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January 2, 2019

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

Subject: Response to DMS Comments for DRAFT Monitoring Year 3 Report
Thomas Creek Restoration Project, Wake County
DMS Project # 96074, DEQ Contract #5549, RFP# 16-005020

Mr. Schaffer:

Please find enclosed our responses to the NC Division of Mitigation Services (DMS) review comments dated December 19, 2018 in reference to the Thomas Creek Restoration Project –DRAFT Monitoring Year 3 Report. We have revised the Draft document in response to the referenced review comments. Each comment and its corresponding response is outlined below.

1. Digital files/drawings:
   a. ThomasCreek_AsBuilt_FlowCrestGauges shapefile is missing spatial reference information.
   Response: This shapefile has been revised to add back the spatial reference information and will be included with the final e-submission.

   b. There is a 9.6 lf segment of Reach 6 in the Attribute Table for ThomasCreek_AsBuilt_Streams_ByMitigationType_Final shapefile. Please explain what this is or remove if not necessary.
   Response: This segment appears to be an unintended relict from the original shapefile processing and has been removed. The revised shapefile will be included with the final e-submission.

   c. Attribute Table for ThomasCreek_AsBuilt_VegPlotAreas shapefile contains no information for MY3.
   Response: The shapefile attribute table appears to currently contains the same Pass/Fail information on each veg plot for MY3 that was reported for MY1 and MY2. Perhaps an older version was mistakenly submitted in the draft e-files. The correct, updated version will be included with the final e-submission.

2. Section 1.0 Executive Summary:
   a. Page 1: Please change all references to linear footages and credits to reflect the approved mitigation plan numbers not as-built.
   Response: The report has been amended to clarify that the given lengths are from the as-built baseline report so as to avoid confusion, but will still use the as-built restoration lengths. These numbers have been reported in numerous tables, the as-built survey stationing and plansheets, GIS shapefiles, and in text descriptions in all previous reports and Baker feels it would quite confusing to change them at this stage. Further, the design reach lengths from the mitigation plan do not accurately represent the actual in-the-field restored/enhanced lengths as numerous small field changes during construction altered those lengths slightly for many of the reaches. These small changes were accurately accounted for in the as-built survey and we feel should be reported as such. Baker understands that the IRT-approved *credits* for each

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length will still derive from the approved mitigation plan credit numbers, though this is a separate issue from the restoration lengths.

b. Page 3, third full paragraph: Change second sentence to reflect that bankfull events have now occurred in all 3 years of monitoring.
Response: Change made as recommended.

3. Appendix A, Table 1:
a. Please insert a column that shows linear footages from the approved mitigation plan.
Response: A new column showing the design reach lengths from the mitigation plan (Table ES.1) was added to Table 1 as directed. Please note that these numbers from the mitigation plan did not have any non-creditable reach sections (as for the easement breaks for stream crossings) removed from them.

b. For column labeled Restoration Footage or Acreage (LF), please add reference that these are As-Built numbers.
Response: Column labeled was modified to indicate they are As-Built numbers as suggested.

4. Appendix D, Table 11: During our review of the Bank Height Ratios (BHR) in Table 11, DMS staff performs a visual comparison of the MY3 data to As-Built/Baseline cross-sections. DMS noted/realized that by displaying the As-built Bankfull Cross-Sectional Area alone, the calculation for the BHR can be difficult to reconcile. We noted possible discrepancies in the BHR calculations for cross-sections 1, 3, 4, 5, 6, 7, 10, 12, 13 and 14 given this disconnect. Using the new BHR calculation methodology where the As-Built Bankfull Area is held constant, please display the Year 3 bankfull elevation as another data series just for the sake of clarity between the BHR calculation and the overlay. It appears that the BHR calculations were done correctly, but just please add the MY3 bankfull data series with its elevation for the sake of clarity to the reader.

Response: An additional data series was added to each cross-section figure showing the MY3 bankfull line (generated using the as-built bankfull area as per the recent DMS memo) as requested. The BHR calculations for the listed cross-sections were re-checked again and were all confirmed as correct. With the new bankfull line shown, a visual comparison between it and the MY3 cross-section data certainly makes the BHR value appear to make intuitive sense.

As requested, Baker has provided three (3) hardcopies, and one (1) CD containing the pdf copy of the FINAL report and all updated digital files. Please do not hesitate to contact me should you have any questions regarding our response submittal.

Sincerely,

Scott King, LSS, PWS
Project Manager

Enclosures

FINAL

Thomas Creek Restoration Project
Year 3 Monitoring Report

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: 3 of 7 Year of Data Collection: 2018 Year of Completed Construction (including planting): 2016 Submission Date: December 2018
Submitted To:	NCDEQ - Division of Mitigation Services 1625 Mail Service Center Raleigh, NC 27699 NC DEQ Contract ID No. 003992

FINAL
Thomas Creek Restoration Project
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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 3 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 (located in Appendix D) have shown very minor fluctuations in their geometry from last year, but these fluctuations do not represent a trend towards instability based off visual field evaluations. All reaches are stable and performing as designed, and are rated at virtually 100 percent for all the parameters evaluated with the exception of the two Stream Problem Areas (SPAs) described below.

During Year 3 monitoring, there were two SPAs observed on site. Both are short sections (~15 ft each) of minor bank scour that occurred during Hurricane Florence along the downstream sections of pool bends on Reach R2. These two sections are shorter sub-sections of stream areas previously identified in the Monitoring Year 2 (MY2) report as SPAs for lacking good bank vegetation. In March 2018 these areas had been replanted with livestakes, which were growing and stabilizing the banks when Hurricane Florence hit in mid-September. The vast majority of the banks with the newly establishing livestakes held firm through the storm, but the two SPA areas experienced minor scour from the high flows and had their livestakes seriously damaged or washed out altogether. These areas will be graded back by hand and replanted with additional livestakes in the winter of 2018/2019. These SPAs are further described in Table 5 and shown in both the CCPV and in photographs, all of which can be found in Appendix B.

During Year 3 monitoring, the planted acreage performance categories were functioning well with no bare areas to report (Appendix C). The average density of total planted stems, based on data collected from the sixteen monitoring plots following Year 3 monitoring in October 2018, was 597 stems per acre. Thus, the Year 3 vegetation data demonstrate that the Site meets the minimum success interim criteria of 320 trees per acre by the end of Year 3. Additionally, there were no areas of invasive species vegetation observed during the Year 3 monitoring.

There were however, two Vegetation Problem Areas (VPAs) identified during the Year 3 monitoring. The first VPA is an area of low stem density totaling 0.20 acres observed along both banks of a section of Reach T1. This area is somewhat steeper and drier than the surrounding, more vegetatively successful areas. It is believed that previously harsh growing seasons that were particularly hot and dry ultimately led to a high plant mortality. It will be supplementally planted with bare-root and/or 1-gallon plants of appropriate species during the winter of 2018/2019. The second VPA is an area of low vigor/short stem heights totaling approximately 0.38 acres noted along the left buffer of Reach R3. Upon close observation, there are a sufficient number of living stems in this area, they simply are not growing at the expected rate. As noted above, previous growing seasons have been particularly harsh and that no doubt hurt plant growth. However, a subsequent soil test revealed that this buffer area could also benefit from a small application of soil amendments. So, over the winter of 2018/2019, this area will receive an application of lime, and then some additional fertilizer in the spring and/or fall of 2019. These VPAs are further described in Table 6 and shown in the CCPV, both of which can be found in Appendix B.

Throughout the monitoring year, Baker also conducted numerous temporary vegetation transects in areas outside the permanent vegetation plots to help assess project performance. The transects were measured out in the field as 100 ft long by 12 ft wide (for an area roughly similar to that of the veg plots). Any living stem of an acceptable species that was at least 2 ft in height was counted. These stem counts were then converted into

stems/acre values for comparison to the vegetation success criteria values. There were seven transects taken during the Year 3 monitoring season; each one meeting the MY3 success criteria, and with an overall average of 544 stems/acre. The location of the transects and their stems/acre values are shown on the CCPV found in Appendix B.

Additionally, during Year 3 monitoring, low stem densities were observed in early 2018 along a section of the right buffer of Reach R3. It was estimated that this area (totaling approximately 0.44 acres) was still passing the MY3 success criteria of 320 stems/acre, but had nevertheless experienced greater mortality than the rest of the site. Most of this area is located along a drier, steeper slope than the rest of the surrounding buffer and it is believed that previous hot and dry harsh growing seasons contributed to the mortality. As such, in March 2018 this area was supplementally planted with a total of 60, 1-gallon container sized trees. The species planted were an approximately equal mix of green ash (*Fraxinus pennsylvanica*), American hornbeam (*Carpinus caroliniana*), sycamore (*Platanus occidentalis*), basswood (*Tilia americana*), persimmon (*Diospyros virginiana*), and silky dogwood (*Cornus amomum*, planted in the wetter portions of the lower floodplain). A subsequent inspection of this planted area during monitoring activities in October 2018 revealed that the planted stems appeared to be alive and growing well, as numerous stems were quickly and easily identified in the field (including along one temporary vegetation transect) and had leaves and/or bud scars to indicate seasonal growth and all-around vigor. Please see the CCPV in Appendix B for the location of this supplementally planted area.

Year 3 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 357 days of consecutive flow in Reach 2 (dating from Nov. 2017 to Oct. 2018), while flow gauge TMCK-FL2 documented 82 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.

During Year 3 monitoring, the Reach R2 crest gauge (crest gauge #1) documented two post-construction bankfull events in April 2018 and September 2018 (from Hurricane Florence). As bankfull events have now been documented in all three years of monitoring, the project has now met the bankfull standard required for credit release.

Two pebble counts were conducted in MY3, one each in riffles located along Reach R2 and Reach R5. The results indicate that the riffle in R2 has somewhat coarsened as compared to MY1 and MY2 and now more closely resembles the as-built baseline distribution. It seems likely this is a result of the high flows from storm events this past year (in particular Hurricane Florence) having flushed out some of the smaller material that had settled in the riffle. By comparison, the riffle in R5 appears very stable as the distribution is quite similar to MY2 results, despite the significant flow events of the past year. Pebble count data and graphs can be found in Appendix D.

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 3 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 3 vegetation plot data were collected in September and October 2018, the visual site assessment data contained in Appendix B were obtained in October 2018, and the cross-section data in Appendix D were collected in November 2018.

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 3 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 MY3 have been calculated using the as-built bankfull area to determine low bank height and the max depth based on the current-year channel profile. 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 3 monitoring, two above-bankfull events were documented; one in April 2018 and another in September 2018 (from Hurricane Florence). Further details of the crest gauge readings are presented in Table 12 in Appendix E, and photographs can be found in Appendix B.

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 3 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. A total of 54.9 in. of rainfall was observed for the project (using the nearest NC-CRONOS station KTTA), while Wake County averages 43.8 in. of annual rainfall, an excess of over 11 in.

2.1.3 Photographic Documentation

Reference photograph transects were taken at each permanent cross-section in November of 2018. 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 3 were taken along each Reach in October 2018 and are provided in Appendix B.

Photographs of each Vegetation Plot taken in September and October 2018 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 3 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 two SPAs (bank scour) noted during Year 3 monitoring as described above. 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 3 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 3 monitoring in September and October 2018, was 597 stems per acre. Thus, the Year 3 vegetation data demonstrate that the Site has met the minimum success interim criteria of 320 trees per acre by the end of Year 3. There were two VPAs (one area of thin stem densities, and one are of low vigor/short stem heights) noted during the Year 3 monitoring as described above.

Additionally, there were no significant areas of invasive species vegetation observed during the Year 3 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 3 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.

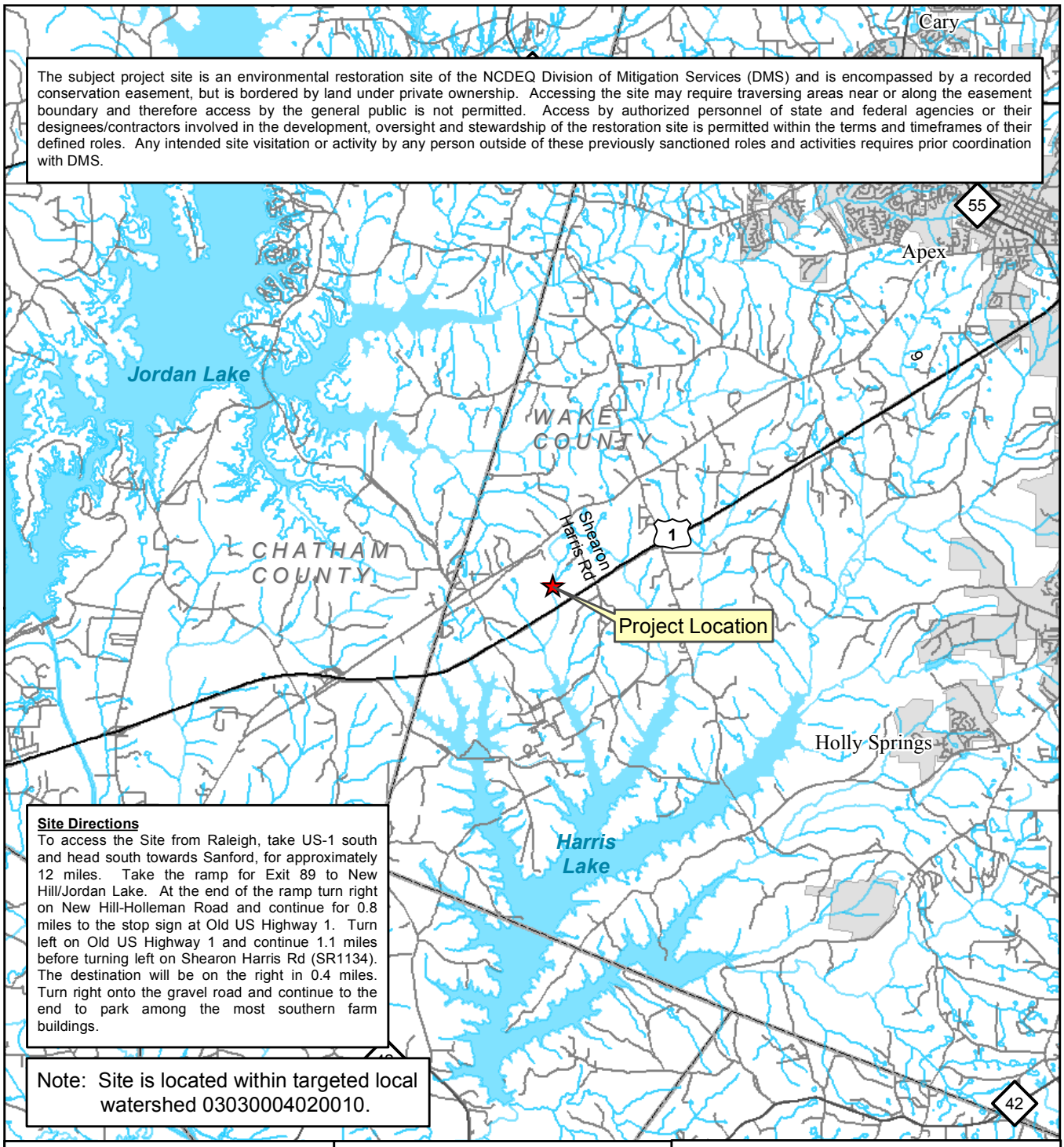
Rosgen, D. L. 1994. A Classification of Natural Rivers. Catena 22:169-199.

