Thomas Creek Restoration Project
Year 5 Monitoring Report - FINAL

Wake County, North Carolina

DMS Project ID Number – 96074, DEQ Contract No. 5549

Permits: SAW-2013-02009, DWR# 14-1328

Cape Fear River Basin: 03030004-020010

Project Info:	Monitoring Year: 5 of 7 Year of Data Collection: 2020 Year of Completed Construction (including planting): 2016 Submission Date: January 2021
Submitted To:	NCDEQ - Division of Mitigation Services 1625 Mail Service Center Raleigh, NC 27699 NC DEQ Contract ID No. 003992

Michael Baker
INTERNATIONAL

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January 7, 2021

Jeremiah Dow, Project Manager
NCDEQ, Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

Subject: Response to DMS Comments for DRAFT Monitoring Year 5 Report
Thomas Creek Restoration Project, Wake County
DMS Project # 96074, DEQ Contract #5549, RFP# 16-005020

Mr. Dow:

Please find below our responses to the NC Division of Mitigation Services (DMS) review comments dated December 21, 2020 in reference to the Thomas Creek Restoration Project –DRAFT Monitoring Year 5 Report. We have revised the Draft document in response to the referenced review comments as outlined below:

1. Digital files/drawings:
   a. If available, please submit features that characterize the mitigation plan design lengths.
      Response: The old GIS shapefiles used to make the figures in the mitigation plan from 2015 were found and are included with the revised digital files. Please note the project design CAD files were used to determine the proposed reach lengths in the mitigation plan.

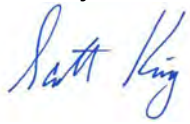
   b. Please submit photos as jpegs rather than a pdf.
      Response: Photos have been provided as individual JPGs in the revised digital documents.

   c. Please submit pebble count data used to create figures.
      Response: The figures include the pebble count by size data used to generate the two graphs, but scanned copies of the original field collection forms have also been included with the revised digital files.

   d. Please submit the data used to create the flow gauge figures.
      Response: The flow gauge data used to create the figures has been provided with the revised digital files.

As requested, Baker has provided one (1) hardcopy and a pdf copy of the Final report, along with all the updated digital files (to be sent by secure ftp link). Please do not hesitate to contact me should you have any questions regarding our response submittal.

Sincerely,



Scott King, LSS, PWS
Project Manager

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Report Prepared and Submitted by Michael Baker Engineering, Inc.

NC Professional Engineering License # F-1084

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APPENDICES

1.0 EXECUTIVE SUMMARY

Michael Baker Engineering, Inc. (Baker) restored 4,721 linear feet of perennial and intermittent stream and enhanced 3,948 linear feet of intermittent stream as documented in the As-built Baseline Report. Baker also planted approximately 14.4 acres of native riparian vegetation within the 22.7 acre recorded conservation easement areas along all or portions of the restored and enhanced reaches (Reaches R1, R2, R3, R4, R5, R6, R7, T1, and T2). The Thomas Creek Restoration Project (Site) is located in Wake County, North Carolina (Figure 1), approximately 1.5 miles southwest of the Community of New Hill. (Figure 1). The Site is located within the NC Division of Mitigation Services' (NCDMS) Targeted Local Watershed (TLW) 03030004-020010 (the Harris Lake Hydrologic Unit) of the Cape Fear River Basin, and is located in what was formerly known as the NC Division of Water Resources (NCDWR) subbasin 03-06-07. The project involved the restoration and enhancement of a rural Piedmont stream system, which had been impaired due to past agricultural conversion and cattle grazing.

Based on the NCDMS 2009 Cape Fear River Basin Restoration Priority (RBRP) Plan, the Thomas Creek Restoration Project area is located in an existing targeted local watershed within the Cape Fear River Basin and is located within the Middle Cape Fear / Kenneth and Parker Creeks, Local Watershed Planning (LWP) area. The restoration strategy for the Cape Fear River Basin is to promote low impact development, stormwater management, restoration and buffer protection in urbanizing areas, and buffer preservation elsewhere.

The primary goal of the project was to improve ecologic functions through the restoration and enhancement of streams and buffers in a degraded, urbanizing area as described in the NCDMS 2009 Cape Fear RBRP. Detailed project goals are identified below:

- Create geomorphically stable conditions along the unnamed tributaries throughout the Site,
- Protect and improve water quality by reducing streambank erosion, and nutrient/sediment inputs,
- Restore stream and floodplain interaction by connecting historic flow paths and promoting natural flood processes,
- Restore and protect riparian buffer functions and corridor habitat in perpetuity by establishing a permanent conservation easement, and
- Improve aquatic and terrestrial habitat through improved substrate and in-stream cover, addition of woody debris, and reduction of water temperature.

To accomplish these goals, the following objectives were identified:

- Restore existing incised, eroding, and channelized streams by providing them access to their relic floodplains,
- Implement agricultural BMPs, including cattle watering stations, to reduce nonpoint source (NPS) inputs to receiving waters,
- Prevent cattle from accessing the conservation easement by installing permanent fencing and thus reduce excessive streambank erosion and undesired nutrient inputs,
- Enhance aquatic habitat value by providing more bedform diversity, creating natural scour pools and reducing sediment from accelerated streambank erosion,

- Plant native species riparian buffer vegetation along streambank and floodplain areas, protected by a permanent conservation easement, to increase stormwater runoff filtering capacity, improve streambank stability and riparian habitat connectivity, and shade the stream to decrease water temperature, and
- Control invasive species vegetation within much of the project area and, if necessary, continue treatments during the monitoring period.

The Year 5 monitoring survey data of the sixteen permanent cross-sections indicates that these stream sections are geomorphically stable and are within the lateral/vertical stability and in-stream structure performance categories. Certain cross-sections (found in Appendix D) have shown very minor fluctuations in their geometry as compared to the previous survey conducted in Year 3. These minor fluctuations represent a trend towards increased stability based off visual field evaluations. All reaches are fully stable and performing as designed and are rated at 100 percent for all the visual parameters evaluated in Table 5.

There were no Stream Problem Areas (SPAs) identified on the project during the Year 5 monitoring. The two short sections of minor bank scour from Hurricane Florence that were reported, repaired, and replanted in Year 4 appear fully stable with vegetation establishing well (see photos in Appendix B).

During Year 5 monitoring, the planted acreage performance categories were functioning well with no bare or thin areas to report. The average density of total planted stems (not including volunteers), based on data collected from the sixteen monitoring plots following Year 5 monitoring in October 2020, was 562 stems per acre. Thus, the Year 5 vegetation data demonstrate that the Site meets the minimum success interim criteria of 260 trees per acre by the end of Year 5. Additionally, there were no areas of invasive species vegetation observed during the Year 5 monitoring.

There were no Vegetation Problem Areas (VPAs) identified on the project during the Year 5 monitoring. However, previously in Year 3 an area of low vigor/short stem heights totaling approximately 0.38 acres was noted along the left buffer of Reach R3. Based on soil test results, this area has periodically received small applications of soil amendments to help improve stem growth. In February 2020 the area received an application of lime, while in May and October of 2020 a small application of fertilizer was applied. The plant vigor and growth in this area certainly appears to be improving but is still behind the growth observed on the rest of the site. As such, soil amendments will continue to be applied to this area. This area is noted in Table 6 and in shown in the CCPV, both of which can be found in Appendix B.

Year 5 flow monitoring demonstrated that both flow gauges (TMCK-FL1 and TMCK-FL2) met the stated success criteria of 30 days or more of consecutive flow through Reaches 2 and 5 respectively. Flow gauge TMCK-FL1 documented 129 days of consecutive flow in Reach 2, while flow gauge TMCK-FL2 documented 295 days of consecutive flow in Reach 5. The flow gauges demonstrated similar patterns relative to rainfall events as shown in the flow gauge graphs in Appendix E. Unfortunately, the pressure transducer device in Flow Gauge #1 failed in May 2020. It will be replaced before the start of Year 6 monitoring.

During Year 5 monitoring, the Reach R2 crest gauge (crest gauge #1) documented one post-construction bankfull event in February 2020, as confirmed by the in-stream flow gauges (see Appendix E). As bankfull events have now been documented in all five years of monitoring, the project has now met the bankfull standard required for credit release.

Two pebble counts were conducted during Year 5 monitoring, one each in riffles located along Reach R2 and Reach R5. The results indicate that the riffle in R2 appears stable and is quite similar to the previous year's condition, having apparently fully flushed out the finer sediment previously observed to have been deposited there. The riffle in R5 also appears quite stable as the distribution is fairly consistent with all previous results,

despite the significant flow events of the past few years. Pebble count data and graphs can be found in Appendix D, while photographs of the two riffles at the time of sampling can be found in Appendix B.

Summary information/data related to the Site 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 available on the DMS website. Any raw data supporting the tables and figures in the Appendices is available from DMS upon request.

This report documents the successful completion of the Year 5 monitoring activities for the post-construction monitoring period.

2.0 METHODOLOGY

The seven-year monitoring plan for the Site includes criteria to evaluate the success of the stream and vegetation components of the Site. The methodology and report template used to evaluate these components adheres to the DMS guidance documents Monitoring Requirements and Performance Standards for Stream and/or Wetland Mitigation (DMS 2011), and to the Monitoring Report Template, Version 1.5 (DMS 2012), which will continue to serve as the template for subsequent monitoring years. The vegetation-monitoring quadrants follow CVS-DMS monitoring levels 1 and 2 in accordance with CVS-DMS Protocol for Recording Vegetation, Version 4.1 (Lee 2007).

Stream survey data was collected to a minimum of Class C Vertical and Class A Horizontal Accuracy using Leica TS06 Total Station and was georeferenced to the NAD83 State Plane Coordinate System, FIPS3200 in US Survey Feet, which was derived from the As-built Survey. This survey system collects point data with an accuracy of less than one tenth of a foot.

The specific locations of monitoring features, such as vegetation plots, permanent cross-sections, reference photograph stations, crest gauges and flow gauges, are shown on the Current Condition Plan View (CCPV) map found in Appendix B.

All earthwork for project construction was completed in October of 2015, with subsequent as-built survey work completed in November of 2015. All site planting (bareroot stems and live-stakes) was completed in January of 2016.

The Monitoring Year 5 vegetation plot data were collected in October 2020, the visual site assessment data contained in Appendix B were obtained in February and October 2020, and the cross-section data found in Appendix D were collected in September 2020.

2.1 Stream Assessment

The Project involved the restoration and enhancement of a rural Piedmont stream system that had been impaired due to past agricultural conversion and cattle grazing. Restoration practices involved raising the existing streambed and reconnecting the stream to the relic floodplain to restore natural flood regimes to the system. The existing channels abandoned within the restoration areas were partially to completely filled to decrease surface and subsurface drainage and to raise the local water table. Permanent cattle exclusion fencing was provided around all proposed reaches and riparian buffers, except along reaches where no cattle are located or cattle lack stream access.

2.1.1 Morphological Parameters and Channel Stability

A longitudinal profile was surveyed for the entire length of channel immediately after construction to document as-built baseline conditions for the Monitoring Year 0 only. Annual longitudinal profiles will not be conducted during subsequent monitoring years unless channel instability has been documented or remedial actions/repairs are required by the U.S. Army Corps of Engineers (USACE) or DMS.

Survey data from the sixteen permanent project cross-sections were collected and classified using the Rosgen Stream Classification System, and all monitored cross-sections fall within the quantitative parameters defined for channels of the design stream type (Rosgen 1994). The Year 5 monitoring survey data for the cross-sections indicates that the Site is geomorphically stable and performing at 100 percent for all the parameters evaluated. The data collected are within the lateral/vertical stability and in-stream structure performance categories. Morphological survey data are presented in Appendix D.

Please note, as per DMS/IRT request the bank height ratios for MY5 have been calculated using the as-built bankfull area to determine low bank height and the max depth based on the current-year channel cross-sectional area. All other values were calculated using the as-built bankfull elevation, as was done for all previous monitoring reports.

Particle size distribution assessments (pebble counts) were conducted using the modified Wolman method as described in Applied River Morphology (Rosgen 1996).

2.1.2 Hydrology

To monitor on-site bankfull events, one crest gauge (crest gauge #1) was installed along the downstream portion of Reach R2 at bankfull elevation along the left top of bank at approximately Station 38+90. During Year 5 monitoring, one above-bankfull event was documented in February 2020. Further details of the crest gauge readings are presented in Table 12 in Appendix E.

To monitor flow on restored reaches, two flow gauges were installed on site; TMCK-FL1 on Reach 2 (Station 20+75), and TMCK-FL2 on Reach 5 (Station 33+90). The Year 5 flow monitoring data demonstrated that both flow gauges met the stated success criteria of 30 days or more of consecutive flow. The gauges also demonstrated similar patterns relative to rainfall events and can corroborate reported overbank flow events from the crest gauge, as shown in the flow gauge graphs found in Appendix E.

As the observed monthly rainfall data for the project presented in Figure 9 in Appendix E demonstrates, the past 12 months have been much wetter as compared to historic averages for Wake County. A total of 59.5 in. of rainfall was observed for the project using the nearest NC-CRONOS station, while Wake County averages 43.8 in. of annual rainfall.

2.1.3 Photographic Documentation

Reference photograph transects were taken at each permanent cross-section in September of 2020. The survey tape was centered in the photographs of the bank. The water line was located in the lower edge of the frame, and as much of the bank as possible is included in each photograph.

Representative stream photographs for Monitoring Year 5 were taken along each Reach in February 2020 and are provided in Appendix B.

Photographs of each Vegetation Plot taken in October 2020 can also be found in Appendix B.

2.1.4 Visual Stream Morphological Stability Assessment

The visual stream morphological stability assessment involves the qualitative evaluation of lateral and vertical channel stability, and the integrity and overall performance of in-stream structures throughout the Project reaches as a whole. Habitat parameters and pool depth maintenance are also evaluated. During Year 5 monitoring, Baker staff walked the entire length of each of the Project reaches several times throughout the year, noting geomorphic conditions of the stream bed profile (riffle/pool facets), both stream banks, and engineered in-stream structures. Representative photographs were taken per the Site's Mitigation Plan, and the locations of any SPAs were documented in the field for subsequent mapping on the CCPV figures. There were no SPAs noted during Year 5 monitoring. A more detailed summary of the results for the visual stream stability assessment can be found in Appendix B, which includes supporting data tables and figures, as well as the general stream photos.

2.2 Vegetation Assessment

In order to determine if the success criteria were achieved, vegetation-monitoring quadrants were installed and are monitored across the site in accordance with the CVS-DMS Protocol for Recording Vegetation, Version 4.1 (Lee 2007) using the CVS-DMS Data Entry Tool v. 2.3.1 (CVS 2012). The vegetation monitoring plots cover a minimum of 2 percent of the planted portion of the Site with sixteen plots established randomly within the planted riparian buffer areas per Monitoring Levels 1 and 2. The sizes of individual quadrants are 100 square meters for woody tree species.

During Year 5 monitoring, the planted acreage performance categories were functioning well with no bare areas to report. The average density of total planted stems, based on data collected from the sixteen monitoring plots following Year 5 monitoring in October 2020, was 562 stems per acre. Thus, the Year 5 vegetation data demonstrate that the Site has met the minimum success interim criteria of 260 trees per acre by the end of Year 5. There were no VPAs noted during the Year 5 monitoring.

Additionally, there were no significant areas of invasive species vegetation observed during the Year 5 monitoring. There were a few small, isolated pockets of cattail (*Typha latifolia*) found along sections of Reach R2. They will be monitored closely over the next year and treated if necessary.

The complete Year 5 vegetation assessment information is provided in Appendix B and C.

3.0 REFERENCES

Carolina Vegetation Survey (CVS) and NC Division of Mitigation Services (DMS). CVS-DMS Data Entry Tool v. 2.3.1. University of North Carolina, Raleigh, NC. 2012.

Lee, M., Peet R., Roberts, S., Wentworth, T. 2007. CVS-DMS Protocol for Recording Vegetation, Version 4.1.

North Carolina Division of Mitigation Services (DMS). 2012. NCDMS Monitoring Report Template, Version 1.5, June 8, 2012.

North Carolina Division of Mitigation Services (DMS). 2011. NCDMS Monitoring Requirements and Performance Standards for Stream and/or Wetland Mitigation. November 7, 2011.

North Carolina Division of Mitigation Services (DMS). 2009. Cape Fear River Basin Restoration Priorities.

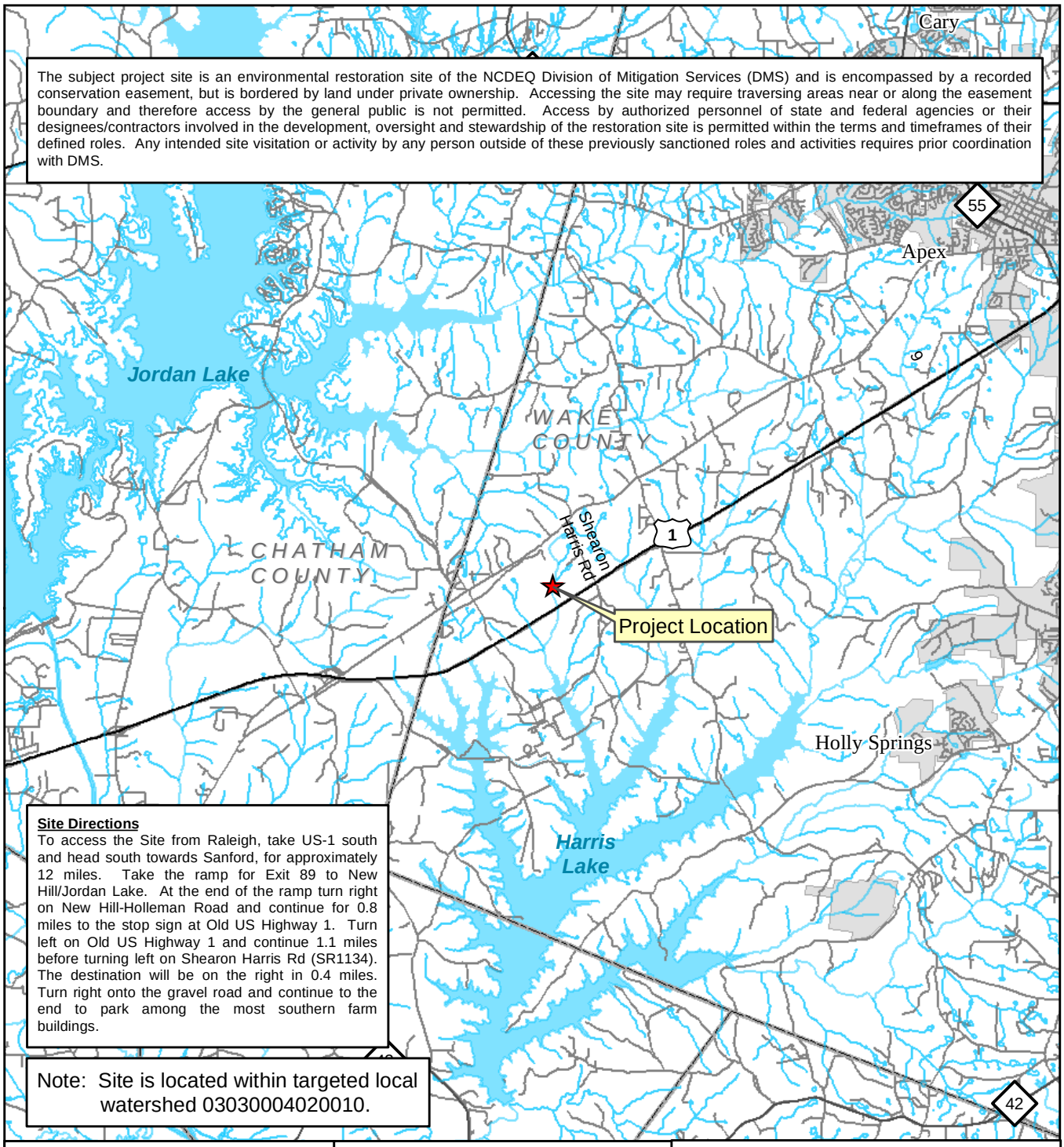
Rosgen, D.L. 1994. A Classification of Natural Rivers. Catena 22:169-199.

Rosgen, D.L. 1996. Applied River Morphology. Wildlands Hydrology. Pagosa Springs, CO.

Appendix A

Project Vicinity Map and Background Tables

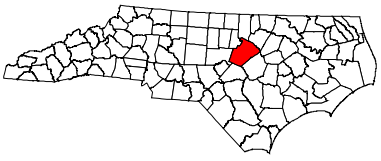
The subject project site is an environmental restoration site of the NCDEQ Division of Mitigation Services (DMS) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easement boundary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



Site Directions

To access the Site from Raleigh, take US-1 south and head south towards Sanford, for approximately 12 miles. Take the ramp for Exit 89 to New Hill/Jordan Lake. At the end of the ramp turn right on New Hill-Holleman Road and continue for 0.8 miles to the stop sign at Old US Highway 1. Turn left on Old US Highway 1 and continue 1.1 miles before turning left on Shearon Harris Rd (SR1134). The destination will be on the right in 0.4 miles. Turn right onto the gravel road and continue to the end to park among the most southern farm buildings.

Note: Site is located within targeted local watershed 03030004020010.



Wake County

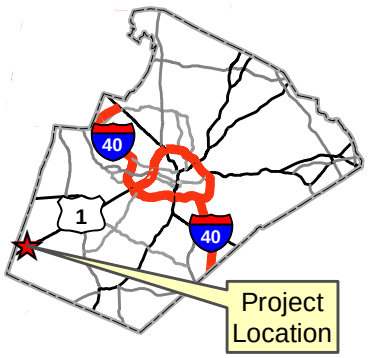


Figure 1 - Project Vicinity Map
Thomas Creek Site
DMS Project ID No. 96074

NCDEQ - Division of Mitigation Services

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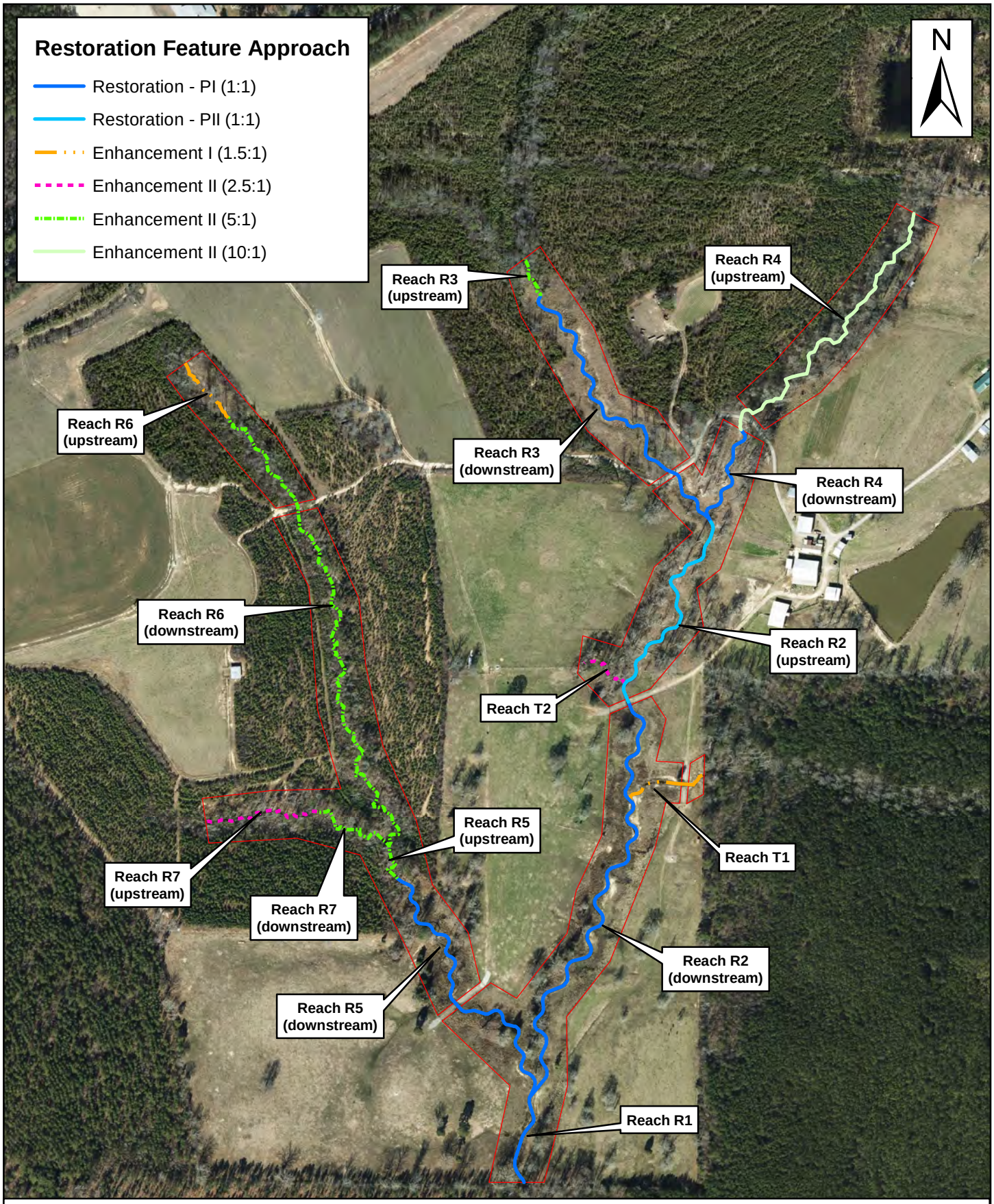
0 0.5 1 2 3 Miles



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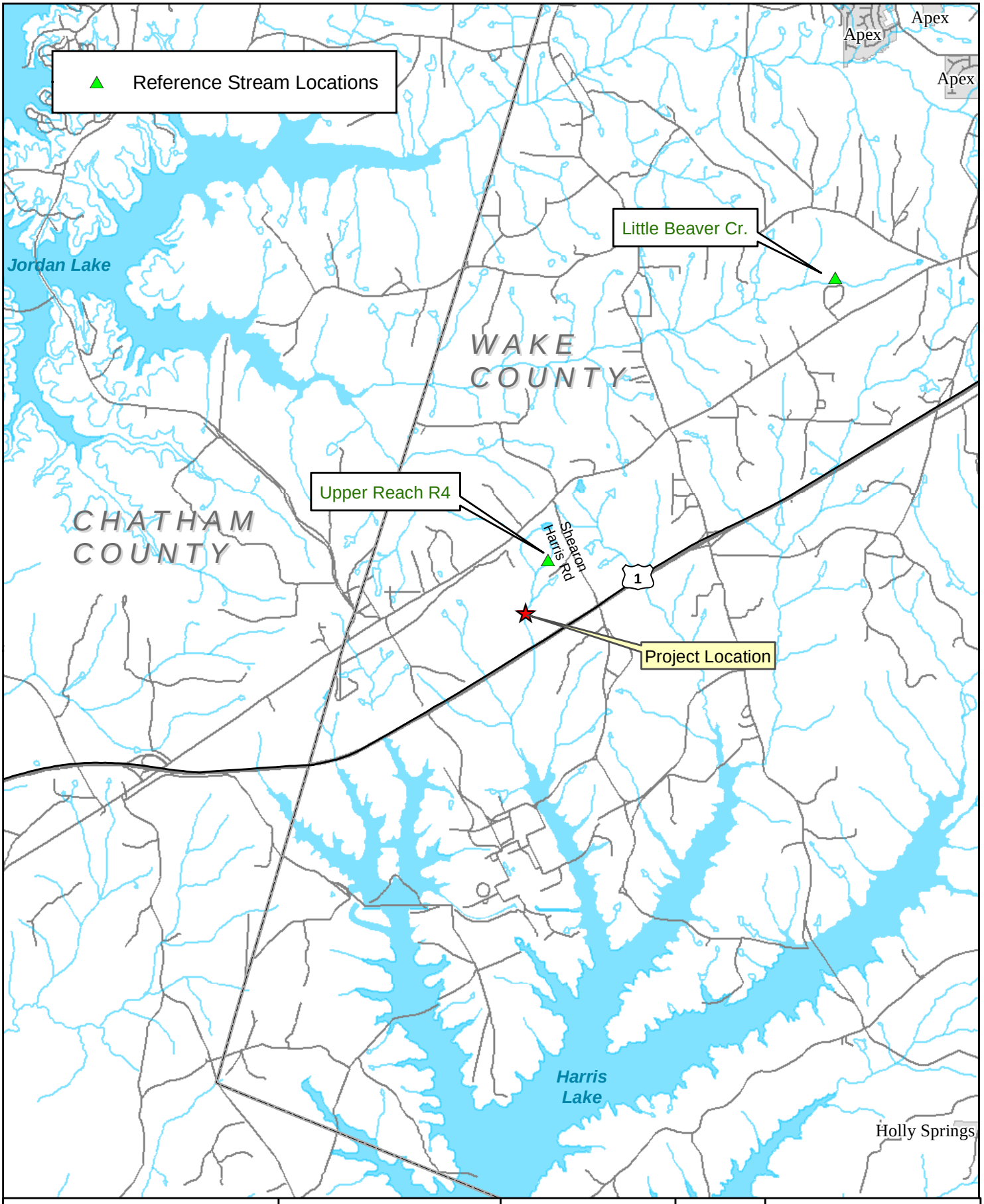
0 250 500 Feet

