



Pigg River Restoration at Power Dam

Year 3 Monitoring Report

As required by VDEQ Permit #15-1551 and USFWS Biological Opinion for the Pigg River Restoration at Power Dam Project.

Prepared for:

Friends of the Rivers of Virginia, Inc.
Attn: Mr. Bill Tanger, Chairman
P.O. Box 1750
Roanoke, Virginia 24008

Prepared By:

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DECEMBER 2019

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Introduction

Wetland Studies and Solutions, Inc. (WSSI) presents this monitoring report to the Friends of the Rivers of Virginia (FORVA), providing data related to Year 3 Monitoring efforts. The monitoring program has been designed to track changes to the river corridor and adjacent wetlands following the removal of the decommissioned Power Dam on the Pigg River in Rocky Mount, Virginia, and in accordance with the *Virginia Water Protection Permit Joint Permit Application #15-1551* (draft dated 6/30/2016). Monitoring activities were performed as outlined in the *Pigg River Restoration at Power Dam Monitoring RFP* (WSSI#1054, dated July 27, 2016, a.k.a. “RFP”). Results of annual monitoring required by the U.S. Fish and Wildlife Service in their biological opinion dated January 13, 2016 are hereby incorporated by reference.

Monitoring Year 3 field data was collected by WSSI staff Matthew Hutchins W.P.I.T.¹ and Nathan Staley P.E.² during baseflow conditions on September 30 – October 2, 2019. A total of twelve (12) cross sections were assessed. Cross-sections were established during November 2016 Post-Construction Monitoring and based on locations outlined in the RFP. Cross-sections, as located by GPS, are shown in **Exhibit 1**. Half of the cross-sections were established upstream and half below the relic dam structure. Spacing was adjusted to focus on areas around the dam where the greatest change was anticipated to occur. Cross-sections covered areas far enough upstream to be beyond backwater effects created by the dam and stretched downstream to the point where effects of the dam removal were anticipated to be largely diminished. Cross-section locations were also selected to correspond with previous monitoring efforts (Hitt et al., 2009; Bass, 2015).

Methods

The focus of Year-3 Monitoring efforts was to locate the twelve monitoring stations previously established and document current channel conditions. The results are compared with post-construction monitoring information to show channel evolution throughout the dam removal 5-year post-construction monitoring period. WSSI staff began by accessing upstream cross-sections by boat. Upstream access was gained through the Town of Rocky Mount’s sanitary sewer pumping station (entrance road located near the intersection of Power Dam Road and Scenic River Drive). Cross-sections 1-5 were accessed by boat. Cross-sections 6-12 were accessed via vehicle/foot travel through Town or private property – specifically public land or Town property for sections 6-8, via Hudson Farm Lane (private) for sections 9-11, and through private land on Chestnut Hill Road just downstream of the Pigg River bridge for section 12.

At each cross-section, WSSI staff photo-documented local conditions through upstream, downstream and channel bank photos. All photo documentation adhered to VWP guidelines, noting direction, photographer, date/time, vegetative cover (as applicable), and a brief description. Additional photos were taken to document conditions at locations where significant tributaries upstream of the dam join Pigg River. This information is included at the end of **Appendix A**.

¹ Wetland Professional In Training, Society of Wetlands Scientists Certification Program, Inc.
² Professional Engineer – License #047145

In addition to photographs, WSSI staff surveyed cross-section geometry using a laser level and survey tape to record station/elevation information. During Year 3 monitoring, points were surveyed at any break in slope, generally consistent with methodologies used in the *Sediment Capacity and Fate Modeling Report* (Bass, 2015) and Post-Construction Monitoring. Slight variations in cross section geometry are attributable to differences in individual sampling events and site-specific factors (i.e. normal survey error, vegetation, slack in the survey tape, etc.). At most of cross sections water depth measurements were taken due to vegetation obstruction (especially for generation of the thalweg profile) and the water surface depth added to the edge of water elevation recorded during cross section survey. Though less exact, this method was necessary due to field conditions and allows relative comparison of overall bed level elevation changes. Major changes seen in cross sections are due to channel evolution and erosion following dam removal. Cross-section geometry for re-surveyed sections is given in **Appendix B**, with sections showing Post-Construction, 1-year, 2-year and 3-year channel geometry overlaid.

Physical habitat parameters including particle size, embeddedness, woody debris, and thalweg depth measurements were recorded consistent with previous studies (Hitt et al., 2009). Observations regarding embeddedness are included with the section descriptions and photographs in **Appendix A**. The presence and quantification of large woody debris was documented by visual assessment for areas 150 feet upstream and downstream of the measured cross-section. Woody debris counts are also given in **Appendix A**.

Thalweg measurements were taken to document streambed elevation changes in the vicinity of the cross-section. Depth measurements were collected at 10-ft. intervals (generally) from the cross-section location in both the upstream and downstream direction for a distance of approximately 50 ft. (each direction). In all cases water depth measurement was taken due to vegetation obstruction and the depth measurement added to the elevation of the edge of water measurement taken during cross section survey. Incomplete thalweg survey information in prior year monitoring was due to similar issues with thick bank vegetation. Therefore, field procedures were modified in Year 3 to allow a more complete general picture of bed elevation changes in future monitoring events. (Note: The modified methodology assumes a negligible water surface slope.) Thalweg plots are given in **Appendix A**.

The method of data collection for bed material size varied depending on local conditions. The particle size distribution at most of the cross sections was uniformly sandy, so no pebble count surveys were warranted. Bed material at the five of the cross sections, specifically 3, 7, 8, 11 and 12, were coarser in nature and warranted formal sampling. Wolman riffle pebble counts were performed at these cross sections and particle size distribution data is presented in **Appendix B**.

Wetland data points were conducted at forested wetland sites #2, #3, and #4, as outlined in the Joint Permit Application (four locations within Site #2 and two location each within Site #3 and #4). Wetland sites are shown in **Exhibit 1**. Sampling consisted of photo documentation of site conditions and observations of vegetation, hydrology and soil characteristics necessary for completion of the “Wetland Determination Data Form – Eastern Mountains and Piedmont Region” from the U.S. Army Corps of Engineers Regional Supplement, Version 2 (2012). A 18”

deep test pit/auger hole was dug to document the presence or absence of a hydric soil, water table or saturation. Field data forms are included in **Appendix C**.

Also included within this report are the results of the Year 3 (11/5/2018 – 10/5/2019) ground and surface water monitoring at Wetland Site #2, (location shown in **Exhibit 1**). Groundwater monitoring information and results can be found in **Appendix D** with corresponding local weather station data given in **Appendix E**.

Results and Conclusions

Year 3 monitoring cross section surveys indicate continued bed incision at Cross Section 1 and 2 (approximately 1.5-ft of drop in Cross Section 1 and 2.5-ft in Cross Section 2 in bed elevations since Year 2), likely driven by the storm events experienced throughout the year. Cross Section 3 saw such a dramatic bank failure neither end pin could be found. Resurvey at Cross Section 3 was precluded by a large debris jam. Basic field measurements were taken and indicate minimal further incision (bed rock outcroppings are now exposed), but channel widening of over 30 feet. Cross Sections 4 saw little change in bed incision but continued bank failure, especially on the left bank. Changes at Sections 5 and 6 were less dramatic since significant evolution occurred immediately following construction and these sections now approach the invert elevation of the dam remains. Upstream of the removed dam, there was a significant loss of bank vegetation and signs of consistent bank failure, even though rain events were less frequent than the previous year, based off precipitation data from NOAA dating from January to September for 2018 and 2019. 2018 showed a total of 55.78 inches and 2019 showed a total of 38.13 inches. Tension cracking and mass failure is visible at cross sections where steep banks still exist. Downstream of the removed dam the banks had sediment deposits, with these deposits burying most of the end pins on both banks. End pins at various cross sections downstream of the dam saw deposition ranging from 2 inches to 10 inches, confirming sediment transport in overbank events since Year 2 monitoring.

Pebble count monitoring data shows an increase in amount of cross sections that justified performing a pebble count. Five pebble counts were taken during Year 3 monitoring 4 more than Year 2. This year there has been a transition toward seeing less sand and more gravel throughout the cross sections. Cross Sections 3 especially had bedrock present showing that the stream may have reached the lowest point.

Year 3 monitoring is the first year to require a detailed analysis of soil characteristics in wetland areas. Previous soil assessment and wetland determinations were performed by agency staff prior to dam removal and WSSI involvement. USFWS staff notes from wetland assessments performed on November 18, 2015 state that Site 4 was:

“perched over 5 feet above the water surface of the Pigg River. Site is not connected to the river and will not be impacted by the project. Boundary flagging and wetland determination data forms were not completed for this site.”