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

Appendix A

Project Vicinity Map and Background Tables

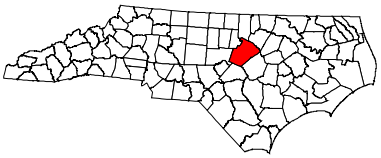
The subject project site is an environmental restoration site of the NCDEQ Division of Mitigation Services (DMS) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easement boundary 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

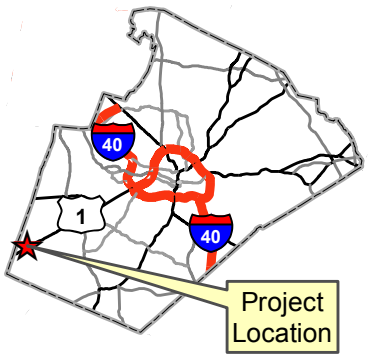


Figure 1 - Project Vicinity Map
Thomas Creek Site
DMS Project ID No. 96074

NCDEQ - Division of Mitigation Services

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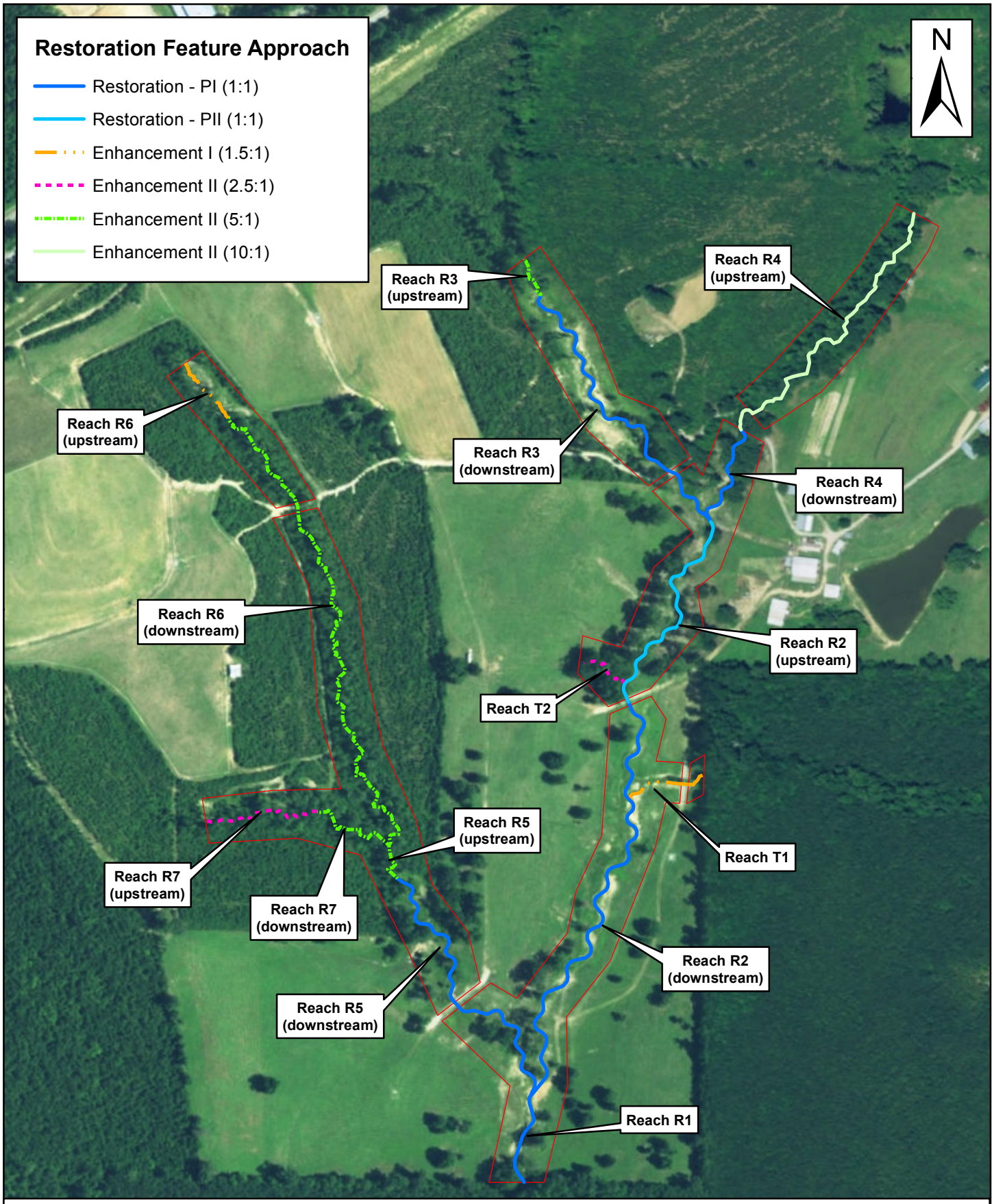
0 0.5 1 2 3 Miles



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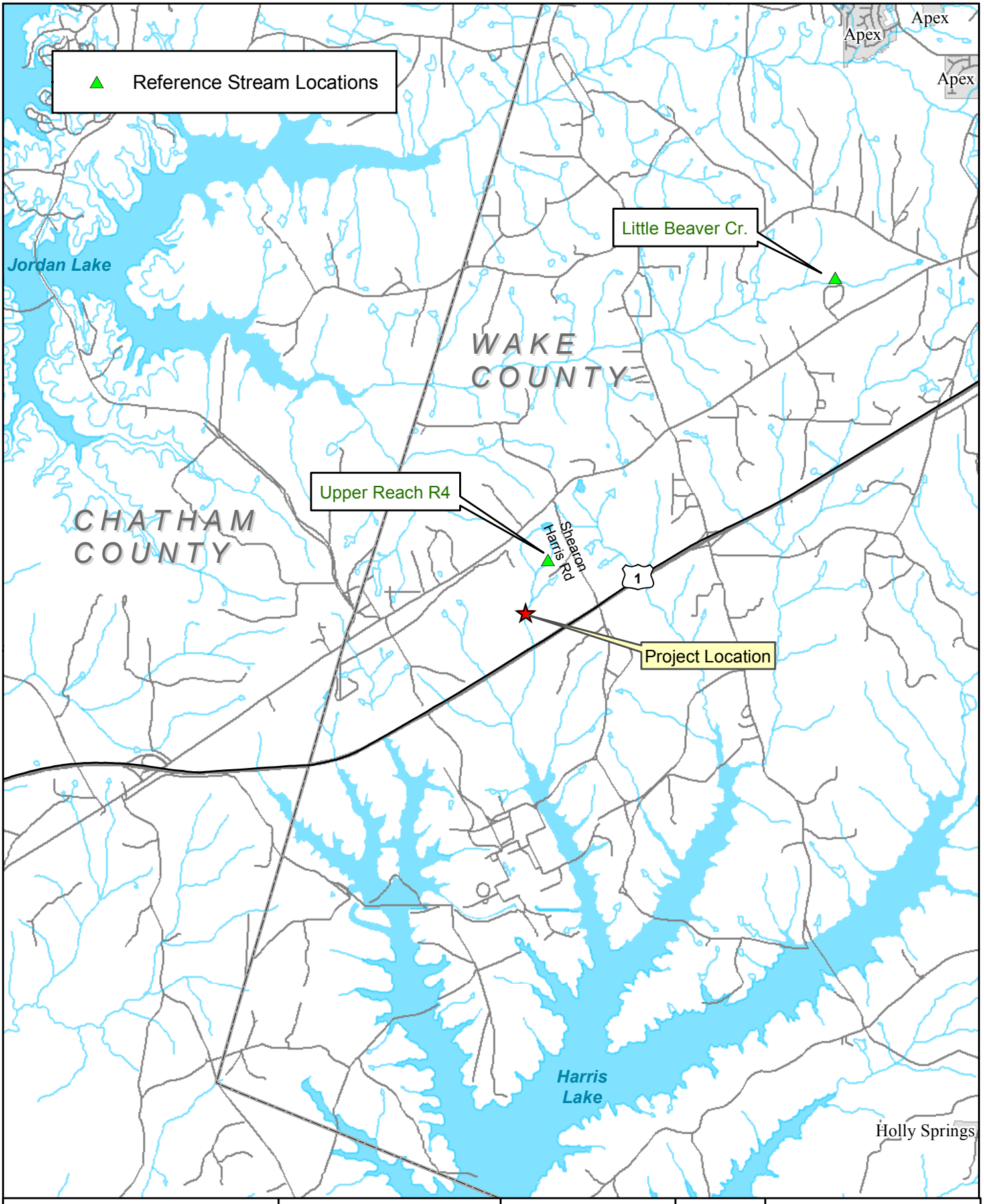
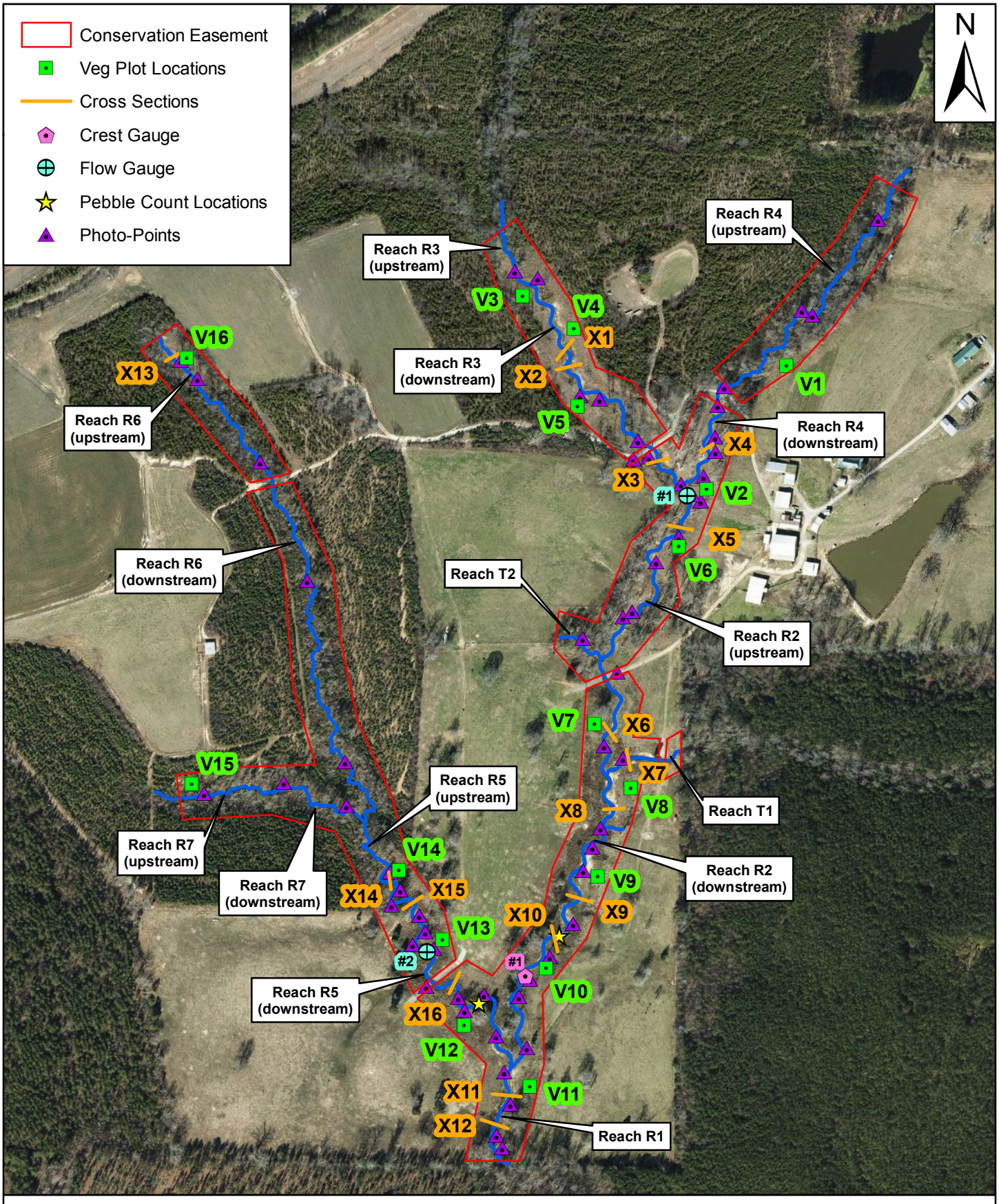
0 250 500 Feet

Figure 2
Restoration Summary Map
Thomas Creek Site



Michael Baker INTERNATIONAL	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 R2 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	3 Years, 2 Months	
Elapsed Time Since Planting Completed in Jan. 2016	2 Years, 11 Months	
Number of Reporting Years [1]	3	
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
Year 2 Monitoring	Oct-17	Nov-17
Year 3 Monitoring	Nov-18	Dec-18
Year 4 Monitoring	Nov-19	N/A
Year 5 Monitoring	Nov-20	N/A
Year 6 Monitoring	Nov-21	N/A
Year 7 Monitoring	Nov-22	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	
River Works, Inc.	114 W. Main St. Clayton, NC 27520 Contact: Bill Wright, Telephone: 919-590-5193
Planting Contractor	
River Works, Inc.	114 W. Main St. Clayton, NC 27520 Contact: George Morris, Telephone: 919-590-5193
Seeding Contractor	
River Works, Inc.	114 W. Main St. Clayton, NC 27520 Contact: Bill Wright, Telephone: 919-590-5193
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

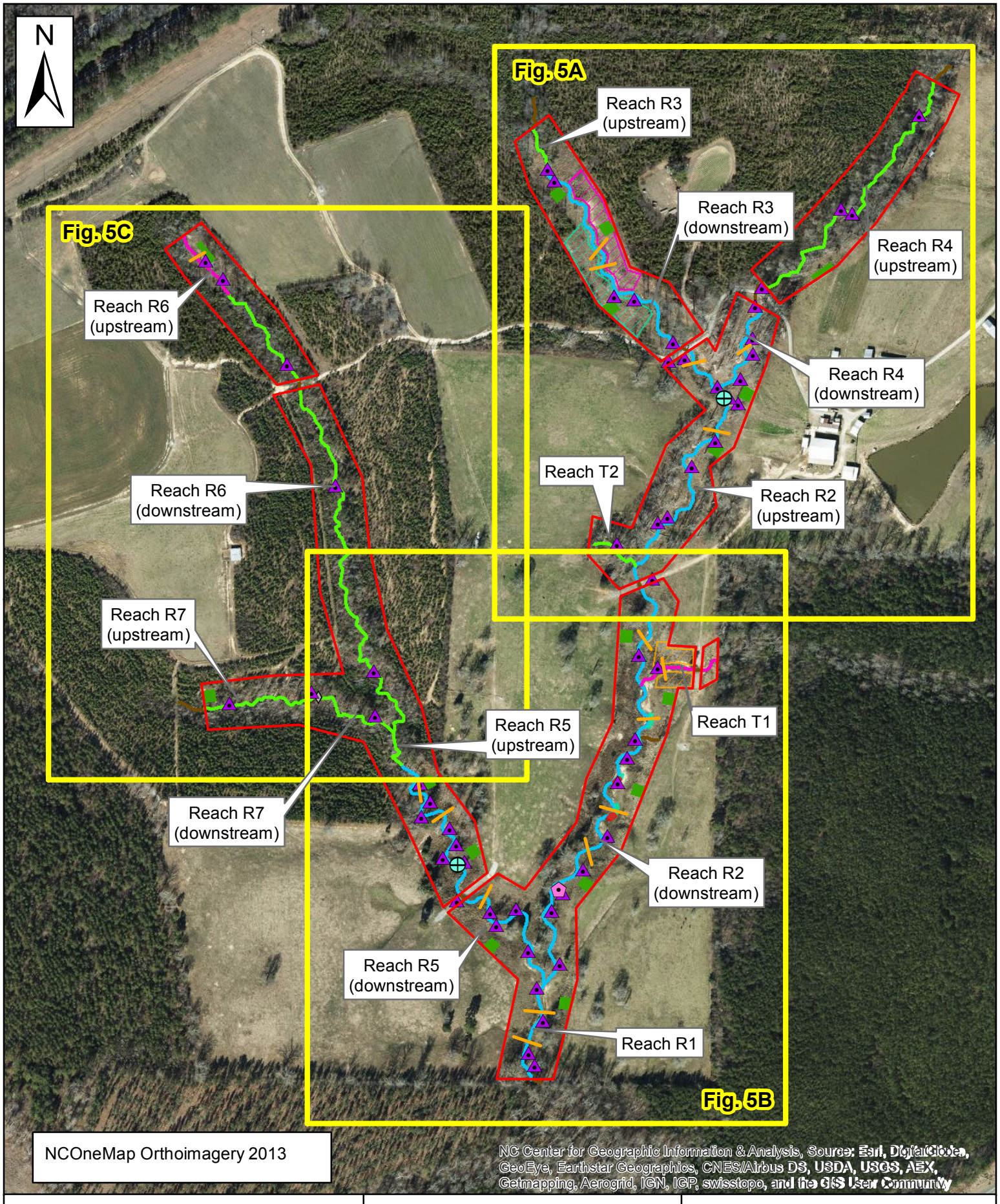
Table 4. Project Attributes (Pre-Construction Conditions)
Thomas Creek Restoration Project: DMS Project No. ID 96074