Figure 2
Restoration Summary Map
Thomas Creek Site



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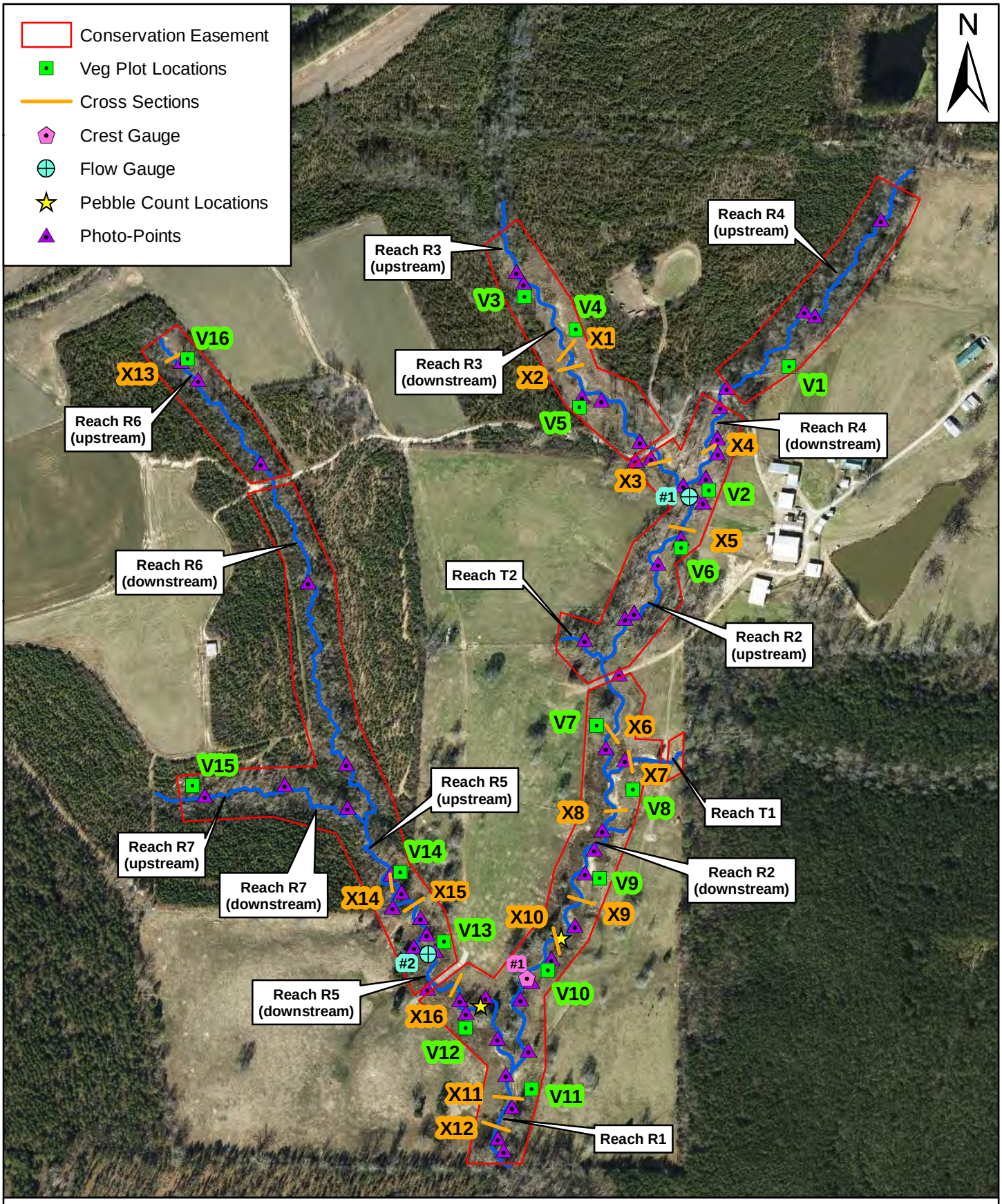
NCDEQ - Division of Mitigation Services

0 0.5 1
Miles

N

Figure 3
Reference Stream Locations Map
Thomas Creek Site



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0 250 500 Feet

Figure 4
Monitoring Features Overview Map
Thomas Creek Site

Table 1. Project Components and Mitigation Credits

Thomas Creek Restoration Project: DMS Project ID No. 96074

Mitigation Credits

	Stream (SMUs)	Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorus Nutrient Offset
Type	R, E1, EII							
Totals	5,706							

Project Components

Project Component or Reach ID	As-Built Stationing/ Location	Existing Footage/ Acreage (LF)	Approach	Restoration/ Restoration Equivalent (SMU) from Mitigation Plan*	Design Reach Length (LF) from Mitigation Plan**	As-Built Restoration Footage (LF)	Mitigation Ratio
Reach 1	42+01 to 44+99	397	Restoration	266	266	298	1:1
Reach 2 (downstream)†	27+78 to 42+01	1,238	Restoration (PI)	1,384	1,404	1,423	1:1
Reach 2 (upstream)†	20+55 to 27+58 (at CE Break)	757	Restoration (PII)	703	703	703	1:1
Reach 3 (downstream)	11+17 to 18+70 / CE Break / 18+94 to 20+55	937	Restoration	929	949	914	1:1
Reach 3 (upstream)	10+00 to 11+17	130	Enhancement II	26	130	117	5:1
Reach 4 (downstream)	10+41 to 13+83	327	Restoration	361	361	342	1:1
Reach 4 (upstream)	00+99 to 09+95	870	Enhancement II	87	870	896	10:1
Reach 5 (downstream)	29+30 to 34+97 / CE Break / 35+17 to 39+91	883	Restoration	1,044	1,064	1,041	1:1
Reach 5 (upstream)	28+02 to 29+30	137	Enhancement II	27	137	128	5:1
Reach 6 (downstream)	12+10 to 15+55 / CE Break / 15+81 to 28+02	1,592	Enhancement II	320	1,618	1,566	5:1
Reach 6 (upstream)	10+00 to 12+10	210	Enhancement I	140	210	210	1.5:1
Reach 7 (downstream)	13+60 to 16+47	287	Enhancement II	57	286	287	5:1
Reach 7 (upstream)	10+00 to 13+60	360	Enhancement II	144	360	360	2.5:1
Reach T1	10+00 to 10+55 / CE Break / 10+75 to 12+47	242	Enhancement I	155	253	227	1.5:1
Reach T2	10+00 to 11+57	171	Enhancement II	63	158	157	2.5:1

Component Summation

Restoration Level	Stream (LF)	Riparian Wetland (AC)	Non-riparian Wetland (AC)	Buffer (SF)	Upland (AC)
Restoration	4,721				
Enhancement I	437				
Enhancement II	3,511				

BMP Elements

Element	Location	Purpose/Function	Notes

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

Notes:

† Starting in MY2, Reach 2 was broken up into an upstream and downstream component based on restoration approach as per DMS request. None of the actual restored lengths have changed, although the credits for R2 (downstream) were adjusted as explained below.

* Starting in MY2, the SMU credit numbers used for these reaches were taken directly from the mitigation plan credit table (Table 5.1) as per DMS/IRT instruction, and vary from those presented in the baseline and MY1 monitoring reports. This was done because credits were originally calculated along the as-built thalweg but have been updated to be calculated along stream centerlines for MY2 onward after discussions with the IRT stemming from the April 3, 2017 Credit Release Meeting. Stationing and Restoration Footage numbers reported herein and on all subsequent monitoring reports will remain as reported from the as-built survey. As Reach E was not originally subdivided, the credits were reduced from the downstream section where the bulk of differences are expected to have occurred, though the total combined credits equal the original value for R2 as found in the approved mitigation plan.

** Starting in MY3, as per DMS/IRT instruction, this column was added to the table showing the design reach lengths taken from the mitigation plan (Table ES.1). Please note these numbers did not remove non-creditable sections such as easement breaks for crossings from their calculations.

Table 2. Project Activity and Reporting History
Thomas Creek Restoration Project: DMS Project ID No. 96074

Elapsed Time Since Grading Completed in Oct. 2015	5 Years, 1 Month
Elapsed Time Since Planting Completed in Jan. 2016	4 Years, 10 Months
Number of Reporting Years [1]	5

Activity or Deliverable	Data Collection Complete	Actual Completion or Delivery
Mitigation Plan Prepared	N/A	Oct-14
Mitigation Plan Amended	N/A	Mar-15
Mitigation Plan Approved	N/A	Mar-15
Final Design – (at least 90% complete)	N/A	Mar-15
Construction Begins	N/A	Apr-15
Temporary S&E mix applied to entire project area	N/A	Oct-15
Permanent seed mix applied to entire project area	N/A	Oct-15
Planting of live stakes	N/A	Jan-16
Planting of bare root trees	N/A	Jan-16
End of Construction	N/A	Oct-15
Survey of As-built conditions (Year 0 Monitoring-baseline)	Nov-15	Nov-15
Baseline Monitoring Report	Mar-16	Oct-16
Year 1 Monitoring	Nov-16	Jan-17
Stream structure and bank repairs made to Reach R1	Repairs made in July 2016	
Year 2 Monitoring	Oct-17	Nov-17
Livestakes re-planted along sections of lower Reach R2	Planted in January 2017	
Year 3 Monitoring	Nov-18	Dec-18
Bank scour repair on 3 sections of Reach R2	Repairs made in March 2018	
Supplemental planting (1-gal.) on R3	Planted in March 2018	
Year 4 Monitoring	Oct-19	Jan-20
Bank scour repair on 2 sections of Reach R2	January 2019	
Supplemental planting (bareroots) on Reach T1	Planted in January 2019	
Cattail treated on sections of R2 and R4	Treated in March and April 2019	
Soil amendments on Reach R3	March and September 2019	
Year 5 Monitoring	Oct-20	Nov-20 (Draft)
Soil amendments on Reach R3	May and October 2020	
Year 6 Monitoring	N/A	N/A
Year 7 Monitoring	N/A	N/A

[1] The number of reports or data points produced excluding the baseline

Table 3. Project Contacts **Thomas Creek Restoration Project: DMS Project ID No. 95729**	
Designer	
Michael Baker Engineering, Inc.	8000 Regency Parkway, Suite 600 Cary, NC 27518 Contact: Katie McKeithan, Telephone: 919-481-5703
Construction Contractor	
KBS Earthworks	5616 Coble Church Rd Julian, NC 27283 Contact: Chris Sizemore, Telephone: 336-362-0289
Planting Contractor	
KBS Earthworks	5616 Coble Church Rd Julian, NC 27283 Contact: Chris Sizemore, Telephone: 336-362-0289
Seeding Contractor	
KBS Earthworks	5616 Coble Church Rd Julian, NC 27283 Contact: Chris Sizemore, Telephone: 336-362-0289
Seed Mix Source	Green Resources, Telephone: 336-855-6363
Nursery Stock Suppliers	Mellow Marsh Farm, Telephone: 919-742-1200 ArborGen, Telephone: 843-528-3204
Monitoring Performers	
Michael Baker Engineering, Inc.	8000 Regency Parkway, Suite 600 Cary, NC 27518 Contact:
Stream Monitoring Point of Contact	Scott King, Tel. 919-481-5731
Vegetation Monitoring Point of Contact	Scott King, Tel. 919-481-5731

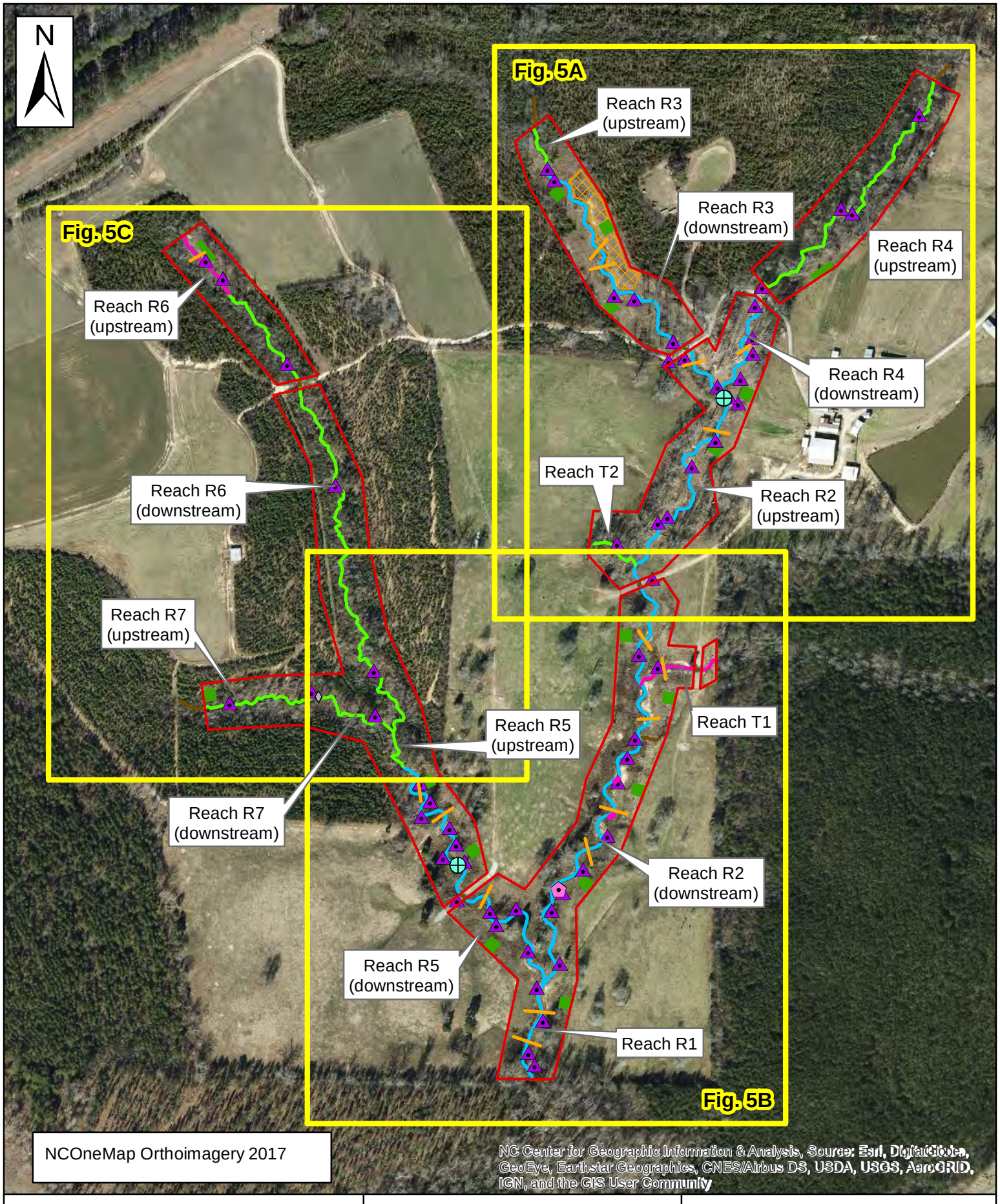
Table 4. Project Attributes (Pre-Construction Conditions)
Thomas Creek Restoration Project: DMS Project No. ID 96074

Project Information					
Project Name	Thomas Creek Restoration Project				
County	Wake				
Project Area (acres)	22.7				
Project Coordinates (latitude and longitude)	35.6636 N, -79.9547 W				
Project Watershed Summary Information					
Physiographic Province	Piedmont				
River Basin	Cape Fear				
USGS Hydrologic Unit 8-digit and 14-digit	03030004 / 03030004020010				
NCDWR Sub-basin	03-06-07				
Project Drainage Area (acres)	246 (Reach R1 main stem at downstream extent)				
Project Drainage Area Percent Impervious	<1%				
CGIA / NCEEP Land Use Classification	2.01.01.01, 2.03.01, 2.99.01, 3.02 / Forest (66%) Agriculture (19%) Impervious Cover (1%)				
Reach Summary Information					
Parameters	**Reach R1**	**Reach R2**	**Reach R3**	**Reach R4**	**Reach R5**
Length of Reach (linear feet)	397	1,995	1,067	342	1,020
Valley Classification (Rosgen)	VII	VII	VII	VII	VII
Drainage Area (acres)	246	176	62	36	62
NCDWR Stream Identification Score	37.5	38	25 / 37	31	31 / 34
NCDWR Water Quality Classification	C				
Morphological Description (Rosgen stream type)	Bc	F (upstream)/ Gc (downstream)	Gc (upstream)/ Bc (downstream)	Bc	Bc
Evolutionary Trend	Bc→Gc→F	Bc→Gc→F	Bc→Gc→F	Bc→Gc→F	Bc→Gc→F
Underlying Mapped Soils	WoA	WoA	WoA	WoA	WoA
Drainage Class	Poorly drained	Poorly drained	Poorly drained	Poorly drained	Poorly drained
Soil Hydric Status	Hydric	Hydric	Hydric	Hydric	Hydric
Average Channel Slope (ft/ft)	0.0165	0.0083	0.014	0.0102	0.0172
FEMA Classification	N/A	N/A	N/A	N/A	N/A
Native Vegetation Community	Piedmont Small Stream				
Percent Composition of Exotic/Invasive Vegetation	<5%	25%	<5%	<5%	<5%
Parameters	**Reach R6**	**Reach R7**	**Reach T1**	**Reach T2**	
Length of Reach (linear feet)	1,828	646	242	171	
Valley Classification (Rosgen)	VII	VII	VII	VII	
Drainage Area (acres)	32	14	49	5	
NCDWR Stream Identification Score	25 / 30	23 / 35	23.75	20.75	
NCDWR Water Quality Classification	C				
Morphological Description (Rosgen stream type)	G5c (upstream)/ B5c (downstream)	G5 (upstream)/ B5c (downstream)	B5c	B5c	
Evolutionary Trend	Bc→Gc→F	Bc→Gc→F	Bc→Gc→F	Bc→Gc→F	
Underlying Mapped Soils	WoA	WoA	WoA	WoA	
Drainage Class	Poorly drained	Poorly drained	Poorly drained	Poorly drained	
Soil Hydric Status	Hydric	Hydric	Hydric	Hydric	
Average Channel Slope (ft/ft)	0.015/0.025	0.025	0.02	0.041	
FEMA Classification	N/A	N/A	N/A	N/A	
Native Vegetation Community	Piedmont Small Stream				
Percent Composition of Exotic/Invasive Vegetation	<5%	<5%	<5%	<5%	

Regulatory Considerations			
Regulation	**Applicable**	**Resolved**	**Supporting Documentation**
Waters of the United States – Section 404	Yes	Yes	Categorical Exclusion (Appendix B)
Waters of the United States – Section 401	Yes	Yes	Categorical Exclusion (Appendix B)
Endangered Species Act	No	N/A	Categorical Exclusion (Appendix B)
Historic Preservation Act	No	N/A	Categorical Exclusion (Appendix B)
Coastal Area Management Act (CAMA)	No	N/A	Categorical Exclusion (Appendix B)
FEMA Floodplain Compliance	No	Yes	Categorical Exclusion (Appendix B)
Essential Fisheries Habitat	No	N/A	Categorical Exclusion (Appendix B)

Appendix B

Visual Assessment Data

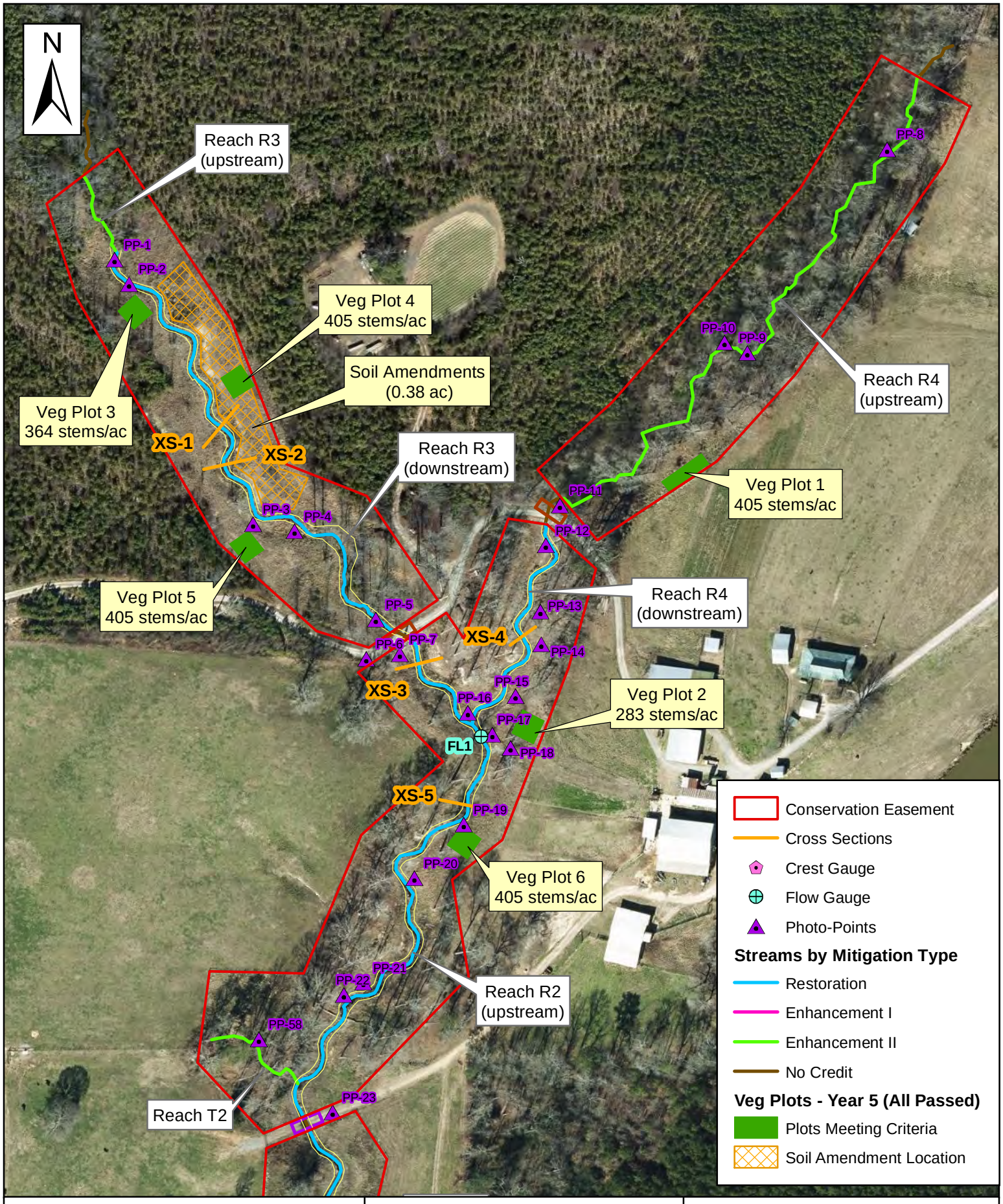


Michael Baker INTERNATIONAL

0 250 500 Feet

DEQ DMS Project # 96074

Figure 5 Index Map
Current Condition Plan View
Thomas Creek Site - MY5

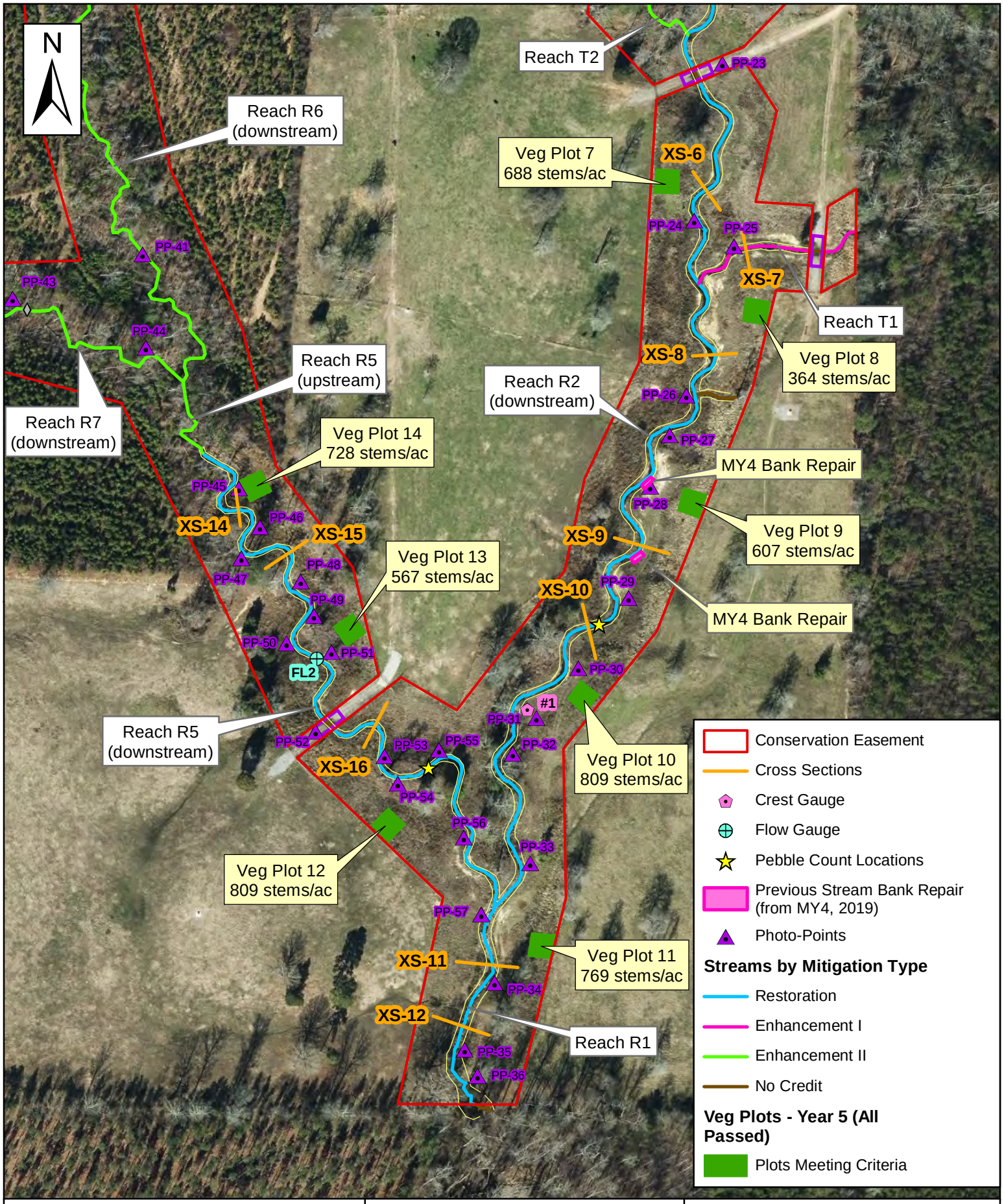


Michael Baker INTERNATIONAL

0 100 200 Feet

DENR DMS Project # 96074

Figure 5A
Current Condition Plan View
Thomas Creek Site - MY5

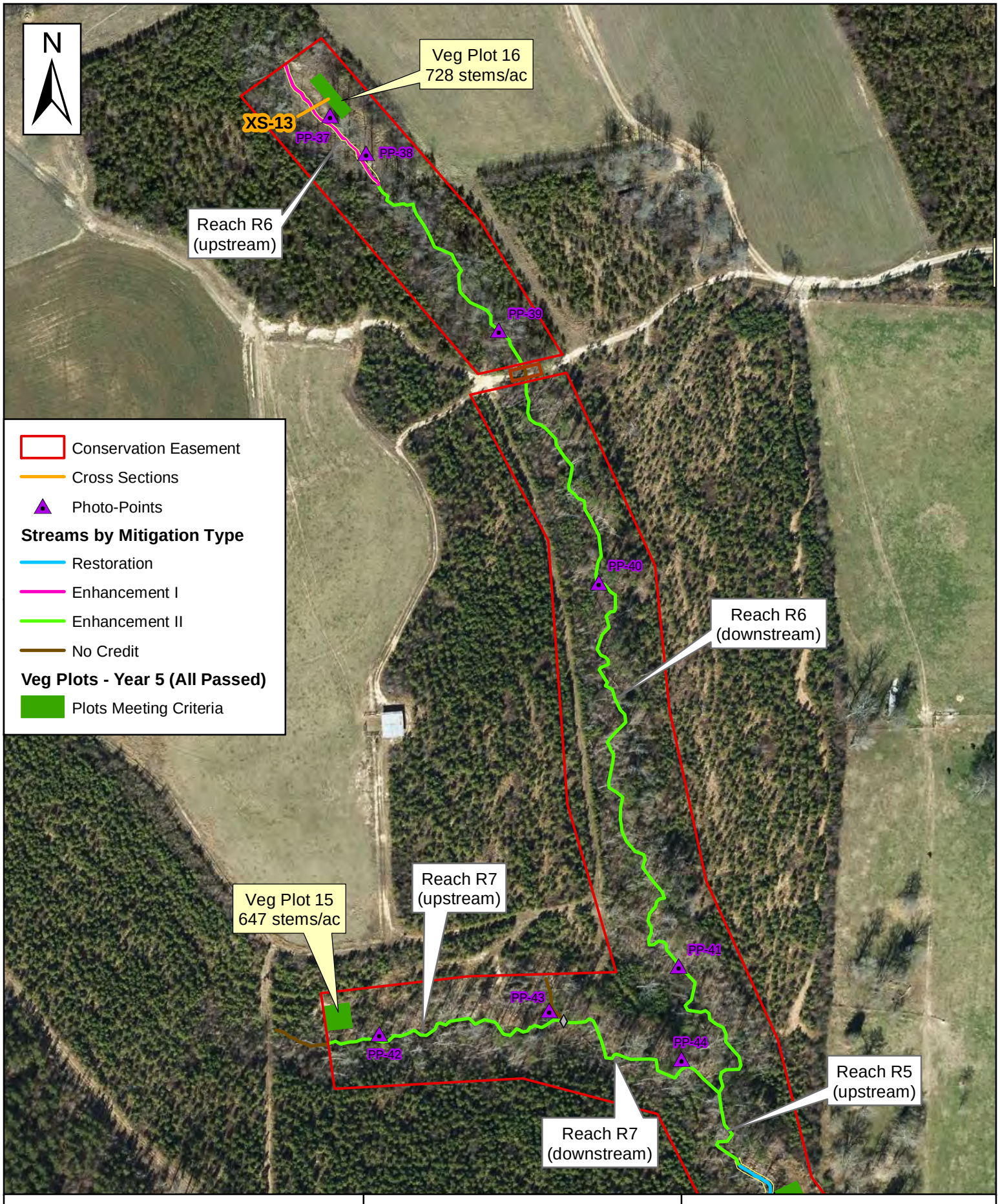


Michael Baker INTERNATIONAL

0 100 200 Feet

DENR DMS Project # 96074

Figure 5B
Current Condition Plan View
Thomas Creek Site - MY5



Michael Baker INTERNATIONAL

0 100 200 Feet

DENR DMS Project # 96074

Figure 5C
Current Condition Plan View
Thomas Creek Site - MY5

Table 5. Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach ID: Reach 1
Assessed Length (LF): 298

