Shadrick Creek Restoration Project

Annual Monitoring/Closeout Report

Monitoring Year 5 of 5

FINAL

Shadrick Creek Stream Restoration Project
NCDMS Contract No. 7343
NCDMS Project No. 92916
DWR# 10-0465v2
USACE Action ID: 2010-00764
McDowell County, North Carolina
Data Collected: April 2022 – November 2022
Date Submitted: December 2022

Submitted to:

NCDEQ-Division of Mitigation Services
1652 Mail Service Center Raleigh NC 27699-1652

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EQUINOX
balance through proper planning

December 13, 2022

Matthew Reid
Project Manager, NCDENR-DMS
Asheville Regional Office
2090 U. S. 70 Highway
Swannanoa, NC 28778-8211

Subject: RE: Draft MY5 Monitoring Report
Review for the Shadrick Creek Restoration Project
Catawba River Basin – CU# 03050101
McDowell County, North Carolina
NCEEP Project # 92916
Contract No. 7343

Dear Mr. Reid

On December 9, 2022, Equinox received the DMS comments on Draft MY5 Monitoring Report for the Shadrick Creek Stream Restoration Project (NCEEP Project # 92916). Please find the original DMS Comments below with responses from Equinox (**in RED**).

On November 30, 2022, the NCDENR – Division of Mitigation Services (DMS) received the Draft MY5 Monitoring Report for the Shadrick Creek Stream Restoration Project from Equinox Environmental. Anticipated mitigation on the site includes 1,353 linear feet of stream restoration; 6,966 linear feet of stream enhancement (Level I); 215 linear feet of stream enhancement (Level II); 2,895 linear feet of stream preservation; and 0.53 acres of wetland enhancement for a total of 6,662 Stream Mitigation Units (SMUs) and 0.265 Wetland Mitigation Units (WMUs). The site also has 527,000 Riparian Buffer credits. The following are our comments:

- *MY5 is the final year of monitoring for Shadrick Creek. The site will be presented for closeout in 2023. Since DMS does not produce closeout reports anymore, I would like to include a summary of the monitoring results and treat the final monitoring report as a monitoring/closeout report. Please include the following closeout site summary in section 1.0 Project Summary:*

This is the fifth and final monitoring report (MY5) as established in the Mitigation Plan and will also serve as the closeout report. Assessments completed over the past five monitoring years illustrate that the Site has met the success criteria as defined in the Mitigation Plan for vegetation, stream morphology, and stream hydrology. The MY5 vegetation survey resulted in an average stem density of 405 planted stems per acre. Fourteen of sixteen vegetation plots have met and exceeded the required 260 planted stems per acre. Plots 11 and 15 both averaged 243 planted stems per acre and failed to

meet the success criteria by one stem each. When volunteers are included, the site density is 1,470 stems per acre. Additionally, the MY5 visual assessment revealed that invasive plant populations have been reduced due to ongoing treatments and over 99% of the easement acreage is unaffected by invasive populations. In March 2021, DMS implemented stream repairs for three instances of lateral and vertical instability throughout the Site that continue to appear stable and are functioning as designed. Visual assessments reveal that over 99% of enhanced and restored reaches are stable. Overall, surveyed cross-sections along all reaches indicate the channel is supporting stable dimensions and functioning as designed. The performance standard of two recorded bankfull events in separate monitoring years was met for the Site in MY2. The site will be presented for regulatory closeout in 2023. ***Text added to the report body***

- *Title Page: Please update title to read Annual Monitoring Report/Closeout Report.* **Updated**
- *Title Page: Please update DWR Project # to: 10-0465v2* **Updated**
- *1.5.2 Stream Geomorphology: In the beaver discussion please include "APHIS is actively trapping the beaver and the dams will be removed once beaver have been trapped. This will occur in early December 2022."* ***Added text***
- *Table 2: Please use the attached revised Table 2 in the revised report. There were some inconsistencies with activities/dates and the revised table consolidates some activities. Two new entries are included (site instituted date and MY5 beaver/dam removal).* **Replaced Table 2.**
- *CCPV: Please include beaver dam locations on UT9 Reach 2. There are two locations identified on the profile survey.* **CCPV revised.**
- *Photo Point 7: Upstream and downstream photo reference UT7. This should be UT5. Please revise.* **Revised**
- *Photo Point 21 Supplemental – Recommend adding "Repair Area 2021" to photo description.* **Revised Caption.**
- *Photo Point 23 Supplemental – Recommend adding "Repair Area 2021" to photo description.* **Revised Caption.**

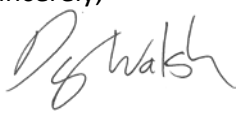
Electronic Deliverable Comments:

- *Please submit a standard Vegetation Visual Assessment Table per the Template. The threshold column has been omitted in previous monitoring years. Template is attached for reference. Please update report as necessary to account for thresholds.* **Updated Table 6.**
- *Please review cross section data submitted and the Bank Height Ratio Calculations: XS 9 indicates approximately .6 ft of downcutting between MY 0 and MY 5 but the BHR is reported to vary between 1.0 to 0.6 for years 0 and 5 respectively. Low Top of Bank does not appear to be reported accurately.* **LTOB for MY4 and MY5 revised to similar convention as used during MY0.**
- *MY5 cross section workbook digital submission does not appear to include MY5 cross section data. Please revise for final submittal.* **Most Recent version included in deliverables**

At your earliest convenience, please provide a written response letter addressing the DMS comments provided and two (2) final hard copies of the revised/updated Monitoring Document. The comment response letter should be included in the revised report after the report cover page. Please include a full final electronic copy with electronic support files on a USB drive. The final electronic monitoring report with all attachments should be named: ***Shadrick_92916_MY5_2022.pdf.*** ***Included in Report and Supplemental Files.***

The Equinox project manager for this project is Mr. Danvey Walsh. His contact is as follows:

Sincerely,



Danvey Walsh
Environmental Scientist Equinox
37 Haywood Street
Asheville, NC 28801
Office: 828-253-6856 ext. 201
Fax: 828-253-8256

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Prepared by:

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Asheville, NC 28801

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1.0 PROJECT SUMMARY

1.1. Project Setting and Background

The Shadrick Creek Restoration Project (Shadrick) is located in the Catawba River Basin (Catalog Unit (CU) 03050101). The Shadrick Creek site is also located within the Muddy Creek (Upper Catawba) Local Watershed (LWP) area. The Shadrick Creek site watershed also includes the Hydrologic Unit Code (HUC) 0305010103006, which is identified as a Targeted Local Watershed (TLW) in the Ecosystem Enhancement Program's (EEP) 2009 Upper Catawba River Basin Restoration Priority (RBRP) Plan. Project work at the Shadrick site was completed in April 2017, and included construction, planting, invasive treatment, and fence installation. Through the project work, a total of 1,353 linear feet were restored, 6,966 linear feet were enhanced through Enhancement I, 215 linear feet were enhanced through Enhancement II, 2,895 linear feet were preserved, and 0.530 acre of wetlands were enhanced. The site generated a total of 6,662 SMU's, 0.265 WMU, and 527,000 SF of Buffer. Refer to Table 1 for the project components and mitigation credit information and Figure 2 for the project asset map.

The Shadrick site has a history of unrestricted livestock access leading to bank erosion, compaction, and discontinuity between the stream and its associated floodplain. Historic agricultural practices, including recent tree farming, and removal of the vegetative buffer have caused loss of plant diversity, stream incision, and failing banks. The completed project will reduce sediment inputs from the failing banks, reduce nutrients and bacteria entering the stream from livestock, and will enhance the forested corridor along the stream floodplain.

This project is protected by a 54.6-acre conservation easement and is located approximately 5.5 miles east of Nebo, NC in McDowell County at 35.720410° N, 81.901405° W. The Shadrick Creek site is bounded to the north by the Norfolk Southern Railroad. Agricultural and/or forested lands border the project to the south, east, and west.

This is the fifth and final monitoring report (MY5) as established in the Mitigation Plan and will also serve as the closeout report. Assessments completed over the past five monitoring years illustrate that the Site has met the success criteria as defined in the Mitigation Plan for vegetation, stream morphology, and stream hydrology. The MY5 vegetation survey resulted in an average stem density of 405 planted stems per acre. Fourteen of sixteen vegetation plots have met and exceeded the required 260 planted stems per acre. Plots 11 and 15 both averaged 243 planted stems per acre and failed to meet the success criteria by one stem each. When volunteers are included, the site density is 1,470 stems per acre. Additionally, the MY5 visual assessment revealed that invasive plant populations have been reduced due to ongoing treatments and over 99% of the easement acreage is unaffected by invasive populations. In March 2021, DMS implemented stream repairs for three instances of lateral and vertical instability throughout the Site that continue to appear stable and are functioning as designed. Visual assessments reveal that over 99% of enhanced and restored reaches are stable. Overall, surveyed cross-sections along all reaches indicate the channel is supporting stable dimensions and functioning as designed. The performance standard of two recorded bankfull events in separate monitoring years was met for the Site in MY2. The site will be presented for regulatory closeout in 2023.

1.2. Project Goals and Objectives

The project goals address stressors identified in the TLW and priority subwatershed, as outline in the Final Mitigation Plan, and include:

- Improve water quality by repairing eroding stream banks, establishing riparian buffers, and implementing agricultural best management practices;
- Improve the community structure of the buffers;
- Improve stream function and habitat by re-establishing stream-to-floodplain connections;

- Restore long-term stability through the restoration of channel dimensions, pattern, and profile;
- Improve in-stream habitat using in-stream structures; and
- Remove exotic invasive plant species.

The following objectives are proposed for accomplishing the above listed goals as outlined in the Final Mitigation Plan:

- Restoration and enhancement of approximately 5,276 LF of Shadrick Creek;
- Restoration and enhancement of 3,179 LF of UTs 1, 5, 9, and 10;
- Preservation of 3,835 LF of UTs 2, 5, 6, 7, and 8;
- Enhancement of 0.53 acre of wetland by improving hydrologic connections and vegetation communities;
- Installing over 8,000 LF of livestock fence, three wells and six watering tanks; and
- Establishment of riparian buffers by removing exotic invasive plants and installing a variety of native vegetation.

1.3. Project Success Criteria

The stream restoration success criteria for the project will follow accepted and approved criteria based on the Mitigation Plan for Shadrick Creek Stream Restoration (2010). The Shadrick Creek Mitigation Plan references the Stream Mitigation Guidelines issued in April 2003 by the USACE and NCDWQ. Specific success criteria are presented below.

1.3.1. Streams

The stream geometry will be considered successful if the cross-section geometry, profile, and sinuosity are stable or reach a dynamic equilibrium. It is expected that there will be changes in the designed cross sections, profile, and/or substrate composition. Any changes that occur during the monitoring period will be evaluated to determine whether they represent a trend toward a less stable condition (e.g., down cutting, erosion, etc.) or simply an increase in stability (e.g., settling, vegetative changes, coarsening of bed material, etc.) or move toward equilibrium.

An initial, though not exclusive, indicator of success will be the stream's adherence to design or reference ratios of stream geometry found in the morphological table in Appendix D or in a comparable, stable reference system. The channel may not adhere to design or reference ratios of stream geometry, but can be considered stable if the following key indicators are present:

- Stream Type: Maintenance of the design stream type or progression toward/conversion to a stable stream type such as C or E will indicate stability.
- Bank Height Ratio: Bank height ratio between 1.0 and 1.2 will indicate that flood flows have access to the active floodplain and that higher flows do not apply excessive stresses to stream banks.

Stream bank erosion upstream of the project site will persistently contribute sediment to the project reaches due to unstable upstream banks. Excess sediment will be routed through the project area or deposited in target areas such as point bars and the floodplain. Minor sedimentation of pools and glides may occur. The pools are designed to be over-dug to account for some sedimentation in pools and glides. If a large storm event occurs before the woody vegetation has established, isolated bank erosion may occur in sections where the flood-prone area has been restricted by topography or easements. Areas of bank erosion will be repaired, as necessary.

1.3.2. Vegetation

The success of riparian vegetation planting will be gauged by stem counts of planted species. Stem counts of more than 320 trees per acre after three years, and 260 trees per acre after five years will be considered successful. Photos taken at established photo points should indicate maturation of riparian vegetation.

1.4. Mitigation Components

The Shadrick Creek Restoration Project is anticipated to generate 6,662 SMUs, 0.265 WMU, and 527,000 Square Feet of Buffer Credits. Refer to Figure 2 for the project component/ asset map for a visual description of the project assets and Table 1 for project components and mitigation credit information for the Shadrick Creek Restoration Project. These credits are based on stream lengths surveyed during the as-built baseline survey and account for the breaks in the easement.

The total number of SMUs generated from the Shadrick Creek Restoration Project are 164 SMUs lower than what was outlined in the Shadrick Creek Restoration Project Mitigation Plan Addendum (2015). This discrepancy is due mostly to the Mitigation Plan Addendum calculating the total linear feet of stream preservation as 3,835 while the as-built report total indicates that the total linear feet of preservation equals 2,895 (difference of 940 LF). It is believed that this discrepancy is attributed to UT3 and UT4 being determined as non-jurisdictional streams. Other deviations from the Mitigation Plan exist based on data taken from the centerline survey for the As-Built survey. Please refer to Table 1 for these numbers.

1.5. Project Performance

Monitoring Year 5 (MY5) data was collected from April to November 2022. Monitoring activities included visual assessment of all reaches and the surrounding easement, collection of images at 31 permanent photo stations, inventory of 16 permanent vegetation monitoring plots, surveying of 18 cross-sections, and collection of longitudinal profile survey data for approximately 1,354 linear feet of stream channel.

Summary information/data related to the occurrence of items such as beaver or encroachment and statistics related to performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the Baseline Monitoring Report and in the Mitigation Plan (formerly Restoration Plan) documents available on the NCDMS website. All raw data supporting the tables and figures in the appendices is available from DMS upon request.

1.5.1. Vegetation

Visual assessment of vegetation outside of the monitoring plots (Appendix B – Table 6) indicates that the herbaceous vegetation is generally well established throughout the project. Shadrick Creek has some areas of sparsely vegetated, rocky ground, located along the bankfull bench. These areas have shown improvement over time but continue to be impacted by high flow events.

Monitoring of the permanent vegetation plots (n = 16) was completed in November 2022. Summary tables and photographs associated with MY5 vegetation monitoring are located in Appendix B and Appendix C. MY5 monitoring data indicates that all but two (2) vegetation plots, (Plot 11 and 15), are meeting the MY5 success criteria of 260 planted stems per acre. Of those two plots, Vegetation Plot 11 was impacted by a downed tree and could not be thoroughly surveyed. A total of 18 species of trees and shrubs were documented within the plots in MY5. Planted stem densities among plots ranged from 243 to 647 planted stems per acre with an annual mean of 405 planted stems per acre across all plots. When volunteer stems are included, the mean annual total stems per acre rose to 1470 and ranged between 243 and 3,885 stems per acre, (Table 7, Appendix B).

With regard to invasive-exotic species, a focused treatment along Shadrick Creek Reach 1, UT 9 and UT 10 was conducted in June, July, and October 2022 (Tables 2 and 6). The June treatment focused on foliar applications along Shadrick Creek Reach 1 and tributaries. The July 2022 treatment targeted removal of larger stems of multiflora rose (*Rosa multiflora*), privet (*Ligustrum ssp.*), and invasive olive (*Elaeagnus ssp.*) The October treatment covered follow-up treatments along Shadrick Creek reach 1 tributaries and selective felling of larger isolated privet, and Bradford pear along Reaches 2 and 3. The predominant species documented at the Shadrick Creek Site include Multiflora Rose (*Rosa multiflora*), Japanese honeysuckle (*Lonicera japonica*), Privet spp. (*Ligustrum sinense*), and kudzu (*Pueraria montana var. lobata*). Most areas were too small to be rendered on the CCPV with accuracy and consisted of isolated stems of multiflora rose and privet throughout the reach. All areas called out as "invasives present" in the MY4 report or during the MY5 initial site assessment were treated during MY5. Three (3) areas of invasive species are called out in the CCPV. Invasive polygons will be removed from the CCPV as they are assessed as controlled. The timeframe and method of treatment can be found in Appendix F. Additional rounds of invasive treatment will be conducted during 2023 as needed.

1.5.2. Stream Geomorphology

Visual assessment of the stream channel was performed to document, repairs, signs of instability, such as eroding banks, structural instability, or excessive sedimentation. One area of bank scour was noted on Shadrick Creek Reach 2, and one area of scour was noted on Shadrick Creek Reach 3 (Table 5, Figure 2 CCPV). The area of bank erosion noted on the LDB Shadrick Reach 2 was located just upstream of the crossing and is a result of focused flow along that bank. This area has remained relatively stable into MY5. One area of scour was identified along Shadrick Reach 3 in MY5. In this area a portion of the outer bend of Shadrick Creek just upstream of Cross-section 19 is experiencing some mass wasting. Photo and locations of these areas can be found in Appendix B and the CCPV.

Geomorphic data for MY5 was collected during October and November 2022. Summary tables and cross-section data plots related to stream morphology are located in Appendix D. Cross-sectional dimensions have generally remained stable between baseline conditions and MY5 monitoring efforts. Cross-section 1 has shown substantial bank building between MY4 and MY5. This was not observed in either Cross-section 2 or 3 further downstream on UT1. A substantial deepening of the pool at Cross-section 5 observed during MY4 has begun to aggrade and is approaching pre-MY4 dimensions. Similarly, deposition noted in Cross-section 8 during MY4 has been transported and the cross-section was again similar to pre-MY4 conditions. The dimensions of UT 9 Reach 1 have remained stable between MY4 and MY5. Riparian vegetation is robust and maintaining stable banks. Cross-section 9 riffle has deepened slightly and has experienced some undercutting and building of the right bank. Slight adjustments have been observed across all cross-sections, none were indicative of a move toward instability (Appendix D, Table 11a). Riffle dimensions for each reach also remained relatively similar between baseline conditions and MY5 monitoring (Appendix D, Table 11b).

Longitudinal profile data (Appendix B, Table 11b) indicated relatively minor change in riffle and pool dimensions between baseline conditions and MY5 monitoring. Minor fluctuations in pool depths, lengths and spacing were noted through previous monitoring years but the project has remained stable. Riffle slopes and water surface slopes are similar since baseline. MY5 mean riffle and pool lengths have shortened but maintained a similar ratio relative to baseline.

Three beaver dams were identified in October of 2022. The major dam was located at Station 34+74. A smaller dam was located Station 35+50. Two beaver dams were observed on UT9 Reach 2 (Stations 20+63 and 21+29). Backwater depth was significant enough to prevent the surveying of cross-

section 7. APHIS is actively trapping the beaver and the dams will be removed once beaver have been trapped. This will occur in early December 2022 (Problem area photos, Appendix D).

1.5.3. Stream Hydrology

Since project completion in late 2017, a minimum of eight bankfull events have been documented at the Shadrick Creek Site. Based on precipitation data, the suspected dates within MY5 are May 25-27th, 2022. A complete history of overbank event and monitoring methodology can be found in Table 12, Appendix E.

2.0 METHODS

The visual assessment of the project was performed at the beginning and end of each monitoring year. Permanent photo station photos were taken during the morphological monitoring. Additional photos of vegetation or stream problem areas were taken as needed.

Geomorphic measurements were taken during low flow conditions using a Nikon® NPR 332 Total Station. Three-dimensional coordinates associated with cross-section and profile data were collected in the field and geo-referenced (NAD83 State Plane feet FIPS 3200). Morphological data were collected at 19 cross-sections. Survey data was imported into CAD, ArcGIS®, and Microsoft Excel® for data processing and analysis.

Vegetation success is being monitored at 16 permanent monitoring plots. Vegetation monitoring follows the CVS-EEP Level 2 Protocol for Recording Vegetation, version 4.2 (Lee et al. 2008) and includes analysis of species composition and density of planted species. Data is processed using the CVS data entry tool. In the field, the four corners of each plot were permanently marked with metal t-posts and PVC pipe. Photos of each plot were taken from the plot origin each monitoring year.

Precipitation data was reported from the North Carolina State Climate Office (NCSCO) station #315340 in Marion, NC. Bankfull events were documented with two crest gauges, one located on Shadrick Creek Reach 1 and another on Shadrick Creek Reach 3. Crest gauges were be monitored semi-annually. The height of the corklines were recorded and cross-referenced with known bankfull elevations at each crest gauge.

3.0 REFERENCES

Ben Patton Land Surveying. 2017. As-Built Survey of Shadrick Creek Restoration Project. Prepared for N.C. Division of Mitigation Services.

Confluence Engineering. 2015. Mitigation Plan Addendum – Final, Shadrick Creek Restoration Project. Prepared for North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program. Mitigation Plan Addendum – Final, Shadrick Creek Restoration Project. EEP Project No. 92916.

Harrelson, Cheryl, C. Rawlins, and J. Potyondy. 1994. Stream Channel Reference Sites: An Illustrated Guide to Field Technique. Gen. Tech. Rep. RM-245. Rocky Mountain Forest and Range Experiment Station. USDA Forest Service. Fort Collins, Colorado.

Kimley-Horn and Associates, Inc. 2010. Mitigation Plan for Shadrick Creek Stream Restoration. Prepared for North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program. Final Mitigation Plan, Shadrick Creek Stream Restoration, McDowell County. EEP Project No: 92916.

Lee, Michael T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation, Version 4.2 (http://cvs.bio.unc.edu/methods.htm.

North Carolina State Climate Office. Station # 315340 (Marion 2 NW) Accessed December 7, 2021 (https://Climate.ncsu.edu).

Appendix A
Project Background Data and Maps

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Driving Directions: From Asheville drive east on I-40 and take exit 90. Turn right onto Harmony Grove Road, after 0.6 miles turn right to stay on Harmony Grove Road. After 2.2 miles continue onto State Road 1536. After 0.4 miles turn right on NC-126 E. Follow NC-126 E for approximately 2.5 miles then turn right onto a dirt road across from Lake James State Park. The Shadrick Creek Mitigation Site will be on the right after about 0.25 mile.

The subject project site in an environmental restoration site of the NCDMS and encompassed by a recorded conservation easement, but is bordered by land with private ownership. Accessing the site may require traversing areas near or along the easement boundary and therefore access to the general public is not permitted. Access by authorized personnel of state and federal agencies or their designee/contractors involved in the development, oversight, and stewardship of the restoration site is permitted within the terms and timeframes of their defined role. Any intended site visitation or activity by any person outside of these previously sanctioned roles and activities requires prior coordination with NCDMS.

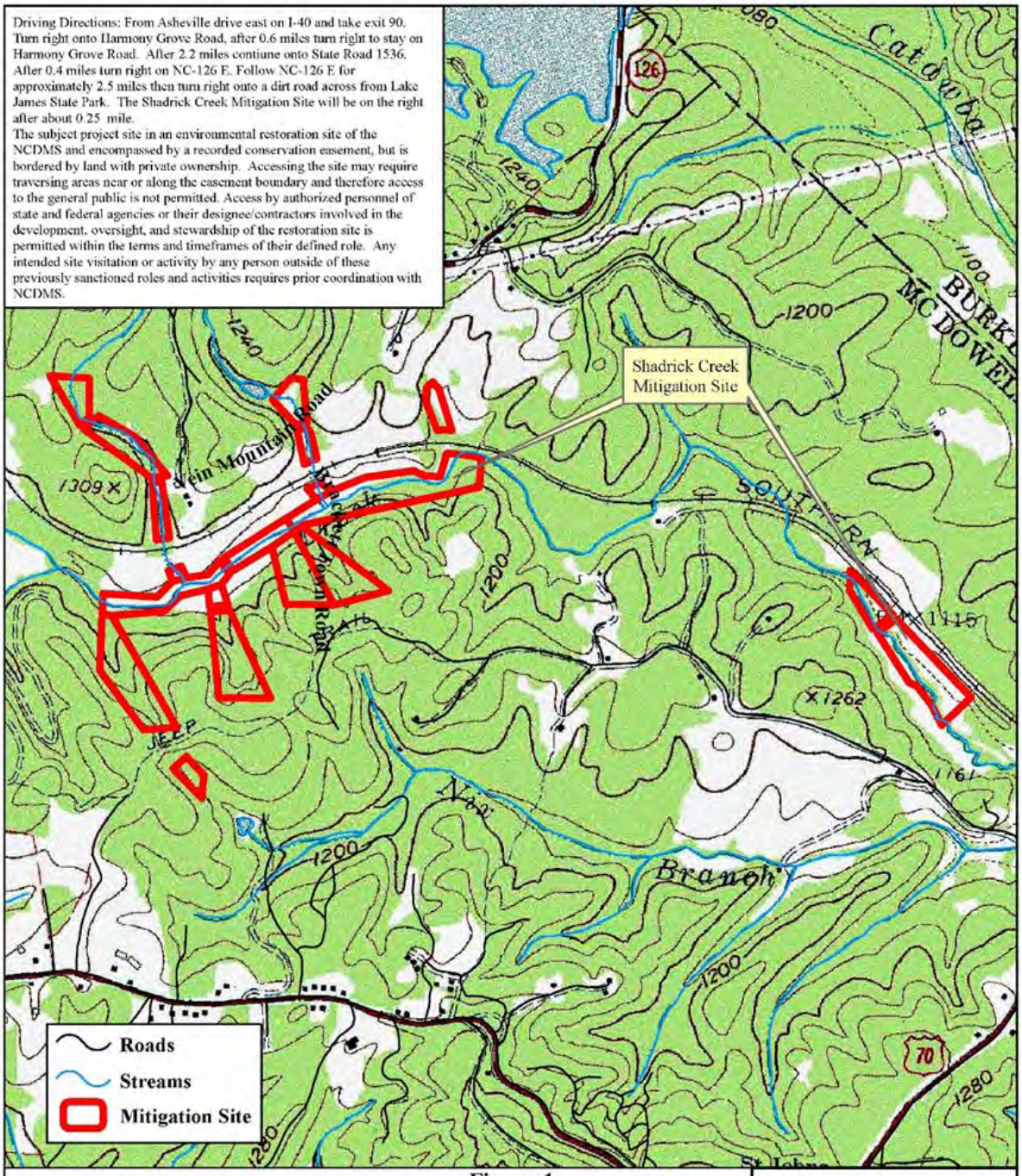

Figure 1
Shadrick Mitigation Site
Vicinity Map

EQUINOX

0 0.175 0.35 0.7 Miles

Table 1. Project Mitigation Components and Summation

Shadrick Creek Stream Restoration Project

Mitigation Credits*

	Stream SMUs				Wetland WMUs	Buffer SF
Type	R	EI	EII	**P**	**E**	**527,000**
Totals	**1,353**	**4,644**	**86**	**579**	**0.265**	

Project Components

Project Component -or- Reach ID	Stationing/Location	Existing Footage/Acreage	Restoration Footage or Acreage*	Restoration Footage/Acreage Discrepancy from Mitigation Plan	Restoration -or- Restoration Equivalent	Approach (PI, PII etc.)	Mitigation Ratio	Mitigation Credits*	Buffer SF
Shadrick Reach 1	10+06 - 46+84	3,686	3,632	-6	EI	P3	1.5:1	2,421	199,000
Shadrick Reach 2	100+04 - 105+77	595	573	-2	EI	P3	1.5:1	382	226,000
Shadrick Reach 3	105+77 - 117+26	1,168	1,104	-4	R	P2	1:1	1,104	
UT-1	10+00 - 30+57	1,637	1,651	14	EI	P3	1.5:1	1,101	46,000
UT-5	6+64 - 8+79	228	215	-13	EII	Buffer	2.5:1	86	Incl. in Shadrick R1
UT's 2, 5, 6, 7 & 8	-	3,835	2,895	-940	P	Preservation	5:1	579	-
UT-9 Reach 1	9+90 - 17+42	678	706	28	EI	P3	1.5:1	471	34,000
UT-9 Reach 2	19+59 - 22+08	237	249	3	R	P2	1:1	249	
UT-10	9+92 - 13+96	391	404	13	EI	P3	1.5:1	269	24,000
Wetland A	UT1	0.440	0.440	0	E	Stab./Buffer	2:1	0.220	-
Wetland B	Shadrick Reach 1	0.090	0.090	0	E	Buffer	2:1	0.045	-

Component Summation

Restoration Level	Stream	Riparian Wetland		Non-riparian Wetland	Buffer	Upland
	(linear feet)	(acres)		(acres)	(square feet)	(acres)
		Riverine	Non-Riverine	-	-	-
Restoration	1,353	-	-	-	-	-
Enhancement	-	0.530	-	-	-	-
Enhancement I	6,966	-	-	-	-	-
Enhancement II	215	-	-	-	-	-
Preservation	2,895	-	-	-	527,000 SF	-
High Quality Preservation	-	-	-	-	-	-

BMP Elements

Element	Location	Purpose/Function	Notes
FB	Entire Site	Protect Stream Channel	

BMP Elements

BR = Bioretention Cell; SF = Sand Filter; SW = Stormwater Wetland; WDP = Wet Detention Pond; DDP = Dry Detention Pond; FS = Filter Strip; S = Grassed Swale; LS = Level Spreader; NI = Natural Infiltration Area; FB = Forested Buffer

* Mitigation credits and stream lengths account for breaks in conservation easements