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

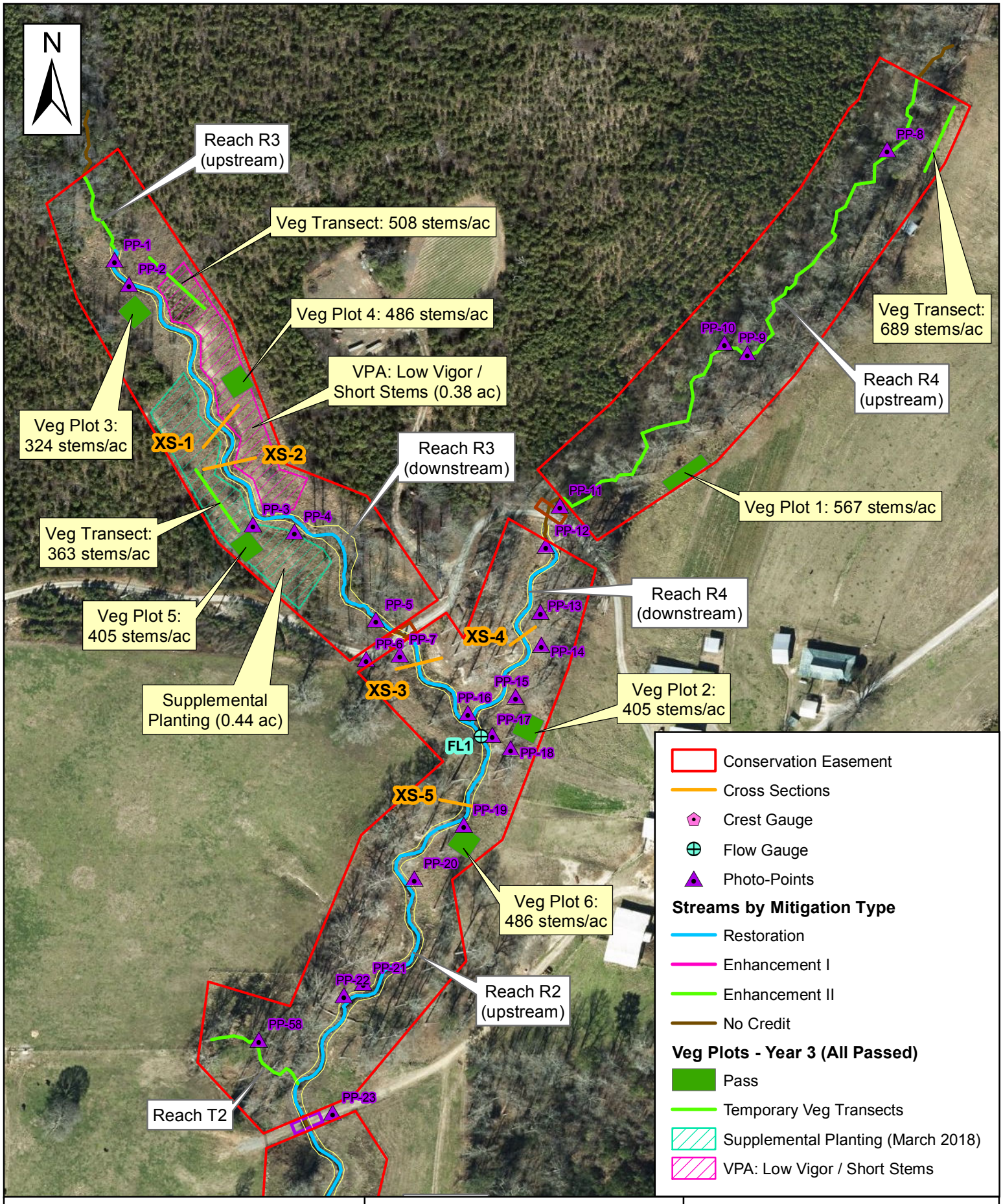


Michael Baker INTERNATIONAL

0 250 500 Feet

DEQ DMS Project # 96074

Figure 5 Index Map
Current Condition Plan View
Thomas Creek Site - MY3

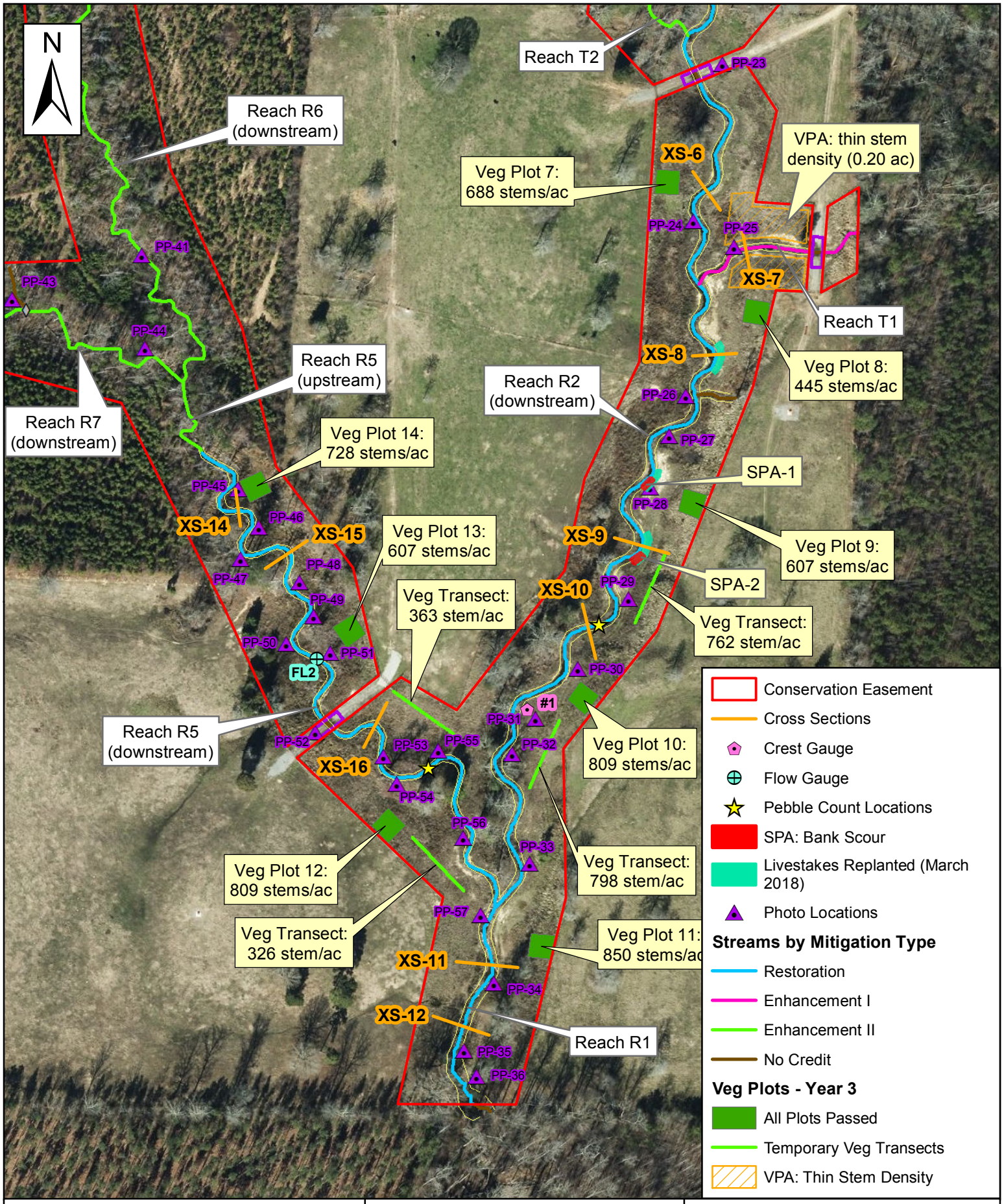


Michael Baker INTERNATIONAL

0 100 200 Feet

DENR DMS Project # 96074

Figure 5A
Current Condition Plan View
Thomas Creek Site - MY3

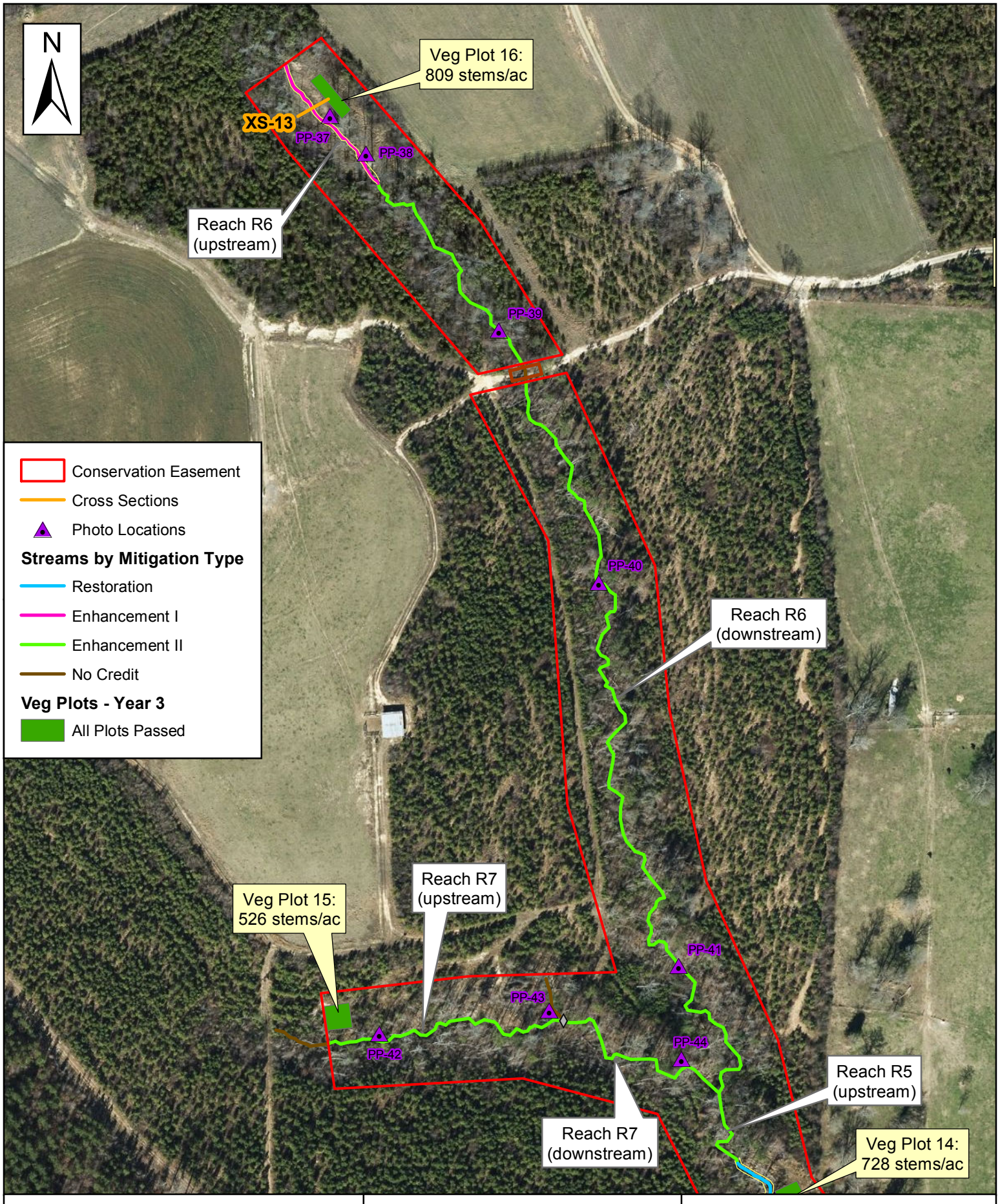


Michael Baker INTERNATIONAL

0 100 200 Feet

DENR DMS Project # 96074

Figure 5B
Current Condition Plan View
Thomas Creek Site - MY3



Michael Baker INTERNATIONAL

0 100 200 Feet

DENR DMS Project # 96074

Figure 5C
Current Condition Plan View
Thomas Creek Site - MY3

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			2	30	99%	0	0	99%
	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	2	30	99%	0	0	99%
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	Orange hatching	2	0.20	1.4%
			Total	**2**	**0.20**	**1.4%**
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	Pink hatching	1	0.38	2.6%
			Cumulative Total	**3**	**0.58**	**4.0%**
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%

Thomas Creek: MY3 Stream Station Photo-Points

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: MY3 Stream Station Photo-Points

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: MY3 Stream Station Photo-Points

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: MY3 Stream Station Photo-Points

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: MY3 Stream Station Photo-Points

PP-25: Reach T1, view upstream 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: MY3 Stream Station Photo-Points

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: MY3 Stream Station Photo-Points

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: MY3 Stream Station Photo-Points

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: MY3 Stream Station Photo-Points

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: MY3 Stream Station Photo-Points

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

Thomas Creek: MY3 Vegetation Plot Photographs

Vegetation Plot 1 – September 2018

Vegetation Plot 2 – September 2018

Vegetation Plot 3 – September 2018

Vegetation Plot 4 – September 2018

Vegetation Plot 5 – September 2018

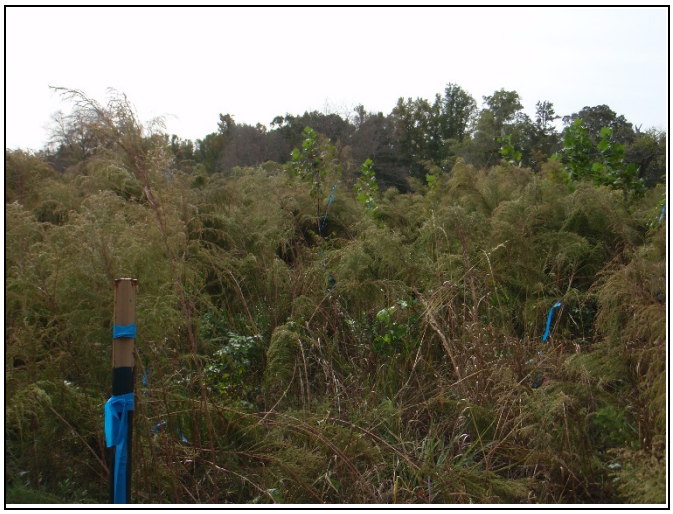
Vegetation Plot 6 – September 2018

Thomas Creek: MY3 Vegetation Plot Photographs

Vegetation Plot 7 – October 2018

Vegetation Plot 8 – October 2018

Vegetation Plot 9 – October 2018



Vegetation Plot 10 – October 2018

Vegetation Plot 11 – October 2018

Vegetation Plot 12 – October 2018

Thomas Creek: MY3 Vegetation Plot Photographs

Vegetation Plot 13 – October 2018

Vegetation Plot 14 – October 2018

Vegetation Plot 15 – September 2018

Vegetation Plot 16 – September 2018

Thomas Creek: MY3 Crest Gauge Photographs

Crest Gauge on Reach 2 at Station 38+90

Overbank event of 0.97 ft (photo: 4/23/18)

Overbank event of 1.49 ft from Hurricane Florence (photo: 10/10/18)

Close-up of overbank event of 1.49 ft from Hurricane Florence (photo: 10/10/18)

Evidence of overbank flow, Reach R3: Debris jam in the limbs of floodplain vegetation

Evidence of overbank flow, Reach R2: Debris jam in the limbs of floodplain vegetation

Thomas Creek: MY3 Crest Gauge Photographs

Evidence of overbank flow, Reach R5: Debris pile / wrack line in floodplain

Evidence of overbank flow, Reach T1: Debris pile / wrack line in floodplain

Thomas Creek: MY3 Stream and Vegetation Problem Areas and Repair Photographs

SPA-1: Bank scour and damaged livestake establishment from Hurricane Florence, left bank of R2, Station 34+75

SPA-2: Bank scour and damaged livestake establishment from Hurricane Florence, left bank of R2, Station 35+75

Livestakes planted in March 2018 establishing and stabilizing the left bank of R2, ~Station 32+25

Livestakes planted in March 2018 establishing and stabilizing the left bank of R2, ~Station 34+25

Livestakes planted in March 2018 establishing and stabilizing the left bank of R2, ~Station 35+50

VPA-1: Thin stem density observed within the riparian buffers of both banks of Reach T1

Appendix C

Vegetation Plot Data

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

			Current Plot Data (MY3 2018)																									
			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		
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
Asimina triloba	pawpaw	Tree																										
Betula nigra	river birch	Tree	1		1	1		1	1		1				1		1	2		2	1		1	3		3	2		2
Carpinus caroliniana	American hornbeam	Tree	4	1	5										1		1				5		5						
Carya glabra	pignut hickory	Tree		1	1								2	2					1	1								1	1
Diospyros virginiana	common persimmon	Tree	5		5	1		1	2		2	5		5				1		1		1	1	1		1	1		1
Fraxinus pennsylvanica	green ash	Tree										1		1	1		1				3		3	1		1	2		2
Liriodendron tulipifera	tuliptree	Tree								1	1	1	3	4	1	1	2							2		2			
Nyssa sylvatica	blackgum	Tree																										
Platanus occidentalis	American sycamore	Tree	2		2	1		1				3		3	1		1	5		5	2		2	3	1	4	1		1
Quercus	oak	Tree											1	1														
Quercus michauxii	swamp chestnut oak	Tree	1		1	2		2													2		2	1		1	4		4
Quercus nigra	water oak	Tree											3	3														
Quercus pagoda	cherrybark oak	Tree				1		1	1		1	1		1	3		3	1		1							2		2
Quercus phellos	willow oak	Tree																										1	1
Quercus rubra	northern red oak	Tree																										
Rhus copallinum	flameleaf sumac	shrub																										
Sassafras albidum	sassafras	Tree														1	1											
Viburnum dentatum	southern arrowwood	Shrub	1		1	4		4	4		4	1		1	2		2	3		3	4		4				3		3
		Stem count	14	2	16	10	0	10	8	1	9	12	9	21	10	2	12	12	1	13	17	1	18	11	1	12	15	2	17
		size (ares)	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		
		Species count	6	2	7	6		6	4	1	5	6	4	9	7	2	8	5	1	6	6	1	7	6	1	6	7	2	9
		Stems per ACRE	567	80.9	647	405	0	405	324	40.5	364	486	364	850	405	80.9	486	486	40.5	526	688	40.5	728	445	40.5	486	607	80.9	688

			Current Plot Data (MY3 2018) Continued																					Annual Means								
			96074-01-0010			96074-01-0011			96074-01-0012			96074-01-0013			96074-01-0014			96074-01-0015			96074-01-0016			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
Asimina triloba	pawpaw	Tree								1	1	3		3										3	1	4	3		3	5		5
Betula nigra	river birch	Tree	3		3	2		2	2		2	2		2	1		1	1	1	1	2		2	25		25	26		26	38		38
Carpinus caroliniana	American hornbeam	Tree	4		4	1		1	2		2				5		5	5		6	5		5	32	2	34	32	1	33	34		34
Carya glabra	pignut hickory	Tree																							5	5		4	4			
Diospyros virginiana	common persimmon	Tree	2		2	2		2	1		1				2		2				1	1	2	24	2	26	25	3	28	31		31
Fraxinus pennsylvanica	green ash	Tree				3		3							1		1	2		2	1		1	15		15	15		15	16		16
Liriodendron tulipifera	tuliptree	Tree				1		1	4		4	2		2							3		3	14	5	19	18	4	22	28		28
Nyssa sylvatica	blackgum	Tree																										1	1			
Platanus occidentalis	American sycamore	Tree	2		2	2		2	5		5	5		5	6		6	1		1				39	1	40	38	1	39	40		40
Quercus	oak	Tree																							1	1						
Quercus michauxii	swamp chestnut oak	Tree	2		2				2	1	3				2		2				4		4	20	1	21	21	1	22	23		23
Quercus nigra	water oak	Tree																				1	1		4	4						
Quercus pagoda	cherrybark oak	Tree	4		4	1		1	4		4	3		3							1		1	22		22	22		22	27		27
Quercus phellos	willow oak	Tree											1	1		1	1								3	3		3	3			
Quercus rubra	northern red oak	Tree																										4	4			
Rhus copallinum	flameleaf sumac	shrub																										3	3			
Sassafras albidum	sassafras	Tree																							1	1						
Viburnum dentatum	southern arrowwood	Shrub	3		3	9		9							1		1	4		4	3		3	42		42	44	1	45	46		46
		Stem count	20	0	20	21	0	21	20	2	22	15	1	16	18	1	19	13	1	14	20	2	22	236	26	262	244	26	270	288	0	288
		size (ares)	1			1			1			1			1			1			1			16			16			16		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.40			0.40			0.40		
		Species count	7	0	7	8	0	8	7	2	8	5	1	6	7	1	8	5	1	5	8	2	9	10	11	15	10	11	15	10		10
		Stems per ACRE	809	0	809	850	0	850	809	80.9	890	607	40.5	647	728	40.5	769	526	40.5	567	809	80.9	890	597	65.8	663	617	65.8	683	728.4	0	728.434

