59	Stream Power (lb/ft s)	296.90	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.28	0.85	0.23
C & E Loss (ft)	0.00	Cum SA (acres)	0.15	0.11	0.36

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 225 Profile: PF 1

E.G. Elev (ft)	809.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.49	Reach Len. (ft)	25.12	25.00	25.08
Crit W.S. (ft)		Flow Area (sq ft)	69.59	166.58	29.52
E.G. Slope (ft/ft)	0.001882	Area (sq ft)	69.59	166.58	29.52
Q Total (cfs)	1203.00	Flow (cfs)	106.32	1028.39	68.29
Top Width (ft)	109.42	Top Width (ft)	51.53	20.73	37.15
Vel Total (ft/s)	4.53	Avg. Vel. (ft/s)	1.53	6.17	2.31
Max Chl Dpth (ft)	8.87	Hydr. Depth (ft)	1.35	8.04	0.79
Conv. Total (cfs)	27730.7	Conv. (cfs)	2450.8	23705.8	1574.1
Length Wtd. (ft)	25.02	Wetted Per. (ft)	53.94	22.22	38.63
Min Ch El (ft)	799.62	Shear (lb/sq ft)	0.15	0.88	0.09
Alpha	1.61	Stream Power (lb/ft s)	287.82	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.24	0.75	0.21
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	0.10	0.35

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 200 Profile: PF 1

E.G. Elev (ft)	808.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.44	Reach Len. (ft)	17.24	17.24	17.24
Crit W.S. (ft)	805.53	Flow Area (sq ft)	77.61	164.04	28.09
E.G. Slope (ft/ft)	0.002011	Area (sq ft)	77.61	164.04	28.09
Q Total (cfs)	1203.00	Flow (cfs)	139.53	1016.66	46.81
Top Width (ft)	127.62	Top Width (ft)	48.12	21.81	57.69
Vel Total (ft/s)	4.46	Avg. Vel. (ft/s)	1.80	6.20	1.67
Max Chl Dpth (ft)	8.59	Hydr. Depth (ft)	1.61	7.52	0.49
Conv. Total (cfs)	26827.2	Conv. (cfs)	3111.5	22671.8	1043.8
Length Wtd. (ft)	17.24	Wetted Per. (ft)	49.53	22.86	59.52
Min Ch El (ft)	799.85	Shear (lb/sq ft)	0.20	0.90	0.06
Alpha	1.66	Stream Power (lb/ft s)	283.23	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.20	0.65	0.19
C & E Loss (ft)	0.01	Cum SA (acres)	0.09	0.09	0.32

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 175 BR U Profile: PF 1

E.G. Elev (ft)	808.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.29	Reach Len. (ft)	12.50	12.50	12.50
Crit W.S. (ft)	805.51	Flow Area (sq ft)	40.01	160.80	20.26
E.G. Slope (ft/ft)	0.002359	Area (sq ft)	40.01	160.80	20.26
Q Total (cfs)	1203.00	Flow (cfs)	94.07	1065.06	43.87
Top Width (ft)	80.62	Top Width (ft)	16.69	21.81	42.12
Vel Total (ft/s)	5.44	Avg. Vel. (ft/s)	2.35	6.62	2.16
Max Chl Dpth (ft)	8.44	Hydr. Depth (ft)	2.40	7.37	0.48
Conv. Total (cfs)	24770.3	Conv. (cfs)	1936.8	21930.1	903.3
Length Wtd. (ft)	12.50	Wetted Per. (ft)	19.25	22.86	43.89
Min Ch El (ft)	799.85	Shear (lb/sq ft)	0.31	1.04	0.07
Alpha	1.33	Stream Power (lb/ft s)	283.23	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.18	0.59	0.18
C & E Loss (ft)	0.01	Cum SA (acres)	0.08	0.08	0.30

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 175 BR D Profile: PF 1

E.G. Elev (ft)	808.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.28	Reach Len. (ft)	20.26	20.26	20.26
Crit W.S. (ft)	805.67	Flow Area (sq ft)	52.82	159.22	22.96
E.G. Slope (ft/ft)	0.002476	Area (sq ft)	52.82	159.22	22.96
Q Total (cfs)	1203.00	Flow (cfs)	146.54	1038.64	17.82
Top Width (ft)	103.30	Top Width (ft)	18.30	21.61	63.39
Vel Total (ft/s)	5.12	Avg. Vel. (ft/s)	2.77	6.52	0.78
Max Chl Dpth (ft)	8.01	Hydr. Depth (ft)	2.89	7.37	0.36
Conv. Total (cfs)	24175.7	Conv. (cfs)	2944.8	20872.7	358.1
Length Wtd. (ft)	20.26	Wetted Per. (ft)	20.56	24.02	66.65
Min Ch El (ft)	800.27	Shear (lb/sq ft)	0.40	1.02	0.05
Alpha	1.44	Stream Power (lb/ft s)	343.56	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.16	0.54	0.18
C & E Loss (ft)	0.01	Cum SA (acres)	0.07	0.08	0.29

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 150 Profile: PF 1

E.G. Elev (ft)	808.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.27	Reach Len. (ft)	24.75	25.00	25.36
Crit W.S. (ft)		Flow Area (sq ft)	80.68	158.92	30.28
E.G. Slope (ft/ft)	0.002350	Area (sq ft)	80.68	158.92	30.28
Q Total (cfs)	1203.00	Flow (cfs)	176.52	1008.70	17.78
Top Width (ft)	177.35	Top Width (ft)	42.35	21.61	113.39
Vel Total (ft/s)	4.46	Avg. Vel. (ft/s)	2.19	6.35	0.59
Max Chl Dpth (ft)	8.00	Hydr. Depth (ft)	1.90	7.35	0.27
Conv. Total (cfs)	24814.1	Conv. (cfs)	3641.1	20806.2	366.8
Length Wtd. (ft)	24.97	Wetted Per. (ft)	43.11	24.02	116.38
Min Ch El (ft)	800.27	Shear (lb/sq ft)	0.27	0.97	0.04
Alpha	1.74	Stream Power (lb/ft s)	343.56	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.13	0.47	0.17
C & E Loss (ft)	0.01	Cum SA (acres)	0.06	0.07	0.25

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 125 Profile: PF 1

E.G. Elev (ft)	808.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.24	Reach Len. (ft)	25.28	25.00	25.21
Crit W.S. (ft)		Flow Area (sq ft)	90.57	148.56	53.38
E.G. Slope (ft/ft)	0.002158	Area (sq ft)	90.57	148.56	53.38
Q Total (cfs)	1203.00	Flow (cfs)	221.75	935.02	46.23
Top Width (ft)	162.12	Top Width (ft)	37.35	19.73	105.04
Vel Total (ft/s)	4.11	Avg. Vel. (ft/s)	2.45	6.29	0.87
Max Chl Dpth (ft)	8.37	Hydr. Depth (ft)	2.42	7.53	0.51
Conv. Total (cfs)	25894.2	Conv. (cfs)	4773.2	20126.0	995.1
Length Wtd. (ft)	25.05	Wetted Per. (ft)	38.35	21.33	107.43
Min Ch El (ft)	799.87	Shear (lb/sq ft)	0.32	0.94	0.07
Alpha	1.89	Stream Power (lb/ft s)	358.81	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.08	0.38	0.14
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	0.05	0.18