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	3	3			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	3	3			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	3	3			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	3	3			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	3	3			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering 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	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath or around sills or arms	3	3			100%			
	3. Bank Position	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 ≥ 1.5. Rootwads/logs providing some cover at low flow	3	3			100%			

Table 5. Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach ID: Reach 2
Assessed Length (LF): 2,126

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	38	38			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	41	41			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	41	41			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	41	41			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	41	41			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	27	27			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	24	24			100%			
	2a. Piping	Structures lacking any substantial flow underneath or around sills or arms	27	27			100%			
	3. Bank Position	Bank erosion within the structures extent of influence **does not** exceed 15%	27	27			100%			
	4. Habitat	Pool forming structures maintaining - Max Pool Depth/Mean Bankfull Depth ratio ≥ 1.5. Rootwads/logs providing some cover at low flow	13	13			100%			

Table 5. Continued Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach ID: Reach 3
Assessed Length (LF): 1,031

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	16	16			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	15	15			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	15	15			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	15	15			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	15	15			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	10	10			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 or around sills or arms	10	10			100%			
	3. Bank Position	Bank erosion within the structures extent of influence **does not** exceed 15%	10	10			100%			
	4. Habitat	Pool forming structures maintaining - Max Pool Depth/Mean Bankfull Depth ratio ≥ 1.5. Rootwads/logs providing some cover at low flow	7	7			100%			

Table 5. Continued Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach ID: Reach 4
Assessed Length (LF): 1,238

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	8	8			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	8	8			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	8	8			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	8	8			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	8	8			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	4	4			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 or around sills or arms	4	4			100%			
	3. Bank Position	Bank erosion within the structures extent of influence **does not** exceed 15%	4	4			100%			
	4. Habitat	Pool forming structures maintaining - Max Pool Depth/Mean Bankfull Depth ratio ≥ 1.5. Rootwads/logs providing some cover at low flow	3	3			100%			

Table 5. Continued Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach ID: Reach 5
Assessed Length (LF): 1,169

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	17	17			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	18	18			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	18	18			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	18	18			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	18	18			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	16	16			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 or around sills or arms	16	16			100%			
	3. Bank Position	Bank erosion within the structures extent of influence **does not** exceed 15%	16	16			100%			
	4. Habitat	Pool forming structures maintaining - Max Pool Depth/Mean Bankfull Depth ratio ≥ 1.5. Rootwads/logs providing some cover at low flow	15	15			100%			

Table 5. Continued Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach ID: Reach 6
Assessed Length (LF): 1,776

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	6	6			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	5	5			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	5	5			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	5	5			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	5	5			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	0	0			-			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	0	0			-			
	2a. Piping	Structures lacking any substantial flow underneath or around sills or arms	0	0			-			
	3. Bank Position	Bank erosion within the structures extent of influence **does not** exceed 15%	0	0			-			
	4. Habitat	Pool forming structures maintaining - Max Pool Depth/Mean Bankfull Depth ratio ≥ 1.5. Rootwads/logs providing some cover at low flow	0	0			-			

Table 5. Continued Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach ID: Reach 7
Assessed Length (LF): 647

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	5	5			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	6	6			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	6	6			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	6	6			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	6	6			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering 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 or around sills or arms	2	2			100%			
	3. Bank Position	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 ≥ 1.5. Rootwads/logs providing some cover at low flow	2	2			100%			

Table 5. Continued Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach ID: Reach T1
Assessed Length (LF): 227

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	4	4			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	5	5			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	5	5			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	5	5			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	5	5			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering 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 or around sills or arms	1	1			100%			
	3. Bank Position	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 ≥ 1.5. Rootwads/logs providing some cover at low flow	1	1			100%			

Table 5. Continued Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074

Reach ID: Reach T2

Assessed Length (LF): 157

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	3	3			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	2	2			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	2	2			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	2	2			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	2	2			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering 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 or around sills or arms	1	1			100%			
	3. Bank Position	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 ≥ 1.5. Rootwads/logs providing some cover at low flow	1	1			100%			

Table 6. Vegetation Conditions Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074

Planted Acreage: 14.4						
Vegetation Category	**Defintions**	**Mapping Threshold (acres)**	**CCPV Depiction**	**Number of Polygons**	**Combined Acreage**	**% of Planted Acreage**
1. Bare Areas	Very limited cover both woody and herbaceous material.	0.1	N/A	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	N/A	0	0.00	0.0%
			Total	**0**	**0.00**	**0.0%**
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems or a size class that are obviously small given the monitoring year.	0.25	N/A*	0*	0.38	2.6%
			Cumulative Total	**0**	**0.38**	**2.6%**
Easement Acreage: 22.7						
Vegetation Category	**Defintions**	**Mapping Threshold**	**CCPV Depiction**	**Number of Polygons**	**Combined Acreage**	**% of Planted Acreage**
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale)	1000 ft²	N/A	0	0.00	0.0%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale)	none	N/A	0	0.00	0.0%

* Note: The area of low vigor noted here refers to the previously reported VPA that is being addressed as described in the report text. At DMS request, it is not shown on the CCPV so as to not to create confusion between any potential new VPAs for the monitoring year.

Thomas Creek: MY5 Stream Station Photo-Points (from 2/14/20)

PP-1: Reach 3, view upstream, Station 11+50

PP-2: Reach 3, view downstream, Station 12+00

PP-3: Reach 3, view upstream, Station 15+75

PP-4: Reach 3, view downstream, Station 16+25

PP-5: Reach 3, view downstream towards pipe crossing, Station 18+50

PP-6: Reach 3, stream crossing, Station 18+80

Thomas Creek: MY5 Stream Station Photo-Points (from 2/14/20)

PP-7: Reach 3, Station 19+00

PP-8: Reach 4, view downstream at Station 01+90

PP-9: Reach 4, view downstream at Station 05+75

PP-10: Reach 4, view downstream at Station 06+10

PP-11: Reach 4, view upstream at Station 10+10

PP-12: Reach 4, view upstream at Station 10+50

Thomas Creek: MY5 Stream Station Photo-Points (from 2/14/20)

PP-13: Reach 4, view upstream at Station 11+75

PP-14: Reach 4, view downstream at Station 12+25

PP-15: Reach 4, view upstream at Station 13+00

PP-16: Reach 2, view upstream at Station 20+60

PP-17: Reach 2, Flow Gauge #1 at Station 20+75

PP-18: Reach 2, view of stabilized drainage on left bank at Station 20+80

Thomas Creek: MY5 Stream Station Photo-Points (from 2/14/20)

PP-19: Reach 2, view upstream at Station 22+00

PP-20: Reach 2, view upstream at Station 23+00

PP-21: Reach 2, view upstream at Station 25+25

PP-22: Reach 2, view downstream at Station 25+50

PP-23: Reach 2, view of crossing at Station 27+75

PP-24: Reach 2, view downstream at Station 30+20

Thomas Creek: MY5 Stream Station Photo-Points (from 2/14/20)

PP-25: Reach T1, view downstream at Station 11+75

PP-26: Reach 2, view of drainage on left bank at Station 32+90

PP-27: Reach 2, view downstream at Station 33+25

PP-28: Reach 2, view downstream at Station 34+30

PP-29: Reach 2, view downstream at Station 36+90

PP-30: Reach 2, view upstream at Station 38+25

Thomas Creek: MY5 Stream Station Photo-Points (from 2/14/20)

PP-31: Reach 2, Crest Gauge at Station 38+90

PP-32: Reach 2, view downstream at Station 39+40

PP-33: Reach 2, view upstream at Station 41+50

PP-34: Reach 1, view upstream at Station 42+75

PP-35: Reach 1, view downstream at Station 43+25

PP-36: Reach 1, view of drainage on left bank at Station 44+00

Thomas Creek: MY5 Stream Station Photo-Points (from 2/14/20)

PP-37: Reach 6, view upstream at Station 10+75

PP-38: Reach 6, view upstream at Station 11+50

PP-39: Reach 6, view upstream at Station 15+25

PP-40: Reach 6, view upstream at Station 18+90

PP-41: Reach 6, view upstream at Station 25+50

PP-42: Reach 7, view upstream at Station 10+40

Thomas Creek: MY5 Stream Station Photo-Points (from 2/14/20)

PP-43: Reach 7, view of stabilized drainage at Station 13+50

PP-44: Reach 7, view upstream at Station 15+00

PP-45: Reach 5, view upstream at Station 30+25

PP-46: Reach 5, view downstream at Station 30+75

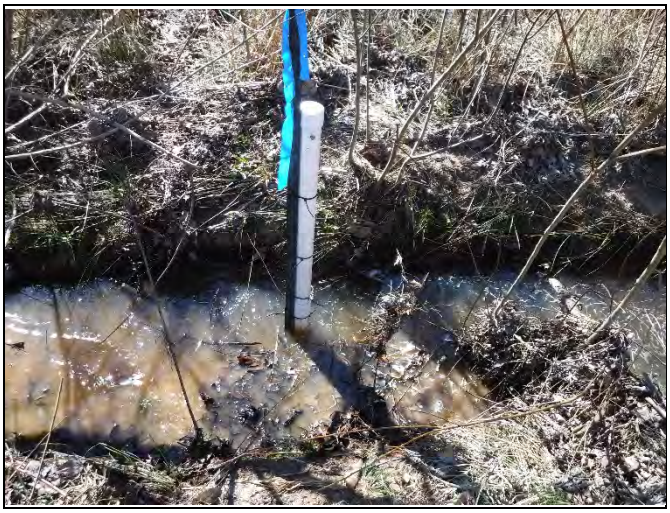
PP-47: Reach 5, view downstream at Station 31+40

PP-48: Reach 5, view downstream at Station 32+50

Thomas Creek: MY5 Stream Station Photo-Points (from 2/14/20)

PP-49: Reach 5, view upstream at Station 33+10

PP-50: Reach 5, view downstream at Station 33+75



PP-51: Reach 5, Flow Gauge #2 at Station 33+90

PP-52: Reach 5, view of crossing at Station 35+00

PP-53: Reach 5, view upstream at Station 36+40

PP-54: Reach 5, view upstream at Station 36+75

Thomas Creek: MY5 Stream Station Photo-Points (from 2/14/20)

PP-55: Reach 5, view downstream at Station 37+30

PP-56: Reach 5, view upstream at Station 38+50

PP-57: Reach 5, view upstream at Station 39+90
(the confluence of R5 and R2)

PP-58: Reach T2, view upstream at Station 10+80
(photo from 6/2/20)

Thomas Creek: MY5 Vegetation Plot Photographs

Vegetation Plot 1 – October 2020

Vegetation Plot 2 – October 2020

Vegetation Plot 3 – October 2020

Vegetation Plot 4 – October 2020

Vegetation Plot 5 – October 2020

Vegetation Plot 6 – October 2020

Thomas Creek: MY5 Vegetation Plot Photographs

Vegetation Plot 7 – October 2020

Vegetation Plot 8 – October 2020

Vegetation Plot 9 – October 2020

Vegetation Plot 10 – October 2020

Vegetation Plot 11 – October 2020

Vegetation Plot 12 – October 2020

Thomas Creek: MY5 Vegetation Plot Photographs

Vegetation Plot 13 – October 2020

Vegetation Plot 14 – October 2020

Vegetation Plot 15 – October 2020

Vegetation Plot 16 – October 2020

Thomas Creek: MY5 Crest Gauge Photographs

Crest Gauge on Reach R2 at Station 38+90
(photo from 2/14/20)

Overbank event of 0.98 ft on 2/6/20
(photo from 2/14/20)

Overbank event of 0.98 ft on 2/6/20
(photo from 2/14/20)

Debris piles in floodplain along Reach R2
(photo from 2/20/20)

Debris piles along bank on Reach R2
(photo from 2/20/20)

Thomas Creek: MY5 Maintenance and Repair Photographs

R2 Station 34+75: Previous bank repair on left bank from Hurricane Florence scour (photo: June 2020)

R2 Station 34+75: Previous bank repair on left bank from Hurricane Florence scour (photo: October 2020)

R2 Station 35+75: Previous bank repair on left bank from Hurricane Florence scour (photo: June 2020)

R2 Station 35+75: Previous bank repair on left bank from Hurricane Florence scour (photo: October 2020)

Thomas Creek: MY5 Additional Monitoring Photographs

Reach R2 riffle (Station 37+00) used for pebble count

Reach R5 riffle (Station 37+00) used for pebble count

Flow Gauge #1 on Reach R2 (photo: 2/14/20)

Flow Gauge #1 on Reach R2 (photo: 6/2/20)

Flow Gauge #1 on Reach R2 (photo: 10/22/20)

Flow Gauge #2 on Reach R5 (photo: 2/14/20)

Thomas Creek: MY5 Additional Monitoring Photographs

Flow Gauge #2 on Reach R5 (photo: 10/22/20)

Pipe culvert on R3 (photo: 1/23/20)

Pipe culvert on R3 (photo: 10/22/20)

Pipe culvert on R4 (photo: 2/14/20)

Pipe culvert on R4 (photo: 2/20/20)

Crossing outside of CE on T1 (photo: 10/22/20)

Thomas Creek: MY5 Additional Monitoring Photographs

Flow on T1, upstream (photo: 10/22/20)

Flow on T1, upstream (photo: 10/22/20)

Flow on T1, downstream (photo: 10/22/20)

Flow on T2, upstream (photo: 6/2/20)

Flow on T2, downstream (photo: 6/2/20)

Flow on T2, upstream (photo: 6/2/20)

Thomas Creek: MY5 Additional Monitoring Photographs

Flow on upper R6, upstream (photo: 1/23/20)

Flow on upper R6, upstream (photo: 1/23/20)

Flow on upper R6, upstream (photo: 2/20/20)

Flow on upper R6, upstream (photo: 2/20/20)

Flow on upper Reach R6, upstream (photo: 10/22/20)

Flow on upper Reach R6, upstream (photo:10/22/20)

Appendix C

Vegetation Plot Data

Table 7. CVS Density Per Plot
Thomas Creek Restoration Project: DMS Project ID No. 96074

			Current Plot Data (MY5 2020)																												
			96074-01-0001			96074-01-0002			96074-01-0003			96074-01-0004			96074-01-0005			96074-01-0006			96074-01-0007			96074-01-0008			96074-01-0009			96074-01-0010		
Scientific Name	**Common Name**	**Species Type**	**P**	**V**	**T**	**P**	**V**	**T**	**P**	**V**	**T**	**P**	**V**	**T**	**P**	**V**	**T**	**P**	**V**	**T**	**P**	**V**	**T**	**P**	**V**	**T**	**P**	**V**	**T**	**P**	**V**	**T**
Acer rubrum	red maple	Tree								2	2								2	2												
Asimina triloba	pawpaw	Tree																			1		1									
Baccharis halimifolia	eastern baccharis	Shrub																														
Betula nigra	river birch	Tree	1		1	1		1	1	1	2				1		1	2	1	3	1		1	1		1	2		2	3		3
Carpinus caroliniana	American hornbeam	Tree	3		3																4		4							4		4
Carya glabra	pignut hickory	Tree		1	1								1	1																		
Diospyros virginiana	common persimmon	Tree	4	1	5	1		1	2		2	4		4				1		1				1		1	1	2	3	2		2
Euonymus americanus	hearts a bustin	Shrub																														
Fraxinus pennsylvanica	green ash	Tree				1		1				1	1	2	1	1	2				3		3	1		1	2	1	3			
Hamamelis virginiana	American witchhazel	Tree														1	1															
Ilex opaca	American holly	Tree																							1	1					2	2
Juniperus virginiana	eastern redcedar	Tree																							1	1					5	5
Liquidambar styraciflua	sweetgum	Tree																													5	5
Liriodendron tulipifera	tuliptree	Tree								1	1	1	1	2	2	1	3							2		2						
Myrica cerifera	wax myrtle	Shrub																														
Nyssa sylvatica	blackgum	Tree																														
Pinus taeda	loblolly pine	Tree																														
Platanus occidentalis	American sycamore	Tree	1		1							2	1	2	1	1	2	5		5	2		2	3		3	1		1	2		2
Prunus serotina	black cherry	Tree																														
Quercus alba	white oak	Tree				1		1								2	2															
Quercus lyrata	overcup oak	Tree											2	2																		
Quercus michauxii	swamp chestnut oak	Tree	1		1	2	1	3													2		2	1		1	4		4	2		2
Quercus nigra	water oak	Tree																														
Quercus pagoda	cherrybark oak	Tree				1		1	1		1	1	6	7	3		3										2		2	4		4
Quercus phellos	willow oak	Tree																										1	1			
Quercus rubra	northern red oak	Tree																														
Rhus copallinum	flameleaf sumac	shrub																														
Sambucus canadensis	elderberry	Shrub								1	1																					
Sassafras albidum	sassafras	Tree																														
Viburnum dentatum	southern arrowwood	Shrub							5		5	1		1	2		2	2		2	4		4				3		3	3		3
	Stem count		10	2	12	7	1	8	9	5	14	10	12	21	10	6	16	10	3	13	17	0	17	9	2	11	15	4	19	20	12	32
	size (ares)		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		
	Species count		5	2	6	6	1	6	4	4	7	6	6	8	6	5	8	4	2	5	7	0	7	6	2	8	7	3	8	7	3	10
	Stems per ACRE		405	80.9	486	283	40.5	324	364	202	567	405	486	850	405	243	647	405	121	526	688	0	688	364	80.9	445	607	162	769	809	486	1295

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%
Includes volunteer stems

Table 7. CVS Density Per Plot
Thomas Creek Restoration Project: DMS Project ID No. 96074

			Current Plot Data (MY5 2020) Continued																		Annual Means								
			96074-01-0011			96074-01-0012			96074-01-0013			96074-01-0014			96074-01-0015			96074-01-0016			MY5 (2020)			MY3 (2018)			MY2 (2017)			MY1 (2016)		
Scientific Name	Common Name	Species Type	P	V	T	P	V	T	P	V	T	P	V	T	P	V	T	P	V	T	P	V	T	P	V	T	P	V	T	P	V	T
Acer rubrum	red maple	Tree																				4	4									
Asimina triloba	pawpaw	Tree	1		1				3		3										5		5	3	1	4	3		3	5		5
Baccharis halimifolia	eastern baccharis	Shrub					2	2														2	2									
Betula nigra	river birch	Tree	1		1	2		2	2		2	1		1	1		1	2		2	22	2	24	25		25	26		26	38		38
Carpinus caroliniana	American hornbeam	Tree	2		2	2		2				5		5	6		6	5		5	31		31	32	2	34	32	1	33	34		34
Carya glabra	pignut hickory	Tree								1	1											3	3		5	5		4	4			
Diospyros virginiana	common persimmon	Tree	1	1	2	2	1	3				2		2				1		1	22	5	27	24	2	26	25	3	28	31		31
Euonymus americanus	hearts a bustin	Shrub														1	1					1	1									
Fraxinus pennsylvanica	green ash	Tree	3		3							1		1	2		2	1		1	16	3	19	15		15	15		15	16		16
Hamamelis virginiana	American witchhazel	Tree																				1	1									
Ilex opaca	American holly	Tree								1	1											4	4									
Juniperus virginiana	eastern redcedar	Tree					5	5		3	3					2	2					16	16									
Liquidambar styraciflua	sweetgum	Tree								5	5		3	3		4	4		2	2		19	19									
Liriodendron tulipifera	tuliptree	Tree				3		3	2		2							2		2	12	3	15	14	5	19	18	4	22	28		28
Myrica cerifera	wax myrtle	Shrub											1	1								1	1									
Nyssa sylvatica	blackgum	Tree		1	1																	1	1					1	1			
Pinus taeda	loblolly pine	Tree														5	5		2	2		7	7									
Platanus occidentalis	American sycamore	Tree	2		2	5		5	5		5	6		6	1		1				36	1	37	39	1	40	38	1	39	40		40
Prunus serotina	black cherry	Tree											1	1					1	1		2	2									
Quercus alba	white oak	Tree													1	1	2				2	3	5									
Quercus lyrata	overcup oak	Tree																	1	1		3	3									
Quercus michauxii	swamp chestnut oak	Tree				2		2				2		2				3	1	4	19	2	21	20	2	22	21	1	22	23		23
Quercus nigra	water oak	Tree																							4	4						
Quercus pagoda	cherrybark oak	Tree	1		1	4		4	2		2							1		1	20	6	26	22		22	22		22	27		27
Quercus phellos	willow oak	Tree											1	1	1		1				1	2	3		3	3		3	3			
Quercus rubra	northern red oak	Tree																										4	4			
Rhus copallinum	flameleaf sumac	shrub														1	1					1	1					3	3			
Sambucus canadensis	elderberry	Shrub																				1	1									
Sassafras albidum	sassafras	Tree																							1	1						
Viburnum dentatum	southern arrowwood	Shrub	8	1	9							1		1	4		4	3		3	36	1	37	42		42	44	1	45	46		46
	Stem count		19	3	22	20	8	28	14	10	24	18	6	24	16	14	30	18	7	25	222	94	316	236	26	262	244	26	270	288	0	288
	size (ares)		1			1			1			1			1			1			16			16			16			16		
	size (ACRES)		0.02			0.02			0.02			0.02			0.02			0.02			0.40			0.40			0.40			0.40		
	Species count		8	3	9	7	3	9	5	4	9	7	4	11	7	6	12	8	5	12	12	25	27	10	11	15	10	11	15	10		10
	Stems per ACRE		769	121	890	809	324	1133	567	405	971	728	243	971	647	567	1214	728	283	1012	562	238	799.3	597	65.8	663	617	65.8	683	728	0	728

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%
Includes volunteer stems

Table 8. CVS Vegetation Plot Summary Information
Thomas Creek Restoration Project: DMS Project ID No. 96074

Thomas Creek Restoration Project: DMS Project ID No. 96074

Year 5 (October 2020)

Vegetation Plot Summary Information

Plot #	Riparian Buffer Stems[1]	Stream/ Wetland Stems[2]	Live Stakes	Invasives	Volunteers[3]	Total[4]	Unknown Growth Form
1	n/a	10	0	0	2	**12**	0
2	n/a	7	0	0	1	**8**	0
3	n/a	9	0	0	5	**14**	0
4	n/a	10	0	0	11	**21**	0
5	n/a	10	0	0	6	**16**	0
6	n/a	10	0	0	3	**13**	0
7	n/a	17	0	0	0	**17**	0
8	n/a	9	0	0	2	**11**	0
9	n/a	15	0	0	4	**19**	0
10	n/a	20	0	0	12	**32**	0
11	n/a	19	0	0	3	**22**	0
12	n/a	20	0	0	8	**28**	0
13	n/a	14	0	0	10	**24**	0
14	n/a	18	0	0	6	**24**	0
15	n/a	16	0	0	14	**30**	1
16	n/a	18	0	0	7	**25**	0

Wetland/Stream Vegetation Totals

(per acre)

Riparian Buffer Vegetation Totals

(per acre)

Plot #	Stream/ Wetland Stems[2]	Volunteers[3]	Total[4]	Success Criteria Met?	Plot #	Riparian Buffer Stems[1]	Success Criteria Met?
1	405	81	486	Yes	**1**	n/a	n/a
2	283	40	324	Yes	**2**	n/a	n/a
3	364	202	567	Yes	**3**	n/a	n/a
4	405	445	850	Yes	**4**	n/a	n/a
5	405	243	647	Yes	**5**	n/a	n/a
6	405	121	526	Yes	**6**	n/a	n/a
7	688	0	688	Yes	**7**	n/a	n/a
8	364	81	445	Yes	**8**	n/a	n/a
9	607	162	769	Yes	**9**	n/a	n/a
10	809	486	1295	Yes	**10**	n/a	n/a
11	769	121	890	Yes	**11**	n/a	n/a
12	809	324	1133	Yes	**12**	n/a	n/a
13	567	405	971	Yes	**13**	n/a	n/a
14	728	243	971	Yes	**14**	n/a	n/a
15	647	567	1214	Yes	**15**	n/a	n/a
16	728	283	1012	Yes	**16**	n/a	n/a
Project Avg	**562**	**238**	**799**	**Yes**	**Project Avg**	**n/a**	**n/a**

Stem Class	**Characteristics**
[1]Buffer Stems	Native planted hardwood trees. Does NOT include shrubs. No pines. No vines.
[2]Stream/ Wetland Stems	Native planted woody stems. Includes shrubs, does NOT include live stakes. No vines
[3]Volunteers	Native woody stems. Not planted. No vines.
[4]Total	Planted + volunteer native woody stems. Includes live stakes. Excl. exotics. Excl. vines.