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 3 (October 2018)
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	14	0	0	2	**16**	0
2	n/a	10	0	0	0	**10**	0
3	n/a	8	0	0	1	**9**	0
4	n/a	12	0	0	9	**21**	0
5	n/a	10	0	0	2	**12**	0
6	n/a	12	0	0	1	**13**	0
7	n/a	17	0	0	1	**18**	0
8	n/a	11	0	0	1	**12**	0
9	n/a	15	0	0	2	**17**	0
10	n/a	20	0	0	0	**20**	0
11	n/a	21	0	0	0	**21**	0
12	n/a	20	0	0	2	**22**	0
13	n/a	15	0	0	1	**16**	0
14	n/a	18	0	0	1	**19**	0
15	n/a	13	0	0	1	**14**	0
16	n/a	20	0	0	2	**22**	0

Wetland/Stream Vegetation Totals (per acre)

Plot #	Stream/ Wetland Stems[2]	Volunteers[3]	Total[4]	Success Criteria Met?
1	567	81	647	Yes
2	405	0	405	Yes
3	324	40	364	Yes
4	486	364	850	Yes
5	405	81	486	Yes
6	486	40	526	Yes
7	688	40	728	Yes
8	445	40	486	Yes
9	607	81	688	Yes
10	809	0	809	Yes
11	850	0	850	Yes
12	809	81	890	Yes
13	607	40	647	Yes
14	728	40	769	Yes
15	526	40	567	Yes
16	809	81	890	Yes
Project Avg	**597**	**66**	**663**	**Yes**

Riparian Buffer Vegetation Totals (per acre)

Plot #	Riparian Buffer Stems[1]	Success Criteria Met?
1	n/a	n/a
2	n/a	n/a
3	n/a	n/a
4	n/a	n/a
5	n/a	n/a
6	n/a	n/a
7	n/a	n/a
8	n/a	n/a
9	n/a	n/a
10	n/a	n/a
11	n/a	n/a
12	n/a	n/a
13	n/a	n/a
14	n/a	n/a
15	n/a	n/a
16	n/a	n/a
Project Avg	**n/a**	**n/a**

Stem Class	**Characteristics**
[1]Buffer Stems	Native planted hardwood trees. Does NOT include shrubs. No pines. No vines.
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%
Includes volunteer stems

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																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Tree Species																		
Betula nigra	river birch	1	1	1		1	2	1	3	2	3	2	2	2	1	1	2	
Carya glabra	pignut hickory	1			2		1			1								
Diospyros virginiana	common persimmon	5	1	2	5		1	1	1	1	2	2	1		2		2	
Fraxinus pennsylvanica	green ash				1	1		3	1	2		3			1	2	1	
Liriodendron tulipifera	tuliptree			1	4	2			2			1	4	2			3	
Nyssa sylvatica	blackgum																	
Platanus occidentalis	American sycamore	2	1		3	1	5	2	4	1	2	2	5	5	6	1		Average Stems Per Acres
Quercus michauxii	swamp chestnut oak	1	2					2	1	4	2		3		2		4	
Quercus pagoda	cherrybark oak		1	1	2	3	1			2	4	1	4	3			1	
Quercus phellos	willow oak									1				1	1			
Quercus rubra	northern red oak				3												1	
Shrub Species																		
Asimina triloba	pawpaw												1	3				
Carpinus caroliniana	American hornbeam	5				1		5			4	1	2		5	6	5	
Rhus copallinum	winged sumac																	
Viburnum dentatum	southern arrowwood	1	4	4	1	2	3	4		3	3	9			1	4	3	
Sassafras albidum	Sassafras					1												
Total Stems Per Plot - Year 3		**16**	**10**	**9**	**21**	**12**	**13**	**18**	**12**	**17**	**20**	**21**	**22**	**16**	**19**	**14**	**22**	
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

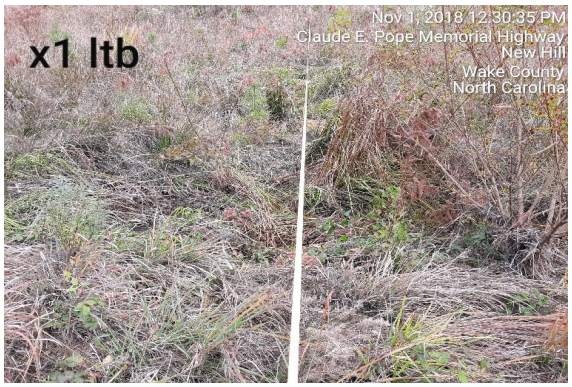
*Note: Starting in MY2, the values provided above in Table 9 include the identified volunteer species, while the baseline (MY0) and MY1 data did not.

Appendix D

Stream Survey Data

Figure 6. Year 3 Cross-sections

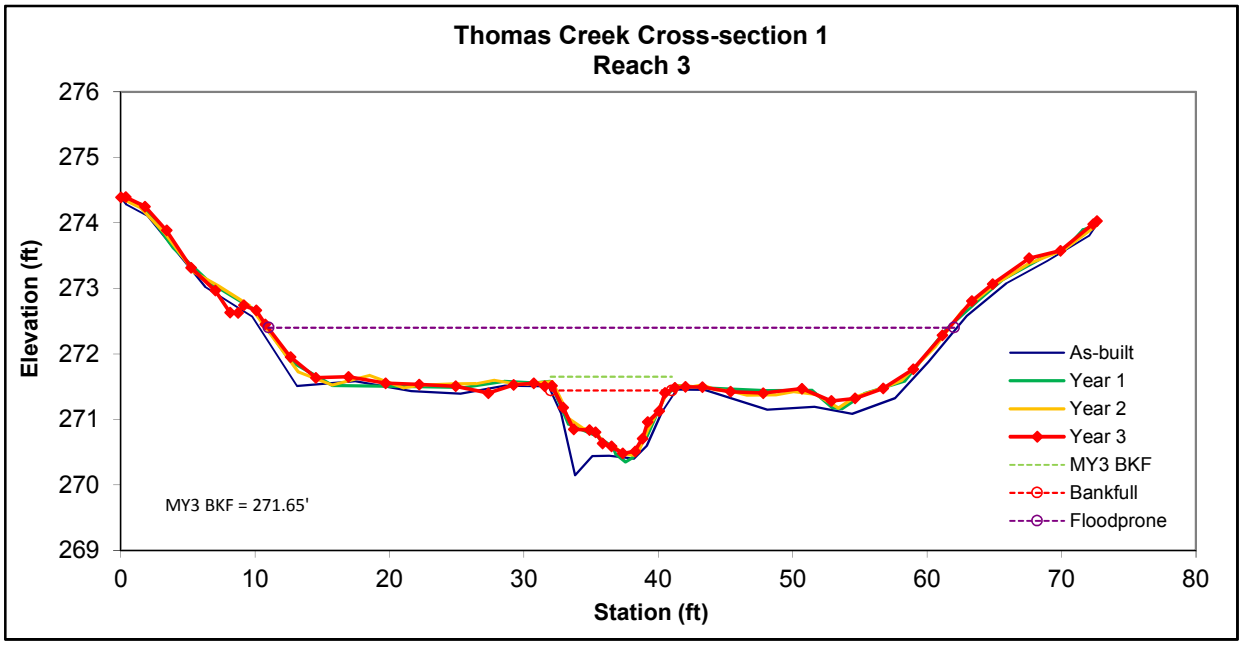
Permanent Cross-section 1
(Year 3 Data - Collected November 2018)



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	BKF Elev	TOB Elev
Riffle	C	5.1	8.6	0.6	1.0	14.4	0.9	5.9	271.44	271.48



Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the as-built bankfull elevation, as was done for previous monitoring reports.

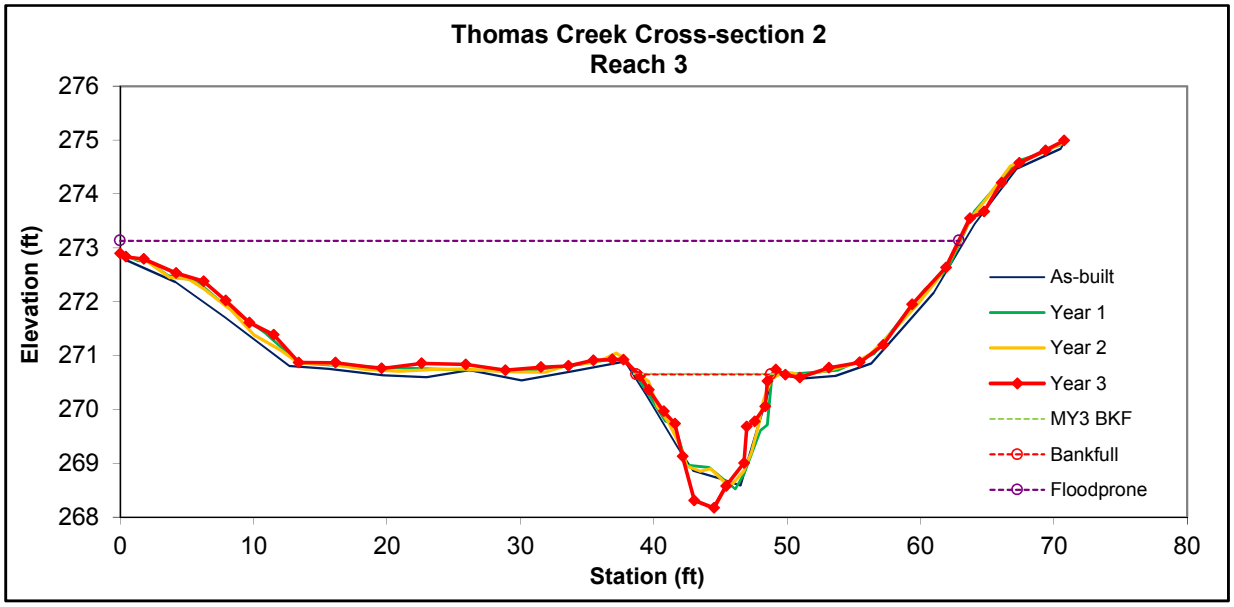
Permanent Cross-section 2

(Year 3 Data - Collected October 2018)

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	BKF Elev	TOB Elev
Pool	-	13.3	10.0	1.3	2.5	7.6	-	-	270.65	270.73



Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the as-built bankfull elevation, as was done for previous monitoring reports.

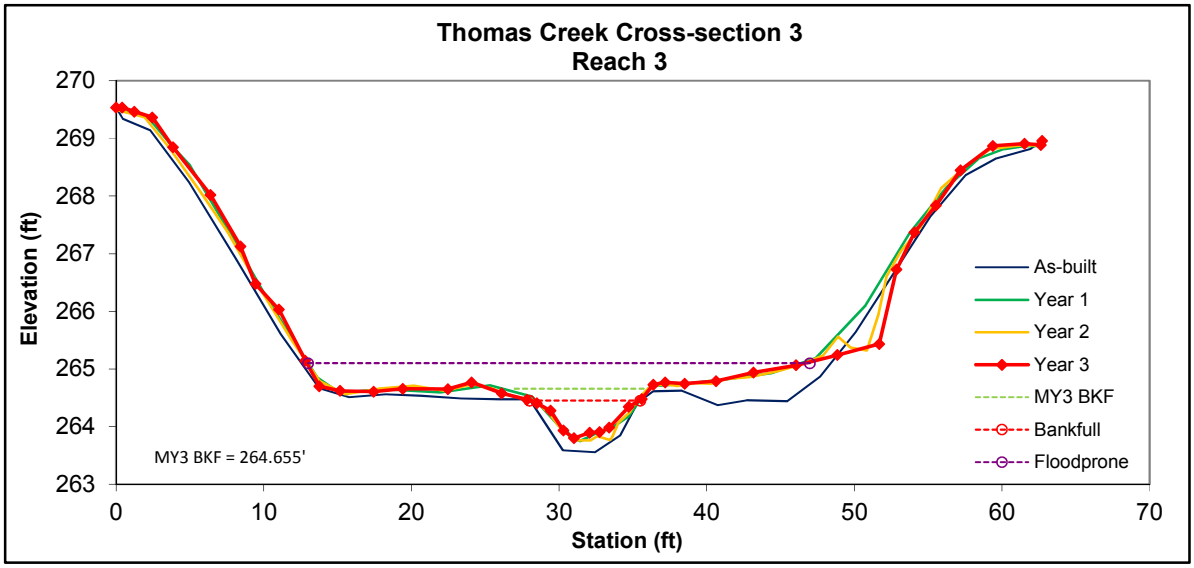
Permanent Cross-section 3

(Year 3 Data - Collected November 2018)

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	BKF Elev	TOB Elev
Riffle	C	2.6	7.4	0.3	0.7	21.3	0.7	4.5	264.45	264.41



Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the as-built bankfull elevation, as was done for previous monitoring reports.

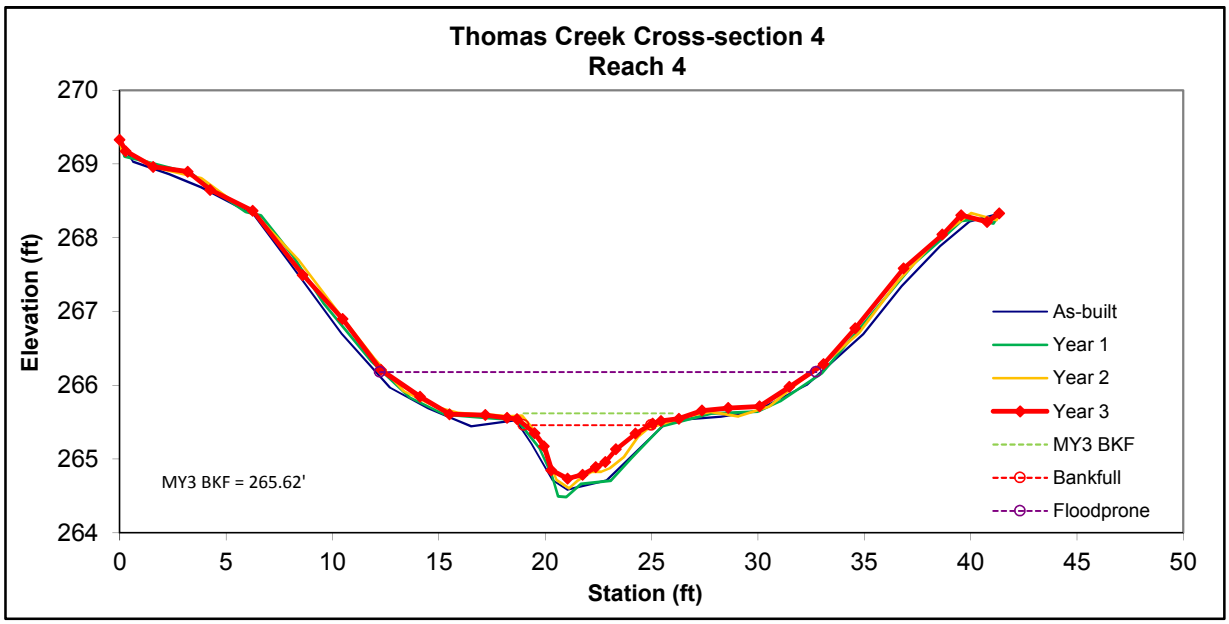
Permanent Cross-section 4

(Year 3 Data - Collected November 2018)

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	BKF Elev	TOB Elev
Riffle	C	2.3	5.9	0.4	0.7	14.8	0.8	3.4	265.46	265.48



Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the as-built bankfull elevation, as was done for previous monitoring reports.