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 100 Profile: PF 1

E.G. Elev (ft)	808.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.17	Reach Len. (ft)	24.40	25.00	25.60
Crit W.S. (ft)		Flow Area (sq ft)	63.02	156.19	59.60
E.G. Slope (ft/ft)	0.002277	Area (sq ft)	63.02	156.19	59.60
Q Total (cfs)	1203.00	Flow (cfs)	165.70	978.12	59.18
Top Width (ft)	145.92	Top Width (ft)	24.05	22.12	99.76
Vel Total (ft/s)	4.31	Avg. Vel. (ft/s)	2.63	6.26	0.99
Max Chl Dpth (ft)	8.33	Hydr. Depth (ft)	2.62	7.06	0.60
Conv. Total (cfs)	25212.1	Conv. (cfs)	3472.6	20499.1	1240.3
Length Wtd. (ft)	24.99	Wetted Per. (ft)	24.96	23.52	101.71
Min Ch El (ft)	799.84	Shear (lb/sq ft)	0.36	0.94	0.08
Alpha	1.77	Stream Power (lb/ft s)	345.72	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.04	0.29	0.11
C & E Loss (ft)	0.01	Cum SA (acres)	0.02	0.04	0.12

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 75 Profile: PF 1

E.G. Elev (ft)	808.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	808.14	Reach Len. (ft)	24.78	25.00	25.07
Crit W.S. (ft)		Flow Area (sq ft)	13.14	193.39	60.93
E.G. Slope (ft/ft)	0.002230	Area (sq ft)	13.14	193.39	60.93
Q Total (cfs)	1203.00	Flow (cfs)	23.29	1109.86	69.85
Top Width (ft)	118.41	Top Width (ft)	8.59	28.09	81.73
Vel Total (ft/s)	4.50	Avg. Vel. (ft/s)	1.77	5.74	1.15
Max Chl Dpth (ft)	8.32	Hydr. Depth (ft)	1.53	6.88	0.75
Conv. Total (cfs)	25476.2	Conv. (cfs)	493.3	23503.8	1479.1
Length Wtd. (ft)	25.00	Wetted Per. (ft)	9.26	32.68	82.52
Min Ch El (ft)	799.82	Shear (lb/sq ft)	0.20	0.82	0.10
Alpha	1.51	Stream Power (lb/ft s)	315.25	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.02	0.19	0.07
C & E Loss (ft)	0.01	Cum SA (acres)	0.01	0.03	0.07

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 50 Profile: PF 1

E.G. Elev (ft)	808.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	807.99	Reach Len. (ft)	24.84	25.00	24.40
Crit W.S. (ft)		Flow Area (sq ft)	17.50	165.04	71.42
E.G. Slope (ft/ft)	0.002376	Area (sq ft)	17.50	165.04	71.42
Q Total (cfs)	1203.00	Flow (cfs)	41.08	1053.48	108.44
Top Width (ft)	94.30	Top Width (ft)	6.75	22.80	64.74
Vel Total (ft/s)	4.74	Avg. Vel. (ft/s)	2.35	6.38	1.52
Max Chl Dpth (ft)	8.28	Hydr. Depth (ft)	2.59	7.24	1.10
Conv. Total (cfs)	24679.1	Conv. (cfs)	842.8	21611.7	2224.6
Length Wtd. (ft)	24.94	Wetted Per. (ft)	8.49	24.94	66.56
Min Ch El (ft)	799.71	Shear (lb/sq ft)	0.31	0.98	0.16
Alpha	1.61	Stream Power (lb/ft s)	289.54	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.01	0.09	0.04
C & E Loss (ft)	0.01	Cum SA (acres)	0.00	0.01	0.03

Plan: POST-DEV 10YR LICK RUN Site 1 RS: 25 Profile: PF 1

E.G. Elev (ft)	808.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.69	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	807.77	Reach Len. (ft)			
Crit W.S. (ft)	805.45	Flow Area (sq ft)	11.83	151.17	53.73
E.G. Slope (ft/ft)	0.003002	Area (sq ft)	11.83	151.17	53.73
Q Total (cfs)	1203.00	Flow (cfs)	27.62	1067.63	107.75
Top Width (ft)	64.28	Top Width (ft)	4.51	22.09	37.68
Vel Total (ft/s)	5.55	Avg. Vel. (ft/s)	2.33	7.06	2.01
Max Chl Dpth (ft)	7.41	Hydr. Depth (ft)	2.63	6.84	1.43
Conv. Total (cfs)	21957.5	Conv. (cfs)	504.2	19486.8	1966.6
Length Wtd. (ft)		Wetted Per. (ft)	6.89	23.39	39.30
Min Ch El (ft)	800.36	Shear (lb/sq ft)	0.32	1.21	0.26
Alpha	1.45	Stream Power (lb/ft s)	253.93	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTIONS OUTPUT – POST DEVELOPMENT (100-YR)

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 500 Profile: PF 1

E.G. Elev (ft)	816.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.07	Reach Len. (ft)	22.11	25.00	27.53
Crit W.S. (ft)		Flow Area (sq ft)	220.49	280.91	809.66
E.G. Slope (ft/ft)	0.000234	Area (sq ft)	220.49	280.91	809.66
Q Total (cfs)	2557.00	Flow (cfs)	306.15	914.87	1335.98
Top Width (ft)	170.00	Top Width (ft)	35.71	19.23	115.06
Vel Total (ft/s)	1.95	Avg. Vel. (ft/s)	1.39	3.26	1.65
Max Chl Dpth (ft)	15.05	Hydr. Depth (ft)	6.17	14.61	7.04
Conv. Total (cfs)	167131.6	Conv. (cfs)	20010.6	59798.1	87322.9
Length Wtd. (ft)	25.76	Wetted Per. (ft)	41.32	20.48	117.11
Min Ch El (ft)	801.02	Shear (lb/sq ft)	0.08	0.20	0.10
Alpha	1.43	Stream Power (lb/ft s)	196.21	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	8.12	3.65	8.31
C & E Loss (ft)	0.00	Cum SA (acres)	1.33	0.24	1.26

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 475 Profile: PF 1

E.G. Elev (ft)	816.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.08	Reach Len. (ft)	22.46	25.00	26.68
Crit W.S. (ft)		Flow Area (sq ft)	338.95	341.42	746.78
E.G. Slope (ft/ft)	0.000190	Area (sq ft)	338.95	341.42	746.78
Q Total (cfs)	2557.00	Flow (cfs)	466.65	1010.17	1080.18
Top Width (ft)	184.83	Top Width (ft)	50.48	23.66	110.69
Vel Total (ft/s)	1.79	Avg. Vel. (ft/s)	1.38	2.96	1.45
Max Chl Dpth (ft)	14.77	Hydr. Depth (ft)	6.71	14.43	6.75
Conv. Total (cfs)	185455.8	Conv. (cfs)	33845.3	73266.2	78344.3
Length Wtd. (ft)	25.05	Wetted Per. (ft)	55.03	24.59	112.59
Min Ch El (ft)	801.31	Shear (lb/sq ft)	0.07	0.16	0.08
Alpha	1.46	Stream Power (lb/ft s)	225.34	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	7.98	3.47	7.82
C & E Loss (ft)	0.00	Cum SA (acres)	1.30	0.23	1.19

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 450 Profile: PF 1

E.G. Elev (ft)	816.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.07	Reach Len. (ft)	19.77	25.00	26.95
Crit W.S. (ft)		Flow Area (sq ft)	485.87	407.49	610.44
E.G. Slope (ft/ft)	0.000165	Area (sq ft)	485.87	407.49	610.44
Q Total (cfs)	2557.00	Flow (cfs)	651.48	1131.68	773.85
Top Width (ft)	197.30	Top Width (ft)	69.86	27.89	99.55
Vel Total (ft/s)	1.70	Avg. Vel. (ft/s)	1.34	2.78	1.27
Max Chl Dpth (ft)	14.76	Hydr. Depth (ft)	6.95	14.61	6.13
Conv. Total (cfs)	199004.7	Conv. (cfs)	50702.8	88075.4	60226.5
Length Wtd. (ft)	24.06	Wetted Per. (ft)	73.84	29.03	100.92
Min Ch El (ft)	801.31	Shear (lb/sq ft)	0.07	0.14	0.06
Alpha	1.51	Stream Power (lb/ft s)	238.42	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	7.77	3.25	7.41
C & E Loss (ft)	0.00	Cum SA (acres)	1.27	0.22	1.13

