MITIGATION PLAN

Revision #2

UT West Branch Rocky River Restoration Site
Mecklenburg County, North Carolina
DMS Project Number 92684
DEQ Contract Number D16015i
USACE Action ID: SAW-2017-00342

DESIGN-BID-BUILD PROJECT

Yadkin River Basin
Cataloging Unit 03040105

Prepared for:

NC Department of Environmental Quality
Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652
November 28, 2018

Prepared by:

KCI Associates of North Carolina, PC
4505 Falls of Neuse Rd, Suite 400
Raleigh, NC 27609
(919) 783-9214

KCI Project Staff: Kristin Knight-Meng, Josh Sitz, Joe Sullivan, and Adam Spiller

This mitigation plan has been written in conformance with the requirements of the following:

- *Federal rule for compensatory mitigation project sites as described in the Federal Register Title 33 Navigation and Navigable Waters Volume 3 Chapter 2 Section § 332.8 paragraphs (c)(2) through (c)(14).*
- *NCDEQ Division of Mitigation Services In-Lieu Fee Instrument signed and dated July 28, 2010*

These documents govern NCDMS operations and procedures for the delivery of compensatory mitigation.

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

REPLY TO
ATTENTION OF:

February 11, 2019

Regulatory Division

Re: NCIRT Review and USACE Approval of the UT to West Branch Rocky River Mitigation Plan; SAW-2017-00342; NCDMS Project # 92684

Mr. Tim Baumgartner
North Carolina Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

Dear Mr. Baumgartner:

The purpose of this letter is to provide the North Carolina Division of Mitigation Services (NCDMS) with all comments generated by the North Carolina Interagency Review Team (NCIRT) during the 30-day comment period for the UT to West Branch Rocky River Mitigation Plan, which closed on January 5, 2019. Due to the lapse in federal funding the dispute resolution period was extended an additional 15 days. These comments are attached for your review.

Based on our review of these comments, we have determined that no major concerns have been identified with the Draft Mitigation Plan, which is considered approved with this correspondence. However, several minor issues were identified, as described in the attached comment memo, which must be addressed in the Final Mitigation Plan.

The Final Mitigation Plan is to be submitted with the Preconstruction Notification (PCN) Application for Nationwide permit approval of the project along with a copy of this letter. Issues identified above must be addressed in the Final Mitigation Plan. All changes made to the Final Mitigation Plan should be summarized in an errata sheet included at the beginning of the document. If it is determined that the project does not require a Department of the Army permit, you must still provide a copy of the Final Mitigation Plan, along with a copy of this letter, to the appropriate USACE field office at least 30 days in advance of beginning construction of the project. Please note that this approval does not preclude the inclusion of permit conditions in the permit authorization for the project, particularly if issues mentioned above are not satisfactorily addressed. Additionally, this letter provides initial approval for the Mitigation Plan, but this does not guarantee that the project will generate the requested amount of mitigation credit. As you are aware, unforeseen issues may arise during construction or monitoring of the project that may require maintenance or reconstruction that may lead to reduced credit.

Thank you for your prompt attention to this matter, and if you have any questions regarding this letter, the mitigation plan review process, or the requirements of the Mitigation Rule, please call me at 919-554-4884, ext 60.

Sincerely,

Kim Browning
Mitigation Specialist
for Henry Wicker

Enclosures

Electronic Copies Furnished:

NCIRT Distribution List
Paul Wiesner – NCDMS
Harry Tsomides—NCDMS
Adam Spiller—KCI

KCI ASSOCIATES OF NC

ISO 9001:2008 CERTIFIED

ENGINEERS • PLANNERS • SCIENTISTS • CONSTRUCTION MANAGERS

4505 Falls of Neuse Rd., Suite 400 • Raleigh, NC 27609 • Phone 919-783-9214 • Fax 919-783-9266

November 28, 2018

Todd Tugwell, Mitigation Project Manager
Wilmington District, US Army Corps of Engineers
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587

NCDMS Project Name: UT to West Branch Mitigation Site, Mecklenburg County, NC
USACE AID#: SAW-2017-00342
NCDMS #: 92684

Dear Mr. Tugwell,

Following the comments received by NCDMS on May 15, 2018, we have prepared the following responses to the mitigation plan review for the UT to West Branch Rocky River Mitigation Site to accompany the revised mitigation plan. In addition to the IRT's recommended changes, we also modified the design of UTWB-1 from the previously proposed anabranched/headwater reach to a single-thread stream. This change was necessary when permission for a conservation easement extension could not be obtained for the beginning of UT to West Branch Rocky River. As a result, a Priority 2 transition is now needed at the top of project. We are calling this version of the mitigation plan "Revision 2" to distinguish from past iterations of the plan. This design change also makes some of the previous IRT comments inapplicable as noted below.

Mac Haupt, NCDWR

1. Design for UTWB-1: in various places throughout the document this area is mentioned as an anabranch system and others as a headwater. DWR believes that these are two distinct design paths. The design section proposes an anabranch system with flow interceptors inserted in a few places across the valley. In addition, the flow requirement proposed is 30 days of continuous flow.
    a. Anabranch systems are typically found in flood dominated systems/alluvial
    b. Often anabranch systems are found in high bedload systems
    c. DWR is open to the design of an anabranch system, however, DWR believes
        i. since this system shows more distinct channel characteristics, a higher continuous flow will be required. DWR recommends 60 days of continuous days for this system.
    d. DWR agrees with taking the valley centerline for credit determination for this reach, whether anabranch or headwater.
    e. If the design reverts back to the headwater type then the flow requirement would be 30 days.

No longer applicable – a single-thread channel is now being proposed for UTWB-1.

f. The design section also states that this reach's channel will be lifted 4-6 feet, please realize that this represents significant risks to losing flow.

No longer applicable – a single-thread channel is now being proposed for UTWB-1.

g. If an anabranch system is constructed, please insert a permanent cross section for this reach (previous DMS comment).

No longer applicable – a single-thread channel is now being proposed for UTWB-1. Two traditional monitoring cross-sections are now proposed for UTWB-1.

a. The design section for this reach also proposes that if the stream system does not have the required flow, then the proposal is to get wetland credit with a 7% hydroperiod during the growing season. The draft plan had a limited soils investigation for this area of the reach. DWR would like to see more soil cores related to the on-site soils in the floodplain of UTWB-1 before final determination of the wetland hydroperiod for credit.

The hydroperiod is not anticipated to be relevant to the Revision #2 design, but prior to the design change, KCI had conducted two more detailed soil descriptions in the area and will include this information in the revised mitigation plan. The investigation confirmed that Monacan variant exists in the proposed area of UTWB-1. Monacan variant is a hydric soil, which met the definition with F12, iron-manganese masses. The water table was found at 23-26" below the existing ground surface at the time of the survey (6/8/18). The Monacan series is described as a silt loam formed in recent alluvium, moderately well or somewhat poorly drained.

2. DWR likes the fact that macrobenthic monitoring will be performed on the project.

3. The cross sections shown in Figure 9 don't appear to show much of a channel. It appears that a floodplain is being graded across the valley.

The proposed single-thread channel is relatively small in scale when compared to the proposed floodplain and the existing incised channel. However, it is sized adequately for its drainage area and location (W/D ratio averages around 16 for the proposed single-thread reaches and the cross-sectional areas are 4.3 and 9.0 square feet for UTWB-1/UTWB-2 and UTWB-3, respectively).

4. DWR also has concerns with the bench widths on reach UTWB-3 (as previously by DMS in comment #34 in their letter). DWR would prefer to see benching that is at least 2X bankfull width, with at least half of that on the outside meander bend where most of flow energy will be directed.

For UTWB-3, we included an additional diagram (Figure 10) that shows the extent of the floodplain grading. For all of UTWB-3, the entrenchment ratio is at least 2.2, and for the majority of UTWB-3 (excluding begin/end reach transitions), the floodprone width is approximately 50-90 feet wide. With the bankfull design width of 12 feet, this equates to an entrenchment ratio of 4-7.5. There are locations where the width of the floodplain on the outer bend is limited, but

when flows reach the bankfull elevation or higher, water is distributed across the entire floodplain and shear stress is not concentrated along that outer bank. We believe the proposed floodplain grading extents shown offer a balanced approach to grading a stable stream valley for this reach

5. DWR has concerns that the buffer method that was presented is not the latest method provided by the IRT.

   No longer applicable. Based on discussions between USACE and DMS representatives, extra stream buffer widths will not be used to produce additional stream credit, but rather considered in exchange for easement language that states that "trails shall not be permitted within 50 feet from the top of the restored stream bank" with the exception of the proposed crossings and in "short sections of trail....where no alternative alignment is practicable."

Andrea Hughes, USACE

1. For Reach 1 of UTWB, the plan proposes to restore an anabranching stream system. However, several sections of the plan, including the performance standards, refer to this area as headwater stream restoration per the guidance. By definition, anabranch refers to a section of a stream that diverts from the main channel and rejoins the main channel downstream. If the proposal is for an anabranch system then performance standards must include planform measurements in addition to flow. If the proposal is a headwater stream restoration then it must follow the headwater guidance. In addition, the plan should provide documentation that the site historically supported the proposed system regardless whether it is an anabranching system or headwater system.

   No longer applicable – a single-thread channel is now being proposed for UTWB-1.

2. Please provide the location and additional details regarding the reference site used for design.

   We used primarily on-site references for the project design with determinations from on-site cross-section measurements for the bankfull area and discharge. In addition to these on-site values, reference values for typical Piedmont streams from Harman and Star (2011) were used for a C5-type channels.

3. The design plans do not include information for UTWB Reach 1 other than a general depiction of a cross-section and a statement that actual dimensions for the cross sections as well as the profile will be determined in the field. We cannot approve a mitigation plan or issue a permit based on this information. The draft mitigation plan should provide a clear explanation of the work proposed for this area as well as a 30-60% design.

   A single-thread channel is now proposed for UTWB-1 along with the requisite morphological criteria and planview detailing pattern, dimension, and profile for this reach.

4. The plan also indicates that if UTWB Reach 1 does not meet performance criteria to generate stream credits, then the area will generate wetland credits as long as the hydro-period is at least 7%. We concur with DWR's comment above. Additional information on the soils will be required before we can make a final determination of appropriate hydro-period.

The hydroperiod is not anticipated to be relevant to the Revision #2 design, but prior to the design change, KCI had conducted two more detailed soil descriptions in the area and will include this information in the revised mitigation plan. The investigation confirmed that Monacan variant exists in the proposed area of UTWB-1. Monacan variant is a hydric soil, which met the definition with F12, iron-manganese masses. The water table was found at 23-26" below the existing ground surface at the time of the survey (6/8/18). The Monacan series is described as a silt loam formed in recent alluvium, moderately well or somewhat poorly drained.

5. We do not recommend inclusion of *Acer rubrum* in planting plans as this species may currently be present onsite. Also, the planting plan indicates only 5 species (including *Acer rubrum*). We recommend including additional woody species to ensure diversity.

   We have taken out red maple and revised the planting list, to include the following with a minimum of 6 species to be used:

Common Name	**Scientific Name**	**Wetland Status (Eastern Mts & Piedmont)**
Alder	*Alnus serrulata*	FACW
River Birch	*Betula nigra*	FACW
American Hornbeam	*Carpinus caroliniana*	FAC
Flowering Dogwood	*Cornus florida*	FACU
Green Ash	*Fraxinus pennsylvanica*	FACW
American Witch Hazel	*Hamamelis virginiana*	FACU
Tulip Poplar	*Liriodendron tulipifera*	FACU
American Sycamore	*Platanus occidentalis*	FACW
White Oak	*Quercus alba*	FACU
Swamp Chestnut Oak	*Quercus michauxii*	FACW
Willow Oak	*Quercus phellos*	FAC
American Elm	*Ulmus americana*	FACW

6. The stream geomorphology performance standards should include a bank height ratio (BHR) of < 1.2 and an entrenchment ratio (ER) of > 2.2. BHR and ER at any measured riffle cross-section should not change by more than 10% from the baseline condition during any given monitoring interval (e.g., no more than 10% between years 1 and 2, 2 and 3, 3 and 5, or 5 and 7).

   This has been added to the mitigation plan.

7. Regarding monitoring for UTWB Reaches 2 and 3, cross-sections should be installed at an approximate frequency of one per 20 bankfull-widths, measured along the centerline of the channel. The guidance regarding two cross-sections per 1000 linear feet is only applicable to small streams with narrow widths.

   We have added two more sets of cross-sections, one set on UTWB-2 and another set on UTWB-3, respectively. With the addition of two cross-sections (riffle and pool) on the new single-thread reach of UTWB-1, this brings the total of the monitoring cross-sections to 14 for the site.

8. According to the document, UT 1 has a watershed of 4 acres and UT 2 has a watershed of 75 acres. Treatments for both tributaries involve Priority I restoration. We recommend placement of a stream gauge to document a minimum of 30 days of continuous flow per the 2016 guidance.

   We have added a monitoring device on both of these features (either a stream gauge or camera).

9. The document does not include enough information to determine additional buffer credits and it does not appear that the most recent guidance for additional buffer widths is being utilized. The buffer tool is available on the RIBITS website at https://ribits.usace.army.mil/ribits_apex/f?p=107:2 Select Wilmington District under the drop down menu on the left, then select Bank and ILF Establishment, and select Buffer Calculation Spreadsheet January 2018 under Wilmington District Bank and ILF Guidance.

   The buffer tool is no longer being used for this site.

10. Please be aware that additional buffer credits may not be generated for areas receiving credit based on valley length.

    The buffer tool is no longer being used for this site.

11. The mitigation plan must name the party that will serve as long term manager. If the long term manager will be the NCDEQ Stewardship program, please remove the reference to “or 3rd party if approved”.

    This has been changed to NCDEQ Stewardship Program.

12. Appendix 12.4: The conservation easement indicates the construction of trails, walkways, and greenways shall be permitted within the easement area. We cannot approve a mitigation plan where there is potential for future encroachment into credit generating areas.

    As mentioned in the buffer discussion, USACE and DMS representatives reached an agreement that extra stream buffer widths will not be used to produce additional stream credit, but rather be taken in exchange for easement language that states that "trails shall not be permitted within 50 feet from the top of the restored stream bank" with the exception of the proposed crossings and in "short sections of trail....where no alternative alignment is practicable."

13. You must provide a legible map depicting all existing and proposed trails, greenways, and walkways within the credit generating boundaries for the site. Based on Figure 7, it appears that several trails will impact the stream buffer area but this is not depicted on the UTWB Stream Buffer Maps.

    We have included an Existing Trail Map in the Section 12.2 in the appendix that shows all the trails that will exist once the mitigation project is complete.

14. Appendix 12.5: Under Subsequent Credit Releases, please change the bank-full criteria to four bank-full events in separate years. Based on this requirement, the 10% release cannot occur prior to the fourth year monitoring. Please revise the credit release chart.

    This has been changed.

15. All temporary and permanent impacts to existing aquatic resources must be accounted for in the PCN and the loss or conversion of those waters must be replaced on-site. Please include a map depicting the location of all impacts with the PCN and make sure that the resource labels match the labels used for the jurisdictional determination

    We will make sure to include this in the PCN.

Todd Bowers, EPA
The EPA Region 4 Ocean, Wetlands and Stream Protection Branch offers the following site-specific comments as they pertain to the UT West Branch Rocky River Final Mitigation Plan dated March 12, 2018:

1. Cover Page: The USACE Action ID SAW-2017-00342 should be included.

    This has been updated.

2. Section 1.0/Page 1: State the Project Purpose (Project is being developed to provide compensatory mitigation credits for the NCDMS ILF Program to offset impacts to waters of the United States within the US Army Corps of Engineers Wilmington District)

    This has been updated with a statement of purpose.

3. Section 3.1.3/Page 14: Provide some explanation as to why the entire northern reach of UTWB Reach 1 was not included in the mitigation plan.

    No longer applicable – a single-thread channel is now being proposed for UTWB-1.

4. Section 3.1.3/Page 15: The EPA is very pleased that KCI has made the effort to characterize the benthic macroinvertebrate communities (poor) within the project. This adds evidence that the stream's water quality functions are impaired to the point that only pollution tolerant fauna was present (Not Functioning). We fully support the desire for KCI to include additional benthic sampling to provide some evidence that water quality and habitat functions have made improvements (to Functioning or Functioning-at-Risk). I recommend that KCI add this analysis to the functional uplift potential section of the mitigation plan.

    We do anticipate biological uplift to the site in the long-term of the project, but we are not including this as a primary goal for the project, as macroinvertebrates may not colonize the site fully by the end of project monitoring. DMS may conduct limited monitoring to include the results for informational purposes only, not as a performance standard.

5. Section 3.1.4/Pages 18 and 19: Excellent site photos demonstrating the stressors and impaired condition of the streams.