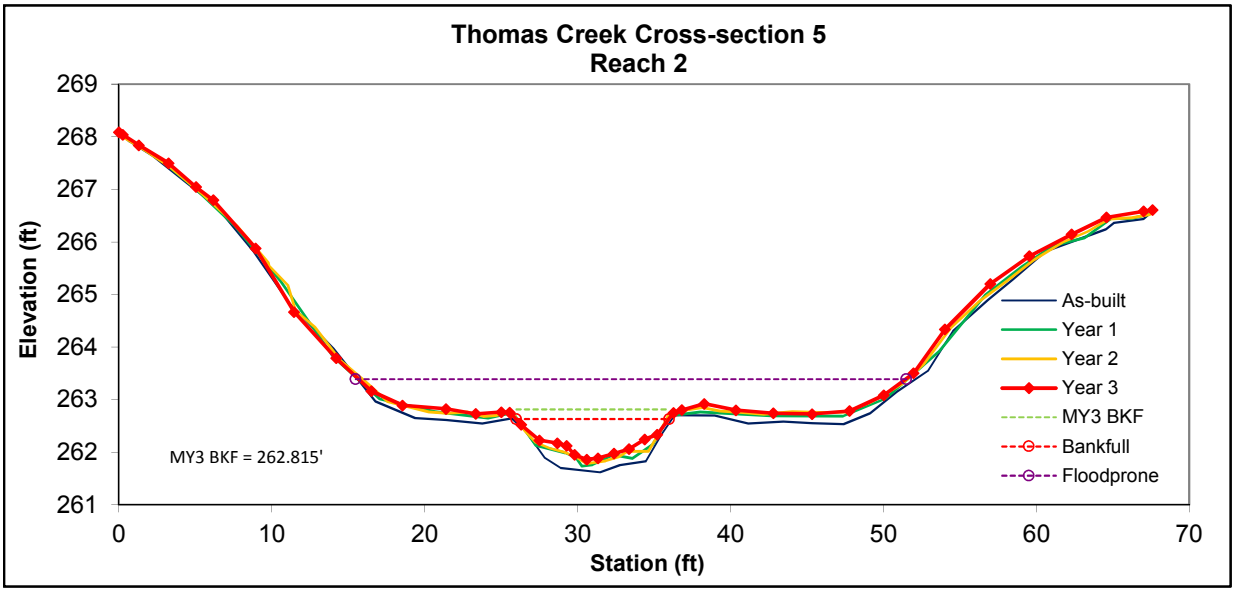
Permanent Cross-section 5

(Year 3 Data - Collected November 2018)

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	BKF Elev	TOB Elev
Riffle	C	4.8	10.0	0.5	0.8	21.0	0.9	3.6	262.63	262.75



Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the as-built bankfull elevation, as was done for previous monitoring reports.

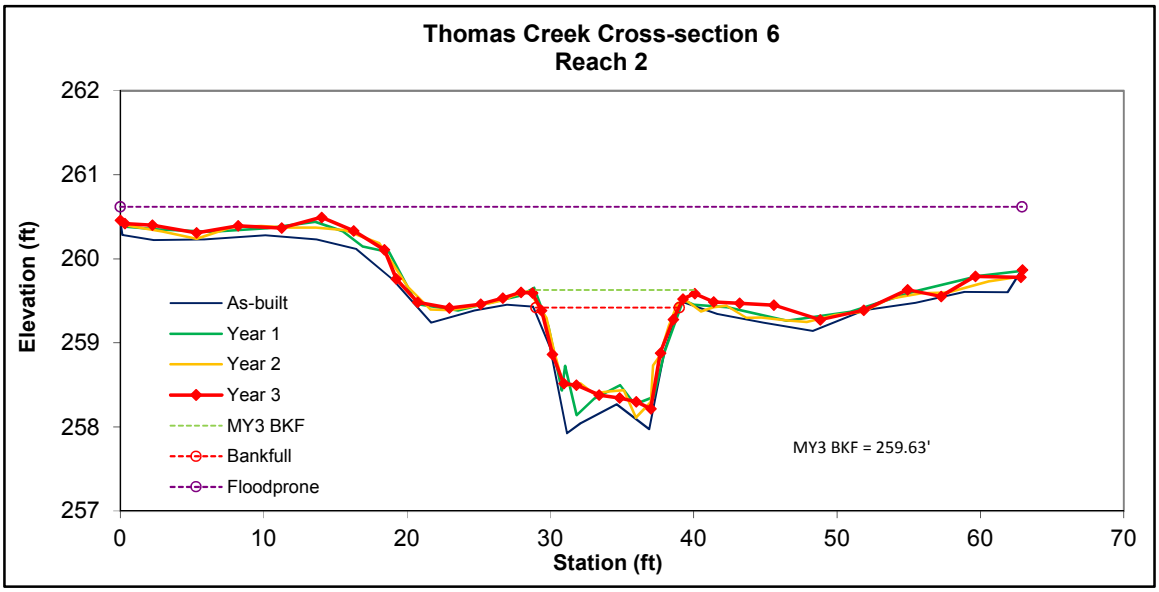
Permanent Cross-section 6

(Year 3 Data - Collected November 2018)

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	BKF Elev	TOB Elev
Riffle	C	8.0	9.7	0.8	1.2	11.6	0.9	6.5	259.42	259.52



Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the as-built bankfull elevation, as was done for previous monitoring reports.

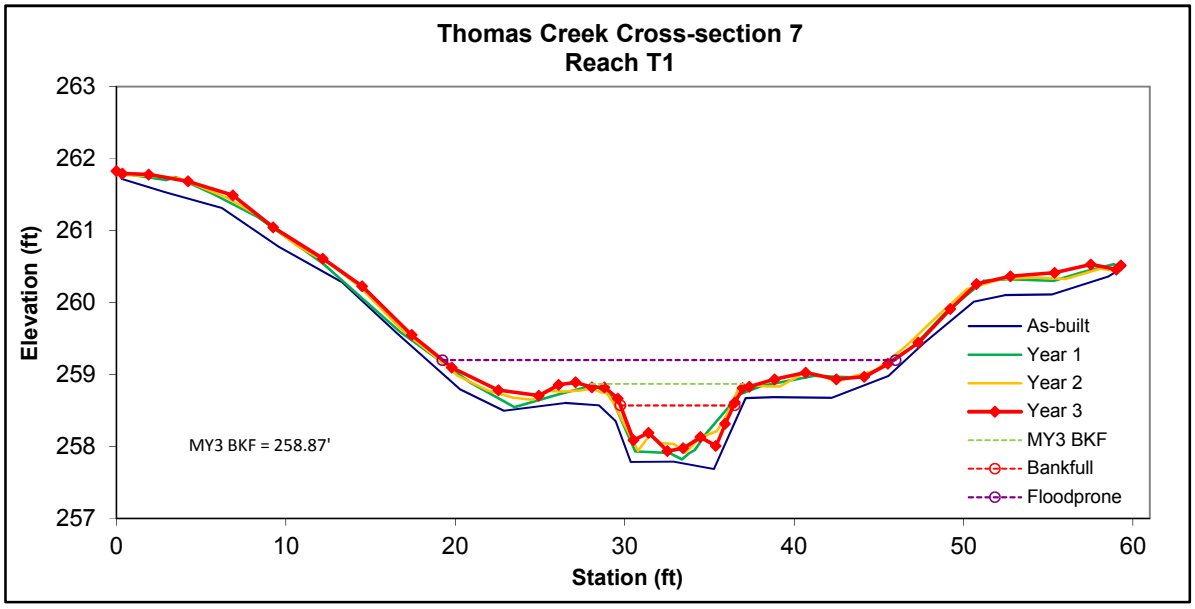
Permanent Cross-section 7

(Year 3 Data - Collected November 2018)

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	BKF Elev	TOB Elev
Riffle	C	3.0	6.7	0.4	0.6	15.0	0.9	4.0	258.57	258.81



Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the as-built bankfull elevation, as was done for previous monitoring reports.

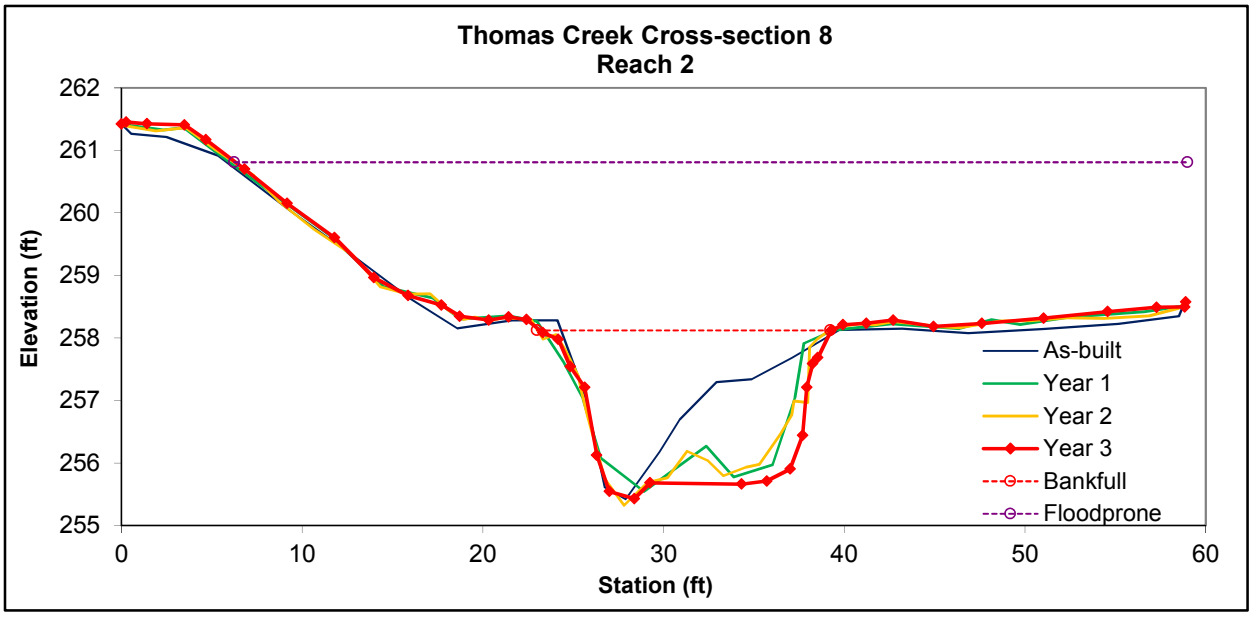
Permanent Cross-section 8

(Year 3 Data - Collected November 2018)

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	BKF Elev	TOB Elev
Pool	-	30.3	16.1	1.9	2.7	8.6	-	-	258.12	258.12



Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the as-built bankfull elevation, as was done for previous monitoring reports.

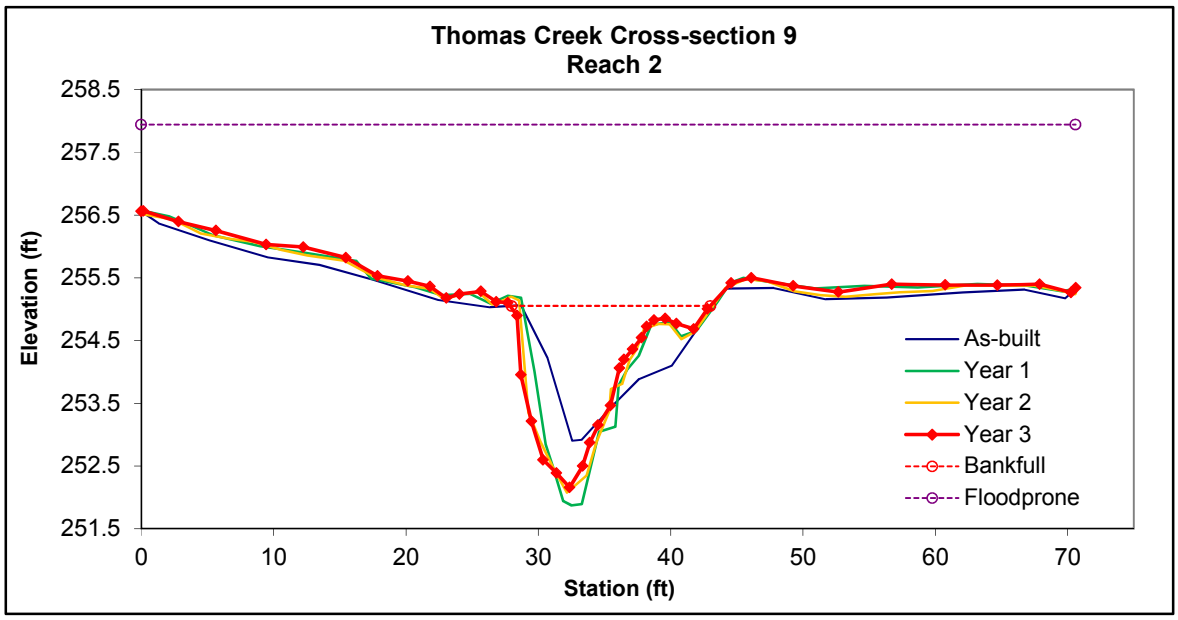
Permanent Cross-Section 9

(Year 3 Data - Collected November 2018)

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	BKF Elev	TOB Elev
Pool	-	18.9	15.1	1.3	2.9	12.1	-	-	255.05	254.82



Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the as-built bankfull elevation, as was done for previous monitoring reports.

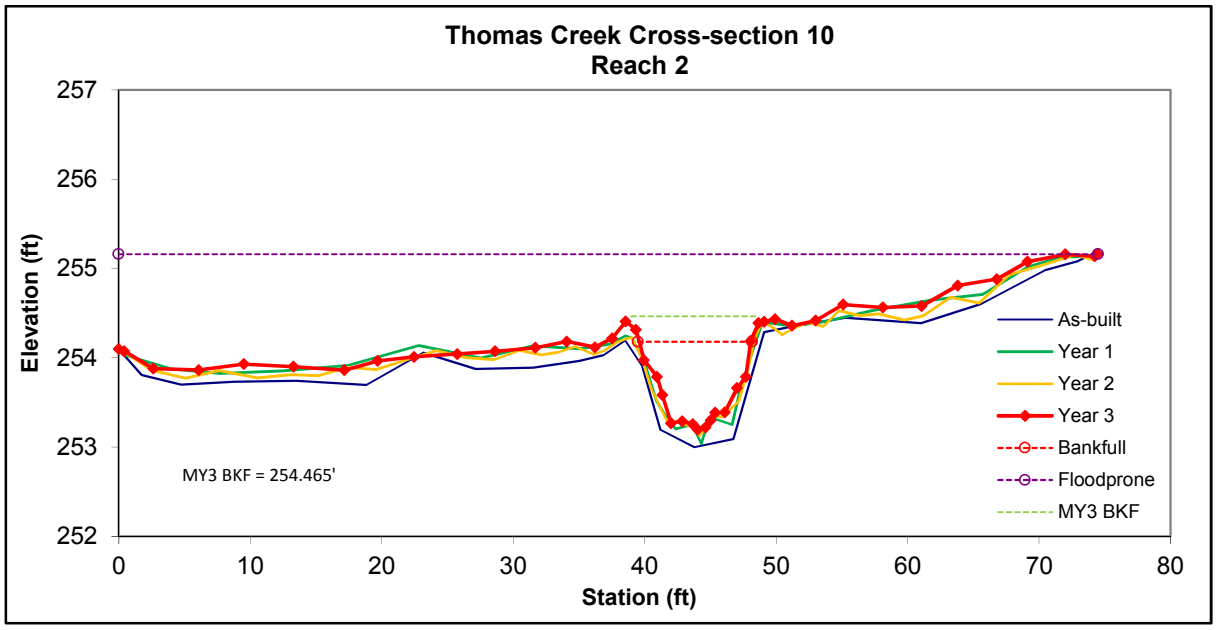
Permanent Cross-section 10

(Year 3 Data - Collected November 2018)

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	BKF Elev	TOB Elev
Riffle	C	5.7	8.5	0.7	1.0	12.7	0.9	8.8	254.18	254.32



Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the as-built bankfull elevation, as was done for previous monitoring reports.

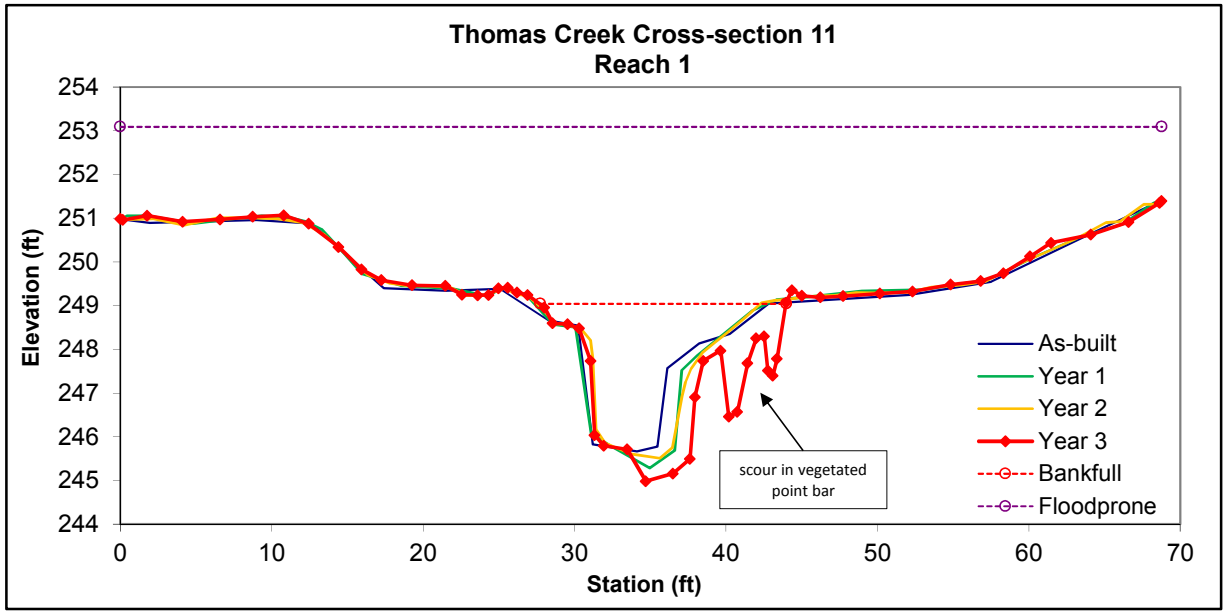
Permanent Cross-section 11

(Year 3 Data - Collected November 2018)

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	BKF Elev	TOB Elev
Pool	-	34.6	16.3	2.1	4.1	7.7	-	-	249.04	249.24



Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the as-built bankfull elevation, as was done for previous monitoring reports.