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 425 Profile: PF 1

E.G. Elev (ft)	816.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.08	Reach Len. (ft)	33.63	25.00	21.85
Crit W.S. (ft)		Flow Area (sq ft)	607.52	539.99	473.38
E.G. Slope (ft/ft)	0.000127	Area (sq ft)	607.52	539.99	473.38
Q Total (cfs)	2557.00	Flow (cfs)	733.42	1359.27	464.31
Top Width (ft)	212.88	Top Width (ft)	85.23	35.48	92.17
Vel Total (ft/s)	1.58	Avg. Vel. (ft/s)	1.21	2.52	0.98
Max Chl Dpth (ft)	15.91	Hydr. Depth (ft)	7.13	15.22	5.14
Conv. Total (cfs)	226480.0	Conv. (cfs)	64961.0	120394.1	41124.9
Length Wtd. (ft)	27.82	Wetted Per. (ft)	89.01	36.73	94.71
Min Ch El (ft)	800.17	Shear (lb/sq ft)	0.05	0.12	0.04
Alpha	1.59	Stream Power (lb/ft s)	255.19	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	7.52	2.98	7.07
C & E Loss (ft)	0.00	Cum SA (acres)	1.24	0.20	1.07

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 400 Profile: PF 1

E.G. Elev (ft)	816.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.06	Reach Len. (ft)	2.50	2.50	2.50
Crit W.S. (ft)	809.19	Flow Area (sq ft)	828.26	330.33	353.79
E.G. Slope (ft/ft)	0.000180	Area (sq ft)	828.26	330.33	353.79
Q Total (cfs)	2557.00	Flow (cfs)	1235.14	969.61	352.25
Top Width (ft)	218.26	Top Width (ft)	111.82	21.19	85.25
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)	1.49	2.94	1.00
Max Chl Dpth (ft)	16.71	Hydr. Depth (ft)	7.41	15.59	4.15
Conv. Total (cfs)	190800.2	Conv. (cfs)	92164.8	72350.8	26284.5
Length Wtd. (ft)	2.50	Wetted Per. (ft)	114.32	23.07	89.50
Min Ch El (ft)	799.35	Shear (lb/sq ft)	0.08	0.16	0.04
Alpha	1.57	Stream Power (lb/ft s)	264.95	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	6.97	2.73	6.86
C & E Loss (ft)	0.01	Cum SA (acres)	1.16	0.18	1.02

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 387 BR U Profile: PF 1

E.G. Elev (ft)	816.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.08	Reach Len. (ft)	9.00	9.00	9.00
Crit W.S. (ft)	809.46	Flow Area (sq ft)	819.75	309.42	350.08
E.G. Slope (ft/ft)	0.000324	Area (sq ft)	819.75	309.42	350.08
Q Total (cfs)	2557.00	Flow (cfs)	1532.23	581.59	443.18
Top Width (ft)	218.31	Top Width (ft)	111.82	21.19	85.31
Vel Total (ft/s)	1.73	Avg. Vel. (ft/s)	1.87	1.88	1.27
Max Chl Dpth (ft)	16.73	Hydr. Depth (ft)	7.33	14.60	4.10
Conv. Total (cfs)	142138.9	Conv. (cfs)	85173.8	32329.6	24635.5
Length Wtd. (ft)	9.00	Wetted Per. (ft)	131.74	65.60	97.97
Min Ch El (ft)	799.35	Shear (lb/sq ft)	0.13	0.10	0.07
Alpha	1.06	Stream Power (lb/ft s)	264.95	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	6.92	2.71	6.84
C & E Loss (ft)	0.00	Cum SA (acres)	1.15	0.18	1.02

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 387 BR D Profile: PF 1

E.G. Elev (ft)	816.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.08	Reach Len. (ft)	13.50	13.50	13.50
Crit W.S. (ft)	809.39	Flow Area (sq ft)	865.58	266.59	395.63
E.G. Slope (ft/ft)	0.000289	Area (sq ft)	865.58	266.59	395.63
Q Total (cfs)	2557.00	Flow (cfs)	1576.68	467.56	512.75
Top Width (ft)	219.85	Top Width (ft)	117.19	18.71	83.95
Vel Total (ft/s)	1.67	Avg. Vel. (ft/s)	1.82	1.75	1.30
Max Chl Dpth (ft)	16.35	Hydr. Depth (ft)	7.39	14.25	4.71
Conv. Total (cfs)	150528.4	Conv. (cfs)	92818.1	27525.1	30185.3
Length Wtd. (ft)	13.50	Wetted Per. (ft)	131.19	57.53	98.27
Min Ch El (ft)	799.73	Shear (lb/sq ft)	0.12	0.08	0.07
Alpha	1.05	Stream Power (lb/ft s)	279.10	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	6.75	2.65	6.77
C & E Loss (ft)	0.00	Cum SA (acres)	1.13	0.18	1.00

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 375 Profile: PF 1

E.G. Elev (ft)	816.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.05	Reach Len. (ft)	24.98	25.00	25.22
Crit W.S. (ft)		Flow Area (sq ft)	873.98	284.89	399.60
E.G. Slope (ft/ft)	0.000176	Area (sq ft)	873.98	284.89	399.60
Q Total (cfs)	2557.00	Flow (cfs)	1299.58	825.04	432.38
Top Width (ft)	219.72	Top Width (ft)	117.11	18.71	83.90
Vel Total (ft/s)	1.64	Avg. Vel. (ft/s)	1.49	2.90	1.08
Max Chl Dpth (ft)	16.32	Hydr. Depth (ft)	7.46	15.23	4.76
Conv. Total (cfs)	192629.4	Conv. (cfs)	97902.6	62153.7	32573.1
Length Wtd. (ft)	25.03	Wetted Per. (ft)	119.43	20.02	87.97
Min Ch El (ft)	799.73	Shear (lb/sq ft)	0.08	0.16	0.05
Alpha	1.50	Stream Power (lb/ft s)	279.10	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	6.48	2.57	6.64
C & E Loss (ft)	0.00	Cum SA (acres)	1.09	0.17	0.98

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 350 Profile: PF 1

E.G. Elev (ft)	816.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.05	Reach Len. (ft)	25.24	25.00	25.33
Crit W.S. (ft)		Flow Area (sq ft)	889.70	274.95	406.05
E.G. Slope (ft/ft)	0.000171	Area (sq ft)	889.70	274.95	406.05
Q Total (cfs)	2557.00	Flow (cfs)	1321.71	780.20	455.10
Top Width (ft)	215.87	Top Width (ft)	116.59	18.54	80.75
Vel Total (ft/s)	1.63	Avg. Vel. (ft/s)	1.49	2.84	1.12
Max Chl Dpth (ft)	15.87	Hydr. Depth (ft)	7.63	14.83	5.03
Conv. Total (cfs)	195786.5	Conv. (cfs)	101201.5	59738.7	34846.4
Length Wtd. (ft)	25.19	Wetted Per. (ft)	118.81	19.44	86.86
Min Ch El (ft)	800.18	Shear (lb/sq ft)	0.08	0.15	0.05
Alpha	1.44	Stream Power (lb/ft s)	303.83	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	5.97	2.41	6.41
C & E Loss (ft)	0.00	Cum SA (acres)	1.03	0.16	0.93