6. Section 4/Page 20: Functional Uplift Potential.
    a. Overall, I would like to see considerable improvement of this section as it is. I encourage the provider to expand on their analysis to really demonstrate the potential for functional uplift with this project. The impairments and stressors of each stream's categorical functions are described and addressed but not rated. Those same functions need to be broken down into components that can be rated as either Not Functioning, Functioning-at-Risk, or Functioning (NF, FAR, F) especially those that are tied to performance standards. Each reach should be broken down and analyzed for functional uplift.
    b. Hydrology: The analysis of the watershed including the lack of available data, current and projected stressors and limited ability to provide functional uplift with this project is reasonable and sound. In this regard a conclusion that ties in the functional status, in this case NF or FAR, should be stated as well as the anticipated outcome of NF or FAR assuming no functional uplift.
    c. Hydraulics: Each reach should be broken down and given a current functional status (assuming NF or FAR). For example, one component (BHR) of the hydraulics category is likely to be rated as F for the overall outcome but its current rating on a per reach basis is unknown (assumed to be NF based on very poor BHR and ER).
    d. Channel Geomorphology: A breakdown of stressors and impairments of each reach on the site is needed to determine if functions range from moderate (FAR?) to poor (NF?) across the site and while various measures to improve channel geomorphology are presented, a functional endpoint (F) is not given and some lift is assumed. LWD is an example of a component that can be measured prior to work, rated as compared to an index or reference reach (NF or FAR), and improved to emulate the desired index rating or reference conditions (F). Performance standards may or not be applicable (such as is the case with buffer width) but the point is to show current condition, the departure from reference or ideal conditions (potential lift), and how well the project will improve that function (anticipated or actual lift).
    e. Physiochemical: Recommend the provider maintain the findings of macroinvertebrate sampling to confirm the streams are NF or FAR. While uplift may or may not occur, some baseline data will be of use to determine if any water quality improvements, and therefore functional lift, has occurred. In-situ water quality data would also be useful to determine functional lift in this category.
    f. Biology: No data or analysis presented. Assuming no functional lift in this category unless provided with more information.

    Regarding the Functional Uplift comments above, while DMS supports the use of an organizational framework to qualitatively estimate functional uplift at the project level, they do not specifically require the use of the functional pyramid. KCI decided to use the framework from the parameters described in Harman and Starr 2012 for restoration projects. According to DMS, the use of the Stream Quantification tool (that incorporates measurement of parameters within the functional pyramid) in its present form is being tested for potential use, but testing is not complete. Qualitative estimates of function (NF, FAR, F) by reach does not follow the DMS guidelines of describing project uplift or of establishing measureable goals linked to performance criteria.

7. Section 6.0/Page 22: If there is a reference site or condition for the design of the anabranched portion of UTWB-1 please include it in this section.

   We used primarily on-site references for the project design with determinations from on-site cross-section measurements for the bankfull area and discharge. In addition to these on-site values, reference values for typical Piedmont streams from Harman and Star (2011) were used for a C5-type channels.

8. Section 6.7/Page 31 Planting: Recommend removing *Acer rubrum* (red maple) from the planting plan (Page 31 and Sheet 11) and replacing it with a suitable oak species.

   Acer rubrum has been eliminated from the planting plan and several additional oaks among other species have been added.

   a. Please include a desired plant community for the planted riparian planting zone such as Piedmont Bottomland Hardwood Forest and provide a citation for this community type such as Shafale and Weakley Classification of Natural Communities of North Carolina (1990).

      In general, we prefer not to designate a specified community type since a site can generally not be converted to that community within the timeframe of monitoring. We do select trees that are in line with the surrounding community types, though.

9. Section 6.8/Page 31 Project Assets: I agree with the approach to determining buffer width for the anabranched portion of UTWB and generally agree with the buffer credit calculations across the site.

   The buffer tool is no longer being used for this site.

10. Section 7.0/Page 35: I am in support with groundwater monitoring of the anabranched section of UTWB-1 as a contingency for wetland conditions developing in lieu of a branched stream. Recommend showing locations for monitoring stream hydrologic performance or groundwater in Figure 12 (Page 39).

    No longer applicable.

11. Table 16/Page 38: Recommend adding beaver/nuisance fauna monitoring and a contingency plan/statement for dealing with beaver presence and/or damage caused.

    We have added a Beaver and Other Nuisance Fauna component to the Planned Maintenance table in Section 12.7.

12. Figure 12/Page 39: Recommend moving the permanent vegetation monitoring plot at the project southern end into the adjacent agricultural field to be planted and outside of the 50-foot riparian zone. This will capture a former field and provide some monitoring for vegetation being used for additional buffer credit.

    This plot has been moved as requested in the revised mitigation plan.

13. Section 11/Page 42: Add Shafale and Weakely's Classification of Natural Communities of North Carolina, Third Approximation, 1990 to the list of references cited.

    See response above regarding community types.

Sincerely,

Kristin Knight-Meng, P.E.
Project Manager

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

REPLY TO
ATTENTION OF:

CESAW-RG/Hughes May 15, 2018

MEMORANDUM FOR RECORD

SUBJECT: UT to West Branch Mitigation Site - NCIRT Comments during 30-day Mitigation Plan Review

PURPOSE: The comments listed below were posted to the NCDMS Mitigation Plan Review Share Point site during the 30-day comment period in accordance with Section 332.8(g) of the 2008 Mitigation Rule.

NCDMS Project Name: UT to West Branch Mitigation Site, Mecklenburg County, NC

USACE AID#: SAW-2017-00342

NCDMS #: 92684

30-Day Comment Deadline: April 19, 2018

Todd Bowers, USEPA, April 19, 2018:
SEE ATTACHED COMMENTS

Mac Haupt, NCDWR, April 19, 2018

1. Design for UTWB-1: in various places throughout the document this area is mentioned as an anabranch system and others as a headwater. DWR believes that these are two distinct design paths. The design section proposes an anabranch system with flow interceptors inserted in a few places across the valley. In addition, the flow requirement proposed is 30 days of continuous flow.

    a. Anabranch systems are typically found in flood dominated systems/alluvial
    b. Often anabranch systems are found in high bedload systems
    c. DWR is open to the design of an anabranch system, however, DWR believes since this system shows more distinct channel characteristics, a higher continuous flow will be required. DWR recommends 60 days of continuous days for this system.
    d. DWR agrees with taking the valley centerline for credit determination for this reach, whether anabranch or headwater.
    e. If the design reverts back to the headwater type then the flow requirement would be 30 days.
    f. The design section also states that this reach's channel will be lifted 4-6 feet, please realize that this represents significant risks to losing flow.

g. If an anabranch system is constructed, please insert a permanent cross section for this reach (previous DMS comment).
h. The design section for this reach also proposes that if the stream system does not have the required flow, then the proposal is to get wetland credit with a 7% hydroperiod during the growing season. The draft plan had a limited soils investigation for this area of the reach. DWR would like to see more soil cores related to the on-site soils in the floodplain of UTWB-1 before final determination of the wetland hydroperiod for credit.

2. DWR likes the fact that macrobenthic monitoring will be performed on the project.

3. The cross sections shown in Figure 9 don't appear to show much of a channel. It appears that a floodplain is being graded across the valley.

4. DWR also has concerns with the bench widths on reach UTWB-3 (as previously by DMS in comment #34 in their letter). DWR would prefer to see benching that is at least 2X bankfull width, with at least half of that on the outside meander bend where most of flow energy will be directed.

5. DWR has concerns that the buffer method that was presented is not the latest method provided by the IRT.

Andrea Hughes, USACE, May 9, 2018

1. For Reach 1 of UTWB, the plan proposes to restore an anabranching stream system. However, several sections of the plan, including the performance standards, refer to this area as headwater stream restoration per the guidance. By definition, anabranch refers to a section of a stream that diverts from the main channel and rejoins the main channel downstream. If the proposal is for an anabranch system then performance standards must include planform measurements in addition to flow. If the proposal is a headwater stream restoration then it must follow the headwater guidance. In addition, the plan should provide documentation that the site historically supported the proposed system regardless whether it is an anabranching system or headwater system.

2. Please provide the location and additional details regarding the reference site used for design.

3. The design plans do not include information for UTWB Reach 1 other than a general depiction of a cross-section and a statement that actual dimensions for the cross sections as well as the profile will be determined in the field. We cannot approve a mitigation plan or issue a permit based on this information. The draft mitigation plan should provide a clear explanation of the work proposed for this area as well as a 30-60% design.

4. The plan also indicates that if UTWB Reach 1 does not meet performance criteria to generate stream credits, then the area will generate wetland credits as long as the hydro-period is at least 7%. We concur with DWR's comment above. Additional information on the soils will be required before we can make a final determination of appropriate hydro-period.

5. We do not recommend inclusion of *Acer rubrum* in planting plans as this species may currently be present onsite. Also, the planting plan indicates only 5 species (including *Acer rubrum*). We recommend including additional woody species to ensure diversity.

6. The stream geomorphology performance standards should include a bank height ratio (BHR) of $\leq$ 1.2 and an entrenchment ratio (ER) of > 2.2. BHR and ER at any measured riffle cross-section should not change by more than 10% from the baseline condition during any given monitoring interval (e.g., no more than 10% between years 1 and 2, 2 and 3, 3 and 5, or 5 and 7).

7. Regarding monitoring for UTWB Reaches 2 and 3, cross-sections should be installed at an approximate frequency of one per 20 bankfull-widths, measured along the centerline of the channel. The guidance regarding two cross-sections per 1000 linear feet is only applicable to small streams with narrow widths.

8. According to the document, UT 1 has a watershed of 4 acres and UT 2 has a watershed of 75 acres. Treatments for both tributaries involve Priority I restoration. We recommend placement of a stream gauge to document a minimum of 30 days of continuous flow per the 2016 guidance.

9. The document does not include enough information to determine additional buffer credits and it does not appear that the most recent guidance for additional buffer widths is being utilized. The buffer tool is available on the RIBITS website at https://ribits.usace.army.mil/ribits_apex/f?p=107:2
Select Wilmington District under the drop down menu on the left, then select Bank and ILF Establishment, and select Buffer Calculation Spreadsheet January 2018 under Wilmington District Bank and ILF Guidance.

10. Please be aware that additional buffer credits may not be generated for areas receiving credit based on valley length.

11. The mitigation plan must name the party that will serve as long term manager. If the long term manager will be the NCDEQ Stewardship program, please remove the reference to "or 3rd party if approved".

12. Appendix 12.4: The conservation easement indicates the construction of trails, walkways, and greenways shall be permitted within the easement area. We cannot approve a mitigation plan where there is potential for future encroachment into credit generating areas.

13. You must provide a legible map depicting all existing and proposed trails, greenways, and walkways within the credit generating boundaries for the site. Based on Figure 7, it appears that several trails will impact the stream buffer area but this is not depicted on the UTWB Stream Buffer Maps.

14. Appendix 12.5: Under Subsequent Credit Releases, please change the bank-full criteria to four bank-full events in separate years. Based on this requirement, the 10% release cannot occur prior to the fourth year monitoring. Please revise the credit release chart.

15. All temporary and permanent impacts to existing aquatic resources must be accounted for in the PCN and the loss or conversion of those waters must be replaced on-site. Please include a map depicting the location of all impacts with the PCN and make sure that the resource labels match the labels used for the jurisdictional determination.

HUGHES.ANDREA.WADE.1258339165

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DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=HUGHES.ANDREA.WADE.1258339165
Date: 2018.05.15 12:08:50 -04'00'

Andrea Hughes
Mitigation Project Manager
Regulatory Division

Memorandum to the Record
April 19, 2018

Agency Comments for the UT West Branch Rocky River Mitigation Site (SAW-2017-00342) Final Mitigation Plan Associated with the NCDMS In-Lieu Fee Program in Mecklenburg County, NC

Andrea,

Thank you for the opportunity to provide feedback and comments on the UT West Branch Rocky River (UTWB) Stream Mitigation Site (the Site or Project) Final Mitigation Plan as an addition to the North Carolina Division of Mitigation Resources In-Lieu Fee Program (NCDMS ILF). KCI Associates of North Carolina (KCI) has presented a potentially suitable plan to provide compensatory mitigation for stream impacts associated with the US Army Corps of Engineers Clean Water Act Section 404 permit program. The site, as presented, is expected to provide approximately 4,026 Stream Mitigation Units (SMU) through enhancement and restoration of UT to West Branch Rocky River and two unnamed tributaries Yadkin River watershed HUC 03040105. The UTWB site will also provide an opportunity for the restoration and enhancement of Piedmont Bottomland forest within the riparian floodplains of the project streams and adjacent agricultural areas within the conservation easements. No nutrient offsets are presented specifically for additional compensatory mitigation credit, however riparian buffers that exceed the 50-ft minimum threshold are being considered for additional credits as SMUs.

Note: It is understood that site visits have been made by IRT members during the development of site feasibility to provide mitigation credit. In that regard, I feel it necessary to denote that I have not been on-site during this process and that my comments may reflect a lack of on-site observation and evaluation. Site visit notes made with the IRT on June 14, 2017 have been reviewed, especially the portions that involve the anabranched system and groundwater monitoring.

The EPA Region 4 Ocean, Wetlands and Stream Protection Branch offers the following site-specific comments as they pertain to the UT West Branch Rocky River Final Mitigation Plan dated March 12, 2018:

- Cover Page: The USACE Action ID SAW-2017-00342 should be included.
- Section 1.0/Page 1: State the Project Purpose (Project is being developed to provide compensatory mitigation credits for the NCDMS ILF Program to offset impacts to waters of the United States within the US Army Corps of Engineers Wilmington District)
- Section 3.1.3/Page 14: Provide some explanation as to why the entire northern reach of UTWB Reach 1 was not included in the mitigation plan.
- Section 3.1.3/Page 15: The EPA is very pleased that KCI has made the effort to characterize the benthic macroinvertebrate communities (poor) within the project. This adds evidence that the stream's water quality functions are impaired to the point that only pollution tolerant fauna was present (Not Functioning). We fully support the desire for KCI to include additional benthic sampling to provide some evidence that water quality

and habitat functions have made improvements (to Functioning or Functioning-at-Risk). I recommend that KCI add this analysis to the functional uplift potential section of the mitigation plan.

- Section 3.1.4/Pages 18 and 19: Excellent site photos demonstrating the stressors and impaired condition of the streams.
- Section 4/Page 20: Functional Uplift Potential.
    - Overall, I would like to see considerable improvement of this section as it is. I encourage the provider to expand on their analysis to really demonstrate the potential for functional uplift with this project. The impairments and stressors of each stream's categorical functions are described and addressed but not rated. Those same functions need to be broken down into components that can be rated as either Not Functioning, Functioning-at-Risk, or Functioning (NF, FAR, F) especially those that are tied to performance standards. Each reach should be broken down and analyzed for functional uplift.
    - Hydrology: The analysis of the watershed including the lack of available data, current and projected stressors and limited ability to provide functional uplift with this project is reasonable and sound. In this regard a conclusion that ties in the functional status, in this case NF or FAR, should be stated as well as the anticipated outcome of NF or FAR assuming no functional uplift.
    - Hydraulics: Each reach should be broken down and given a current functional status (assuming NF or FAR). For example, one component (BHR) of the hydraulics category is likely to be rated as F for the overall outcome but its current rating on a per reach basis is unknown (assumed to be NF based on very poor BHR and ER).
    - Channel Geomorphology: A breakdown of stressors and impairments of each reach on the site is needed to determine if functions range from moderate (FAR?) to poor (NF?) across the site and while various measures to improve channel geomorphology are presented, a functional endpoint (F) is not given and some lift is assumed. LWD is an example of a component that can be measured prior to work, rated as compared to an index or reference reach (NF or FAR), and improved to emulate the desired index rating or reference conditions (F). Performance standards may or not be applicable (such as is the case with buffer width) but the point is to show current condition, the departure from reference or ideal conditions (potential lift), and how well the project will improve that function (anticipated or actual lift).
    - Physiochemical: Recommend the provider maintain the findings of macroinvertebrate sampling to confirm the streams are NF or FAR. While uplift may or may not occur, some baseline data will be of use to determine if any water quality improvements, and therefore functional lift, has occurred. In-situ water quality data would also be useful to determine functional lift in this category.
    - Biology: No data or analysis presented. Assuming no functional lift in this category unless provided with more information.
- Section 6.0/Page 22: If there is a reference site or condition for the design of the anabranched portion of UTWB-1 please include it in this section.

- Section 6.7/Page 31 Planting:
    - Recommend removing *Acer rubrum* (red maple) from the planting plan (Page 31 and Sheet 11) and replacing it with a suitable oak species.
    - Please include a desired plant community for the planted riparian planting zone such as Piedmont Bottomland Hardwood Forest and provide a citation for this community type such as Shafale and Weakley Classification of Natural Communities of North Carolina (1990).
- Section 6.8/Page 31 Project Assets: I agree with the approach to determining buffer width for the anabranched portion of UTWB and generally agree with the buffer credit calculations across the site.
- Section 7.0/Page 35: I am in support with groundwater monitoring of the anabranched section of UTWB-1 as a contingency for wetland conditions developing in lieu of a branched stream. Recommend showing locations for monitoring stream hydrologic performance or groundwater in Figure 12 (Page 39).
- Table 16/Page 38: Recommend adding beaver/nuisance fauna monitoring and a contingency plan/statement for dealing with beaver presence and/or damage caused.
- Figure 12/Page 39: Recommend moving the permanent vegetation monitoring plot at the project southern end into the adjacent agricultural field to be planted and outside of the 50-foot riparian zone. This will capture a former field and provide some monitoring for vegetation being used for additional buffer credit.
- Section 11/Page 42: Add Shafale and Weakely's Classification of Natural Communities of North Carolina, Third Approximation, 1990 to the list of references cited.