WSSI staff took two data points at Site 4 (adjacent to Cross Section 2) during Year 3 monitoring. Results showed that the site did not meet the hydrology or hydric soil requirements for a wetland. Additional assessment during future monitoring will aid in drawing conclusions regarding changing conditions. At Site 3 (adjacent to Cross Section 4), all three parameters were met but no saturation, water table or standing water was present at the time of monitoring. At Site 2 (multiple sample locations) the plants, soils, and hydrology were all present and met the requirements needed to be considered a wetland.

WETLAND STUDIES AND SOLUTIONS, INC.



Matthew Hutchins, WPIT³
Environmental Technician



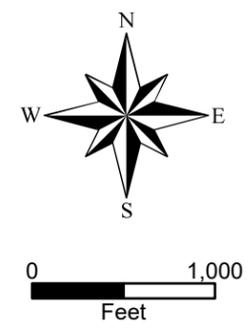
Nathan Staley, P.E.⁴
Senior Associate Engineer

³ Wetland Professional in Training, Society of Wetland Scientists Certification Program, Inc.

⁴ Professional Engineer – License #047145



**Pigg River Restoration at
Power Dam-Monitoring
Permanent Monitoring Locations**
Original Scale: 1"=1000'



- Survey Locations
- Cross Sections

Appendix A

Cross Section 1

<u>Location</u>	<u>Latitude</u>	<u>Longitude</u>
Left Bank	36.990985	-79.864618
Right Bank	36.990712	-79.864937

Description: Cross Section 1 is located approximately 600 feet downstream of the existing sanitary pump station, accessible via Scenic River Road. Access was by boat from the upstream pumping station. Local conditions were noted as forested on the left bank and agricultural fields on the right bank. (Note: Left and right bank references will always be made facing downstream.) The left bank slope was steep, and the right bank sloped gradually with a sharp drop at the top of the bank. In contrast to previous monitoring events, both banks have more vegetation than the previous year. In addition, 300 yards downstream of the Cross Section there were two large pile ups of large woody debris.

The instrument setup for this Cross Section was on the left bank (Height of Instrument, HI = 4.64 ft.). The Cross Section plot and thalweg profile are shown below. No pebble count was taken at this location due to the uniform fine-grained (sandy) nature of bed sediments. Isolated pockets of gravel from 12-50mm were observed across the stream adjacent to some woody debris.



Photo 1-1

Location, Orientation: XS 1, Looking Upstream

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

9/30/19, 9:11 AM

Taken by: *See note below

Description: View looking upstream from the middle of Cross Section 1

Woody Debris: 15

*Note: All Post-construction photographs taken by M. Hutchins, unless otherwise noted.



Photo 1-2

Location, Orientation: XS 1, Looking Downstream

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

9/30/19, 9:11 AM

Description: View looking downstream from the middle of Cross Section 1

Woody Debris: 30



Photo 1-3

Location, Orientation: XS 1, Left Bank

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

9/30/19, 9:11 AM

Description: View looking left from the middle of Cross Section 1

Vegetation: 60% herbaceous cover, few trees at top of bank, large woody debris present



Photo 1-4

Location, Orientation: XS 1, Right Bank

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

9/30/19, 9:13 AM

Description: View looking right from the middle of Cross Section 1

Vegetation: 40% herbaceous cover, no trees



Photo 1-5

Location, Orientation: XS 1, Upstream looking down

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

9/30/19, 9:12 AM

Description: View looking downstream at Cross Section 1 from an upstream position



Photo 1-6

Location, Orientation: XS 1, Downstream looking up

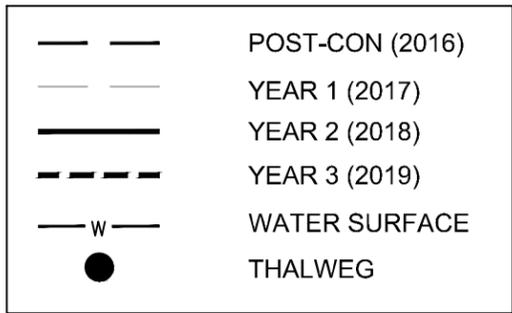
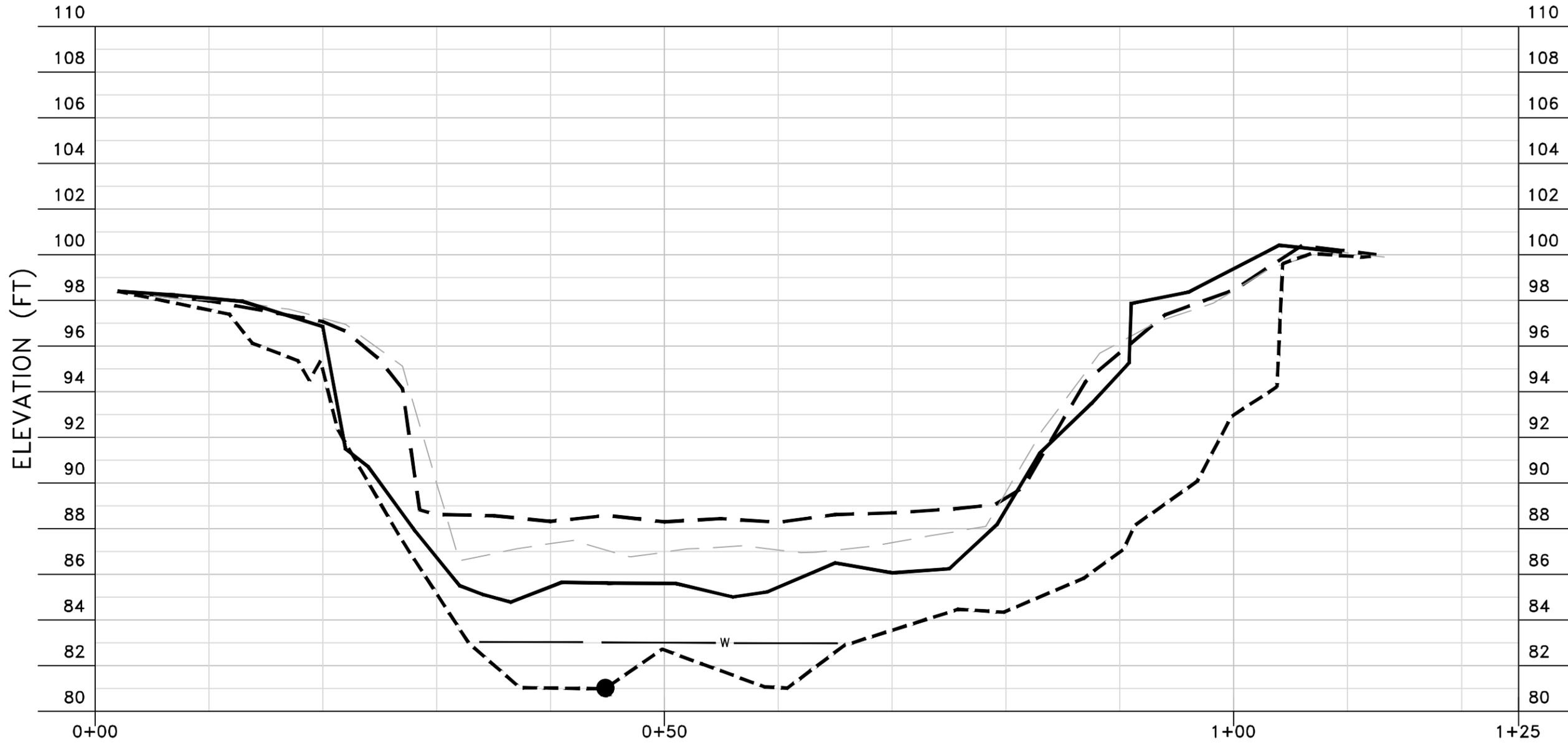
Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

10/01/18, 9:13 AM

Description: View looking upstream at Cross Section 1 from a downstream position

XS 1



DISTANCE ALONG BASELINE (FT)

PROFILE SCALE:

HORIZ: 1"=10'

VERT: 1"=5'

(ELEV. RELATIVE TO ASSUMED XS END PIN AT 100.)