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 325 Profile: PF 1

E.G. Elev (ft)	816.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.06	Reach Len. (ft)	25.36	25.00	24.66
Crit W.S. (ft)		Flow Area (sq ft)	874.86	257.63	618.20
E.G. Slope (ft/ft)	0.000149	Area (sq ft)	874.86	257.63	618.20
Q Total (cfs)	2557.00	Flow (cfs)	1221.88	673.63	661.50
Top Width (ft)	246.78	Top Width (ft)	113.73	17.16	115.89
Vel Total (ft/s)	1.46	Avg. Vel. (ft/s)	1.40	2.61	1.07
Max Chl Dpth (ft)	15.91	Hydr. Depth (ft)	7.69	15.01	5.33
Conv. Total (cfs)	209804.8	Conv. (cfs)	100256.4	55271.9	54276.5
Length Wtd. (ft)	25.05	Wetted Per. (ft)	115.54	18.56	121.74
Min Ch El (ft)	800.15	Shear (lb/sq ft)	0.07	0.13	0.05
Alpha	1.42	Stream Power (lb/ft s)	306.36	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	5.46	2.26	6.11
C & E Loss (ft)	0.00	Cum SA (acres)	0.96	0.15	0.87

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 300 Profile: PF 1

E.G. Elev (ft)	816.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.06	Reach Len. (ft)	27.04	25.00	24.95
Crit W.S. (ft)		Flow Area (sq ft)	755.79	309.48	792.19
E.G. Slope (ft/ft)	0.000125	Area (sq ft)	755.79	309.48	792.19
Q Total (cfs)	2557.00	Flow (cfs)	945.05	755.84	856.11
Top Width (ft)	251.56	Top Width (ft)	101.32	20.09	130.15
Vel Total (ft/s)	1.38	Avg. Vel. (ft/s)	1.25	2.44	1.08
Max Chl Dpth (ft)	16.20	Hydr. Depth (ft)	7.46	15.40	6.09
Conv. Total (cfs)	228361.3	Conv. (cfs)	84401.0	67503.0	76457.4
Length Wtd. (ft)	25.65	Wetted Per. (ft)	103.76	21.75	135.36
Min Ch El (ft)	799.86	Shear (lb/sq ft)	0.06	0.11	0.05
Alpha	1.44	Stream Power (lb/ft s)	299.85	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	4.98	2.09	5.71
C & E Loss (ft)	0.00	Cum SA (acres)	0.90	0.14	0.80

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 275 Profile: PF 1

E.G. Elev (ft)	816.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.06	Reach Len. (ft)	25.02	25.00	24.94
Crit W.S. (ft)		Flow Area (sq ft)	677.41	339.18	965.75
E.G. Slope (ft/ft)	0.000110	Area (sq ft)	677.41	339.18	965.75
Q Total (cfs)	2557.00	Flow (cfs)	739.70	782.55	1034.75
Top Width (ft)	269.47	Top Width (ft)	100.00	21.40	148.06
Vel Total (ft/s)	1.29	Avg. Vel. (ft/s)	1.09	2.31	1.07
Max Chl Dpth (ft)	16.60	Hydr. Depth (ft)	6.77	15.85	6.52
Conv. Total (cfs)	244113.0	Conv. (cfs)	70618.5	74708.6	98786.0
Length Wtd. (ft)	24.98	Wetted Per. (ft)	103.11	23.49	151.24
Min Ch El (ft)	799.46	Shear (lb/sq ft)	0.05	0.10	0.04
Alpha	1.47	Stream Power (lb/ft s)	297.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	4.54	1.91	5.21
C & E Loss (ft)	0.00	Cum SA (acres)	0.84	0.13	0.72

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 250 Profile: PF 1

E.G. Elev (ft)	816.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.06	Reach Len. (ft)	25.27	25.00	25.28
Crit W.S. (ft)		Flow Area (sq ft)	632.95	335.75	1081.78
E.G. Slope (ft/ft)	0.000104	Area (sq ft)	632.95	335.75	1081.78
Q Total (cfs)	2557.00	Flow (cfs)	651.77	754.42	1150.82
Top Width (ft)	279.91	Top Width (ft)	97.08	21.38	161.45
Vel Total (ft/s)	1.25	Avg. Vel. (ft/s)	1.03	2.25	1.06
Max Chl Dpth (ft)	16.57	Hydr. Depth (ft)	6.52	15.70	6.70
Conv. Total (cfs)	251136.0	Conv. (cfs)	64013.5	74095.2	113027.4
Length Wtd. (ft)	25.20	Wetted Per. (ft)	100.82	23.19	164.10
Min Ch El (ft)	799.49	Shear (lb/sq ft)	0.04	0.09	0.04
Alpha	1.46	Stream Power (lb/ft s)	296.90	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	4.16	1.71	4.62
C & E Loss (ft)	0.00	Cum SA (acres)	0.78	0.11	0.63

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 225 Profile: PF 1

E.G. Elev (ft)	816.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.06	Reach Len. (ft)	25.12	25.00	25.08
Crit W.S. (ft)		Flow Area (sq ft)	642.91	323.39	1149.94
E.G. Slope (ft/ft)	0.000095	Area (sq ft)	642.91	323.39	1149.94
Q Total (cfs)	2557.00	Flow (cfs)	643.69	698.89	1214.42
Top Width (ft)	278.01	Top Width (ft)	94.69	20.73	162.59
Vel Total (ft/s)	1.21	Avg. Vel. (ft/s)	1.00	2.16	1.06
Max Chl Dpth (ft)	16.44	Hydr. Depth (ft)	6.79	15.60	7.07
Conv. Total (cfs)	262026.1	Conv. (cfs)	65961.7	71618.2	124446.2
Length Wtd. (ft)	25.07	Wetted Per. (ft)	100.22	22.22	165.48
Min Ch El (ft)	799.62	Shear (lb/sq ft)	0.04	0.09	0.04
Alpha	1.41	Stream Power (lb/ft s)	287.82	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	3.79	1.52	3.98
C & E Loss (ft)	0.00	Cum SA (acres)	0.72	0.10	0.54

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 200 Profile: PF 1

E.G. Elev (ft)	816.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.05	Reach Len. (ft)	17.24	17.24	17.24
Crit W.S. (ft)	808.89	Flow Area (sq ft)	672.73	329.96	1052.40
E.G. Slope (ft/ft)	0.000100	Area (sq ft)	672.73	329.96	1052.40
Q Total (cfs)	2557.00	Flow (cfs)	697.54	728.20	1131.26
Top Width (ft)	269.21	Top Width (ft)	98.00	21.81	149.40
Vel Total (ft/s)	1.24	Avg. Vel. (ft/s)	1.04	2.21	1.07
Max Chl Dpth (ft)	16.20	Hydr. Depth (ft)	6.86	15.13	7.04
Conv. Total (cfs)	255174.0	Conv. (cfs)	69610.8	72670.4	112892.8
Length Wtd. (ft)	17.24	Wetted Per. (ft)	103.54	22.86	153.46
Min Ch El (ft)	799.85	Shear (lb/sq ft)	0.04	0.09	0.04
Alpha	1.42	Stream Power (lb/ft s)	283.23	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	3.41	1.34	3.34
C & E Loss (ft)	0.00	Cum SA (acres)	0.67	0.09	0.45

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 175 BR U Profile: PF 1

E.G. Elev (ft)	816.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.05	Reach Len. (ft)	12.50	12.50	12.50
Crit W.S. (ft)	808.77	Flow Area (sq ft)	561.96	286.31	937.12
E.G. Slope (ft/ft)	0.000253	Area (sq ft)	561.96	286.31	937.12
Q Total (cfs)	2557.00	Flow (cfs)	706.99	447.55	1402.46
Top Width (ft)	269.21	Top Width (ft)	98.00	21.81	149.40
Vel Total (ft/s)	1.43	Avg. Vel. (ft/s)	1.26	1.56	1.50
Max Chl Dpth (ft)	16.20	Hydr. Depth (ft)	5.73	13.13	6.27
Conv. Total (cfs)	160806.3	Conv. (cfs)	44461.5	28145.9	88198.9
Length Wtd. (ft)	12.50	Wetted Per. (ft)	138.99	66.51	184.61
Min Ch El (ft)	799.85	Shear (lb/sq ft)	0.06	0.07	0.08
Alpha	1.02	Stream Power (lb/ft s)	283.23	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	3.17	1.21	2.95
C & E Loss (ft)	0.00	Cum SA (acres)	0.63	0.08	0.39