Thank you for the opportunity to provide feedback, comments and concerns with the UT West Branch Rocky River Final Mitigation Site Plan in Mecklenburg County, NC. The sponsor has provided a potentially suitable plan to offset impacts and provide compensatory stream and wetland credits to the NCDMS ILF program within the Yadkin River watershed service area. However, many concerns with the project functional analysis remain and should be adequately addressed before the EPA can concur with an approval of the final mitigation plan. If you or the sponsor have any questions or need clarification on any of the comments stated above, please contact me at 404-562-9225 or at bowers.todd@epa.gov.

Best Regards,

Todd Bowers

Comments submitted to Andrea Hughes (SAW-PM) via email on April 19, 2018

KCI ASSOCIATES OF NC

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ENGINEERS • PLANNERS • SCIENTISTS • CONSTRUCTION MANAGERS

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Date: February 15, 2018

To: Harry Tsomides, Project Manager
DMS Review Team Members: Kelly Phillips, Periann Russell, Paul Wiesner, and Lin Xu

From: Kristin Knight-Meng, Project Manager
KCI Associates of North Carolina, P.A.

Subject: UT West Branch Rocky River Restoration Site
Draft (REVISED) Mitigation Plan Report and Construction Plans Review
Yadkin River Basin - 03040105
Mecklenburg County, North Carolina
Contract No. #6830
DMS Project #92684

Dear Mr. Tsomides,

Please see below our responses to the DMS comments received December 12, 2017 on the Draft (REVISED) Mitigation Plan for the UT West Branch Rocky River Restoration Project. We have addressed your comments in the final report and have outlined our changes below. We will provide final hard copies upon your approval of this electronic version of the report.

COVER PAGE / GENERAL / FORMATTING

1. The official project name should be "UT West Branch Rocky River" (cover page, figures, plan sheets, headers etc.); while it was mentioned during the 2016 review that "UTWB" could be used in the narrative to abbreviate the project rather than "UTWBRRRS", the project name "UT West Branch Rocky River" should be used consistently when not abbreviated as "UTWB."

2. Cover page – change "DMS Contract Number D16015i" to "DEQ Contract Number D16015i".

3. Please indicate on cover page DESIGN- BID-BUILD.

4. River basin should reflect the 8-digit basin (Yadkin), not the Rocky River smaller basin.

Items #1-4 have been changed.

5. Please confirm that KCI have followed the updated mitigation plan guidance or have explained where and why any of the guidelines may not have been followed; particularly for the required number of cross sections, the use of random plots along with fixed plots, and volunteer tracking.

KCI has modified the report to include formatting from the most recent DMS template (June 2017) and the NC IRT 2016 guidance memo. We now include 12 proposed veg plots with 6 permanent fixed and 6 random plots. We believe the cross-sections proposed are sufficient under the 2016 IRT guidance at 2 cross-sections per 1,000 feet on small narrow streams (8 cross-sections proposed for the UTWB site).

1.0 PROJECT INTRODUCTION

6. Please add the following to clarify the easement history: "The original conservation easement (April 2010) did not allow enough room for the designed restoration of this project. A negotiated modification (2014) resulted in adding additional land needed to complete the stream restoration while allowing for a partial release of the original easement to allow the gas utility to complete their line."

This has been added to the second paragraph.

7. Total LF is indicated as 3604 however the existing footage / acreage in Table 13 (assets) indicates 3407 LF. Please resolve this apparent difference.

We have changed it to 3,407 lf here.

8. The longitude should not be preceded with a negative sign when an East/West designator is used.

This has been changed.

2.0 WATERSHED APPROACH AND SITE SELECTION

9. Please change "approximately 0.05 river miles" to "approximately 260 feet".

Item 9 has been changed.

3.0 BASELINE AND EXISTING CONDITIONS

10. Page 14 – The number of EPT found during the November 2016 benthic survey could possibly be noted.

A note has been added to state that no EPT taxa were found.

11. Second to last paragraph should clarify that, while the benthic sampling will be performed to evaluate project functional uplift/improvement, it will not be used as a quantitative performance criterion.

This has been added.

12. End of section 3 should mention the small jurisdictional wetland in the easement, but not being sought for credit.

We added "A small jurisdictional wetland (0.16 acre) does exist in the southeastern corner of the project easement, but no mitigation credit is being sought for this feature".

13. Consider formatting the pictures to include a ¼ point border to separate the photos. This edit should not affect the layout or number of pages but will assist in viewing the photographs.

The photos have been reformatted.

6.0 DESIGN APPROACH AND MITIGATION WORK PLAN

14. Thank you for describing the design approach toward tree conservation. Please add to the section that any trees compromised during construction or trees that would interfere with hydraulic function or landform stability will be removed.

This has been added to the end of the paragraph about UTWB-1.

15. Section 6.7 Planting: "Additional oak species will be planted in clusters of 50 stems per acre following Monitoring Year 3 or when planted trees average 6 feet in height." Please amend or remove this statement and revise the vegetation section accordingly. As the project is a DBB, DMS does not want to commit to this proposed additional planting effort in the mitigation plan.

We have removed this note.

16. There are 2 Section 6.0's in the report - 6.0 Performance Standards does not coincide with the table of contents or the report section numbering. Please update accordingly.

This has been corrected.

17. UTWB-3: This section indicates that a floodplain wide enough to accommodate a floodplain for a C-type channel will be excavated in the PII cut for the 1,422-foot reach. Please include a figure to communicate the floodplain extent and geometry. The figure will need to show the major surface features of the floodplain including the grading extent, flood prone area line, bench and bank full.

A conceptual grading figure has been included as Figure 9. A more complete view of this will be included in the final construction plans, which will include grading extents on the planview sheets for Priority 2 reaches as well as detailed cross-sections with grading tie-outs shown.

18. Stream Hydrologic Performance – Please provide a little more detail; specifically, please clarify an achievable set of stream hydrology performance standards for the unique case of the anabranch system, that reflects some of the pertinent field discussions during the June 2017 site meeting, and how visual monitoring / and/or gage data will be analyzed to determine success. Indicate in the monitoring requirements Notes section (Table 16) how the anabranch system will be monitored to show success versus the rest of the single-thread restoration sections. Discussion evolved during the 6/14/2017 meeting with the IRT (see 6/14/2017 minutes) discussing hydrologic criteria. Specifically, it was recommended that a site and design-specific set of success criteria for stream hydrology should be proposed, and that groundwater monitoring might be used a surrogate for stream hydrology. Groundwater gauges would be calibrated to the lowest level of the channels throughout that reach. There was no clear consensus on the details of monitoring in this reach, but that the details would be determined during the development of the mitigation plan.

The current description of the stream hydrologic performance adheres to the IRT 2016 guidance for headwater streams. We used the 30 day criterion as a minimum performance standard, because it is also used for headwater streams. In addition, we have 5 groundwater gauges to be installed along the anabranched reach to monitor for groundwater saturation and surface flow. We considered photo loggers, but decided that they would not be able to sufficiently detect flow on a small system like UTWB-1. Visual inspection will be a primary component of the hydrologic success and will need to be documented by the monitoring team to support the presence of stream hydrology.

The following note has been added to Table 16 for stream hydrology: "UTWB-1 (anabranched) reach will be evaluated through visual inspection and groundwater/surface saturation (30-day minimum flow annually)."

19. It is stated "The following performance standards are based on the *Stream and Wetland Mitigation Monitoring Guidelines* (NCEEP 2014) and will be used to judge site success." The performance standards should be developed and follow the IRT's October 24, 2016 guidance. Please update the mitigation plan accordingly. For example, the 2016 update states annual vegetation monitoring in years 1,2,3,5 and 7. In addition please ensure that the prescribed number of cross sections are accurate, the use of random plots are used along with fixed plots, and tracking volunteers are all included.

We have updated everything to adhere to the IRT 2016 guidance.

20. The IRT's October 24, 2016 guidance references a method for additional credit for buffers exceeding minimum standard widths. The IRT is currently developing a "buffer spreadsheet" that they would prefer be used to evaluate and award additional mitigation credits. Please check with Periann Russell (DMS) to obtain the most up to date IRT buffer spreadsheet and utilize it in the revised mitigation plan.

We obtained the new guidance (version 20180118) and have updated the credits and buffer figures using this method. The additional amount lowered to 298.4 credits using this new method. We eliminated the immediate areas at the two bike crossings and the utility easement from the buffer credit, but did not remove any other trails from the calculation. The IRT 2016 guidance states that impervious trail surfaces are not allowed, but that foot paths are permitted.

7.0 MONITORING PLAN

21. *Vegetation Monitoring*: It is stated "Beginning at the end of the first growing season, **KCI** will monitor the planted vegetation….." Please change KCI to DMS to avoid confusion. KCI has not been awarded the project monitoring on this DBB project site.

This has been changed.

22. Stream geomorphology monitoring – please state the methodology/basis for the number of cross sections, as well as the locations of vegetation plots shown in figure 10.

We have updated the monitoring protocol to adhere to the NCIRT's 2016 guidance. This states that for small width streams, 2 cross-sections per 1000 feet of stream is adequate. The site currently has 8 monitoring cross-sections proposed for 3,823.6 creditable feet of stream.

The vegetation plots have been modified so that there are six permanent fixed plots and six random plots to be selected each monitoring visit. The number complies with the 2% of the planted acreage recommended for vegetation plots in the 2016 guidance.

23. Reporting - It is stated "Annual monitoring data will be reported using the most current DMS monitoring template (NCEEP 2015). Please update to indicate that the current template version of June 2017 will be used (DMS 2017).

This has been corrected.

24. Table 16 indicates that pressure transducer will be installed "at the end of UTWB-3" (downstream limit of the project). Hydrology verification measurements should be mid-reach on the project reach(es) in question, not at the downstream limits of the drainage.

We have changed this to note that the gauge should be installed mid-reach.

25. The 2017 IRT site meeting minutes indicate that, in the event that anabranch system does not lead to stream criteria/ success, that wetland credits may be garnered, and that a target hydroperiod would be used for the performance assessment. This should be addressed briefly in this section with a proposed hydroperiod.

The following has been added to Section 7 under the Stream Hydrology subheading:

"If continuous surface flow is not recorded during the monitoring period to satisfy stream hydrology, the UTWB-1 floodplain may be eligible for wetland credit if a hydroperiod of 7% or greater of continuous saturation during the growing season within 12 inches of the ground surface is achieved. The USDA WETS table for Charlotte Douglas Airport estimates that the growing season begins March 16th and ends November 20th (249 days) for a 50% probability of a freeze of 28 degrees F or lower (USDA 2018); 7% of this period is equivalent to approximately 18 days."

7-9% was discussed at the IRT site meeting as possibilities for the hydroperiod. Although the Monacan silt loam found at the site is not listed under the Piedmont soils in the 2016 guidance, 7-9% is listed for soils such as Riverview silt loam and Cordorus silt loam.

8.0 ADAPTIVE MANAGEMENT PLAN

26. Boilerplate language should be updated per 2016-2017 template. DMS can provide.

This text has been updated using the June 2017 mitigation plan template.

9.0 LONG-TERM MANAGEMENT PLAN

27. Boilerplate language should be updated per 2016-2017 template. DMS can provide.

This text has been updated using the June 2017 mitigation plan template.

11.0 APPENDICES

28. Please include the meeting minutes from the June 14, 2017 IRT site visit in the revised mitigation plan appendices (attached). Please confirm that the mitigation plan addresses the IRT concerns noted in the 2017 meeting minutes.

The meeting minutes from June 14, 2017 have been included in the appendices as Section 12.3. We attempted to cover all of the concerns brought up at that site meeting in the mitigation plan, but please let us know if we missed anything.

29. Conservation Easement (2014) document should be part of the Site Protection Instrument section. This supporting documentation is available from DMS.

This has been included in the Site Protection section.

30. Add missing sections:
Maintenance Plan, Invasive Species (brief statement / plan), DMS Floodplain Requirements Checklist

These have all been added.

31. The signed Categorical Exclusion form and NLEB/ USFWS correspondence are included in the appendices. Please also include additional supporting documentation (CE/ ERTR report) associated with the Categorical Exclusion. This supporting documentation is available from DMS. This is provided for the benefit of the IRT to avoid issues during 404/401 permitting.

The additional documentation has been included in Section 12.12.

32. Please try to include the approved Jurisdictional Determination in the revised mitigation plan for IRT review. David Schaffer was called and e-mailed by DMS on 12/5/2017 to request that the JD be issued for inclusion in the mitigation plan. If the approved JD cannot be obtained by early January, we will submit the plan for IRT review and note that the July 2017 JD request has not been issued by the USACE.

The JD was obtained from Mr. Schaffer and is being included in Section 12.9.

Plan Sheets

33. Please include overlays of the existing and proposed surfaces on the cross-sections to illustrate the overall approach from a Priority I vs Priority II prospective.

We will provide an output of sections (existing/proposed) for grading for the final plans. For the typical sections in the preliminary plans, they are not in an ideal format to add existing cross-sections. Instead, we added a new figure, Figure 10, which shows an approximate schematic of UTWB-2 and UTWB-3 cross-sections.

34. The section typicals specify a bench width of less than ½ a bankfull width which is very narrow considering the available easement area and existing topography. The proposed grading would result in a narrow meandering bench rather than a floodplain with a sinuous channel. Standard PII cut approach includes a floodplain with parallel sides and a bench width approximately 1.5 bankfull

widths beyond the beltwidth. The proposed floodplain appears to be contained entirely within the beltwidth. Please consider maintaining a PI approach for a greater distance downstream to make a larger floodplain feasible.

The typical cross-sections show the minimum required dimensions for a C-type channel, but as DMS noted, does not fully show the valley grading necessary for a Priority 2 approach. We fully intend to have all Priority 2 sections have adequate floodplain access. We have addressed that at this stage by adding Figure 9, which shows the approximate grading extents. Once the preliminary plans have been approved by the IRT, we will develop detailed cross-sections for grading in the final construction plans, which will show the exact valley tie-outs and proposed grading at regular intervals along the stream.

35. Culvert slopes are specified to be approximately the same as the riffle slopes. The cross-sectional area of the two pipes at the bankfull depth is reduced from 9 to 6 square feet. This raises the concern of losing the 1 foot of substrate in the pipe (especially in the upper end) due to the increased transport efficiency of culverts. Please insure the culvert design is optimized to maintain the substrate while maintaining capacity.

The culverts are sized adequately for the stream, but we will add Class B riprap as the in-culvert substrate in the final constructions plans.

36. The existing surface is shown as Top of Bank in Sheet 9 of 12; please correct.

This has been corrected.

37. If access and haul routes are known they should be on the plan sheets; otherwise they should be part of the Construction Plan and Project Manual deliverables.

These have not been determined as of yet, and will be included in the final construction plans.

38. The plan sheets show the details for Constructed Riffle with Log Sill and Soil Lift and Constructed Riffle with Soil Lift. However, those structures are not distinguished in the legend, there is only constructed riffle symbol. Are there constructed riffles in the plan without a log sill? If so these two structures should be distinguished so the contractor knows which to install.

The legend has been updated to show the different types of constructed riffles. Also, for the final construction plans, we will add a detailed list of structures with stationing and elevations for clarity.

39. There are solid thick red lines shown around outsides of meander bends. Does the solid thick red line represent the soil lift? Please include it in the legend.

Yes, these are the proposed toe wood with soil lifts as shown in the legend. The hatching is harder to see at smaller scales, but we will ensure that it is legible at the plotted scale.

40. In general, it seems like a lot of structures proposed for the project. Please advise on the structure quantity and confirm that all structures are justified.

We admit that there are a large quantity of structures for this site, but we believe they all provide value to the project. The constructed riffles are essential to the stability of the riffles given the erodible nature of

the soils, steeper slopes than typical for this type of stream, and lack of a sediment supply in the watershed to seed the riffles. In our past experience, riffles without stabilization experience degradation in the year or two following construction. The toe wood with soil lift will protect the outer banks, but more importantly provide habitat diversity to the project pools.

FIGURES

41. Figure 1 – Grainy texture; can this be improved? Stream names are barely legible.

The quality of this figure has been improved.

42. Buffer Calculation Maps 3 and 4 – bike crossings / crossing exceptions should have callouts (to be consistent with Map 2)

These have been added (also maps updated to reflect new buffer methodology).

43. Figure 10 - Dimension: In the anabranched system, at least two cross sections should be across the entire valley floor. This was a comment from the June 2016 draft. Please include or explain why they are not being included.

At the KCI-DMS meeting on Aug 3, 2016, DMS requested that we remove the monitoring cross-sections from the anabranched reach. We can add them back in if DMS would like.

TABLES

44. Table 1 – Stream Enhancement is not a Restoration Equivalent (RE). Also, an additional line should be inserted to capture standard credits so the reader can know right away the exact difference between standard credits versus credits using buffer method.

This table has been modified.

45. Table 3 - Please update the evolutionary trend to the appropriate Simon series.

This has been corrected.

46. Table 13 – If possible, add a row of Totals at the bottom

This has been added to the table, and the credits from buffer widths have been updated as well.

47. Table 14 - Please calculate and report SMU to the nearest tenths.

This has been changed throughout the report.