ELEVATION (FT)

Pigg River Dam Removal Restoration - Monitoring
Rocky Mount, Virginia

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No.	Date	Description	

Boundary and Topo Source:
WSSI and Orange Digital Data

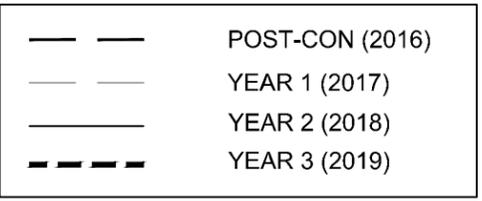
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MEH	MEH	NAS

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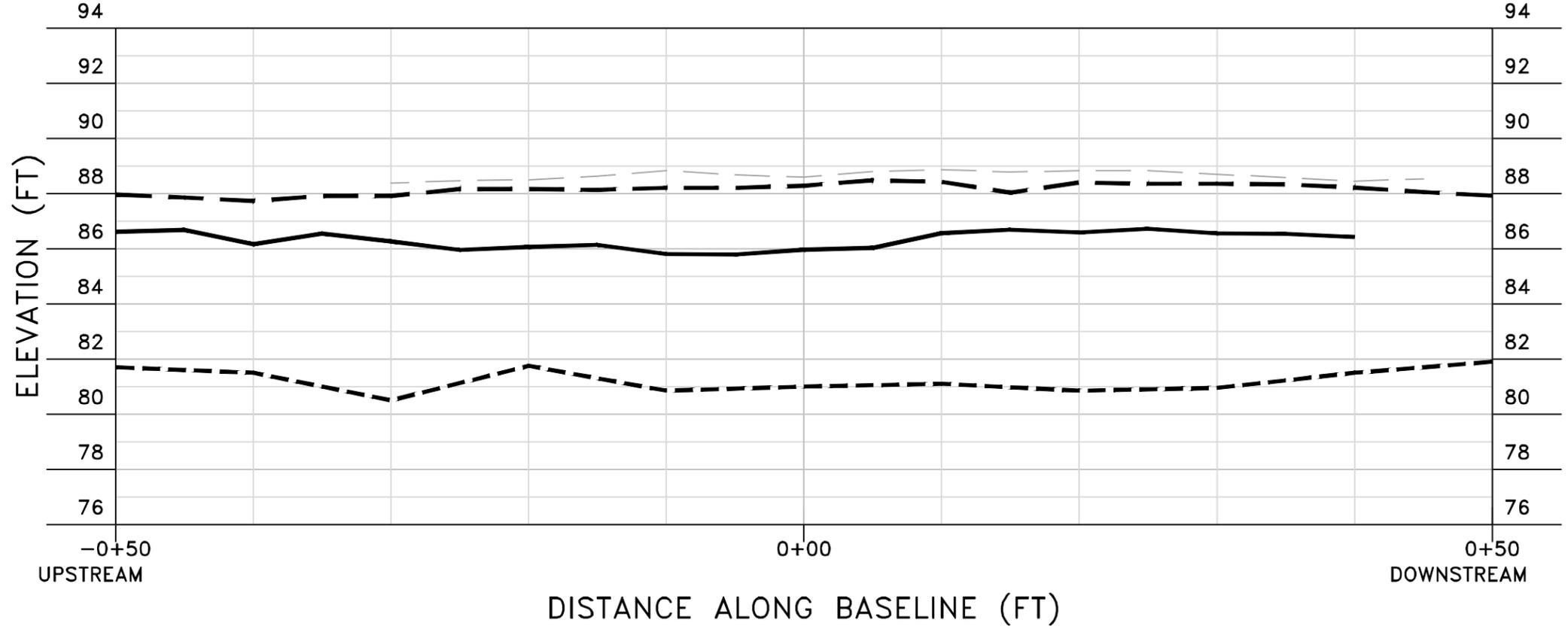
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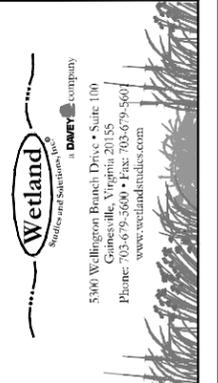
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Year 3 - XS 1



Thalweg XS 1



PROFILE SCALE:
 HORIZ: 1"=10'
 VERT: 1"=5'
 (ELEV. RELATIVE TO ASSUMED XS END PIN AT 100.)



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 Rocky Mount, Virginia

Year 3 - Thalweg Profile XS 1
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No.	Date	Description

DATE: OCT 2019 SCALE: AS NOTED

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 WSSI and Orange Digital Data

Design	Draft	Approved
MEH	MEH	NAS

Sheet #
 2 of 24

Computer File Name:
 2019-07-20-08-41-42-14-01-01.dwg

Cross Section 2

<i>Location</i>	<i>Latitude</i>	<i>Longitude</i>
Left Bank	36.984705	-79.864096
Right Bank	36.984655	-79.864333

Description: Cross Section 2 is located approximately 2,400 feet downstream (south) of Cross Section 1 and 1,200 feet downstream of an old power line easement. Powerlines were not seen at the time of survey this year. Access was by boat from the upstream pumping station. Local conditions were noted as forested on both banks. The right bank sloped down with a drop off near the top of bank with some herbaceous cover and woody debris. The left bank was highly eroded with little herbaceous cover and large amount of woody debris.

The instrument setup for this Cross Section was measured from left bank (HI = 4.93 ft.). The Cross Section plot and thalweg profile are shown below. No pebble count was taken at this location due the uniform fine-grained (sandy) nature of bed sediments but 10% of bed contained 3-10mm gravel. The left bank end pin was not found and was assumed to be washed away. The right bank pin was moved six feet back (the pin was moved after measurements were taken), due to it being right on the edge of the eroding bank. Year 3 showed increased bed incision and bank failure.

This Cross Section was located adjacent to the overbank wetland area (left bank) identified in permit documents and previous reports as Wetland Site #4. Wetland data forms are given in Appendix C.



Photo 2-1

Location, Orientation: XS 2, Looking Upstream

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: Site #4, DP-1 and DP-2

9/30/19, 11:33 AM

Description: View looking upstream from the center of Cross Section 2

Woody Debris: 25



Photo 2-2

Location, Orientation: XS 2, Looking Downstream

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: Site #4, DP-1 and DP-2

9/30/19, 11:33 AM

Description: View looking downstream from the middle of Cross Section 2
Woody Debris: 10



Photo 2-3

Location, Orientation: XS 2, Left Bank

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: Site #4, DP-1 and DP-2

9/30/19, 11:33 AM

Description: View looking left from the middle of Cross Section 2
Vegetation: 40% herbaceous cover, few trees, woody debris



Photo 2-4

Location, Orientation: XS 2, Right Bank

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: Site #4, DP-1 and DP-2

9/30/19, 11:33 AM

Description: View looking right from the middle of Cross Section 2

Vegetation: 70% herbaceous cover, few trees, woody debris



Photo 2-5

Location, Orientation: XS 2, Upstream looking down

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: Site #4, DP-1 and DP-2

9/30/19, 11:34 AM

Description: View looking downstream at Cross Section 2 from an upstream position



Photo 2-6

Location, Orientation: XS 2, Downstream looking up
Permit Number: JPA #15-1551
Wetland Data Sheet Reference: Site #4, DP-1 and DP-2
9/30/19, 11:36 AM

Description: View looking upstream at Cross Section 2 from a downstream position



Photo 2-7

Location, Orientation: XS 2, Right Bank end pin before moving
Permit Number: JPA #15-1551
Wetland Data Sheet Reference: Site #4, DP-1 and DP-2
9/30/19, 10:53 AM

Description: Photo of the end pin right on the edge of bank erosion before it was moved.