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 9. Total Stem Counts for Each Species Arranged by Plot
Thomas Creek Restoration Project; DMS Project ID No. 96074

Botanical Name	Common Name	Plots																Average Stems Per Acres
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Tree Species																		
Acer rubrum	red maple			2			2											
Betula nigra	river birch	1	1	2		1	3	1	1	2	3	1	2	2	1	1	2	
Carya glabra	pignut hickory	1			1									1				
Diospyros virginiana	common persimmon	5	1	2	4		1		1	3	2	2	3		2		1	
Fraxinus pennsylvanica	green ash		1		2	2		3	1	3		3			1	2	1	
Hamamelis virginiana	American witchhazel					1												
Ilex opaca	American holly								1		2			1				
Juniperus virginiana	eastern redcedar								1		5		5	3		2		
Liquidambar styraciflua	sweetgum										5			5	3	4	2	
Liriodendron tulipifera	tuliptree			1	2	3			2				3	2			2	
Nyssa sylvatica	blackgum											1						
Pinus taeda	loblolly pine															5	2	
Platanus occidentalis	American sycamore	1			2	2	5	2	3	1	2	2	5	5	6	1		
Prunus serotina	black cherry														1		1	
Quercus alba	white oak		1			2										2		
Quercus lyrata	overcup oak				2												1	
Quercus michauxii	swamp chestnut oak	1	3					2	1	4	2		2		2		4	
Quercus pagoda	cherrybark oak		1	1	7	3				2	4	1	4	2			1	
Quercus phellos	willow oak									1					1	1		
Shrub Species																		
Asimina triloba	pawpaw							1				1		3				
Baccharis halimifolia	eastern baccharis												2					
Carpinus caroliniana	American hornbeam	3						4			4	2	2		5	6	5	
Euonymus americanus	hearts a bustin															1		
Myrica cerifera	wax myrtle														1			
Rhus copallinum	flameleaf sumac															1		
Sambucus canadensis	elderberry			1														
Viburnum dentatum	southern arrowwood			5	1	2	2	4		3	3	9			1	4	3	
Total Stems Per Plot - Year 5		**12**	**8**	**14**	**21**	**16**	**13**	**17**	**11**	**19**	**32**	**22**	**28**	**24**	**24**	**30**	**25**	
Total Stems/Acre - Year 5		486	324	567	850	647	526	688	445	769	1295	890	1133	971	971	1214	1012	799
Total Stems/Acre - Year 3		647	405	364	850	486	526	728	486	688	809	850	890	647	769	567	890	663
Total Stems/Acre - Year 2*		688	445	405	850	445	526	809	486	648	809	850	890	647	809	567	1052	683
Total Stems/Acre - Year 1		809	526	567	526	526	607	890	728	648	931	931	850	769	728	688	931	728
Total Stems/Acre for As-Built (Year 0)		850	688	607	648	648	607	971	728	648	971	971	931	890	809	688	890	784

Appendix D

Stream Survey Data

Figure 6. Year 5 Cross-Sections

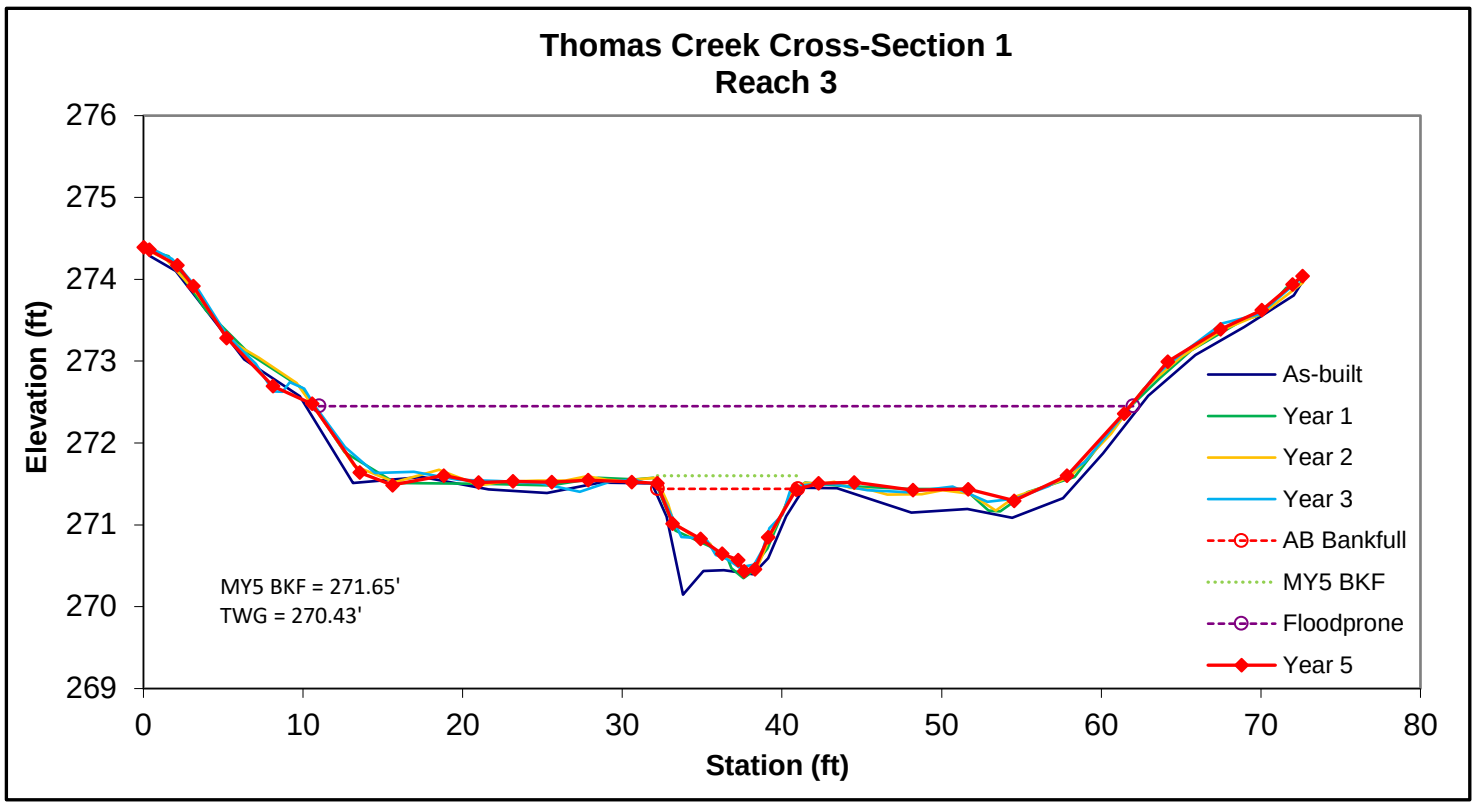
Permanent Cross-Section 1

(Year 5 Data - Collected September 2020)

Looking from Left Pin

Looking from Right Pin

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	AB BKF Elev	LTOB Elev
Riffle	C	5.1	8.7	0.6	1.0	15.1	0.9	5.9	271.44	271.43



Note:Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

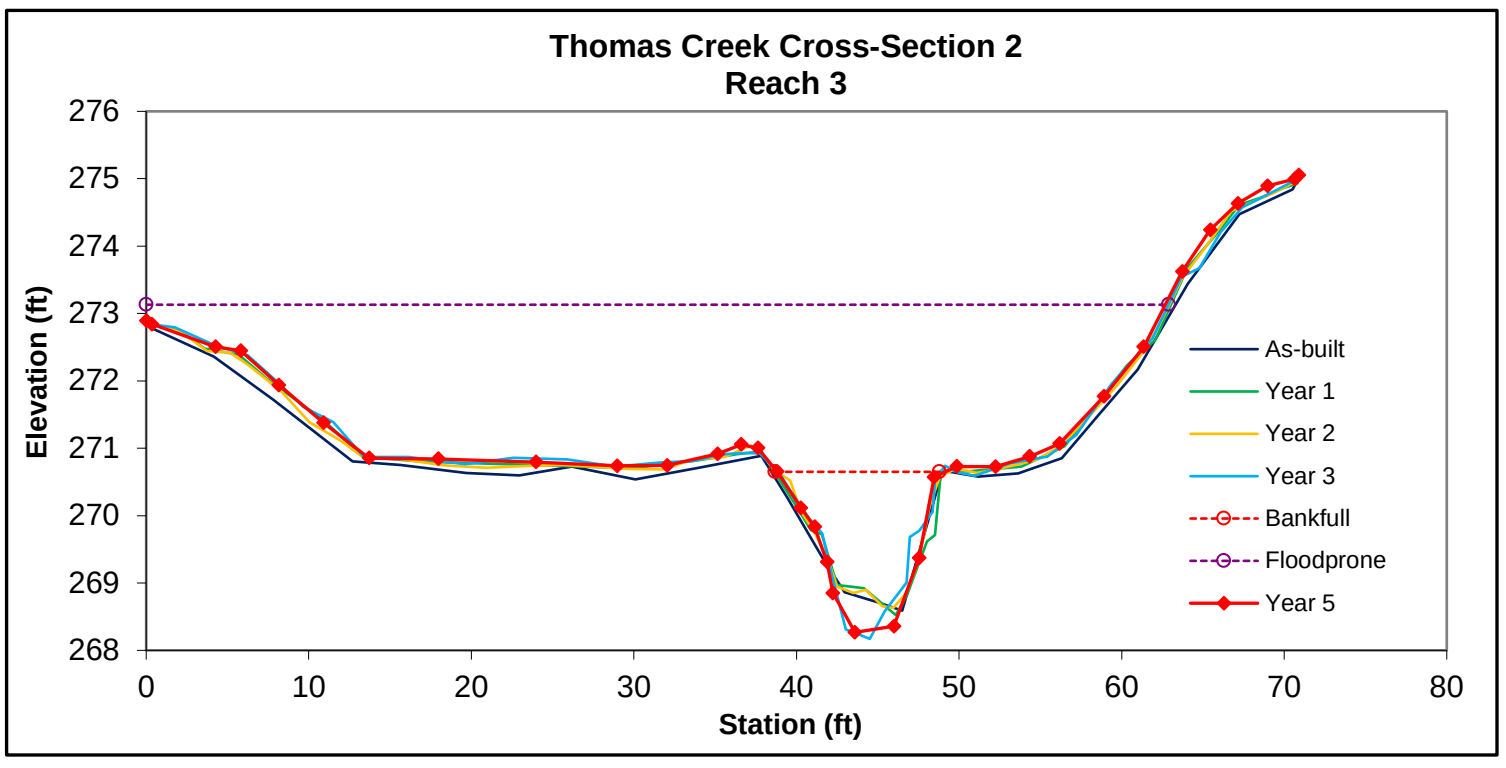
Permanent Cross-Section 2

(Year 5 Data - Collected September 2020)

Looking from Left Pin

Looking from Right Pin

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	AB BKF Elev	LTOB Elev
Pool	-	14.2	10.3	1.4	2.4	7.5	-	-	270.65	270.57



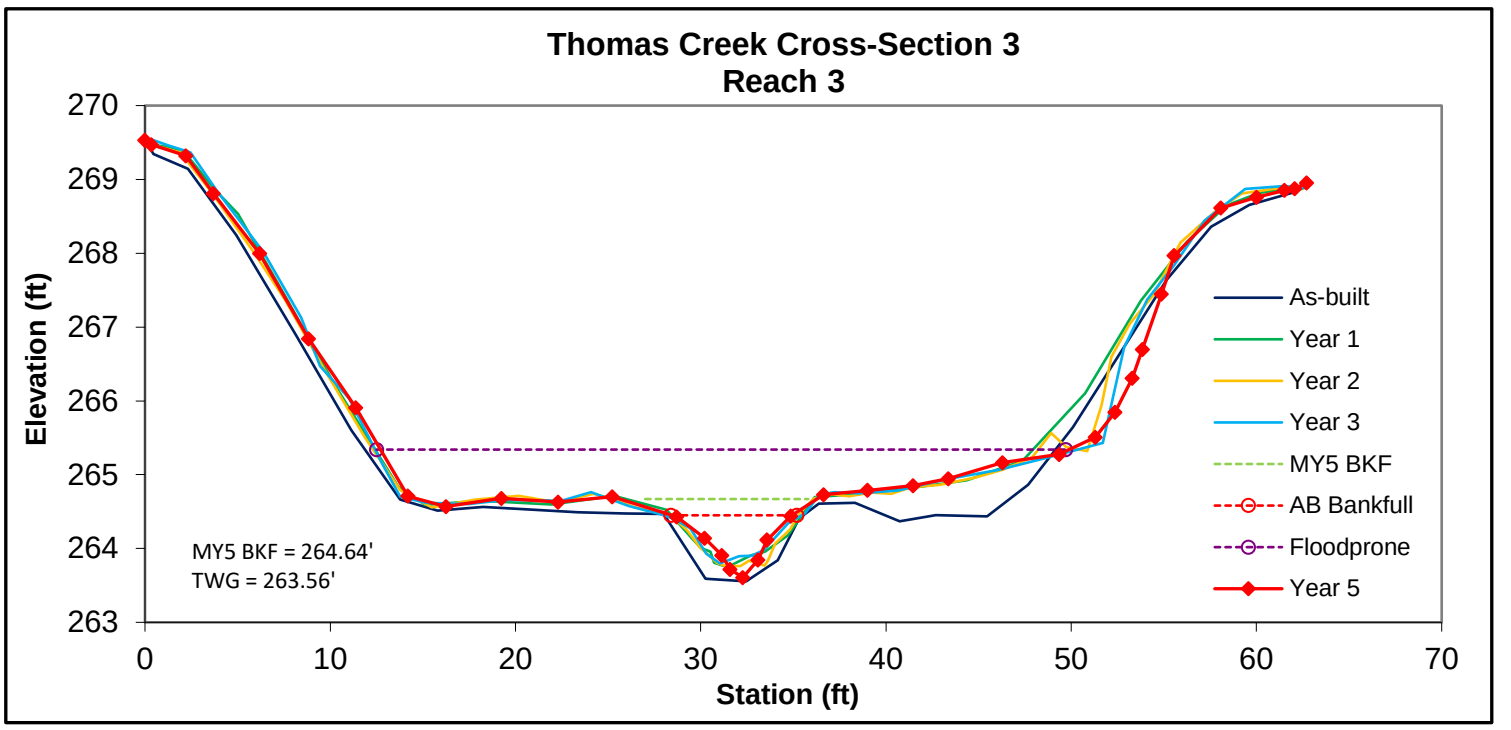
Permanent Cross-Section 3

(Year 5 Data - Collected September 2020)

Looking from Left Pin

Looking from Right Pin

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	AB BKF Elev	LTOB Elev
Riffle	C	2.5	6.5	0.4	0.8	16.9	0.8	5.7	264.45	264.43



Note:Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

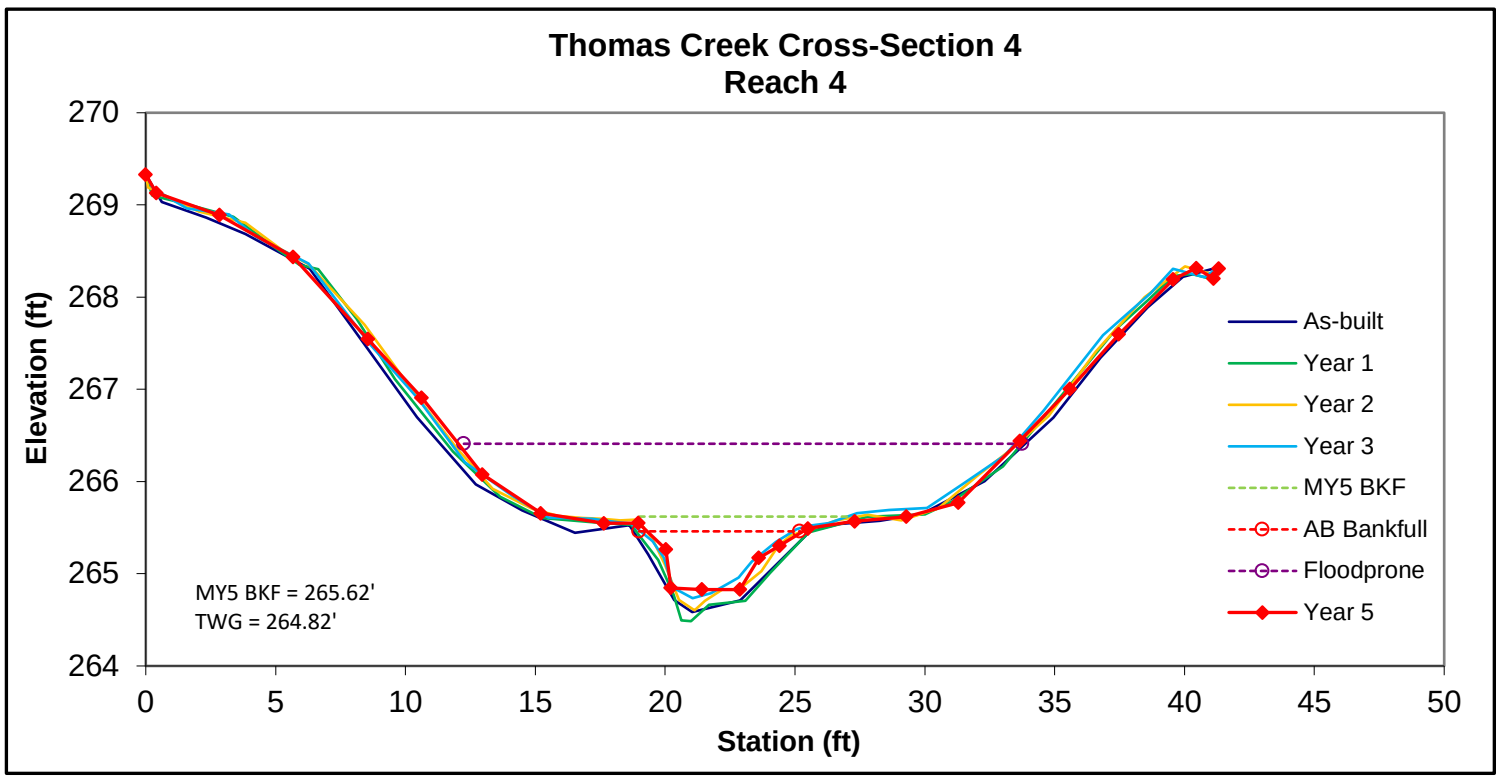
Permanent Cross-Section 4

(Year 5 Data - Collected September 2020)

Looking from Left Pin

Looking from Right Pin

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	AB BKF Elev	LTOB Elev
Riffle	C	2.4	6.0	0.4	0.6	15	0.8	3.2	265.46	265.49



Note:Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

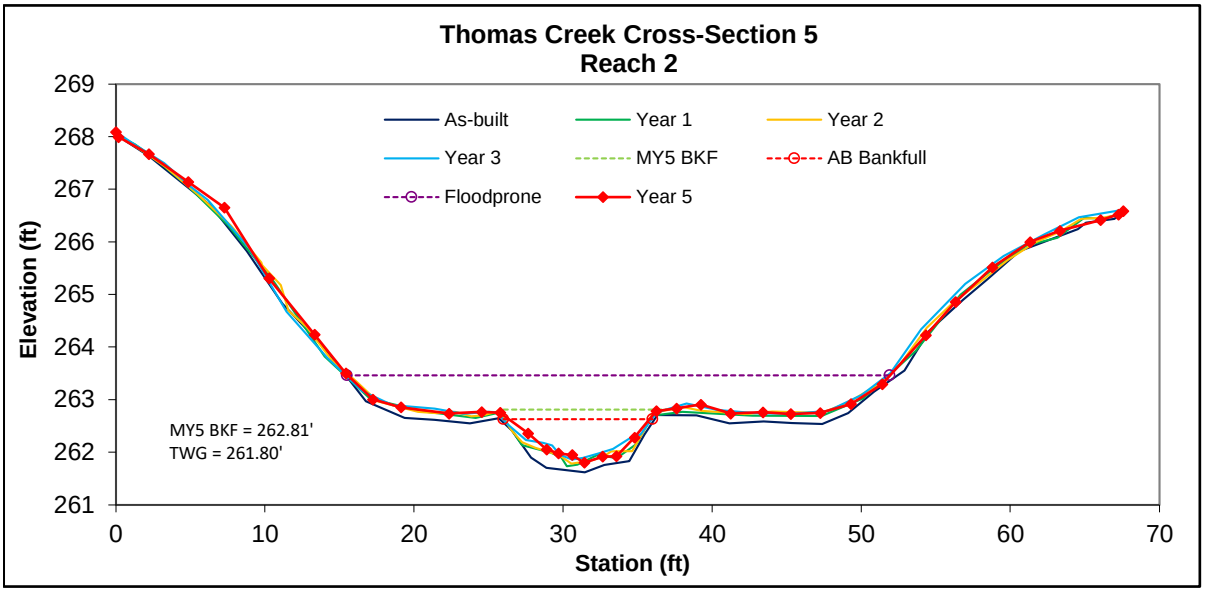
Permanent Cross-Section 5

(Year 5 Data - Collected September 2020)

Looking from the Left Bank

Looking from the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	AB BKF Elev	LTOB Elev
Riffle	C	4.9	9.5	0.5	0.8	18.4	0.9	3.8	262.63	262.75



Note:Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

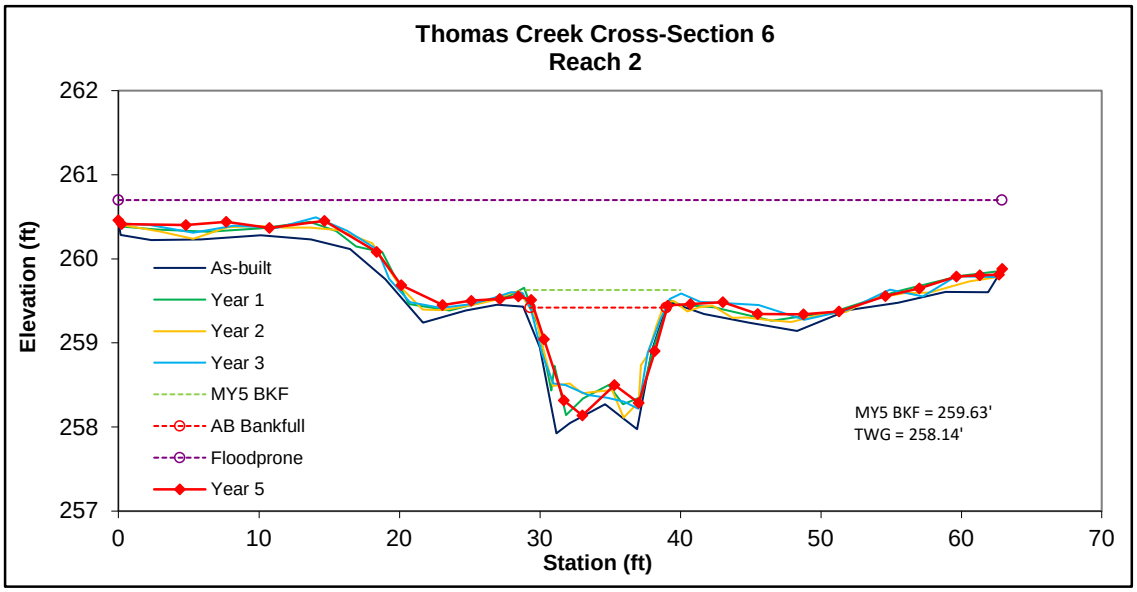
Permanent Cross-Section 6

(Year 5 Data - Collected September 2020)

Looking from the Left Bank

Looking from the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	AB BKF Elev	LTOB Elev
Riffle	C	8.2	9.5	0.9	1.3	11	0.9	6.6	259.42	259.45



Note:Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

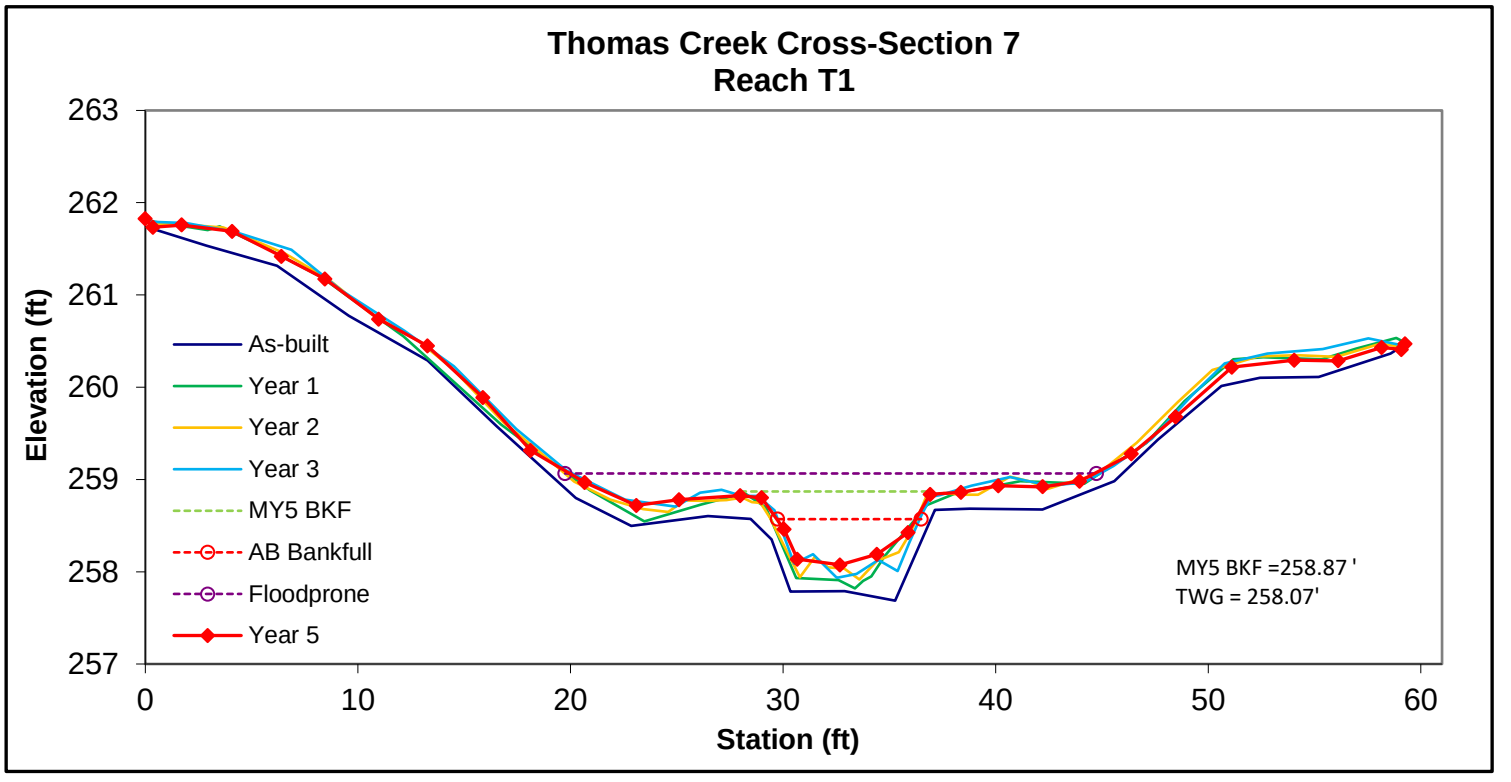
Permanent Cross-Section 7

(Year 5 Data - Collected September 2020)

Looking from the Left Bank

Looking from the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	2.3	6.5	0.4	0.5	18.7	0.9	3.8	258.57	258.80