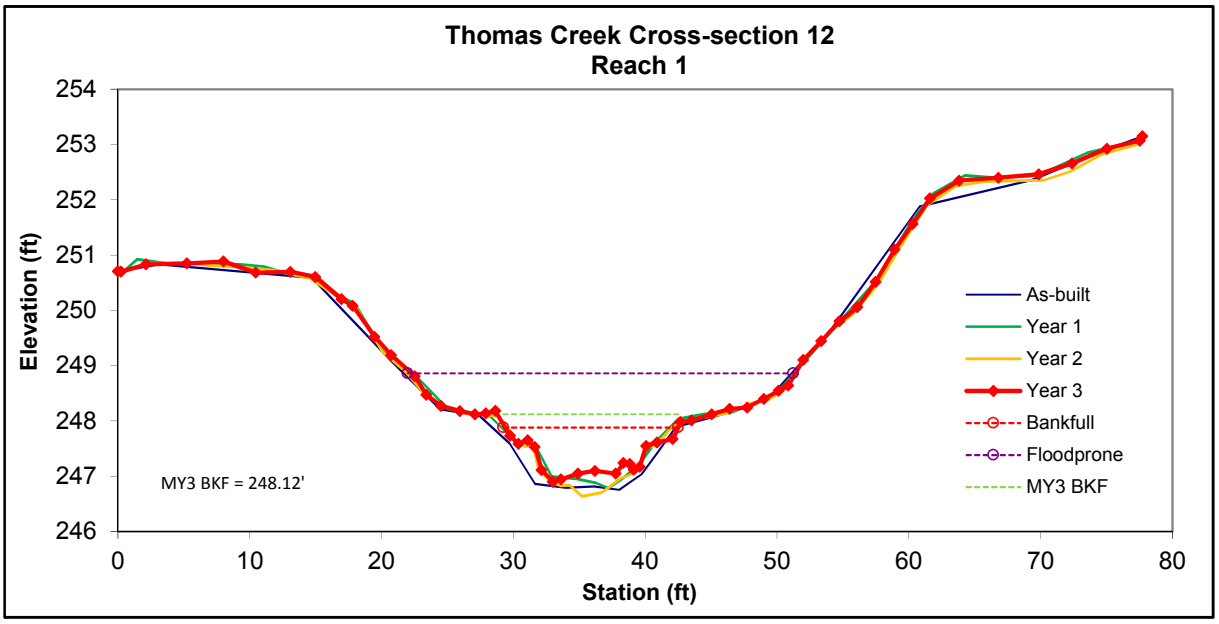
Permanent Cross-section 12

(Year 3 Data - Collected November 2018)

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	BKF Elev	TOB Elev
Riffle	C	7.7	13.1	0.6	1.0	22.3	0.9	2.2	247.88	247.98



Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the as-built bankfull elevation, as was done for previous monitoring reports.

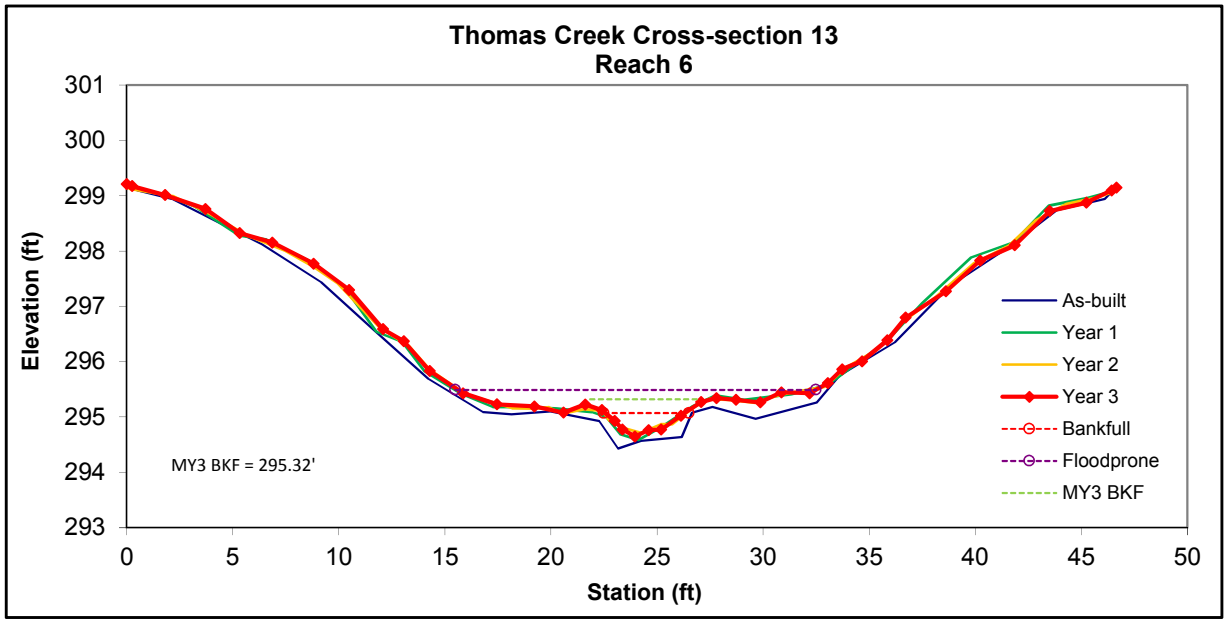
Permanent Cross-section 13

(Year 3 Data - Collected November 2018)

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	BKF Elev	TOB Elev
Riffle	C	0.9	3.7	0.2	0.4	15.5	0.7	4.5	295.07	295.12



Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the as-built bankfull elevation, as was done for previous monitoring reports.

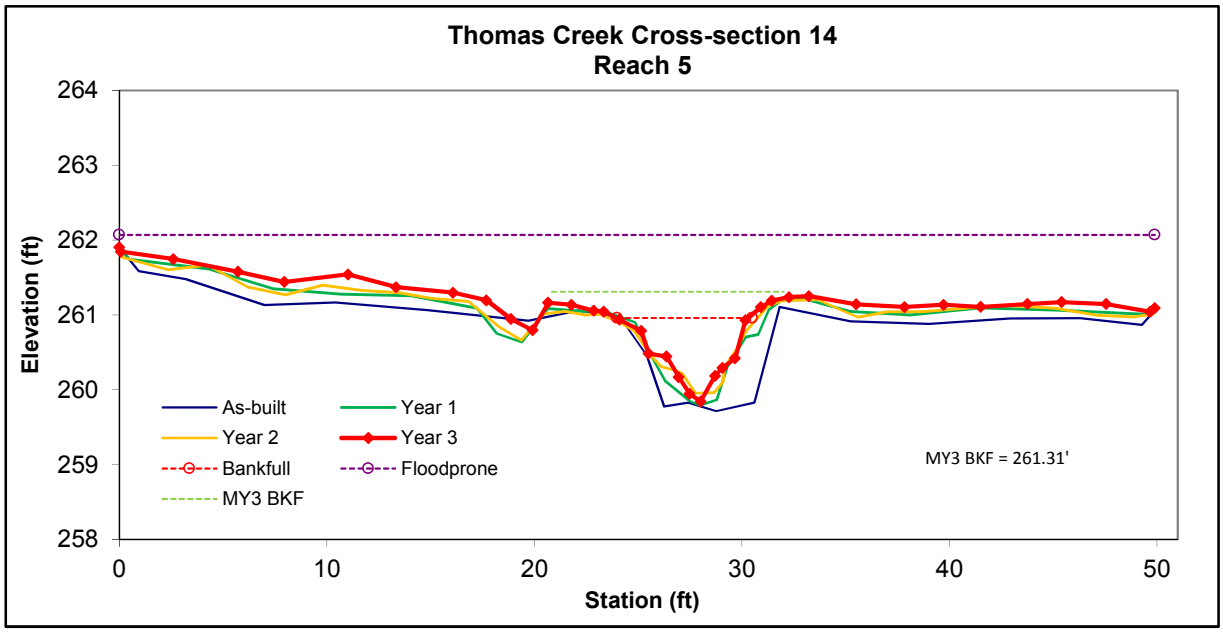
Permanent Cross-section 14

(Year 3 Data - Collected November 2018)

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	BKF Elev	TOB Elev
Riffle	E	3.5	6.4	0.5	1.1	11.6	0.8	7.8	260.96	261.05



Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the as-built bankfull elevation, as was done for previous monitoring reports.

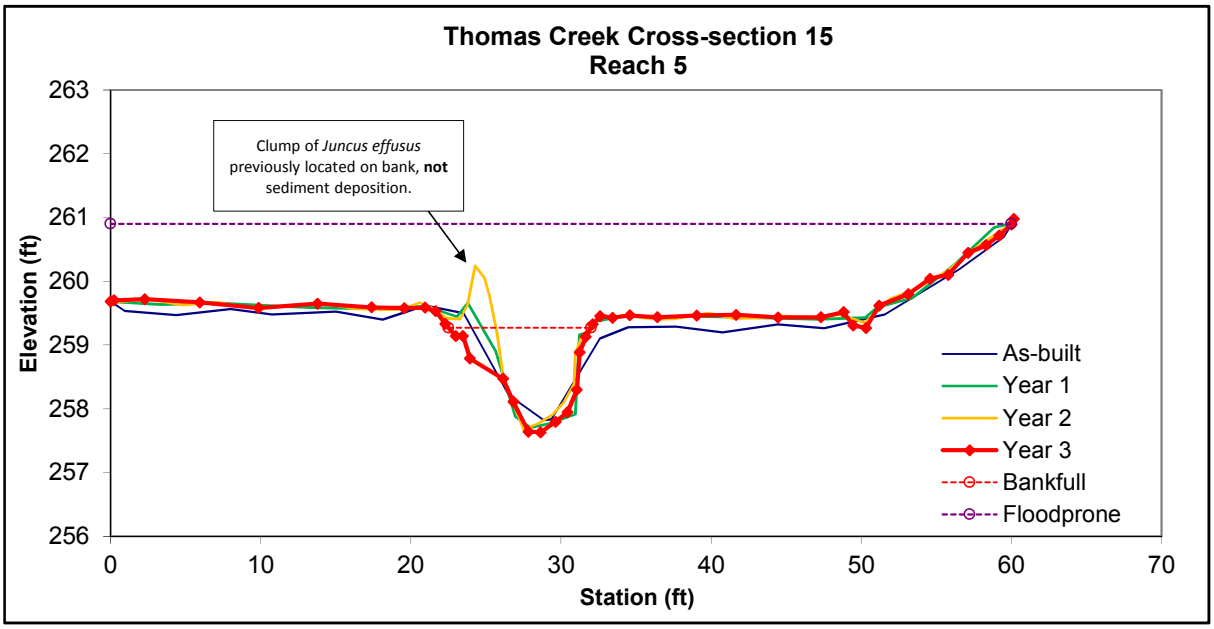
Permanent Cross-section 15

(Year 3 Data - Collected November 2018)

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	BKF Elev	TOB Elev
Pool	-	8.7	9.5	0.9	1.6	10.4	-	-	259.27	259.45



Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the as-built bankfull elevation, as was done for previous monitoring reports.

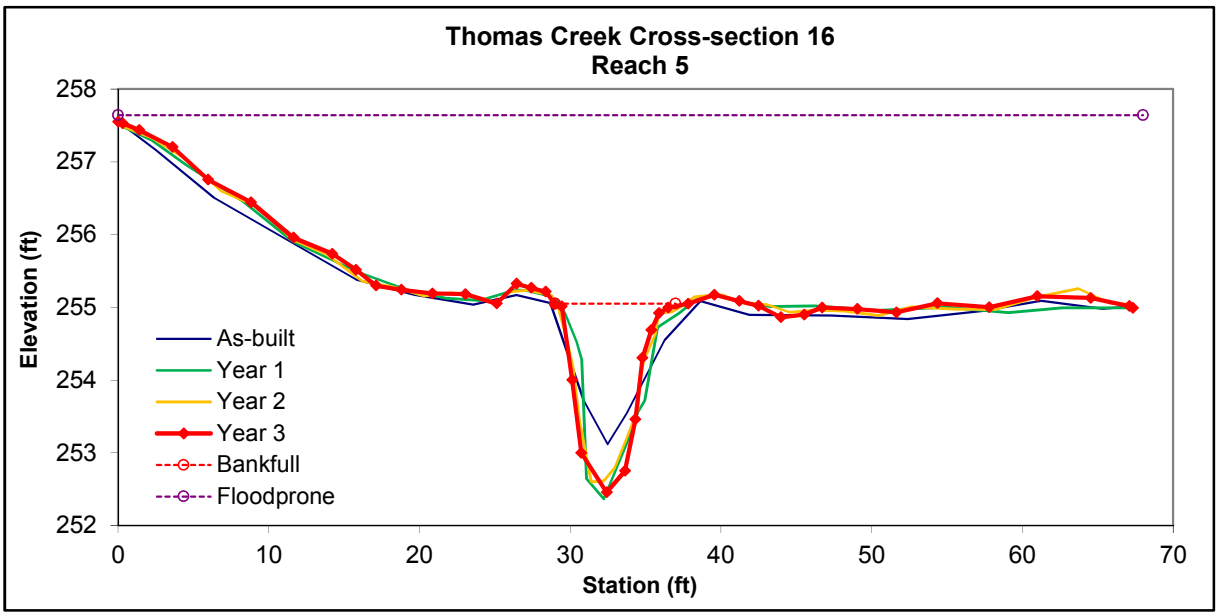
Permanent Cross-section 16

(Year 3 Data - Collected November 2018)

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	BKF Elev	TOB Elev
Pool	-	10.6	8.9	1.2	2.6	7.4	-	-	255.05	254.92



Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the as-built bankfull elevation, as was done for previous monitoring reports.

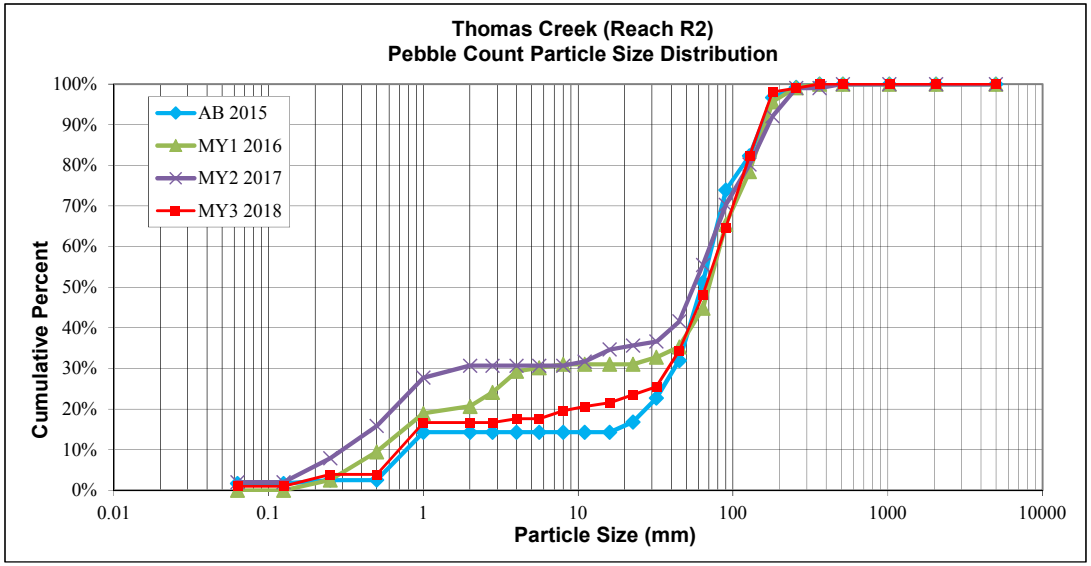
Figure 7. Pebble Count - Monitoring Year 3
Thomas Creek Mitigation Project, DMS# 96074

SITE OR PROJECT:	Thomas Creek
REACH/LOCATION:	Reach R2 (Station 37+00)
FEATURE:	Rock Riffle
DATE:	23-Oct-18

			MY3 2018			Distribution
MATERIAL	**PARTICLE**	**SIZE (mm)**	**Total**	**Class %**	**% Cum**	**Plot Size (mm)**
Silt/Clay	Silt / Clay	< .063	1	1%	1%	0.063
Sand	Very Fine	.063 - .125			1%	0.125
	Fine	.125 - .25	3	3%	4%	0.25
	Medium	.25 - .50			4%	0.50
	Coarse	.50 - 1.0	13	13%	17%	1.0
	Very Coarse	1.0 - 2.0			17%	2.0
Gravel	Very Fine	2.0 - 2.8			17%	2.8
	Very Fine	2.8 - 4.0	1	1%	18%	4.0
	Fine	4.0 - 5.6			18%	5.6
	Fine	5.6 - 8.0	2	2%	20%	8.0
	Medium	8.0 - 11.0	1	1%	21%	11.0
	Medium	11.0 - 16.0	1	1%	22%	16.0
	Coarse	16 - 22.6	2	2%	24%	22.6
	Coarse	22.6 - 32	2	2%	25%	32
	Very Coarse	32 - 45	9	9%	34%	45
	Very Coarse	45 - 64	14	14%	48%	64
Cobble	Small	64 - 90	17	17%	65%	90
	Small	90 - 128	18	18%	82%	128
	Large	128 - 180	16	16%	98%	180
	Large	180 - 256	1	1%	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			102	100%		

Largest particle= 256

Summary Data			
Channel materials			
D16 =	1.0	D84 =	132.7
D35 =	45.8	D95 =	168.5
D50 =	66.6	D100 =	256 - 362