Photo 2-8

Location, Orientation: XS 2, Right Bank end pin after moving

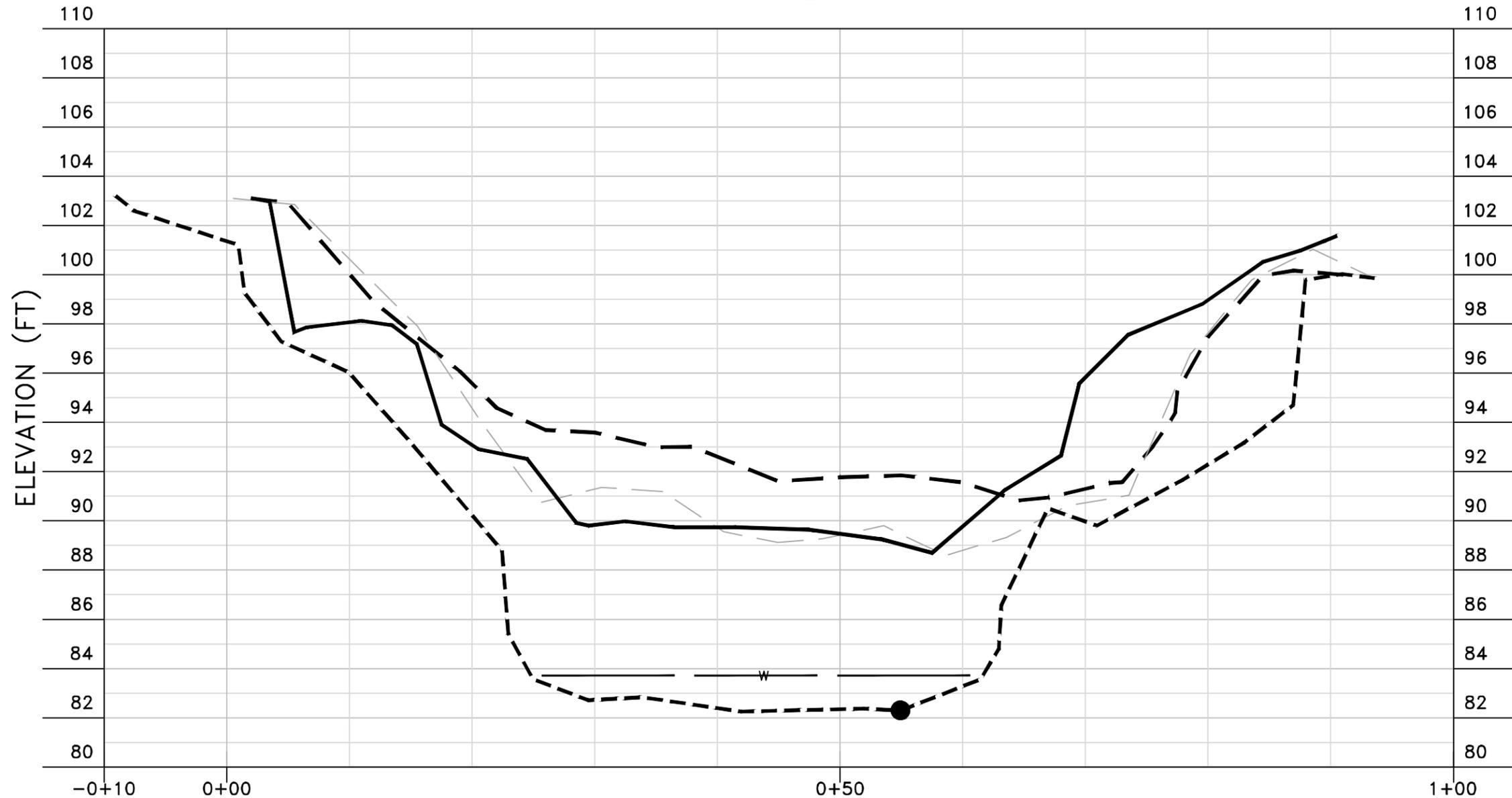
Permit Number: JPA #15-1551

Wetland Data Sheet Reference: Site #4, DP-1 and DP-2

9/30/19, 11:17 AM

Description: View looking at Right Bank end pin after moving it six feet back after the survey was taken.

XS 2



DISTANCE ALONG BASELINE (FT)

PROFILE SCALE:

HORIZ: 1"=10'

VERT: 1"=5'

(ELEV. RELATIVE TO ASSUMED XS END PIN AT 100.)

	POST-CON (2016)
	YEAR 1 (2017)
	YEAR 2 (2018)
	YEAR 3 (2019)
	WATER SURFACE
	THALWEG

Wetland
Soil and Sediment
Data
Company
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Guineysville, Virginia 20155
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www.wetlanddata.com

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Rocky Mount, Virginia

Year 3 - XS 2
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WSSI and Orange Digital Data

Design	Draft	Approved
MEH	MEH	NAS

Sheet #
3 of 24

Computer File Name:
20190920-000-000-000-000-000-000

Cross Section 3

<i><u>Location</u></i>	<i><u>Latitude</u></i>	<i><u>Longitude</u></i>
Left Bank	36.980573	-79.855954
Right Bank	36.980669	-79.855792

Description: Cross Section 3 was located approximately 2,600 feet downstream of Cross Section 2, 500 feet southeast of the south end of Scenic River Road, and just downstream of a large meander bend. Access was by boat from the upstream pumping station. Significant erosion and bank failure was seen at this section. After an exhaustive search, it was assumed that both end pins were washed away and lost. Local conditions were noted as forested at the top both banks above the erosion. The left bank was composed of 20% vegetative cover and exposed root structures creating a steep vertical upper bank with the lower left bank primarily composed of sediment deposits and large chunks of the eroded bank. The right bank was also steeply sloped and composed of exposed bedrock and woody debris. A large pile of woody debris extended 300+ feet upstream from the Cross Section location and blocked crews from resurveying at Cross Section 3. Rough field measurements indicated 30-40 feet of channel widening since Year 2 monitoring. Bedrock outcroppings seen in the channel bottom indicate the section has reached maximum incision.

No survey was taken. A pebble count was taken due to the variety of bed material and presence of bedrock and can be found in Appendix B.



Photo 3-1

Location, Orientation: XS 3, Looking Upstream

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

9/30/19, 1:49 PM

Description: View looking upstream at Cross Section 3 from a downstream position

Woody Debris: >100



Photo 3-2

Location, Orientation: XS 3, Looking Downstream

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

9/30/19, 1:49 PM

Description: View looking downstream at Cross Section 3 from a downstream position

Woody Debris: 10



Photo 3-3

Location, Orientation: XS 3, Left Bank

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

9/30/19, 1:49 PM

Description: View looking left at Cross Section 3 from a downstream position

Vegetation: 10% herbaceous plants, few trees on top of bank



Photo 3-4

Location, Orientation: XS 3, Right Bank

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

9/30/19, 1:49 PM

Description: View looking right at Cross Section 3 from a downstream position

Vegetation: 10% herbaceous cover, a few trees at top of bank, exposed bedrock and woody debris



Photo 3-5

Location, Orientation: XS 3, Large Debris Pile

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

9/30/19, 1:51 PM

Description: View looking from left bank at the large debris pile at Cross Section #3



Photo 3-6

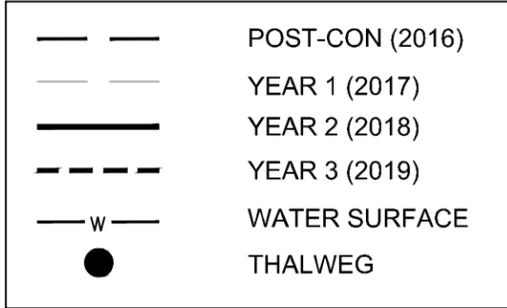
Location, Orientation: XS 3, Downstream looking up

Permit Number: JPA #15-1551

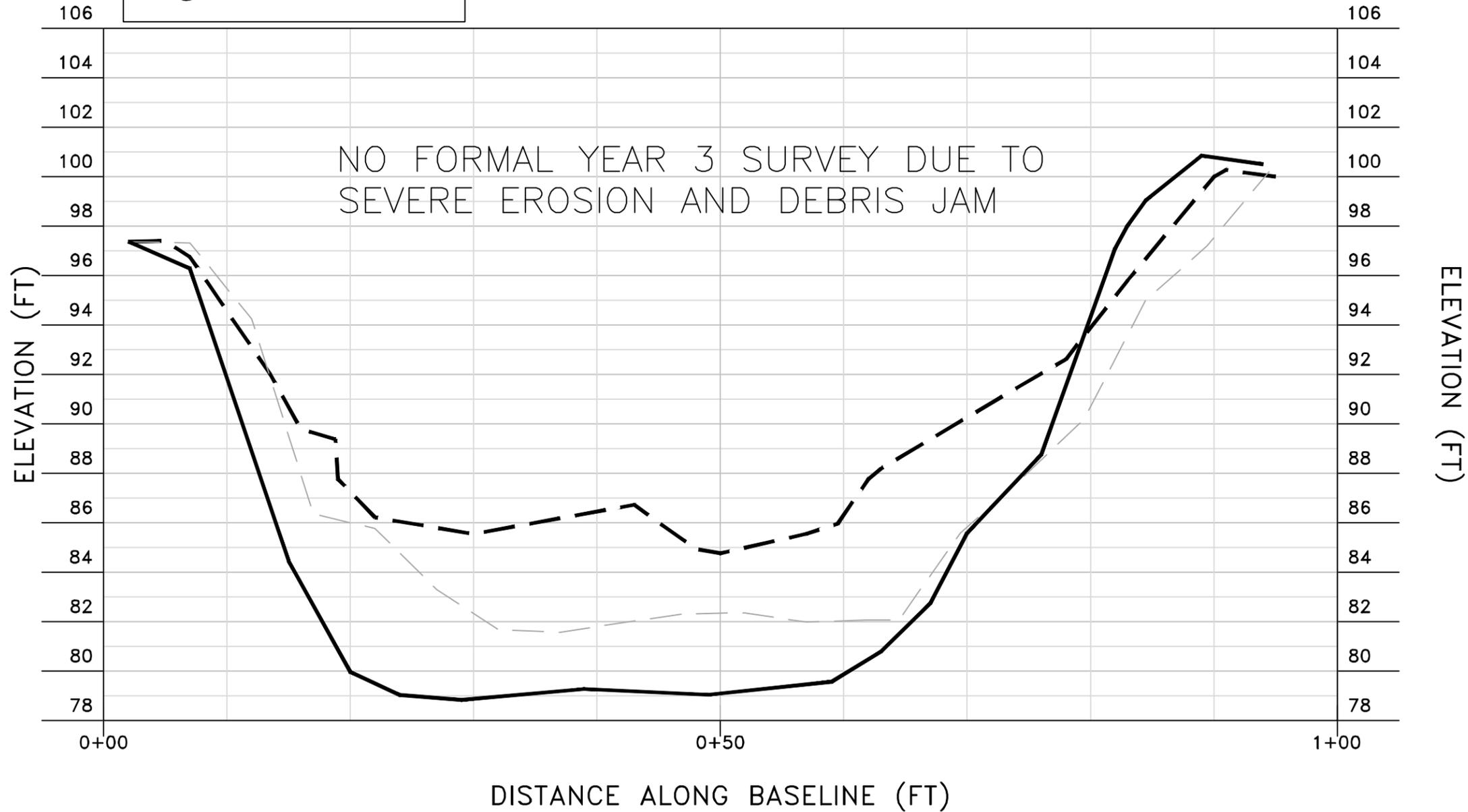
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9/30/19, 1:49 PM