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 175 BR D Profile: PF 1

E.G. Elev (ft)	816.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.05	Reach Len. (ft)	20.26	20.26	20.26
Crit W.S. (ft)	809.05	Flow Area (sq ft)	829.46	283.84	808.41
E.G. Slope (ft/ft)	0.000238	Area (sq ft)	829.46	283.84	808.41
Q Total (cfs)	2557.00	Flow (cfs)	931.98	424.35	1200.67
Top Width (ft)	329.57	Top Width (ft)	178.00	21.61	129.96
Vel Total (ft/s)	1.33	Avg. Vel. (ft/s)	1.12	1.50	1.49
Max Chl Dpth (ft)	15.78	Hydr. Depth (ft)	4.66	13.13	6.22
Conv. Total (cfs)	165914.6	Conv. (cfs)	60472.7	27534.7	77907.1
Length Wtd. (ft)	20.26	Wetted Per. (ft)	220.83	67.26	149.64
Min Ch El (ft)	800.27	Shear (lb/sq ft)	0.06	0.06	0.08
Alpha	1.05	Stream Power (lb/ft s)	343.56	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	2.97	1.13	2.70
C & E Loss (ft)	0.00	Cum SA (acres)	0.59	0.08	0.35

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 150 Profile: PF 1

E.G. Elev (ft)	816.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.05	Reach Len. (ft)	24.75	25.00	25.36
Crit W.S. (ft)		Flow Area (sq ft)	936.35	326.99	976.55
E.G. Slope (ft/ft)	0.000096	Area (sq ft)	936.35	326.99	976.55
Q Total (cfs)	2557.00	Flow (cfs)	813.08	678.60	1065.31
Top Width (ft)	329.56	Top Width (ft)	178.00	21.61	129.95
Vel Total (ft/s)	1.14	Avg. Vel. (ft/s)	0.87	2.08	1.09
Max Chl Dpth (ft)	15.78	Hydr. Depth (ft)	5.26	15.13	7.51
Conv. Total (cfs)	260957.2	Conv. (cfs)	82979.9	69255.7	108721.6
Length Wtd. (ft)	25.06	Wetted Per. (ft)	181.84	24.02	134.68
Min Ch El (ft)	800.27	Shear (lb/sq ft)	0.03	0.08	0.04
Alpha	1.44	Stream Power (lb/ft s)	343.56	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	2.56	0.99	2.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.51	0.07	0.29

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 125 Profile: PF 1

E.G. Elev (ft)	816.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.04	Reach Len. (ft)	25.28	25.00	25.21
Crit W.S. (ft)		Flow Area (sq ft)	1098.70	302.52	937.36
E.G. Slope (ft/ft)	0.000087	Area (sq ft)	1098.70	302.52	937.36
Q Total (cfs)	2557.00	Flow (cfs)	949.53	614.68	992.78
Top Width (ft)	338.24	Top Width (ft)	196.99	19.73	121.52
Vel Total (ft/s)	1.09	Avg. Vel. (ft/s)	0.86	2.03	1.06
Max Chl Dpth (ft)	16.17	Hydr. Depth (ft)	5.58	15.33	7.71
Conv. Total (cfs)	273905.6	Conv. (cfs)	101714.1	65844.7	106346.8
Length Wtd. (ft)	25.18	Wetted Per. (ft)	199.83	21.33	125.66
Min Ch El (ft)	799.87	Shear (lb/sq ft)	0.03	0.08	0.04
Alpha	1.43	Stream Power (lb/ft s)	358.81	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1.98	0.81	1.73
C & E Loss (ft)	0.00	Cum SA (acres)	0.40	0.05	0.22

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 100 Profile: PF 1

E.G. Elev (ft)	816.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.04	Reach Len. (ft)	24.40	25.00	25.60
Crit W.S. (ft)		Flow Area (sq ft)	982.84	330.20	907.56
E.G. Slope (ft/ft)	0.000094	Area (sq ft)	982.84	330.20	907.56
Q Total (cfs)	2557.00	Flow (cfs)	852.57	692.62	1011.81
Top Width (ft)	322.30	Top Width (ft)	184.62	22.12	115.56
Vel Total (ft/s)	1.15	Avg. Vel. (ft/s)	0.87	2.10	1.11
Max Chl Dpth (ft)	16.20	Hydr. Depth (ft)	5.32	14.93	7.85
Conv. Total (cfs)	263545.6	Conv. (cfs)	87873.3	71386.6	104285.7
Length Wtd. (ft)	25.06	Wetted Per. (ft)	188.35	23.52	119.37
Min Ch El (ft)	799.84	Shear (lb/sq ft)	0.03	0.08	0.04
Alpha	1.46	Stream Power (lb/ft s)	345.72	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1.38	0.63	1.19
C & E Loss (ft)	0.00	Cum SA (acres)	0.29	0.04	0.15

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 75 Profile: PF 1

E.G. Elev (ft)	816.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.02	Reach Len. (ft)	24.78	25.00	25.07
Crit W.S. (ft)		Flow Area (sq ft)	730.51	414.86	766.12
E.G. Slope (ft/ft)	0.000125	Area (sq ft)	730.51	414.86	766.12
Q Total (cfs)	2557.00	Flow (cfs)	630.42	937.03	989.55
Top Width (ft)	295.72	Top Width (ft)	170.46	28.09	97.17
Vel Total (ft/s)	1.34	Avg. Vel. (ft/s)	0.86	2.26	1.29
Max Chl Dpth (ft)	16.20	Hydr. Depth (ft)	4.29	14.77	7.88
Conv. Total (cfs)	228848.2	Conv. (cfs)	56421.6	83863.2	88563.4
Length Wtd. (ft)	24.97	Wetted Per. (ft)	174.36	32.68	99.86
Min Ch El (ft)	799.82	Shear (lb/sq ft)	0.03	0.10	0.06
Alpha	1.51	Stream Power (lb/ft s)	315.25	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.90	0.41	0.70
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	0.03	0.09

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 50 Profile: PF 1

E.G. Elev (ft)	816.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.01	Reach Len. (ft)	24.84	25.00	24.40
Crit W.S. (ft)		Flow Area (sq ft)	742.12	347.88	644.42
E.G. Slope (ft/ft)	0.000150	Area (sq ft)	742.12	347.88	644.42
Q Total (cfs)	2557.00	Flow (cfs)	717.32	916.97	922.71
Top Width (ft)	266.75	Top Width (ft)	165.44	22.80	78.51
Vel Total (ft/s)	1.47	Avg. Vel. (ft/s)	0.97	2.64	1.43
Max Chl Dpth (ft)	16.30	Hydr. Depth (ft)	4.49	15.26	8.21
Conv. Total (cfs)	208836.7	Conv. (cfs)	58585.4	74891.3	75360.0
Length Wtd. (ft)	24.77	Wetted Per. (ft)	171.41	24.94	82.56
Min Ch El (ft)	799.71	Shear (lb/sq ft)	0.04	0.13	0.07
Alpha	1.61	Stream Power (lb/ft s)	289.54	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.48	0.20	0.29
C & E Loss (ft)	0.00	Cum SA (acres)	0.09	0.01	0.04