Table 2. Project Activity and Reporting History Shadrick Creek Restoration Project			
Activity or Report		**Data Collection Complete**	**Completion or Delivery**
Site Instituted		-	Aug 2008
Mitigation Plan		-	May 2010
Mitigation Plan Addendum		-	Feb 2015
Final Design - Construction Plans		-	Feb 2015
Construction		-	Apr 2017
Bare Root and Live Stake Plantings		-	Apr 2017
Temporary S&E Mix Applied		-	Apr 2017
Permanent Seed Mix Applied		-	Apr 2017
Year 0 Monitoring - Baseline	Vegetation Survey	Sep 2017	Feb 2018
	Stream Survey	Dec 2017	
Invasive Vegetation Management		-	Jul 2018
Year 1 Monitoring	Vegetation Survey	Sep 2018	Nov 2018
	Stream Survey	Oct 2018	
Year 2 Monitoring	Vegetation Survey	Oct 2019	Nov 2019
	Stream Survey	July 2019	
Beaver and Dam Removal		-	Aug 2019
Invasive Vegetation Management		-	Mar, Jun, Jul, Oct 2019
Year 3 Monitoring	Vegetation Survey	Sept 2020	Nov 2020
	Stream Survey	Oct 2020	
Invasive Vegetation Management		-	Aug, Sep 2020
Year 4 Monitoring	Vegetation Survey	Nov 2021	Nov 2021
	Stream Survey	Nov 2021	
Stream Repair		-	Mar 2021
Invasive Vegetation Management		-	Jul 2021
Beaver and Dam Removal		-	Nov 2021
Year 5 Monitoring	Vegetation Survey	Oct 2022	Nov 2022
	Stream Survey	Nov 2022	
Invasive Vegetation Management		-	Jun, Jul, Oct 2022
Beaver and Dam Removal		-	Sep, Dec 2022

Table 3. Project Contacts	
Shadrick Creek Restoration Project	
Prime Contractor	North Carolina Division of Mitigation Services 217 W Jones Street Suite 3000a Raleigh, North Carolina 27603 Matthew Reid (828) 231-7812
Designer	Wildlands Engineering 167B Haywood Road Asheville, North Carolina 28806 Andrew Bick (828) 774-5547
Construction Contractor	Baker Construction 1000 Bat Cave Road Old Fort, NC 28762 Charles Baker (828) 668-5060
Seeding Contractor	Baker Construction 1000 Bat Cave Road Old Fort, NC 28762 Charles Baker (828) 668-5060
Planting Contractor	Equinox 37 Haywood St. Asheville, North Carolina 28801 Owen Carson (828) 253-6856
As-built Surveys	Ben Patton Land Surveying 259 Daves Farm Dr. Marion, NC 28752 Ben Patton (828) 768-1625
Seeding Mix Source	Green Resource 5204 Highgreen Court Colfax, North Carolina 27235 (336) 855-6363
Live Stakes	Foggy Mountain Nursery 797 Helton Creek Road Lansing, North Carolina (336) 384-5323
Monitoring Performers (MY0-MY5)- 2017 - 2022	Equinox Environmental 37 Haywood St. Asheville, North Carolina 28801 Danvey Walsh (828) 253-6856

Table 4. Project Baseline Information and Attributes

Project Information

Project Name	Shadrick Creek
County	McDowell
Project Area (acres)	54.6
Project Coordinates (latitude and longitude)	35.720410° N, -81.901405° W

Project Watershed Summary Information

Physiographic Province		Blue Ridge	
River Basin		Catawba River	
USGS Hydrologic Unit 8-digit	3050101	USGS Hydrologic Unit 14-digit	0305010103006
DWR Sub-basin		03-08-30	
Project Drainage Area (acres)		2,093	
Project Drainage Area Percentage of Impervious Area		> 1%	
CGIA Land Use Classification		Agricultural	

Reach Summary Information

Parameters	Shadrick Creek Reach 1	Shadrick Creek Reach 2	Shadrick Creek Reach 3	UT-1	UT-9 Reach 1	UT-9 Reach 2	UT-10
Length of reach (linear feet)*	3,632	573	1,104	1,651	706	249	404
Valley Confinement (Rosgen)	VIII	VIII	VIII	II	II	VIII	II
Drainage area (miles^2)	2.80	3.30	3.30	0.10	0.10	0.10	0.05
Perrenial, Intermittent, Ephemeral	Perrenial	Perrenial	Perrenial	Perrenial	Perrenial	Perrenial	Perrenial
NCDWR Water Quality Classification	C	C	C	C	C	C	C
Stream Classification (existing)	E4	E4	E4	G4	B4, G4	B4, G4	F4
Stream Classification (proposed)	C4	C4	C4	B4	B4	E4	B4
Evolutionary Trend (Rosgen)	V	V	V	V	VI	VI	VI
FEMA classification	-	-	-	-	-	-	-

Wetland Summary Information

Parameters	Wetland A	Wetland B
Size of Wetland (acres)	0.44	0.09
Wetland Type (non-riparian, riparian riverine or riparian non-riverine)	Riparian	Riparian
Mapped Soil Series	HeD	EwE
Drainage class	well-drained	well-drained
Soil Hydric Status	Hydric	Hydric
Source of Hydrology	Spring	Spring
Hydrologic Impairment	Logging	Stream Incision, Cattle Grazing
Native vegetation community	Piedmont/ Low Mountain Alluvial Forest	Piedmont/ Low Mountain Alluvial Forest
Percent composition of exotic invasive vegetation	0%	0%

Regulatory Considerations

Regulation	Applicable?	Resolved?	Supporting Documentation
Waters of the United States – Section 404	Yes	Yes	Jurisdictional Determination
Waters of the United States – Section 401	Yes	Yes	Jurisdictional Determination
Endangered Species Act	No	N/A	ERTR
Historic Preservation Act	No	N/A	ERTR
Coastal Zone Management Act (CZMA)/ Coastal Area Management Act (CAMA)	No	N/A	
FEMA Floodplain Compliance	Yes	Yes	Yes
Essential Fisheries Habitat	No	N/A	-

*Accounts for breaks in conservation easements

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Appendix B
Visual Assessment Data

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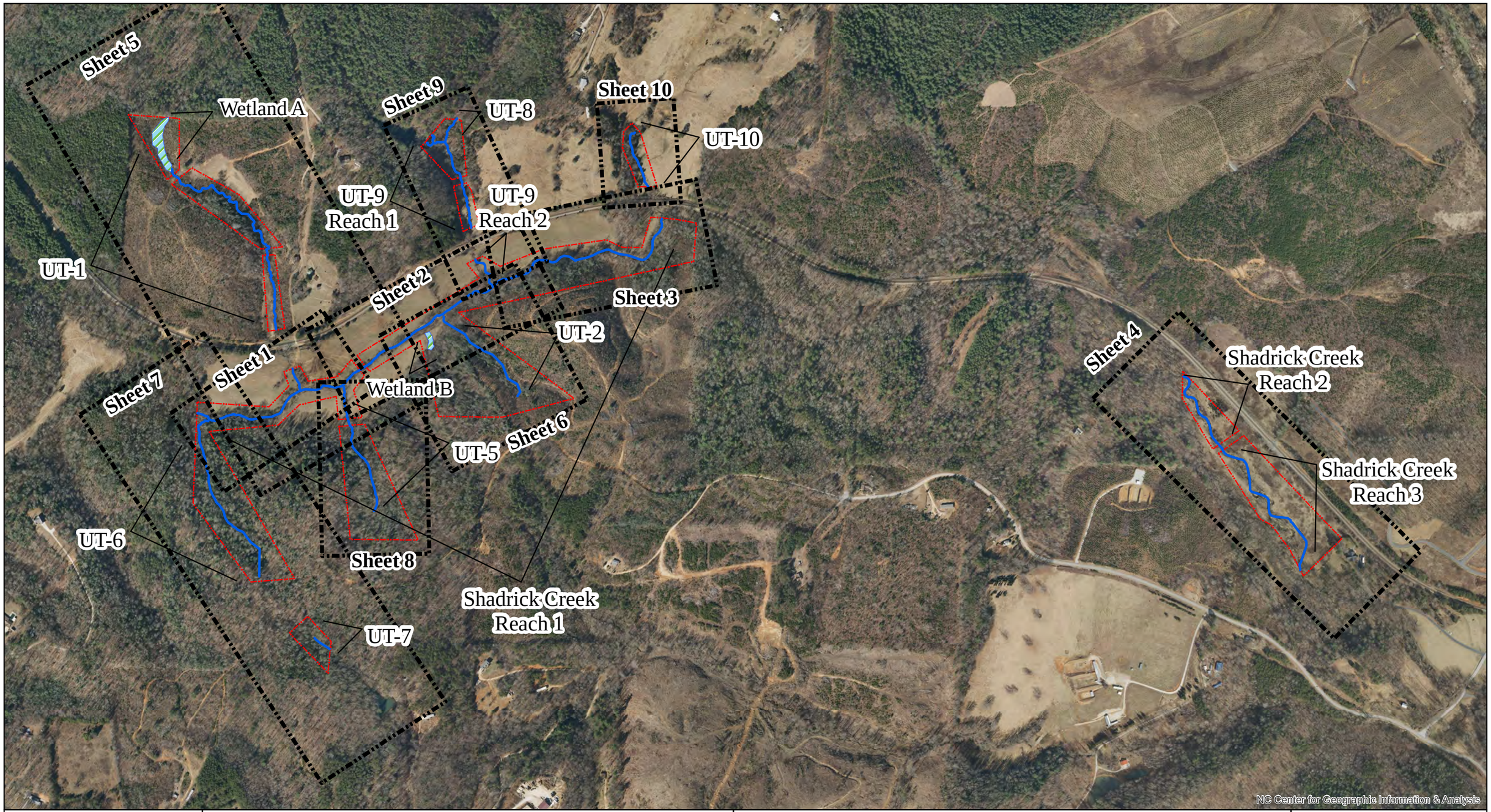
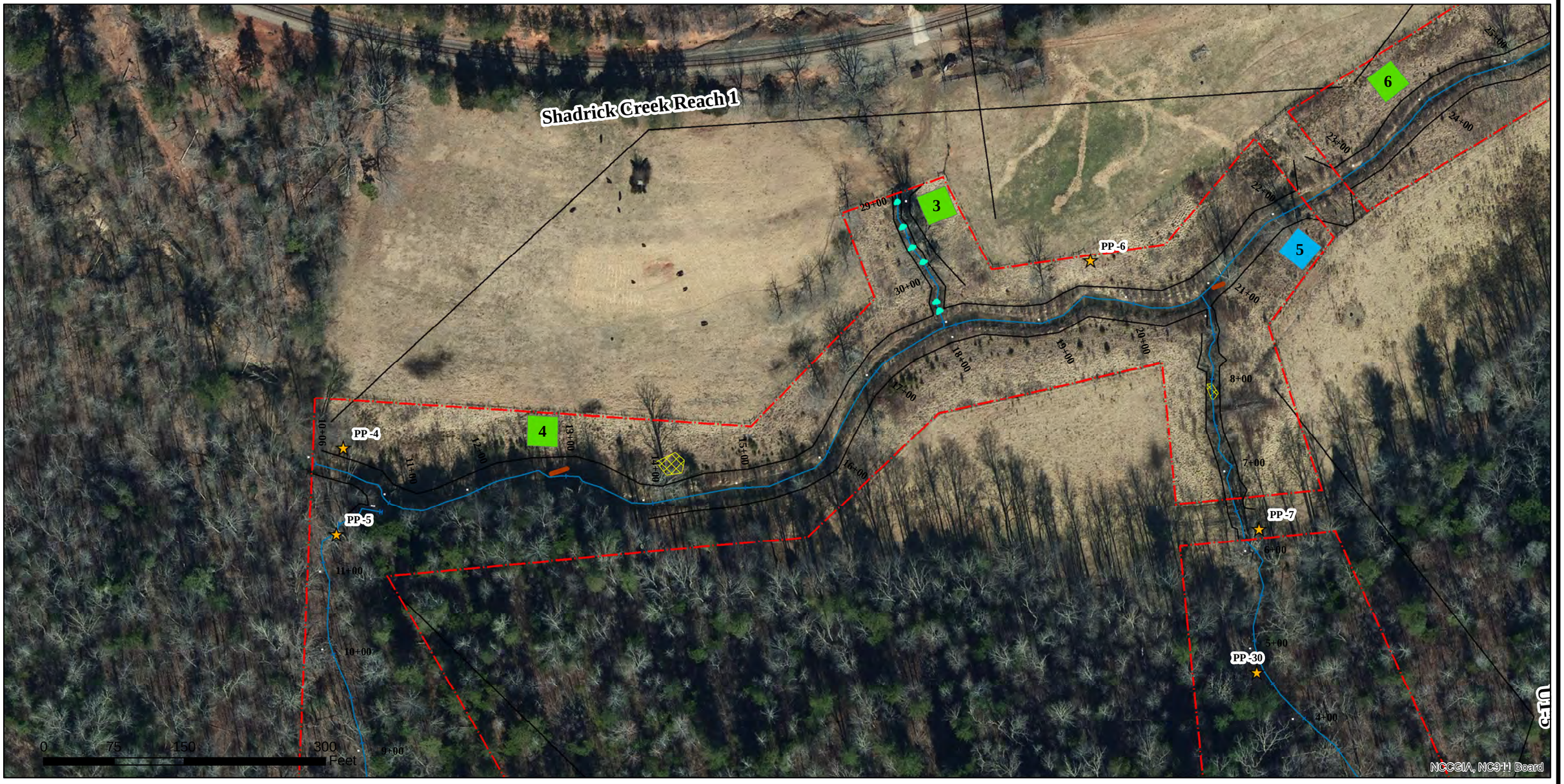


Nothing Compares
NORTH CAROLINA

Shadrick Creek Restoration Site
McDowell County, NC NCDMS
Contract No.: 00006783 NCDMS
Project No.: 92916
Overview Map

Thalweg
Wetland Enhancement
Easement
Sheet

EQUINOX



Prepared for:

Mitigation Services
ENVIRONMENTAL QUALITY

Shadrick Creek Restoration Site
Monitoring Year 5 CCPV
McDowell County, NC
NCDMS Contract No.: 00006783
NCDMS Project No.: 92916
November 2022
Sheet 1 of 10

- Photo Point
- Log Vane
- Boulder Structure
- Easement
- Top of Bank

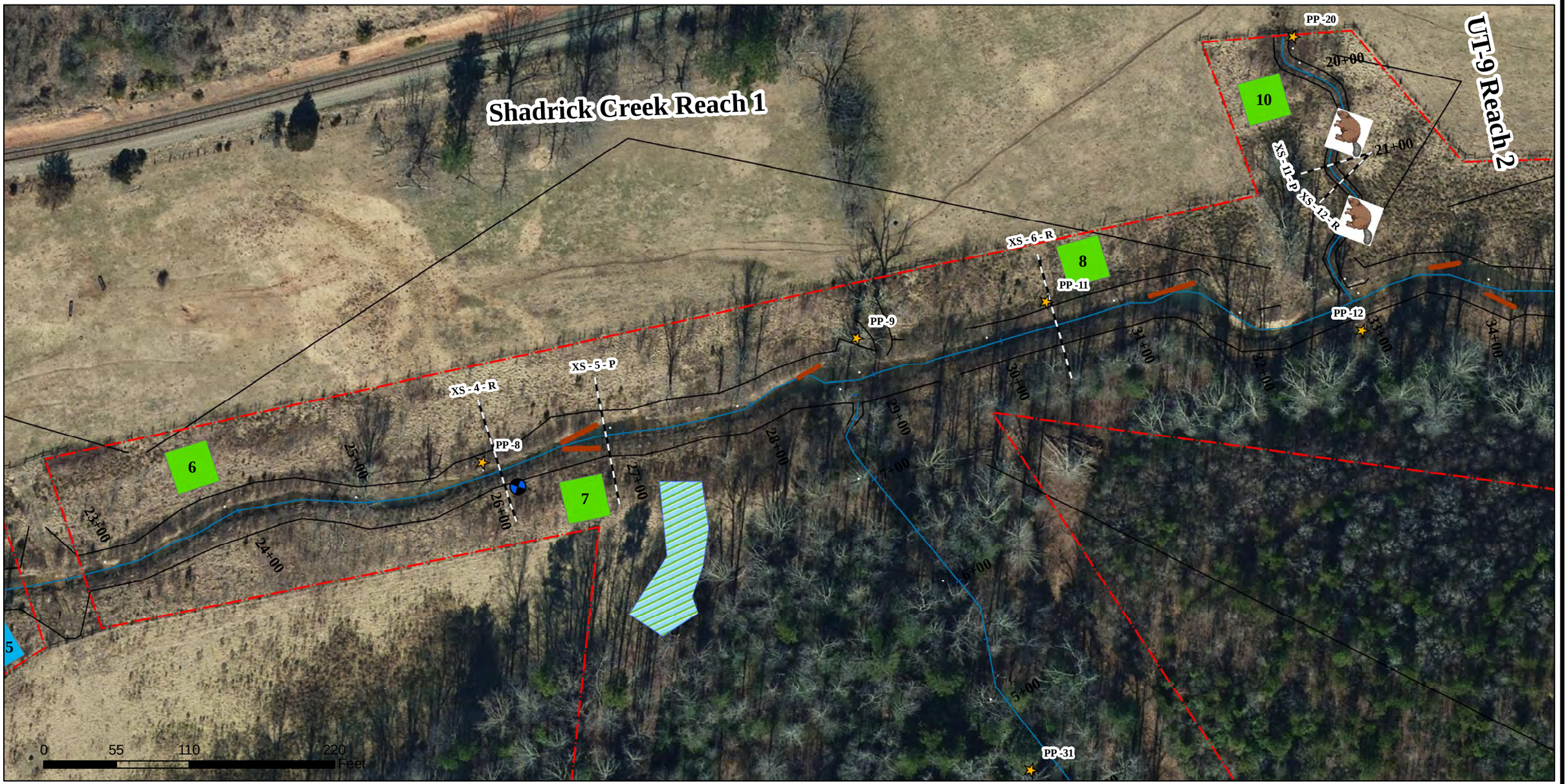
Vegetation Plot
- Meeting <10%
- Meeting>10%
- Thalweg

Invasive-Exotic Species
- Present

Notes:
1) Baseline Data Provided by Patton Land Surveying

Prepared by

EQUINOX



Prepared for:

Mitigation Services
ENVIRONMENTAL QUALITY

Shadrick Creek Restoration Site
Monitoring Year 5 CCPV
McDowell County, NC
NCDMS Contract No.: 00006783
NCDMS Project No.: 92916
November 2022
Sheet 2 of 10

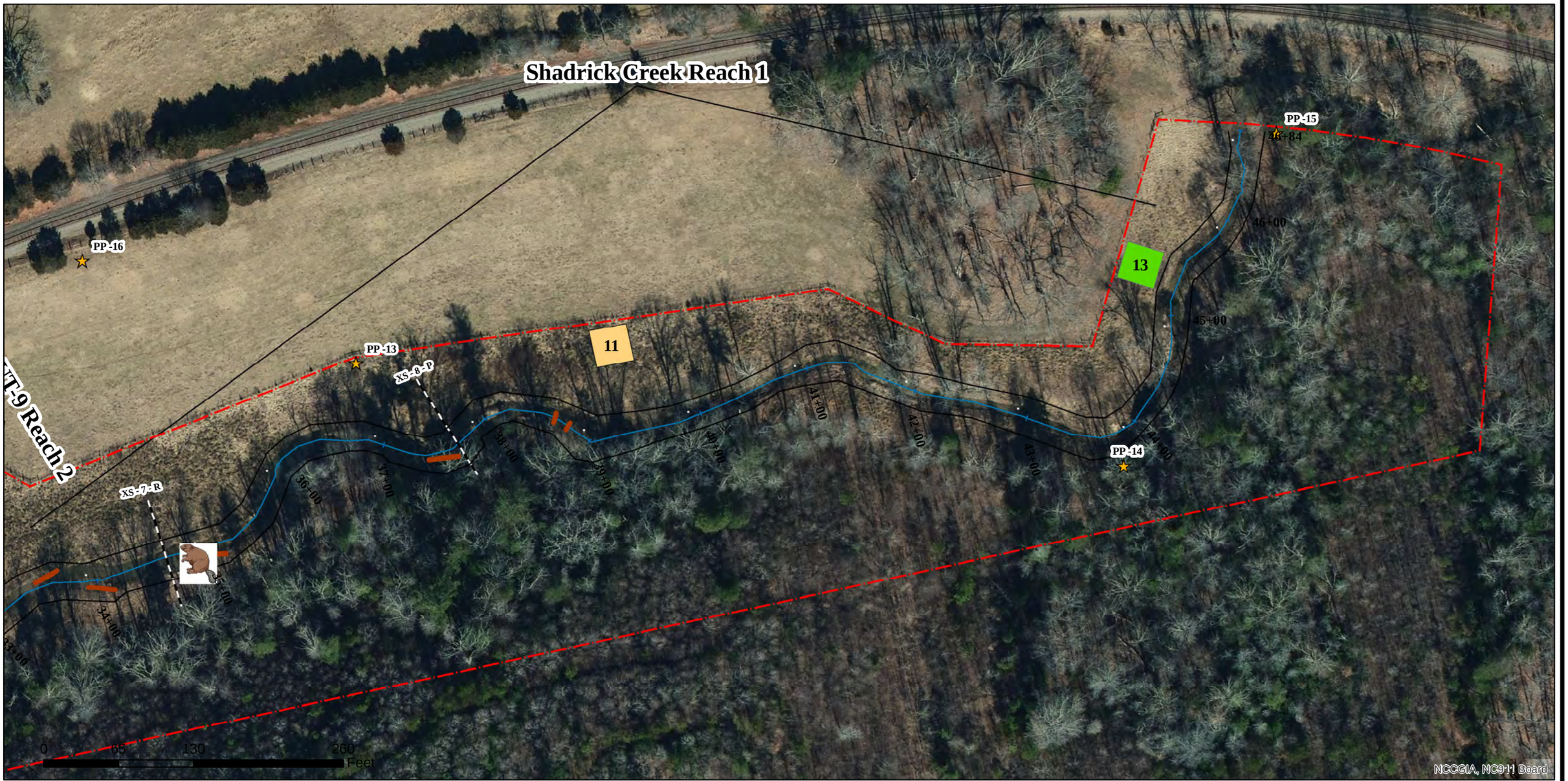
Beaver Dam
Top of Bank
Cross-Section
Crest Gauge
Photo Point
Log Vane
Easement
Thalweg
Wetland Enhancement

Vegetation Plot
Meeting <10%
Meeting>10%

Notes:
1) Baseline Data Provided by Patton Land Surveying

Prepared by

EQUINOX



Prepared for:

Mitigation Services
ENVIRONMENTAL QUALITY

Shadrick Creek Restoration Site
Monitoring Year 5 CCPV
McDowell County, NC
NCDMS Contract No.: 00006783
NCDMS Project No.: 92916
November 2022
Sheet 3 of 10

Beaver Dam
Photo Point
Log Vane
Easement
Top of Bank
Cross-Section

Vegetation Plot

Failing<10%
Meeting>10%
Thalweg

Notes:
1) Baseline Data Provided by Patton Land Surveying

Prepared by

EQUINOX

Prepared for:

Mitigation Services
ENVIRONMENTAL QUALITY

Shadrick Creek Restoration Site
Monitoring Year 5 CCPV
McDowell County, NC
NCDMS Contract No.: 00006783
NCDMS Project No.: 92916
November 2022
Sheet 4 of 10

Beaver Dam
Repair
Photo Point
Log Vane
Easement
Top of Bank
Cross-Section
Crest Gauge
Vegetation Plot
Failing<10%
Meeting <10%
Meeting>10%
Thalweg
Stream Problem Areas
Bank Erosion
Mass Wasting

Notes:
1) Baseline Data Provided by Patton Land Surveying

Prepared by

EQUINOX

Prepared for:

Mitigation Services
ENVIRONMENTAL QUALITY

Shadrick Creek Restoration Site
Monitoring Year 5 CCPV
McDowell County, NC
NCDMS Contract No.: 00006783
NCDMS Project No.: 92916
November 2022
Sheet 5 of 10

Repair
Photo Point
Log Vane
Boulder Structure
Easement
Top of Bank
Cross-Section
Vegetation Plot
Meeting>10%
Thalweg
Invasive-Exotic Species
Present
Wetland Enhancement

Notes:
1) Baseline Data Provided by Patton Land Surveying

Prepared by

EQUINOX

CCPV

Prepared for:

Mitigation Services
ENVIRONMENTAL QUALITY

Shadrick Creek Restoration Site
Monitoring Year 5 CCPV
McDowell County, NC
NCDMS Contract No.: 00006783
NCDMS Project No.: 92916
November 2022
Sheet 6 of 10

Photo Point
Log Vane
Easement
Top of Bank
Cross-Section
Crest Gauge

Vegetation Plot
Meeting <10%
Meeting>10%
Thalweg

Invasive-Exotic Species
Present

Wetland Enhancement

Notes:
1) Baseline Data Provided by Patton Land Surveying

Prepared by

EQUINOX

Prepared for:

Mitigation Services
ENVIRONMENTAL QUALITY

Shadrick Creek Restoration Site
Monitoring Year 5 CCPV
McDowell County, NC
NCDMS Contract No.: 00006783
NCDMS Project No.: 92916
November 2022
Sheet 7 of 10

Photo Point
Log Vane
Easement
Top of Bank
Thalweg

Invasive-Exotic Species

Present

Vegetation Plot

Meeting>10%

Notes:
1) Baseline Data Provided by Patton Land Surveying

Prepared by

EQUINOX

Prepared for:

Mitigation Services
ENVIRONMENTAL QUALITY

Shadrick Creek Restoration Site
Monitoring Year 5 CCPV
McDowell County, NC
NCDMS Contract No.: 00006783
NCDMS Project No.: 92916
November 2022
Sheet 8 of 10

Photo Point
Easement
Top of Bank
Thalweg

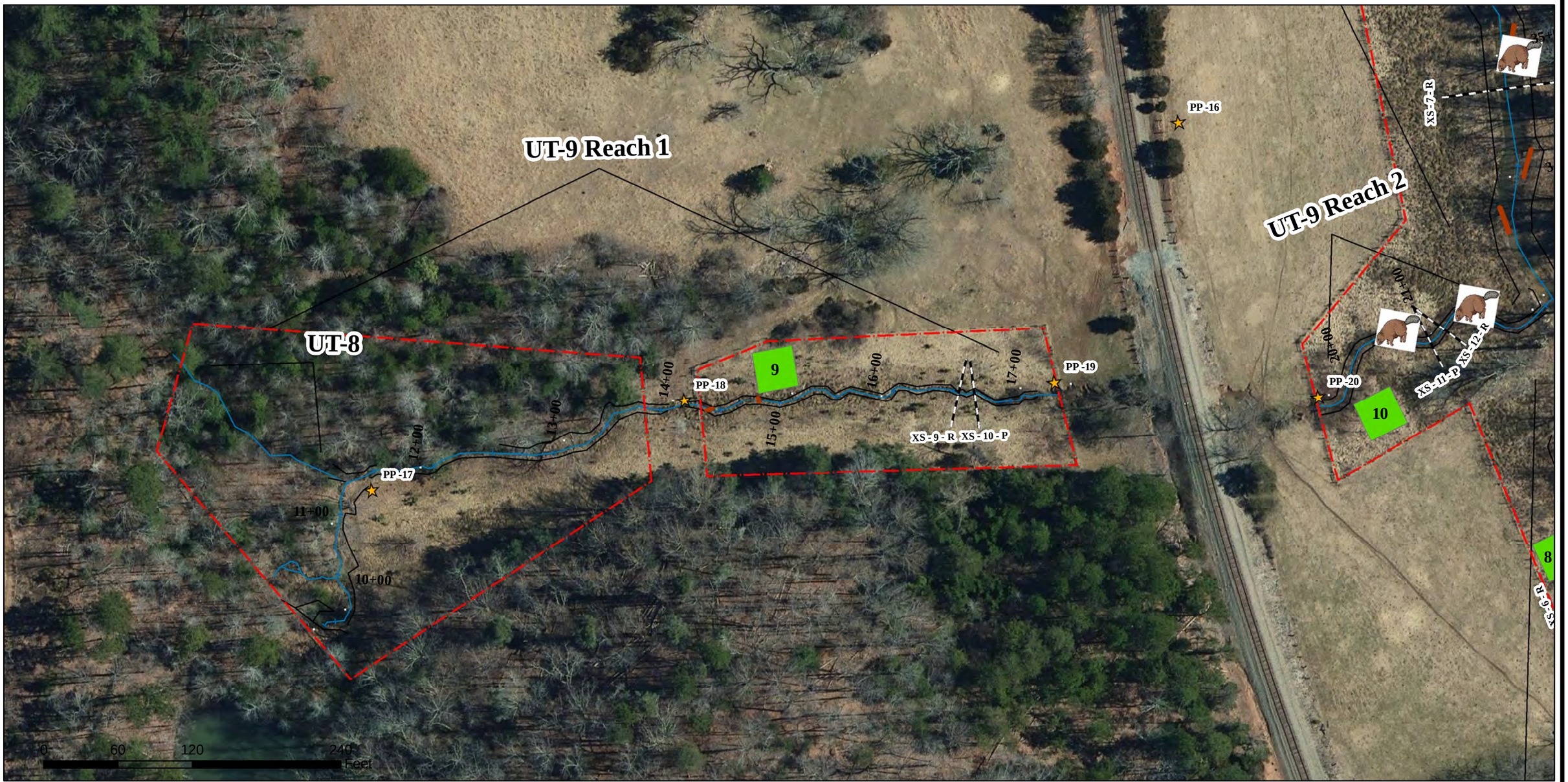
Invasive-Exotic Species

Present

Notes:
1) Baseline Data Provided by Patton Land Surveying

Prepared by

EQUINOX



Prepared for:

Mitigation Services
ENVIRONMENTAL QUALITY

Shadrick Creek Restoration Site
Monitoring Year 5 CCPV
McDowell County, NC
NCDMS Contract No.: 00006783
NCDMS Project No.: 92916
November 2022
Sheet 9 of 10

Beaver Dam
Photo Point
Log Vane
Easement
Top of Bank
Cross-Section

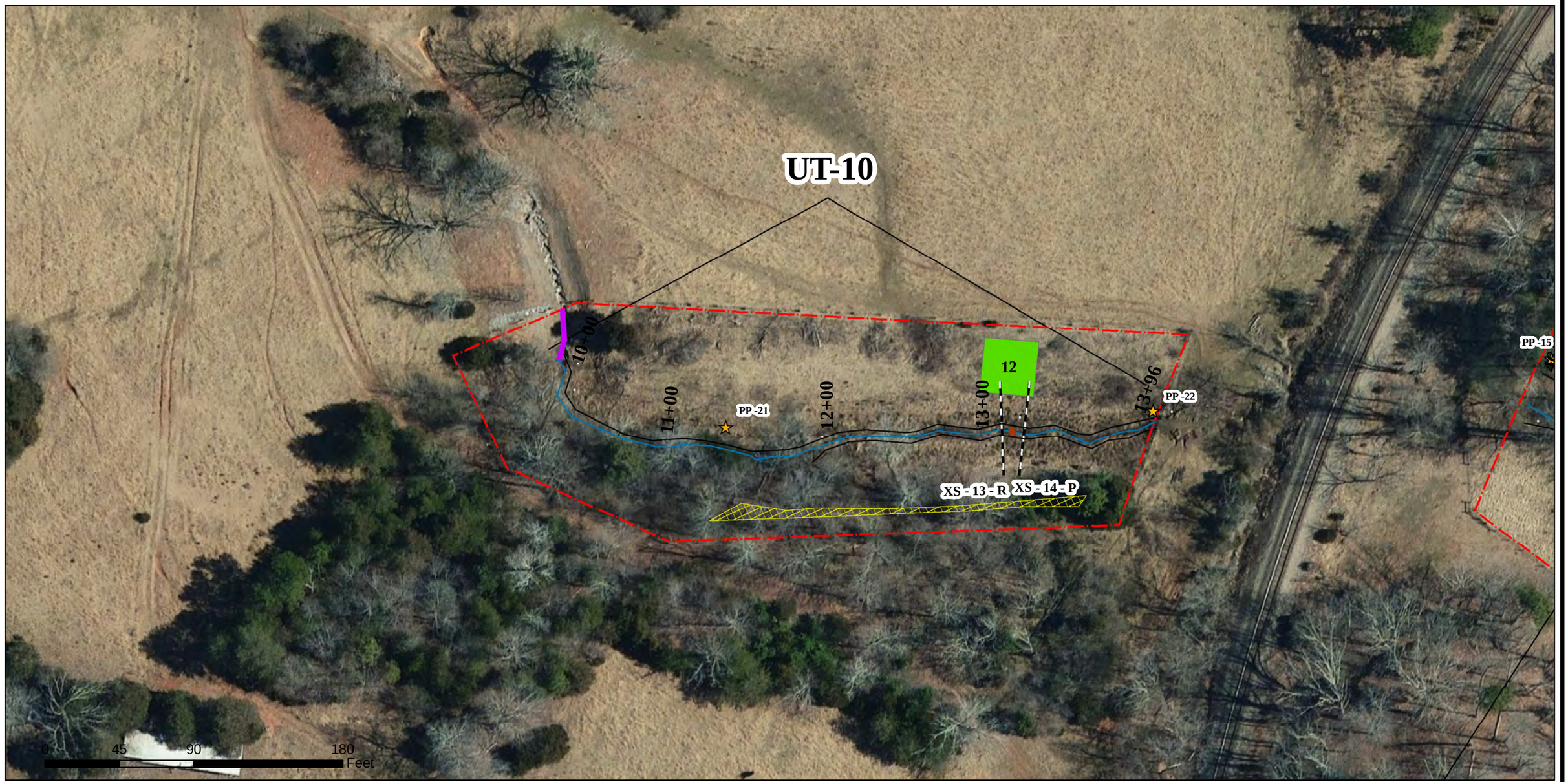
Vegetation Plot

Meeting>10%
Thalweg

Notes:
1) Baseline Data Provided by Patton Land Surveying

Prepared by

EQUINOX



Prepared for:

Mitigation Services
ENVIRONMENTAL QUALITY

Shadrick Creek Restoration Site
Monitoring Year 5 CCPV
McDowell County, NC
NCDMS Contract No.: 00006783
NCDMS Project No.: 92916
November 2022
Sheet 10 of 10

Repair
Photo Point
Log Vane
Easement
Top of Bank
Cross-Section

Vegetation Plot
Meeting>10%
Thalweg

Invasive-Exotic Species
Present

Notes:
1) Baseline Data Provided by Patton Land Surveying

Prepared by

EQUINOX

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Table 5. Visual Stream Morphology Stability Assessment
Shadrick Creek Restoration Site - Shadrick Creek Reach 1 - Enhancement I
Assessed Length 3,631 feet (4/12/2022 and 10/11/2022)

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	15	15			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	15	15			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	15	15			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	15	15			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	15	15			100%			

- Information Unavailable
N/A - Item does not apply.

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Shadrick Creek Restoration Site - Shadrick Creek Reach 2 - Enhancement I
Assessed Length 573 feet (4/12/2022 and 10/11/2022)

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			1	27	98%	0	0	98%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	1	27	98%	N/A	N/A	N/A
2. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	2	2			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	2	2			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	2	2			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	2	2			100%			

N/A - Item does not apply.

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Shadrick Creek Restoration Site - Shadrick Creek Reach 3 - Restoration
Assessed Length 1,104 feet (4/12/2022 and 10/11/2022)

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			1	27	99%	N/A	N/A	N/A
				Totals	1	27	99%	N/A	N/A	N/A
2. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	3	3			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	3	3			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	3	3			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	3	3			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	3	3			100%			

N/A - Item does not apply.

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Shadrick Creek Restoration Site - UT1 - Enhancement 1
Assessed Length 1,651 feet (4/12/2022 and 10/11/2022)

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
2. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	14	14			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	14	14			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	14	14			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	14	14			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	14	14			100%			

N/A - Item does not apply.

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Shadrick Creek Restoration Site - UT9 Reach 1 - Enhancement 1
Assessed Length 706 feet (4/12/2022 and 10/11/2022)

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
2. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	2	2			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	2	2			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	2	2			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	2	2			100%			

N/A - Item does not apply.

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Shadrick Creek Restoration Site - UT9 Reach 2 - Restoration
Assessed Length 238 feet (4/12/2022 and 10/11/2022)

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
2. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	1	1			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	1	1			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	1	1			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	1	1			100%			

N/A - Item does not apply.

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Shadrick Creek Restoration Site - UT10 - Enhancement I
Assessed Length 404 feet (4/12/2022 and 10/11/2022)

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
2. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	1	1			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	1	1			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	1	1			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	1	1			100%			

N/A - Item does not apply.

Table 6. Vegetation Condition Assessment Shadrick Creek Restoration Site						
Planted Acreage : 8.68 (Assessed 4/12/2022 and 10/11/2022)						
Vegetation Category	**Definitions**	**Mapping Threshold**	**CCPV Depiction**	**Number of Polygons**	**Combined Acreage**	**% of Planted Acreage**
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres		0	0.00	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres		0	0.00	0.0%
			Totals	0	0.00	0.0%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	Pattern and Color	0	0.00	0.0%
			Cumulative Totals	0	0.00	0.0%
Easement Acreage : 54.59						
Vegetation Category	**Definitions**	**Mapping Threshold**	**CCPV Depiction**	**Number of Polygons**	**Combined Acreage**	**% of Easement Acreage**
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	1000 sf		3	0.04	0.1%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	none	Pattern and Color	0	0.00	0.0%

N/A - Item does not apply.

Permanent Photo Stations

UT-1 – Permanent Photo Station 1
Looking Upstream

UT-1 – Permanent Photo Station 1 Looking Downstream

UT-1 – Permanent Photo Station 2
Looking Upstream

UT-1 – Permanent Photo Station 2
Looking Downstream

UT-1 – Permanent Photo Station 3
Looking Upstream

Shadrick Creek Reach 1 – Permanent Photo Station 4
Looking Downstream

UT-6 – Permanent Photo Station 5
Looking Upstream

Shadrick Creek Reach 1 – Permanent Photo Station 6
Looking Upstream

Shadrick Creek Reach 1 – Permanent Photo Station 6
Looking Downstream

UT-5 – Permanent Photo Station 7
Looking Upstream from Crossing

UT-5 – Permanent Photo Station 7
Looking Downstream from Crossing

Shadrick Creek Reach 1 – Permanent Photo Station 8
Looking Upstream from Cross-Section 4

Shadrick Creek Reach 1 – Permanent Photo Station 8
Looking Downstream from Cross-Section 4

Shadrick Creek Reach 1 – Permanent Photo Station 9
Looking Upstream at UT-2

UT-2 - Permanent Photo Station 10
Looking Downstream at Easement

Shadrick Creek Reach 1 – Permanent Photo Station 11
Looking Upstream from Cross-Section 6

Shadrick Creek Reach 1 – Permanent Photo Station 11
Looking Downstream from Cross-Section 6

Shadrick Creek Reach 1 – Permanent Photo Station 12
Looking Upstream Shadrick Creek from confluence of UT-9 Reach 2

Shadrick Creek Reach 1 – Permanent Photo Station 12
Looking Downstream Shadrick Creek from confluence of UT-9 Reach 2

Shadrick Creek Reach 1 – Permanent Photo Station 12
Looking Upstream UT-9 Reach 2 from the confluence with Shadrick Creek

Shadrick Creek Reach 1 – Permanent Photo Station 13
Looking Upstream

Shadrick Creek Reach 1 – Permanent Photo Station 13
Looking Downstream

Shadrick Creek Reach 1 – Permanent Photo Station 14
Looking Upstream

Shadrick Creek Reach 1 – Permanent Photo Station 14
Looking Downstream

Shadrick Creek Reach 1 – Permanent Photo Station 15
Looking Upstream

Shadrick Creek Reach 1 – Permanent Photo Station 16
Looking Upstream

Shadrick Creek Reach 1 – Permanent Photo Station 16
Looking Downstream

UT-9 Reach 1 – Permanent Photo Station 17
Looking Downstream

UT-8 and UT 9– Permanent Photo Station 17
Looking Upstream

UT-9 Reach 1 – Permanent Photo Station 18
Looking Downstream

UT-9 Reach 1 – Permanent Photo Station 19
Looking Upstream

UT-9 Reach 2 – Permanent Photo Station 20
Looking Downstream

UT-10 – Permanent Photo Station 21 Supplemental
Looking Upstream at head of project and 2021 Repair Area

UT-10 – Permanent Photo Station 21
Looking Downstream

UT-10 – Permanent Photo Station 22
Looking Upstream

Shadrick Creek Reach 2 – Permanent Photo Station 23 Supplemental
Looking Upstream towards 2021 Repair Area

Shadrick Creek Reach 2 – Permanent Photo Station 23
Looking Upstream

Shadrick Creek Reach 2 – Permanent Photo Station 23
Looking Downstream

Shadrick Creek Reach 2 – Permanent Photo Station 24
Looking Upstream.

Shadrick Creek Reach 2 – Permanent Photo Station 24
Looking Downstream.

Shadrick Creek Reach 3 – Permanent Photo Station 25
Looking Upstream.

Shadrick Creek Reach 3 – Permanent Photo Station 25
Looking Downstream.

Shadrick Creek Reach 3 – Permanent Photo Station 26
Looking Upstream

Shadrick Creek Reach 3 – Permanent Photo Station 26 Looking Downstream

Shadrick Creek Reach 3 – Permanent Photo Station 27
Looking Upstream

Shadrick Creek Reach 3 – Permanent Photo Station 28
Looking Upstream

UT-7 – Permanent Photo Station 29
Looking Downstream

UT5 – Permanent Photo Station 30
Looking Upstream

UT-2 – Permanent Photo Station 31
Looking Downstream

Vegetation Plot Photos

Vegetation Monitoring Plot 1

Vegetation Monitoring Plot 2

Vegetation Monitoring Plot 3

Vegetation Monitoring Plot 4

Vegetation Monitoring Plot 5

Vegetation Monitoring Plot 6

Vegetation Monitoring Plot 7

Vegetation Monitoring Plot 8

Vegetation Monitoring Plot 9

Vegetation Monitoring Plot 10

Vegetation Monitoring Plot 11

Vegetation Monitoring Plot 12

Vegetation Monitoring Plot 13

Vegetation Monitoring Plot 14

Vegetation Monitoring Plot 15

Vegetation Monitoring Plot 16

Problem Area Photos

Shadrick Creek Reach 1 – Beaver dam Station 34+75

Shadrick Creek Reach 1 –Secondary beaver dam Station 36+50

Bank Slump, Shadrick Reach 3, Station 113+75

Cattle encroachment UT 10.

UT 10 cattle exclusion added to existing fence.

Appendix C
Vegetation Plot Data

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Table 7. Current Plot Data (MY5) 2022
Shadrick Creek Restoration Project

			Current Plot Data (MY5 2022)																														
			92916-01-0001			92916-01-0002			92916-01-0003			92916-01-0004			92916-01-0005			92916-01-0006			92916-01-0007			92916-01-0008			92916-01-0009			92916-01-0010			*92916-01-0011		
Scientific Name	**Common Name**	**Species Type**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**
Acer rubrum		Tree	2	2	2	2	2	2	1	1	1	2	2	2				4	4	4	1	1	1				1	1	1						
Alnus serrulata	Tag Alder, Smooth Ald	Shrub Tree						9									11						36											
Betula nigra	River Birch, Red Birch	Tree							1	1	1			20			75	3	3	15	2	2	2	2	2	10				7	7	7	1	1	1
Carpinus caroliniana		Shrub Tree																																
Cephalanthus occidentalis	Buttonbush	Shrub Tree																																
Cercis canadensis		Shrub Tree							1	1	1							1	1	1							2	2	2				1	1	1
Cornus amomum	Silky Dogwood	Shrub Tree																																
Corylus cornuta		Shrub Tree																																
Diospyros virginiana	American Persimmon,	Tree						5						12																				
Fraxinus pennsylvanica	Green Ash, Red Ash	Tree	12	12	12	5	5	5	7	7	7	1	1	1	1	1	1	3	3	3	4	4	4	6	6	7	4	4	4				1	1	1
Hamamelis virginiana		Shrub Tree																																
Ilex opaca	American Holly, Christ	Shrub Tree																																
Juglans nigra	Black Walnut	Tree																		2														
Juniperus virginiana		Tree									3						11			5						1								
Liquidambar styraciflua	Sweet Gum, Red Gum	Tree						11																								1		
Liriodendron tulipifera		Tree						11						3									27						8					
Nyssa sylvatica	Sour Gum, Black Gum,	Tree																																
Oxydendrum arboreum	Sourwood, Sorrel-tree	Shrub Tree																								9								
Pinus virginiana	Virginia Pine, Scrub Pir	Tree						2			2			5			20			19			6			6			10					
Platanus occidentalis	Sycamore, Plane-tree	Tree				3	3	8				4	4	4	1	1	8	2	2	20	3	3	14				9	9	18					
Populus deltoides		Tree				2	2	2				4	4	4	5	5	5	2	2	2										1	1	2	3	3	3
Prunus serotina		Shrub Tree																																
Quercus alba	White Oak	Tree																																
Quercus falcata	Spanish Oak, Southern	Tree																					2											
Quercus nigra	Water Oak, Paddle Oak	Tree																																
Quercus velutina	Black Oak	Tree																					4											
Rhus copallinum		Shrub Tree																																
Salix caprea	Goat Willow, Great Sal	Shrub Tree																																
Salix nigra	Black Willow	Tree																																
		Stem count	14	14	14	12	12	55	10	10	15	11	11	51	7	7	131	15	15	71	10	10	96	8	8	33	16	16	43	8	8	10	6	6	6
		size (ares)	1			1			1			1			1			1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	2	2	2	4	4	9	4	4	6	4	4	8	3	3	7	6	6	9	4	4	9	2	2	5	4	4	6	2	2	3	4	4	4
		Stems per ACRE	566.6	566.6	566.6	485.6	485.6	2226	404.7	404.7	607	445.2	445.2	2064	283.3	283.3	5301	607	607	2873	404.7	404.7	3885	323.7	323.7	1335	647.5	647.5	1740	323.7	323.7	404.7	242.8	242.8	242.8

Color for Density

Exceeds requirements by 10%

Exceeds requirements, but by less than 10%

Fails to meet requirements, by less than 10%

Fails to meet requirements by more than 10%

*** Vegetation plot impacted by treefall.**

Table 7 cont. Current Plot Data (MY5) 2022
Shadrick Creek Restoration Project

			Current Plot Data (MY5 2022)															Annual Means																	
			92916-01-0012			92916-01-0013			92916-01-0014			92916-01-0015			92916-01-0016			MY5 (2022)			MY4 (2021)			MY3 (2020)			MY2 (2019)			MY1 (2018)			MY0 (2017)		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer rubrum		Tree	2	2	2	1	1	1	1	1	1				1	1	1	18	18	18	22	22	54	22	22	37	24	24	40	24	24	26	25	25	25
Alnus serrulata	Tag Alder, Smooth Ald	Shrub Tree																		56			51			62			24			28			
Betula nigra	River Birch, Red Birch	Tree							1	1	1	1	1	1	1	1	1	19	19	134	18	18	109	19	19	139	22	22	99	21	21	30	24	24	24
Carpinus caroliniana		Shrub Tree				1	1	1										1	1	1															
Cephalanthus occidentalis	Buttonbush	Shrub Tree																					2												
Cercis canadensis		Shrub Tree																5	5	5	9	9	9	10	10	10	11	11	11	10	10	10	10	10	10
Cornus amomum	Silky Dogwood	Shrub Tree																					3						4						
Corylus cornuta		Shrub Tree																											1						
Diospyros virginiana	American Persimmon,	Tree																		17			10			42			8			3			
Fraxinus pennsylvanica	Green Ash, Red Ash	Tree	7	7	8	3	3	3	3	3	3	2	2	3	2	2	2	61	61	64	61	61	61	65	65	65	67	67	71	66	66	66	67	67	67
Hamamelis virginiana		Shrub Tree												2						2	2	2	2	4	4	4	4	4	4	6	6	6	8	8	8
Ilex opaca	American Holly, Christ	Shrub Tree																					4						1						
Juglans nigra	Black Walnut	Tree																		2			7			5			6						
Juniperus virginiana		Tree			1															21															
Liquidambar styraciflua	Sweet Gum, Red Gum	Tree																		12			46			24			9						
Liriodendron tulipifera		Tree															1			50			25			39			11			8			
Nyssa sylvatica	Sour Gum, Black Gum,	Tree																											1						
Oxydendrum arboreum	Sourwood, Sorrel-tree	Shrub Tree												2						11															
Pinus virginiana	Virginia Pine, Scrub Pir	Tree			2									3						75			76			9									
Platanus occidentalis	Sycamore, Plane-tree	Tree	2	2	2	3	3	3	4	4	4				2	2	2	33	33	83	35	35	70	32	32	127	35	35	61	33	33	46	36	36	36
Populus deltoides		Tree				1	1	1	1	1	1	3	3	3	1	1	1	23	23	24	25	25	25	26	26	26	27	27	27	27	27	27	28	28	28
Prunus serotina		Shrub Tree																					4			18									
Quercus alba	White Oak	Tree																											4						
Quercus falcata	Spanish Oak, Southern	Tree																		2															
Quercus nigra	Water Oak, Paddle Oak	Tree																											1						
Quercus velutina	Black Oak	Tree																		4									1						
Rhus copallinum		Shrub Tree																														4			
Salix caprea	Goat Willow, Great Sal	Shrub Tree																					2												
Salix nigra	Black Willow	Tree																					7			3			1			2			
		Stem count	11	11	15	9	9	9	10	10	10	6	6	14	7	7	8	160	160	581	172	172	567	178	178	610	190	190	385	187	187	256	198	198	198
		size (ares)	1			1			1			1			1			16			16			16			3			3			3		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.40			0.40			0.40			0.07			0.07			0.07		
		Species count	3	3	5	5	5	5	5	5	5	3	3	6	5	5	6	7	7	18	7	7	19	7	7	15	7	7	20	7	7	12	7	7	7
		Stems per ACRE	445.2	445.2	607	364.2	364.2	364.2	404.7	404.7	404.7	242.8	242.8	566.6	283.3	283.3	323.7	404.7	404.7	1470	435	435	1434	450.2	450.2	1543	2563	2563	5193	2523	2523	3453	2671	2671	2671

Color for Density

Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%

Table 8. Vegetation Plot Criteria Attainment Shadrick Creek Restoration Project		
Vegetation Plot ID	Vegetation Survival Threshold Met?	Tract Mean
1	Yes	87.5%
2	Yes	
3	Yes	
4	Yes	
5	Yes	
6	Yes	
7	Yes	
8	Yes	
9	Yes	
10	Yes	
11	No	
12	Yes	
13	Yes	
14	Yes	
15	No	
16	Yes	

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Appendix D
Stream Measurement and Geomorphology Data

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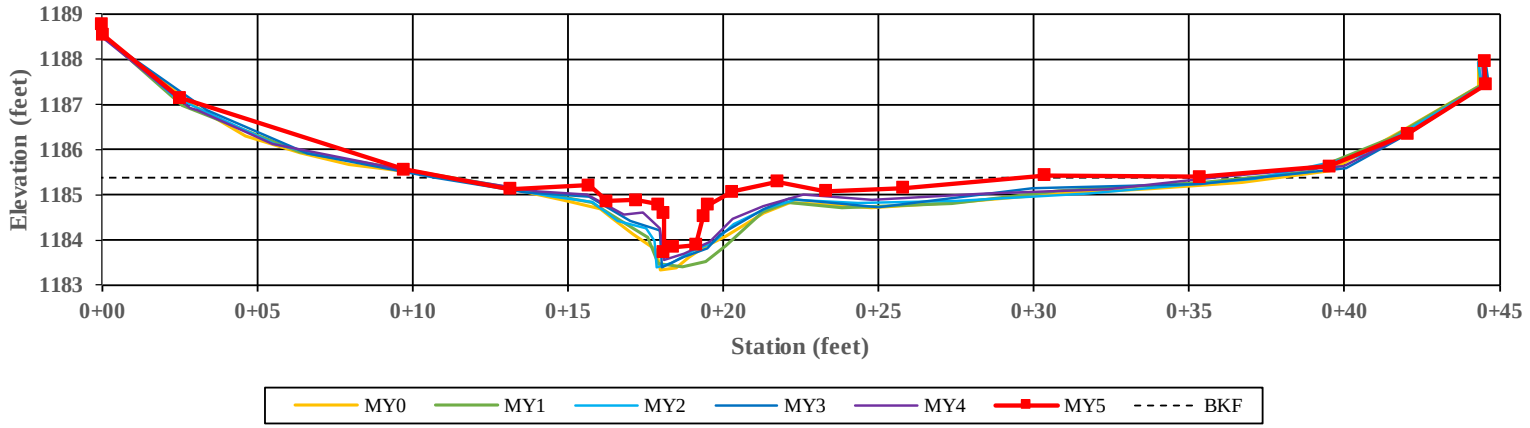
Project Name: Shadrick Creek **XS Number:** 1 **Station:** 16+05

Reach Name: UT1 **XS Type:** Pool



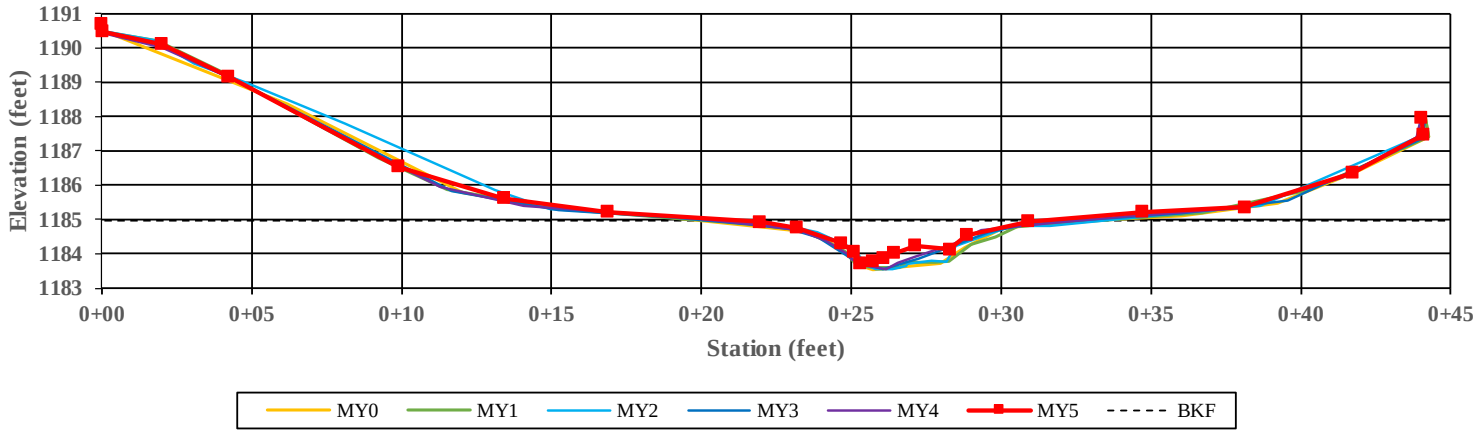
CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	6.1	5.4	5.6	5.6	5.7	9.5	-	-
Floodprone Width (ft)	24.0	24.0	24.0	24.0	24.0	24.0	-	-
Bankfull Mean Depth (ft)	0.7	0.8	0.8	0.8	0.8	0.5	-	-
Bankfull Max Depth (ft)	1.5	1.4	1.6	1.6	1.6	1.6	-	-
Bankfull Cross-Sectional Area (ft^2)	4.5	4.5	4.5	4.5	4.5	4.5	-	-
Width/Depth Ratio	8.4	6.7	7.0	6.9	7.2	20.3	-	-
Entrenchment Ratio	3.9	4.4	4.3	4.3	4.2	2.5	-	-
Bank Height Ratio	1.0	1.0	0.9	0.9	0.9	0.9	-	-
Low Top of Bank Depth (ft)	1.5	1.4	1.5	1.5	1.4	1.5		

Left Descending Bank

Right Descending Bank

Project Name: Shadrick Creek **XS Number:** 2 **Station:** 16+29

Reach Name: UT1 **XS Type:** Riffle



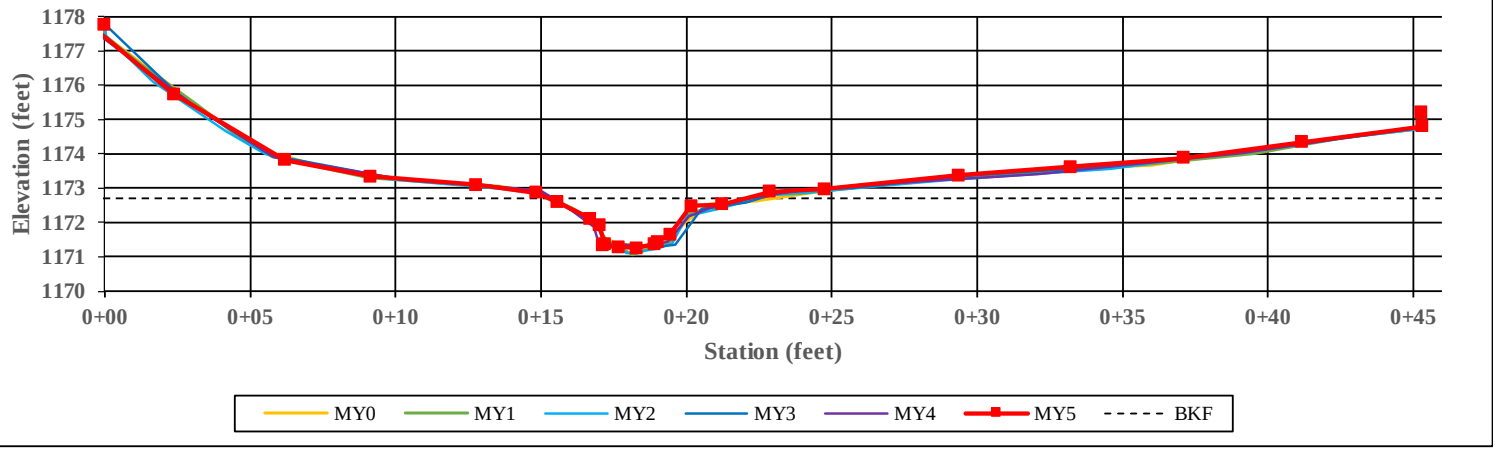
CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	5.3	6.3	5.4	6.6	5.2	5.7	-	-
Floodprone Width (ft)	24.0	24.0	24.0	24.0	24.0	24.0	-	-
Bankfull Mean Depth (ft)	0.8	0.7	0.8	0.6	0.8	0.8	-	-
Bankfull Max Depth (ft)	1.1	1.1	1.3	1.2	1.3	1.3	-	-
Bankfull Cross-Sectional Area (ft^2)	4.3	4.3	4.3	4.3	4.3	4.3	-	-
Width/Depth Ratio	6.6	9.3	6.9	10.3	6.3	7.4	-	-
Entrenchment Ratio	4.5	3.8	4.4	3.6	4.6	4.2	-	-
Bank Height Ratio	1.0	1.0	1.0	1.1	0.9	1.0	-	-
Low Top of Bank Depth (ft)	1.0	1.1	1.3	1.3	1.1	1.2	-	-