Description: View looking upstream at Cross Section 3 from a downstream position



XS 3



PROFILE SCALE:

HORIZ: 1"=10'

VERT: 1"=5'

(ELEV. RELATIVE TO ASSUMED XS END PIN AT 100.)



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Rocky Mount, Virginia

Year 3 - XS 3

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	Description		

DATE: OCT 2019

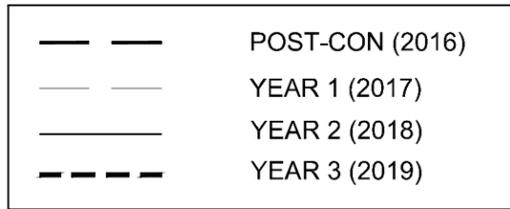
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WSSI and Orange Digital Data

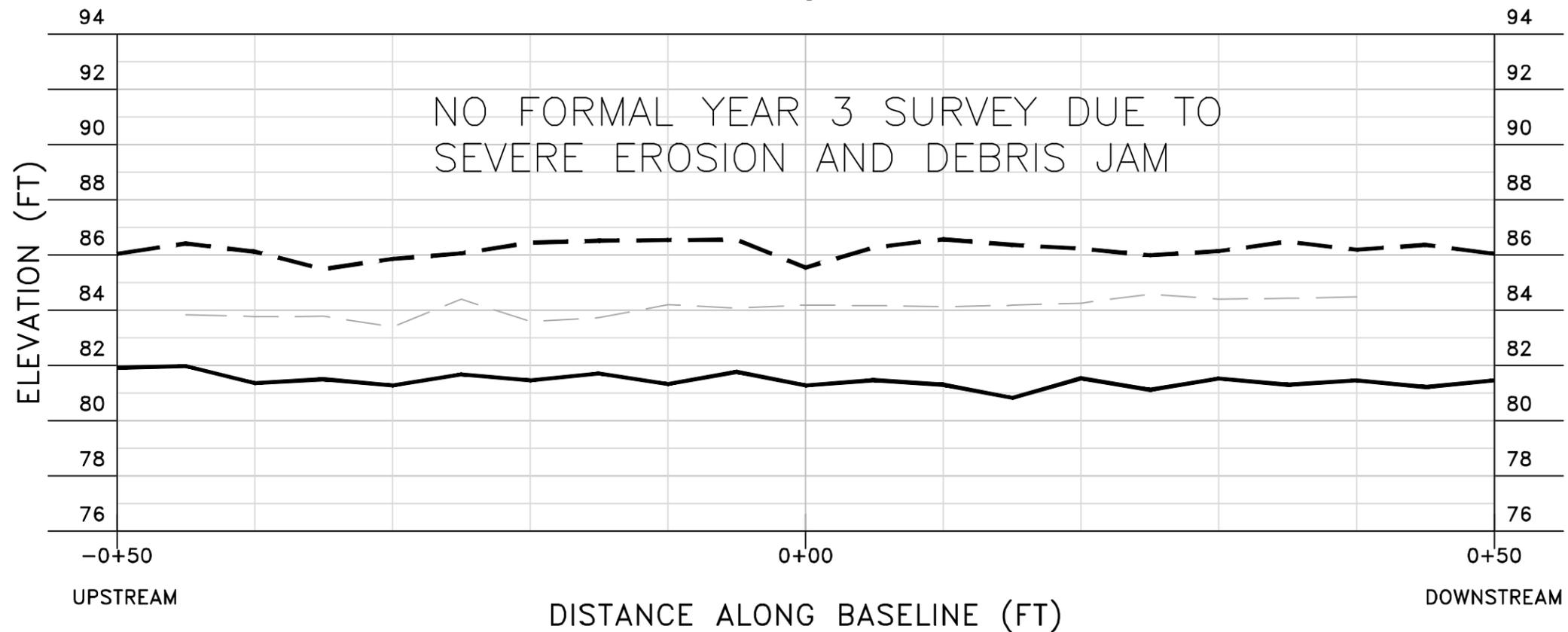
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Computer File Name:
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Thalweg XS 3



PROFILE SCALE:
 HORIZ: 1"=10'
 VERT: 1"=5'
 (ELEV. RELATIVE TO ASSUMED XS END PIN AT 100.)



Pigg River Dam Removal Restoration - Monitoring
 Rocky Mount, Virginia
 Year 3 - Thalweg Profile XS 3
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 DATE: OCT 2019
 SCALE: AS NOTED

Boundary and Topo Source:
 WSSI and Orange Digital Data

Design	Draft	Approved
MEH	MEH	NAS

Sheet #
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Computer File Name:
 20190920084101.AXD

Cross Section 4

<i>Location</i>	<i>Latitude</i>	<i>Longitude</i>
Left Bank	36.985663	-79.856937
Right Bank	36.985403	-79.856873
Thalweg	36.985530	-79.856930

Description: Cross Section 4 is located approximately 1,600 feet downstream of Cross Section 3, east of Scenic River Road and west of Power Dam Road in a short, straight, run between two sharp meander pools. Access was by boat from the upstream pumping station. The right upper bank face was vertical, approximately 10-ft high. The lower right bank was a steady slope composed of herbaceous cover. The left upper bank had shrubs; the lower left bank was a steep drop to the water showing signs of bank failure. Both pins were moved back six feet due to continued bank failure (the pins were moved after measurements were taken).

The instrument setup for this Cross Section was at the left bank (HI = 4.47 ft.). The Cross Section plot and thalweg profile are shown below. No pebble count was taken at this location due the uniform fine-grained (sandy/silty) nature of bed sediments.

This Cross Section was located adjacent to the overbank wetland area (right bank) identified in permit documents and previous reports as Wetland Site #3. Wetland data forms are given in Appendix C.



Photo 4-1

Location, Orientation: XS 4, Looking Upstream

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: Site #3, DP-1 and DP-2

9/30/19, 3:26 PM

Description: View looking upstream from the center of Cross Section 4

Woody Debris: 5



Photo 4-2

Location, Orientation: XS 4, Looking Downstream

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: Site #3, DP-1 and DP-2

9/30/19, 3:26 PM

Description: View looking downstream from the middle of Cross Section 4

Woody Debris: 30



Photo 4-3

Location, Orientation: XS 4, Left Bank

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: Site #3, DP-1 and DP-2

9/30/19, 3:26 PM

Description: View looking left from the middle of Cross Section 4

Vegetation: 40% herbaceous cover with some shrubs on the top of the bank



Photo 4-4

Location, Orientation: XS 4, Right Bank

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: Site #3, DP-1 and DP-2

9/30/19, 3:26 PM

Description: View looking right from the middle of Cross Section 4

Vegetation: 40% herbaceous cover, small shrubs and a few trees at top of bank



Photo 4-5

Location, Orientation: XS 4, Upstream looking down

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: Site #3, DP-1 and DP-2

10/01/18, 3:33 PM

Description: View looking downstream at Cross Section 4 from an upstream position