Plan: POST-DEV 100YR LICK RUN Site 1 RS: 25 Profile: PF 1

E.G. Elev (ft)	816.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.050	0.040	0.050
W.S. Elev (ft)	816.00	Reach Len. (ft)			
Crit W.S. (ft)	808.60	Flow Area (sq ft)	936.94	332.96	406.97
E.G. Slope (ft/ft)	0.000154	Area (sq ft)	936.94	332.96	406.97
Q Total (cfs)	2557.00	Flow (cfs)	1067.07	902.50	587.43
Top Width (ft)	236.32	Top Width (ft)	166.07	22.09	48.16
Vel Total (ft/s)	1.52	Avg. Vel. (ft/s)	1.14	2.71	1.44
Max Chl Dpth (ft)	15.64	Hydr. Depth (ft)	5.64	15.07	8.45
Conv. Total (cfs)	205856.4	Conv. (cfs)	85906.5	72657.7	47292.3
Length Wtd. (ft)		Wetted Per. (ft)	172.89	23.39	52.63
Min Ch El (ft)	800.36	Shear (lb/sq ft)	0.05	0.14	0.07
Alpha	1.55	Stream Power (lb/ft s)	253.93	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CREATION TO COMPLETION

Attachment D- Permit Approvals

DIVISION OF NATURAL RESOURCES
324 Fourth Avenue, Room 200
South Charleston WV 25303-1228
TDD (304) 558-1439
TDD 1-800-354-6087
Fax (304) 558-6048
Telephone (304) 558-3225

Earl Ray Tomblin
Governor

Robert A. Fala
Director

August 6, 2015

Division of Natural Resources
RIGHT OF ENTRY

Re: LS-15-VI/09-1245

CONE Gathering, LLC
Adam White
c/o CESO, Inc.
800 Bursca Drive
Suite 804
Bridgeville, PA 15017-

Dear Mr. White:

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 thirty-four foot five inch by thirteen foot one inch (34'5"x13'1") bridge (Proposed Donahoo Access Road) along Lick Run near New Milton 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

DIVISION OF NATURAL RESOURCES
Wildlife Resources Section
Operations Center
P.O. Box 67
Elkins, West Virginia 26241-3235
Telephone (304) 637-0245
Fax (304) 637-0250

Earl Ray Tomblin
Governor

Frank Jezioro
Director

December 5, 2013

Mr. Michael P. Eagan
CESO, Inc.
402 2nd Street SE, Suite 310
Canton, OH 44702-1174

Dear Mr. Eagan:

We have reviewed our files for information on rare, threatened and endangered (RTE) species and sensitive habitats for the area of the proposed Sherwood South Pipeline project in Doddridge County, WV.

We have no known records of any RTE species or sensitive habitats within the project area; however, unless horizontal directional drilling (HHD) is utilized, surveys for freshwater mussels will be required in Meathouse Fork prior to any in-stream work. Because this is an endangered mussel stream, US Fish and Wildlife Service coordination will be required whether HDD is used or the site is trenched. In addition, although surveys are not required for the crossings of South Fork Hughes River, US Fish and Wildlife Service coordination will be necessary for these crossings as this is also an endangered mussel stream. The Wildlife Resources Section knows of no surveys that have been conducted in the area for rare species or rare species habitat. Consequently, this response is based on information currently available and should not be considered a comprehensive survey of the area under review.

The information provided above is the product of a database search and retrieval. This information does not satisfy other consultation or permitting requirements for disturbances to the natural resources of the state, and further consultation may be required. Additionally, any concurrence requirements for federally listed species must come from the US Fish and Wildlife Service.

Thank you for your inquiry, and should you have any questions please feel free to contact me at the above number, extension 2048. Enclosed please find an invoice.

Sincerely,

Barbara Sargent
Environmental Resources Specialist
Wildlife Diversity Unit

enclosure

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

February 4, 2014

Mr. Andrew Longenecker
CESO, Inc.
402 2nd Street, SE
Canton, Ohio 44702

Re: CONE Gathering, LLC, Sherwood South Pipeline Project, Doddridge County, WV

Dear Mr. Longenecker:

This responds to your request of November 25, 2013, for information regarding the potential occurrence of federally listed endangered and threatened species and their designated critical habitats. CONE Gathering, LLC (CONE) proposes to construct the 19.7-mile Sherwood South pipeline project in Doddridge County, West Virginia. These comments are provided pursuant to the Endangered Species Act (ESA, 87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

The U.S. Fish and Wildlife Service (Service) has determined that three federally listed endangered species are known to occur within the proposed project area, and may be affected by the construction and operation of the proposed project. These are the Indiana bat (*Myotis sodalis*), the clubshell mussel (*Pleurobema clava*), and the snuffbox mussel (*Epioblasma triquetra*). Information to avoid impacts to these species is provided below.

Additionally, on October 2, 2013, in the *Federal Register* (78 FR 61045-61080) the Service proposed the northern long eared bat (*Myotis septentrionalis*) for listing under the ESA. If a decision is made to list this species, potential impacts from this project to this species may need to be addressed if this project is not completed by October 2, 2014. We encourage you to begin incorporating conservation measures to protect these species prior to any potential final listing decisions.

Indiana Bat

The project area is within the range of the Indiana bat (*Myotis sodalis*) and may provide summer foraging and roosting habitats, as well as winter habitat, for this endangered mammal. Indiana bats use caves or mine portals for winter hibernation habitat between November 15 and March 31. Indiana bats may use the proposed site for foraging and roosting between April 1 and November 14. Indiana bat foraging habitat is generally defined as riparian, bottomland, or upland

forest, as well as old fields or pastures with scattered trees. Roosting and maternity habitats consist primarily of live or dead hardwood trees which have exfoliating bark that provides space for bats to roost between the bark and the bole of the tree. Tree cavities, crevices, splits, or hollow portions of tree boles and limbs also provide roost sites. In West Virginia, the Service considers all forest habitats containing trees greater than or equal to 5 inches in diameter at breast height to be potentially suitable as summer roosting and foraging habitat for the Indiana bat.

Based on radio-telemetry data, the Service presumes that Indiana bats are present in areas within 5 miles of hibernacula, 5 miles of summer capture sites with no known maternity roosts, and 2.5 miles of maternity roosts. The proposed project does not pass through any of these buffer zones.

In electronic correspondence dated January 17, 2014, you stated that CONE will clear all project-related timber when bats are in hibernation (November 15 through March 31) to avoid direct impacts to Indiana bats and that no caves or portals exist within the proposed project boundary. An estimated 55 acres of forest area would be cleared for the project, which would leave approximately 1,876 acres or 91.1 percent of forested habitat within the ¼-mile buffer area after project clearing has been completed. The total number of acres in the buffer area is 2,060. The results of this analysis show that there will be sufficient forested habitat remaining on the landscape post-construction to support Indiana bats.

The Service has concluded that the project is not likely to adversely affect the Indiana bat because CONE has committed that all trees within the proposed project area will be cleared seasonally so that no bats will be killed directly by the removal of trees. In addition, there will be sufficient forested habitat remaining on the landscape post-construction to support Indiana bats.

Freshwater Mussels

The proposed project proposes to cross the South Fork Hughes River which provides habitat for the clubshell and snuffbox mussels. Both are listed as endangered under the ESA. Freshwater mussels, like the clubshell and snuffbox, feed by filtering food particles from the water column. Juvenile and adult freshwater mussels have been documented to feed on detritus, diatoms, phytoplankton, and zooplankton. Freshwater mussels rely on fish to complete their life histories. When mussel larvae (glochidia) are released into the water by adult females, they must attach themselves within a few days to an appropriate fish host, which they then parasitize for a short time while developing into juvenile mussels. The loss of many historic populations was likely due to the impacts of impoundments, navigation projects, water quality degradation from agricultural and industrial wastes, deforestation and other forms of habitat alteration, including gravel and sand dredging. Impacts that directly affected the species also include reduction or elimination of fish hosts.

The project proposes to cross the South Fork Hughes River by horizontal directional drill (HDD). This method will allow the pipeline to be placed under the stream without direct affects to the waterway. The HDD method uses bentonite clay in its pressurized drilling that, on occasion, can result in a frac-out that releases bentonite clay into waterways.