48. Table 16 – Parameter “exotic and nuisance vegetation” should be changed to “invasive vegetation” or “invasive and exotic vegetation”. The definitions exotic/nuisance/invasive etc. are not interchangeable. In addition, please add a description in the quantity column or footnote the table to indicate the level of intervention will be aimed at controlling invasives to the degree that the functional integrity of the native community is not threatened, The guidance refers to making sure

invasives are not impacting the functional integrity of the target vegetative community, and if so, adaptive management aimed at controlling the species should be conducted.

The wording was changed to "invasive species" and an asterisk was added referring to the (newly added) invasive species plan in Section 12.10.

Please let us know if you require any additional changes before we complete the submittal of this final mitigation plan.

Sincerely,

Kristin Knight-Meng
Project Manager

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FIGURES

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1.0 PROJECT INTRODUCTION

The UT West Branch Rocky River Restoration Site (UTWB) is a stream mitigation project being developed for the North Carolina Division of Mitigation Services (DMS) within the Yadkin River Basin (Hydrologic Unit Code 03040105) in Mecklenburg County, North Carolina. The project is being developed to provide compensatory mitigation credits for the NCDMS ILF Program to offset impacts to waters of the United States within the US Army Corps of Engineers Wilmington District. The targeted stream exists within the Southern Outer Piedmont Level IV Ecoregion in the Piedmont physiographic province.

The project site is located approximately 4.7 miles east of Davidson, NC in Mecklenburg County as seen in Figure 1. The existing stream and its two tributaries are comprised of 3,433 linear feet and lie to the east of Fisher Road along the eastern boundary of the Town of Davidson's Fisher Farm Park before reaching the confluence with the West Branch Rocky River on the southern edge of the park. The center of the existing stream is approximately located at 35.488120 N, 80.798404 W. A conservation easement for the project has already been recorded and measures 58.9 acres. The original conservation easement (April 2010) did not allow enough room for the designed restoration of this project. A negotiated modification (2014) resulted in adding additional land needed to complete the stream restoration while allowing for a partial release of the original easement to allow the gas utility to complete their line. The Tarheel Trail Blazers maintain approximately 5.2 miles of single-track mountain bike trails throughout Fisher Farm Park, and some trails exist within the conservation easement per the conservation easement deed allowance. Bike trails are not expected to impact the stream project, and will be maintained in most locations more than 50 feet off the constructed channel.

The UTWB will aim to restore and establish a stable stream system, and provide functional uplift to the existing landscape. The proposed streams will include an Unnamed Tributary to West Branch Rocky River (UTWB), Unnamed Tributary 1 (UT1), and Unnamed Tributary 2 (UT2). UTWB will be divided into three reaches - UTWB-1, UTWB-2, and UTWB-3. Reaches UTWB-1, 2, and 3 will be improved through a combination of Priority 1 and Priority 2 stream restoration over 3,612 linear feet of proposed single-thread channel. For UT1, 143 linear feet of stream will be improved through Enhancement II and Priority I stream restoration. UT2 will have 304 proposed linear feet that will undergo Enhancement I and restoration. The table below summarizes the project mitigation credits.

Table 1. Credit Summary

UT West Branch Rocky River Restoration Site, Mecklenburg County DMS Contract D16015i; DMS Project Number 92684									
Mitigation Credits									
	Stream		**Riparian Wetland**		**Non-riparian Wetland**		**Buffer**	**Nitrogen Nutrient Offset**	**Phosphorous Nutrient Offset**
Type	R	RE	R	RE	R	RE			
Linear Feet/Acres	3,931								
Credits	3,886.6								
TOTAL CREDITS	3,886.6								

R=Restoration RE=Restoration Equivalent

Once site grading is complete, the unforested portions of the stream buffer will be planted with riparian species. The site will be monitored for a minimum of seven years or until the success criteria are met.

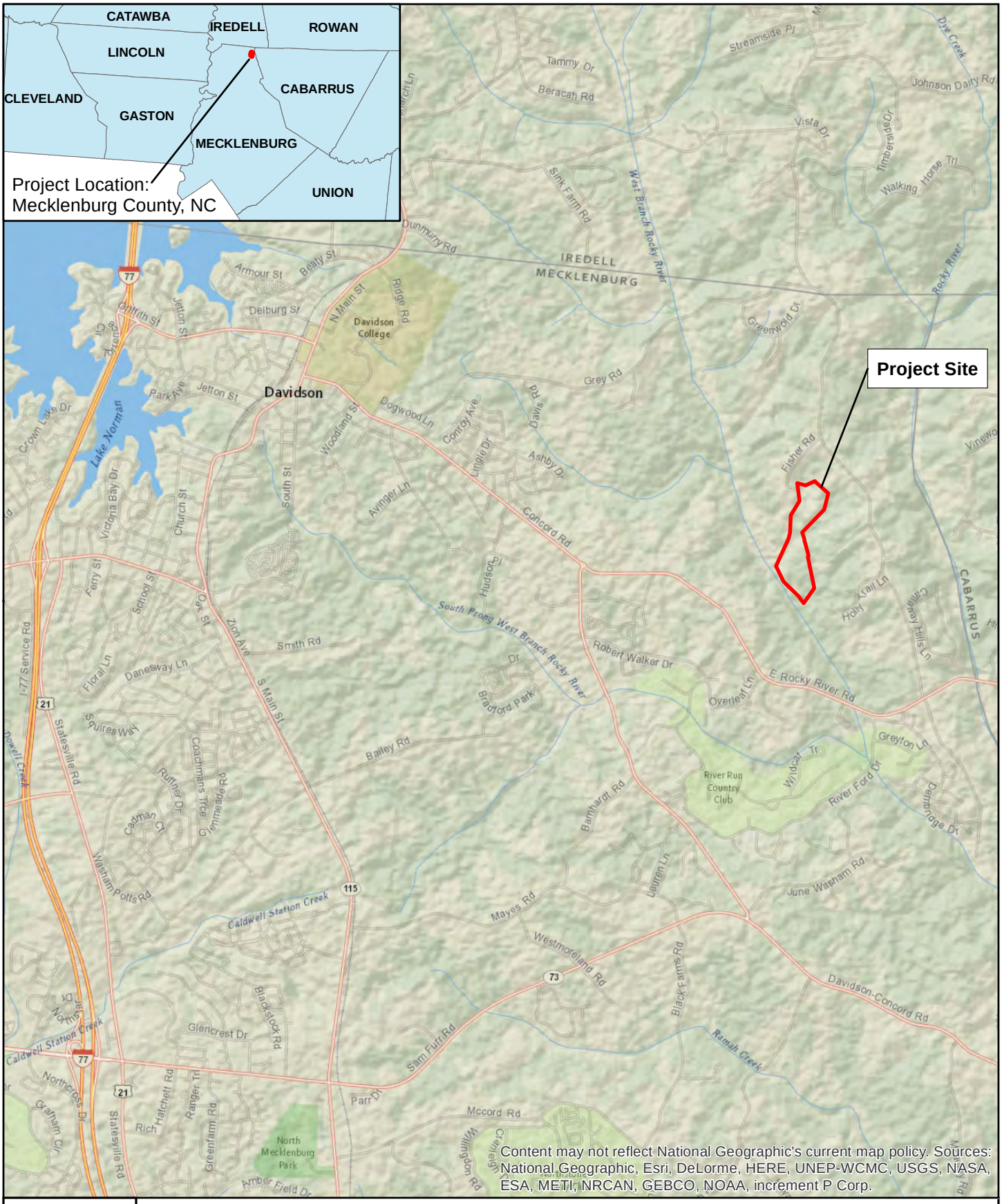

Figure 1. Project Site Vicinity Map, UT West Branch Rocky River, Mecklenburg County, NC

Project Easement

N

0 2,000 4,000 Feet

Image Source: See map

KCI ASSOCIATES OF NC

2.0 WATERSHED APPROACH AND SITE SELECTION

The site's watershed, Hydrologic Unit Code (HUC) 03040105010010, was identified as a Targeted Local Watershed (TLW) in EEP's 2009 Yadkin-Pee Dee River Basin Restoration Priority Plan (NCDENR, EEP 2009). The project is also located within Phase 1 of the Upper Rocky River Local Watershed Plan (LWP) study area (NCDENR, EEP 2004). The Summary of Findings and Recommendations listed several factors impacting the streams within this LWP, including the following that apply to the UTWB:

- Inadequate stream buffers
- Stream bank erosion
- Stream channelization
- Increased sedimentation

The proposed stream mitigation project supports the recommendations of the LWP by restoring natural hydraulic characteristics and providing geomorphic stability. UT West Branch Rocky River is included in the 03040105010010 watershed cataloging unit (Upper Rocky River) within the Lower Yadkin River Basin. UTWB provides an opportunity to complete a restoration project within a small project watershed with the majority of the area draining to the project streams located within the Fisher Farm Park. The project watershed for UTWB is comprised of 0.26 square mile and is located within sub-watershed WBRR-8 as defined in the Upper Rocky River/Clarke Creek LWP. The LWP included the project site (identified as WBRR-8-S-1 in the LWP) as an ideal candidate for stream and/or wetland restoration. The LWP suggests the project would have "high impacts" in regards to bank erosion, stream buffer and macroinvertebrates (NCDENR, EEP 2004). The project aims to uphold the goals identified by the Yadkin-Pee Dee River Basin Restoration Priority Plan by restoring stream hydraulics, improving/restoring riparian buffers, improving stream stability and reducing sediment loading (NCDENR, EEP 2009).

UTWB ends at an existing gas utility easement approximately 260 feet upstream of its confluence with West Branch Rocky River. UTWB and the segment of West Branch Rocky River downstream of the site are classified for surface water as Class C. Neither UTWB nor West Branch Rocky River were listed as impaired under the draft 2016 303(d) list. Downstream of the project site, Rocky River (13-17a) is listed as impaired under the draft 2016 303(d) list for benthos (NCDEQ, DWR 2016). There is one other DMS mitigation project (Dye Branch II) currently located in the northern section of the 03040105010010 watershed cataloging unit.

The project watershed is shown in Figure 2, and another map illustrating the project's watershed location in relation to the Upper Rocky River watershed identified in the LWP is shown in Figure 3.

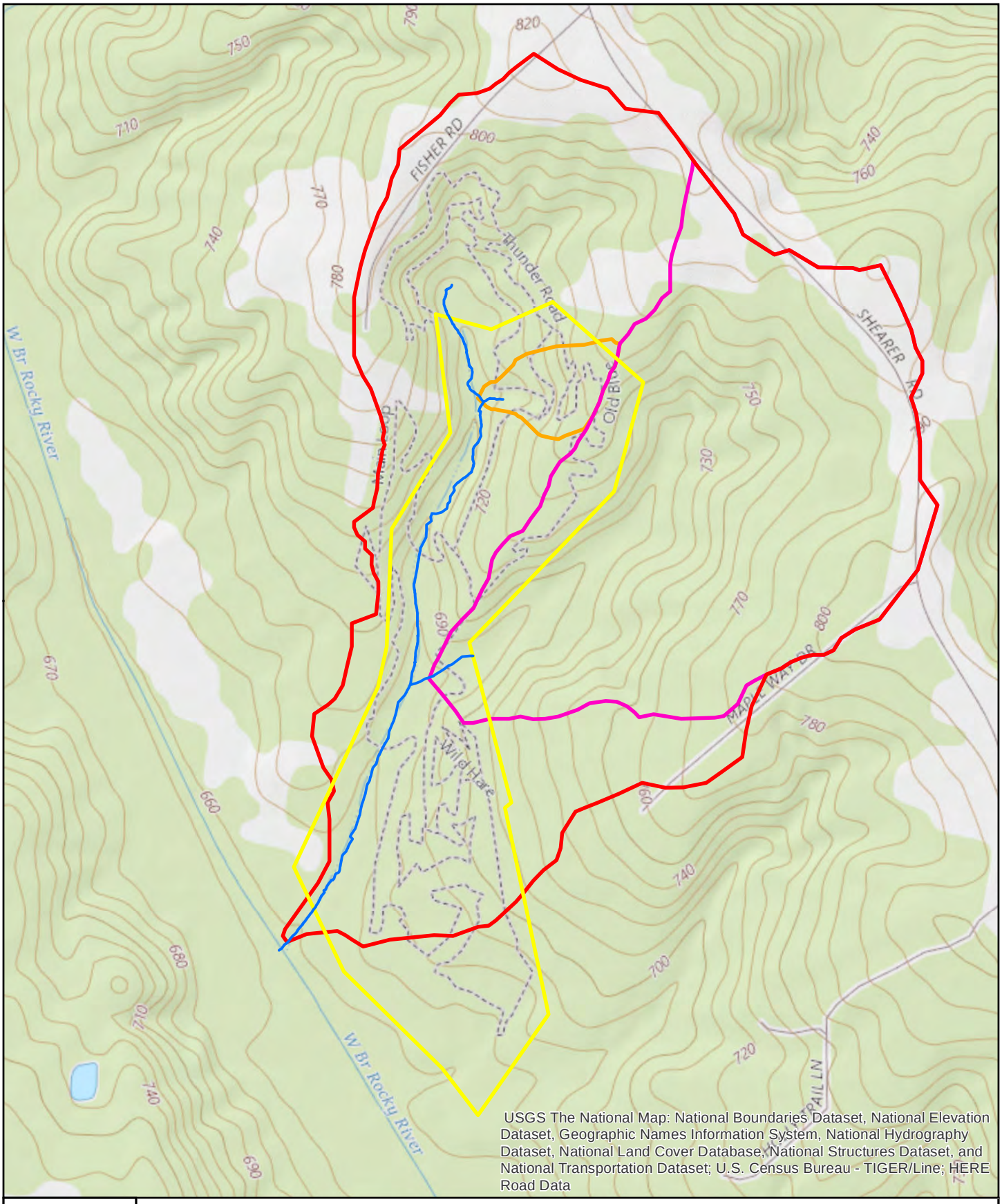

Figure 2. Project Site Watershed Map, UT West Branch Rocky River, Mecklenburg County, NC

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- Project Streams
- Project Easement
- Project Watershed (167 acres)
- UT1 Watershed (4 acres)
- UT2 Watershed (75 acres)

N

0 300 600 Feet

Image Source: See map

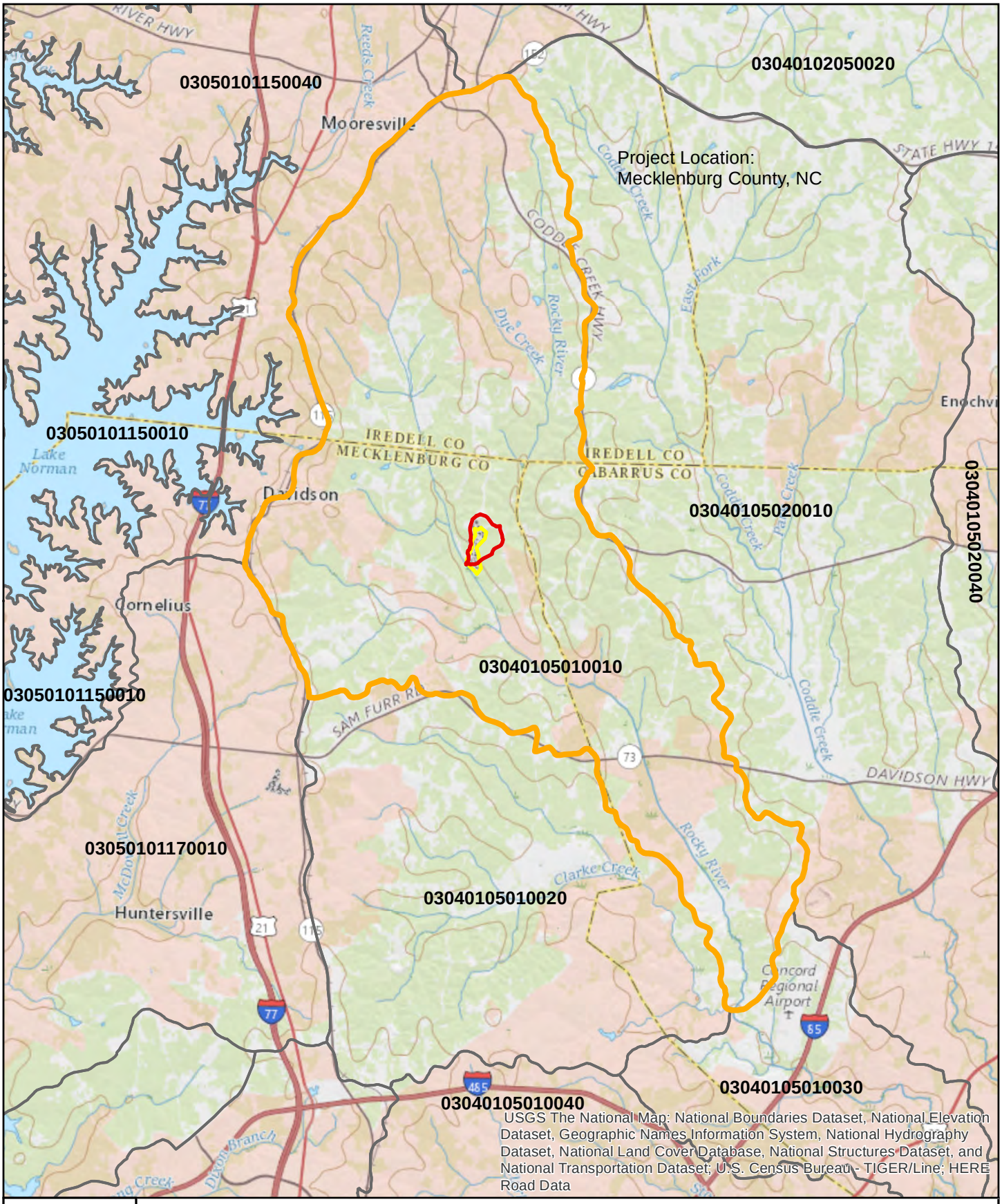

Figure 3. Project Site / LWP Watershed Map, UT West Branch Rocky River, Mecklenburg County, NC

Upper Rocky River LWP (HUC 030401050102)
14-digit Hydrologic Units
Watersheds
Project Easement
N
0 1 2 Miles
Image Source: See map

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3.0 BASELINE AND EXISTING CONDITIONS

3.1 Watershed Processes and Resource Conditions

3.1.1 Landscape Characteristics

The project site is located within the Southern Outer Piedmont (Level IV 45b) ecoregion of the Piedmont physiographic province. The Southern Outer Piedmont is mostly irregular plains with pine dominating old field sites and pine plantations. In less altered areas, mixed oak forests can be found. The geology of this area is typified by gneiss, schist, and granite rock types, covered with deep saprolite and mostly red, clayey subsoils (Griffith et al 2002).