Note:Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

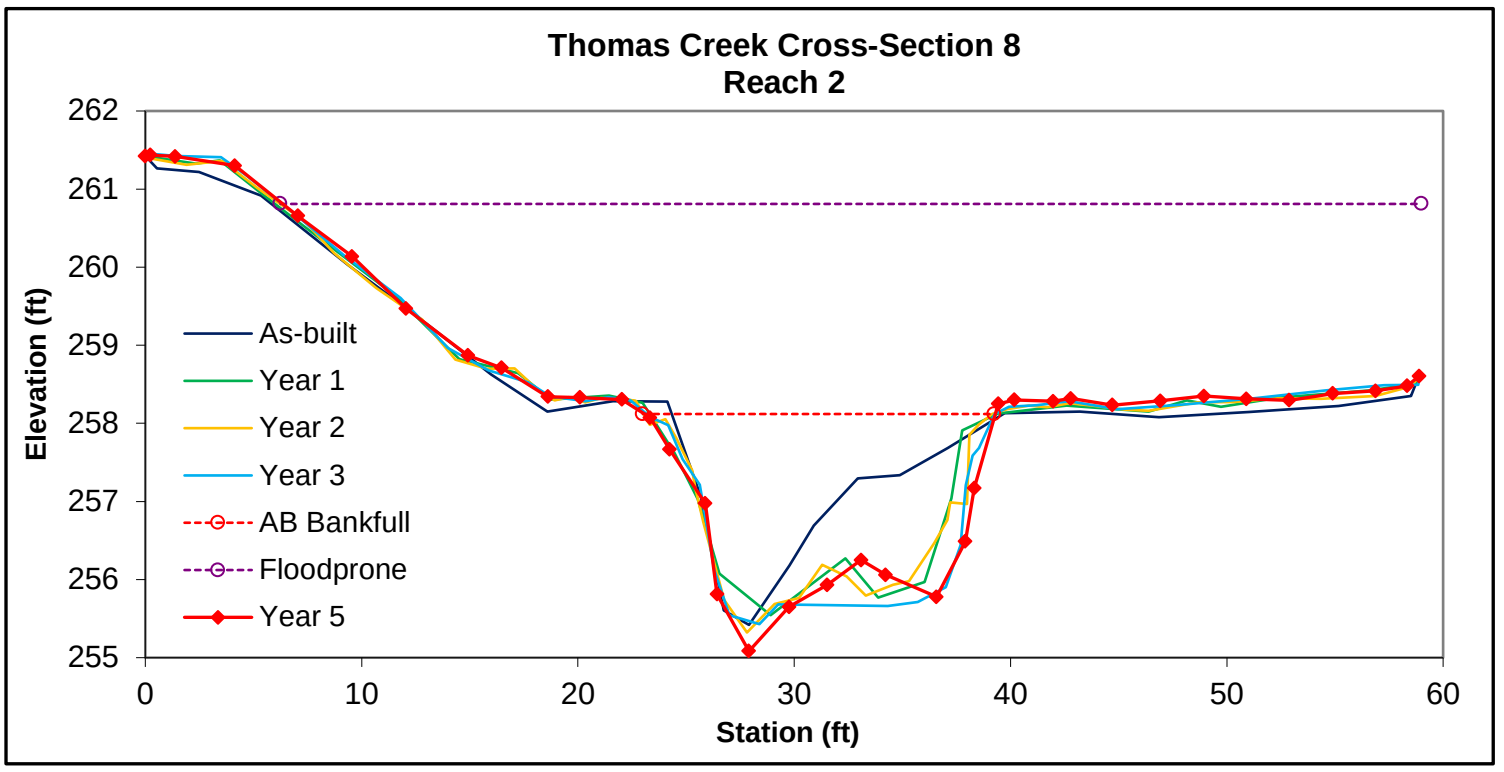
Permanent Cross-Section 8

(Year 5 Data - Collected September 2020)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	AB BKF Elev	LTOB Elev
Pool	-	29.9	16.2	1.8	3	8.8	-	-	258.12	258.07



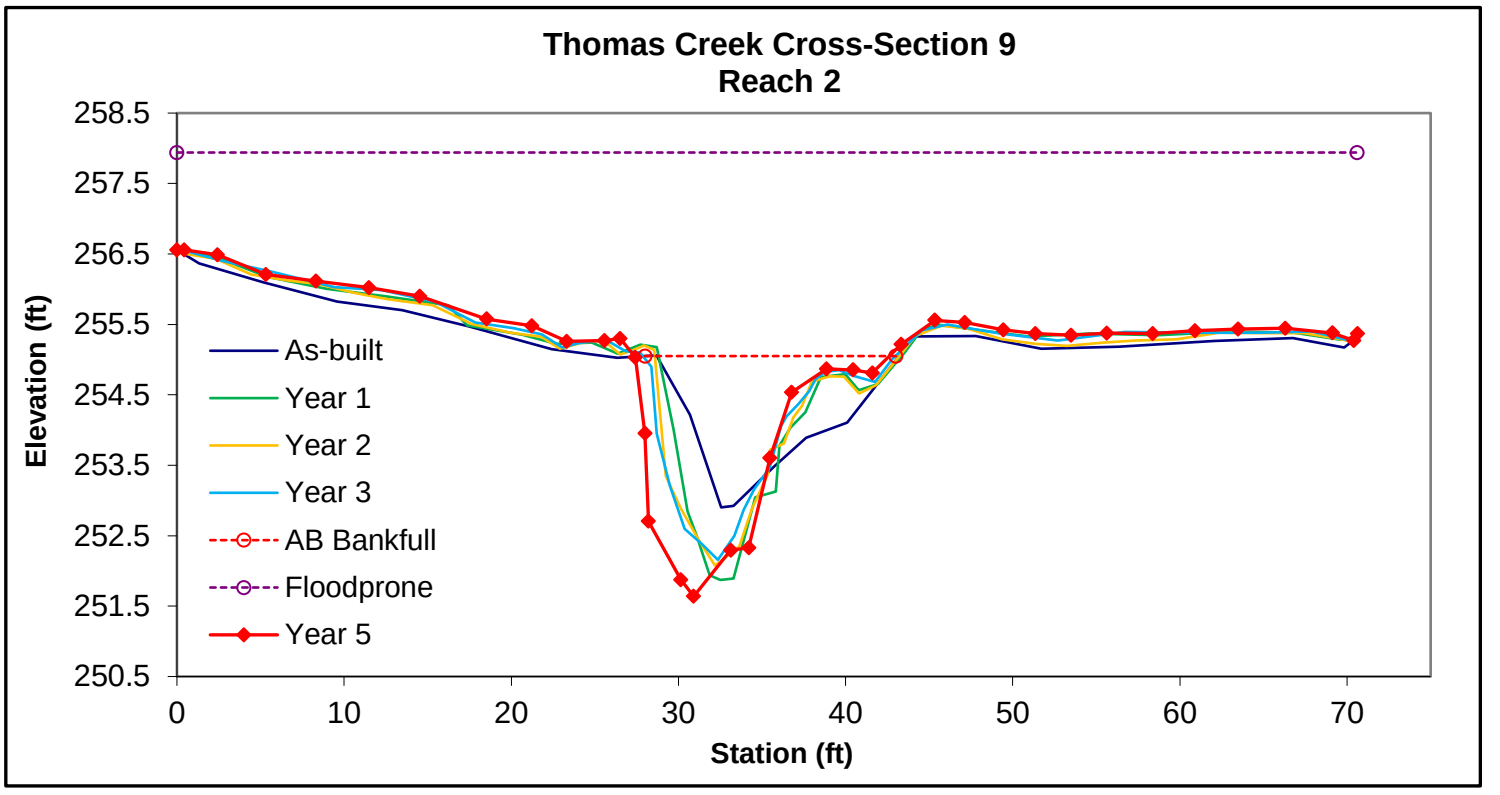
Permanent Cross-Section 9

(Year 5 Data - Collected September 2020)

Looking from the Left Bank

Looking from the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	AB BKF Elev	LTOB Elev
Pool	-	23.7	15.3	1.6	3.4	9.8	-	-	255.05	254.54



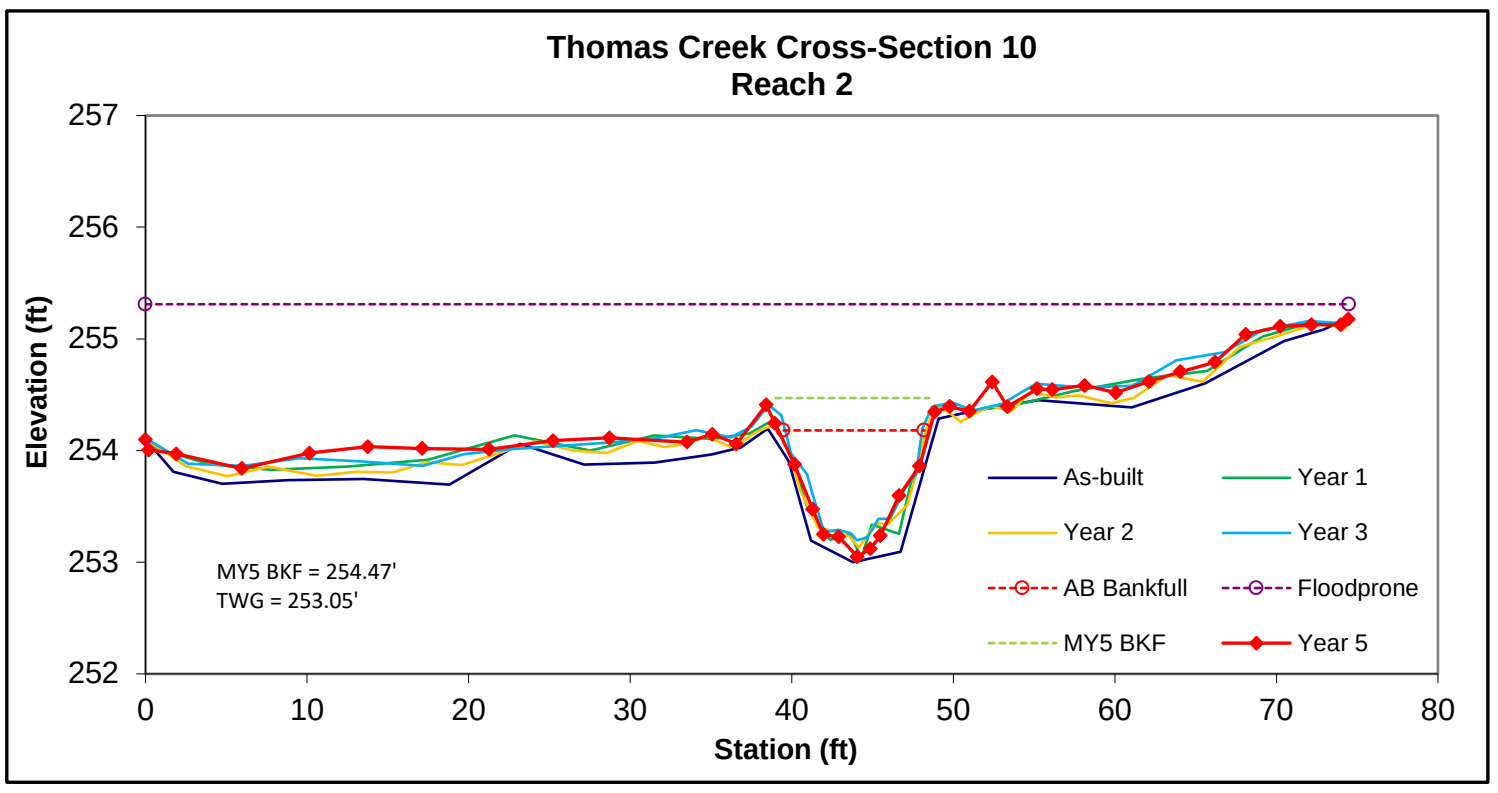
Permanent Cross-Section 10

(Year 5 Data - Collected September 2020)

Looking from the Left Bank

Looking from the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	AB BKF Elev	LTOB Elev
Riffle	C	6.4	9.4	0.7	1.1	13.7	0.9	8.0	254.18	254.34

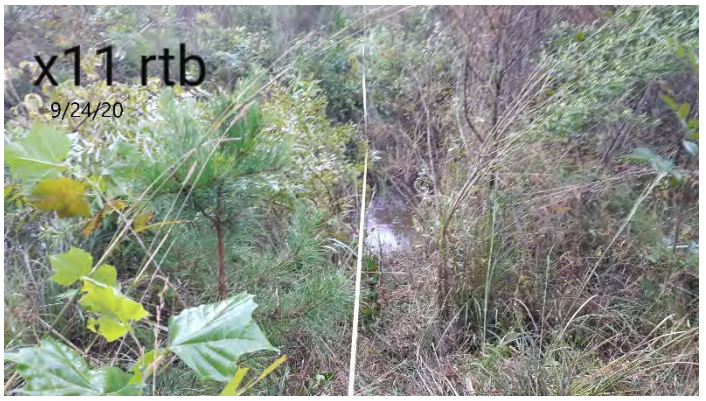


Note:Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

Permanent Cross-section 11

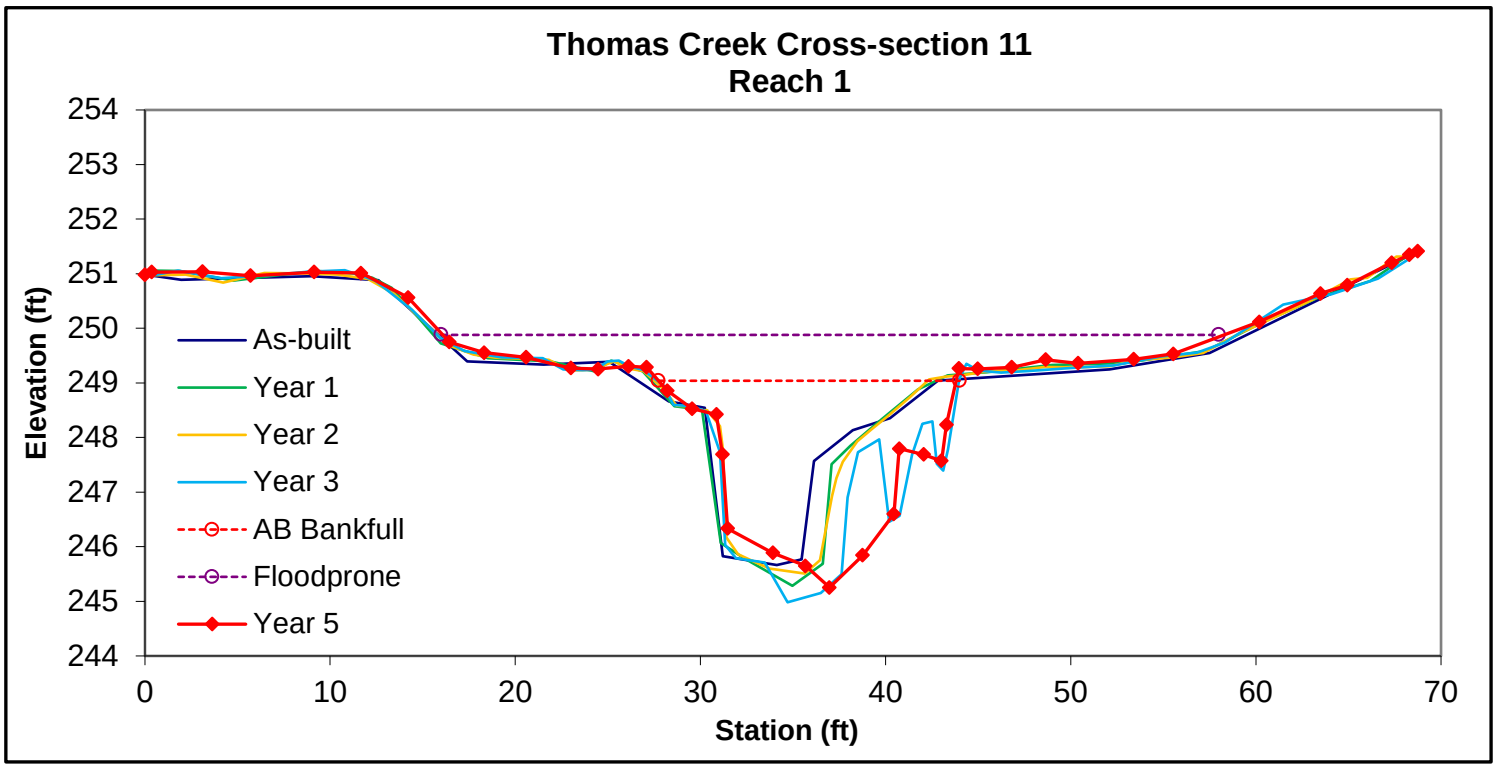
(Year 5 Data - Collected September 2020)

Looking from the Left Bank



Looking from the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	AB BKF Elev	LTOB Elev
Pool	-	34.8	16.1	2.2	3.8	7.4	-	-	249.04	249.27



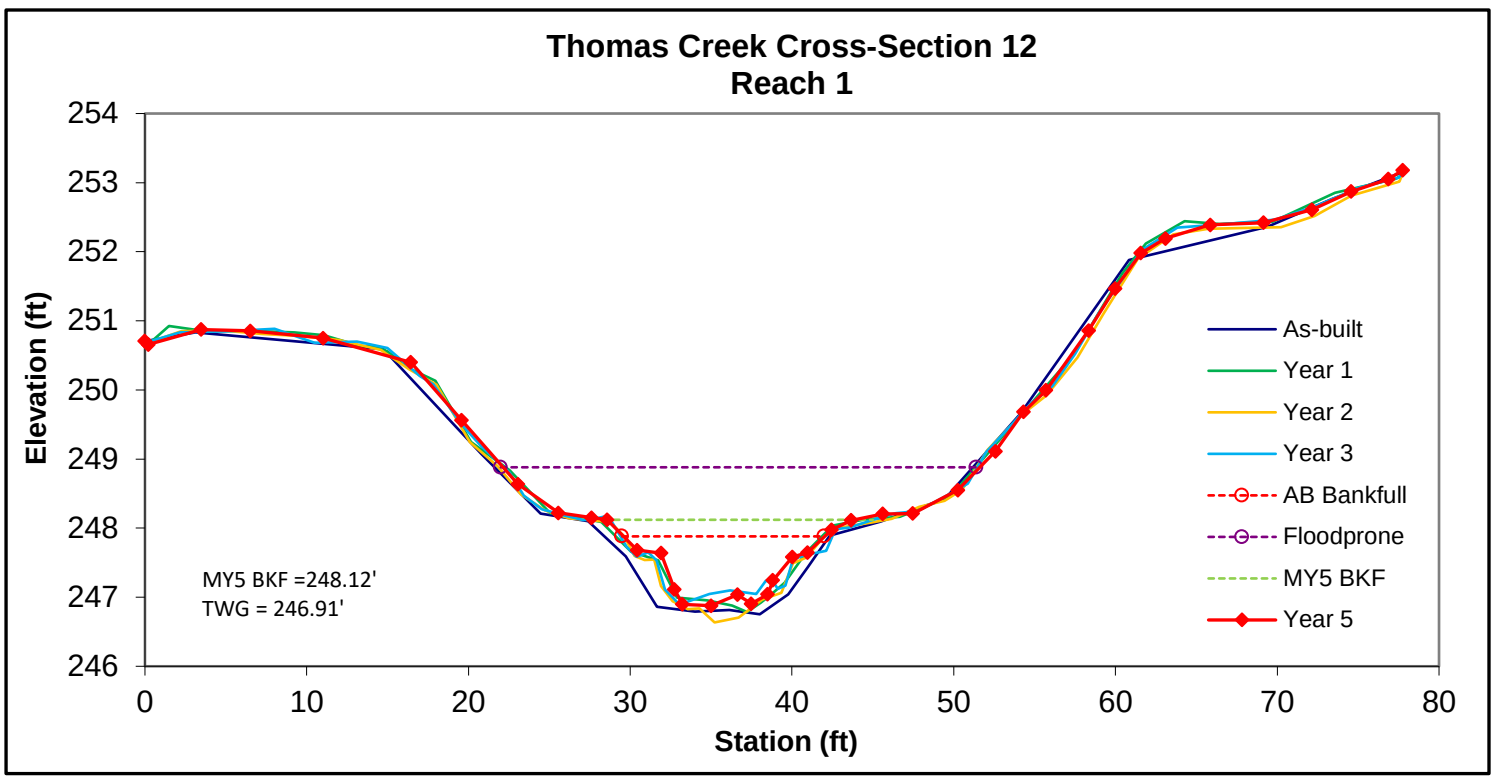
Permanent Cross-Section 12

(Year 5 Data - Collected September 2020)

Looking from the Left Bank

Looking from the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	7.4	12.4	0.6	1.0	20.9	0.9	2.4	247.88	247.98



Note:Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

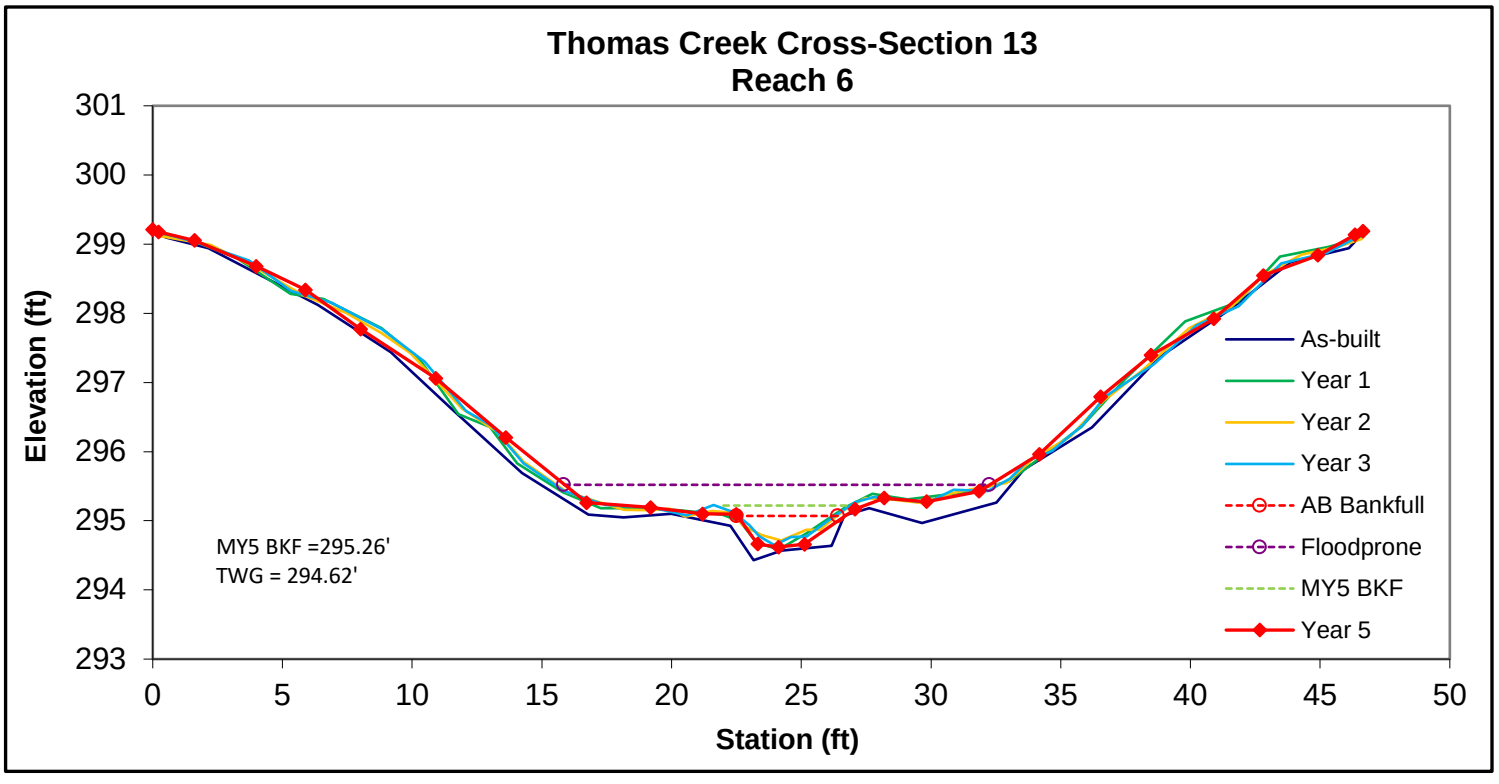
Permanent Cross-Section 13

(Year 5 Data - Collected September 2020)

Looking from the Left Bank

Looking from the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	AB BKF Elev	LTOB Elev
Riffle	C	1.3	4.2	0.3	0.4	13.8	0.8	3.9	295.07	295.09



Note:Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

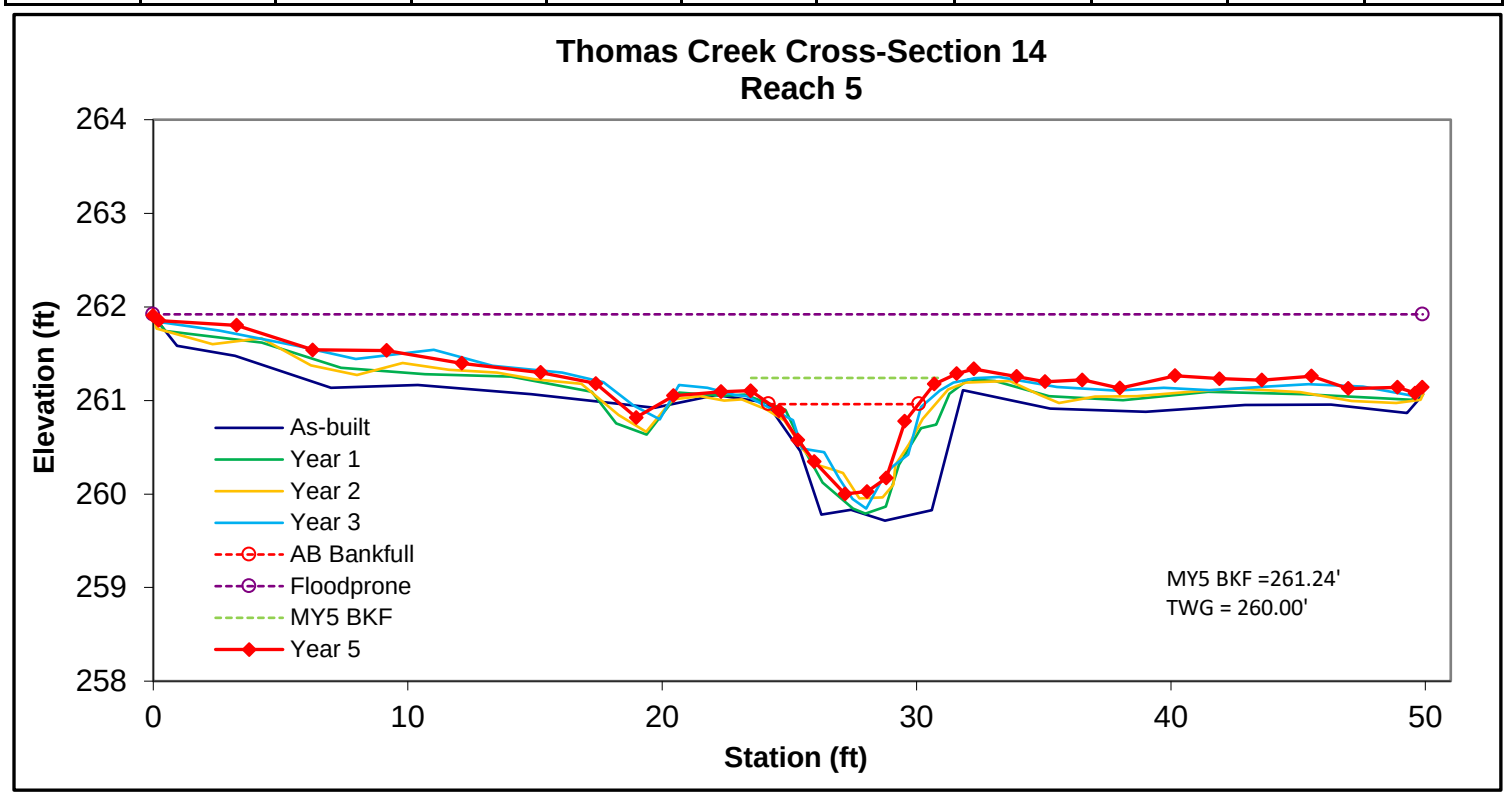
Permanent Cross-Section 14

(Year 5 Data - Collected September 2020)

Looking from the Left Bank

Looking from the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	AB BKF Elev	LTOB Elev
Riffle	E	3.3	5.8	0.6	1.0	10.3	0.9	8.5	260.96	261.1