Left Descending Bank

Right Descending Bank

Project Name: Shadrick Creek **XS Number:** 3 **Station:** 21+68

Reach Name: UT1 **XS Type:** Riffle



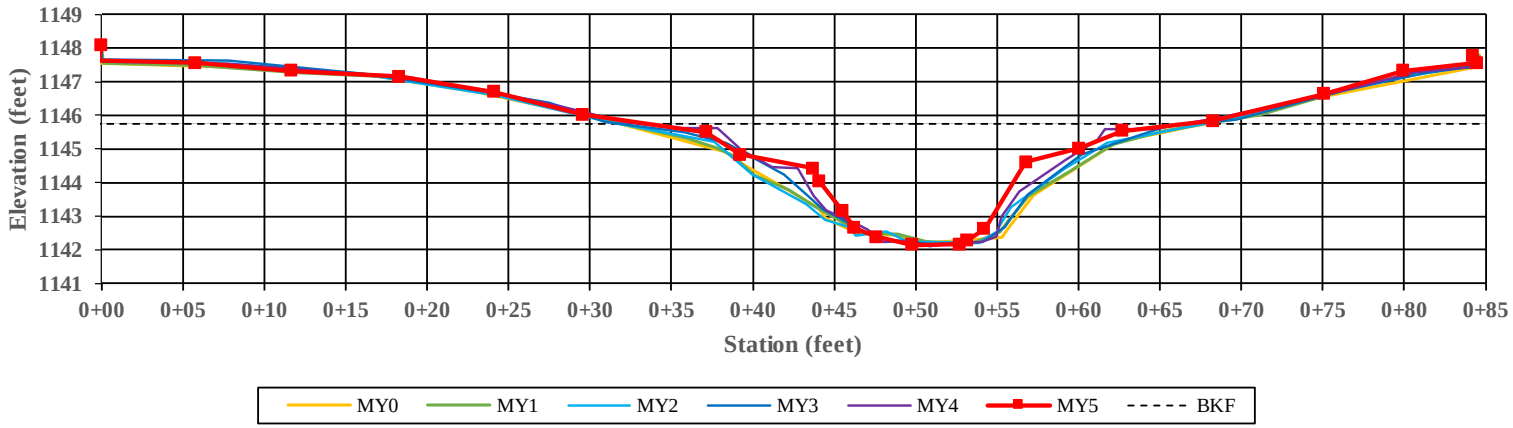
CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	4.7	5.0	5.0	4.5	5.1	3.5	-	-
Floodprone Width (ft)	24.0	24.0	24.0	24.0	24.0	24.0	-	-
Bankfull Mean Depth (ft)	0.8	0.8	0.8	0.9	0.8	1.1	-	-
Bankfull Max Depth (ft)	1.3	1.4	1.4	1.2	1.2	1.4	-	-
Bankfull Cross-Sectional Area (ft^2)	3.9	3.9	3.9	3.9	3.9	3.9	-	-
Width/Depth Ratio	5.6	6.5	6.5	5.3	6.5	3.1	-	-
Entrenchment Ratio	5.2	4.8	4.8	5.3	4.7	6.9	-	-
Bank Height Ratio	1.0	1.0	1.0	0.9	0.9	0.9	-	-
Low Top of Bank Depth (ft)	1.3	1.4	1.3	1.1	1.1	1.3	-	-

Left Descending Bank

Right Descending Bank

Project Name: Shadrick Creek **XS Number:** 4 **Station:** 26+02

Reach Name: Shadrick Reach 1 **XS Type:** Riffle



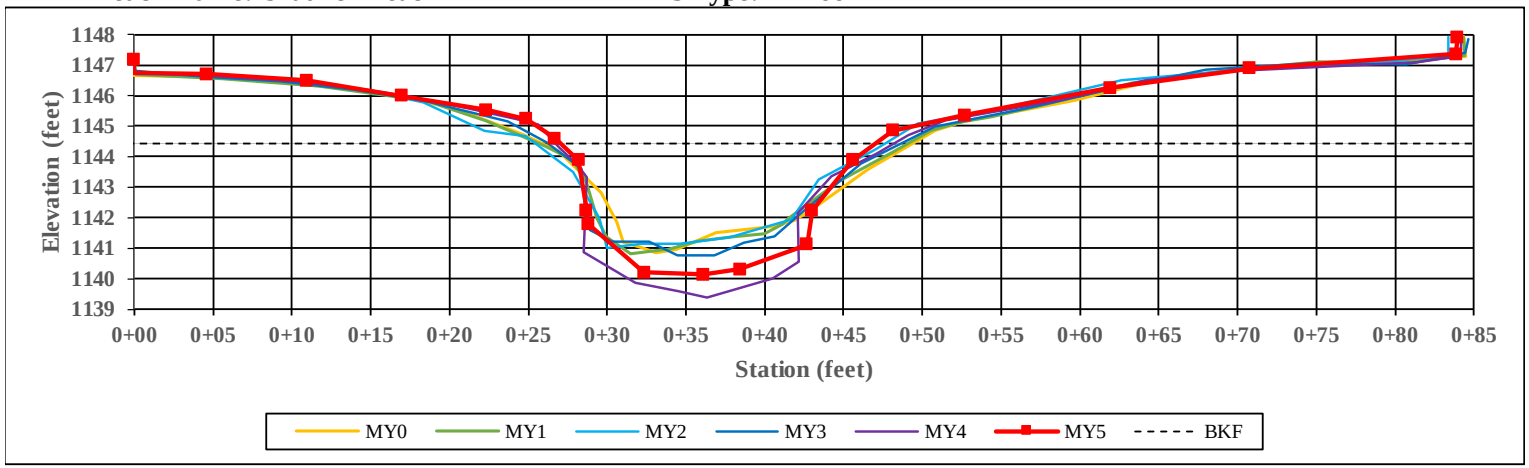
CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	24.1	25.9	24.1	21.9	21.9	20.8	-	-
Floodprone Width (ft)	100.0	100.0	100.0	100.0	100.0	100.0	-	-
Bankfull Mean Depth (ft)	2.0	1.8	1.9	2.1	2.1	2.3	-	-
Bankfull Max Depth (ft)	3.0	3.1	3.1	3.2	3.4	3.6	-	-
Bankfull Cross-Sectional Area (ft^2)	47.0	47.0	47.0	47.0	47.0	47.0	-	-
Width/Depth Ratio	12.3	14.2	12.4	10.2	10.2	9.2	-	-
Entrenchment Ratio	4.2	3.9	4.1	4.6	4.6	4.8	-	-
Bank Height Ratio	1.1	1.1	1.1	1.0	1.0	0.9	-	-
Low Top of Bank Depth (ft)	3.3	3.4	3.3	3.3	3.5	3.4	-	-

Left Descending Bank

Right Descending Bank

Project Name: Shadrick Creek **XS Number:** 5 **Station:** 26+87

Reach Name: Shadrick Reach 1 **XS Type:** Pool



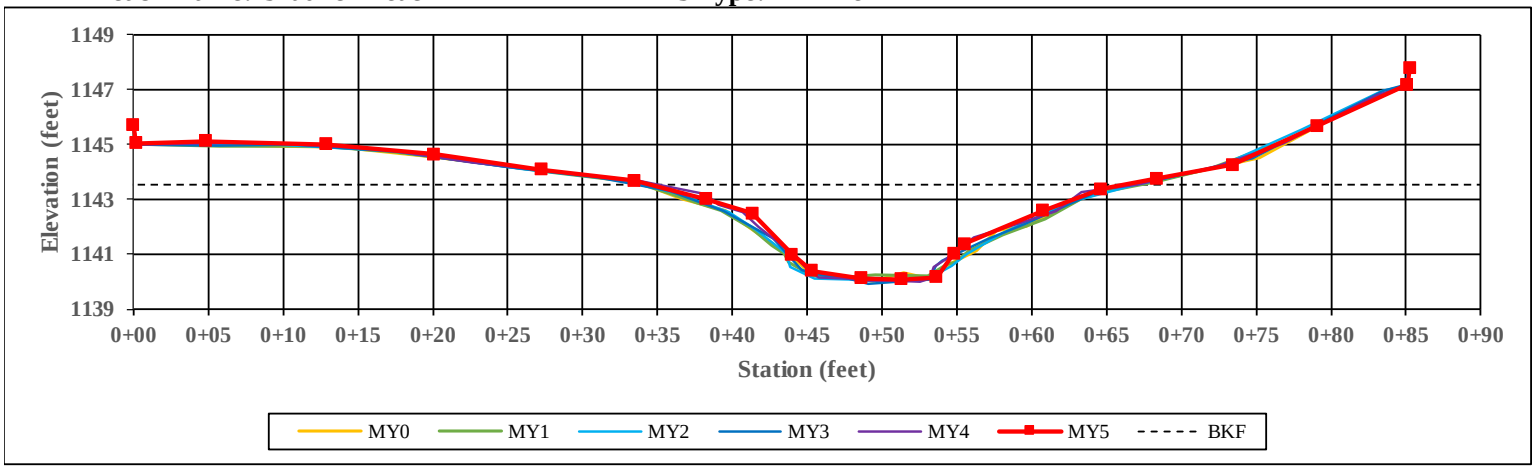
CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	26.2	24.4	24.7	19.9	18.7	18.5	-	-
Floodprone Width (ft)	100.0	100.0	100.0	100.0	100.0	100.0	-	-
Bankfull Mean Depth (ft)	2.3	2.4	2.4	3.0	3.2	3.2	-	-
Bankfull Max Depth (ft)	4.0	4.0	4.0	4.1	4.6	4.3	-	-
Bankfull Cross-Sectional Area (ft^2)	59.5	59.5	59.5	59.5	59.5	59.5	-	-
Width/Depth Ratio	11.5	10.0	10.3	6.7	5.9	5.8	-	-
Entrenchment Ratio	3.8	4.1	4.0	5.0	5.4	5.4	-	-
Bank Height Ratio	1.0	1.1	1.0	1.1	1.2	1.1	-	-
Low Top of Bank Depth (ft)	-	4.3	4.1	4.3	5.8	4.7	-	-

Left Descending Bank

Right Descending Bank

Project Name: Shadrick Creek **XS Number:** 6 **Station:** 30+44

Reach Name: Shadrick Reach 1 **XS Type:** Riffle



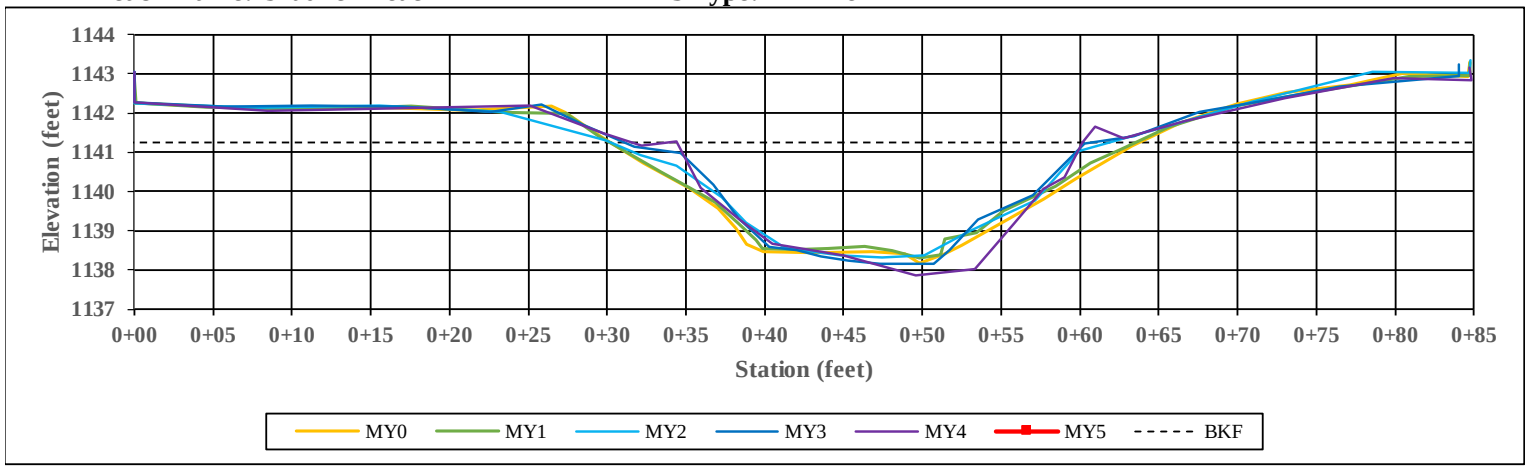
CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	27.4	27.4	26.4	22.9	22.5	22.4	-	-
Floodprone Width (ft)	100.0	100.0	100.0	100.0	100.0	100.0	-	-
Bankfull Mean Depth (ft)	1.9	1.9	2.0	2.3	2.3	2.3	-	-
Bankfull Max Depth (ft)	3.2	3.1	3.2	3.4	3.4	3.4	-	-
Bankfull Cross-Sectional Area (ft^2)	52.0	52.0	52.0	52.0	52.0	52.0	-	-
Width/Depth Ratio	14.5	14.5	13.4	10.1	9.8	9.7	-	-
Entrenchment Ratio	3.6	3.6	3.8	4.4	4.4	4.5	-	-
Bank Height Ratio	1.0	1.0	1.0	1.0	0.8	1.0	-	-
Low Top of Bank Depth (ft)	-	3.1	3.2	3.5	2.8	3.3	-	-

Left Descending Bank

Right Descending Bank

Project Name: Shadrick Creek **XS Number:** 7 **Station:** 34+64

Reach Name: Shadrick Reach 1 **XS Type:** Riffle



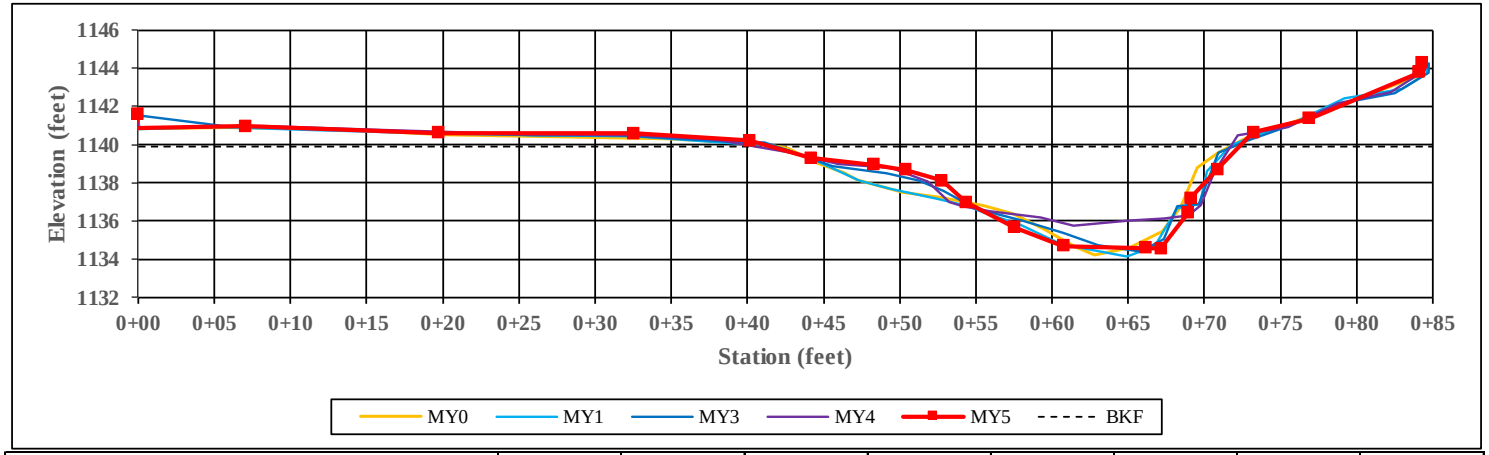
CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	*MY5	MY6	MY7
Bankful Width (ft)	31.0	29.3	30.0	28.6	26.0	-	-	-
Floodprone Width (ft)	100.0	100.0	100.0	100.0	100.0	-	-	-
Bankfull Mean Depth (ft)	1.9	2.0	2.0	2.1	2.3	-	-	-
Bankfull Max Depth (ft)	3.0	3.0	3.1	3.2	3.4	-	-	-
Bankfull Cross-Sectional Area (ft^2)	59.3	59.3	59.3	59.3	59.3	-	-	-
Width/Depth Ratio	16.2	14.5	15.2	13.8	11.4	-	-	-
Entrenchment Ratio	3.2	3.4	3.3	3.5	3.9	-	-	-
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	-	-	-
Low Top of Bank Depth (ft)	3.0	3.1	3.0	3.2	3.4	-	-	-

Right Descending Bank

*** Cross section not surveyed due to beaver impoundment**

Project Name: Shadrick Creek **XS Number:** 8 **Station:** 37+68

Reach Name: Shadrick Reach 1 **XS Type:** Pool



CHANNEL DIMENSIONS SUMMARY	MY0	MY1	*MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	28.3	27.1	-	28.2	27.7	26.7	-	-
Floodprone Width (ft)	100.0	100.0	-	100.0	100.0	100.0	-	-
Bankfull Mean Depth (ft)	3.0	3.1	-	3.0	3.0	3.2	-	-
Bankfull Max Depth (ft)	5.6	5.5	-	5.5	4.5	5.3	-	-
Bankfull Cross-Sectional Area (ft^2)	84.3	84.3	-	84.3	84.3	84.3	-	-
Width/Depth Ratio	9.5	8.7	-	9.4	9.1	8.4	-	-
Entrenchment Ratio	3.5	3.7	-	3.5	3.6	3.7	-	-
Bank Height Ratio	1.0	1.1	-	1.0	0.8	1.1	-	-
Low Top of Bank Depth (ft)	5.8	5.9	-	5.7	3.8	5.7	-	-

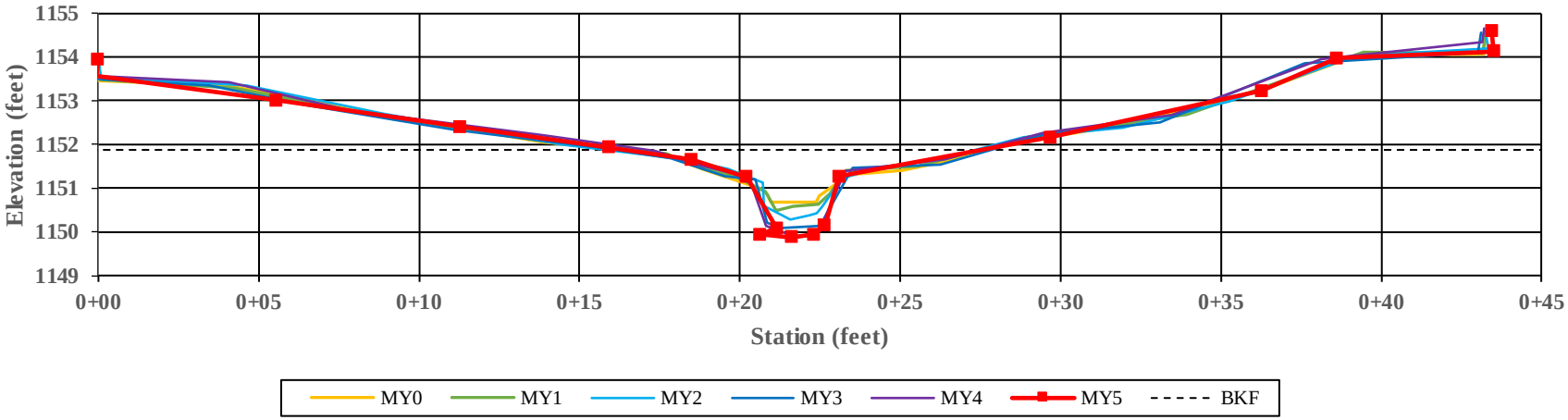
Left Descending Bank

Right Descending Bank

*** Cross section not surveyed due to beaver impoundment**

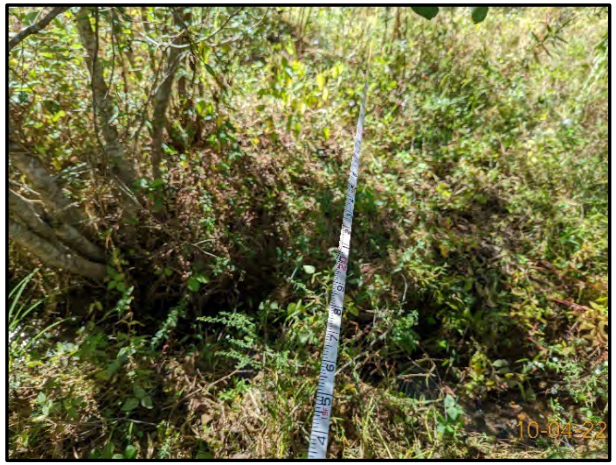
Project Name: Shadrick Creek **XS Number:** 9 **Station:** 16+53

Reach Name: UT9 Reach 1 **XS Type:** Riffle



CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	8.7	7.8	8.0	6.7	4.5	4.2	-	-
Floodprone Width (ft)	24.0	24.0	24.0	24.0	24.0	24.0	-	-
Bankfull Mean Depth (ft)	0.5	0.6	0.6	0.7	1.1	1.2	-	-
Bankfull Max Depth (ft)	1.1	1.3	1.5	1.6	1.8	2.0	-	-
Bankfull Cross-Sectional Area (ft^2)	4.8	4.8	4.8	4.8	4.8	4.8	-	-
Width/Depth Ratio	15.8	12.7	13.4	9.3	4.2	3.6	-	-
Entrenchment Ratio	2.8	3.1	3.0	3.6	5.4	5.8	-	-
Bank Height Ratio	1.0	1.0	1.0	1.0	0.9	0.9	-	-
Low Top of Bank Depth (ft)	1.1	1.3	1.5	1.6	1.6	1.8	-	-

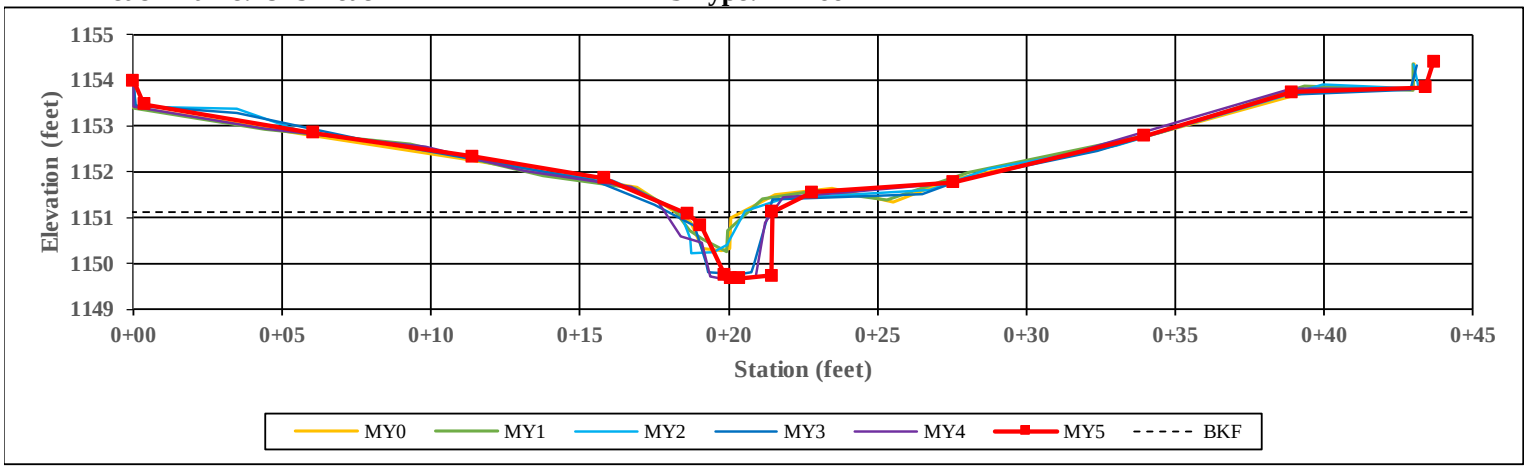
Left Descending Bank



Right Descending Bank

Project Name: Shadrick Creek **XS Number:** 10 **Station:** 16+68

Reach Name: UT9 Reach 1 **XS Type:** Pool



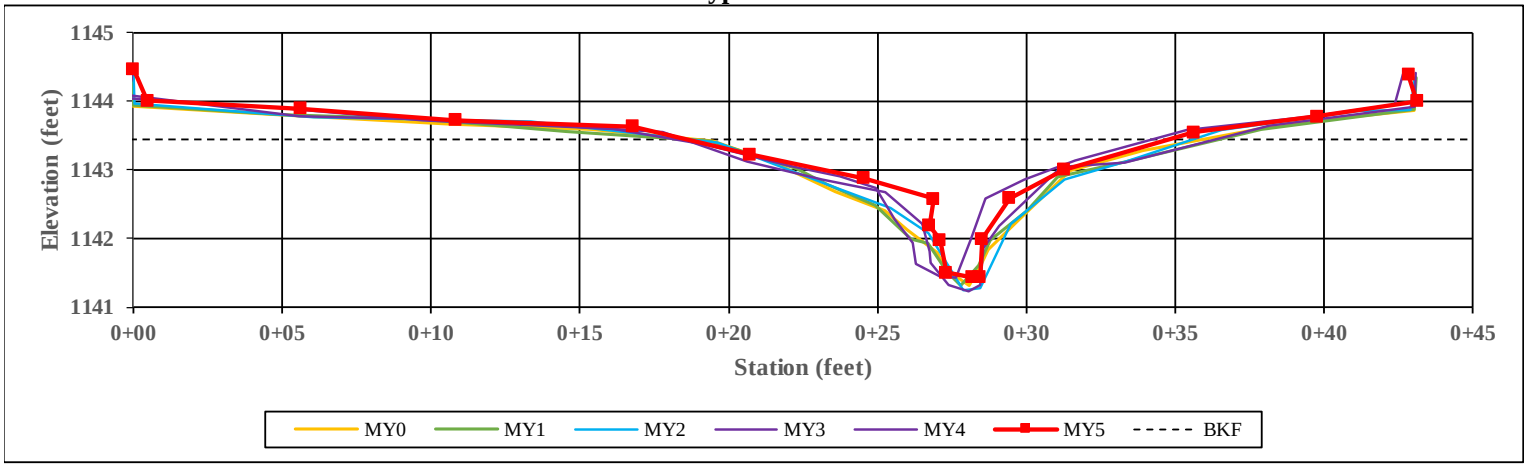
CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	6.5	6.1	4.7	3.3	2.8	2.8	-	-
Floodprone Width (ft)	24.0	24.0	24.0	24.0	24.0	24.0	-	-
Bankfull Mean Depth (ft)	0.5	0.5	0.6	0.9	1.1	1.1	-	-
Bankfull Max Depth (ft)	1.3	1.4	1.3	1.5	1.4	1.4	-	-
Bankfull Cross-Sectional Area (ft^2)	3.0	3.0	3.0	3.0	3.0	3.0	-	-
Width/Depth Ratio	14.3	12.1	7.3	3.6	2.7	2.7	-	-
Entrenchment Ratio	3.7	4.0	5.1	7.3	8.4	8.5	-	-
Bank Height Ratio	1.0	1.0	0.9	1.1	1.2	1.0	-	-
Low Top of Bank Depth (ft)	1.3	1.3	1.2	1.6	1.7	1.5	-	-