According to the Soil Survey of Mecklenburg County, the majority of the project area consists of Cecil sandy clay loam (CeB2), 2-8% slopes. Cecil sandy clay loam (CeD2), 8-15% slopes represents the next largest component followed by Monacan loam (MO), 0-2% slopes. Mecklenburg fine sandy loam (MeB), 2-8% slopes and Pacolet sandy loam (PaE), 15-25% slopes exist along the western boundary of the project watershed. Helena sandy loam (HeB), 2-8% slopes is mapped in the southern extent of the conservation easement. The results of the soil survey are presented in Figure 4.

KCI's soil scientist also completed an investigation of the soils at the site, in particular to determine the extent of floodplain soils and the potential for clay to use as channel plugs. Soil data sheets and a map of the soil borings are included in Section 12.2. The floodplain soils within the stream valley were mapped as Monacan loam and are areas that would support a relocated stream channel. The relocation of UTWB primarily follows the delineated Monacan loam area.

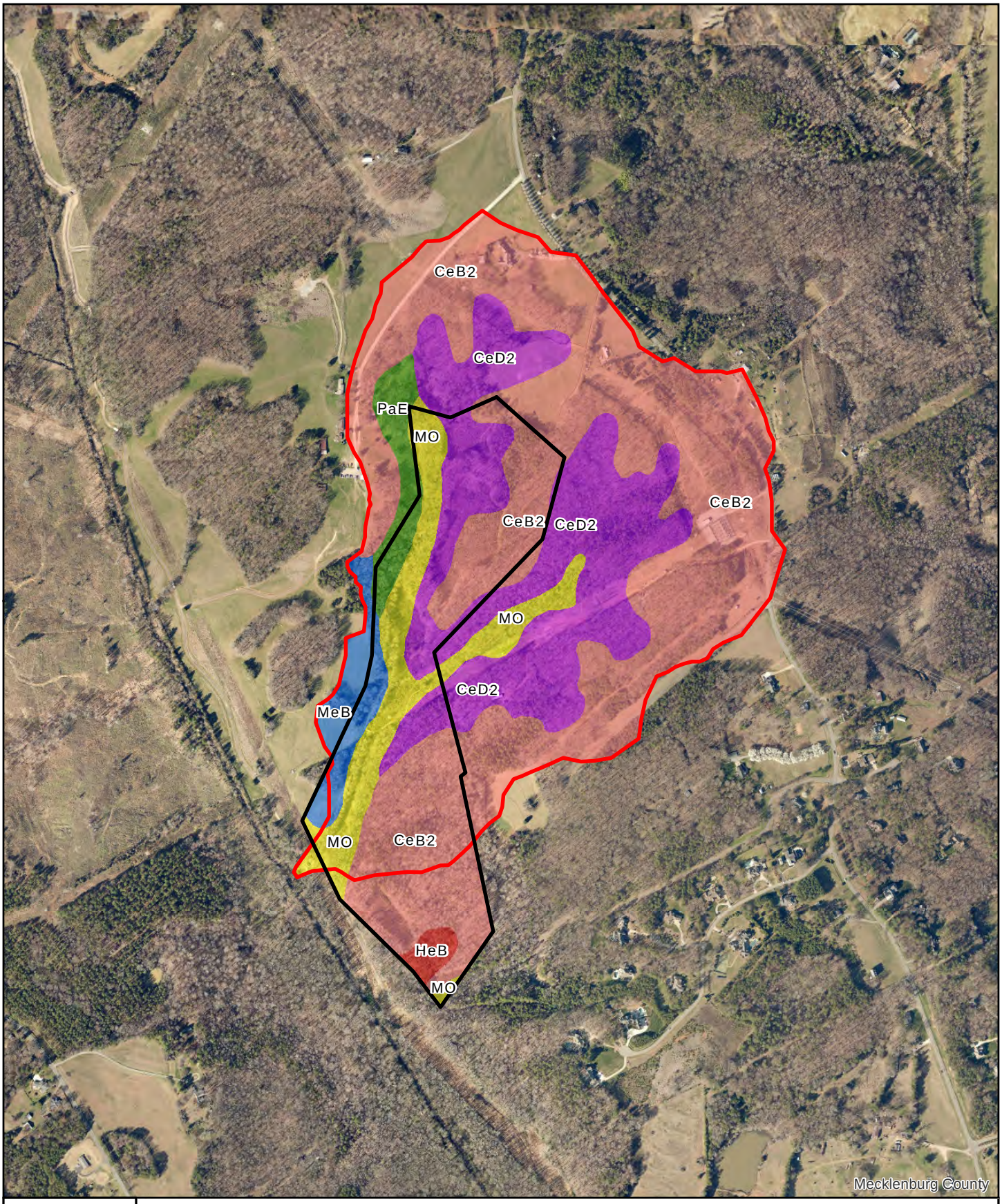

Figure 4. Project Site NRCS Soil Survey Map, UT West Branch Rocky River, Mecklenburg County, NC

KCI ASSOCIATES OF NC

- Project Easement
- Project Watershed
- CeB2 - Cecil sandy clay loam, 2-8% slopes (101.7 ac)
- CeD2 - Cecil sandy clay loam, 8-15% slopes (47.2 ac)
- HeB - Helena sandy loam, 2-8% slopes (1.6 ac)
- MeB - Mecklenburg fine sandy loam, 2-8% slopes (7.0 ac)
- MO - Monacan loam, 0-2% slopes (16.0 ac)
- PaE - Pacolet sandy loam, 15-25% slopes (5.6 ac)

N

0 400 800 Feet

Image Source: Mecklenburg County 2018

3.1.2 Land Use/Land Cover and Chronology of Impacts

The project watershed for the UTWB is comprised of 0.26 square miles (167 acres). Current land use within the project watershed consists of forest (71% / 118 ac), open/grassland (16% / 26 ac), utility easements (10% / 17 ac), low-density residential development (2% / 3 ac), and roads (2% / 3 ac). The project site is located within the Town of Davidson's Fisher Farm Park. The park spans approximately 200 acres and is currently used for low-intensity recreational purposes such as walking and mountain biking. The park is located within a conservation easement held by Mecklenburg County and administered by Davidson Lands Conservancy. Future risk of modifications to the project's 0.26-mi^2 watershed is low due its proximity to a large conservation area. Current land use is shown in Figure 5.

Historic aerial photographs were analyzed to collect information regarding evolutionary changes to the project area over recent history. An Aerial Decade Package provided by Environmental Data Resources (EDR) included historic aerials for the following years: 1938, 1948, 1951, 1965, 1976, 1983, 1988, 1993, 1996, 2006, 2008, 2009, 2010, and 2012. Selected historic aerials are presented in Figures 6A, 6B, and 6C.

According to the aerial imagery, UTWB was channelized prior to the 1938 depiction, which suggests much of the site was being used for agricultural purposes along the length of the existing channel. Small amounts of stream buffer existed near the top of the site within the wooded section; however, beginning just north of the location where UT2 flows into UTWB and continuing until the channel meets the West Branch Rocky River, no stream buffer existed on either side of the existing channel. These conditions remained unchanged for approximately 45 years. The 1983 aerial photograph suggests areas near the midpoint of the channel on the eastern side experienced a decrease in agricultural maintenance when compared to previous years. This lack of maintenance continued to present day with previously farmed land along both sides of the channel now primarily existing as open fields with areas of early successional sweetgum thickets. Trees beginning to line the middle and downstream sections of the channel, which were barely visible in the 1983 depiction, now appear as multiple rows of mature trees.

Based on field evaluations and historic aerial photograph interpretation, the project stream has experienced physical and functional changes in recent history. Channel modification and vegetation clearing occurring prior to 1938 appear to have had the most impact on the current condition of the channel. Vegetation removal, upstream land use conversion, and increased stream velocity due to the channel modifications such as straightening/ditching have contributed to the current degradation of the stream.

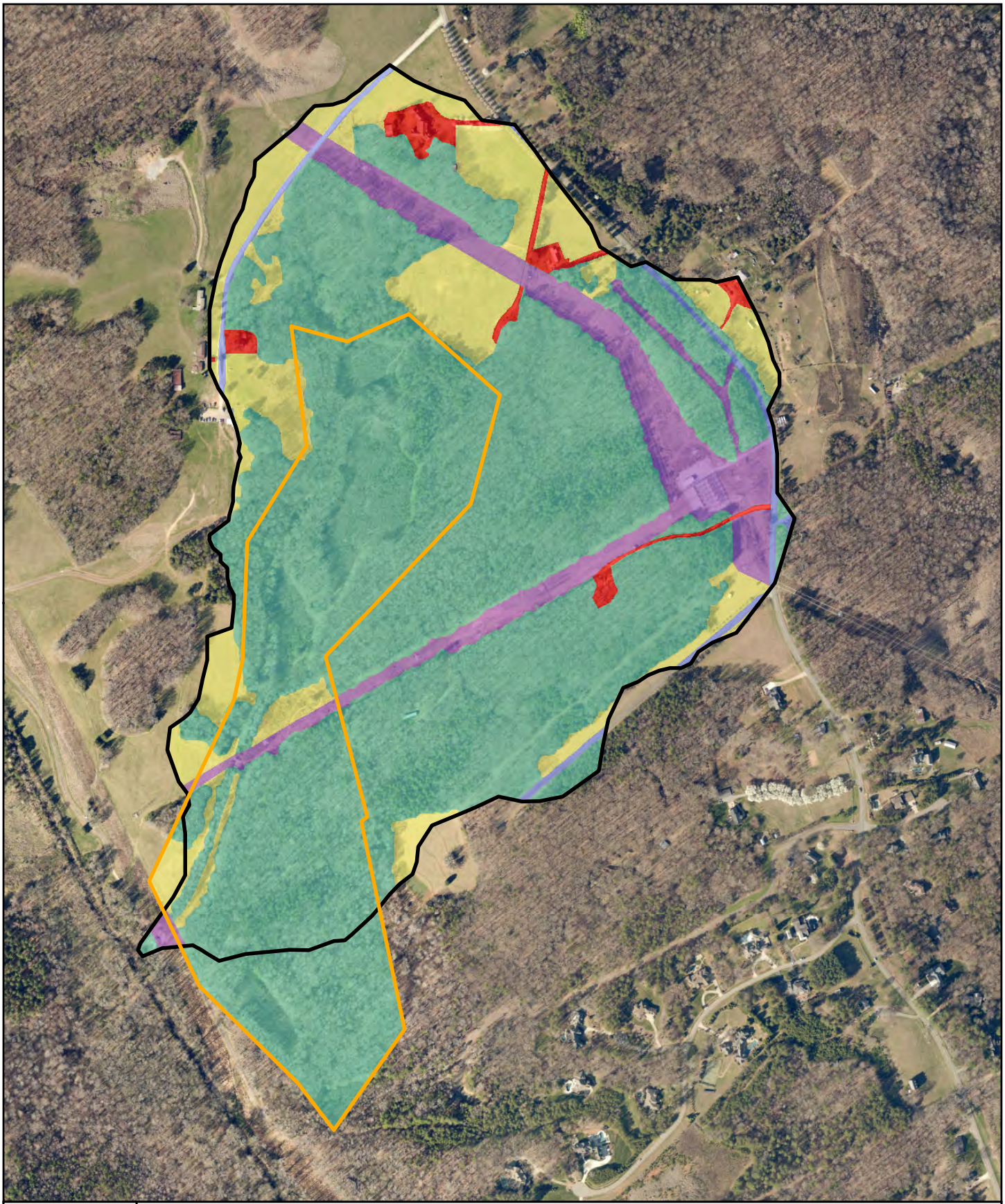

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Figure 5. Project Site Land Use Map, UT West Branch Rocky River, Mecklenburg County, NC

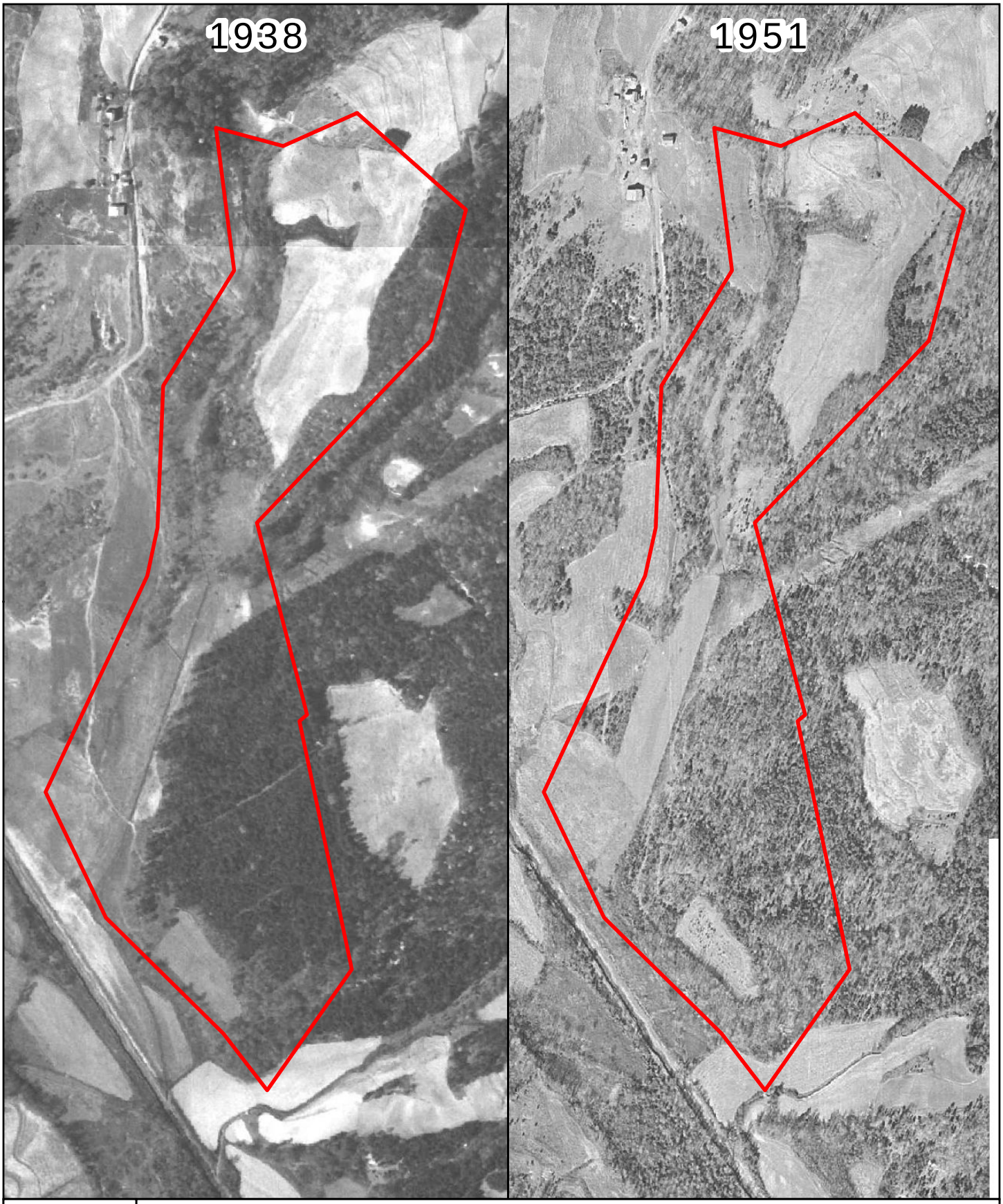

Figure 6A. Project Site Historical Condition Plan View, UT West Branch Rocky River, Mecklenburg County, NC