Photo 4-6

Location, Orientation: XS 4, Downstream looking up

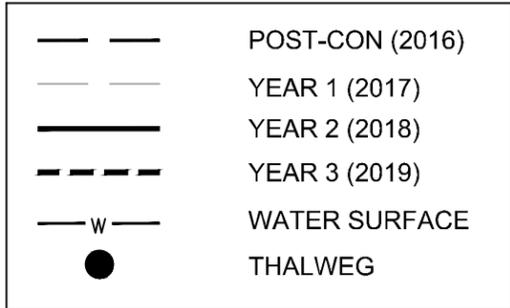
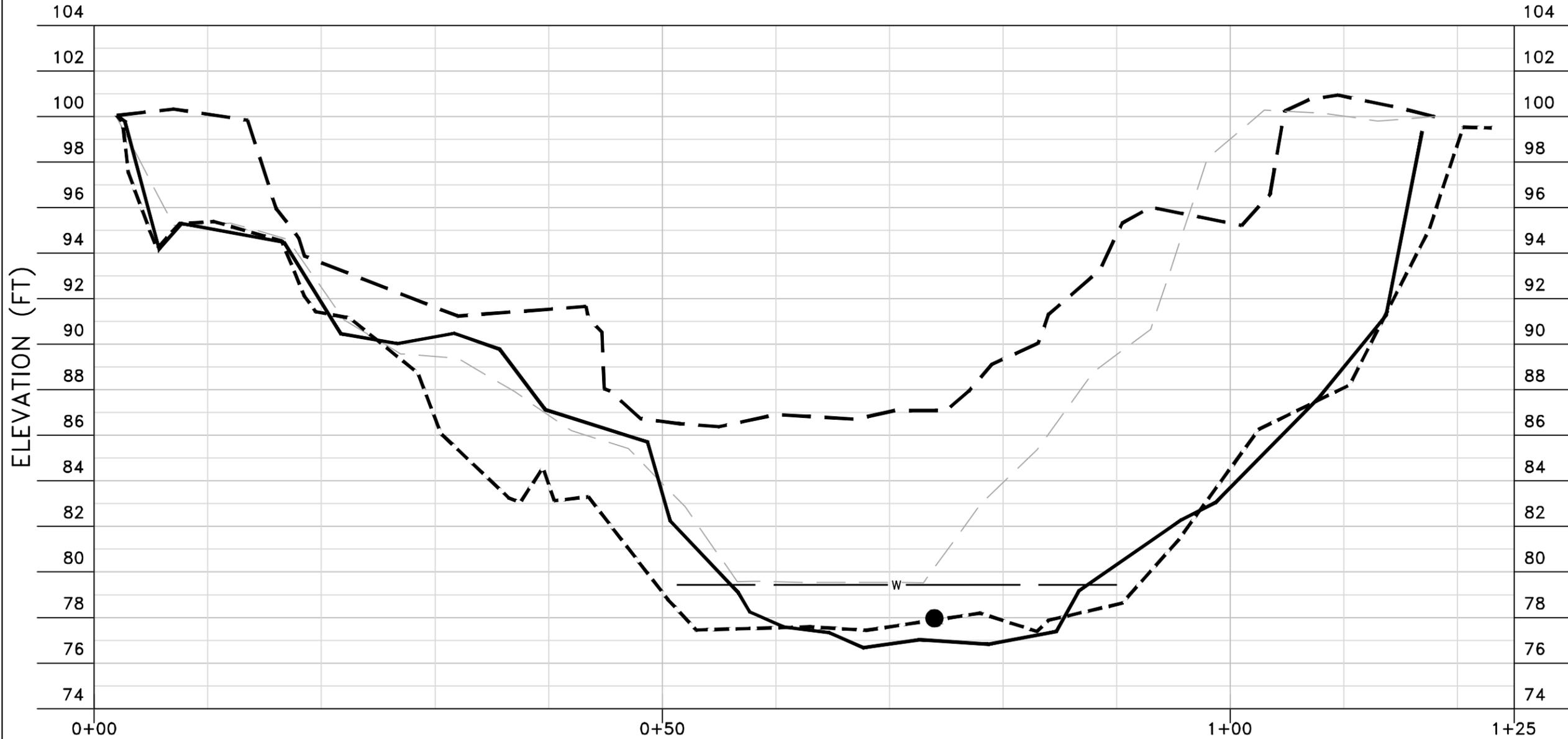
Permit Number: JPA #15-1551

Wetland Data Sheet Reference: Site #3, DP-1 and DP-2

10/01/18, 3:33 PM

Description: View looking upstream at Cross Section 4 from a downstream position

XS 4



DISTANCE ALONG BASELINE (FT)

PROFILE SCALE:

HORIZ: 1"=10'

VERT: 1"=5'

(ELEV. RELATIVE TO ASSUMED XS END PIN AT 100.)

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DATE: OCT 2019

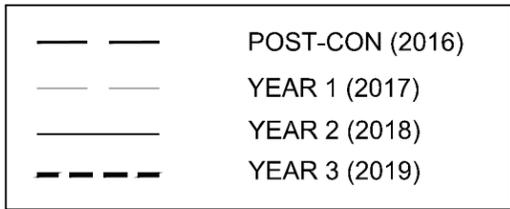
SCALE: AS NOTED

Boundary and Topo Source:
 WSSI and Orange Digital Data

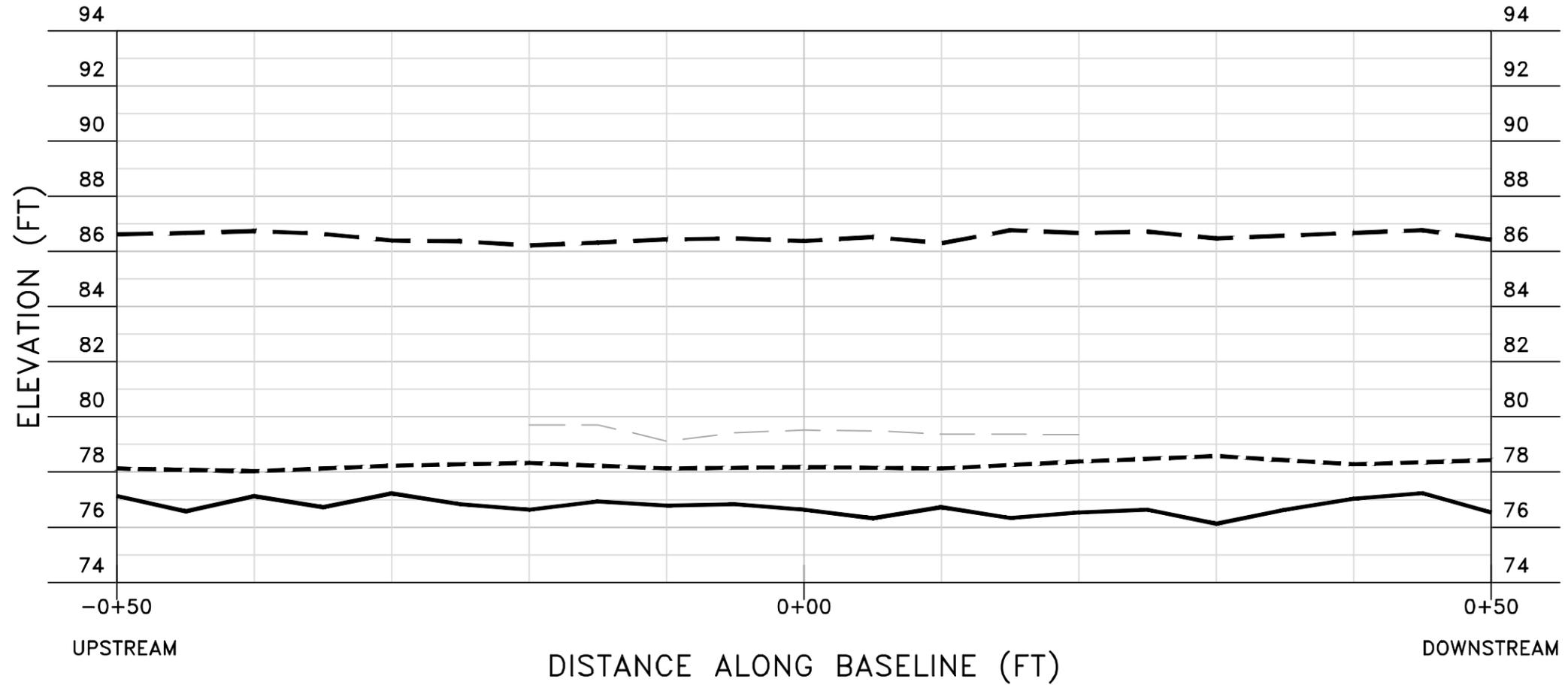
Design	Draft	Approved
MEH	MEH	NAS

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Computer File Name:
 2019-07-20-08-41-14-10-14-14



Thalweg XS 4



PROFILE SCALE:
 HORIZ: 1"=10'
 VERT: 1"=5'
 (ELEV. RELATIVE TO ASSUMED XS END PIN AT 100.)