Left Descending Bank

Right Descending Bank

Project Name: Shadrick Creek **XS Number:** 11 **Station:** 21+34

Reach Name: UT9 Reach 2 **XS Type:** Pool



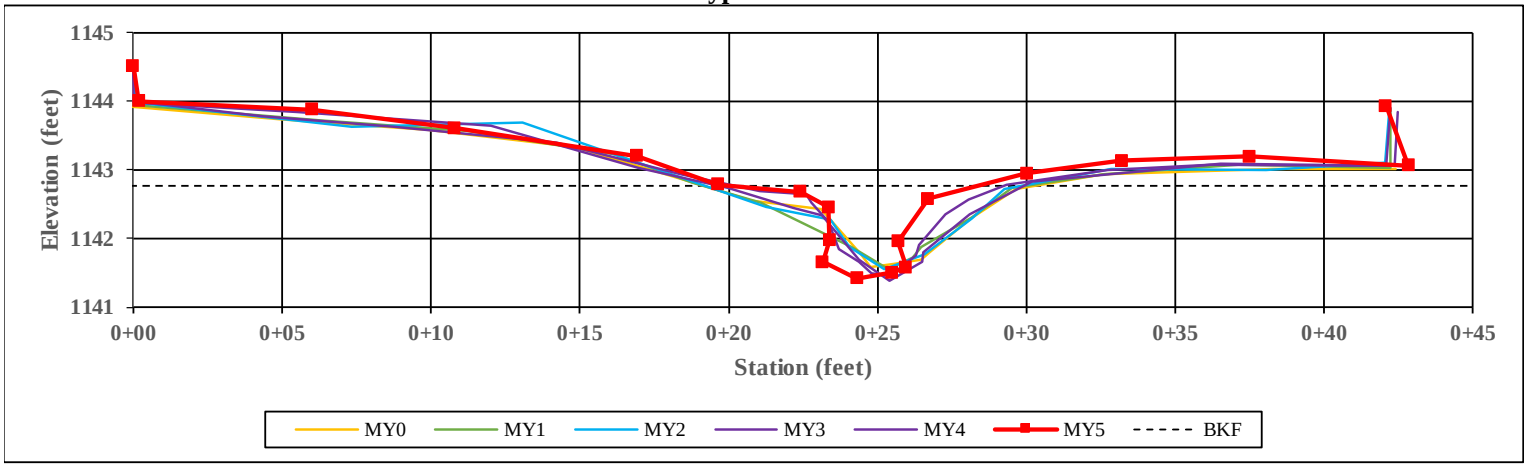
CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	6.4	7.8	7.8	7.9	5.0	4.9	-	-
Floodprone Width (ft)	24.0	24.0	24.0	24.0	24.0	24.0	-	-
Bankfull Mean Depth (ft)	0.9	0.7	0.7	0.7	1.2	1.2	-	-
Bankfull Max Depth (ft)	1.7	1.6	1.7	1.8	1.9	2.0	-	-
Bankfull Cross-Sectional Area (ft^2)	5.8	5.8	5.8	5.8	5.8	5.8	-	-
Width/Depth Ratio	7.0	10.4	10.4	10.9	4.3	4.1	-	-
Entrenchment Ratio	3.8	3.1	3.1	3.0	4.8	4.9	-	-
Bank Height Ratio	1.0	1.0	1.0	0.9	0.8	0.8	-	-
Low Top of Bank Depth (ft)	-	1.6	1.6	1.6	1.4	1.6	-	-

Left Descending Bank

Right Descending Bank

Project Name: Shadrick Creek **XS Number:** 12 **Station:** 21+49

Reach Name: UT9 Reach 2 **XS Type:** Riffle



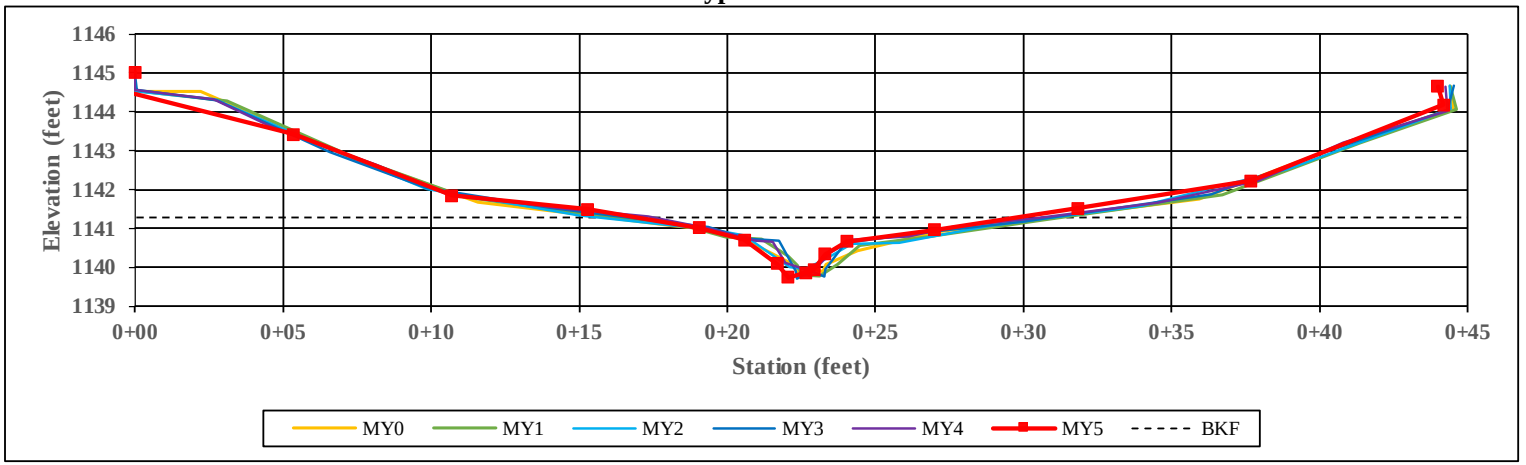
CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	7.3	7.1	6.9	5.9	4.5	3.3	-	-
Floodprone Width (ft)	24.0	24.0	24.0	24.0	24.0	24.0	-	-
Bankfull Mean Depth (ft)	0.5	0.5	0.5	0.6	0.8	1.1	-	-
Bankfull Max Depth (ft)	1.0	1.0	1.0	1.1	1.2	1.4	-	-
Bankfull Cross-Sectional Area (ft^2)	3.6	3.6	3.6	3.6	3.6	3.6	-	-
Width/Depth Ratio	15.2	13.7	13.1	9.8	5.7	3.1	-	-
Entrenchment Ratio	3.3	3.4	3.5	4.1	5.3	7.2	-	-
Bank Height Ratio	1.0	1.0	0.9	0.9	0.9	0.9	-	-
Low Top of Bank Depth (ft)	-	1.0	0.9	1.1	1.1	1.3	-	-

Left Descending Bank

Right Descending Bank

Project Name: Shadrick Creek **XS Number:** 13 **Station:** 13+00

Reach Name: UT10 **XS Type:** Riffle



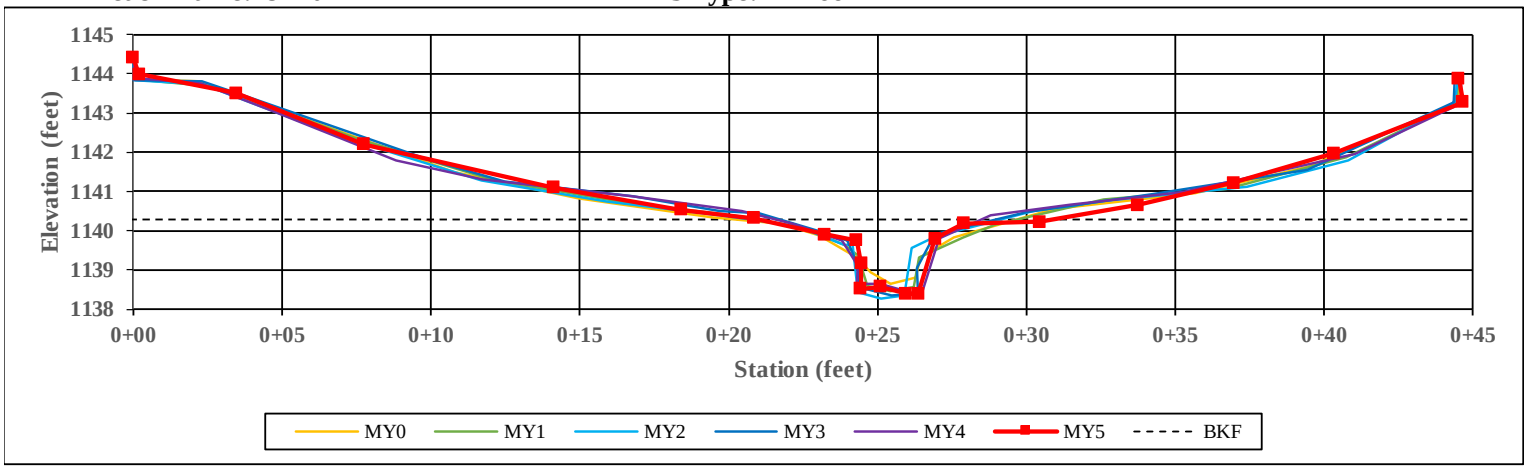
CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	6.3	6.7	6.2	7.4	6.7	2.3	-	-
Floodprone Width (ft)	24.0	24.0	24.0	24.0	24.0	24.0	-	-
Bankfull Mean Depth (ft)	0.5	0.5	0.6	0.5	0.5	1.2	-	-
Bankfull Max Depth (ft)	1.1	1.2	1.1	1.3	1.1	1.5	-	-
Bankfull Cross-Sectional Area (ft^2)	3.4	3.4	3.4	3.4	3.4	2.7	-	-
Width/Depth Ratio	11.8	13.4	11.2	16.0	13.0	2.0	-	-
Entrenchment Ratio	3.8	3.6	3.9	3.3	3.6	10.3	-	-
Bank Height Ratio	1.0	0.9	0.9	1.0	0.9	0.6	-	-
Low Top of Bank Depth (ft)	1.1	1.0	1.0	1.3	1.0	1.0	-	-

Left Descending Bank

Right Descending Bank

Project Name: Shadrick Creek **XS Number:** 14 **Station:** 13+13

Reach Name: UT10 **XS Type:** Pool



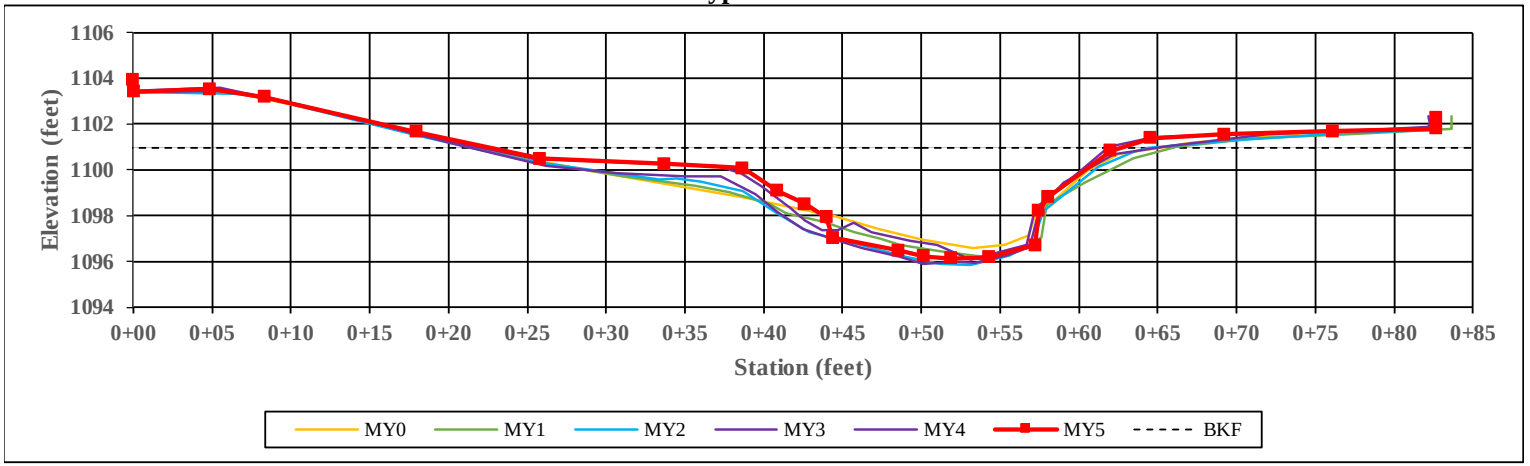
CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	5.8	6.4	6.5	3.9	4.8	3.7	-	-
Floodprone Width (ft)	24.0	24.0	24.0	24.0	24.0	24.0	-	-
Bankfull Mean Depth (ft)	0.8	0.8	0.7	1.2	1.0	1.3	-	-
Bankfull Max Depth (ft)	1.6	1.7	1.9	1.9	1.8	1.9	-	-
Bankfull Cross-Sectional Area (ft^2)	4.8	4.8	4.8	4.8	4.8	4.8	-	-
Width/Depth Ratio	7.0	8.4	8.8	3.2	4.9	2.9	-	-
Entrenchment Ratio	4.1	3.8	3.7	6.2	5.0	6.5	-	-
Bank Height Ratio	1.2	0.9	1.0	1.1	1.0	1.0	-	-
Low Top of Bank Depth (ft)	1.9	1.6	1.9	2.1	1.8	1.8	-	-

Left Descending Bank

Right Descending Bank

Project Name: Shadrick Creek **XS Number:** 15 **Station:** 103+19

Reach Name: Shadrick Reach 2 **XS Type:** Pool



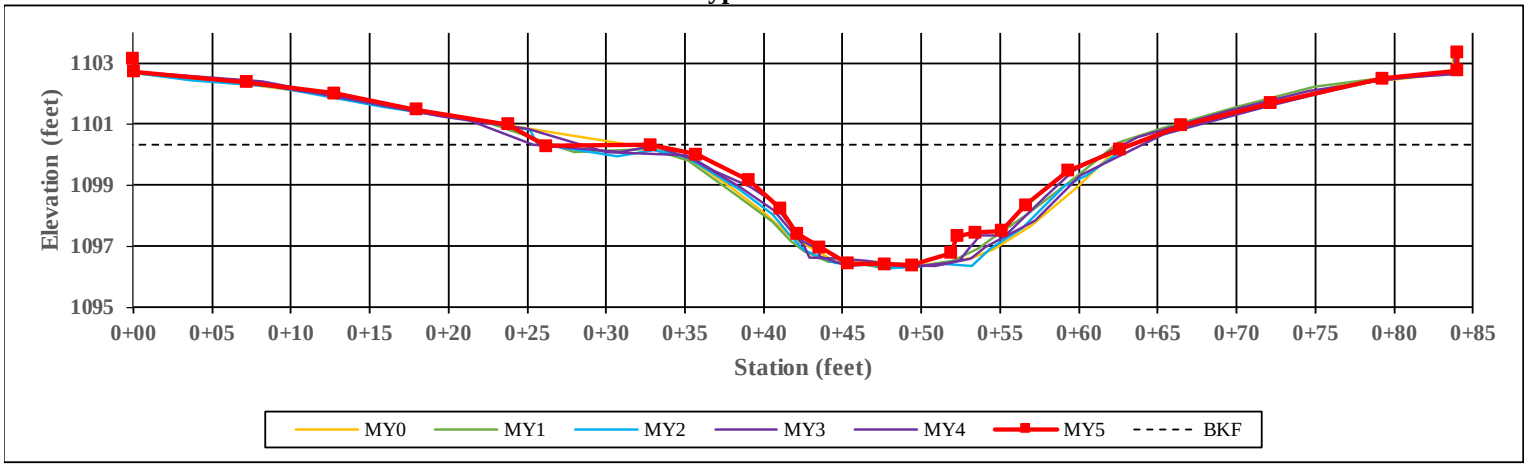
CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	33.5	36.0	35.9	32.9	34.8	32.2	-	-
Floodprone Width (ft)	116.0	116.0	116.0	116.0	116.0	116.0	-	-
Bankfull Mean Depth (ft)	2.4	2.2	2.2	2.4	2.3	2.5	-	-
Bankfull Max Depth (ft)	4.2	4.3	4.5	4.6	4.9	4.8	-	-
Bankfull Cross-Sectional Area (ft^2)	80.4	80.4	80.4	80.4	80.4	80.4	-	-
Width/Depth Ratio	13.9	16.1	16.0	13.5	15.1	12.9	-	-
Entrenchment Ratio	3.5	3.2	3.2	3.5	3.3	3.6	-	-
Bank Height Ratio	1.0	1.0	1.1	1.0	0.8	1.0	-	-
Low Top of Bank Depth (ft)	-	4.3	4.9	4.8	4.1	4.7	-	-

Left Descending Bank

Right Descending Bank

Project Name: Shadrick Creek **XS Number:** 16 **Station:** 104+67

Reach Name: Shadrick Reach 2 **XS Type:** Riffle



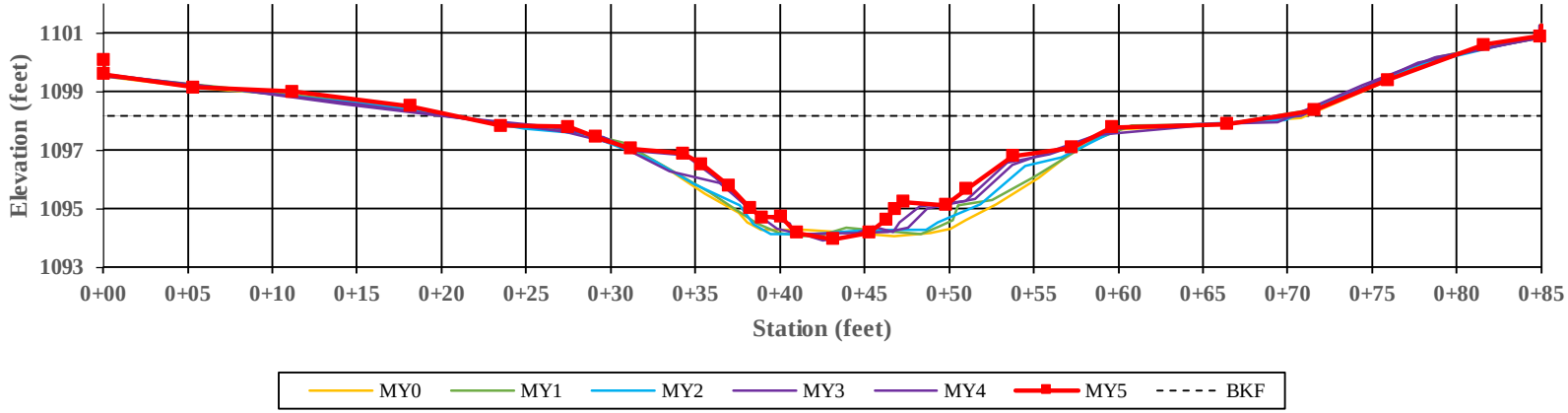
CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	29.7	27.1	29.7	25.0	26.6	26.9	-	-
Floodprone Width (ft)	116.0	116.0	116.0	116.0	116.0	116.0	-	-
Bankfull Mean Depth (ft)	2.4	2.6	2.4	2.9	2.7	2.7	-	-
Bankfull Max Depth (ft)	3.9	4.0	4.0	4.0	4.2	4.3	-	-
Bankfull Cross-Sectional Area (ft^2)	71.7	71.7	71.7	71.7	71.7	71.7	-	-
Width/Depth Ratio	12.3	10.2	12.3	8.7	9.9	10.1	-	-
Entrenchment Ratio	3.9	4.3	3.9	4.6	4.4	4.3	-	-
Bank Height Ratio	1.0	1.0	1.0	0.9	0.9	0.9	-	-
Low Top of Bank Depth (ft)	-	3.9	4.0	3.7	4.0	3.9	-	-

Left Descending Bank

Right Descending Bank

Project Name: Shadrick Creek **XS Number:** 17 **Station:** 109+18

Reach Name: Shadrick Reach 3 **XS Type:** Riffle



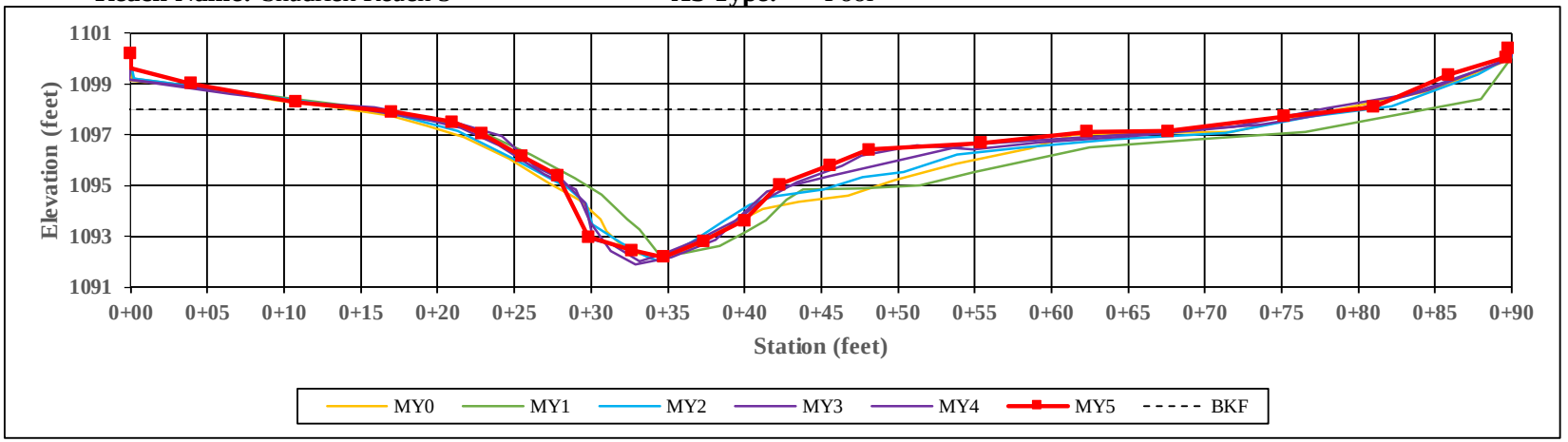
CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	30.0	30.2	31.7	36.2	28.2	28.1	-	-
Floodprone Width (ft)	116.0	116.0	116.0	116.0	116.0	116.0	-	-
Bankfull Mean Depth (ft)	2.3	2.3	2.2	1.9	2.4	2.4	-	-
Bankfull Max Depth (ft)	3.5	3.6	3.6	3.7	4.1	4.2	-	-
Bankfull Cross-Sectional Area (ft^2)	68.6	68.6	68.6	68.6	68.6	68.6	-	-
Width/Depth Ratio	13.1	13.3	14.7	19.1	11.6	11.5	-	-
Entrenchment Ratio	3.9	3.8	3.7	3.2	4.1	4.1	-	-
Bank Height Ratio	1.0	1.0	1.0	1.0	0.8	0.9	-	-
Low Top of Bank Depth (ft)	-	3.5	3.6	3.6	3.5	3.8	-	-

Left Descending Bank

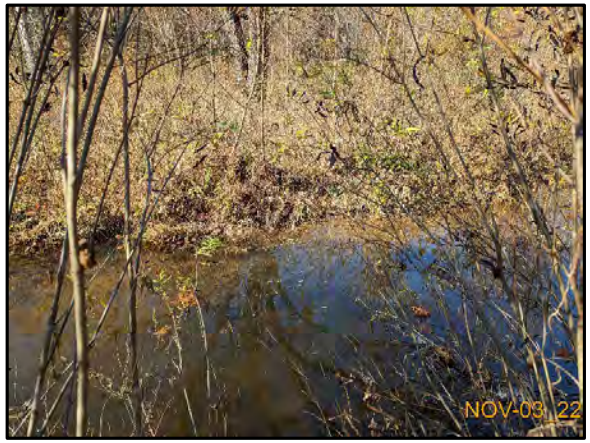
Right Descending Bank

Project Name: Shadrick Creek **XS Number:** 18 **Station:** 111+27

Reach Name: Shadrick Reach 3 **XS Type:** Pool



CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	39.6	46.4	46.3	42.9	21.0	22.6	-	-
Floodprone Width (ft)	116.0	116.0	116.0	116.0	116.0	116.0	-	-
Bankfull Mean Depth (ft)	2.2	1.9	1.9	2.1	4.2	3.9	-	-
Bankfull Max Depth (ft)	4.7	4.6	5.1	5.4	6.5	5.8	-	-
Bankfull Cross-Sectional Area (ft^2)	88.1	88.1	88.1	88.1	88.1	88.1	-	-
Width/Depth Ratio	17.8	24.4	24.3	20.9	5.0	5.8	-	-
Entrenchment Ratio	2.9	2.5	2.5	2.7	5.5	5.1	-	-
Bank Height Ratio	1.0	1.0	1.1	1.0	0.7	0.8	-	-
Low Top of Bank Depth (ft)	4.7	4.5	5.7	5.4	4.6	4.5	-	-

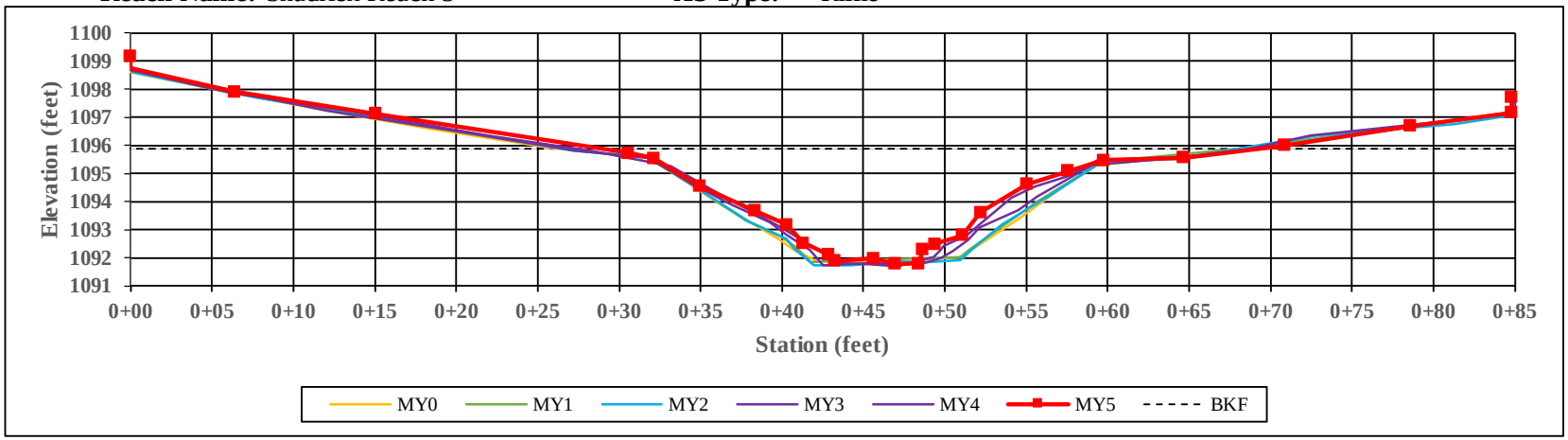


Left Descending Bank

Downstream

Project Name: Shadrick Creek **XS Number:** 19 **Station:** 114+53

Reach Name: Shadrick Reach 3 **XS Type:** Riffle



CHANNEL DIMENSIONS SUMMARY	MY0	MY1	MY2	MY3	MY4	MY5	MY6	MY7
Bankful Width (ft)	25.2	21.1	21.6	28.3	24.4	22.6	-	-
Floodprone Width (ft)	116.0	116.0	116.0	116.0	116.0	116.0	-	-
Bankfull Mean Depth (ft)	2.4	2.8	2.8	2.2	2.5	2.7	-	-
Bankfull Max Depth (ft)	3.5	3.6	3.7	3.8	4.0	4.1	-	-
Bankfull Cross-Sectional Area (ft^2)	61.0	60.1	60.1	61.0	61.0	61.0	-	-
Width/Depth Ratio	10.4	7.4	7.7	13.1	9.7	8.4	-	-
Entrenchment Ratio	4.6	5.5	5.4	4.1	4.8	5.1	-	-
Bank Height Ratio	1.0	1.0	1.0	1.0	0.9	0.9	-	-
Low Top of Bank Depth (ft)	-	3.6	3.7	3.8	3.5	3.7	-	-