In electronic correspondence dated January 17, 2014, you stated your client's commitment to the following measures that will be followed in the event of a frac-out that could cause the sudden release of bentonite clay substrate into waterways:

1. Agencies will be contacted within 24 hours of the event.
2. Immediately halt the pumping of drilling fluids.
3. Install containment measures (i.e., erosion and sedimentation control barriers).
4. Immediate suspension of drilling activities if the frac-out cannot be controlled.

In the event of a frac-out, the Service believes that implementation of the measures outlined above will minimize, to the extent practicable, the likelihood of adverse impacts the South Fork Hughes River and the clubshell and snuffbox mussels. This office should be notified immediately if any deviations from the submitted plans are anticipated, or if a frac-out occurs during construction of the project.

As a result of this information, the Service has concluded that the project may affect, but is not likely to adversely affect any federally listed endangered and threatened species. No biological assessment or further section 7 consultation under the ESA is required with the Service. Should project plans change or amendments be proposed that we have not considered in your proposed action, or if additional information on listed and proposed species becomes available, or if new species become listed or critical habitat is designated, this determination may be reconsidered. If you have any questions regarding this letter, please contact Liz Stout of my staff at (304) 636-6586, Ext. 15, or elizabeth_stout@fws.gov, or at the letterhead address.

Sincerely,

John E. Schmidt
Field Supervisor

Form MM-109
Rev. 05-19-05

PERMIT NO. 0420141044

PERMIT TO ENTER UPON, UNDER, OVER OR ACROSS THE STATE ROADS OF THE STATE OF WEST VIRGINIA, AS PROVIDED FOR IN SECTION 6, ARTICLE 16, CHAPTER 17; SECTION 9, ARTICLE 16, CHAPTER 17; SECTION 8, ARTICLE 4, CHAPTER 17, WEST VIRGINIA CODE, 1931, AS AMENDED.

THIS PERMIT, Made this 23 day of July 20 14, between the WEST VIRGINIA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS, a statutory corporation hereinafter called DIVISION and CONE Gathering, LLC

Address: 1000 CONSOL Energy Drive, Canonsburg, PA 15317 Phone No: (240) 506-7299 hereinafter called APPLICANT.

WITNESSETH

In consideration of the hereinafter set out covenants and in accordance with Section 6, Article 16, Chapter 17; or Section 9, Article 16, Chapter 17; or Section 8, Article 4, Chapter 17, of the Official Code of West Virginia, 1931, as amended, and the rules and regulations promulgated thereunder, APPLICANT does hereby apply to enter

Route Type & No. CR 40 DOH Project No. N/A (if applicable);
at 0.07 miles south of Jct. CR 40 and CR 18 Mile Post 11.042
in Doddridge County, for the purposes hereinafter set forth and in accordance with the plans and specifications which are attached hereto and made a part hereof: to construct a permanent access drive to enable the construction of a waterline.

APPLICANT further agrees to accept the conditions hereinafter set forth:

1. APPLICANT shall deposit with DIVISION the sum of $ 1,000,000 in the form of an official, certified or cashier's check, or executed bond with surety satisfactory to DIVISION to cover any damage and inspection costs DIVISION may sustain by reason of the granting of this permit, including any expense incurred in restoring said highway to its original condition or the proper repair of any and all damages that may result within one (1) year from the date of the completion of said work.
2. APPLICANT agrees to reimburse DIVISION for inspection costs as follows:
   - ☒ A. For any inspection costs incurred under this permit.
   - ☐ B. At $ _____ per linear foot for _____ feet of water line installed under this permit
   - ☐ C. At $ _____ per linear foot for _____ feet of sewer line installed under this permit
3. APPLICANT shall notify DIVISION at least 48 hours in advance of the date the work will begin. Failure to comply will be cause for cancellation of this permit.
4. APPLICANT agrees to protect its employees, equipment and users of the highway at all times in accordance with the current Division of Highways manual "Traffic Control For Street and Highway Construction and Maintenance Operations".
5. APPLICANT agrees to comply with all applicable state and federal laws in the performance of work under this permit.
6. Supplementary conditions cited on the reverse side of this permit are understood and agreed to be a part hereof.
7. The work authorized under this permit shall be completed on or before (Date): 03/15/2015

Applicant's signature on this permit affirms that all text herein is a verbatim reproduction of The West Virginia Division of Highways Encroachment Permit Form MM-109, revision date May 19, 2005. All attachments are inclusive to this permit.

RECOMMENDED: _____
Title HWY ADM 3

Kelly Eddy Permitting Supervisor
Signature and Title of Applicant

BOND REQUIREMENT:
BOND NO. SUR0022700 DATE 05/16/2014
Attached ☐ On File ☐
INSPECTION: Owner/Consultant ☐
Full Time ☐ Part Time ☐
Periodic ☐ Reimbursable ☐ No Cost ☐

APPROVED: _____
Title ACTING MAINTENANCE ENGINEER
West Virginia Division of Highways

AUTHORIZATION NO: _____

PERMIT NO: 0420141044

Addendum to Permit 04-2014-1044, 04-2014-1045, 04-2014-1047, 04-2014-1048, 04-2014-1049, 04-2014-1050, 04-2014-1052, 04-2014-1053, 04-2014-1055, 04-2014-1057, 04-2014-1058, 04-2014-1060, 04-2014-1061, 04-2014-1062, 04-2014-1063

This addendum, made this 22nd day of September 2014, between the West Virginia Department of Transportation, Division of Highways, a statutory company hereinafter called the Division

and CONE Gathering, LLC

Address: One Energy Drive, Jane Lew, WV 26378 Phone: 304 692-4321

hereinafter called APPLICANT.

The Applicant has filed with the DIVISION a written application for the following named routes and locations:

Doddridge County Route 13, Maxwell Ridge at Mile Post 3.587 to 8.99; SLS 13/3 at Mile Post 1.54; SLS 40, at Mile Post 3.33 to 3.57 and 11.042 to 11.12; SLS 19/11, Hughes River at Mile Post 1.58 to 7.783, SLS 50/30 at Mile post 4.32 to 6.15; and SLS 21, Oxford Road at Mile post 0.00 to 4.53.

Road conditions have been verified by route review filming and any degradation will be the responsibility of the applicant to restore. Release of the applicant's bond will be determined by a final route review.

- Approach roads that the grade is above the roadway, the applicant must prevent water from entering the Division's roads by installing a box and grate or by slanting the access roads to a parallel ditch.
- Applicant will utilize CASE A-6 Traffic Control or CASE C-2 appropriately.
- 04-2014-1045, 04-2014-1050, 04-2014-1053, 04-2014-1060, 04-2014-1061, and 04-2014-1058 – a 15" drainage vessel is required and applicant need to reestablish the ditch line on the upper and lower side of the approach.
- 04-2014-1049 – Slope temporary access road ditch to the left of Center Line and Line ditch with rip rap.

Perform repairs as necessary during operation.

- After completion of the project, a joint review of roads will be filmed and evaluated to assure roads have been repaired to existing condition or better.
- No travel on School Bus Routes during their traversing operational hours on above mentioned route on bi-directional roadways where the lane widths are less than 10 ft.
- Pilot Vehicle required for all Oversized Loads on covered roads.
- Ditch lines to be maintained by applicant. **FDR or equivalent may be required to stabilize road to uphold increased traffic and heavy and excess amount of loads.** Centerline of roadway cannot be relocated without an agreement between West Virginia Division of Highways and CNX Gas Company, LLC. This work requires an advanced notice and prior approval by Maintenance/Design Engineer.
- Repairs that will include "Hot Mix Asphalt" will have the following testing requirement: The supplier will be responsible for testing at the plant; Compaction testing will be as per WV DOH specifications.
- The Division of Highways shall have the right at all times to inspect the work, and if such inspections should reveal that the work is not done according to specifications, upon being so advised by the Division, CONE Gathering, LLC agrees to take immediate corrective actions.