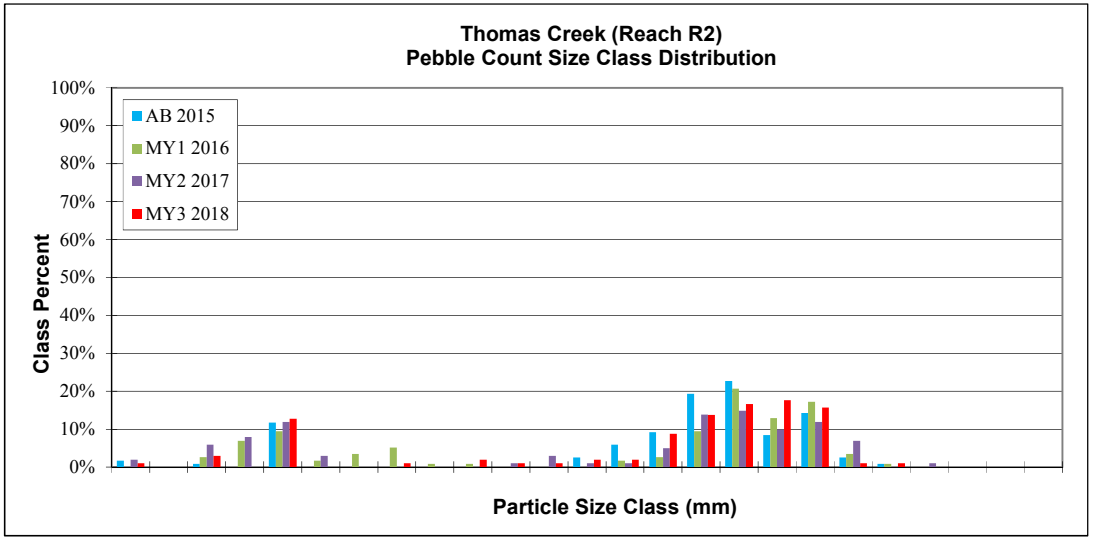


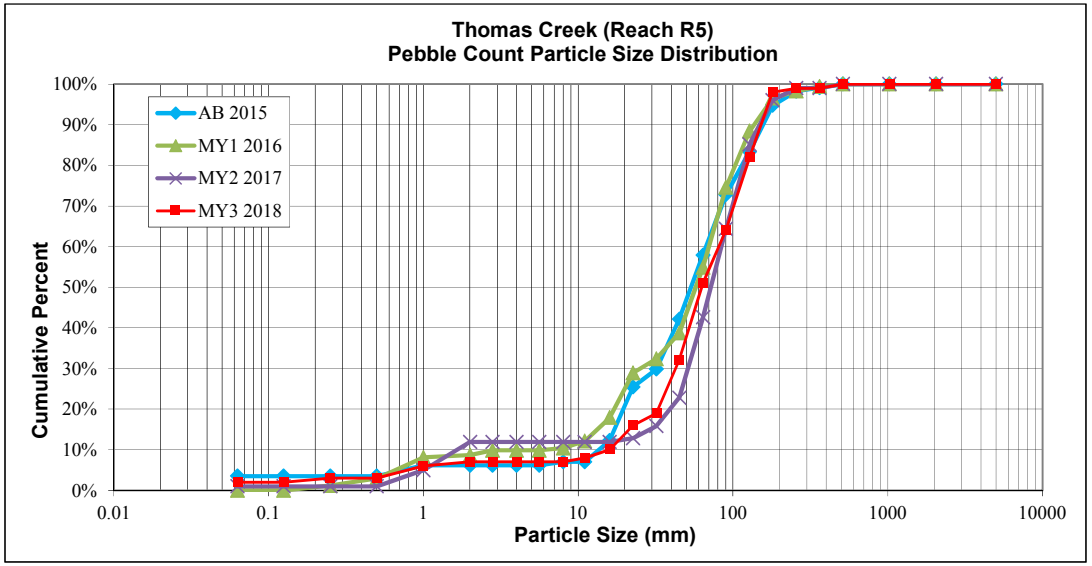
Figure 7. Pebble Count - Monitoring Year 3
Thomas Creek Mitigation Project, DMS# 96074

SITE OR PROJECT:	Thomas Creek
REACH/LOCATION:	Reach R5 (Station 37+00)
FEATURE:	Rock Riffle
DATE:	23-Oct-18

			MY3 2018			Distribution
MATERIAL	PARTICLE	SIZE (mm)	Total	Class %	% Cum	Plot Size (mm)
Silt/Clay	Silt / Clay	< .063	2	2%	2%	0.063
Sand	Very Fine	.063 - .125			2%	0.125
	Fine	.125 - .25	1	1%	3%	0.25
	Medium	.25 - .50			3%	0.50
	Coarse	.50 - 1.0	3	3%	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			7%	8.0
	Medium	8.0 - 11.0	1	1%	8%	11.0
	Medium	11.0 - 16.0	2	2%	10%	16.0
	Coarse	16 - 22.6	6	6%	16%	22.6
	Coarse	22.6 - 32	3	3%	19%	32
	Very Coarse	32 - 45	13	13%	32%	45
	Very Coarse	45 - 64	19	19%	51%	64
Cobble	Small	64 - 90	13	13%	64%	90
	Small	90 - 128	18	18%	82%	128
	Large	128 - 180	16	16%	98%	180
	Large	180 - 256	1	1%	99%	256
Boulder	Small	256 - 362			99%	362
	Small	362 - 512	1	1%	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= 256

Summary Data			
Channel materials			
D16 =	22.6	D84 =	133.6
D35 =	47.6	D95 =	168.9
D50 =	62.8	D100 =	362 - 512



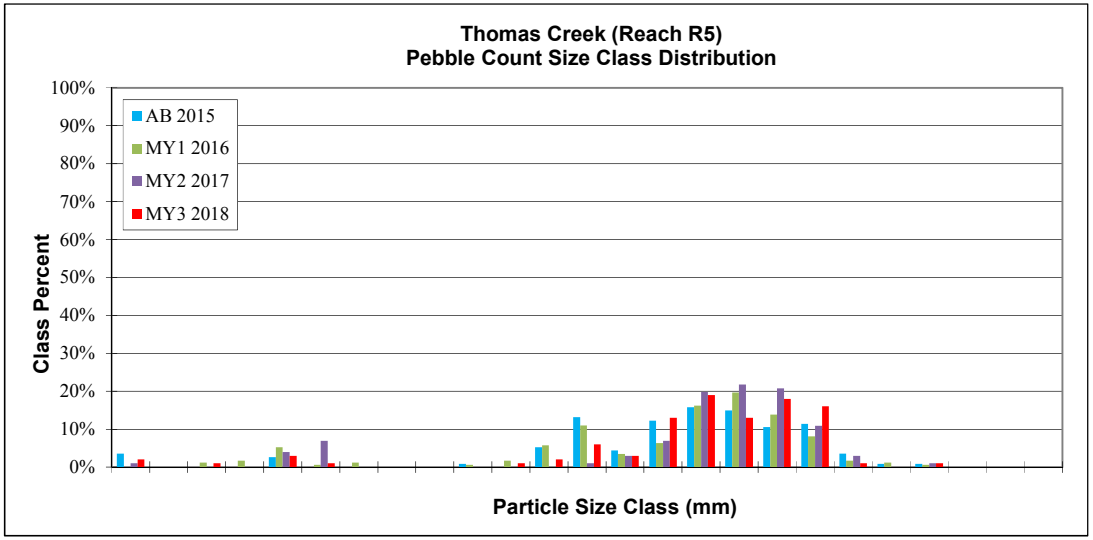


Table 10. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 1 - Length 298 ft

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	-----	-----	-----	-----
Re: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 – 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	-----	-----	-----	-----	-----	-----	-----	-----	-----	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 (ft²)	-----	-----	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 (ft³)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----																								
Reach Shear Stress (competency) lb/ft²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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	-----	-----	-----	-----
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: 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)	-----	-----	-----	-----	3.2	-----	-----	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 (ft²)	-----	-----	-----	-----	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 (ft³)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----				----												---								
Reach Shear Stress (competency) lb/ft²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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 (ft²)	-----	-----	-----	-----	-----	-----	-----	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 (ft³)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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/ft²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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 (ft²)	-----	-----	-----	-----	-----	-----	-----	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				10.5	10.2	10.2	10.0				7.5	7.1	7.0	7.4				
BF Mean Depth (ft)	0.8	0.6	0.6	0.6				1.3	1.3	1.2	1.3				0.6	0.4	0.5	0.3				
Width/Depth Ratio	11.9	14.1	13.7	14.4				8.3	8.0	8.5	7.6				12.3	16.9	15.5	21.3				
BF Cross-sectional Area (ft^2)	7.3	5.4	5.1	5.1				13.4	13.2	12.2	13.3				4.5	3.0	3.1	2.6				
BF Max Depth (ft)	1.3	1.1	1.0	1.0				2.1	2.1	2.0	2.5				0.9	0.7	0.7	0.7				
Width of Floodprone Area (ft)	55.3	51.8	51.4	50.7				61.3	62.2	59.5	62.9				37.3	34.1	34.1	33.8				
Entrenchment Ratio	5.9	6.0	6.1	5.9				-	-	-	-				5.0	4.9	5.0	4.5				
Bank Height Ratio	1.0	0.9	0.8	0.9				-	-	-	-				1.0	0.9	0.8	0.7				
Wetted Perimeter (ft)	10.9	10.0	9.6	8.9				13.1	12.8	12.6	11.8				8.7	7.9	7.9	7.6				
Hydraulic Radius (ft)	0.7	0.5	0.5	0.6				1.0	1.0	1.0	1.1				0.5	0.4	0.4	0.4				
Cross Sectional Area between end pins (ft^2)	-							-							-							
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				10.4	9.8	9.8	10.0				10.2	9.7	9.5	9.7				8.5	6.8	6.9	6.7			
BF Mean Depth (ft)	0.5	0.5	0.5	0.4				0.7	0.6	0.6	0.5				1.0	0.9	0.8	0.8				0.6	0.5	0.4	0.4			
Width/Depth Ratio	12.7	12.6	13.5	14.8				14.8	16.6	16.8	21.0				10.1	11.4	11.7	11.6				13.6	13.8	16.0	15.0			
BF Cross-sectional Area (ft^2)	3.6	3.6	2.8	2.3				7.4	5.8	5.6	4.8				10.2	8.3	7.7	8.0				5.3	3.4	3.0	3.0			
BF Max Depth (ft)	0.9	1.0	0.8	0.7				1.0	0.9	0.9	0.8				1.5	1.3	1.3	1.2				0.9	0.8	0.7	0.6			
Width of Floodprone Area (ft)	21.9	22.3	20.6	20.2				38.2	37.0	36.3	35.8				62.9	62.9	63.0	62.9				30.6	28.2	27.1	26.7			
Entrenchment Ratio	3.2	3.1	3.2	3.4				3.7	3.7	3.7	3.6				6.2	6.2	6.2	6.5				3.6	3.7	3.7	4.0			
Bank Height Ratio	1.0	1.2	0.9	0.8				1.0	0.9	1.0	0.9				0.9	0.9	0.9	0.9				1.0	1.2	0.9	0.9			
Wetted Perimeter (ft)	7.8	7.9	7.0	6.1				11.8	11.0	10.9	10.2				12.2	11.4	11.1	10.3				9.7	7.8	7.7	7.0			
Hydraulic Radius (ft)	0.5	0.5	0.4	0.4				0.6	0.5	0.5	0.5				0.8	0.7	0.7	0.8				0.5	0.4	0.4	0.4			
Cross Sectional Area between end pins (ft^2)	-							-							-							-						
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				14.5	14.5	14.6	15.1				10.3	9.3	9.1	8.5				
BF Mean Depth (ft)	1.2	1.6	1.7	1.9				1.1	1.3	1.4	1.3				0.8	0.7	0.7	0.7				
Width/Depth Ratio	13.3	9.8	9.6	8.6				12.9	10.8	10.8	12.1				12.6	13.2	13.0	12.7				
BF Cross-sectional Area (ft^2)	17.6	26.3	27.0	30.3				16.3	19.5	19.7	18.9				8.4	6.5	6.4	5.7				
BF Max Depth (ft)	2.7	2.6	2.8	2.7				2.2	3.2	3.0	2.9				1.2	1.1	1.1	1.0				
Width of Floodprone Area (ft)	53.1	52.4	53.2	52.8				70.6	70.6	70.7	70.6				74.5	74.5	74.5	74.5				
Entrenchment Ratio	-	-	-	-				-	-	-	-				7.2	7.3	7.3	8.8				
Bank Height Ratio	-	-	-	-				-	-	-	-				1.0	1.0	0.9	0.9				
Wetted Perimeter (ft)	17.6	19.3	19.5	18.3				16.8	17.2	17.3	17.0				11.9	10.7	10.5	8.9				
Hydraulic Radius (ft)	1.0	1.4	1.4	1.7				1.0	1.1	1.1	1.1				0.7	0.6	0.6	0.6				
Cross Sectional Area between end pins (ft^2)	-							-							-							
d50 (mm)	-							-							-							

Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the 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				13.9	12.7	12.4	13.1				6.3	4.1	4.1	3.7				
BF Mean Depth (ft)	1.5	1.7	1.7	2.1				0.8	0.7	0.8	0.6				0.3	0.3	0.2	0.2				
Width/Depth Ratio	11.1	8.8	8.7	7.7				17.4	19.8	16.5	22.3				18.7	16.1	19.5	15.5				
BF Cross-sectional Area (ft²)	23.7	26.8	25.0	34.6				11.1	8.2	9.3	7.7				2.1	1.1	0.8	0.9				
BF Max Depth (ft)	3.4	3.8	3.5	4.1				1.1	1.1	1.3	1.0				0.6	0.5	0.4	0.4				
Width of Floodprone Area (ft)	68.8	68.8	68.7	68.8				30.6	30.0	31.3	29.1				19.4	17.6	16.0	16.9				
Entrenchment Ratio	-	-	-	-				2.2	2.2	2.1	2.2				3.1	3.2	3.2	4.5				
Bank Height Ratio	-	-	-	-				1.0	1.2	1.1	0.9				0.8	0.6	0.7	0.7				
Wetted Perimeter (ft)	19.2	18.9	18.1	23.6				15.5	14.0	13.9	13.6				6.9	4.6	4.5	3.8				
Hydraulic Radius (ft)	1.2	1.4	1.4	1.5				0.7	0.6	0.7	0.6				0.3	0.2	0.2	0.2				
Cross Sectional Area between end pins (ft²)	-							-							-							
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				10.3	7.3	6.4	9.5				9.3	8.7	8.5	8.9				
BF Mean Depth (ft)	0.9	0.6	0.5	0.5				0.8	1.0	1.0	0.9				0.8	1.2	1.2	1.2				
Width/Depth Ratio	8.4	10.8	13.5	11.6				13.8	7.1	6.2	10.4				11.9	7.3	7.0	7.4				
BF Cross-sectional Area (ft²)	6.8	4.4	3.8	3.5				7.7	7.5	6.5	8.7				7.3	10.4	10.2	10.6				
BF Max Depth (ft)	1.2	1.2	1.0	1.1				1.5	1.6	1.6	1.6				1.3	2.7	2.5	2.6				
Width of Floodprone Area (ft)	49.9	49.9	49.9	49.9				59.6	58.8	59.7	59.0				63.8	67.4	67.3	67.3				
Entrenchment Ratio	6.6	6.6	6.6	7.8				-	-	-	-				-	-	-	-				
Bank Height Ratio	1.0	1.0	0.8	0.8				-	-	-	-				-	-	-	-				
Wetted Perimeter (ft)	9.3	8.1	7.6	6.9				11.8	9.3	8.4	10.5				10.9	11.1	10.9	11.1				
Hydraulic Radius (ft)	0.7	0.5	0.5	0.5				0.7	0.8	0.8	0.8				0.7	0.9	0.9	1.0				
Cross Sectional Area between end pins (ft²)	-							-							-							
d50 (mm)	-							-							-							