Left Descending Bank

Right Descending Bank

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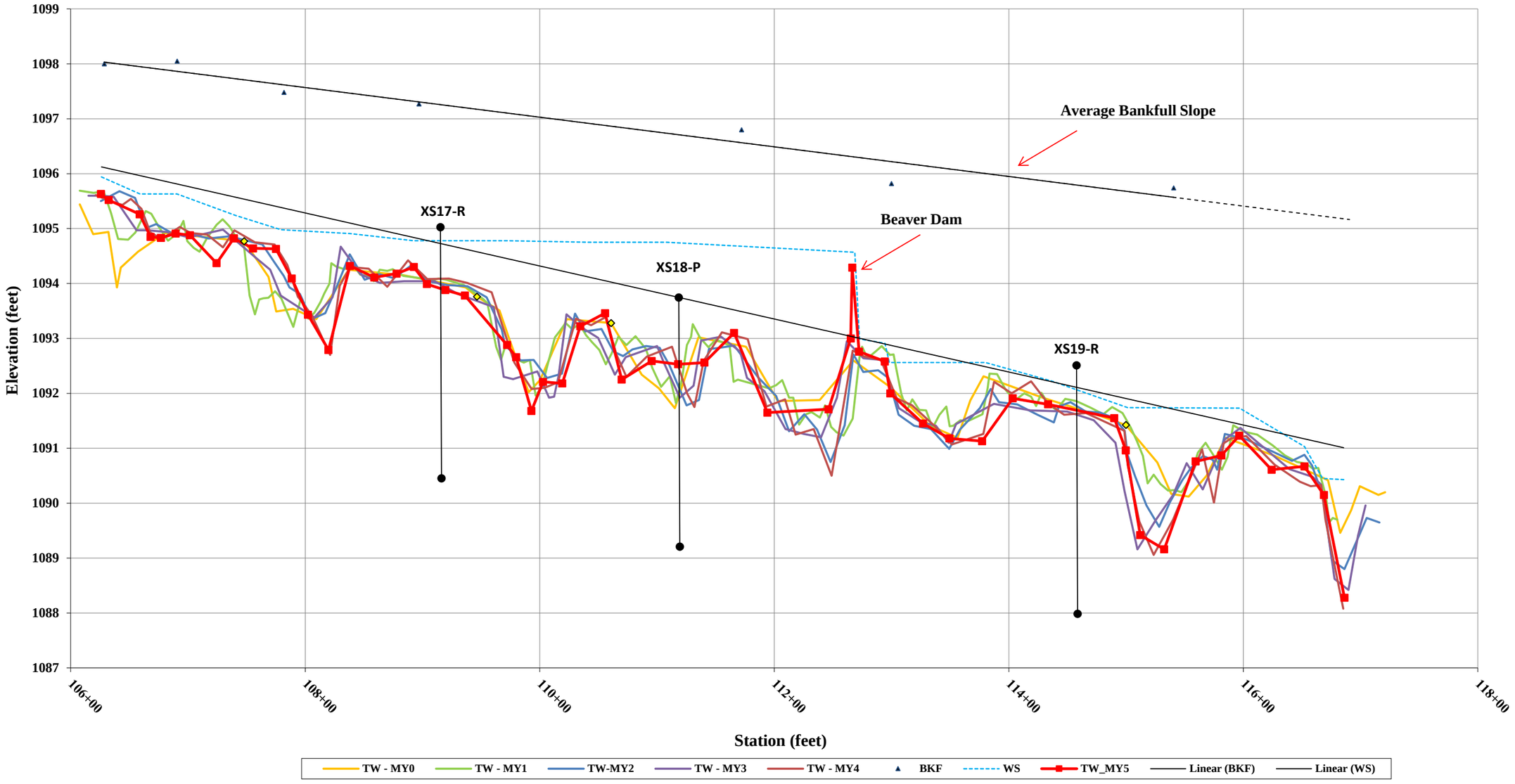
Shadrick Creek - Shadrick Reach 3
Longitudinal Profile
Staioning 106+23 to 117+27



Shadrick Creek - UT9
Longitudinal Profile
Stationing 19+59 to 22+08

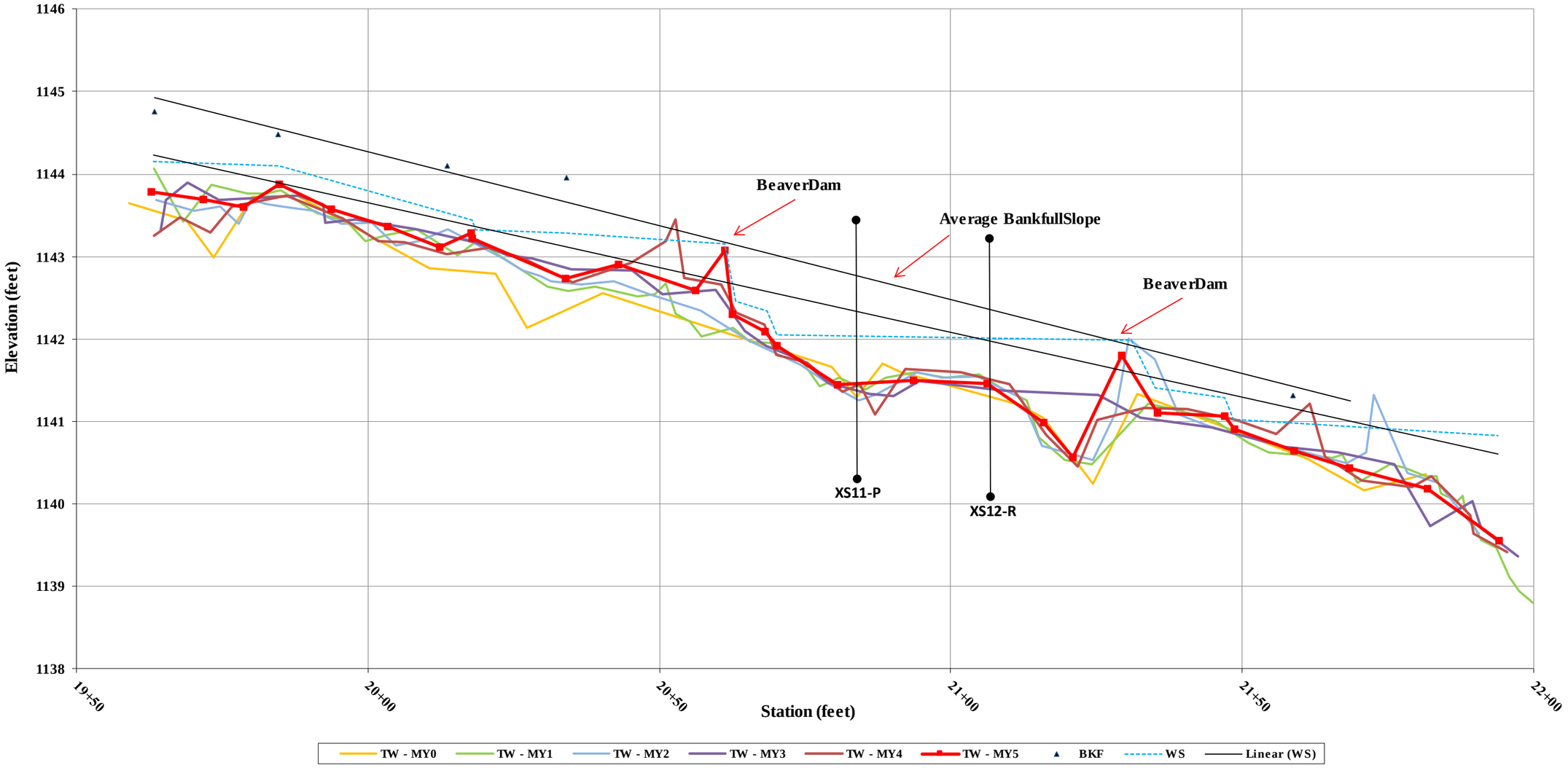


Table 10. Baseline Stream Data Summary
Shadrick Creek - Shadrick Creek Reach 1 (3,631 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			As-Built / Baseline					
Dimension & Substrate - Riffle	**LL**	**UL**	**Eq.**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**
Bankfull Width (ft)	-	-	-	21.0	-	22.0	23.0	-	-	-	-	19	-	-	-	-	27.0	-	26.6	29.3	28.7	32.7	3.1	3
Floodprone Width (ft)				68.0	-	74.0	80.0	-	-	-	-	32.0	-	-	-	-	100.0	-	100.0	100.0	100.0	100.0	0.0	3
Bankfull Mean Depth (ft)				2.4	-	2.6	2.8	-	-	-	-	1.8	-	-	-	-	2.2	-	1.8	1.8	1.8	1.8	0.0	3
Bankfull Max Depth (ft)				3.6	-	3.6	3.7	-	-	-	-	2.1	-	-	-	-	3.0	-	3.0	3.1	3.0	3.2	0.1	3
Bankfull Cross Sectional Area (ft^2)		-		51.4	-	57.5	63.5	-	-	-	-	34.5	-	-	-	-	58.4	-	47.0	52.8	52.0	59.3	6.2	3
Width/Depth Ratio				6.9	-	8.6	10.3	-	-	-	-	10.4	-	-	-	-	12.4	-	15.0	16.3	15.8	18.0	1.5	3
Entrenchment Ratio				3.0	-	3.4	3.8	-	-	-	-	1.7	-	-	-	-	3.7	-	3.1	3.4	3.5	3.8	0.4	3
Bank Height Ratio				1.3	-	1.3	1.4	-	-	-	-	-	-	-	-	-	-	-	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)				23.0	-	25.0	40.0	-	-	-	-	40.0	-	-	-	23.0	25.0	40.0	21.0	35.0	28.0	56.0	18.5	3
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Riffle Slope (ft/ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pool Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pool Max Depth (ft)				3.9	-	4.4	4.8	-	-	-	-	3.9	-	-	-	-	5.0	-	-	-	-	-	-	-
Pool Spacing (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pattern																								
Channel Belt Width (ft)				66.0	-	70.0	162.0	-	-	-	-	65.0	-	-	-	66.0	70.0	162.0	-	-	-	-	-	-
Radius of Curvature (ft)				34.0	-	61.0	149.0	-	-	-	-	60.0	-	-	-	34.0	61.0	149.0	-	-	-	-	-	-
Rc: Bankfull Width (ft/ft)				1.6	-	2.8	6.5	-	-	-	-	3.2	-	-	-	1.6	2.8	6.5	-	-	-	-	-	-
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Meander Width Ratio				3.1	-	3.2	7.0	-	-	-	-	3.4	-	-	-	3.1	3.2	7.0	-	-	-	-	-	-
Substrate, Bed and Transport Parameters																								
Reach Shear Stress (Competency) lb/ft^2				0.75						-						-			-					
Max Part Size (mm) Mobilized at Bankfull				120.0						-						-			-					
Stream Power (Transport Capacity) W/m^2				-												-			-					
Additional Reach Parameters																								
Drainage Area (mi^2)				2.8						2.5						2.8								
Rosgen Classification				E4						E4						C4			C4					
Bankfull Velocity (fps)		-		4.8						3.7						3.9								
Bankfull Discharge (cfs)		-		273.0						127.0						230.0								
Valley Length (ft)				-						-						-			3,268					
Channel Thalweg Length (ft)				-						-						3,641			3,631					
Sinuosity				1.32						1.80						1.32			1.13					
Water Surface Slope (ft/ft)				0.0053						0.0089						0.0053								
Bankfull Slope (ft/ft)				-						-						-			-					
Bankfull Floodplain Area (acres)				-						-														
% of Reach with Eroding Banks				-						-														
Channel Stability or Habitat Metric				-						-														
Biological or Other				-						-														

- Information unavailable.

Non-Applicable.

Table 10 Cont'd. Baseline Stream Data Summary
Shadrick Creek - Shadrick Creek Reach 2 (573 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			As-Built / Baseline					
Dimension & Substrate - Riffle	**LL**	**UL**	**Eq.**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**
Bankfull Width (ft)	-	-	-	19.9	-	20.6	21.3	-	-	-	-	19.7	-	-	-	-	29.0	-	-	29.9	-	-	-	1
Floodprone Width (ft)				68.0	-	74.0	80.0	-	-	-	-	32.0	-	-	-	-	100.0	-	-	116.0	-	-	-	1
Bankfull Mean Depth (ft)	-	-	-	2.3	-	2.4	2.5	-	-	-	-	2.1	-	-	-	-	2.4	-	-	2.4	-	-	-	1
Bankfull Max Depth (ft)				3.4	-	3.7	4.0	-	-	-	-	3.2	-	-	-	-	3.4	-	-	3.9	-	-	-	1
Bankfull Cross Sectional Area (ft^2)		-		46.4	-	49.4	52.3	-	-	-	-	41.0	-	-	-	-	69.7	-	-	71.7	-	-	-	1
Width/Depth Ratio				8.5	-	8.6	8.6	-	-	-	-	9.5	-	-	-	-	12.1	-	-	12.5	-	-	-	1
Entrenchment Ratio				2.2	-	2.8	3.3	-	-	3.0	-	4.0	5.0	-	-	-	1.7	-	-	3.9	-	-	-	1
Bank Height Ratio				1.6	-	1.7	1.7	-	-	-	-	1.9	-	-	-	-	1.0	-	-	1.0	-	-	-	1
d50 (mm)				10.0	-	12.0	32.0	-	-	10.0	-	12.0	32.0	-	-	10.0	12.0	32.0						
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Riffle Slope (ft/ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pool Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pool Max Depth (ft)				-	-	5.1	-	-	-	-	-	-	-	-	-	-	5.5	-	-	-	-	-	-	-
Pool Spacing (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pattern																								
Channel Belt Width (ft)				60.0	-	80.0	100.0	-	-	60.0	-	80.0	100.0	-	-	90.0	116.0	160.0	-	-	-	-	-	-
Radius of Curvature (ft)				20.0	-	43.0	118.0	-	-	30.0	-	40.0	50.0	-	-	30.0	60.0	75.0	-	-	-	-	-	-
Rc: Bankfull Width (ft/ft)				1.00	-	21.00	5.50	-	-	1.50		2.00	2.50	-	-	1.10	2.10	2.60	-	-	-	-	-	-
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Meander Width Ratio				3.0	-	3.9	4.7	-	-	3.1	-	4.1	5.1	-	-	3.1	4.0	5.5	-	-	-	-	-	-
Substrate, Bed and Transport Parameters																								
Reach Shear Stress (Competency) lb/ft^2				0.84						-						-			-					
Max Part Size (mm) Mobilized at Bankfull				130.0						-						-			-					
Stream Power (Transport Capacity) W/m^2				-						-						-								
Additional Reach Parameters																								
Drainage Area (mi^2)				3.3						3.2						3.3								
Rosgen Classification				E4						E4						C4			C4					
Bankfull Velocity (fps)		-		4.5						5.3						4.0								
Bankfull Discharge (cfs)		-		225.0						217.0						280.0								
Valley Length (ft)				-						-						-			499					
Channel Thalweg Length (ft)				-						-						575			573					
Sinuosity				1.26						1.26						1.31			1.15					
Water Surface Slope (ft/ft)				0.0050						0.0050						0.0048			-					
Bankfull Slope (ft/ft)				-						-						-			-					
Bankfull Floodplain Area (acres)				-						-														
% of Reach with Eroding Banks				-						-														
Channel Stability or Habitat Metric				-						-														
Biological or Other				-						-														

- Information unavailable.

Non-Applicable.

Table 10 Cont'd. Baseline Stream Data Summary
Shadrick Creek - Shadrick Creek Reach 3 (1,104 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			As-Built / Baseline					
Dimension & Substrate - Riffle	**LL**	**UL**	**Eq.**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**
Bankfull Width (ft)	-	-	-	19.9	-	20.6	21.3	-	-	-	-	19.7	-	-	-	-	29.0	-	26.9	29.0	29.0	31.1	2.9	2
Floodprone Width (ft)				68.0	-	74.0	80.0	-	-	-	-	32.0	-	-	-	-	100.0	-	116.0	116.0	116.0	116.0	0.0	2
Bankfull Mean Depth (ft)	-	-	-	2.3	-	2.4	2.5	-	-	-	-	2.1	-	-	-	-	2.4	-	2.2	2.2	2.2	2.3	0.0	2
Bankfull Max Depth (ft)				3.4	-	3.7	4.0	-	-	-	-	3.2	-	-	-	-	3.4	-	3.5	3.5	3.5	3.5	0.0	2
Bankfull Cross Sectional Area (ft^2)		-		46.4	-	49.4	52.3	-	-	-	-	41.0	-	-	-	-	69.7	-	61.0	64.8	64.8	68.6	5.4	2
Width/Depth Ratio				8.5	-	8.6	8.6	-	-	-	-	9.5	-	-	-	-	12.1	-	11.9	13.0	13.0	14.1	1.6	2
Entrenchment Ratio				2.2	-	2.8	3.3	-	-	3.0	-	4.0	5.0	-	-	-	1.7	-	3.7	4.0	4.0	4.3	0.4	2
Bank Height Ratio				1.6	-	1.7	1.7	-	-	-	-	1.9	-	-	-	-	1.0	-	1.0	1.0	1.0	1.0	0.0	2
d50 (mm)				10.0	-	12.0	32.0	-	-	10.0	-	12.0	32.0	-	-	10.0	12.0	32.0	29.0	32.0	32.0	35.0	4.2	2
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32.0	69.7	67.8	121.6	34.8	7
Riffle Slope (ft/ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.004	0.007	0.008	0.011	0.002	7
Pool Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.8	42.9	45.0	63.8	15.1	7
Pool Max Depth (ft)				-	-	5.1	-	-	-	-	-	-	-	-	-	-	5.5	-	4.3	4.8	4.5	5.5	0.5	7
Pool Spacing (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	87.4	145.2	141.1	196.3	40.1	6
Pattern																								
Channel Belt Width (ft)				60.0	-	80.0	100.0	-	-	60.0	-	80.0	100.0	-	-	90.0	116.0	160.0	84.7	94.5	95.0	103.5	7.7	4
Radius of Curvature (ft)				20.0	-	43.0	118.0	-	-	30.0	-	40.0	50.0	-	-	30.0	60.0	75.0	61.6	67.0	66.8	72.9	4.8	4
Rc: Bankfull Width (ft/ft)				1.00	-	21.00	5.50	-	-	1.50	-	2.00	2.50	-	-	1.10	2.10	2.60	2.12	2.31	2.30	2.51	0.17	3
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	202.5	250.1	248.2	301.6	51.7	4
Meander Width Ratio				3.0	-	3.9	4.7	-	-	3.1	-	4.1	5.1	-	-	3.1	4.0	5.5	2.1	2.3	2.3	2.5	0.16	4
Substrate, Bed and Transport Parameters																								
Reach Shear Stress (Competency) lb/ft^2				0.84						-						-			-					
Max Part Size (mm) Mobilized at Bankfull				130.0						-						-			-					
Stream Power (Transport Capacity) W/m^2				-						-						-								
Additional Reach Parameters																								
Drainage Area (mi^2)				3.3						3.2						3.3								
Rosgen Classification				E4						E4						C4			C4					
Bankfull Velocity (fps)		-		4.5						5.3						4.0								
Bankfull Discharge (cfs)		-		225.0						217.0						280.0								
Valley Length (ft)				-						-						1,108			1,104					
Channel Thalweg Length (ft)				-						-						-			927					
Sinuosity				1.26						1.26						1.31			1.19					
Water Surface Slope (ft/ft)				0.0050						0.0050						0.0048			0.0043					
Bankfull Slope (ft/ft)				-						-						-			0.0055					
Bankfull Floodplain Area (acres)				-						-														
% of Reach with Eroding Banks				-						-														
Channel Stability or Habitat Metric				-						-														
Biological or Other				-						-														

- Information unavailable.

Non-Applicable.

Table 10 Cont'd. Baseline Stream Data Summary
Shadrick Creek - UT1 (1,651 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			As-Built / Baseline					
Dimension & Substrate - Riffle	**LL**	**UL**	**Eq.**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**
Bankfull Width (ft)	-	-	-	3.3	-	3.9	5.3	-	-	5.4	-	6.7	8.0	-	-	-	8.0	-	5.02	5.68	5.68	6.34	0.93	2
Floodprone Width (ft)				4.5	-	13.0	21.0	-	-	13.0	-	16.5	20.0	-	-	-	24.0	-	24	24	24	24	0	2
Bankfull Mean Depth (ft)	-	-	-	0.3	-	0.7	1.0	-	-	0.6	-	0.6	0.7	-	-	-	0.7	-	0.68	0.73	0.73	0.77	0.07	2
Bankfull Max Depth (ft)				0.5	-	0.9	1.2	-	-	1.1	-	1.1	1.2	-	-	-	1.0	-	1.1	1.19	1.19	1.28	0.12	2
Bankfull Cross Sectional Area (ft^2)		-		1.2	-	2.8	4.6	-	-	3.1	-	4.3	5.5	-	-	-	5.5	-	3.88	4.09	4.09	4.3	0.3	2
Width/Depth Ratio				4.2	-	6.1	12.6	-	-	9.4	-	10.5	11.6	-	-	-	11.6	-	6.5	7.93	7.93	9.35	2.02	2
Entrenchment Ratio				1.1	-	2.8	5.2	-	-	-	-	2.5	-	-	-	-	3.0	-	3.78	4.28	4.28	4.78	0.7	2
Bank Height Ratio				1.0	-	1.5	3.0	-	-	-	-	1.0	-	-	-	-	1.0	-	1.0	1.0	1.0	1.0	0.0	2
d50 (mm)				3.0	-	6.0	9.0	-	-	3.0	-	6.0	9.0	-	-	3.0	6.0	9.0						
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Riffle Slope (ft/ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pool Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pool Max Depth (ft)				0.9	-	1.3	1.9	-	-	-	-	1.2	-	-	-	-	1.6	-	-	-	-	-	-	-
Pool Spacing (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pattern																								
Channel Belt Width (ft)				16.0	-	35.0	50.0	-	-	-	-	40.0	-	-	-	16.0	35.0	50.0	-	-	-	-	-	-
Radius of Curvature (ft)				7.0	-	20.0	70.0	-	-	21.0	-	22.0	23.0	-	-	7.0	20.0	70.0	-	-	-	-	-	-
Rc: Bankfull Width (ft/ft)				2.1	-	5.1	13.2	-	-	3.1	-	3.3	3.4	-	-	2.1	5.1	13.2	-	-	-	-	-	-
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Meander Width Ratio				4.8	-	8.9	9.5	-	-	-	-	6.0	-	-	-	4.8	8.9	9.5	-	-	-	-	-	-
Substrate, Bed and Transport Parameters																								
Reach Shear Stress (Competency) lb/ft^2						0.95						-				-					-			
Max Part Size (mm) Mobilized at Bankfull						145.0						-				-					-			
Stream Power (Transport Capacity) W/m^2						-						-				-								
Additional Reach Parameters																								
Drainage Area (mi^2)						0.10						0.10				0.10								
Rosgen Classification						G4						B4				B4					C4			
Bankfull Velocity (fps)		-				5.5						7.0				4.5								
Bankfull Discharge (cfs)		-				24.0						30.0				25.0								
Valley Length (ft)						-						-				-								
Channel Thalweg Length (ft)						-						-				1,637					1,651			
Sinuosity						1.13						1.13				1.13					1.14			
Water Surface Slope (ft/ft)						0.0230						0.0230				0.0230					-			
Bankfull Slope (ft/ft)						-						-				-					-			
Bankfull Floodplain Area (acres)						-						-												
% of Reach with Eroding Banks						-						-												
Channel Stability or Habitat Metric						-						-												
Biological or Other						-						-												

- Information unavailable.

Non-Applicable.

Table 10 Cont'd. Baseline Stream Data Summary
Shadrick Creek - UT9 Reach 1 (706 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			As-Built / Baseline					
Dimension & Substrate - Riffle	**LL**	**UL**	**Eq.**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**
Bankfull Width (ft)	-	-	-	4.2	-	5.7	6.0	-	-	5.4	-	6.7	8.0	-	-	-	8.0	-	-	9.5	-	-	-	1
Floodprone Width (ft)				8.0	-	10.0	11.0	-	-	13.0	-	17.00	20.0	-	-	-	24.0	-	-	24.0	-	-	-	1
Bankfull Mean Depth (ft)	-	-	-	0.5	-	0.7	1.1	-	-	0.6	-	0.6	0.7	-	-	-	0.7	-	-	0.5	-	-	-	1
Bankfull Max Depth (ft)				0.6	-	0.9	1.5	-	-	1.1	-	1.1	1.2	-	-	-	1.0	-	-	1.1	-	-	-	1
Bankfull Cross Sectional Area (ft^2)		-		2.6	-	2.7	6.3	-	-	3.1	-	4.3	5.5	-	-	-	5.5	-	-	4.8	-	-	-	1
Width/Depth Ratio				5.7	-	6.3	12.7	-	-	9.4	-	10.5	11.6	-	-	-	11.6	-	-	18.7	-	-	-	1
Entrenchment Ratio				1.4	-	1.7	2.7	-	-	-	-	2.5	-	-	-	-	3.0	-	-	2.5	-	-	-	1
Bank Height Ratio				2.3	-	2.7	4.4	-	-	-	-	1.0	-	-	-	-	1.0	-	-	1.0	-	-	-	1
d50 (mm)				-	-	0.3	-	-	-	3.0	-	6.0	9.0	-	-	-	0.3	-						
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Riffle Slope (ft/ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pool Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pool Max Depth (ft)				1.0	-	1.2	1.4	-	-	-	-	1.2	-	-	-	-	1.6	-	-	-	-	-	-	-
Pool Spacing (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pattern																								
Channel Belt Width (ft)				20.0	-	26.0	31.0	-	-	-	-	40.0	-	-	-	20.0	26.0	31.0	-	-	-	-	-	-
Radius of Curvature (ft)				36.0	-	47.0	62.0	-	-	21.0	-	22.0	23.0	-	-	36.0	47.0	62.0	-	-	-	-	-	-
Rc: Bankfull Width (ft/ft)				6.0	-	8.2	14.9	-	-	3.1	-	3.3	3.4	-	-	6.0	8.2	14.9	-	-	-	-	-	-
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Meander Width Ratio				4.5	-	4.8	5.1	-	-	-	-	6.0	-	-	-	4.5	4.8	5.1	-	-	-	-	-	-
Substrate, Bed and Transport Parameters																								
Reach Shear Stress (Competency) lb/ft^2				1.44						-						-			-					
Max Part Size (mm) Mobilized at Bankfull				200.0						-						-			-					
Stream Power (Transport Capacity) W/m^2				-						-						-								
Additional Reach Parameters																								
Drainage Area (mi^2)				0.1						0.1						0.1								
Rosgen Classification				B4, G4						B4						B4			B4					
Bankfull Velocity (fps)		-		10.1						7.0						4.5								
Bankfull Discharge (cfs)		-		48.0						30.0						25.0								
Valley Length (ft)				-						-						-			696					
Channel Thalweg Length (ft)				-						-						678			706					
Sinuosity				1.03						1.13						1.03			1.08					
Water Surface Slope (ft/ft)				0.0350						0.0230						0.0350			-					
Bankfull Slope (ft/ft)				-						-						-			-					
Bankfull Floodplain Area (acres)				-						-														
% of Reach with Eroding Banks				-						-														
Channel Stability or Habitat Metric				-						-														
Biological or Other				-						-														

- Information unavailable.

Non-Applicable.

Table 10 Cont'd. Baseline Stream Data Summary
Shadrick Creek - UT9 Reach 2 (238 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			As-Built / Baseline					
Dimension & Substrate - Riffle	**LL**	**UL**	**Eq.**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**
Bankfull Width (ft)	-	-	-	4.2	-	5.7	6.0	-	-	5.4	-	6.7	8.0	-	-	-	8.0	-	-	8.3	-	-	-	1
Floodprone Width (ft)				8.0	-	10.0	11.0	-	-	13.0	-	17	20.0	-	-	-	24.0	-	-	24.0	-	-	-	1
Bankfull Mean Depth (ft)	-	-	-	0.5	-	0.7	1.1	-	-	0.6	-	0.6	0.7	-	-	-	0.7	-	-	0.4	-	-	-	1
Bankfull Max Depth (ft)				0.6	-	0.9	1.5	-	-	1.1	-	1.1	1.2	-	-	-	1.0	-	-	1.0	-	-	-	1
Bankfull Cross Sectional Area (ft^2)		-		2.6	-	2.7	6.3	-	-	3.1	-	4.3	5.5	-	-	-	5.5	-	-	3.6	-	-	-	1
Width/Depth Ratio				5.7	-	6.3	12.7	-	-	9.4	-	10.5	11.6	-	-	-	11.6	-	-	19.0	-	-	-	1
Entrenchment Ratio				1.4	-	1.7	2.7	-	-	-	-	2.5	-	-	-	-	3.0	-	-	2.9	-	-	-	1
Bank Height Ratio				2.3	-	2.7	4.4	-	-	-	-	1.0	-	-	-	-	1.0	-	-	1.0	-	-	-	1
d50 (mm)				-	-	0.3	-	-	-	3.0	-	6.0	9.0	-	-	-	0.3	-	-	13.0	-	-	-	1
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.3	29.0	27.3	38.4	6.7	4
Riffle Slope (ft/ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.016	0.022	0.020	0.033	0.008	4
Pool Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.6	10.2	11.2	12.6	3.1	4
Pool Max Depth (ft)				1.0	-	1.2	1.4	-	-	-	-	1.2	-	-	-	-	1.8	-	1.0	1.5	1.5	1.7	0.3	4
Pool Spacing (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40.4	47.7	46.4	56.4	8.1	3
Pattern																								
Channel Belt Width (ft)				20.0	-	26.0	31.0	-	-	-	-	40.0	-	-	-	-	42.0	-	24.5	30.0	29.0	36.6	6.1	3
Radius of Curvature (ft)				36.0	-	47.0	62.0	-	-	21.0	-	22	23.0	-	-	-	15.0	-	13.3	15.2	15.4	16.9	1.8	3
Rc: Bankfull Width (ft/ft)				6.0	-	8.2	14.9	-	-	3.1	-	3.3	3.4	-	-	-	1.9		2.12	2.31	2.30	2.51	0.17	3
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	63.7	78.5	79.3	92.5	14.4	3
Meander Width Ratio				4.5	-	4.8	5.1	-	-	-	-	6.0	-	-	-	-	5.3	-	3.1	3.8	3.6	4.6	0.8	3

Substrate, Bed and Transport Parameters																								
Reach Shear Stress (Competency) lb/ft^2				0.58						-						-			-					
Max Part Size (mm) Mobilized at Bankfull				100.0						-						-			-					
Stream Power (Transport Capacity) W/m^2				-						-						-								
Additional Reach Parameters																								
Drainage Area (mi^2)				0.10						0.1						0.1								
Rosgen Classification				B4, G4						B4						E4			C5					
Bankfull Velocity (fps)		-		10.10						7.0						3.3								
Bankfull Discharge (cfs)		-		48.00						30.0						18.0								
Valley Length (ft)				-						-						-			198					
Channel Thalweg Length (ft)				-						-						245			238					
Sinuosity				1.03						1.13						1.71			1.20					
Water Surface Slope (ft/ft)				0.04						0.0230						0.0140			0.0168					
Bankfull Slope (ft/ft)				-						-						-			0.0182					
Bankfull Floodplain Area (acres)				-						-														
% of Reach with Eroding Banks				-						-														
Channel Stability or Habitat Metric				-						-														
Biological or Other				-						-														

- Information unavailable.