Project Easement

N

0 250 500 Feet

Image Source: 1938- Image, 1951- Image

KCI ASSOCIATES OF NC

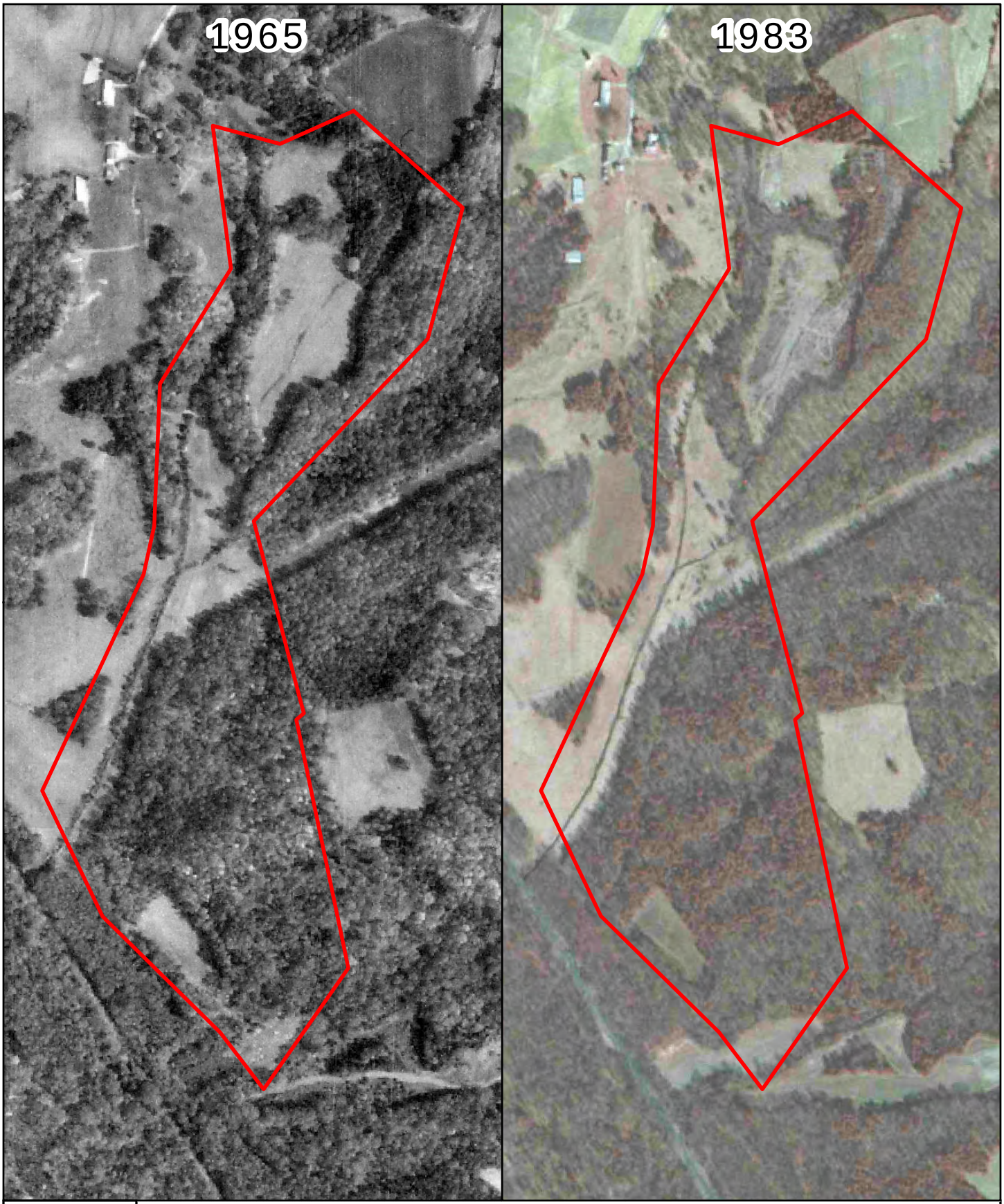

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Figure 6B. Historic Aerials 1965 and 1983, UT West Branch Rocky River, Mecklenburg County, NC

Project Easement

N

0 300 600 Feet

Image Source: USDA

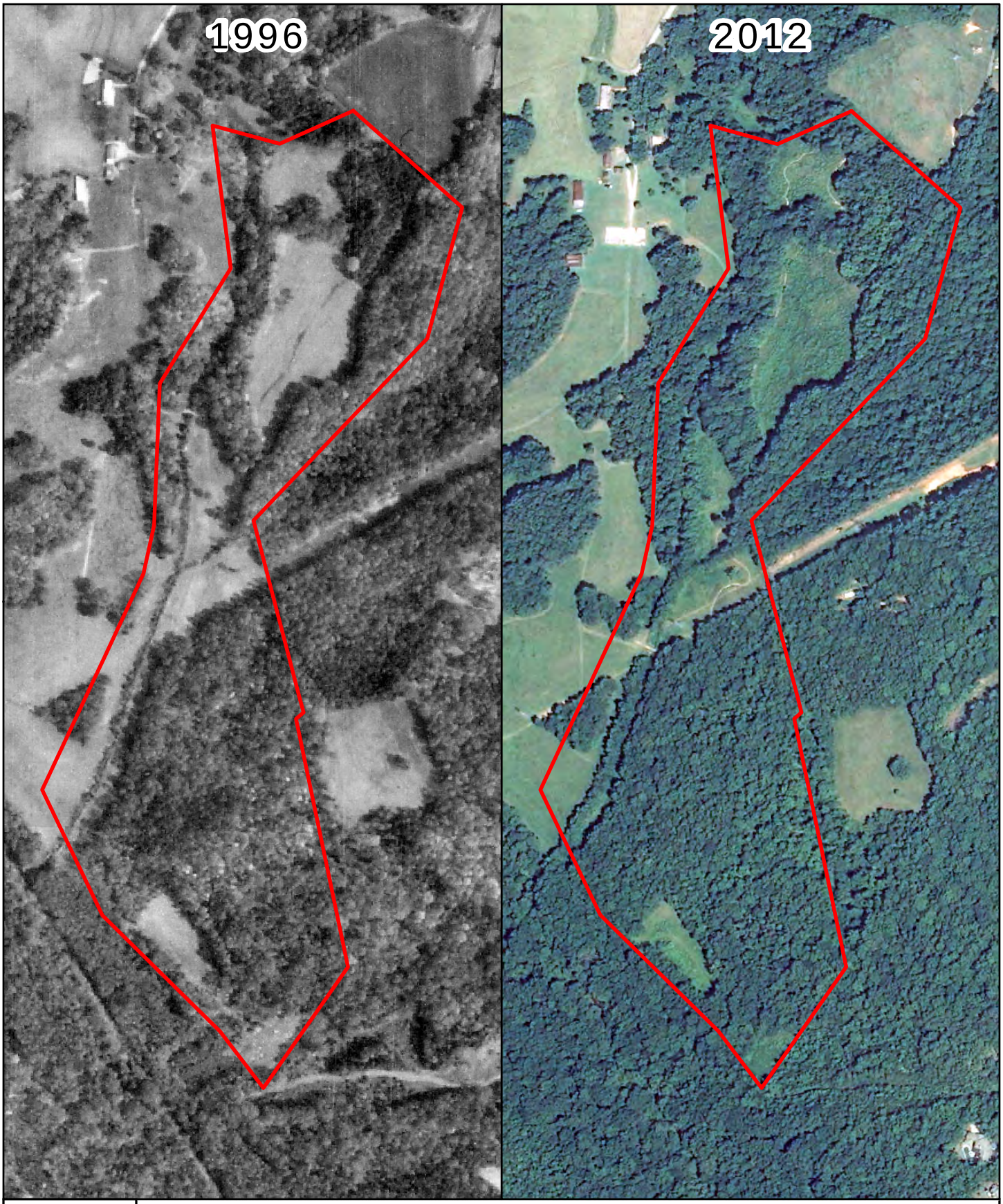

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Figure 6C. Historic Aerials 1996 and 2012, UT West Branch Rocky River, Mecklenburg County, NC

Project Easement

N

0 300 600 Feet

Image Source: USDA

3.1.3. Watershed Disturbance and Response

The proposed stream restoration project is located at Fisher Farm Park, and the local watershed has experienced minimal change in recent years due to the land being preserved for recreational use. However, the existing project streams are severely degraded and incised because of the agricultural practices during the majority of the twentieth century presented in the previous section. Channelization during this time eradicated most natural channel features, and has made the system susceptible to bed degradation and headcuts without the ability for flows to be attenuated on the floodplain. The project streams will continue to deepen and headcut upstream before eventually widening into larger channels, all of which will increase sediment loading of West Branch Rocky River.

Table 2. Existing Stream Bank Height and Entrenchment Ratios

Stream	Existing Bank Height Ratios	Existing Entrenchment Ratios
UTWB	4.2-4.9	1.3-1.5
UT1	2.5	1.5
UT2	11.1	1.3

UTWB begins as a perennial feature approximately 170 linear feet above the northern limits of the conservation easement as a first-order stream that has incised below the valley floodplain. UTWB flows in a general north to south direction until reaching the confluence with West Branch Rocky River. Mitigation activities along UTWB will end at an existing gas easement prior to reaching the confluence of West Branch Rocky River. UTWB has been divided into the following reaches: UTWB-1 (364 existing lf), UTWB-2 (1,512 existing lf) and UTWB-3 (1,144 existing lf). Existing sinuosity ranges from 1.0 on UTWB-1 to 1.07 on UTWB-3. Incoming secondary seepage channels traverse the relic floodplain of UTWB-1, and are causing bank erosion at their confluences with the main channel. The bank height and entrenchment ratios in Table 2 indicate a highly confined and incised channel unable to disperse high energy flows. Much of the riparian corridor adjacent to UTWB-1 and UTWB-2 is vegetated with mature overstory trees providing shade for the existing channel. Various shrubs exist, but groundcover is primarily limited to leaf litter and coarse woody debris with herbaceous communities. Along UTWB-3, two to three rows of mature trees exist on both banks before meeting maintained grasslands, but these trees are growing along eroding stream banks. Two stream crossings, a trail crossing with a 30” corrugated metal pipe (CMP) and a Duke Energy utility access crossing with a 72” CMP, exist along UTWB.

Unnamed Tributary 1 (UT1) converges with UTWB approximately 615 linear feet downstream of the start of UTWB-1. UT1 is a first-order tributary measuring approximately 95 linear feet within the project and drains approximately 4 acres. The initial 49 linear feet of channel is unconfined, and allows floodplain access. A large headcut originating from the confluence with UTWB has caused incision throughout the lower section of the tributary. Riparian vegetation is lacking along the majority of the channel, although there are overstory trees.

Unnamed Tributary 2 (UT2) flows parallel to an existing utility easement and enters UTWB approximately 301 linear feet north of the downstream crossing. UT2 is also a first-order tributary, measuring approximately 319 linear feet within the project and draining 75 acres. A cross-sectional survey of UT2 identified an extremely incised channel as seen in Table 2. The existing riparian corridor along UT2 is similar to that of UTWB-3 where two to three rows of mature trees exist before meeting open grasslands. One trail crossing with a 30” CPP culvert exists near the top of UT2. After the crossing, the stream begins to degrade before reaching a bedrock feature with a 3-foot drop before the confluence with UTWB.

Evaluation of vegetation types show that the dominant species throughout the site are tulip poplar (*Liriodendron tulipifera*), sweetgum (*Liquidambar styraciflua*), and white oak (*Quercus alba*). A consultation with USFWS was completed due to the potential presence of suitable roosting habitat for the federally threatened Northern long-eared bat (*Myotis septentrionalis*). The USFWS issued the opinion that this project is "not likely to adversely affect" the bat. A cutting moratorium from May 15 to August 15 is desired, but not required. The USFWS correspondence is included in Section 12.12.

Macroinvertebrates were sampled at a site visit on November 16, 2016 to further assess existing conditions. A total of 18-20 individuals were found during sampling. A riffle located approximately 120' downstream of the first crossing on UTWB produced the most specimens. A few additional individuals were collected in a riffle approximately 250' downstream of UT1. The sample was primarily comprised of crane fly larva (*Tipulidae*) and earthworms (*Oligochaetes*); no EPT taxa were found. There was little variation in flow regime within the streams (slow shallow was the dominant type). UT2 was sampled from the confluence with UTWB up to the bike crossing (approximately 170'). Within that reach, no individuals were found. Visual inspections of stones and woody debris were conducted along the entire length of the main channel, which only produced one additional specimen.

These results confirmed the macrobenthic communities are poor at UTWB. Given the location of the project streams on the River Continuum Concept, the species within headwater reaches at UTWB should be comprised of collector and shredder macroinvertebrates. In particular, the EPT taxa (*Ephemeroptera*, *Plecoptera*, and *Trichoptera*) are representative of high water quality and the design should encourage the habitat conditions necessary to accommodate these species, which include both habitat for pool and flowing taxa, large woody debris in both riffles and pools to provide niche space, and additional near bank vegetation to contribute organic matter. Improving aquatic habitat for these species will be a driver of the project. Following construction, we will supplement the project stream with macroinvertebrates harvested from neighboring tributaries with reference conditions. Limited macrobenthic monitoring may be conducted for informational purposes only to see if improvements have occurred since project implementation. The benthic sampling will be performed to evaluate project functional uplift/improvement, but will not be used as a quantitative performance criterion.

Geomorphological data suggests all of the project reaches are silt/sand channels with small gravel present in certain locations. Existing sediment loads are dominated by the inputs from bank erosion. Overall, each of the existing streams lack variable bedforms with pools and riffles, aquatic habitat for macroinvertebrates, and an accessible floodplain. Stream banks are mostly vertical with little vegetation present. The project site has experienced landscape and vegetative modifications in the past in order to maximize agricultural resources. These agricultural practices are believed to be the source of legacy sediment and channel incision throughout the site. The project attribute table below summarizes current conditions at the site and Figure 7 displays the current conditions at the site. A stream and wetland delineation was performed for the site and the Preliminary Jurisdictional Determination was approved by the US Army Corps of Engineers on 2/26/2018 (see Sections 12.8 and 12.9). A small jurisdictional wetland (0.16 acre) does exist in the southeastern corner of the project easement, but no mitigation credit is being sought for this feature.

Table 3. Project Attribute Table

Project Information			
Project Name	UT West Branch Rocky River Restoration Site		
County	Mecklenburg County		
Project Area (acres)	58.86 ac		
Project Coordinates (lat. and long.)	352914.45 N, -804754.81 W		
Planted Acreage (Acres of Woody Stems Planted)	11.6 acres		
Project Watershed Summary Information			
Physiographic Province	Piedmont		
River Basin	Yadkin		
USGS Hydrologic Unit 8-digit	03040105	**USGS Hydrologic Unit 14-digit**	03040105010010
DWQ Sub-basin	03-07-11		
Project Drainage Area (acres)	167 acres		
Project Drainage Area Percentage of Impervious Area	2.3%		
CGIA Land Use Classification	Forest, Open/Grassland, Utility Easement, Roads		

Existing Reach Summary Information	
Parameters	**All Reaches Combined**
Length of reach (linear feet)	3,433
Valley Confinement	Confined
Drainage area (acres)	167 acres
Perennial, Intermittent, Ephemeral	Perennial
NCDWQ Water Quality Classification	C (Aquatic Life, Secondary Recreation)
Rosgen Stream Classification (Existing/Proposed)	G5/C5 (D5 at beginning of project)
Evolutionary trend (Simon)	Stage III
FEMA classification	Zone X

Existing Wetland Summary Information	
Parameters	
Size of Wetland (acres)	0.16
Wetland Type	Riparian Non-Riverine
Mapped Soil Series	Helena sandy loam, 2 to 8 percent slopes (HeB)
Drainage class	Moderately well drained
Soil Hydric Status	Hydric B
Source of Hydrology	Groundwater
Restoration or Enhancement Method	N/A

Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the United States – Section 404	Yes	Applying for NWP 27	Preliminary JD approved
Waters of the United States – Section 401	Yes	Applying for NWP 27	Preliminary JD approved
Endangered Species Act**	Yes	Yes	USFWS
Historic Preservation Act**	No	Yes	NCSHPO
Coastal Zone Management Act ** (CZMA)/ Coastal Area Management Act (CAMA)	No	N/A	N/A
FEMA Floodplain Compliance	No	Yes	N/A
Essential Fisheries Habitat**	No	N/A	N/A