Note:Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

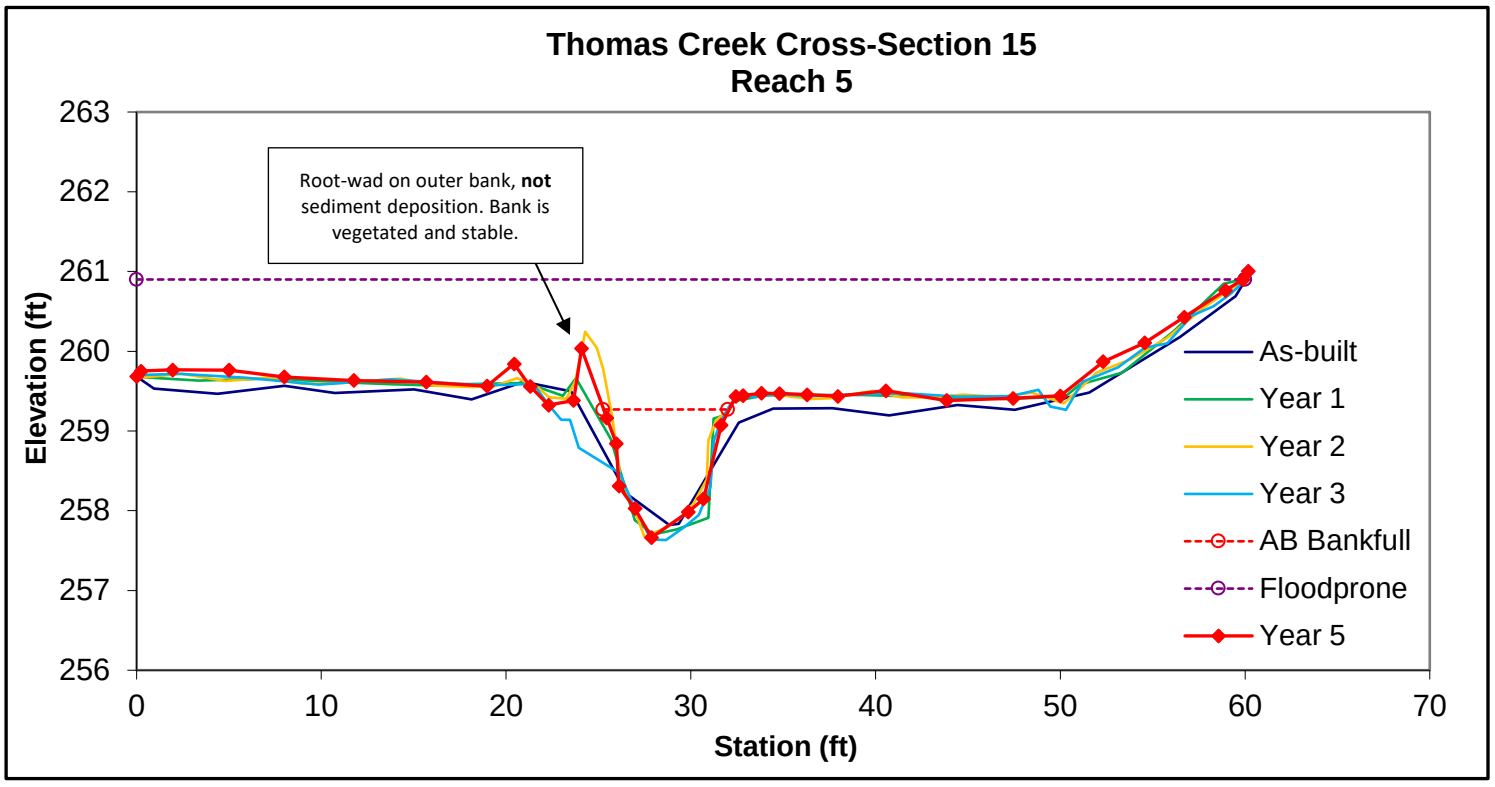
Permanent Cross-Section 15

(Year 5 Data - Collected September 2020)

Looking from the Left Bank

Looking from the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	AB BKF Elev	LTOB Elev
Pool	-	7.0	6.9	1.0	1.6	6.7	-	-	259.27	259.45



Permanent Cross-Section 16

(Year 5 Data - Collected September 2020)

Looking from the Left Bank

Looking from the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	AB BKF Elev	LTOB Elev
Pool	-	10.1	9.0	1.1	2.2	8.1	-	-	255.05	254.95

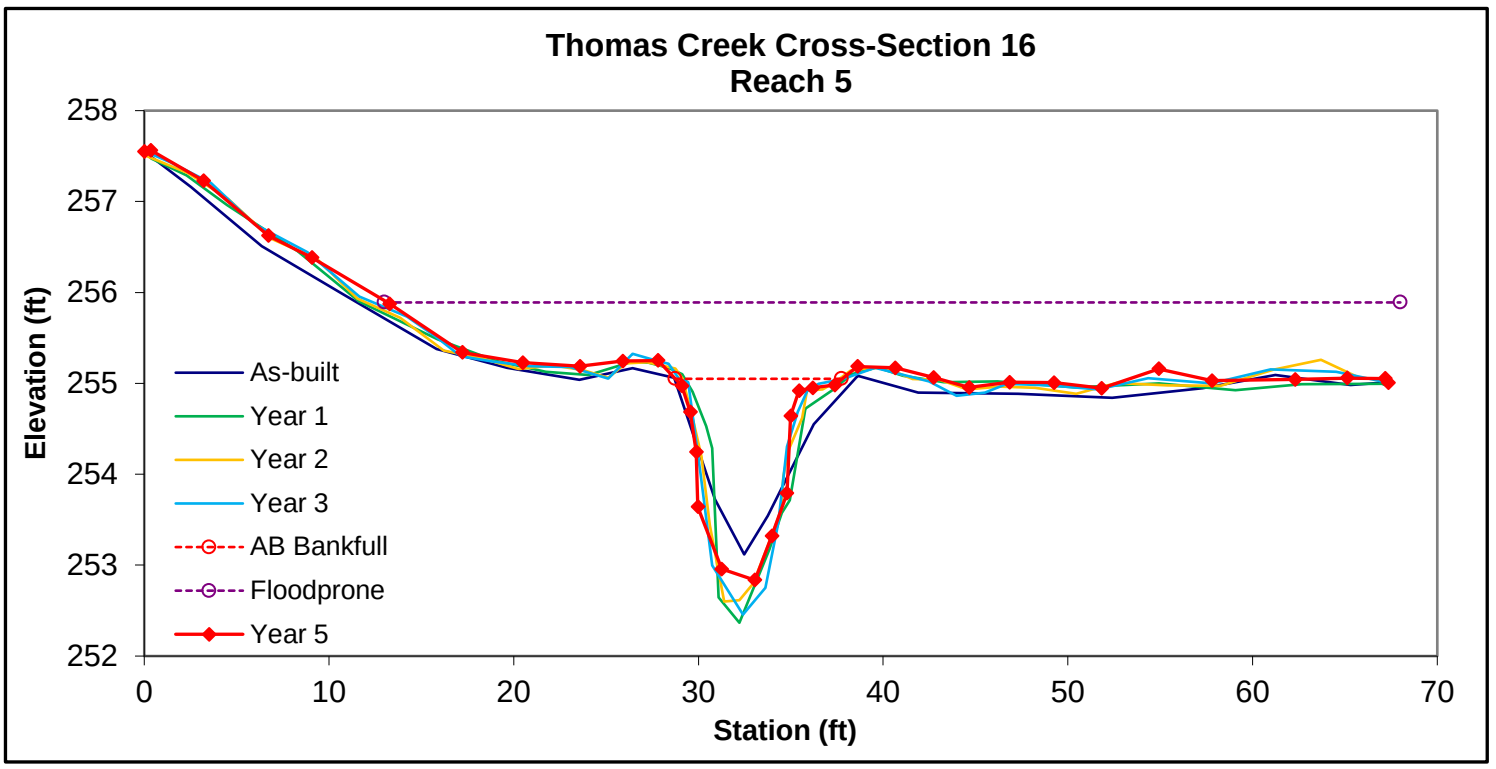


Figure 7. Pebble Count Plot Data

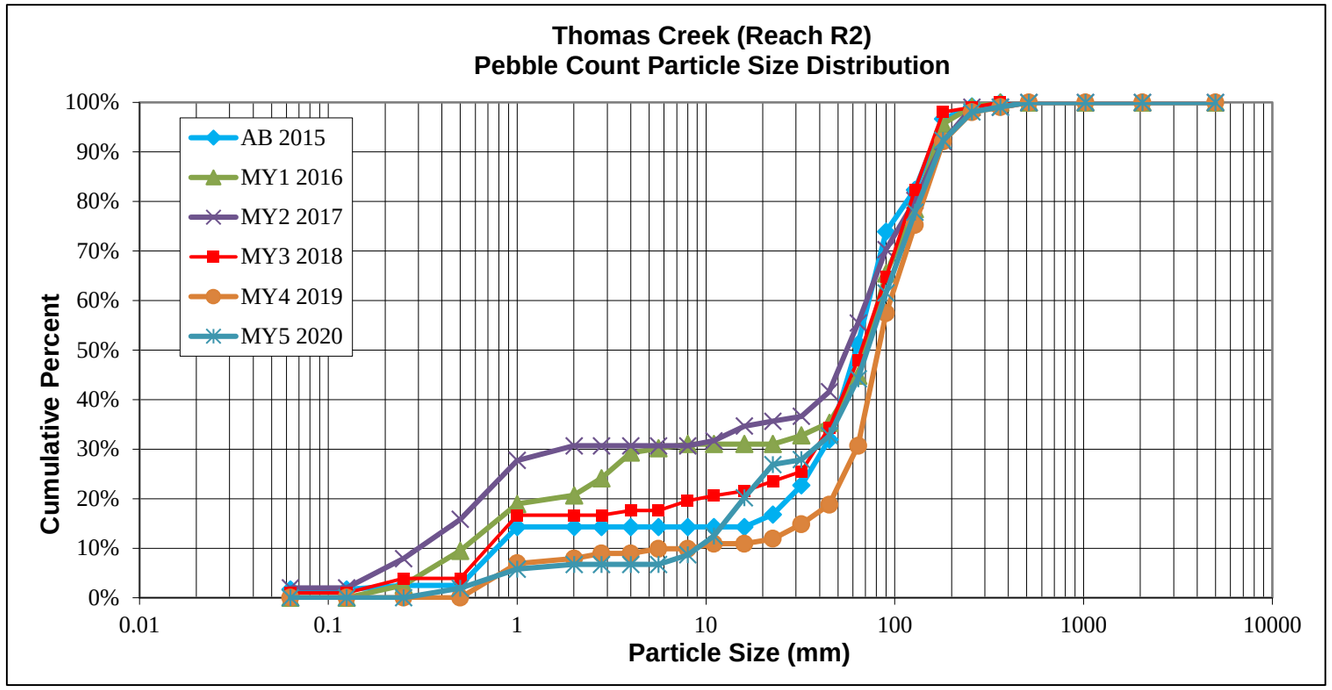
Figure 7. Pebble Count - Monitoring Year 5
Thomas Creek Mitigation Project, DMS# 96074

SITE OR PROJECT:	Thomas Creek
REACH/LOCATION:	Reach R2 (Station 37+00)
FEATURE:	Rock Riffle
DATE:	22-Oct-20

			MY5 2020			Distribution
MATERIAL	**PARTICLE**	**SIZE (mm)**	**Total**	**Class %**	**% Cum**	**Plot Size (mm)**
Silt/Clay	Silt / Clay	< .063			0%	0.063
Sand	Very Fine	.063 - .125			0%	0.125
	Fine	.125 - .25			0%	0.25
	Medium	.25 - .50	2	2%	2%	0.50
	Coarse	.50 - 1.0	4	4%	6%	1.0
	Very Coarse	1.0 - 2.0	1	1%	7%	2.0
Gravel	Very Fine	2.0 - 2.8			7%	2.8
	Very Fine	2.8 - 4.0			7%	4.0
	Fine	4.0 - 5.6			7%	5.6
	Fine	5.6 - 8.0	2	2%	9%	8.0
	Medium	8.0 - 11.0	4	4%	13%	11.0
	Medium	11.0 - 16.0	8	8%	20%	16.0
	Coarse	16 - 22.6	7	7%	27%	22.6
	Coarse	22.6 - 32	1	1%	28%	32
	Very Coarse	32 - 45	5	5%	33%	45
	Very Coarse	45 - 64	12	12%	44%	64
Cobble	Small	64 - 90	18	17%	62%	90
	Small	90 - 128	17	16%	78%	128
	Large	128 - 180	15	14%	92%	180
	Large	180 - 256	6	6%	98%	256
Boulder	Small	256 - 362	1	1%	99%	362
	Small	362 - 512	1	1%	100%	512
	Medium	512 - 1024	0	0%	100%	1024
	Large-Very Large	1024 - 2048	0	0%	100%	2048
Bedrock	Bedrock	> 2048	0	0%	100%	5000
Total % of whole count			104	100%		

Largest particle= 512

Summary Data			
Channel materials			
D16 =	13.0	D84 =	147.9
D35 =	48.3	D95 =	212.2
D50 =	71.7	D100 =	362 - 512



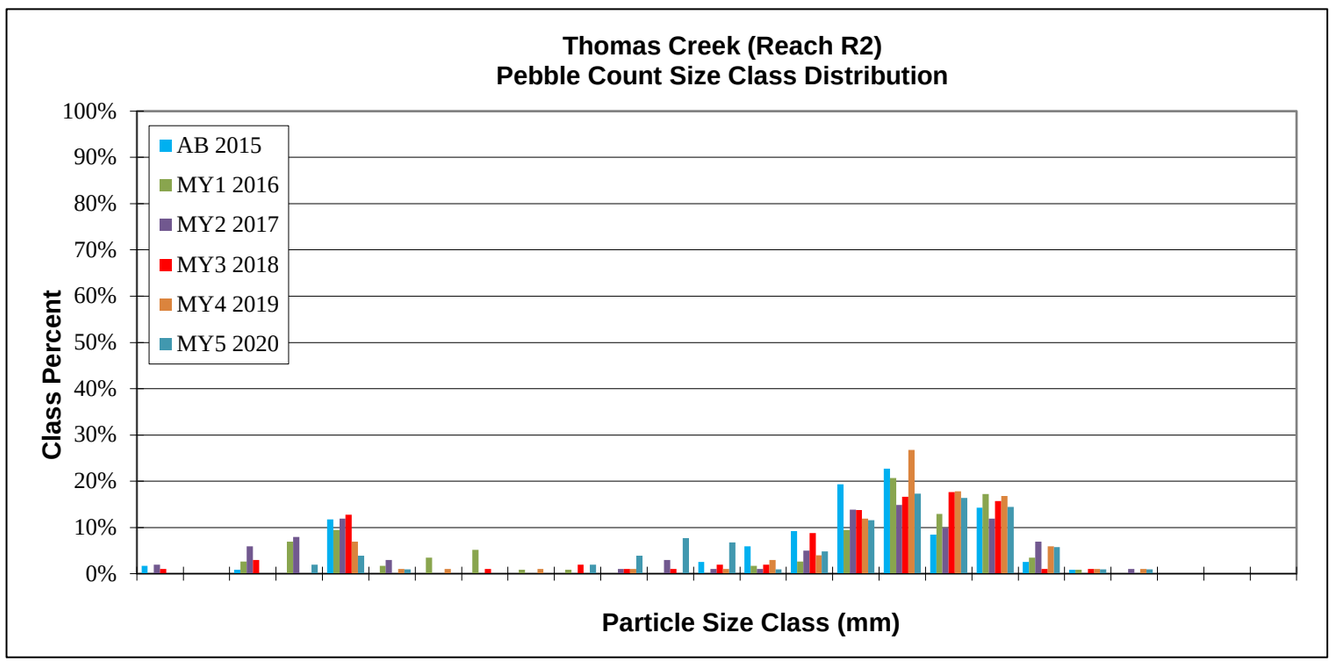


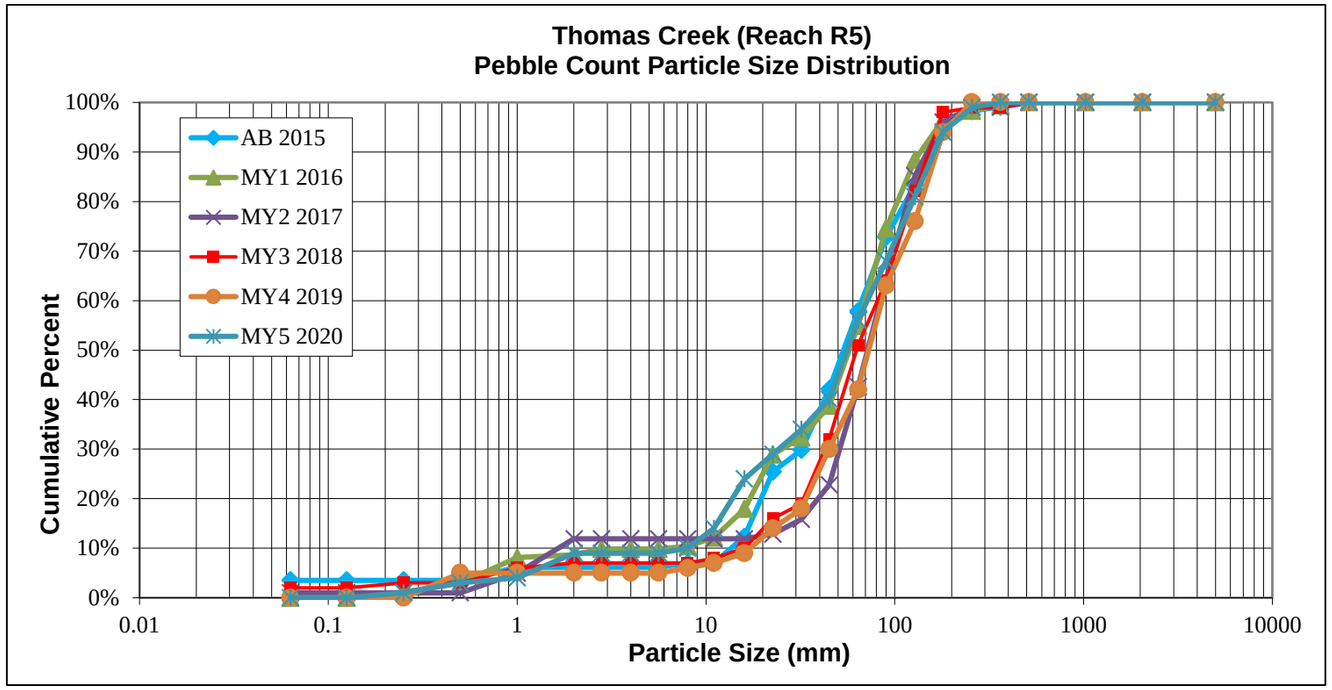
Figure 7. Pebble Count - Monitoring Year 5
Thomas Creek Mitigation Project, DMS# 96074

SITE OR PROJECT:	Thomas Creek
REACH/LOCATION:	Reach R5 (Station 37+00)
FEATURE:	Rock Riffle
DATE:	22-Oct-20

			MY5 2020			Distribution
MATERIAL	**PARTICLE**	**SIZE (mm)**	**Total**	**Class %**	**% Cum**	**Plot Size (mm)**
Silt/Clay	Silt / Clay	< .063			0%	0.063
Sand	Very Fine	.063 - .125			0%	0.125
	Fine	.125 - .25	1	1%	1%	0.25
	Medium	.25 - .50	2	2%	3%	0.50
	Coarse	.50 - 1.0	1	1%	4%	1.0
	Very Coarse	1.0 - 2.0	5	5%	9%	2.0
Gravel	Very Fine	2.0 - 2.8			9%	2.8
	Very Fine	2.8 - 4.0			9%	4.0
	Fine	4.0 - 5.6			9%	5.6
	Fine	5.6 - 8.0	1	1%	10%	8.0
	Medium	8.0 - 11.0	4	4%	14%	11.0
	Medium	11.0 - 16.0	10	10%	24%	16.0
	Coarse	16 - 22.6	5	5%	29%	22.6
	Coarse	22.6 - 32	5	5%	34%	32
	Very Coarse	32 - 45	6	6%	40%	45
	Very Coarse	45 - 64	16	16%	56%	64
Cobble	Small	64 - 90	12	12%	68%	90
	Small	90 - 128	13	13%	81%	128
	Large	128 - 180	13	13%	94%	180
	Large	180 - 256	5	5%	99%	256
Boulder	Small	256 - 362	1	1%	100%	362
	Small	362 - 512			100%	512
	Medium	512 - 1024			100%	1024
	Large-Very Large	1024 - 2048			100%	2048
Bedrock	Bedrock	> 2048			100%	5000
Total % of whole count			100	100%		

Largest particle= 270

Summary Data			
Channel materials			
D16 =	11.9	D84 =	138.5
D35 =	33.9	D95 =	193.1
D50 =	56.1	D100 =	256 - 362



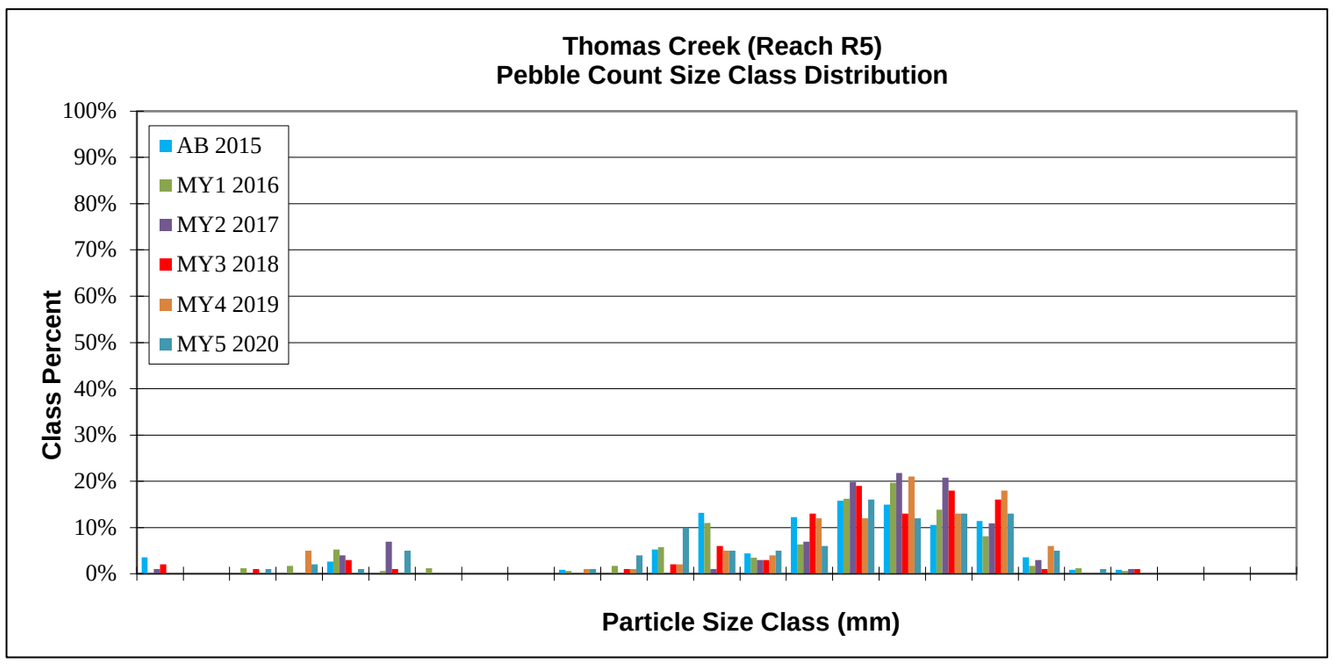


Table 10. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074

Reach 1 - Length 298 ft

Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data – Little Beaver Creek (Wake County)						Design						As-built					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																												
BF Width (ft)	-----	11.6	11.9	-----	-----	-----	-----	9.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	12.5	----	----	-----	-----	-----	13.9	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	-----	-----	-----	9.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	>25	----	----	-----	-----	-----	30.6	-----	-----	-----	-----
BF Mean Depth (ft)	-----	1.2	1.5	-----	-----	-----	-----	1.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.9	----	----	-----	-----	-----	0.8	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	1.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.1	----	----	-----	-----	-----	1.1	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	-----	11.2	-----	-----	-----	-----	11.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	11.2	----	----	-----	-----	-----	11.1	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	-----	-----	-----	7.2	-----	-----	12.0	-----	-----	18.0	-----	-----	-----	14.0	----	----	-----	-----	-----	17.4	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	-----	-----	-----	1.8	-----	-----	1.4	-----	-----	2.2	-----	-----	-----	>2.2	----	----	-----	-----	-----	2.2	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	-----	-----	-----	2.5	-----	-----	1.0	-----	-----	1.1	-----	-----	-----	1.0	----	----	-----	-----	-----	1.0	-----	-----	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	30.0	-----	----	-----	-----	-----	34.4	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	25.0	-----	-----	35.0	-----	-----	-----	33.1	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.0	-----	-----	3.0	-----	-----	2.0	-----	-----	2.8	-----	-----	-----	2.4	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	105.0	-----	-----	-----	103.4	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.5	-----	-----	8.0	-----	-----	-----	2.4	-----	----	-----	-----	-----	2.5	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	24.0	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.028	-----	-----	-----	0.025	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	24	-----	-----	60	-----	-----	-----	64.0	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.4	-----	-----	-----	2.5	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
[1] d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			0.15 / 0.27 / 0.34 / 0.75 / 1.39																					
Reach Shear Stress (competency) lb/ft^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	0.38	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.38	-----	-----	-----	-----	-----	0.38	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	E	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	C5	-----	-----
BF Velocity (fps)	-----	3.4	4.0	-----	-----	-----	-----	3.9	-----	-----	3.5	-----	-----	5	-----	-----	-----	-----	-----	4	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	27.6	44.6	-----	-----	-----	-----	44.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	44.6	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	271.1	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	397	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	266	-----	-----	-----	-----	-----	324.3	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----	-----	1.18	-----	-----	1.1	-----	-----	1.3	-----	-----	-----	-----	-----	1.22	-----	-----	-----	-----	-----	1.2	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0028	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.022	-----	-----	-----	-----	-----	0.0168	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0050	-----	-----	0.002	-----	-----	0.015	-----	-----	-----	-----	-----	0.0165	-----	-----	-----	-----	-----	0.0201	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle

Table 10 continued. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074

Reach 2 - Length 2,126 ft

Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data – Little Beaver Creek (Wake County)						Design						As-built					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																												
BF Width (ft)	-----	11.6	11.9	-----	6.5	-----	-----	9.4	-----	-----	-----	-----	-----	-----	-----	-----	9.2	-----	-----	10.4	-----	-----	10.2	10.3	-----	10.4	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	9.0	-----	-----	13.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	>18	-----	----	-----	-----	38.2	58.5	-----	74.5	-----	-----
BF Mean Depth (ft)	-----	1.2	1.5	-----	0.6	-----	-----	1.2	-----	-----	-----	-----	-----	-----	-----	-----	0.7	-----	-----	0.7	-----	-----	0.7	0.8	-----	1.0	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	1.6	-----	-----	2.6	-----	-----	-----	-----	-----	-----	-----	-----	0.8	-----	-----	1.0	-----	-----	1.0	1.2	-----	1.5	-----	-----
BF Cross-sectional Area (ft^2)	-----	6.0	7.7	-----	7.7	-----	-----	15.7	-----	-----	-----	-----	-----	-----	-----	-----	6.0	-----	-----	7.7	-----	-----	7.4	8.6	-----	10.2	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	3.4	-----	-----	5.4	-----	-----	10.0	-----	-----	15.0	-----	-----	14.0	-----	-----	14.0	-----	-----	10.1	12.5	-----	14.8	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	1.4	-----	-----	1.4	-----	-----	-----	-----	-----	>2.2	-----	-----	-----	>2.2	-----	----	-----	-----	3.7	5.7	-----	7.2	-----	-----
Bank Height Ratio	-----	-----	-----	-----	2.2	-----	-----	3.3	-----	-----	1.0	-----	-----	1.1	-----	-----	-----	1.0	-----	----	-----	-----	0.9	1.0	-----	1.0	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	32.0	-----	-----	45.0	-----	-----	-----	56.6	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	17.0	-----	-----	30.0	-----	-----	-----	22.0	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.0	-----	-----	3.0	-----	-----	2.0	-----	-----	3.0	-----	-----	-----	2.1	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	75.0	-----	-----	107.0	-----	-----	-----	83.2	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	7.0	-----	-----	14.0	-----	-----	3.3	-----	-----	4.7	-----	-----	-----	5.5	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	17.7	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.0094	-----	-----	0.02	-----	-----	-----	0.012	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	25	-----	-----	75	-----	-----	-----	50.8	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.7	-----	-----	1.9	-----	-----	-----	1.7	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
[1] d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			0.11 / 0.22 / 0.32 / 0.85 / 1.89																	20.2 / 47.6 / 62.5 / 133.1 / 173.1				
Reach Shear Stress (competency) lb/ft^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	0.153	-----	-----	0.275	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.275	-----	-----	-----	-----	-----	0.275	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----	-----	-----
Rosgen Classification	-----	-----	-----	-----	G5c	-----	-----	F5	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	C5	-----	-----
BF Velocity (fps)	-----	3.2	3.9	-----	3.8	-----	-----	3.9	-----	-----	3.5	-----	-----	5	-----	-----	3.8	-----	-----	3.9	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	17.8	29.7	-----	22.9	-----	-----	35.0	-----	-----	-----	-----	-----	-----	-----	-----	23.0	-----	-----	29.7	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2549.3	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	1,995	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1,089	-----	-----	-----	-----	-----	3413.7	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.17	-----	-----	-----	-----	1.2	-----	-----	1.5	-----	-----	-----	-----	-----	1.20	-----	-----	-----	-----	-----	1.3	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.0082	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.0047	-----	-----	0.0083	-----	-----	-----	-----	-----	0.0092	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	0.0098	-----	-----	-----	-----	0.002	-----	-----	0.01	-----	-----	-----	-----	-----	0.01	-----	-----	-----	-----	-----	0.0123	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle, As-Built measurement taken on constructed rock riffle