Non-Applicable.

Table 10 Cont'd. Baseline Stream Data Summary
Shadrick Creek - UT10 (404 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			As-Built / Baseline					
Dimension & Substrate - Riffle	**LL**	**UL**	**Eq.**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**
Bankfull Width (ft)	-	-	-	-	-	7.0	-	-	-	5.4	-	6.7	8.0	-	-	-	7.0	-	-	7.3	-	-	-	1
Floodprone Width (ft)				-	-	9.0	-	-	-	13.0	-	17	20.0	-	-	-	24.0	-	-	24.0	-	-	-	1
Bankfull Mean Depth (ft)	-	-	-	-	-	0.5	-	-	-	0.6	-	0.6	0.7	-	-	-	0.6	-	-	0.5	-	-	-	1
Bankfull Max Depth (ft)				-	-	0.8	-	-	-	1.1	-	1.1	1.2	-	-	-	0.8	-	-	1.1	-	-	-	1
Bankfull Cross Sectional Area (ft^2)		-		-	-	3.8	-	-	-	3.1	-	4.3	5.5	-	-	-	4.0	-	-	3.4	-	-	-	1
Width/Depth Ratio				-	-	13.0	-	-	-	9.4	-	10.5	11.6	-	-	-	12.3	-	-	15.6	-	-	-	1
Entrenchment Ratio				-	-	1.3	-	-	-	-	-	2.5	-	-	-	-	3.4	-	-	3.3	-	-	-	1
Bank Height Ratio				-	-	2.5	-	-	-	-	-	1.0	-	-	-	-	1.0	-	-	1.0	-	-	-	1
d50 (mm)				-	-	0.3	-	-	-	3.0	-	6.0	9.0	-	-	-	0.3	-						
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Riffle Slope (ft/ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pool Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pool Max Depth (ft)				-	-	-	-	-	-	-	-	1.2	-	-	-	-	1.3	-	-	-	-	-	-	-
Pool Spacing (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pattern																								
Channel Belt Width (ft)				-	-	30.0	-	-	-	-	-	40	-	-	-	-	30.0	-	-	-	-	-	-	-
Radius of Curvature (ft)				36.0	-	66.0	67.0	-	-	21.0	-	22	23.0	-	-	-	66.0	-	-	-	-	-	-	-
Rc: Bankfull Width (ft/ft)				5.1	-	9.4	9.6	-	-	3.1	-	3.3	3.4	-	-	-	3.3	-	-	-	-	-	-	-
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Meander Width Ratio				-	-	4.3	-	-	-	-	-	6.0	-	-	-	-	4.3	-	-	-	-	-	-	-
Substrate, Bed and Transport Parameters																								
Reach Shear Stress (Competency) lb/ft^2						0.86						-				-				-				
Max Part Size (mm) Mobilized at Bankfull						135.0						-				-				-				
Stream Power (Transport Capacity) W/m^2						-						-				-								
Additional Reach Parameters																								
Drainage Area (mi^2)						0.03						0.1				0.03								
Rosgen Classification						F4						B4				B4				B4				
Bankfull Velocity (fps)		-				1.9						7				7.0								
Bankfull Discharge (cfs)		-				7.0						30.0				30.0								
Valley Length (ft)						-						-				-				390				
Channel Thalweg Length (ft)						-						-				391				404				
Sinuosity						1.04						1.13				1.04				1.03				
Water Surface Slope (ft/ft)						0.0249						0.0230				0.0249				0.0168				
Bankfull Slope (ft/ft)						-						-				-				0.0182				
Bankfull Floodplain Area (acres)						-						-												
% of Reach with Eroding Banks						-						-												
Channel Stability or Habitat Metric						-						-												
Biological or Other						-						-												

- Information unavailable.

Non-Applicable.

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Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Shadrick Creek Restoration Project

.	Cross Section 1 (Pool) UT-1						Cross Section 2 (Riffle) UT-1						Cross Section 3 (Riffle) UT-1						Cross Section 4 (Riffle) Shadrick Reach 1						Cross Section 5 (Pool) Shadrick Reach 1					
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
Record Elevation (datum) Used	1184.84	1184.80	1184.90	1184.91	1185.12	1185.37	1184.65	1184.65	1184.60	1184.74	1184.84	1184.97	1172.54	1172.52	1172.50	1172.48	1172.53	1172.69	1145.23	1145.26	1145.20	1145.37	1145.52	1145.76	1144.87	1144.82	1144.90	1144.75	1144.85	1144.44
Low Bank Height Elevation (datum) Used	1184.84	1184.83	1184.90	1184.91	1185.00	1185.21	1184.65	1184.65	1184.60	1184.84	1184.67	1184.92	1172.54	1172.47	1172.50	1172.59	1172.43	1172.53	1145.23	1145.15	1145.20	1145.18	1145.60	1145.51	1144.87	1144.15	1145.10	1145.13	1145.13	1144.85
Bankfull Width (ft)	7.1	6.1	7.4	11.3	5.7	9.5	6.3	6.7	6.3	6.6	5.2	5.7	5.0	5.6	5.5	5.2	5.1	3.5	26.6	25.9	24.1	26.6	21.9	20.8	26.9	26.4	27.3	24.7	18.7	18.5
Floodprone Width (ft)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Bankfull Mean Depth (ft)	0.6	0.7	0.6	0.4	0.8	0.5	0.7	0.6	0.7	0.6	0.8	0.8	0.8	0.7	0.7	0.7	0.8	1.1	1.8	1.8	1.9	1.8	2.1	2.3	2.2	2.3	2.2	2.4	3.2	3.2
Bankfull Max Depth (ft)	1.5	1.4	1.5	1.5	1.6	1.6	1.1	1.1	1.2	1.2	1.3	1.3	1.3	1.4	1.3	1.2	1.2	1.4	3.0	3.1	3.1	3.2	3.4	3.6	4.0	4.0	3.9	4.0	4.6	4.3
Bankfull Cross Sectional Area (ft^2)	4.5	4.5	4.5	4.5	4.5	4.5	4.3	4.3	4.3	4.3	4.3	4.3	3.9	3.9	3.9	3.9	3.9	3.9	47.0	47.0	47.0	47.0	47.0	47.0	59.5	59.5	59.5	59.5	59.5	59.5
Bankfull Width/Depth Ratio	11.1	8.3	12.2	28.5	7.2	20.3	9.4	10.4	9.1	10.3	6.3	7.4	6.5	7.9	7.9	7.0	6.5	3.1	15.0	14.2	12.4	15.0	10.2	9.2	12.1	11.7	12.6	10.3	5.9	5.8
Bankfull Entrenchment Ratio	3.4	3.9	3.3	2.1	4.2	2.5	3.8	3.6	3.8	3.6	4.6	4.2	4.8	4.3	4.3	4.6	4.7	6.9	3.8	3.9	4.1	3.8	4.6	4.8	3.7	3.8	3.7	4.0	5.4	5.4
Bankfull Bank Height Ratio	1.0	1.0	0.9	1.0	0.9	0.9	1.0	1.0	0.9	1.1	0.9	1.0	1.0	1.0	1.0	1.1	0.9	0.9	1.0	1.0	1.0	0.9	1.0	0.9	1.0	1.1	1.0	1.1	1.2	1.1
Low Top of Bank Depth (ft)	-	1.4	1.5	1.5	1.4	1.5	-	1.1	1.1	1.3	1.1	1.2	-	1.4	1.3	1.3	1.1	1.3	-	3.0	2.9	3.0	3.5	3.4	-	4.3	4.1	4.3	5.8	4.7

	Cross Section 6 (Riffle) Shadrick Reach 1						Cross Section 7 (Riffle) Shadrick Reach 1						Cross Section 8 (Pool) Shadrick Reach 1						Cross Section 9 (Riffle) UT-9 Reach 1						Cross Section 10 (Pool) UT-9 Reach 1					
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**+MY5**	**Base**	**MY1**	**+MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
Record Elevation (datum) Used	1143.26	1143.25	1143.20	1143.28	1143.46	1143.53	1141.15	1141.27	1141.20	1141.41	1141.24	-	1139.81	1139.59	-	1139.88	1140.24	1139.87	1151.76	1151.77	1151.80	1151.64	1151.72	1151.88	1151.63	1151.63	1151.60	1151.28	1151.05	1151.12
Low Bank Height Elevation (datum) Used	1143.26	1143.21	1143.20	1143.36	1142.78	1143.37	1141.15	1141.07	1141.20	1142.20	1141.28	-	1139.81	1140.05	-	1140.14	1139.55	1140.22	1151.76	1151.76	1151.40	1151.47	1151.51	1151.66	1151.63	1151.64	1151.50	1151.40	1151.33	1151.13
Bankfull Width (ft)	28.7	29.1	28.8	28.4	22.5	22.4	32.7	33.6	33.5	28.6	26.0	-	28.8	28.2	-	29.8	27.7	26.7	9.5	9.2	9.7	8.2	4.5	4.2	6.5	6.1	5.0	3.3	2.8	2.8
Floodprone Width (ft)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	-	100.0	100.0	-	100.0	100.0	100.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Bankfull Mean Depth (ft)	1.8	1.8	1.8	1.8	2.3	2.3	1.8	1.8	1.8	2.1	2.3	-	2.9	3.0	-	2.8	3.0	3.2	0.5	0.5	0.5	0.6	1.1	1.2	0.5	0.5	0.6	0.9	1.1	1.1
Bankfull Max Depth (ft)	3.2	3.1	3.2	3.4	3.4	3.4	3.0	3.0	3.0	3.2	3.4	-	5.6	5.5	-	5.4	4.5	5.3	1.1	1.3	1.5	1.6	1.8	2.0	1.3	1.4	1.3	1.5	1.4	1.4
Bankfull Cross Sectional Area (ft^2)	52.0	52.0	52.0	52.0	52.0	52.0	59.3	59.3	59.3	59.3	59.3	-	84.3	84.3	-	84.3	84.3	84.3	4.8	4.8	4.8	4.8	4.8	4.8	3.0	3.0	3.0	3.0	3.0	3.0
Bankfull Width/Depth Ratio	15.8	16.3	15.9	15.5	9.8	9.7	18.0	19.0	18.9	13.8	11.4	-	9.8	9.4	-	10.5	9.1	8.4	18.7	17.6	19.5	14.1	4.2	3.6	14.3	12.1	8.2	3.6	2.7	2.7
Bankfull Entrenchment Ratio	3.5	3.4	3.5	3.5	4.4	4.5	3.1	3.0	3.0	3.5	3.9	-	3.5	3.5	-	3.4	3.6	3.7	2.5	2.6	2.5	2.9	5.4	5.8	3.7	4.0	4.8	7.3	8.4	8.5
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.0	0.8	1.0	1.0	0.9	0.9	1.2	1.0	-	1.0	1.1	-	1.0	0.8	1.1	1.0	1.0	1.0	0.9	0.9	0.9	1.0	1.0	0.9	1.1	1.2	1.0
Low Top of Bank Depth (ft)	-	3.1	3.2	3.5	2.8	3.3	-	2.8	2.7	4.0	3.4	-	-	5.9	-	5.7	3.8	5.7	-	1.3	1.2	1.4	1.6	1.8	-	1.3	1.2	1.6	1.7	1.5

* Beginning in MY1 (2018), the bankfull elevation and channel cross-section dimensions have been calculated using a fixed Abkf as described in the Standard Measurement of the BHR Monitoring Parameter provided by NCIRT and NCDMS (9/2018)

+ Cross section not surveyed due to beaver impoundment

Table 11a cont. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Shadrick Creek Restoration Project

	Cross Section 11 (Pool) UT-9 Reach 2						Cross Section 12 (Riffle) UT-9 Reach 2						Cross Section 13 (Riffle) UT-10						Cross Section 14 (Pool) UT-10						Cross Section 15 (Pool) Shadrick Reach 2					
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
Record Elevation (datum) Used	1142.90	1142.92	1142.90	1143.01	1143.29	1143.45	1142.55	1142.51	1142.50	1142.52	1142.52	1142.77	1140.92	1140.92	1140.90	1141.03	1141.09	1141.27	1140.19	1140.13	1140.20	1140.26	1140.15	1140.29	1100.70	1100.47	1100.37	1100.47	1100.92	1100.95
Low Bank Height Elevation (datum) Used	1142.90	1142.89	1142.80	1142.86	1142.86	1143.01	1142.55	1142.52	1142.50	1142.33	1142.44	1142.68	1140.92	1140.77	1140.60	1140.63	1140.98	1140.71	1140.19	1140.05	1140.10	1140.00	1140.18	1140.20	1100.70	1100.52	1099.60	1099.73	1100.15	1100.83
Bankfull Width (ft)	8.8	8.6	9.1	7.9	5.0	4.9	8.3	7.7	8.0	5.9	4.5	3.3	7.3	8.7	8.4	7.4	6.7	2.3	7.5	6.9	7.1	3.9	4.8	3.7	38.9	38.8	36.9	35.4	34.8	32.2
Floodprone Width (ft)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	116.0	116.0	116.0	116.0	116.0	116.0
Bankfull Mean Depth (ft)	0.7	0.7	0.6	0.7	1.2	1.2	0.4	0.5	0.5	0.6	0.8	1.1	0.5	0.4	0.4	0.5	0.5	1.2	0.6	0.7	0.7	1.2	1.0	1.3	2.1	2.1	2.2	2.3	2.3	2.5
Bankfull Max Depth (ft)	1.6	1.6	1.7	1.8	1.9	2.0	1.0	1.0	1.0	1.1	1.2	1.4	1.1	1.1	1.0	1.3	1.1	1.5	1.6	1.7	1.9	1.9	1.8	1.9	4.1	4.3	4.5	4.6	4.9	4.8
Bankfull Cross Sectional Area (ft^2)	5.8	5.8	5.8	5.8	5.8	5.8	3.6	3.6	3.6	3.6	3.6	3.6	3.4	3.4	3.4	3.4	3.4	2.7	4.8	4.8	4.8	4.8	4.8	4.8	80.4	80.4	80.4	80.4	80.4	80.4
Bankfull Width/Depth Ratio	13.2	12.8	14.4	10.9	4.3	4.1	19.0	16.2	17.6	9.8	5.7	3.1	15.6	22.3	20.8	16.0	13.0	2.0	11.6	9.9	10.5	3.2	4.9	2.9	18.9	18.7	16.9	15.6	15.1	12.9
Bankfull Entrenchment Ratio	2.7	2.8	2.6	3.0	4.8	4.9	2.9	3.1	3.0	4.1	5.3	7.2	3.3	2.8	2.9	3.3	3.6	10.3	3.2	3.5	3.4	6.2	5.0	6.5	3.0	3.0	3.1	3.3	3.3	3.6
Bankfull Bank Height Ratio	1.0	1.0	0.9	0.9	0.8	0.8	1.0	1.0	0.9	0.8	0.9	0.9	1.0	0.9	1.0	0.7	0.9	0.6	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	0.8	0.8	0.8	1.0
Low Top of Bank Depth (ft)	-	1.6	1.5	1.6	1.4	1.6	-	1.0	0.9	0.9	1.1	1.3	-	1.0	0.7	0.9	1.0	1.0	-	1.6	1.9	1.6	1.8	1.8	-	4.4	3.8	3.8	4.1	4.7

	Cross Section 16 (Riffle) Shadrick Reach 2						Cross Section 17 (Riffle) Shadrick Reach 3						Cross Section 18 (Pool) Shadrick Reach 3						Cross Section 19 (Riffle) Shadrick Reach 3					
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
Record Elevation (datum) Used	1100.22	1100.25	1100.30	1100.33	1100.51	1100.64	1097.58	1097.67	1097.70	1097.85	1098.06	1098.17	1096.97	1097.03	1097.00	1097.26	1098.49	1097.99	1095.31	1095.37	1095.30	1095.50	1095.68	1095.87
Low Bank Height Elevation (datum) Used	1100.22	1100.18	1099.30	1099.97	1100.29	1100.31	1097.58	1097.60	1097.71	1097.75	1097.43	1097.77	1096.97	1096.51	1097.00	1096.64	1096.59	1096.66	1095.31	1095.42	1095.30	1095.39	1095.24	1095.47
Bankfull Width (ft)	29.9	29.5	33.3	30.1	26.6	26.9	31.1	32.7	34.4	36.2	28.2	28.1	40.0	43.7	42.9	42.9	21.0	22.6	26.9	26.9	26.9	28.3	24.4	22.6
Floodprone Width (ft)	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0
Bankfull Mean Depth (ft)	2.4	2.4	2.2	2.4	2.7	2.7	2.2	2.1	2.0	1.9	2.4	2.4	2.2	2.0	2.1	2.1	4.2	3.9	2.3	2.3	2.3	2.2	2.5	2.7
Bankfull Max Depth (ft)	3.9	4.0	4.0	4.0	4.2	4.3	3.5	3.6	3.6	3.7	4.1	4.2	4.7	4.7	5.4	5.4	6.5	5.8	3.5	3.5	3.6	3.8	4.0	4.1
Bankfull Cross Sectional Area (ft^2)	71.7	71.7	71.7	71.7	71.7	71.7	68.6	68.6	68.6	68.6	68.6	68.6	88.1	88.1	88.1	88.1	88.1	88.1	61.0	61.0	61.0	61.0	61.0	61.0
Bankfull Width/Depth Ratio	12.5	12.1	15.5	12.6	9.9	10.1	14.1	15.6	17.2	19.1	11.6	11.5	18.2	21.6	20.9	20.9	5.0	5.8	11.9	11.8	11.8	13.1	9.7	8.4
Bankfull Entrenchment Ratio	3.9	3.9	3.5	3.9	4.4	4.3	3.7	3.5	3.4	3.2	4.1	4.1	2.9	2.7	2.7	2.7	5.5	5.1	4.3	4.3	4.3	4.1	4.8	5.1
Bankfull Bank Height Ratio*	1.0	1.0	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	0.8	0.9	1.0	0.9	1.0	0.9	0.7	0.8	1.0	1.0	1.0	1.0	0.9	0.9
Low Top of Bank Depth (ft)	-	3.8	3.6	3.6	4.0	3.9	-	3.5	2.4	3.6	3.5	3.8	-	4.2	5.4	4.8	4.6	4.5	-	3.6	3.7	3.7	3.5	3.7

* Beginning in MY1 (2018), the bankfull elevation and channel cross-section dimensions have been calculated using a fixed Abkf as described in the Standard Measurement of the BHR Monitoring Parameter provided by NCIRT and NCDMS (9/2018)

+ Cross section not surveyed due to beaver impoundment

Table 11b. Monitoring Data - Stream Reach Data Summary
Shadrick Creek - Shadrick Creek Reach 1 (3,631 feet)

Parameter	Baseline						MY - 1						MY - 2						MY - 3						MY - 4						+MY - 5					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	26.6	29.3	28.7	32.7	3.1	3	25.9	29.5	29.1	33.6	3.9	3	24.1	28.8	28.8	33.5	4.7	3	26.6	27.9	28.4	28.6	1.1	3	21.9	23.5	22.5	26.0	2.2	3	20.8	21.6	21.6	22.4	1.2	2
Floodprone Width (ft)	100.0	100.0	100.0	100.0	0.0	3	100.0	100.0	100.0	100.0	0.0	3	100.0	100.0	100.0	100.0	0.0	3	100.0	100.0	100.0	100.0	0.0	3	100.0	100.0	100.0	100.0	0.0	3	100.0	100.0	100.0	100.0	0.0	2
Bankfull Mean Depth (ft)	1.8	1.8	1.8	1.8	0.0	3	1.8	1.8	1.8	1.8	0.0	3	1.8	1.8	1.8	1.9	0.1	3	1.8	1.9	1.8	2.1	0.2	3	2.1	2.2	2.3	2.3	0.1	3	2.3	2.3	2.3	2.3	0.0	2
Bankfull Max Depth (ft)	3.0	3.1	3.0	3.2	0.1	3	3.0	3.1	3.1	3.1	0.1	3	3.0	3.1	3.1	3.2	0.1	3	3.2	3.3	3.2	3.4	0.1	3	3.4	3.4	3.4	3.4	0.0	3	3.4	3.5	3.5	3.6	0.1	2
Bankfull Cross-Sectional Area (ft^2)	47.0	52.8	52.0	59.3	6.2	3	47.0	52.8	52.0	59.3	6.2	3	47.0	52.8	52.0	59.3	6.2	3	47.0	52.8	52.0	59.3	6.2	3	47.0	52.8	52.0	59.3	6.2	3	47.0	49.5	49.5	52.0	3.5	2
Width/Depth Ratio	15.0	16.3	15.8	18.0	1.5	3	14.2	16.5	16.3	19.0	2.4	3	12.4	15.7	15.9	18.9	3.3	3	13.8	14.8	15.0	15.5	0.9	3	9.8	10.4	10.2	11.4	0.8	3	9.2	9.4	9.4	9.7	0.3	2
Entrenchment Ratio	3.1	3.4	3.5	3.8	0.4	3	3.0	3.4	3.4	3.9	0.4	3	3.0	3.5	3.5	4.1	0.6	3	3.5	3.6	3.5	3.8	0.1	3	3.9	4.3	4.4	4.6	0.4	3	4.5	4.6	4.6	4.8	0.3	2
Bank Height Ratio	1.0	1.0	1.0	1.0	0.0	3	0.9	1.0	1.0	1.0	0.0	3	0.9	0.9	1.0	1.0	0.0	3	0.9	1.1	1.0	1.2	0.2	3	0.8	0.9	1.0	1.0	0.1	3	0.9	0.9	0.9	1.0	0.0	2
Profile																																				
Riffle Length (ft)																																				
Riffle Slope (ft/ft)																																				
Pool Length (ft)																																				
Pool Max Depth (ft)																																				
Pool Spacing (ft)																																				
Pattern																																				
Channel Belt Width (ft)																																				
Radius of Curvature (ft)																																				
Rc: Bankfull Width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
Additional Reach Parameters																																				
Rosgen Classification	C4																																			
Channel Thalweg Length (ft)	3,631																																			
Sinuosity (ft)	1.13																																			
Water Surface Slope (Channel) (ft/ft)	.																																			
Bankfull Slope (ft/ft)																																				
Ri% / Ru% / P% / G% / S%																																				

- Information Unavailable
N/A - Information does not apply.
Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step

+ One ross-sections impacted by beaver impoundments.

Table 11b Cont'd. Monitoring Data - Stream Reach Data Summary
Shadrick Creek - Shadrick Creek Reach 2 (573 feet)

Parameter	Baseline						MY - 1						MY - 2						MY - 3						MY - 4						MY - 5					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	-	29.9	-	-	-	1	-	29.5	-	-	-	1	-	33.3	-	-	-	1	-	30.1	-	-	-	1	-	26.6	-	-	-	1	-	26.9	-	-	-	1
Floodprone Width (ft)	-	116.0	-	-	-	1	-	116.0	-	-	-	1	-	116	-	-	-	1	-	116.0	-	-	-	1	-	116.0	-	-	-	1	-	116.0	-	-	-	1
Bankfull Mean Depth (ft)	-	2.4	-	-	-	1	-	2.4	-	-	-	1	-	2.2	-	-	-	1	-	2.4	-	-	-	1	-	2.7	-	-	-	1	-	2.7	-	-	-	1
Bankfull Max Depth (ft)	-	3.9	-	-	-	1	-	4.0	-	-	-	1	-	4.0	-	-	-	1	-	4.0	-	-	-	1	-	4.2	-	-	-	1	-	4.3	-	-	-	1
Bankfull Cross-Sectional Area (ft^2)	-	71.7	-	-	-	1	-	71.7	-	-	-	1	-	71.7	-	-	-	1	-	71.7	-	-	-	1	-	71.7	-	-	-	1	-	71.7	-	-	-	1
Width/Depth Ratio	-	12.5	-	-	-	1	-	12.1	-	-	-	1	-	15.5	-	-	-	1	-	12.6	-	-	-	1	-	9.9	-	-	-	1	-	10.1	-	-	-	1
Entrenchment Ratio	-	3.9	-	-	-	1	-	3.9	-	-	-	1	-	3.5	-	-	-	1	-	3.9	-	-	-	1	-	4.4	-	-	-	1	-	4.3	-	-	-	1
Bank Height Ratio	-	1.0	-	-	-	1	-	1.0	-	-	-	1	-	0.9	-	-	-	1	-	0.9	-	-	-	1	-	0.9	-	-	-	1	-	0.9	-	-	-	1
Profile																																				
Riffle Length (ft)																																				
Riffle Slope (ft/ft)																																				
Pool Length (ft)																																				
Pool Max Depth (ft)																																				
Pool Spacing (ft)																																				
Pattern																																				
Channel Belt Width (ft)																																				
Radius of Curvature (ft)																																				
Rc: Bankfull Width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
Additional Reach Parameters																																				
Rosgen Classification	C4																																			
Channel Thalweg Length (ft)	573																																			
Sinuosity (ft)	1.15																																			
Water Surface Slope (Channel) (ft/ft)																																				
Bankfull Slope (ft/ft)																																				
Ri% / Ru% / P% / G% / S%																																				

- Information Unavailable
N/A - Information does not apply.
Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step

Table 11b Cont'd. Monitoring Data - Stream Reach Data Summary
Shadrick Creek - Shadrick Creek Reach 3 (1,104 feet)