**Items addressed in the Categorical Exclusion in Appendix.

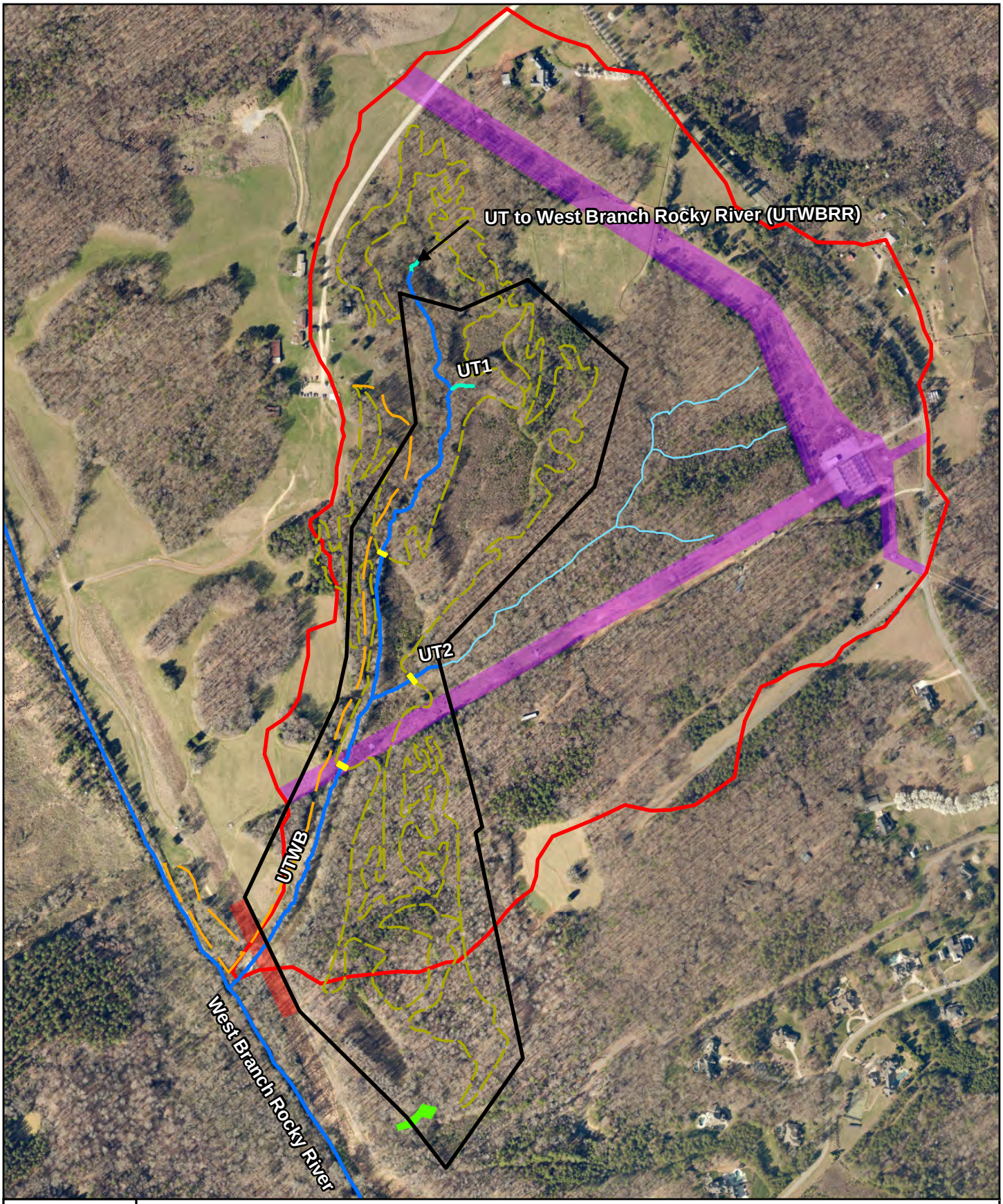

Figure 7. Current Conditions Plan View Map, UT West Branch Rocky River, Mecklenburg County, NC

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Project Easement
Existing Stream Crossings
Perennial Streams
Intermittent Streams
Other Streams
Bike Trail
Hiking Trail
Project Watershed
Existing Electrical Easement
Existing Gas Easement
Existing Wetland (0.16 ac within easement)

0 275 550 Feet

N

Image Source: Meck. Co. 2018

3.1.4 Site Photographs

View looking down valley from the northern limits of the project. 1/18/16

View looking at a secondary channel in the relic floodplain in the upper reach of UTWB. Note the old spoil to the right of secondary channel. 1/18/16

View of headcut where secondary channel enters the incised UTWB. 1/18/16

View showing lack of riparian buffer along the right bank of UTWB near the first stream crossing location. 1/19/16

View downstream from the second crossing showing channel incision in the downstream reach of UTWB. 1/20/16

View of severe channel incision along UTWB. 1/20/16

View of headcut at existing fence where restoration will begin on UT1. 1/19/16

View of degradation along UT1 near the confluence with UTWB. 1/19/16

View looking upstream from existing stream crossing along UT2. 1/18/16

View showing channel incision along UT2 downstream of the stream crossing. 1/18/16

View looking at the upstream limits of UT2 at an existing fence. 1/20/16

View looking at the confluence of UT2 entering UTWB. 1/20/16

4.0 FUNCTIONAL UPLIFT POTENTIAL

Current stream and watershed conditions within the UTWB project site as well as throughout the Upper Rocky River watershed described in previous sections allow for functional improvements at this site. Channel incision resulting from previous modifications is the predominant impairment within the project reaches, and it has contributed to the overall degradation of the local ecosystem due to a lack of floodplain connectivity, minimal bedform variation, and high amounts of sediment inputs from bank erosion.

The uplift for UTWB will be achieved at the hydraulic and geomorphological functional levels. Hydraulic improvements will come from reintroducing bankfull flows to the historic floodplain through Priority 1 Restoration that will elevate the channel to a meandering position within the forested corridor. Reestablishing floodplain connectivity will allow stream flows to access the floodprone area more frequently and return a hydraulic routing system through this stream corridor that will distribute flood flows through a broader area instead of within a confined channel. Geomorphological functional uplift will be achieved through channels sized to the bankfull flow, a planform and profile design emphasizing bedform variation with high amounts of woody debris for bank protection and habitat, and the reestablishment of a forested riparian corridor. As a result, bank migration and lateral stability will be restored to a sustainable level and the banks and bed will accommodate design flows in a stable manner. Sediment inputs will decrease due to reduced bank erosion and sediment transport can return to a stable level that will accommodate watershed inputs. Riparian plantings will further support geomorphological functionality by increasing bank stability.

Consideration of future impacts to the area that could limit functional uplift opportunities is important when assessing project potential. As mentioned in previous sections, the project exists within a recreational park in a rural area. Substantial changes to the surrounding area are not expected. The watershed will experience little change in the future; therefore, the hydrology of the site will likely remain unchanged as well. The table below summarizes the project goals and objectives that will lead to functional improvements and the monitoring tools that will be used to track these changes to the site.

5.0 MITIGATION PROJECT GOALS AND OBJECTIVES

Table 4. Project Goals, Objectives, and Functional Outcomes

Goals	Objective	Functional Level	Function-Based Parameter Effects	Monitoring Measurement Tool
Restore an incised stream to a C-type channel with an active floodplain	Relocate streams to a meandering landscape position to capture hillside seepage	Hydraulics	Floodplain Connectivity	Flood Frequency
				Bank Height Ratio and Entrenchment Ratio
	Install a cross-section sized to the bankfull discharge	Geomorphology	Bank Migration/Lateral Stability	Cross-Sectional Survey
				Visual Inspection of Bank Stability
	Create bedform diversity with pools, riffles, and habitat structures	Geomorphology	Bed Form Diversity	Visual Inspection of Feature Maintenance
Restore a forested riparian buffer to provide bank stability and shading	Plant the site with native trees and shrubs	Geomorphology	Vegetation	Density
				Species Composition/Diversity

Table adapted from Harman et al 2012

6.0 DESIGN APPROACH AND MITIGATION WORK PLAN

6.1 UT West Branch Rocky River (UTWB)

Based on the deficiencies described above, a mitigation work plan has been developed to restore the project streams and achieve functional improvements. Mitigation along UTWB will occur in three reaches (UTWB-1, UTWB-2, and UTWB-3) and will also include two reaches each along UT1 (UT1-1 and UT1-2) and UT2 (UT2-1 and UT2-2). The project design plans are included in Section 12.1.

For UTWB-1, restoration is proposed on the first-order, single-thread stream, starting at the northern end of the conservation easement and extending 423 lf downstream (ending 78 lf upstream of the confluence of UT1) from Stations 8+93 to 13+16. UTWB-1 will serve as a transitional Priority 2/1 reach as it begins at the upstream incised channel and connects downstream to the Priority 1 restoration on UTWB-2. The designed stream will have a width/depth ratio of 16.3, entrenchment ratio of > 2.2, and a slope of 1.4%. At the upper end of UTWB-1, floodplain grading will be completed to ensure a smooth transition from the upstream top of bank elevations into a restored floodprone channel with entrenchment ratios of 2.2 or greater. The designed stream for this reach incorporates riffle-pool sequences with the goal of attaining improved habitat diversity within the system due to the addition of varying flow regimes and depths. Many of the riffles will be constructed riffles to provide stability in the higher gradient riffles. Step pools were avoided as much as possible since they are not as typical in this type of stream, but were necessary in four locations with single step pools. Woody debris harvested onsite will be added to the channel along selected outside meander bends for increased stability and in-stream habitat. Channel plugs will be

utilized within the abandoned channel in the areas where the old channel intersects the designed stream to prevent any re-channelization of the old channel. Existing spoil piles lining the current channel will be removed and used as fill material in the abandoned channel. Incoming flowpaths, which are currently inducing erosion along the existing stream, will be incorporated into the restored stream system. Channel design through this reach includes working around desirable, mature trees already existing within the valley, but site grading necessitated by the Priority 2 transition will require the removal of certain mature trees.

UTWB-2 begins approximately 78 linear feet upstream of the confluence with UT-1 and continues 1,767 feet to the confluence with UT-2. The design approach will be similar to UTWB-1, except for that the design consists of Priority 1 Restoration for the majority of the reach with a bankfull elevation matching the existing historic floodplain as much as feasible. Then the final 753 linear feet of UTWB-2 will be used as a transition to Priority 2 Restoration in the final reach (UTWB-3). The designed stream will have a width/depth ratio of 16.3, entrenchment ratio of > 2.2, and a slope of 1.6%. The planform utilizes the full extent of the valley floor as much as feasible and the resultant sinuosity for the reach is 1.2. An existing trail crossing will be relocated slightly to the east. The existing culvert at the crossing will be replaced with a 48" corrugated metal pipe embedded 1 foot below grade.

UTWB-3 begins at the confluence of UT-2 and continues 1,422 feet to the end of the project at an existing gas easement crossing and will use a Priority 2 approach. In particular, downstream of the second culverted crossing, a new stream valley will be excavated to accommodate a floodplain wide enough for a C-type channel. In this reach, the current design maintains riffle slopes of 3% or less. The excavated material generated by the Priority 2 Restoration will be used to backfill the highly incised existing channel throughout the site. The designed stream will have a width/depth ratio of 16.0, entrenchment ratio of >2.2, and a slope of 1.3%, typical of a Rosgen C-type channel. The resultant sinuosity for this reach is 1.3. The reach will have riffle-pool sequences installed to create bedform diversity, and the stream will incorporate woody debris along selected outside meander bends. Channel plugs will be utilized to prevent re-channelization of the existing channel. Similar to the previous reach, many of the riffles will be constructed riffles to ensure stability in the higher gradient areas. An existing stream crossing used for recreation trails and utility easement access will be relocated slightly. The existing culvert at the crossing will be replaced with two 48" corrugated metal pipes embedded 1 foot below the thalweg.

Figures 9 and 10 provide further detail on the grading and transitions of the proposed channels for UTWB Reaches 2 and 3. UTWB-2 begins as Priority 1 but will transition to Priority 2 as noted above. The cross-section will connect to the existing bank elevations at the upper portions of the reach, but as the stream moves further downstream, an excavated floodplain will be necessary. UTWB-3 will be entirely Priority 2, and the grading extents are noted on Figure 10. A new floodplain will be constructed at the channel elevation with enough capacity to accommodate out-of-bank flows without inducing elevated shear stresses on the newly constructed valley side slopes. At the end of UTWB-3, a series of soil lifts constructed at approximately 45 degrees toward the upstream will transition the restoration floodplain into the existing stream valley downstream of the project.

6.2 Unnamed Tributary 1 (UT1)

UT1 enters UTWB approximately 400 linear feet downstream of the beginning of the UTWB-1. Enhancement II is proposed for the initial 49 lf (UT1-1) beginning at the top of the tributary, and continuing to a headcut located at an existing fence running perpendicular to the channel. Approximately 46 lf of

Priority 1 Restoration (UT1-2) is proposed, beginning at the headcut/fence line and ending at the newly located confluence with UTWB-2. Priority 1 Restoration will include stabilizing the existing headcut with a step pool structure and establishing a bankfull elevation equal to the historic floodplain. A channel block will be utilized in the area where UT1 intersects the old UTWB to prevent any re-channelization of the old channel. The proposed channel will have a width/depth ratio of 16.1, entrenchment ratio of > 2.2, and a slope of 1.6%.

6.3 Unnamed Tributary 2 (UT2)

UT2 is the larger of the two tributaries entering UTWB, approximately 2,200 lf downstream of the beginning of the project. UT2 begins at an existing fence line that lies perpendicular to the current stream and flows southwest until converging with UTWB. Enhancement I is proposed for the top 45 linear feet (UT2-1) of the stream, which begins at an existing fence line. Priority 1/2 Restoration is proposed for the remaining 279 lf (UT2-2) with the purpose of addressing stream bank instability and bed degradation. The proposed channel will have a width/depth ratio of 15.6, entrenchment ratio of > 2.2, and a slope of 1.8%, which are typical for C-type channels. Channel incision is the main deficiency currently; therefore, increasing the bed elevation and adjusting the designed bankfull elevation to match the historic floodplain will reduce stress on the stream bed and improve stability in the reach. The designed stream has riffle-pool sequences that will create bedform variation that this reach currently lacks. Constructed riffles will be utilized for additional stability in higher gradient riffles. Wood toe structures will be added along selected outside meander bends for increased stability and aquatic habitat. The existing culverted crossing for the bike trail will also be moved slightly south of its current location and replaced with a 48” corrugated metal pipe embedded 1’ below the thalweg elevation.

The designed stream will abandon the old channel location after UT2-1, and will meander adjacent to an existing electric utility easement before entering UTWB. Channel plugs will be utilized in the abandoned channel to prevent any re-channelization of the old channel.

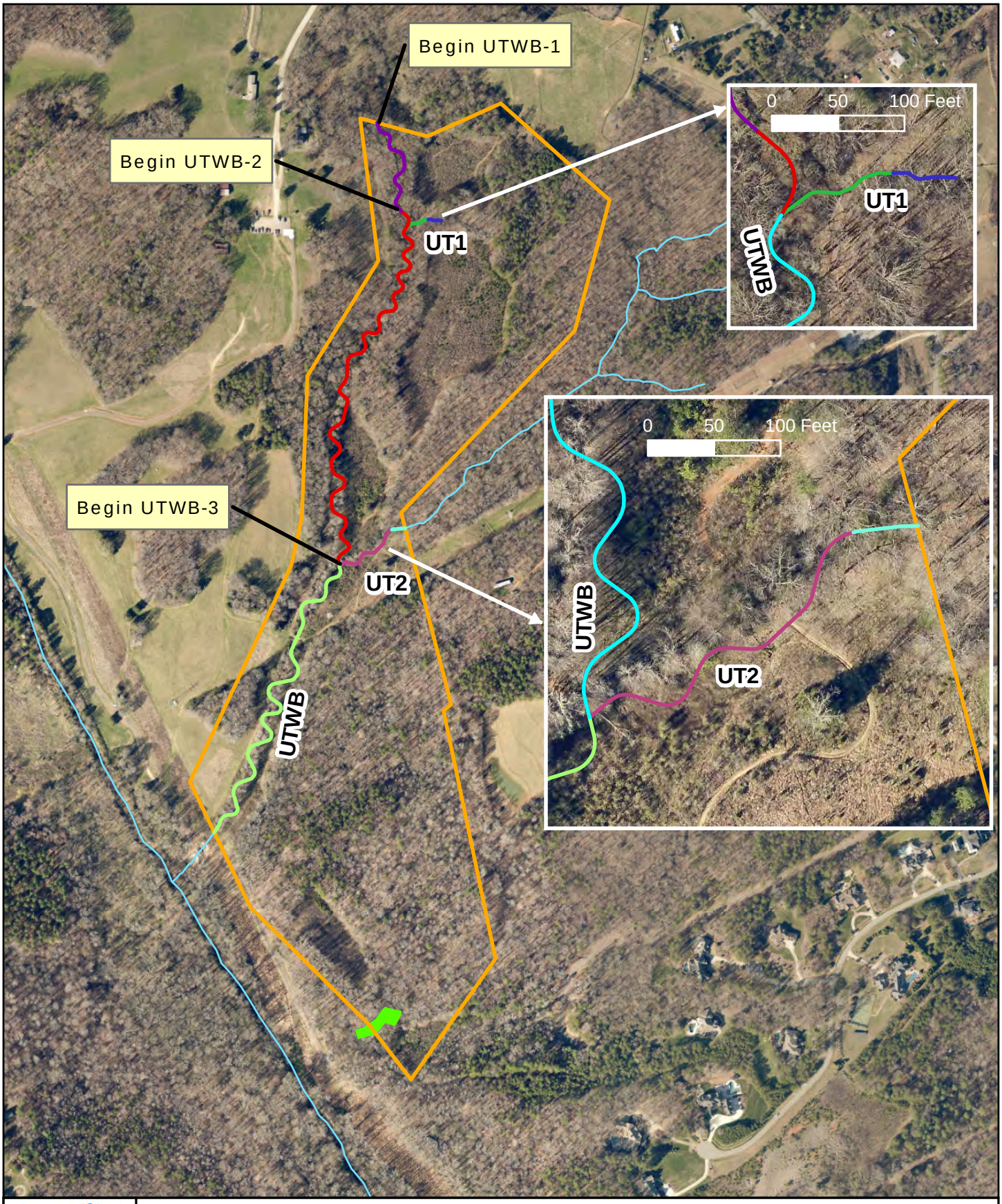

Figure 8. Proposed Mitigation Type Map, UT West Branch Rocky River, Mecklenburg County, NC