Note: Per DMS/IRT request, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the 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-4						MY-5					
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	0.8	-----	-----	-----	-----	-----	0.7	-----	-----	-----	-----	-----	0.8	-----	-----	-----	1	-----	0.6	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	17.4	-----	-----	-----	-----	-----	19.8	-----	-----	-----	-----	-----	16.5	-----	-----	-----	1	-----	22.3	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	11.1	-----	-----	-----	-----	-----	8.2	-----	-----	-----	-----	-----	9.3	-----	-----	-----	1	-----	7.7	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	1.1	-----	-----	-----	-----	-----	1.1	-----	-----	-----	-----	-----	1.3	-----	-----	-----	1	-----	1.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	-----	30.6	-----	-----	-----	-----	-----	30.0	-----	-----	-----	-----	-----	31.3	-----	-----	-----	1	-----	29.1	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	2.2	-----	-----	-----	-----	-----	2.2	-----	-----	-----	-----	-----	2.1	-----	-----	-----	1	-----	2.2	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	1.0	-----	-----	-----	-----	-----	1.2	-----	-----	-----	-----	-----	1.1	-----	-----	-----	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, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the 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-4						MY-5					
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	----	0.7	-----	-----	-----	-----	----	0.6	-----	-----	-----	-----	-----	0.6	-----	-----	-----	1	-----	0.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	----	14.8	-----	-----	-----	-----	----	16.6	-----	-----	-----	-----	-----	16.8	-----	-----	-----	1	-----	21.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	----	7.4	-----	-----	-----	-----	----	5.8	-----	-----	-----	-----	-----	5.6	-----	-----	-----	1	-----	4.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	----	1.0	-----	-----	-----	-----	----	0.9	-----	-----	-----	-----	-----	0.9	-----	-----	-----	1	-----	0.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft	----	38.2	-----	-----	-----	-----	----	37.0	-----	-----	-----	-----	-----	36.3	-----	-----	-----	1	-----	35.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	----	3.7	-----	-----	-----	-----	----	3.7	-----	-----	-----	-----	-----	3.7	-----	-----	-----	1	-----	3.6	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	----	1.0	-----	-----	-----	-----	----	0.9	-----	-----	-----	-----	-----	1.0	-----	-----	-----	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, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the 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-4						MY-5					
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the 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-4						MY-5					
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the 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-4						MY-5					
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	0.5	-----	-----	-----	-----	-----	0.5	-----	-----	-----	-----	-----	0.5	-----	-----	-----	1	-----	0.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	12.7	-----	-----	-----	-----	-----	12.6	-----	-----	-----	-----	-----	13.5	-----	-----	-----	1	-----	14.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	-----	3.6	-----	-----	-----	-----	-----	3.6	-----	-----	-----	-----	-----	2.8	-----	-----	-----	1	-----	2.3	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	0.9	-----	-----	-----	-----	-----	1.0	-----	-----	-----	-----	-----	0.8	-----	-----	-----	1	-----	0.7	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	-----	21.9	-----	-----	-----	-----	-----	22.3	-----	-----	-----	-----	-----	20.6	-----	-----	-----	1	-----	20.2	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	3.2	-----	-----	-----	-----	-----	3.1	-----	-----	-----	-----	-----	3.2	-----	-----	-----	1	-----	3.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	1.0	-----	-----	-----	-----	-----	1.2	-----	-----	-----	-----	-----	0.9	-----	-----	-----	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, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the 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-4						MY-5					
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	0.9	-----	-----	-----	-----	-----	0.6	-----	-----	-----	-----	-----	0.5	-----	-----	-----	1	-----	0.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	8.4	-----	-----	-----	-----	-----	10.8	-----	-----	-----	-----	-----	13.5	-----	-----	-----	1	-----	11.6	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	-----	6.8	-----	-----	-----	-----	-----	4.4	-----	-----	-----	-----	-----	3.8	-----	-----	-----	1	-----	3.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	1.2	-----	-----	-----	-----	-----	1.2	-----	-----	-----	-----	-----	1.0	-----	-----	-----	1	-----	1.1	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	-----	49.9	-----	-----	-----	-----	-----	49.9	-----	-----	-----	-----	-----	49.9	-----	-----	-----	1	-----	49.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	6.6	-----	-----	-----	-----	-----	6.6	-----	-----	-----	-----	-----	6.6	-----	-----	-----	1	-----	7.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	1.0	-----	-----	-----	-----	-----	1.0	-----	-----	-----	-----	-----	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, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the 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-4						MY-5					
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	0.3	-----	-----	-----	-----	-----	0.3	-----	-----	-----	-----	-----	0.2	-----	-----	-----	1	-----	0.2	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	18.7	-----	-----	-----	-----	-----	16.1	-----	-----	-----	-----	-----	19.5	-----	-----	-----	1	-----	15.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	-----	2.1	-----	-----	-----	-----	-----	1.1	-----	-----	-----	-----	-----	0.8	-----	-----	-----	1	-----	0.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	0.6	-----	-----	-----	-----	-----	0.5	-----	-----	-----	-----	-----	0.4	-----	-----	-----	1	-----	0.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	-----	19.4	-----	-----	-----	-----	-----	17.6	-----	-----	-----	-----	-----	16.0	-----	-----	-----	1	-----	16.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	3.1	-----	-----	-----	-----	-----	3.2	-----	-----	-----	-----	-----	3.2	-----	-----	-----	1	-----	4.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	0.8	-----	-----	-----	-----	-----	0.6	-----	-----	-----	-----	-----	0.7	-----	-----	-----	1	-----	0.7	-----	-----	-----	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, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the 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)

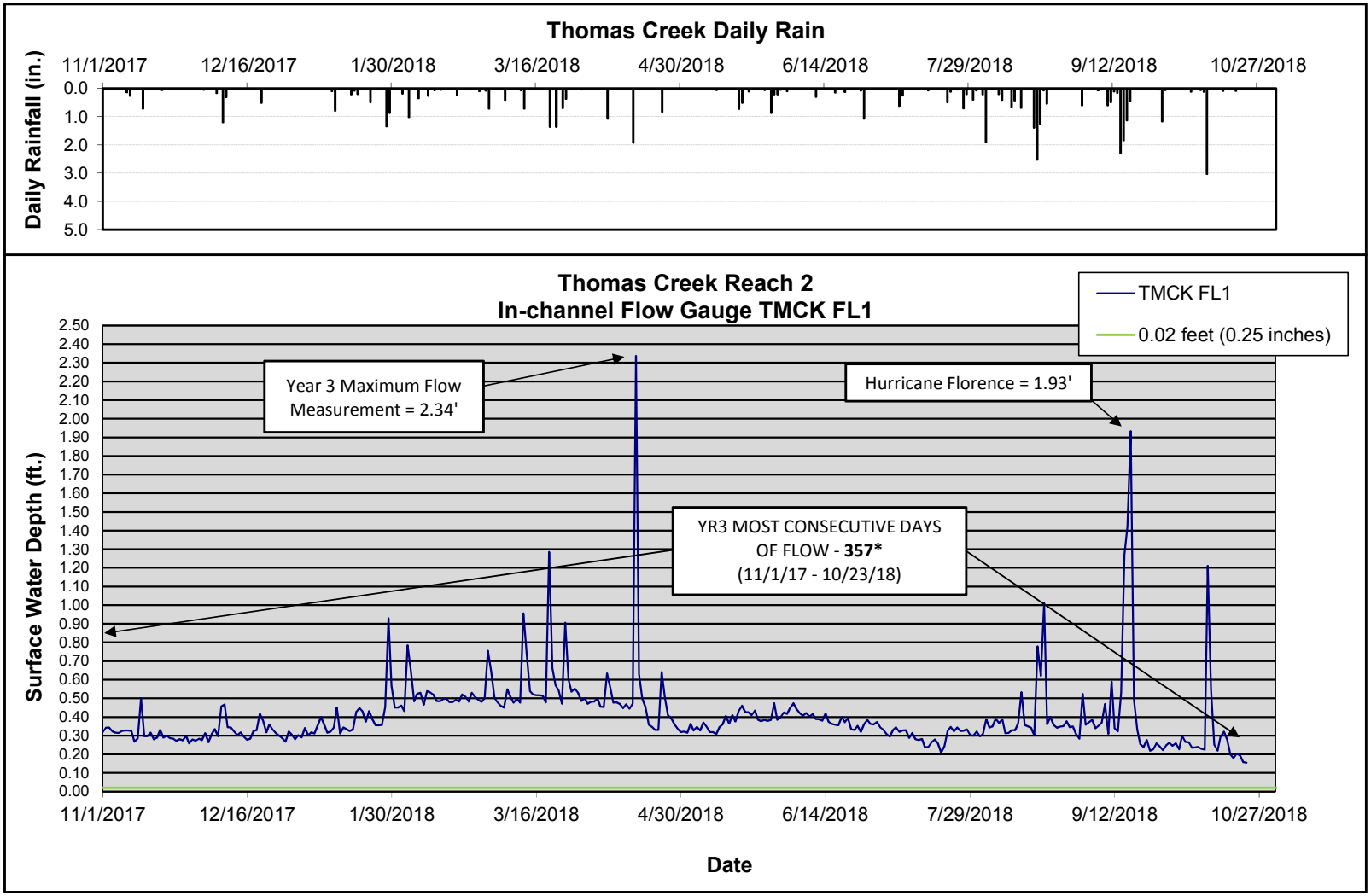
Parameter	Baseline						MY-1						MY-2						MY-3						MY-4						MY-5					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	8.5	-----	-----	-----	-----	-----	6.8	-----	-----	-----	-----	-----	6.9	-----	-----	-----	1	-----	6.7	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	0.6	-----	-----	-----	-----	-----	0.5	-----	-----	-----	-----	-----	0.4	-----	-----	-----	1	-----	0.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	13.6	-----	-----	-----	-----	-----	13.8	-----	-----	-----	-----	-----	16.0	-----	-----	-----	1	-----	15.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	5.3	-----	-----	-----	-----	-----	3.4	-----	-----	-----	-----	-----	3.0	-----	-----	-----	1	-----	3.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	0.9	-----	-----	-----	-----	-----	0.8	-----	-----	-----	-----	-----	0.7	-----	-----	-----	1	-----	0.6	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	-----	30.6	-----	-----	-----	-----	-----	28.2	-----	-----	-----	-----	-----	27.1	-----	-----	-----	1	-----	26.7	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	3.6	-----	-----	-----	-----	-----	3.7	-----	-----	-----	-----	-----	3.7	-----	-----	-----	1	-----	4.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	1.0	-----	-----	-----	-----	-----	1.2	-----	-----	-----	-----	-----	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, bank height ratio for MY3 has been calculated using the as-built bankfull area. All other values were calculated using the as-built bankfull elevation, as was done for previous monitoring reports.

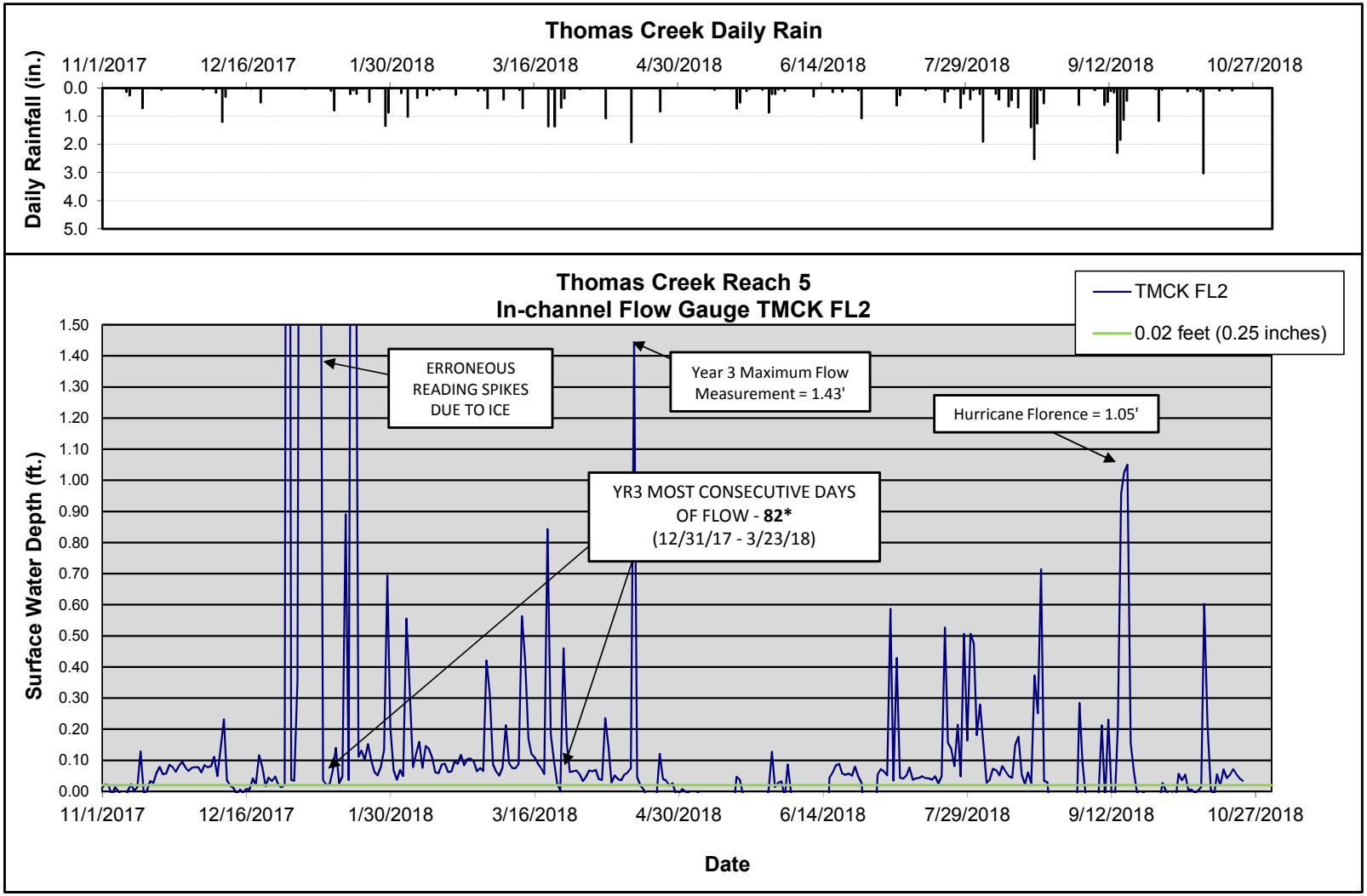
Appendix E

Hydrologic Data

Figure 8. Flow Gauge Graphs

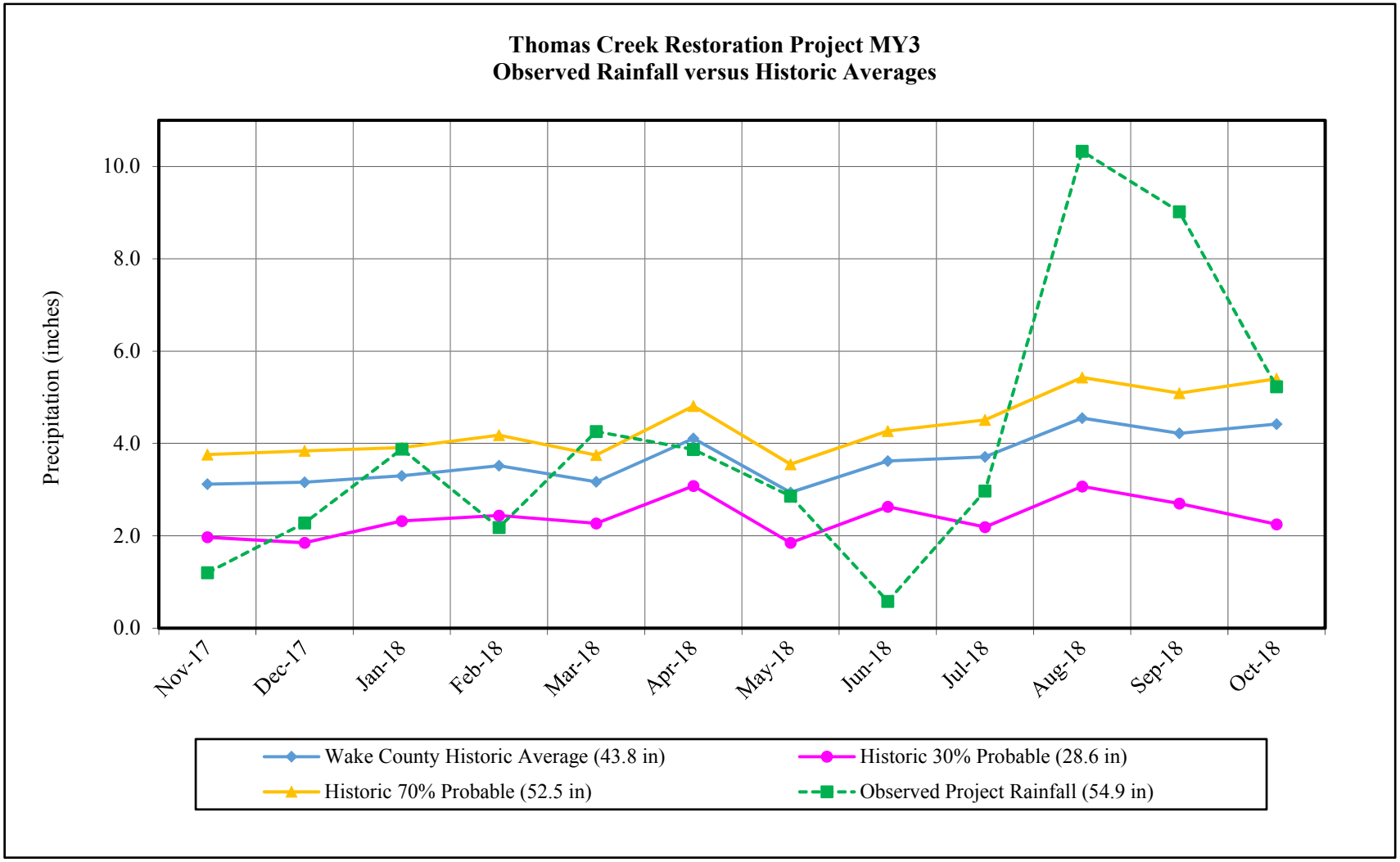


* Surface water flow is estimated to have occurred when the pressure transducer reading is equal to or above 0.02 feet (0.25 inches) in depth.



* 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 54.9" over the previous 12 months (from 11/1/2017 to 10/31/2018). Project rainfall data was collected from the nearest NC-CRONOS station KTTA.

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
Year 2 Monitoring (2017)			
5/2/2017	0.21	4/25/2017 (3.2" rain event)	Crest Gauge
Year 3 Monitoring (2018)			
4/23/2018	0.97	4/15/2018 (1.8" rain event)	Crest Gauge
10/10/2018	1.49	9/15-17/2018 (6.1" from Hurricane Florence)	Crest 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					229	248	357				
Reach 5 Flow Gauge #2 (Installed March 30, 2016)														
TCFL2	126	138	82					182	218	204				

Notes:

[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.