Parameter	Baseline						MY - 1						MY - 2						MY - 3						MY - 4						MY - 5					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	26.9	29.0	29.0	31.1	2.9	2	26.9	29.8	29.8	32.7	4.2	2	26.9	30.6	30.6	34.4	5.3	2	28.3	32.2	32.2	36.2	5.6	2	24.4	26.3	26.3	28.2	2.7	2	22.6	25.3	25.3	28.1	3.9	2
Floodprone Width (ft)	116.0	116.0	116.0	116.0	0.0	2	116.0	116.0	116.0	116.0	0.0	2	116.0	116.0	116.0	116.0	0.0	2	116.0	116.0	116.0	116.0	0.0	2	116.0	116.0	116.0	116.0	0.0	2	116.0	116.0	116.0	116.0	0.0	2
Bankfull Mean Depth (ft)	2.2	2.2	2.2	2.3	0.0	2	2.1	2.2	2.2	2.3	0.1	2	2.0	2.1	2.1	2.3	0.2	2	1.9	2.0	2.0	2.2	0.2	2	2.4	2.5	2.5	2.5	0.0	2	2.4	2.6	2.6	2.7	0.2	2
Bankfull Max Depth (ft)	3.5	3.5	3.5	3.5	0.0	2	3.5	3.6	3.6	3.6	0.1	2	3.6	3.6	3.6	3.6	0.0	2	3.7	3.7	3.7	3.8	0.1	2	4.0	4.1	4.1	4.1	0.1	2	4.1	4.2	4.2	4.2	0.1	2
Bankfull Cross-Sectional Area (ft^2)	61.0	64.8	64.8	68.6	5.4	2	61.0	64.8	64.8	68.6	5.4	2	61.0	64.8	64.8	68.6	5.4	2	61.0	64.8	64.8	68.6	5.3	2	61.0	64.8	64.8	68.6	5.4	2	61.0	64.8	64.8	68.6	5.4	2
Width/Depth Ratio	11.9	13.0	13.0	14.1	1.6	2	11.8	13.7	13.7	15.6	2.7	2	11.8	14.5	14.5	17.2	3.8	2	13.1	16.1	16.1	19.1	4.3	2	9.7	10.7	10.7	11.6	1.3	2	8.4	9.9	9.9	11.5	2.2	2
Entrenchment Ratio	3.7	4.0	4.0	4.3	0.4	2	3.5	3.9	3.9	4.3	0.5	2	3.4	3.8	3.8	4.3	0.7	2	3.2	3.7	3.7	4.1	0.6	2	4.1	4.4	4.4	4.8	0.5	2	4.1	4.6	4.6	5.1	0.7	2
Bank Height Ratio	1.0	1.0	1.0	1.0	0.0	2	1.0	1.0	1.0	1.0	0.0	2	1.0	1.0	1.0	1.0	0.0	2	1.0	1.0	1.0	1.0	0.0	2	0.8	0.9	0.9	0.9	0.0	2	0.9	0.9	0.9	0.9	0.0	2
Profile																																				
Riffle Length (ft)	32.0	69.7	67.8	121.6	34.8	7	22.7	62.4	62.7	113.2	36.5	7	28.4	73.4	72.3	105.2	29.3	7	28.2	64.6	57.5	126.7	37.5	7	23.9	69.0	65.0	153.0	48.6	7	11.7	50.3	36.2	99.4	32.0	7
Riffle Slope (ft/ft)	0.004	0.007	0.008	0.011	0.002	7	0.004	0.008	0.007	0.013	0.004	7	0.003	0.007	0.006	0.012	0.003	7	0.005	0.007	0.008	0.010	0.002	7	0.005	0.008	0.006	0.012	0.003	5	0.001	0.006	0.005	0.012	0.004	6
Pool Length (ft)	13.8	42.9	45.0	63.8	15.1	7	26.4	53.8	53.1	82.5	20.3	7	28.3	50.7	40.9	76.7	21.1	7	32.9	55.9	55.2	78.2	16.2	7	18.9	41.3	37.5	71.4	17.7	7	15.8	51.5	65.9	75.3	25.8	7
Pool Max Depth (ft)	4.3	4.8	4.5	5.5	0.5	7	4.5	4.9	5.0	5.4	0.3	7	4.8	5.1	5.1	5.5	0.3	7	4.3	4.9	4.9	5.3	0.4	7	4.3	5.0	4.5	6.2	0.8	7	3.0	4.9	4.8	7.0	1.3	9
Pool Spacing (ft)	87.4	145.2	141.1	196.3	40.1	6	76.2	147.5	134.5	212.3	53.0	6	101.3	147.3	141.0	202.0	39.1	6	57.1	147.3	167.6	200.4	52.8	6	103.8	143.9	147.7	178.7	31.0	6	46.8	126.5	149.1	173.1	46.4	8
Pattern																																				
Channel Belt Width (ft)	84.7	94.5	95.0	103.5	7.7	4																														
Radius of Curvature (ft)	61.6	67.0	66.8	72.9	4.8	4																														
Rc: Bankfull Width (ft/ft)	2.1	2.3	2.3	2.5	0.2	3																														
Meander Wavelength (ft)	202.5	250.1	248.2	301.6	51.7	4																														
Meander Width Ratio	2.1	2.3	2.3	2.5	0.2	4																														
Additional Reach Parameters																																				
Rosgen Classification	C4						C4						C4						C4						C4						C4					
Channel Thalweg Length (ft)	1,104						1,093						1,153						1,154						1,102						1,102					
Sinuosity (ft)	1.19						1.18						1.25						1.24						1.19						1.19					
Water Surface Slope (Channel) (ft/ft)	0.0043						0.0045						0.0042						0.0044						0.044						0.044					
Bankfull Slope (ft/ft)	0.0055						0.0043						0.0046						0.0054						0.0033						0.0033					
Ri% / Ru% / P% / G% / S%	48%	12%	30%	11%	0%		42%	12%	37%	8%	0%		50%	12%	34%	4%	0%		42%	13%	37%	8%	0%		45%	8%	34%	13%	0%		33%	11%	43%	13%	0%	

- Information Unavailable
N/A - Information does not apply.
Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step

Table 11b Cont'd. Monitoring Data - Stream Reach Data Summary
Shadrick Creek - UT1 (1,651 feet)

Parameter	Baseline						MY - 1						MY - 2						MY - 3						MY - 4						MY - 5					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	5.0	5.7	5.7	6.3	0.9	2	5.6	6.1	6.1	6.7	0.8	2	5.5	5.9	5.9	6.3	0.5	2	5.2	5.9	5.9	6.6	1.0	2	5.1	5.1	5.1	5.2	0.1	2	3.5	4.6	4.6	5.7	1.5	2
Floodprone Width (ft)	24.0	24.0	24.0	24.0	0.0	2	24.0	24.0	24.0	24.0	0.0	2	24.0	24.0	24.0	24.0	0.0	2	24.0	24.0	24.0	24.0	0.0	2	24.0	24.0	24.0	24.0	0.0	2	24.0	24.0	24.0	24.0	0.0	2
Bankfull Mean Depth (ft)	0.7	0.7	0.7	0.8	0.1	2	0.6	0.7	0.7	0.7	0.0	2	0.7	0.7	0.7	0.7	0.0	2	0.6	0.7	0.7	0.7	0.1	2	0.8	0.8	0.8	0.8	0.0	2	0.8	0.9	0.9	1.1	0.2	2
Bankfull Max Depth (ft)	1.1	1.2	1.2	1.3	0.1	2	1.1	1.3	1.3	1.4	0.3	2	1.2	1.3	1.3	1.3	0.1	2	1.2	1.2	1.2	1.2	0.0	2	1.2	1.2	1.2	1.3	0.1	2	1.3	1.3	1.3	1.4	0.1	2
Bankfull Cross-Sectional Area (ft^2)	3.9	4.1	4.1	4.3	0.3	2	3.9	4.1	4.1	4.3	0.3	2	3.9	4.1	4.1	4.3	0.3	2	3.9	4.1	4.1	4.3	0.3	2	3.9	4.1	4.1	4.3	0.2	2	3.9	4.1	4.1	4.3	0.3	2
Width/Depth Ratio	6.5	7.9	7.9	9.4	2.0	2	7.9	9.1	9.1	10.4	1.8	2	7.9	8.5	8.5	9.1	0.8	2	7.0	8.6	8.6	10.3	2.3	2	6.3	6.4	6.4	6.5	0.2	2	3.1	5.2	5.2	7.4	3.0	2
Entrenchment Ratio	3.8	4.3	4.3	4.8	0.7	2	3.6	3.9	3.9	4.3	0.5	2	3.8	4.1	4.1	4.3	0.4	2	3.6	4.1	4.1	4.6	0.7	2	4.6	4.7	4.7	4.7	0.1	2	4.2	5.6	5.6	6.9	1.9	2
Bank Height Ratio	1.0	1.0	1.0	1.0	0.0	2	1.0	1.0	1.0	1.0	0.0	2	0.9	0.9	0.9	1.0	0.0	2	1.1	1.1	1.1	1.1	0.0	2	0.9	0.9	0.9	0.9	0.0	2	0.9	0.9	0.9	1.0	0.1	2
Profile																																				
Riffle Length (ft)																																				
Riffle Slope (ft/ft)																																				
Pool Length (ft)																																				
Pool Max Depth (ft)																																				
Pool Spacing (ft)																																				
Pattern																																				
Channel Belt Width (ft)																																				
Radius of Curvature (ft)																																				
Rc: Bankfull Width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
Additional Reach Parameters																																				
Rosgen Classification	C4																																			
Channel Thalweg Length (ft)	1,651																																			
Sinuosity (ft)	1.14																																			
Water Surface Slope (Channel) (ft/ft)																																				
Bankfull Slope (ft/ft)																																				
Ri% / Ru% / P% / G% / S%																																				

- Information Unavailable
N/A - Information does not apply.
Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step

Table 11b Cont'd. Monitoring Data - Stream Reach Data Summary
Shadrick Creek - UT9 Reach 1 (706 feet)

Parameter	Baseline						MY - 1						MY - 2						MY - 3						MY - 4						MY - 5					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	-	9.5	-	-	-	1	-	9.2	-	-	-	1	-	9.7	-	-	-	1	-	8.2	-	-	-	1	-	4.5	-	-	-	1	-	4.2	-	-	-	1
Floodprone Width (ft)	-	24.0	-	-	-	1	-	24.0	-	-	-	1	-	24	-	-	-	1	-	24.0	-	-	-	1	-	24.0	-	-	-	1	-	24.0	-	-	-	1
Bankfull Mean Depth (ft)	-	0.5	-	-	-	1	-	0.5	-	-	-	1	-	0.5	-	-	-	1	-	0.6	-	-	-	1	-	1.1	-	-	-	1	-	1.2	-	-	-	1
Bankfull Max Depth (ft)	-	1.1	-	-	-	1	-	1.3	-	-	-	1	-	1.5	-	-	-	1	-	1.6	-	-	-	1	-	1.8	-	-	-	1	-	2.0	-	-	-	1
Bankfull Cross-Sectional Area (ft^2)	-	4.8	-	-	-	1	-	4.8	-	-	-	1	-	4.8	-	-	-	1	-	4.8	-	-	-	1	-	4.8	-	-	-	1	-	4.8	-	-	-	1
Width/Depth Ratio	-	18.7	-	-	-	1	-	17.6	-	-	-	1	-	19.5	-	-	-	1	-	14.1	-	-	-	1	-	4.2	-	-	-	1	-	3.6	-	-	-	1
Entrenchment Ratio	-	2.5	-	-	-	1	-	2.6	-	-	-	1	-	2.5	-	-	-	1	-	2.9	-	-	-	1	-	5.4	-	-	-	1	-	5.8	-	-	-	1
Bank Height Ratio	-	1.0	-	-	-	1	-	1.0	-	-	-	1	-	0.8	-	-	-	1	-	0.9	-	-	-	1	-	0.9	-	-	-	1	-	0.9	-	-	-	1
Profile																																				
Riffle Length (ft)																																				
Riffle Slope (ft/ft)																																				
Pool Length (ft)																																				
Pool Max Depth (ft)																																				
Pool Spacing (ft)																																				
Pattern																																				
Channel Belt Width (ft)																																				
Radius of Curvature (ft)																																				
Rc: Bankfull Width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
Additional Reach Parameters																																				
Rosgen Classification	B4																																			
Channel Thalweg Length (ft)	706																																			
Sinuosity (ft)	1.08																																			
Water Surface Slope (Channel) (ft/ft)																																				
Bankfull Slope (ft/ft)																																				
Ri% / Ru% / P% / G% / S%																																				

- Information Unavailable
N/A - Information does not apply.
Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step

Table 11b Cont'd. Monitoring Data - Stream Reach Data Summary
Shadrick Creek - UT9 Reach 2 (238 feet)

Parameter	Baseline						MY - 1						MY - 2						MY - 3						MY - 4						MY - 5					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	-	8.3	-	-	-	1	-	7.7	-	-	-	1	-	8.0	-	-	-	1	-	5.9	-	-	-	1	-	4.5	-	-	-	1	-	3.3	-	-	-	1
Floodprone Width (ft)	-	24.0	-	-	-	1	-	24.0	-	-	-	1	-	24.0	-	-	-	1	-	24.0	-	-	-	1	-	24.0	-	-	-	1	-	24.0	-	-	-	1
Bankfull Mean Depth (ft)	-	0.4	-	-	-	1	-	0.5	-	-	-	1	-	0.5	-	-	-	1	-	0.6	-	-	-	1	-	0.8	-	-	-	1	-	1.1	-	-	-	1
Bankfull Max Depth (ft)	-	1.0	-	-	-	1	-	1.0	-	-	-	1	-	1.0	-	-	-	1	-	1.1	-	-	-	1	-	1.2	-	-	-	1	-	1.4	-	-	-	1
Bankfull Cross-Sectional Area (ft^2)	-	3.6	-	-	-	1	-	3.6	-	-	-	1	-	3.6	-	-	-	1	-	3.6	-	-	-	1	-	3.6	-	-	-	1	-	3.6	-	-	-	1
Width/Depth Ratio	-	19.0	-	-	-	1	-	16.2	-	-	-	1	-	17.6	-	-	-	1	-	9.8	-	-	-	1	-	5.7	-	-	-	1	-	3.1	-	-	-	1
Entrenchment Ratio	-	2.9	-	-	-	1	-	3.1	-	-	-	1	-	3.0	-	-	-	1	-	4.1	-	-	-	1	-	5.3	-	-	-	1	-	7.2	-	-	-	1
Bank Height Ratio	-	1.0	-	-	-	1	-	1.0	-	-	-	1	-	0.9	-	-	-	1	-	0.8	-	-	-	1	-	0.9	-	-	-	1	-	0.9	-	-	-	1
Profile																																				
Riffle Length (ft)	23.3	29.0	27.3	38.4	6.7	4	18.8	24.6	24.3	31.0	5.0	4	21.1	25.6	26.7	33.4	5.7	4	7.5	24.3	19.1	47.2	16.3	7	4.7	14.4	14.0	28.8	8.5	6	9.4	20.7	17.6	43.4	12.9	7
Riffle Slope (ft/ft)	0.016	0.022	0.020	0.033	0.008	4	0.014	0.022	0.021	0.030	0.007	4	0.015	0.022	0.020	0.032	0.007	4	0.006	0.026	0.012	0.058	0.022	7	0.012	0.025	0.017	0.057	0.018	6	0.01	0.02	0.02	0.02	0.00	7
Pool Length (ft)	5.6	10.2	11.2	12.6	3.1	4	7.1	12.2	11.1	19.3	5.3	4	6.4	11.2	11.2	16.0	4.2	4	5.9	8.9	8.1	13.6	3.3	4	1.1	11.0	11.5	18.5	5.6	7	5.1	7.9	8.5	9.8	1.8	6
Pool Max Depth (ft)	1.0	1.5	1.5	1.7	0.3	4	1.1	1.4	1.4	1.8	0.3	4	1.1	1.4	1.5	1.8	0.3	4	0.4	0.5	0.5	0.6	0.1	4	0.8	1.3	1.5	1.7	0.4	7	0.7	1.0	1.0	1.5	0.3	6
Pool Spacing (ft)	40.4	47.7	46.4	56.4	8.1	3	38.7	44.9	45.3	50.6	6.0	3	39.5	46.3	45.8	53.5	7.0	3	38.7	62.8	57.7	92.1	27.1	3	18.3	37.1	34.6	62.0	17.1	6	21.5	43.1	33.8	73.2	24.2	5
Pattern																																				
Channel Belt Width (ft)	24.5	30.0	29.0	36.6	6.1	3																														
Radius of Curvature (ft)	13.3	15.2	15.4	16.9	1.8	3																														
Rc: Bankfull Width (ft/ft)	2.1	2.3	2.3	2.5	0.2	3																														
Meander Wavelength (ft)	63.7	78.5	79.3	92.5	14.4	3																														
Meander Width Ratio	3.1	3.8	3.6	4.6	0.8	3																														
Additional Reach Parameters																																				
Rosgen Classification	C5						C5						C5						C5						C5						C5					
Channel Thalweg Length (ft)	238						240						239						230						236						236					
Sinuosity (ft)	1.20						1.20						1.20						1.15						1.18						1.18					
Water Surface Slope (Channel) (ft/ft)	0.0168						0.0171						0.0159						0.0193						0.0184						0.0193					
Bankfull Slope (ft/ft)	0.0182						0.0166						0.0173						0.0164						0.0170						0.0178					
Ri% / Ru% / P% / G% / S%	60%	13%	21%	6%	0%		51%	15%	25%	9%	0%		55%	14%	8%	0%			75%	6%	16%	3%	0%		37%	12%	33%	15%	4%		60%	9%	19%	8%	4%	

- Information Unavailable
N/A - Information does not apply.
Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step

Table 11b Cont'd. Monitoring Data - Stream Reach Data Summary
Shadrick Creek - UT10 (404 feet)

Parameter	Baseline						MY - 1						MY - 2						MY - 3						MY - 4						MY - 5					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	-	7.3	-	-	-	1	-	8.7	-	-	-	1	-	8.4	-	-	-	1	-	7.4	-	-	-	1	-	6.7	-	-	-	1	-	2.3	-	-	-	1
Floodprone Width (ft)	-	24.0	-	-	-	1	-	24.0	-	-	-	1	-	24.0	-	-	-	1	-	24.0	-	-	-	1	-	24.0	-	-	-	1	-	24.0	-	-	-	1
Bankfull Mean Depth (ft)	-	0.5	-	-	-	1	-	0.4	-	-	-	1	-	0.4	-	-	-	1	-	0.5	-	-	-	1	-	0.5	-	-	-	1	-	1.2	-	-	-	1
Bankfull Max Depth (ft)	-	1.1	-	-	-	1	-	1.1	-	-	-	1	-	1.0	-	-	-	1	-	1.3	-	-	-	1	-	1.1	-	-	-	1	-	1.5	-	-	-	1
Bankfull Cross-Sectional Area (ft^2)	-	3.4	-	-	-	1	-	3.4	-	-	-	1	-	3.4	-	-	-	1	-	3.4	-	-	-	1	-	3.4	-	-	-	1	-	2.7	-	-	-	1
Width/Depth Ratio	-	15.6	-	-	-	1	-	22.3	-	-	-	1	-	20.8	-	-	-	1	-	16.0	-	-	-	1	-	13.0	-	-	-	1	-	2.0	-	-	-	1
Entrenchment Ratio	-	3.3	-	-	-	1	-	2.8	-	-	-	1	-	2.9	-	-	-	1	-	3.3	-	-	-	1	-	3.6	-	-	-	1	-	10.3	-	-	-	1
Bank Height Ratio	-	1.0	-	-	-	1	-	0.9	-	-	-	1	-	0.7	-	-	-	1	-	0.7	-	-	-	1	-	0.9	-	-	-	1	-	0.6	-	-	-	1
Profile																																				
Riffle Length (ft)																																				
Riffle Slope (ft/ft)																																				
Pool Length (ft)																																				
Pool Max Depth (ft)																																				
Pool Spacing (ft)																																				
Pattern																																				
Channel Belt Width (ft)																																				
Radius of Curvature (ft)																																				
Rc: Bankfull Width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
Additional Reach Parameters																																				
Rosgen Classification	B4																																			
Channel Thalweg Length (ft)	404																																			
Sinuosity (ft)	1.03																																			
Water Surface Slope (Channel) (ft/ft)																																				
Bankfull Slope (ft/ft)																																				
Ri% / Ru% / P% / G% / S%																																				

- Information Unavailable
N/A - Information does not apply.
Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step

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Appendix E
Hydrologic Data

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Table 12. Verification of Bankfull Events Shadrick Creek Restoration Project				
Shadrick Reach 1				
Date of Data Collection	**Date of Occurrence**	**Method**	**Feet Above Bankfull Elevation**	**Photo # (if available)**
6/5/2018	Unknown[2]	Crest Gauge	0.05	n/a
11/8/2018	Unknown[3]	Wrack Lines	Unknown	n/a
4/24/2019	Unknown[1]	Crest Gauge	0.4	n/a
4/24/2019	Unknown[1]	Wrack Lines	Unknown	n/a
4/22/2020	Unknown[5]	Crest Gauge	1.1	n/a
4/22/2020	Unknown[5]	Wrack Lines	Unknown	n/a
4/28/2021	Unknown[6]	Crest Gauge/Wrack Lines	0.26 & 0.42	1
11/10/2021	Unknown[7]	Crest Gauge	2.6	2
9/20/2022	Unknown[8]	Crest Gauge	0.7	1
Shadrick Reach 3				
Date of Data Collection	**Date of Occurrence**	**Method**	**Feet Above Bankfull Elevation**	**Photo # (if available)**
2/5/2018	Unknown[4]	Wrack Lines	Unknown	n/a
11/8/2018	Unknown[3]	Crest Gauge	0.6	n/a
4/24/2019	Unknown[1]	Wrack Lines	Unknown	n/a
4/24/2019	Unknown[1]	Crest Gauge	0.4	n/a
4/22/2020	Unknown[5]	Crest Gauge	0.6	n/a
4/22/2020	Unknown[5]	Wrack Lines	Unknown	n/a
11/18/2021	Unknown[7]	Crest Gauge/Wrack Lines	1.2	3 & 4
11/3/2022	Unknown[8]	Crest Gauge	Equal elevation	2

[1] Suspected date is 4/17/2019
[2] Suspected date is 5/18/2018
[3] Suspected date is 10/18/2018
[4] Suspected date is 1/12/2018
[5] Suspected date is 2/4/2020
[6] Suspected date is 3/26/2021
[7] Suspected date is 10/8/2021
[8] Suspected date is 5/25-5/27/2022

Photo Verification of Bankfull Events

Photo #1 – Shadrick Creek Reach 1 Crest Gauge at 1.8 feet (Recorded bankfull + 0.7 feet)

Photo #2 – Shadrick Creek Reach 3 Crest Gauge at 1.3 feet (Recorded ~bankfull)

Figure 3. Daily Precipitation Totals for the Shadrick Creek Restoration Site

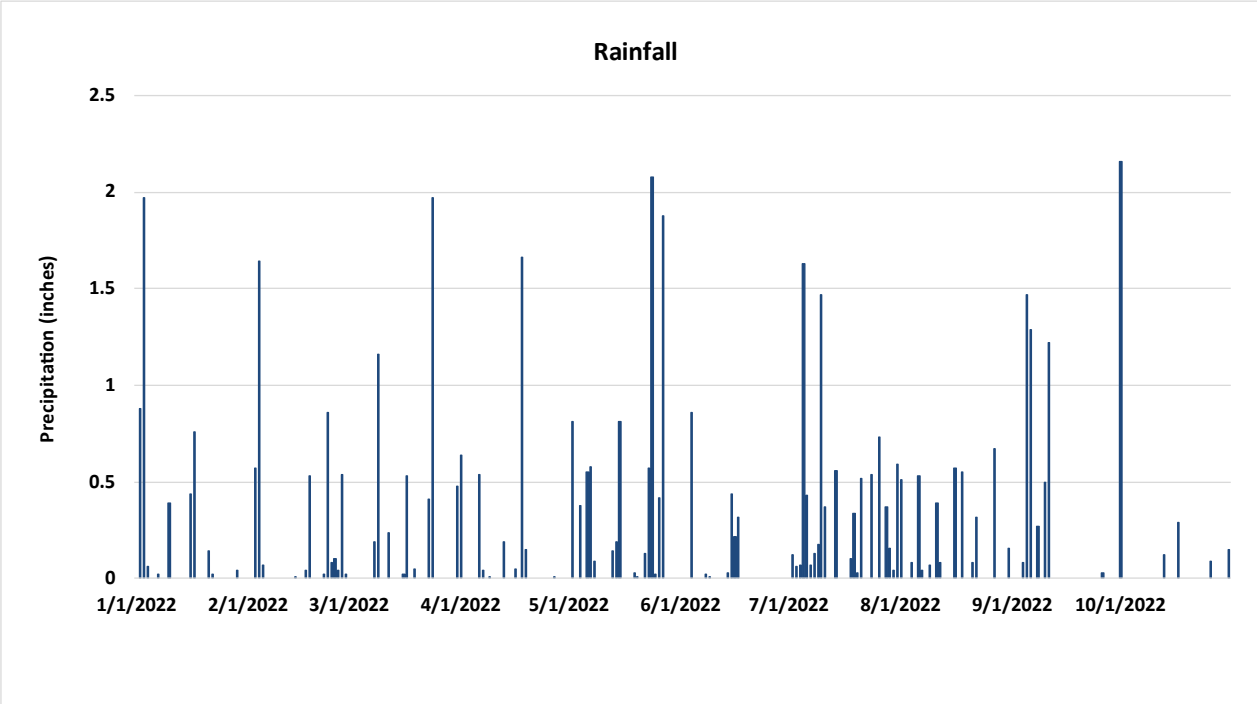
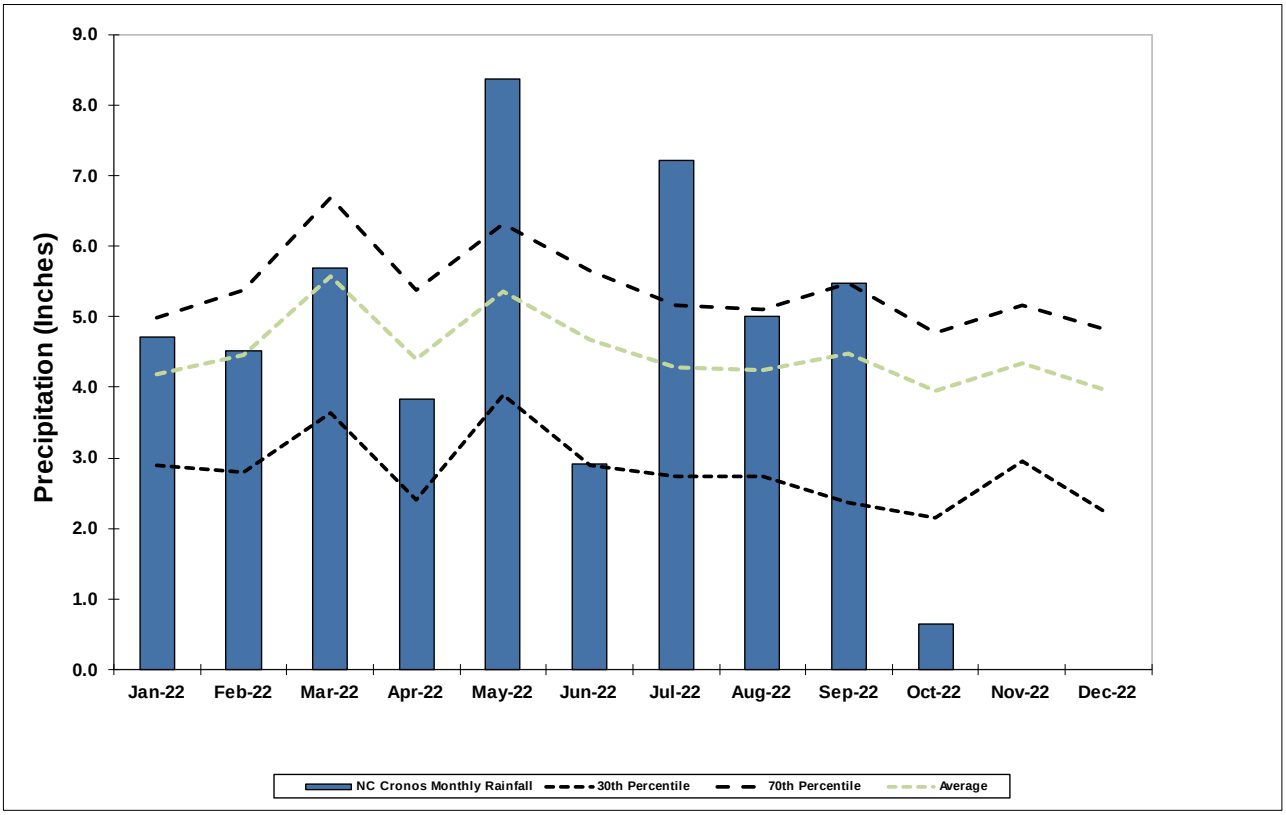


Figure 4. Monthly Precipitation Data Compared to 30th and 70th Percentiles for McDowell County



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Appendix F
Other Data

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SHADRICK CREEK MITIGATION PROJECT - #D16020i - MY5 HERBICIDE LOG (2022)

Date	Start / End Time	Certified Applicator	Areas	Target Species	Type	Herbicide	Solution (%)	Volume Herbicide Concentrate Used* (oz)	Volume Mixture Used (gal)	Weather	Temp (°F)	Wind Speed (mph)	Notes
6/20/2022	10:00-3:00pm	026-29539	Lower UT-2, Mainstem Reach 1, UT-9, UT-10	ROMU, LISI, LOJA, ELUM	Foliar	Glyphosate 5.4 in water plus CideKick adjuvant, blue dye	4	102	20	overcast, muggy, HOT	87	calm	Retreatment of outlying stems within Reach 1 and all incoming tributaries except Upper UT-1 (wetland); incidental treatment of autumn olive seedlings;
			Lower UT-1, parts of mainstem; UT-5 up old road bed; lower UT-9	PUMO	Foliar	Clopyralid 3 in water plus CideKick adjuvant, blue dye	0.07	8	8				Sprayed infestations on edge of CE (outside in places, to prevent spread); cut (not treat) some vines in the RR ROW that dangle over UT-9.
7/14/2022	9:00-4:00pm	026-29539	UT-1: Upper LDB above RR, at lower crossing; Mainstem Reach 1 at gated crossing;	PUMO	Cut stump	Triclopyr 3A (amine) in water	50	16	0.25	warm, sunny	85	mild, 1-2 mph max	Cut/treat any vines encountered. Located several crowns (new?) at gated crossing on mid Reach 1.
			UT-1: Upper LDB above RR; Upper LDB Reach 1; Lower Reach 1 (LDB Floodplain)	LISI, ROMU	Cut stump	Triclopyr 3A (amine) in water	50	32	0.5				Following up on heavy spray areas; cut stumping standing resprouting privet, rose, and occasional honysuckle vine; Chainsaw cuts on UT-10; major removal.
10/5/2022	11:00 - 4:00 pm	026-29539	Reach 1: near crossing to UT-7;	PUMO	Cut stump	Triclopyr 3A (amine) in water	50	16	0.25	warm, sunny	61	calm	Located previously unknown small PUMO patch; cut and paint, and hand pull ;
			UT-1, UT-9, UT-10; UT-6 lower RDB	LISI, ROMU	Cut stump	Triclopyr 3A (amine) in water	50	0.125	0.25				Continued follow up; will need final spray in Q2 2023;
			Reach 3: Bradford pears upper LDB near Upper LDB	PYCA	Cut stump								Observed new large trees near RR tracks, felled them, will follow up Q2 2023.

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