Table 10 continued. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074

Reach 3 - Length 1,031 ft

Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data — Thomas Creek Site Upper Reach 4 (On-site)						Design						As-built					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																												
BF Width (ft)	-----	11.6	11.9	-----	4.5	-----	-----	5.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	7.0	-----	----	-----	-----	7.5	8.4	-----	9.3	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	6.7	-----	-----	9.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	>16	-----	----	-----	-----	37.3	46.3	-----	55.3	-----	-----
BF Mean Depth (ft)	-----	1.2	1.5	-----	0.7	-----	-----	0.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.7	-----	----	-----	-----	0.6	0.7	-----	0.8	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	1.0	-----	-----	1.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.7	-----	----	-----	-----	0.9	0.9	-----	1..29	-----	-----
BF Cross-sectional Area (ft^2)	-----	26.8	36.2	-----	3.0	-----	-----	4.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.1	-----	----	-----	-----	4.5	5.9	-----	7.3	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	6.5	-----	-----	6.7	-----	-----	10	-----	-----	14.0	-----	-----	11.0	12.0	-----	13.0	-----	-----	11.9	12.1	-----	12.3	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	1.5	-----	-----	1.8	-----	-----	-----	-----	-----	>2.2	-----	-----	-----	>2.2	-----	-----	-----	-----	5.0	5.5	-----	5.9	-----	-----
Bank Height Ratio	-----	-----	-----	-----	2.3	-----	-----	3.2	-----	-----	1.0	-----	-----	1.1	-----	-----	-----	1.0	-----	-----	-----	-----	1.0	1.0	-----	1.0	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	18	-----	-----	28	-----	-----	-----	32.2	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	15	-----	-----	21	-----	-----	-----	19.1	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	-----	-----	3	-----	-----	2.0	-----	-----	2.7	-----	-----	-----	2.3	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	70	-----	-----	80	-----	-----	-----	77.5	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.6	-----	-----	4.0	-----	-----	-----	3.8	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	12.5	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.1	-----	-----	2.0	-----	-----	-----	0.031	-----	----	-----	-----	-----	0.013	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	28.0	-----	-----	48.0	-----	-----	-----	47.2	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.5	-----	----	-----	-----	-----	1.3	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
[1] d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			.014 / .029 / 0.41 / 1.16 / 3.05																					
Reach Shear Stress (competency) lb/ft^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	0.083	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.083	-----	-----	-----	-----	-----	0.083	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	B5c	-----	-----	---	-----	-----	E/C5	-----	-----	---	-----	-----	E/C5	-----	-----	-----	-----	-----	C5	-----	-----
BF Velocity (fps)	-----	3.0	3.6	-----	3.8	-----	-----	2.3	-----	-----	3.5	-----	-----	5	-----	-----	-----	-----	-----	3.8	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	9.4	16.5	-----	12.2	-----	-----	16.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	16.5	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	873	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	1,067	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1,231	-----	-----	-----	-----	-----	1,031	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----	-----	1.22	-----	-----	1.20	-----	-----	1.50	-----	-----	-----	-----	-----	1.20	-----	-----	-----	-----	-----	1.2	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0150	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.0150	-----	-----	-----	-----	-----	0.0092	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0182	-----	-----	0.005	-----	-----	0.015	-----	-----	-----	-----	-----	0.0182	-----	-----	-----	-----	-----	0.0123	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle

Table 10 continued. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 4 - Length 1,238 ft

Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design						As-built					
											Thomas Creek Site Upper Reach 4 (On-site)																	
Dimension and Substrate - Riffle		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	11.6	11.9	-----	-----	-----	-----	4.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.3	-----	----	-----	-----	-----	6.8	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	-----	-----	-----	9.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	>13	-----	----	-----	-----	-----	21.9	-----	-----	-----	-----
BF Mean Depth (ft)	-----	1.2	1.5	-----	-----	-----	-----	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.5	-----	----	-----	-----	-----	0.5	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	1.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.6	-----	----	-----	-----	-----	0.9	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	-----	3.1	-----	-----	-----	-----	3.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.1	-----	----	-----	-----	-----	3.6	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	-----	-----	-----	6.4	-----	-----	10.0	-----	-----	14.0	-----	-----	12.0	----	-----	14.0	-----	-----	-----	12.7	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	-----	-----	-----	2.2	-----	-----	-----	-----	-----	>2.2	-----	-----	-----	>2.1	-----	----	-----	-----	-----	3.2	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	-----	-----	-----	3.0	-----	-----	1.0	-----	-----	1.1	-----	-----	-----	1.0	-----	----	-----	-----	-----	1.0	-----	-----	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	20.0	-----	-----	29.0	-----	-----	-----	34.0	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	12.0	-----	-----	18.0	-----	-----	-----	16.9	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.0	-----	-----	3.0	-----	-----	2.0	-----	-----	3.0	-----	-----	-----	2.5	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	60.0	-----	-----	75.0	-----	-----	-----	66.2	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.5	-----	-----	8.0	-----	-----	3.2	-----	-----	4.6	-----	-----	-----	5.0	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	15.4	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.029	-----	-----	-----	0.035	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	28-	-----	-----	43	-----	-----	-----	42.8	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.5	-----	-----	-----	1.3	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----																								
Reach Shear Stress (competency) lb/ft^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	0.056	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.056	-----	-----	-----	-----	-----	0.056	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	C5	-----	-----
BF Velocity (fps)	-----	3.2	3.9	-----	-----	-----	-----	3.6	-----	-----	3.5	-----	-----	5	-----	-----	-----	-----	-----	3.6	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	17.8	29.7	-----	-----	-----	-----	11.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	11.1	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	285.55	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	1,197	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1,201	-----	-----	-----	-----	-----	342.91	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----	-----	1.16	-----	-----	1.20	-----	-----	1.50	-----	-----	-----	-----	-----	1.13	-----	-----	-----	1.20	-----	1.20	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0121	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.015	-----	-----	-----	-----	-----	0.0156	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0105	-----	-----	0.005	-----	-----	0.015	-----	-----	-----	-----	-----	0.024	-----	-----	-----	-----	-----	0.0188	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle

Table 10 continued. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074

Reach 5 - Length 1,169 ft

Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data – Little Beaver Creek (Wake County)						Design						As-built					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																												
BF Width (ft)	-----	11.6	11.9	-----	4.4	-----	-----	8.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.8	-----	----	-----	-----	-----	8.6	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	7.8	-----	-----	>30	-----	-----	-----	-----	-----	-----	-----	-----	-----	>16	-----	----	-----	-----	-----	49.9	-----	-----	-----	-----
BF Mean Depth (ft)	-----	1.2	1.5	-----	0.4	-----	-----	1.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.5	-----	----	-----	-----	-----	0.9	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	0.8	-----	-----	1.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.7	-----	----	-----	-----	-----	1.2	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	-----	4.0	-----	3.4	-----	-----	4.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.6	-----	----	-----	-----	-----	6.8	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	4.2	-----	-----	3.4	-----	-----	10.0	-----	-----	14.0	-----	-----	-----	13.0	-----	----	-----	-----	-----	8.4	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	1.8	-----	-----	5.4	-----	-----	-----	-----	-----	>2.2	-----	-----	-----	>2.3	-----	----	-----	-----	-----	6.6	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	2.4	-----	-----	1.0	-----	-----	1.0	-----	-----	1.1	-----	-----	-----	1.0	-----	----	-----	-----	-----	1.0	-----	-----	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	28	-----	-----	45	-----	-----	-----	58.6	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	14	-----	-----	20	-----	-----	-----	17.5	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	-----	-----	3	-----	-----	-----	2.0	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	60	-----	-----	90	-----	-----	-----	81.5	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.5	-----	-----	8	-----	-----	4.1	-----	-----	6.6	-----	-----	-----	6.8	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	15.2	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.0265	-----	----	-----	-----	-----	0.0196	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	25	-----	-----	55	-----	-----	-----	57.8	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.3	-----	----	-----	-----	-----	1.7	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
[1] d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----																				17.6 / 36.9 / 53.7 / 130.6 / 184.8				
Reach Shear Stress (competency) lb/ft^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	0.097	-----	-----	0.083	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.097	-----	-----	-----	-----	-----	0.097	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	B5c	-----	-----	C	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	E5	-----	-----
BF Velocity (fps)	-----	3.4	3.7	-----	3.7	-----	-----	4.2	-----	-----	3.5	-----	-----	5	-----	-----	-----	-----	-----	3.3	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	9.4	14.7	-----	14.4	-----	-----	16.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	12.0	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	726.02	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	1,022	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1,828	-----	-----	-----	-----	-----	1069.32	-----	-----
Sinuosity	-----	-----	-----	-----	1.31	-----	-----	1.42	-----	-----	1.20	-----	-----	1.50	-----	-----	-----	-----	-----	1.42	-----	-----	-----	-----	-----	1.47	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0177	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.0124	-----	-----	-----	-----	-----	0.0123	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0133	-----	-----	0.005	-----	-----	0.015	-----	-----	-----	-----	-----	0.0134	-----	-----	-----	-----	-----	0.0185	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle, As-Built measurement taken on constructed rock riffle

Table 10 continued. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 6 - Length 1,776 ft

Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design						As-built					
											Thomas Creek Site Upper Reach 4 (On-site)																	
Dimension and Substrate - Riffle		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	-----	-----	-----	3.2	-----	-----	4.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.6	-----	----	-----	-----	-----	6.3	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	4.5	-----	-----	6.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	>9	-----	----	-----	-----	-----	19.4	-----	-----	-----	-----
BF Mean Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.60	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.3	-----	----	-----	-----	-----	0.3	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.4	-----	----	-----	-----	-----	0.6	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	-----	-----	-----	1.8	-----	-----	2.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.5	-----	----	-----	-----	-----	2.1	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	0.9	-----	-----	5.8	-----	-----	12.0	-----	-----	18.0	-----	-----	-----	14.0	-----	----	-----	-----	-----	18.7	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	1.4	-----	-----	1.5	-----	-----	1.4	-----	-----	2.2	-----	-----	-----	>2.0	-----	----	-----	-----	-----	3.1	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	2.9	-----	-----	4.4	-----	-----	1.0	-----	-----	1.1	-----	-----	-----	1.0	-----	----	-----	-----	-----	0.8	-----	-----	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	12.5	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.04	-----	----	-----	-----	-----	0.027	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	34.6	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.0	-----	----	-----	-----	-----	1.2	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----				----												---								
Reach Shear Stress (competency) lb/ft^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	0.019	-----	-----	0.050	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.05	-----	-----	-----	-----	-----	0.05	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	B5c	-----	-----	G5c	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	C5	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	2.8	-----	-----	4.1	-----	-----	4	-----	-----	6	-----	-----	-----	-----	-----	3.3	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	5.1	-----	-----	10.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	12	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	201	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	1,828	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1,808	-----	-----	-----	-----	-----	210	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----	-----	1.13	-----	-----	1.10	-----	-----	1.30	-----	-----	-----	-----	-----	1.05	-----	-----	-----	-----	-----	1.04	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	0.0148	-----	-----	0.0250	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.030	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	0.0250	-----	-----	0.0361	-----	-----	0.005	-----	-----	0.015	-----	-----	-----	-----	-----	0.033	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle

Table 10 continued. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074

Reach 7 - Length 647 ft

Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data – Thomas Creek Site Upper Reach 4 (On-site)						Design						As-built					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																												
BF Width (ft)	-----	-----	-----	-----	-----	-----	-----	3.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	-----	-----	-----	5.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	-----	-----	-----	-----	-----	-----	1.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	-----	-----	-----	8.4	-----	-----	12.0	-----	-----	18.0	-----	-----	-----	14.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	-----	-----	-----	1.5	-----	-----	1.4	-----	-----	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	-----	-----	-----	4.2	-----	-----	1.0	-----	-----	1.1	-----	-----	-----	1.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.0	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
[1] d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			.012 / 0.29 / 0.43 / 0.87 / 1.39																					
Reach Shear Stress (competency) lb/ft^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	0.022	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.022	-----	-----	-----	-----	-----	0.022	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	B5	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	3.6	-----	-----	-----	-----	4	-----	-----	6	-----	-----	-----	-----	-----	3.33	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	5.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	646	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	646	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----	-----	1.11	-----	-----	1.10	-----	-----	1.30	-----	-----	-----	-----	-----	1.11	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.025	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.032	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.036	-----	-----	0.005	-----	-----	0.015	-----	-----	-----	-----	-----	0.036	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle

Table 10 continued. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074

Reach T1 - Length 227 ft

Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data — Thomas Creek Site Upper Reach 4 (On-site)						Design						As-built					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																												
BF Width (ft)	-----	-----	-----	-----	-----	-----	-----	7.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	7.0	-----	-----	-----	-----	-----	8.5	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	-----	-----	-----	10.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	30.6	-----	-----	-----	-----
BF Mean Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.6	-----	-----	-----	-----	-----	0.6	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.7	-----	-----	-----	-----	-----	0.9	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	-----	-----	-----	-----	-----	-----	2.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.8	-----	-----	-----	-----	-----	5.3	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	-----	-----	-----	18.6	-----	-----	12.0	-----	-----	18.0	-----	-----	-----	13.0	-----	-----	-----	-----	-----	13.6	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	-----	-----	-----	1.5	-----	-----	1.4	-----	-----	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.6	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	-----	-----	-----	2.6	-----	-----	1.0	-----	-----	1.1	-----	-----	-----	1.0	-----	-----	-----	-----	-----	1.0	-----	-----	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	32.5	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	13.5	-----	-----	18.0	-----	-----	-----	14.0	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.0	-----	-----	2.6	-----	-----	-----	1.7	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	48.0	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.8	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	14.7	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.0135	-----	-----	-----	-----	-----	0.0113	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	25	-----	-----	42	-----	-----	-----	41.2	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.4	-----	-----	-----	-----	-----	1.4	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----																								
Reach Shear Stress (competency) lb/ft^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	0.077	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.077	-----	-----	-----	-----	-----	0.077	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	C5	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	5.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.66	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	14.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	13.9	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	218	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	242	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	253	-----	-----	-----	-----	-----	227	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----	-----	1.09	-----	-----	1.10	-----	-----	1.30	-----	-----	-----	-----	-----	1.16	-----	-----	-----	-----	-----	1.04	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0203	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.004	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0120	-----	-----	0.005	-----	-----	0.015	-----	-----	-----	-----	-----	0.005	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle

Table 10 continued. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach T2 - Length 157 ft

Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data Thomas Creek Site Upper Reach 4 (On-site)						Design						As-built					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																												
BF Width (ft)	-----	-----	-----	-----	-----	-----	-----	2.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	-----	-----	-----	3.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	-----	-----	-----	-----	-----	-----	0.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	-----	-----	-----	5.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	-----	-----	-----	1.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	-----	-----	-----	2.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----																								
Reach Shear Stress (competency) lb/ft^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	0.008	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.008	-----	-----	-----	-----	-----	0.008	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	3.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	2.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	171	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	157	-----	-----	-----	-----	-----	157	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----	-----	1.17	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0414	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0417	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle

Table 11a. Cross-Section Morphology and Hydraulic Monitoring Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074

Stream Reach	Reach 3 (1,032 LF)																				
	Cross-section X-1 (Riffle)							Cross-section X-2 (Pool)							Cross-section X-3 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
BF Width (ft)	9.3	8.8	8.3	8.6	-	8.7		10.5	10.2	10.2	10.0	-	10.3		7.5	7.1	7.0	7.4	-	6.5	
BF Mean Depth (ft)	0.8	0.6	0.6	0.6	-	0.6		1.3	1.3	1.2	1.3	-	1.4		0.6	0.4	0.5	0.3	-	0.4	
Width/Depth Ratio	11.9	14.1	13.7	14.4	-	15.1		8.3	8.0	8.5	7.6	-	7.5		12.3	16.9	15.5	21.3	-	16.9	
BF Cross-sectional Area (ft²)	7.3	5.4	5.1	5.1	-	5.1		13.4	13.2	12.2	13.3	-	14.2		4.5	3.0	3.1	2.6	-	2.5	
BF Max Depth (ft)	1.3	1.1	1.0	1.0	-	1.0		2.1	2.1	2.0	2.5	-	2.4		0.9	0.7	0.7	0.7	-	0.8	
Width of Floodprone Area (ft)	55	52	51	51	-	51		61	62	60	63	-	63		37	34	34	34	-	37	
Entrenchment Ratio	5.9	6.0	6.1	5.9	-	5.9		-	-	-	-	-	-		5.0	4.9	5.0	4.5	-	5.7	
Bank Height Ratio	1.0	0.9	0.8	0.9	-	0.9		-	-	-	-	-	-		1.0	0.9	0.8	0.7	-	0.8	
Wetted Perimeter (ft)	10.9	10.0	9.6	8.9	-	9.1		13.1	12.8	12.6	11.8	-	11.9		8.7	7.9	7.9	7.6	-	6.8	
Hydraulic Radius (ft)	0.7	0.5	0.5	0.6	-	0.6		1.0	1.0	1.0	1.1	-	1.2		0.5	0.4	0.4	0.4	-	0.4	
d50 (mm)	-							-							-						

Stream Reach	Reach 4 (1,238 LF)							Reach 2 upstream (703 LF)							Reach 2 downstream (1,423 LF)							Reach T1 (227 LF)						
	Cross-section X-4 (Riffle)							Cross-section X-5 (Riffle)							Cross-section X-6 (Riffle)							Cross-section X-7 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
BF Width (ft)	6.8	6.8	6.1	5.9	-	6.0		10.4	9.8	9.8	10.0	-	9.5		10.2	9.7	9.5	9.7	-	9.5		8.5	6.8	6.9	6.7	-	6.5	
BF Mean Depth (ft)	0.5	0.5	0.5	0.4	-	0.4		0.7	0.6	0.6	0.5	-	0.5		1.0	0.9	0.8	0.8	-	0.9		0.6	0.5	0.4	0.4	-	0.4	
Width/Depth Ratio	12.7	12.6	13.5	14.8	-	15.0		14.8	16.6	16.8	21.0	-	18.4		10.1	11.4	11.7	11.6	-	0.9		13.6	13.8	16.0	15.0	-	18.7	
BF Cross-sectional Area (ft²)	3.6	3.6	2.8	2.3	-	2.4		7.4	5.8	5.6	4.8	-	4.9		10.2	8.3	7.7	8.0	-	8.2		5.3	3.4	3.0	3.0	-	2.3	
BF Max Depth (ft)	0.9	1.0	0.8	0.7	-	0.6		1.0	0.9	0.9	0.8	-	0.8		1.5	1.3	1.3	1.2	-	1.3		0.9	0.8	0.7	0.6	-	0.5	
Width of Floodprone Area (ft)	22	22	21	20	-	22		38	37	36	36	-	36		63	63	63	63	-	63		31	28	27	27	-	25	
Entrenchment Ratio	3.2	3.1	3.2	3.4	-	3.2		3.7	3.7	3.7	3.6	-	3.8		6.2	6.2	6.2	6.5	-	6.6		3.6	3.7	3.7	4.0	-	3.8	
Bank Height Ratio	1.0	1.2	0.9	0.8	-	0.8		1.0	0.9	1.0	0.9	-	0.9		0.9	0.9	0.9	0.9	-	0.9		1.0	1.2	0.9	0.9	-	0.9	
Wetted Perimeter (ft)	7.8	7.9	7.0	6.1	-	6.4		11.8	11.0	10.9	10.2	-	9.7		12.2	11.4	11.1	10.3	-	10.1		9.7	7.8	7.7	7.0	-	6.7	
Hydraulic Radius (ft)	0.5	0.5	0.4	0.4	-	0.4		0.6	0.5	0.5	0.5	-	0.5		0.8	0.7	0.7	0.8	-	0.8		0.5	0.4	0.4	0.4	-	0.3	
d50 (mm)	-							-							-							-						

Stream Reach	Reach 2 downstream (1,423 LF)																				
	Cross-section X-8 (Pool)							Cross-section X-9 (Pool)							Cross-section X-10 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
BF Width (ft)	15.3	16.1	16.1	16.1	-	16.2		14.5	14.5	14.6	15.1	-	15.3		10.3	9.3	9.1	8.5	-	9.4	
BF Mean Depth (ft)	1.2	1.6	1.7	1.9	-	1.8		1.1	1.3	1.4	1.3	-	1.6		0.8	0.7	0.7	0.7	-	0.7	
Width/Depth Ratio	13.3	9.8	9.6	8.6	-	8.8		12.9	10.8	10.8	12.1	-	9.8		12.6	13.2	13.0	12.7	-	13.7	
BF Cross-sectional Area (ft²)	17.6	26.3	27.0	30.3	-	29.9		16.3	19.5	19.7	18.9	-	23.7		8.4	6.5	6.4	5.7	-	6.4	
BF Max Depth (ft)	2.7	2.6	2.8	2.7	-	3.0		2.2	3.2	3.0	2.9	-	3.4		1.2	1.1	1.1	1.0	-	1.1	
Width of Floodprone Area (ft)	53	52	53	53	-	53		71	71	71	71	-	71		74	74	74	75	-	75	
Entrenchment Ratio	-	-	-	-	-	-		-	-	-	-	-	-		7.2	7.3	7.3	8.8	-	8.0	
Bank Height Ratio	-	-	-	-	-	-		-	-	-	-	-	-		1.0	1.0	0.9	0.9	-	0.9	
Wetted Perimeter (ft)	17.6	19.3	19.5	18.3	-	18.5		16.8	17.2	17.3	17.0	-	18.2		11.9	10.7	10.5	8.9	-	9.7	
Hydraulic Radius (ft)	1.0	1.4	1.4	1.7	-	1.6		1.0	1.1	1.1	1.1	-	1.3		0.7	0.6	0.6	0.6	-	0.7	
d50 (mm)	-							-							-						

Note: Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

Table 11a. (Continued) Cross Section Morphology and Hydraulic Monitoring Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074

Stream Reach	Reach 1 (208 LF)														Reach 6 (1,776 LF)							
	Cross-section X-11 (Pool)							Cross-section X-12 (Riffle)							Cross-section X-13 (Riffle)							
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	
BF Width (ft)	16.2	15.4	14.8	16.3	-	16.1		13.9	12.7	12.4	13.1	-	12.4		6.3	4.1	4.1	3.7	-	4.2		
BF Mean Depth (ft)	1.5	1.7	1.7	2.1	-	2.2		0.8	0.7	0.8	0.6	-	0.6		0.3	0.3	0.2	0.2	-	0.3		
Width/Depth Ratio	11.1	8.8	8.7	7.7	-	7.4		17.4	19.8	16.5	22.3	-	20.9		18.7	16.1	19.5	15.5	-	13.8		
BF Cross-sectional Area (ft²)	23.7	26.8	25.0	34.6	-	34.8		11.1	8.2	9.3	7.7	-	7.4		2.1	1.1	0.8	0.9	-	1.3		
BF Max Depth (ft)	3.4	3.8	3.5	4.1	-	3.8		1.1	1.1	1.3	1.0	-	1.0		0.6	0.5	0.4	0.4	-	0.4		
Width of Floodprone Area (ft)	69	69	69	69	-	42		31	30	31	29	-	29		19	18	16	17	-	16		
Entrenchment Ratio	-	-	-	-	-	-		2.2	2.2	2.1	2.2	-	2.4		3.1	3.2	3.2	4.5	-	3.9		
Bank Height Ratio	-	-	-	-	-	-		1.0	1.2	1.1	0.9	-	0.9		0.8	0.6	0.7	0.7	-	0.8		
Wetted Perimeter (ft)	19.2	18.9	18.1	23.6	-	19.9		15.5	14.0	13.9	13.6	-	12.8		6.9	4.6	4.5	3.8	-	4.3		
Hydraulic Radius (ft)	1.2	1.4	1.4	1.5	-	1.7		0.7	0.6	0.7	0.6	-	0.6		0.3	0.2	0.2	0.2	-	0.3		
d50 (mm)	-							-							-							
Stream Reach	**Reach 5 (1,168 LF)**																					
	Cross-section X-14 (Riffle)							Cross-section X-15 (Pool)							Cross-section X-16 (Pool)							
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	
BF Width (ft)	7.5	6.9	7.2	6.4	-	5.8		10.3	7.3	6.4	9.5	-	6.9		9.3	8.7	8.5	8.9	-	9.0		
BF Mean Depth (ft)	0.9	0.6	0.5	0.5	-	0.6		0.8	1.0	1.0	0.9	-	1.0		0.8	1.2	1.2	1.2	-	1.1		
Width/Depth Ratio	8.4	10.8	13.5	11.6	-	10.3		13.8	7.1	6.2	10.4	-	6.7		11.9	7.3	7.0	7.4	-	8.1		
BF Cross-sectional Area (ft²)	6.8	4.4	3.8	3.5	-	3.3		7.7	7.5	6.5	8.7	-	7.0		7.3	10.4	10.2	10.6	-	10.1		
BF Max Depth (ft)	1.2	1.2	1.0	1.1	-	1.0		1.5	1.6	1.6	1.6	-	1.6		1.3	2.7	2.5	2.6	-	2.2		
Width of Floodprone Area (ft)	50	50	50	50	-	50		60	59	60	59	-	60		64	67	67	67	-	55		
Entrenchment Ratio	6.6	6.6	6.6	7.8	-	8.5		-	-	-	-	-	-		-	-	-	-	-	-		
Bank Height Ratio	1.0	1.0	0.8	0.8	-	0.9		-	-	-	-	-	-		-	-	-	-	-	-		
Wetted Perimeter (ft)	9.3	8.1	7.6	6.9	-	6.3		11.8	9.3	8.4	10.5	-	7.9		10.9	11.1	10.9	11.1	-	11.1		
Hydraulic Radius (ft)	0.7	0.5	0.5	0.5	-	0.5		0.7	0.8	0.8	0.8	-	0.9		0.7	0.9	0.9	1.0	-	0.9		
d50 (mm)	-							-							-							