Pigg River Dam Removal Restoration - Monitoring
 Rocky Mount, Virginia
 Year 3 - Thalweg Profile XS 4
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No.	Description			

DATE: OCT 2019 SCALE: AS NOTED

Boundary and Topo Source:
 WSSI and Orange Digital Data

Design	Draft	Approved
MEH	MEH	NAS

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Cross Section 5

<u><i>Location</i></u>	<u><i>Latitude</i></u>	<u><i>Longitude</i></u>
Left Bank	36.991448	-79.857178
Right Bank		

Description: Cross Section 5 is located approximately 2,000 feet downstream of Cross Section 4; approximately 800 feet downstream (north) of the power line easement (power lines were not present this year). Access was by boat from the upstream pumping station. The Cross Section has not experienced much change since the previous year. Banks are starting to grow vegetation with bank failure only seen at the top of the banks. The right bank is flanked by a wide steep mudflat about 5 ft. tall. The upper right bank has herbaceous vegetation with a few trees at the top of the bank. The upper left bank drops off and then slowly slopes towards the water with herbaceous vegetation starting to grow. Both pins were moved back due to continued bank failure, right bank pin was moved back 8 ft and the left bank pin was moved back 5 feet (pins were moved after measurements were taken).

The measurements started at left bank with the instrument setup for this cross section on the right bank (HI 1= 4.09 ft. HI 2= 3.10 ft). The Cross Section plot and thalweg profile are shown below. No pebble count was taken at this location due the uniform fine-grained (sandy) nature of bed sediments.



Photo 5-1

Location, Orientation: XS 5, Looking Upstream

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

9/30/19, 5:28 PM

Description: View looking upstream from the center of Cross Section 5

Woody Debris: 10

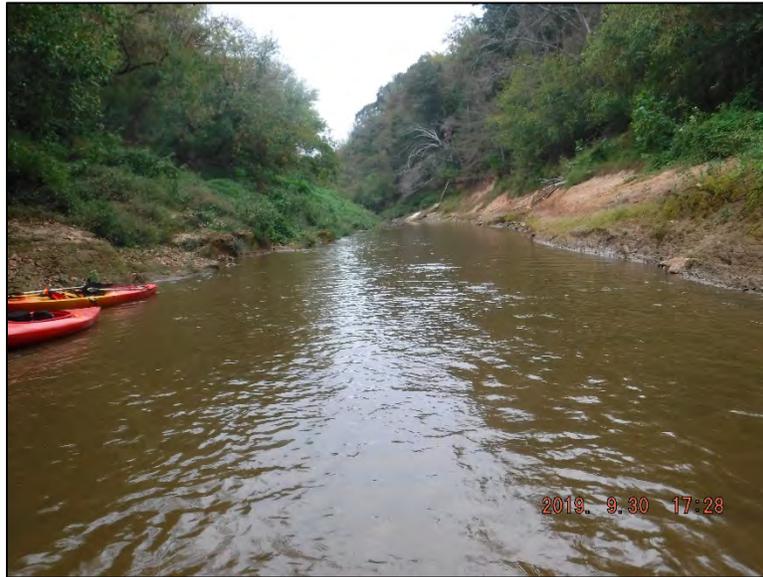


Photo 5-2

Location, Orientation: XS 5, Looking Downstream

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

9/30/19, 5:28 PM

Description: View looking downstream from the middle of Cross Section 5

Woody Debris: 5



Photo 5-3

Location, Orientation: XS 5, Left Bank

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: Site #2, DP-1 and DP-2

9/30/19, 5:28 PM

Description: View looking left from the middle of Cross Section 5

Vegetation: 20% herbaceous cover



Photo 5-4

Location, Orientation: XS 5, Right Bank

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

9/30/19, 5:26 PM

Description: View looking right from the middle of Cross Section 5

Vegetation: 50% herbaceous cover (mainly upper bank)



Photo 5-5

Location, Orientation: XS 5, Upstream looking down

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

10/01/18, 6:01 PM

Description: View looking downstream at Cross Section 5 from an upstream position



Photo 5-6

Location, Orientation: XS 5, Downstream looking up

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

9/30/19, 5:27 PM

Description: View looking upstream at Cross Section 5 from a downstream position

Cross Section 6

<i>Location</i>	<i>Latitude</i>	<i>Longitude</i>
Left Bank		
Right Bank	36.995027	-79.859314

Description: Cross Section 6 is located approximately 300 feet upstream of the Power Dam structure. Access was by foot via the trail paralleling Power Dam Road. The Cross Section is bounded on both banks by forested conditions. Year 2 survey work found the thalweg to be roughly at the elevation of the dam breach. Thus, further downcutting was not expected. Year 3 survey showed some sediment deposition between Year 2 and Year 3. This section was approximately 30-ft deep from top of bank to the bottom of the bank. It is characterized by a wide channel Cross Section with widening of the channel apparent from previously confined cross sections (XS 4, 5, 6). The right bank had a vertical upper bank with evidence of continued bank failures. Tension cracks were evident. Midway down the right bank a large shelf was established with herbaceous vegetation and major scouring occurring at the lower right bank. The upper left bank showed evidence of mass failure with steep vertical faces covered with herbaceous vegetation. The mid- to lower-left bank sloped down and was covered with herbaceous vegetation.

The instrument setup for this Cross Section was at the right bank (HI 1 = 3.72 ft.; HI 2 = 3.59 ft.). The Cross Section plot and thalweg profile are shown below. No pebble count was taken at this location due to the uniform fine-grained (sandy) nature of bed sediments.

This Cross Section was located adjacent to a wider area of wetlands (as previously delineated), located on the left bank – the lower end of the area identified in permit documents and previous reports as Wetland Site #2. The Wetland data forms are given in Appendix C.



Photo 6-1

Location, Orientation: XS 6, Looking Upstream

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

10/1/19, 9:27 AM

Description: View looking upstream from the center of Cross Section 6

Woody Debris: 10



Photo 6-2

Location, Orientation: XS 6, Looking Downstream

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

10/1/19, 9:27 AM

Description: View looking downstream from the middle of Cross Section 6

Woody Debris: 5



Photo 6-3

Location, Orientation: XS 6, Left Bank

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

10/1/19, 9:27 AM

Description: View looking left from the middle of Cross Section 6
Vegetation: 85% herbaceous cover, large trees and shrubs at top of bank



Photo 6-4

Location, Orientation: XS 6, Right Bank

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

10/1/19, 9:27 AM

Description: View looking right from the middle of Cross Section 6
Vegetation: 30% herbaceous cover, large trees and shrubs at top of bank



Photo 6-5

Location, Orientation: XS 6, Upstream looking down

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

10/1/19, 9:31 AM

Description: View looking downstream at Cross Section 6 from an upstream position



Photo 6-6

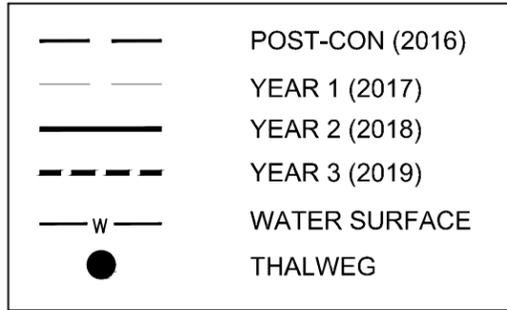
Location, Orientation: XS 6, Downstream looking up