Applicant shall properly repair and maintain any and all damages that may result to said bridges, highways, shoulders and ditches from hauling activities of Applicant, its agents, contractors and employees, to as good a condition prior to commencement of Applicant's operation or as when the permit was issued, as determined by the District Engineer/Manager of the DIVISON having jurisdiction over the work permitted, or pay damages therefore in the amount to sufficiently restore such bridges, roads, highways, shoulders and ditches to original condition; and shall reimburse the DIVISON for all inspection costs incurred by it in connection with said work and repairs of such damages and faithfully comply with all terms and conditions of said permits and save harmless the DIVISION and the State of West Virginia from all losses resulting from the conduct of said work and repairs; provided that all projects covered by this blanket bond have been restored to original or better condition; then this Bond shall be released; or otherwise will remain in full force and effect.

Bond Amount: $ 1,000,000.00 Bond Number SUR0022700 Date: 5/16/2014

Approach Review

Permit Number: 01-2014-1044
Date Reviewed: 9-11-14

County DODDRIDGE **Route** CR 40

Coordinates N 39.256064
W 80.71156

Approach Width 60' **Approach Grade** - 3 %

Sight Distance (N) E 200'

Sight Distance (S) W 250'

Pipe Required Y (N) **If Yes: What Size** _____

Road Speed Limit 25

Located 0.075 Mile/s N (S) E W of WV Rt 18 on the N S E (W) side of the road

APPLICANT MUST PREVENT WATER FROM ENTERING _____ BY INSTALLING AN OPEN GRATE AT THE ENTRANCE OR BY SLOPING THE ACCESS ROAD TO A PARALLEL DITCH.

Permit Application # 15-395 – NOT IN FLOODPLAIN
Antero Resources
Gum Run Road Upgrade
Location: Old County Rt. 36 (Gum Run Rd)
Received: 11/09/15
Announced: 11/17/15
Publication Date: Week of 11/16/15
20-Day Comment Period Window (from Commission Meeting) 12/07/2015
90-Day Approval Window (from date of receipt) N/A
Project Description: Road Upgrade

Permit Application # 15-396 – NOT IN FLOODPLAIN
Antero Resources
Hunter's Fork Access Road
Location: Hunter Fork Road – (CR-44)
Received: 11/09/15
Announced: 11/17/15
Publication Date: Week of 11/16/15
20-Day Comment Period Window (from Commission Meeting) 12/07/2015
90-Day Approval Window (from date of receipt) N/A
Project Description: Access Road

Permit Application # 15-397 – NOT IN FLOODPLAIN
Antero Resources
Pumpkin Center Access Road
Location: Arnolds Creek (39.247302N, 80.809174W
Received: 11/09/15
Announced: 11/17/15
Publication Date: Week of 11/16/15
20-Day Comment Period Window (from Commission Meeting) 12/07/2015
90-Day Approval Window (from date of receipt) N/A
Project Description: Access Road

Permit Application # 15-398 –
Cone Gathering, LLC
Donahoo Access Road
Location: Off Lick Run Road, New Milton
Received: 11/09/15
Announced: 11/17/15
Publication Date: Week of 11/16/15
20-Day Comment Period Window (from Commission Meeting) 12/07/2015
90-Day Approval Window (from date of receipt) N/A
Project Description: Access Road

The Doddridge Independent

The Doddridge Independent

PUBLISHER'S CERTIFICATE

I, Michael D. Zorn, Publisher of The Doddridge Independent, A newspaper of general circulation published in the town of West Union, Doddridge County, West Virginia, do hereby certify that:

Permit Application # 15-398 – NOT IN FLOODPLAIN

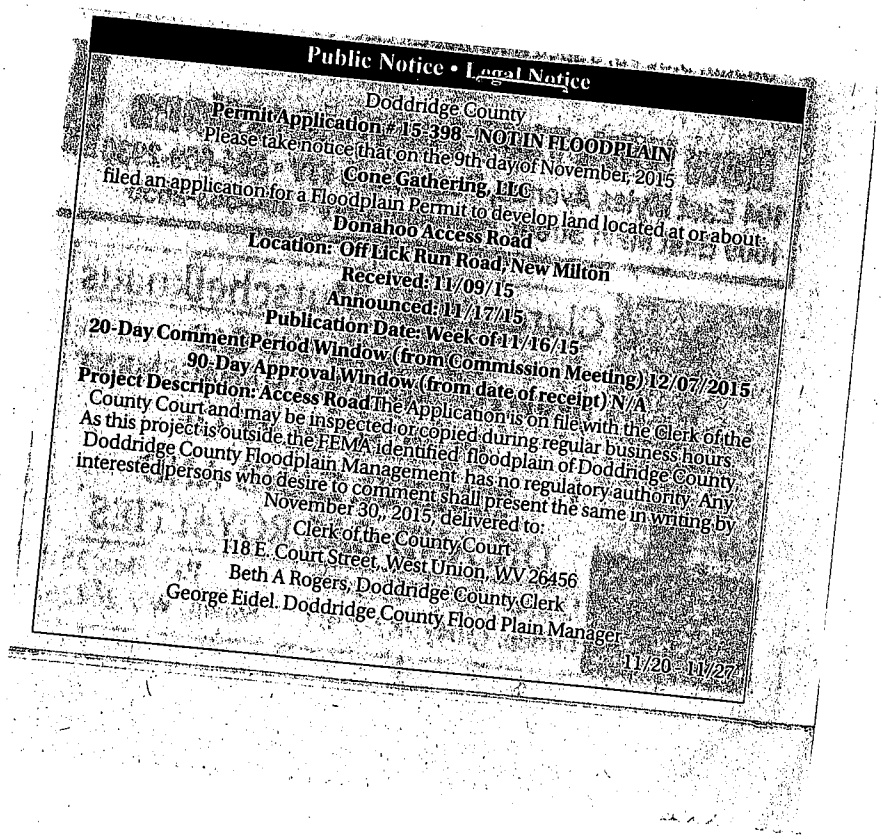
Please take notice that on the 9th day of November, 2015

Cone Gathering, LLC

filed an application for a Floodplain Permit to develop land located at or about:

Donahoo Access Road

Location: Off Lick Run Road, New Milton



Public Notice • Legal Notice

Doddridge County

Permit Application # 15-398 - NOT IN FLOODPLAIN

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Cone Gathering, LLC

filed an application for a Floodplain Permit to develop land located at or about:

Donahoo Access Road

Location: Off Lick Run Road, New Milton

Received: 11/09/15

Announced: 11/17/15

Publication Date: Week of 11/16/15

20-Day Comment Period Window (from Commission Meeting) 12/07/2015

90-Day Approval Window (from date of receipt) N/A

Project Description: Access Road The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours. As this project is outside the FEMA identified floodplain of Doddridge County, Doddridge County Floodplain Management has no regulatory authority. Any interested persons who desire to comment shall present the same in writing by November 30, 2015, delivered to:

Clerk of the County Court

118 E. Court Street, West Union, WV 26456

Beth A Rogers, Doddridge County Clerk

George Eidel, Doddridge County Flood Plain Manager

11/20, 11/27

was published in The Doddridge Independent
2 times commencing on Friday, November 20, 2015 and
Ending on Friday, November 27, 2015 at the request of:

George Eidel, Doddridge County Floodplain Manager& Doddridge County Commission

Given under my hand this Friday, November 27, 2015

The publisher's fee for said publication is:

$ 25.27 1st Run/$ 18.95 Subsequent Runs

This Legal Ad Total: $ 44.22

Michael D. Zorn
Publisher of The Doddridge Independent

Subscribed to and sworn to before me on

this date: 11/30/15

Notary Public in and for Doddridge County

My Commission expires on

The 17th day of May 20 19

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA
PAMELA R. STRUSPRING
P.O. BOX 81
WEST UNION, WV 26456
My commission expires May 17, 2019