Note: Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

Table 11b. Stream Reach Morphology Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 1 (298 LF)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-5						MY-7					
Dimension and 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
BF Width (ft)	-----	13.9	-----	-----	-----	-----	-----	12.7	-----	-----	-----	-----	-----	12.4	-----	-----	-----	1	-----	13.1	-----	-----	-----	1	-----	12.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	0.8	-----	-----	-----	-----	-----	0.7	-----	-----	-----	-----	-----	0.8	-----	-----	-----	1	-----	0.6	-----	-----	-----	1	-----	0.6	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	17.4	-----	-----	-----	-----	-----	19.8	-----	-----	-----	-----	-----	16.5	-----	-----	-----	1	-----	22.3	-----	-----	-----	1	-----	20.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	-----	11.1	-----	-----	-----	-----	-----	8.2	-----	-----	-----	-----	-----	9.3	-----	-----	-----	1	-----	7.7	-----	-----	-----	1	-----	7.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	1.1	-----	-----	-----	-----	-----	1.1	-----	-----	-----	-----	-----	1.3	-----	-----	-----	1	-----	1.0	-----	-----	-----	1	-----	1.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	-----	30.6	-----	-----	-----	-----	-----	30.0	-----	-----	-----	-----	-----	31.3	-----	-----	-----	1	-----	29.1	-----	-----	-----	1	-----	29.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	2.2	-----	-----	-----	-----	-----	2.2	-----	-----	-----	-----	-----	2.1	-----	-----	-----	1	-----	2.2	-----	-----	-----	1	-----	2.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	1.0	-----	-----	-----	-----	-----	1.2	-----	-----	-----	-----	-----	1.1	-----	-----	-----	1	-----	0.9	-----	-----	-----	1	-----	0.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Profile																																				
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																																				
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																																				
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Thalweg Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Note: Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

Table 11b. Stream Reach Morphology Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 2 upstream (703 LF)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-5						MY-7					
Dimension and 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
BF Width (ft)	----	10.4	-----	-----	-----	-----	----	9.8	-----	-----	-----	-----	-----	9.8	-----	-----	-----	1	-----	10.0	-----	-----	-----	1	-----	9.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	----	0.7	-----	-----	-----	-----	----	0.6	-----	-----	-----	-----	-----	0.6	-----	-----	-----	1	-----	0.5	-----	-----	-----	1	-----	0.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	----	14.8	-----	-----	-----	-----	----	16.6	-----	-----	-----	-----	-----	16.8	-----	-----	-----	1	-----	21.0	-----	-----	-----	1	-----	18.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	----	7.4	-----	-----	-----	-----	----	5.8	-----	-----	-----	-----	-----	5.6	-----	-----	-----	1	-----	4.8	-----	-----	-----	1	-----	4.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	----	1.0	-----	-----	-----	-----	----	0.9	-----	-----	-----	-----	-----	0.9	-----	-----	-----	1	-----	0.8	-----	-----	-----	1	-----	0.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	----	38.2	-----	-----	-----	-----	----	37.0	-----	-----	-----	-----	-----	36.3	-----	-----	-----	1	-----	35.8	-----	-----	-----	1	-----	36.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	----	3.7	-----	-----	-----	-----	----	3.7	-----	-----	-----	-----	-----	3.7	-----	-----	-----	1	-----	3.6	-----	-----	-----	1	-----	3.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Bank Height Ratio	----	1.0	-----	-----	-----	-----	----	0.9	-----	-----	-----	-----	-----	1.0	-----	-----	-----	1	-----	0.9	-----	-----	-----	1	-----	0.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Profile																																				
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																																				
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																																				
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Thalweg Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Note: Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

Table 11b. Stream Reach Morphology Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074

Reach 2 downstream (1,423 LF)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-5						MY-7					
Dimension and 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
BF Width (ft)	10.2	10.2	-----	10.3	-----	2	9.3	9.5	-----	9.7	-----	2	9.1	9.3	-----	9.5	-----	2	8.5	9.1	-----	9.7	-----	2	9.4	9.4	-----	9.4	-----	2	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	0.8	0.9	-----	1.0	-----	2	0.7	0.8	-----	0.9	-----	2	0.7	0.8	-----	0.8	-----	2	0.7	0.8	-----	0.8	-----	2	0.7	0.7	-----	0.7	-----	2	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	10.1	11.4	-----	12.6	-----	2	11.4	12.3	-----	13.2	-----	2	11.7	12.4	-----	13.0	-----	2	11.6	12.2	-----	12.7	-----	2	0.9	0.9	-----	0.9	-----	2	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	8.4	9.3	-----	10.2	-----	2	6.5	7.4	-----	8.3	-----	2	6.4	7.1	-----	7.7	-----	2	5.7	6.9	-----	8.0	-----	2	6.4	6.4	-----	6.4	-----	2	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	1.2	1.3	-----	1.5	-----	2	1.1	1.2	-----	1.3	-----	2	1.1	1.2	-----	1.3	-----	2	1.0	1.1	-----	1.2	-----	2	1.1	1.1	-----	1.1	-----	2	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	62.9	68.7	-----	74.5	-----	2	62.9	68.7	-----	74.5	-----	2	63.0	68.7	-----	74.5	-----	2	62.9	68.7	-----	74.5	-----	2	62.9	62.9	-----	62.9	-----	2	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	6.2	6.7	-----	7.2	-----	2	6.2	6.8	-----	7.3	-----	2	6.2	6.8	-----	7.3	-----	2	6.5	7.7	-----	8.8	-----	2	6.6	6.6	-----	6.6	-----	2	-----	-----	-----	-----	-----	-----
Bank Height Ratio	0.9	1.0	-----	1.0	-----	2	0.9	1.0	-----	1.0	-----	2	0.9	0.9	-----	0.9	-----	2	0.9	0.9	-----	0.9	-----	2	0.9	0.9	-----	0.9	-----	2	-----	-----	-----	-----	-----	-----
Profile																																				
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																																				
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																																				
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Thalweg Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Note: Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

Table 11b. Stream Reach Morphology Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 3 (1,031 LF)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-5						MY-7					
Dimension and 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
BF Width (ft)	7.5	8.4	-----	9.3	-----	2	7.1	7.9	-----	8.8	-----	2	7.0	7.7	-----	8.3	-----	2	7.4	8.0	-----	8.6	-----	2	6.5	7.6	-----	8.7	-----	2	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	0.6	0.7	-----	0.8	-----	2	0.4	0.5	-----	0.6	-----	2	0.5	0.5	-----	0.6	-----	2	0.3	0.5	-----	0.6	-----	2	0.4	0.5	-----	0.6	-----	2	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	11.9	12.1	-----	12.3	-----	2	14.1	15.5	-----	16.9	-----	2	13.7	14.6	-----	15.5	-----	2	14.4	17.9	-----	21.3	-----	2	15.1	16.0	-----	16.9	-----	2	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	4.5	5.9	-----	7.3	-----	2	3.0	4.2	-----	5.4	-----	2	3.1	4.1	-----	5.1	-----	2	2.6	3.9	-----	5.1	-----	2	2.5	3.8	-----	5.1	-----	2	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	0.9	1.1	-----	1.3	-----	2	0.7	0.9	-----	1.1	-----	2	0.7	0.8	-----	1.0	-----	2	0.7	0.9	-----	1.0	-----	2	0.8	0.9	-----	1.0	-----	2	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	37.3	46.3	-----	55.3	-----	2	34.1	43.0	-----	51.8	-----	2	34.1	42.8	-----	51.4	-----	2	33.8	42.3	-----	50.7	-----	2	37.0	44.0	-----	51.0	-----	2	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	5.0	5.5	-----	5.9	-----	2	4.9	5.5	-----	6.0	-----	2	5.0	5.6	-----	6.1	-----	2	4.5	5.2	-----	5.9	-----	2	5.7	5.8	-----	5.9	-----	2	-----	-----	-----	-----	-----	-----
Bank Height Ratio	1.0	1.0	-----	1.0	-----	2	0.9	0.9	-----	0.9	-----	2	0.8	0.8	-----	0.8	-----	2	0.7	0.8	-----	0.9	-----	2	0.8	0.9	-----	0.9	-----	2	-----	-----	-----	-----	-----	-----
Profile																																				
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																																				
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																																				
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Thalweg Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Note: Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

Table 11b. Stream Reach Morphology Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 4 (1,238 LF)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-5						MY-7					
Dimension and 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
BF Width (ft)	-----	6.8	-----	-----	-----	-----	-----	6.8	-----	-----	-----	-----	-----	6.1	-----	-----	-----	1	-----	5.9	-----	-----	-----	1	-----	6.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	0.5	-----	-----	-----	-----	-----	0.5	-----	-----	-----	-----	-----	0.5	-----	-----	-----	1	-----	0.4	-----	-----	-----	1	-----	0.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	12.7	-----	-----	-----	-----	-----	12.6	-----	-----	-----	-----	-----	13.5	-----	-----	-----	1	-----	14.8	-----	-----	-----	1	-----	15.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	3.6	-----	-----	-----	-----	-----	3.6	-----	-----	-----	-----	-----	2.8	-----	-----	-----	1	-----	2.3	-----	-----	-----	1	-----	2.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	0.9	-----	-----	-----	-----	-----	1.0	-----	-----	-----	-----	-----	0.8	-----	-----	-----	1	-----	0.7	-----	-----	-----	1	-----	0.6	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	-----	21.9	-----	-----	-----	-----	-----	22.3	-----	-----	-----	-----	-----	20.6	-----	-----	-----	1	-----	20.2	-----	-----	-----	1	-----	21.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	3.2	-----	-----	-----	-----	-----	3.1	-----	-----	-----	-----	-----	3.2	-----	-----	-----	1	-----	3.4	-----	-----	-----	1	-----	3.2	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	1.0	-----	-----	-----	-----	-----	1.2	-----	-----	-----	-----	-----	0.9	-----	-----	-----	1	-----	0.8	-----	-----	-----	1	-----	0.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Profile																																				
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																																				
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																																				
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Thalweg Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Note: Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

Table 11b. Stream Reach Morphology Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 5 (1,169 LF)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-5						MY-7					
Dimension and 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
BF Width (ft)	-----	7.5	-----	-----	-----	-----	-----	6.9	-----	-----	-----	-----	-----	7.2	-----	-----	-----	1	-----	6.4	-----	-----	-----	1	-----	5.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	0.9	-----	-----	-----	-----	-----	0.6	-----	-----	-----	-----	-----	0.5	-----	-----	-----	1	-----	0.5	-----	-----	-----	1	-----	0.6	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	8.4	-----	-----	-----	-----	-----	10.8	-----	-----	-----	-----	-----	13.5	-----	-----	-----	1	-----	11.6	-----	-----	-----	1	-----	10.3	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	6.8	-----	-----	-----	-----	-----	4.4	-----	-----	-----	-----	-----	3.8	-----	-----	-----	1	-----	3.5	-----	-----	-----	1	-----	3.3	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	1.2	-----	-----	-----	-----	-----	1.2	-----	-----	-----	-----	-----	1.0	-----	-----	-----	1	-----	1.1	-----	-----	-----	1	-----	1.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	-----	49.9	-----	-----	-----	-----	-----	49.9	-----	-----	-----	-----	-----	49.9	-----	-----	-----	1	-----	49.9	-----	-----	-----	1	-----	49.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	6.6	-----	-----	-----	-----	-----	6.6	-----	-----	-----	-----	-----	6.6	-----	-----	-----	1	-----	7.8	-----	-----	-----	1	-----	8.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	1.0	-----	-----	-----	-----	-----	1.0	-----	-----	-----	-----	-----	0.8	-----	-----	-----	1	-----	0.8	-----	-----	-----	1	-----	0.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Profile																																				
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																																				
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																																				
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Thalweg Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Note: Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

Table 11b. Stream Reach Morphology Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 6 (1,776 LF)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-5						MY-7					
Dimension and 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
BF Width (ft)	-----	6.3	-----	-----	-----	-----	-----	4.1	-----	-----	-----	-----	-----	4.1	-----	-----	-----	1	-----	3.7	-----	-----	-----	1	-----	4.2	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	0.3	-----	-----	-----	-----	-----	0.3	-----	-----	-----	-----	-----	0.2	-----	-----	-----	1	-----	0.2	-----	-----	-----	1	-----	0.3	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	18.7	-----	-----	-----	-----	-----	16.1	-----	-----	-----	-----	-----	19.5	-----	-----	-----	1	-----	15.5	-----	-----	-----	1	-----	13.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	2.1	-----	-----	-----	-----	-----	1.1	-----	-----	-----	-----	-----	0.8	-----	-----	-----	1	-----	0.9	-----	-----	-----	1	-----	1.3	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	0.6	-----	-----	-----	-----	-----	0.5	-----	-----	-----	-----	-----	0.4	-----	-----	-----	1	-----	0.4	-----	-----	-----	1	-----	0.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	-----	19.4	-----	-----	-----	-----	-----	17.6	-----	-----	-----	-----	-----	16.0	-----	-----	-----	1	-----	16.9	-----	-----	-----	1	-----	16.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	3.1	-----	-----	-----	-----	-----	3.2	-----	-----	-----	-----	-----	3.2	-----	-----	-----	1	-----	4.5	-----	-----	-----	1	-----	3.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	0.8	-----	-----	-----	-----	-----	0.6	-----	-----	-----	-----	-----	0.7	-----	-----	-----	1	-----	0.7	-----	-----	-----	1	-----	0.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Profile																																				
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																																				
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																																				
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Thalweg Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Note: Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

Table 11b. Stream Reach Morphology Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach T1 (227 LF)

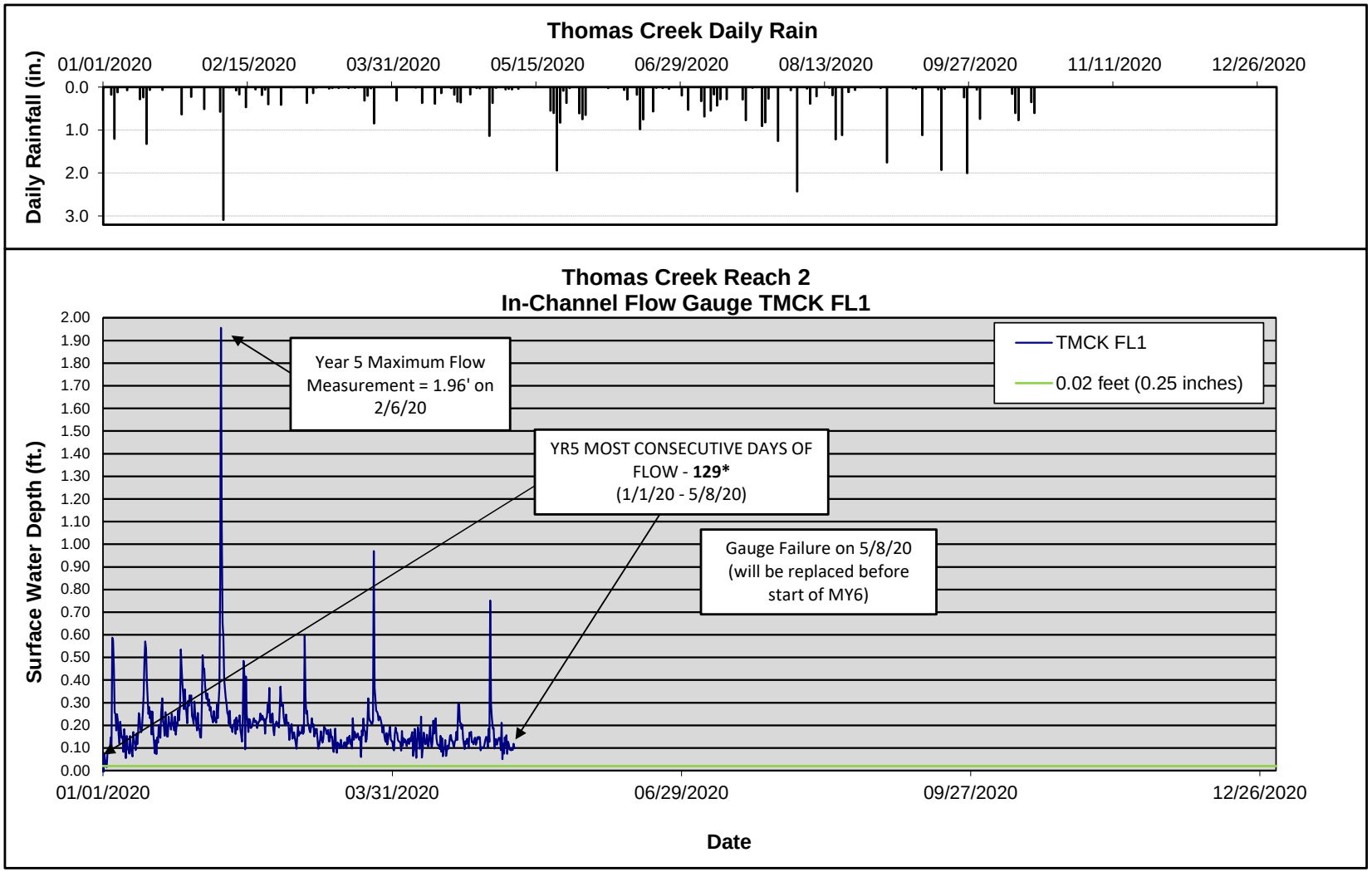
Parameter	Baseline						MY-1						MY-2						MY-3						MY-5						MY-7					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	8.5	-----	-----	-----	-----	-----	6.8	-----	-----	-----	-----	-----	6.9	-----	-----	-----	1	-----	6.7	-----	-----	-----	1	-----	6.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	0.6	-----	-----	-----	-----	-----	0.5	-----	-----	-----	-----	-----	0.4	-----	-----	-----	1	-----	0.4	-----	-----	-----	1	-----	0.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	13.6	-----	-----	-----	-----	-----	13.8	-----	-----	-----	-----	-----	16.0	-----	-----	-----	1	-----	15.0	-----	-----	-----	1	-----	18.7	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	-----	5.3	-----	-----	-----	-----	-----	3.4	-----	-----	-----	-----	-----	3.0	-----	-----	-----	1	-----	3.0	-----	-----	-----	1	-----	2.3	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	0.9	-----	-----	-----	-----	-----	0.8	-----	-----	-----	-----	-----	0.7	-----	-----	-----	1	-----	0.6	-----	-----	-----	1	-----	0.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	-----	30.6	-----	-----	-----	-----	-----	28.2	-----	-----	-----	-----	-----	27.1	-----	-----	-----	1	-----	26.7	-----	-----	-----	1	-----	25.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	3.6	-----	-----	-----	-----	-----	3.7	-----	-----	-----	-----	-----	3.7	-----	-----	-----	1	-----	4.0	-----	-----	-----	1	-----	3.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	1.0	-----	-----	-----	-----	-----	1.2	-----	-----	-----	-----	-----	0.9	-----	-----	-----	1	-----	0.9	-----	-----	-----	1	-----	0.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Profile																																				
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																																				
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																																				
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Thalweg Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Note: Per DMS/IRT request, the bank height ratio for MY5 has been calculated using the bankfull elevation as determined from the as-built bankfull area. All other values were calculated using the original as-built bankfull elevation, as was done for previous monitoring reports.

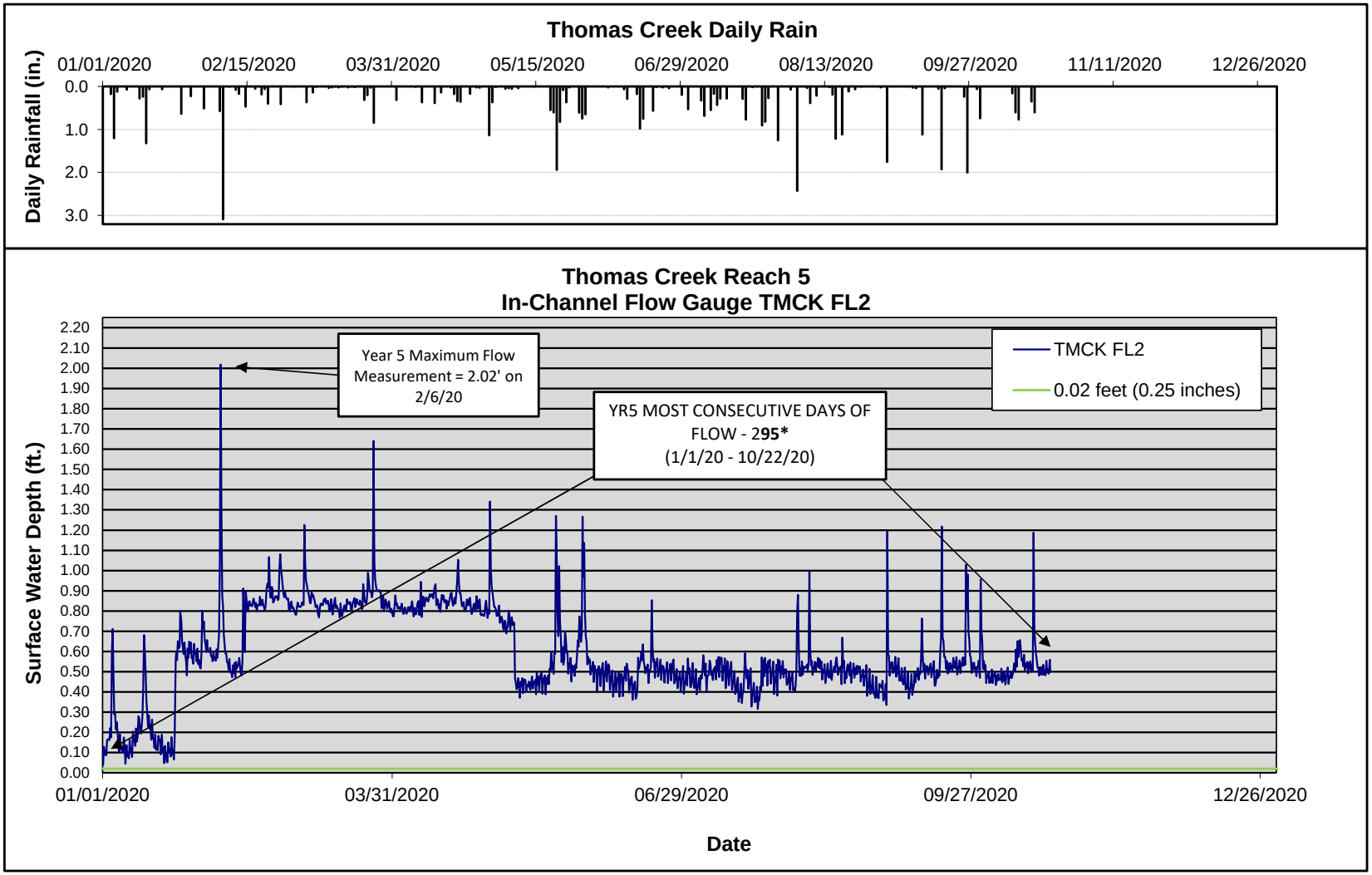
Appendix E

Hydrologic Data

Figure 8. Flow Gauge Graphs

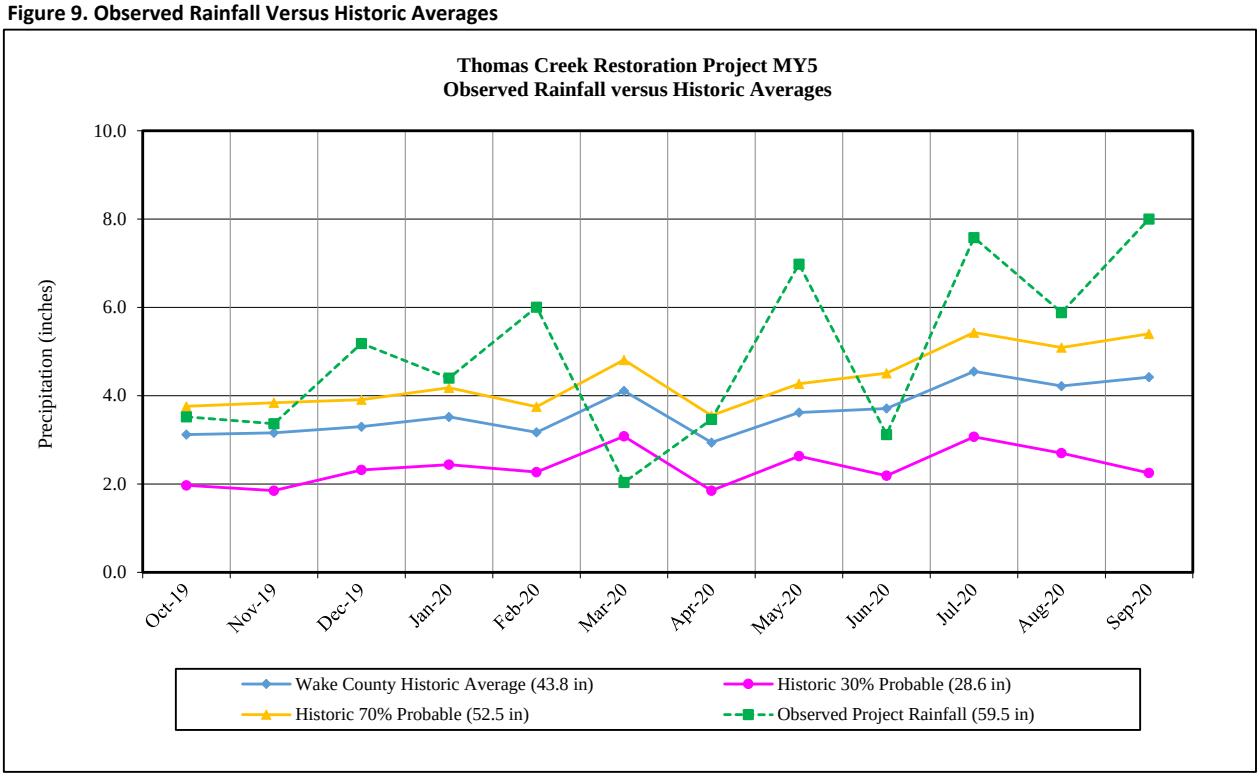


* Surface water flow is estimated to have occurred when the pressure transducer reading is equal to or above 0.02 feet (0.25 inches) in depth.



* Surface water flow is estimated to have occurred when the pressure transducer reading is equal to or above 0.02 feet (0.25 inches) in depth.

Figure 9. Observed Rainfall Versus Historic Averages



Note: Historic average annual rainfall for Wake County is 43.8", while the observed project rainfall recorded a total of 59.5" over the previous 12 months (from 10/1/2019 to 9/31/2020). Project rainfall data was collected from the NC-CRONOS station LAKE.

Table 12. Verification of Bankfull Events
Thomas Creek Restoration Project: DMS Project ID No. 96074

Date of Data Collection	Reach 2 Crest Gauge (feet)	Estimated Occurrence of Bankfull Event	Method of Data Collection
Year 1 Monitoring (2016)			
10/27/2016	1.1	10/8/2016 (Hurricane Matthew)	Crest Gauge, Flow Gauge
Year 2 Monitoring (2017)			
05/02/2017	0.21	4/25/2017 (3.2" rain event)	Crest Gauge, Flow Gauge
Year 3 Monitoring (2018)			
04/23/2018	0.97	4/15/2018 (1.8" rain event)	Crest Gauge, Flow Gauge
10/10/2018	1.49	9/15-17/2018 (6.1" from Hurricane Florence)	Crest Gauge, Flow Gauge
Year 4 Monitoring (2019)			
04/25/2019	0.89	4/19/2019 (0.71" rain event)	Crest Gauge, Flow Gauge
Year 5 Monitoring (2020)			
02/21/2020	0.98	2/6/20 (3.1" rain event)	Crest Gauge, Flow Gauge

Note: Crest gauge readings can be corroborated with associated spikes in the flow gauge reading graphs (see Appendix E).

Table 13. Flow Gauge Success
Thomas Creek Restoration Project: DMS Project ID No. 96074

Flow Gauge ID	Most Consecutive Days Meeting Criteria[1]							Cumulative Days Meeting Criteria[2]						
	Year 1 (2016)	Year 2 (2017)	Year 3 (2018)	Year 4 (2019)	Year 5 (2020)	Year 6 (2021)	Year 7 (2022)	Year 1 (2016)	Year 2 (2017)	Year 3 (2018)	Year 4 (2019)	Year 5 (2020)	Year 6 (2021)	Year 7 (2022)
Reach 2 Flow Gauge #1 (Installed March 30, 2016)														
TCFL1	229	248	357	179	129*			229	248	357	240	129*		
Reach 5 Flow Gauge #2 (Installed March 30, 2016)														
TCFL2	126	138	82	94	295			182	218	204	191	295		

Notes:

* Flow Gauge #1 failed on 5/8/20 and will be replaced before the start of MY6

[1]Indicates the single greatest number of consecutive days within the monitoring year where flow was measured.

[2]Indicates the total number of days within the monitoring year where flow was measured.

Success Criteria: A restored stream reach will be considered at least intermittent when the flow duration occurs for a minimum of 30 consecutive days during the monitoring year.

Surface water flow is estimated to have occurred when the pressure transducer reading is equal to or above 0.02 feet (0.25 inches) in depth.