Permit Number: JPA #15-1551

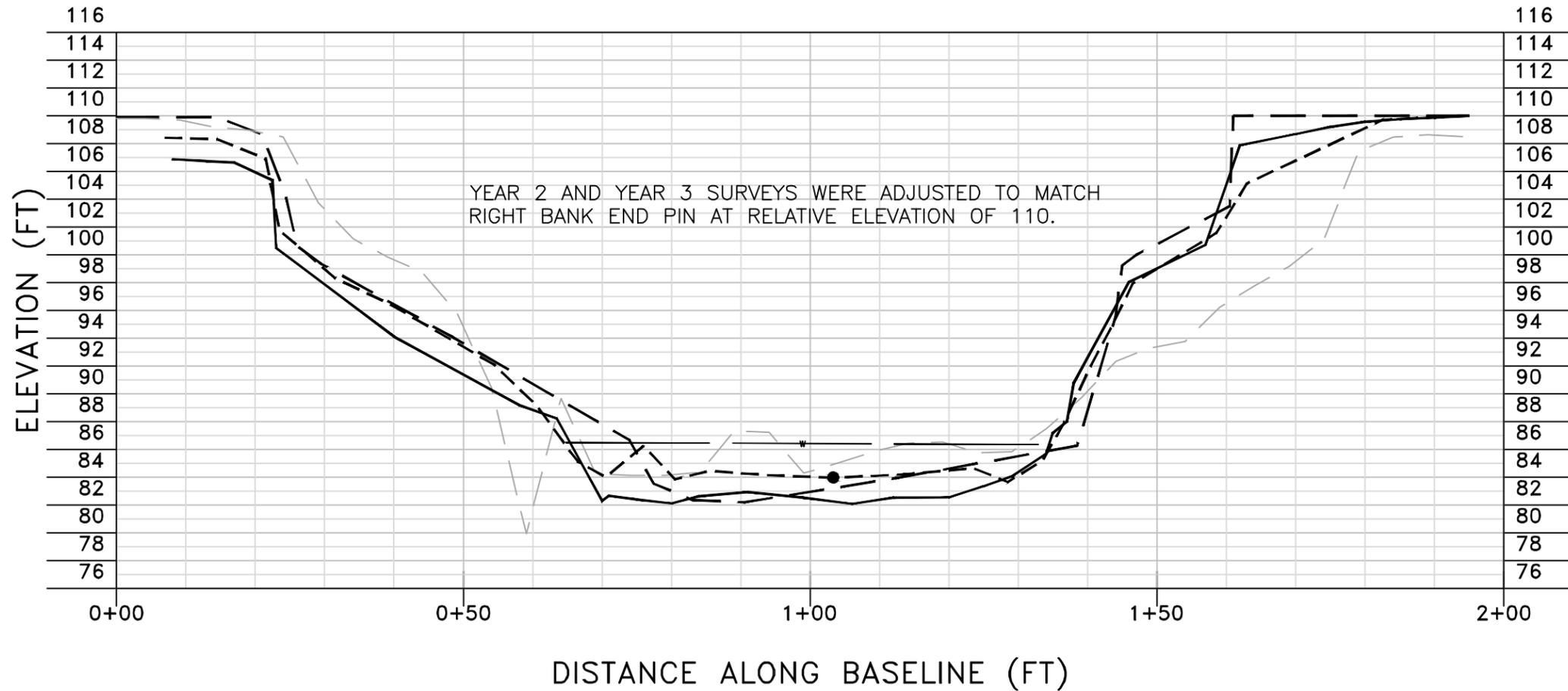
Wetland Data Sheet Reference: n/a

10/1/19, 9:24 AM

Description: View looking upstream at Cross Section 6 from a downstream position



XS 6



PROFILE SCALE:
 HORIZ: 1"=20'
 VERT: 1"=10'

PROFILE SCALE:
 HORIZ: 1"=10'
 VERT: 1"=5'

(ELEV. RELATIVE TO ASSUMED XS END PIN AT 100.)



Pigg River Dam Removal Restoration - Monitoring
 Rocky Mount, Virginia

Year 3 - XS 5 & 6

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DATE: OCT 2019 SCALE: AS NOTED

Boundary and Topo Source: WSSI and Orange Digital Data

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MEH	MEH	NAS

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Computer File Name:
C:\2019\2019-08-14\11.XS6.DWG

Cross Section 7

<u><i>Location</i></u>	<u><i>Latitude</i></u>	<u><i>Longitude</i></u>
Left Bank	36.997204	-79.860491
Right Bank	36.997218	-79.859878

Description: Cross Section 7 is located approximately 450 feet downstream of the Power Dam Road bridge. Vehicular access was gained via farm field roads on Rocky Mount treatment plant property. The Cross Section was bounded on the left bank by forest and on the right bank by a narrow band of trees along the top of bank with agricultural fields just beyond.

Sediment has continued to deposit on the left bank, the left bank pin was buried under 6 inches of sediment. Little vegetation has established on both right and left banks. The right bank contained large woody debris. The left bank pin was moved up to the new existing grade elevation in order to make it easier to find in the following years (pin was moved after measurements were taken).

The instrument setup for this Cross Section was at the right bank (HI = 3.69 ft.). The Cross Section plot and thalweg profile are shown below. A pebble count was taken at this location due to the variation in bed material and data shown in Appendix B.



Photo 7-1

Location, Orientation: XS 7, Looking Upstream

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

10/01/19, 8:44 AM

Description: View looking upstream from the middle of Cross Section 7

Woody Debris: 30



Photo 7-2

Location, Orientation: XS 7, Looking Downstream

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

10/01/19, 8:44 AM

Description: View looking downstream from the middle of Cross Section 7

Woody Debris: 60



Photo 7-3

Location, Orientation: XS 7, Left Bank

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

10/01/19, 8:44 AM

Description: View looking left from the middle of Cross Section 7

Vegetation: 5% herbaceous cover, few trees



Photo 7-4

Location, Orientation: XS 7, Right Bank

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

10/01/19, 8:44 AM

Description: View looking right from the middle of Cross Section 7

Vegetation: 5% herbaceous plants, trees at bankfull



Photo 7-5

Location, Orientation: XS 7, Upstream looking down

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

10/01/19, 8:46 AM

Description: View looking downstream at Cross Section 7 from an upstream position



Photo 7-6

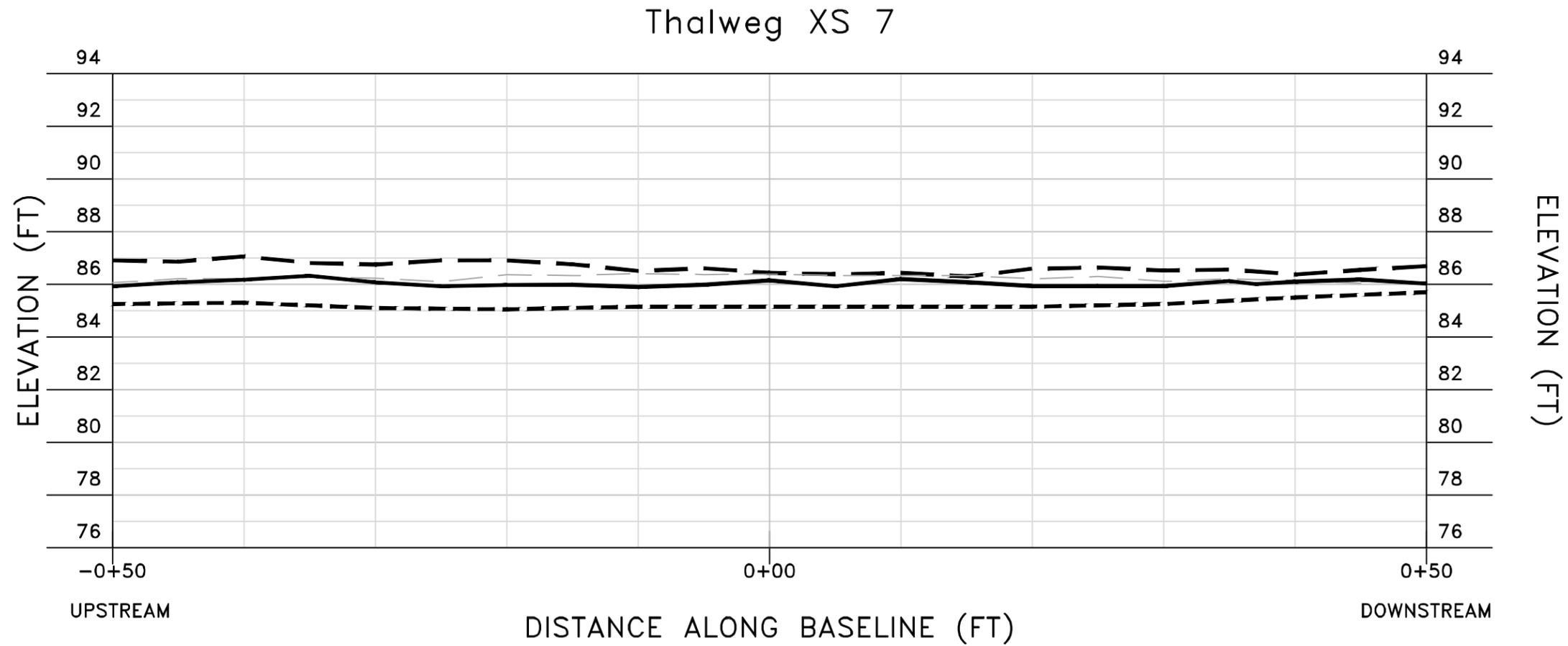
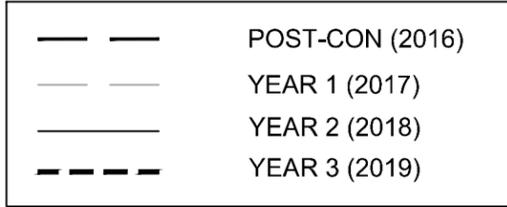
Location, Orientation: XS 7, Downstream looking up

Permit Number: JPA #15-1551

Wetland Data Sheet Reference: n/a

10/01/19, 8:47 AM

Description: View looking upstream at Cross Section 7 from a downstream position



PROFILE SCALE:
 HORIZ: 1"=10'
 VERT: 1"=5'
 (ELEV. RELATIVE TO ASSUMED XS END PIN AT 100.)



Pigg River Dam Removal Restoration - Monitoring
 Rocky Mount, Virginia
 Year 3 - Thalweg Profile XS 7
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DATE: OCT 2019

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Boundary and Topo Source:
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NAS	NAS	NAS

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Computer File Name:
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