Project Easement
Existing Wetland (0.16 ac)
UTWB Reach 1 (R) - 423 lf
UTWB Reach 2 (R) - 1,767 lf
UTWB Reach 3 (R) - 1,422 lf
UT1 Reach 1 (EII) - 49 lf
UT1 Reach 2 (R) - 94 lf
UT2 Reach 1 (EI) - 45 lf
UT2 Reach 2 (R) - 279 lf
Existing Streams

N

0 250 500 Feet

Image Source:
Mecklenburg County 2018 Aerial

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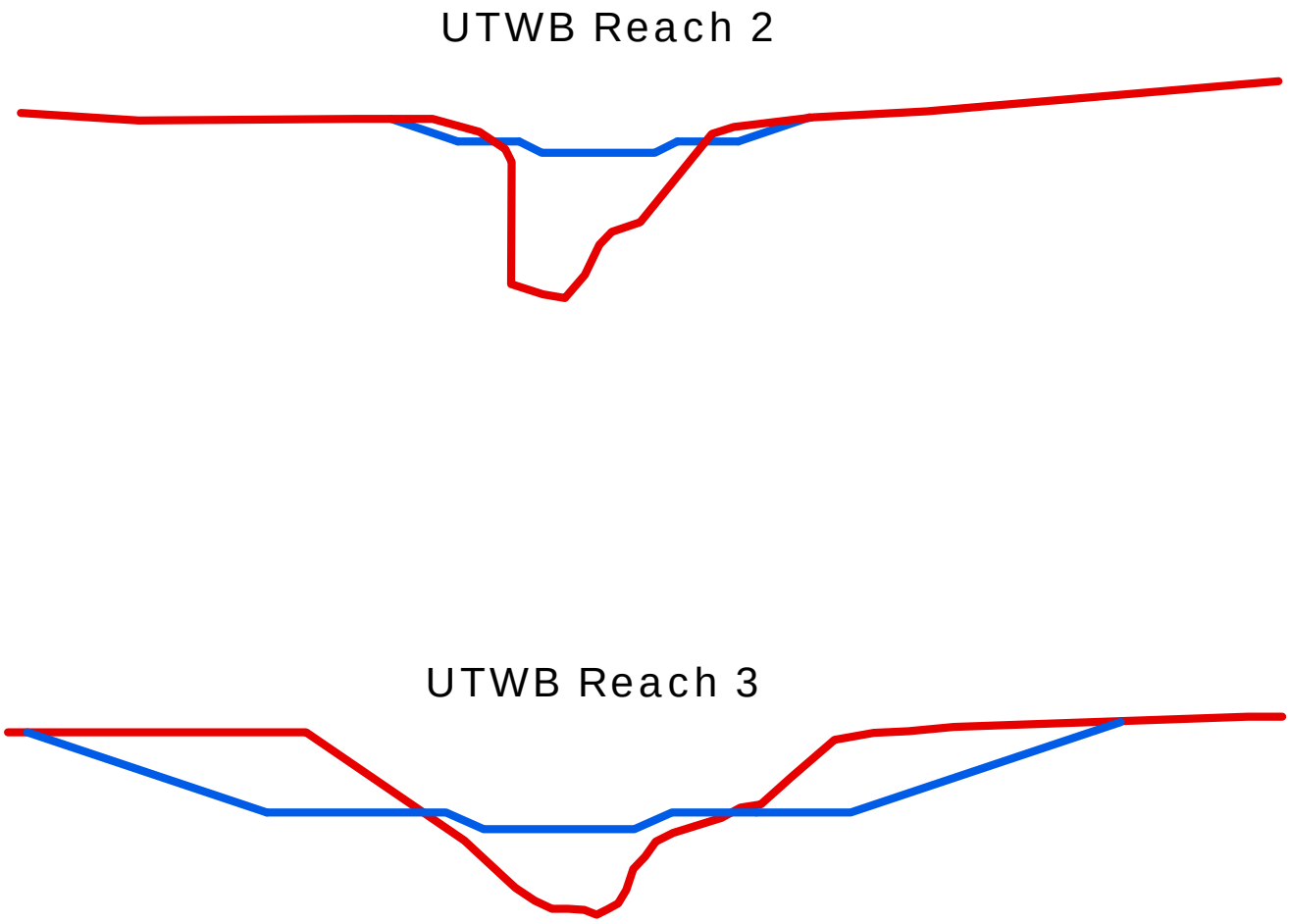

Figure 9. Cross-Section Schematic for UTWB-2 and UTWB-3, UT West Branch Rocky River, Mecklenburg County, NC

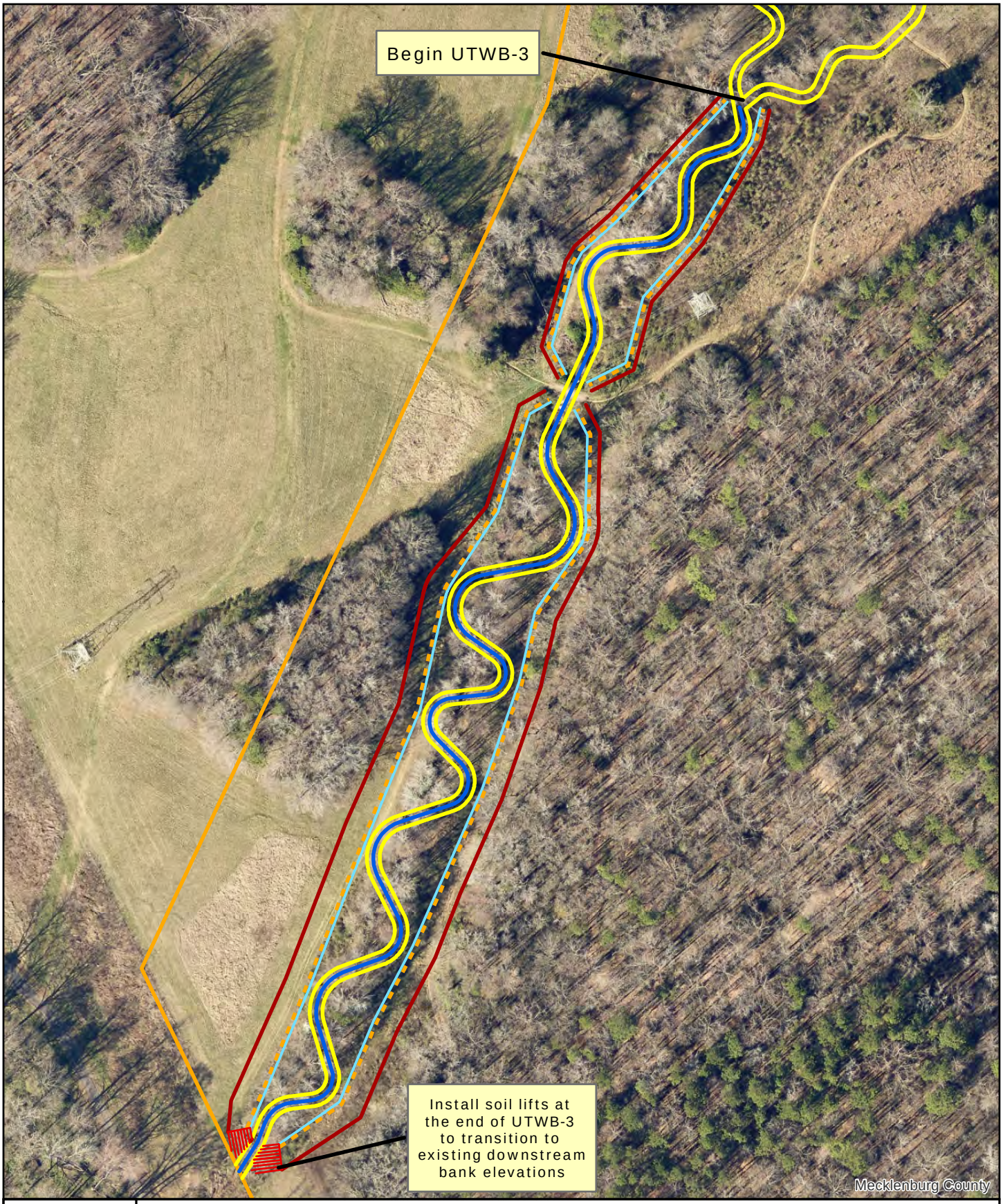

Figure 10. UTWB-3 Proposed Priority 2 Approach, UT West Branch Rocky River, Mecklenburg County, NC

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UTWB Reach 3 (R) - 1,422 lf
Extent of Bankful Channel
UTWB-3 Extent of Bankfull Bench
UTWB-3 Extent of Floodprone Area
UTWB3 Approx. Extent of Grading
Approximate Soils Lifts
Project Easement

N

0 62.5 125 Feet

Image Source:
Mecklenburg County 2018 Aerial

6.4 Design Discharge Determination

Design discharge values were determined primarily by using data from the existing cross-sections. The Piedmont Rural Regional Curve and corresponding equations from "Bankfull Hydraulic Geometry Relationships for North Carolina Streams" (Harman *et al*., 1999) were used for comparison. Along UTWB, six cross-sections were taken along the 3,406 lf-long channel as representative of the existing conditions. The lower two cross-sections (XS 5 and 6) near the end of the site were used to analyze the bankfull values at the bottom of UTWB and had bankfull areas of 9.2 and 8.5 square feet, respectively. With a channel slope of 0.0121, the bankfull discharge for these two cross-sections is estimated between 35-43 cfs. These on-site field measurements were compared to regional curve estimates (Table 5). A design discharge of approximately 35 cfs and an area of 9.0 sf were selected for UTWB-3.

Table 5. Bankfull Verification for UTWB

Bankfull Verification: UTWB	Area (sf)	Width (ft)	Approx. Discharge (cfs)
Regional Curve - NC Rural Piedmont (0.25 sq mi)	8.5	6.6	33
Existing Cross-Section 5	9.2	7.4	43
Existing Cross-Section 6	8.5	9.1	35

Along UT1, two cross-sections (XS 7 and 8) near the end of the reach had bankfull areas of 1.3 and 0.9 square feet, respectively. The existing slope of this stream is quite steep as it cuts down to the existing bed elevation of UTWB, indicating a higher discharge of 7.4-9.1 cfs. The regional curve estimates a bankfull area of approximately 0.7 square feet based on the drainage area of 0.01 square miles, which is slightly smaller than the cross-sectional measurements, but does not take into account the seep discharge for UT1. The existing cross-sections have a discharge of approximately 5-8 cfs, but a smaller discharge of 5 cfs and an area of 1.9 sf were selected for the proposed UT1 cross-section given the lower channel slope.

Table 6. Bankfull Verification for UT1

Bankfull Verification: UT1	Area (sf)	Width (ft)	Approx. Discharge (cfs)
Regional Curve - NC Rural Piedmont (0.01 sq mi)	0.7	1.3	2.3
Existing Cross-Section 7	1.3	2.8	8
Existing Cross-Section 8	0.9	2.2	5

The two cross-sections for UT2 (XS 9 and 10) had bankfull areas of 1.8 and 2.4 square feet, respectively, based on field measurements. The slope of UT2 is also very steep as it nears the confluence with UTWB. The regional curve estimates a bankfull area of approximately 5.0 square feet based on the drainage area of 0.12 square miles, which is larger than the cross-sectional measurements. However, the width and discharge values are similar to UT2. The final design values for UT2 are 22 cfs and 5.5 sf, closer to the regional curve estimate.

Table 7. Bankfull Verification for UT2

Bankfull Verification: UT2	Area (sf)	Width (ft)	Approx. Discharge (cfs)
Regional Curve - NC Rural Piedmont (0.12 sq mi)	5.0	4.7	19
Existing Cross-Section 9	1.8	4.9	9
Existing Cross-Section 10	2.4	5.3	13

In addition to the design discharges, reference values for typical Piedmont streams from Harman and Star (2011) were used for a C5-type channels. These values were used to form the planform and cross-section configurations of the proposed channels for UTWB-1, UTWB-2, UTWB-3, UT1-2, and UT2-2. The values for the profile were not adhered to as strictly due to the steeper slopes required to accommodate the transition down to the West Branch Rocky River confluence.

6.5 Sediment

The sediment in the project streams is dominated by a silt/sand mixture that currently is supplied by the eroding banks throughout the site. The project watershed itself is largely contained within the project easement and is supply limited due to a majority of the watershed being forested (71%). Once the project streams are restored, the sediment loading is expected to decrease throughout the reaches. A conservative approximation of the existing sediment loading to the project reaches using a moderate near bank stress rating and a very high BEHI rating estimates 107 tons/year from the project reaches with a rate of 0.75 feet/year (Doll et al 2003). Following restoration, the sediment material should remain in the silt/sand range with inclusions of small gravel, but should be limited in quantity.

In order to further analyze the existing sediment conditions within the project stream, three pebble counts were performed on UTWB for trend analysis. These data are provided in Section 12.2 and summarized in the table below. The sediment sampling shows that there is a similar size of sediment being moved through the system currently of around medium to very coarse sand (increasing in size near the bottom of UTWB as more severe bank erosion occurs).

Based on the collected sediment and cross-section data, shear stress values were calculated to compare the existing conditions to the proposed riffle cross-sections. The shear stress values for the designed reaches were calculated and related to the movement of a particular grain size using Shield's threshold of motion curve (Shields *et al.* 1936). The calculations based on the existing cross-sections show the high amount of shear stress the channel is currently experiencing at bankfull conditions. Shear stress values predict movements large enough to carry medium to large cobble in some instances. The proposed values are smaller, but still predict movement of larger material (coarse to very coarse gravel) than the silt/sand material present at the site. As a result, the riffles at the project site will have to be protected with constructed riffles to ensure excessive bed degradation does not occur. Because the watershed is also supply limited, the riffles will not be seeded with large amounts of material as well, which emphasizes the importance of fortifying the riffles with rock material to provide a base material for riffle protection. Table 8 summaries the existing and proposed sediment condition.

Table 8. Sediment Summary for Project Reaches

Type	Reach	Average Shear Stress (lbs/sq. ft)	Predicted Grain Diameter (mm) (Shields Curve)	Grain Type	Measured D84 (mm)	Sample Type
Existing	XS 1 UTWB1	1.22	96	medium cobble	0.45	PC
Existing	XS 2 UTWB1	1.80	144	large cobble	0.45	PC
Existing	XS 3 UTWB2	1.01	79	small cobble	0.47	Pebble Count
Existing	XS 4 UTWB2	1.23	97	medium cobble	0.47	Pebble Count
Proposed	***PROP UTWB2***	***0.50***	***38***	***very coarse gravel***	***N/A***	***N/A***
Existing	XS 5 UTWB3	0.74	57	very coarse gravel	1.3	Pebble Count
Existing	XS 6 UTWB3	0.61	47	very coarse gravel	1.3	Pebble Count
Proposed	***PROP UTWB3***	***0.59***	***45***	***very coarse gravel***	***N/A***	***N/A***
Existing	XS 7 T1	1.52	121	medium cobble	N/A	N/A
Existing	XS 8T1	1.24	98	medium cobble	N/A	N/A
Proposed	***PROP T1***	***0.31***	***23***	***coarse gravel***	***N/A***	***N/A***
Existing	XS 9 T2	1.02	79	small cobble	N/A	N/A
Existing	XS 10 T2	1.26	99	medium cobble	N/A	N/A
Proposed	***PROP T2***	***0.61***	***47***	***very coarse gravel***	***N/A***	***N/A***

6.6 Morphological Essential Parameters Tables

Table 9. Morphological Essential Parameters for UTWB-1

Parameter	Existing Condition	Reference Condition	Proposed
Valley Width (ft)	58-90	N/A	50-90
Contributing Drainage Area (acres)	37.9	Variable	60.0
Channel/Reach Classification	G5	C5	C5
Design Discharge Width (ft)	3.4-5.6	N/A	8.4
Design Discharge Depth (ft)	0.8-1.0	N/A	0.5
Design Discharge Area (ft^2)	2.7-5.6	N/A	4.3
Design Discharge Velocity (ft/s)	4.3-5.4	N/A	3.4
Design Discharge (cfs)	12-30	N/A	15
Water Surface Slope	0.036	N/A	0.016
Sinuosity	1.0	1.2-1.5	1.2
Width/Depth Ratio	4.3-5.6	10-14	16.3
Bank Height Ratio	4.0-4.8	1.0-1.1	1.0
Entrenchment Ratio	1.1-1.6	2.2+	2.2+
d16 / d35 / d50 / d84 / d95 / dip / disp (mm)	0.062/0.26/0.31/0.45/0.61/-0.29/3.2	Silt/Sand	Silt/Sand

Table 10. Morphological Essential Parameters for UTWB-2

Parameter	Existing Condition	Reference Condition	Proposed
Valley Width (ft)	58-90	N/A	50-90
Contributing Drainage Area (acres)	59.8	Variable	60.0
Channel/Reach Classification	G5	C5	C5
Design Discharge Width (ft)	5	N/A	8.4
Design Discharge Depth (ft)	1.1	N/A	0.5
Design Discharge Area (ft^2)	5.3	N/A	4.3
Design Discharge Velocity (ft/s)	5.2-6.0	N/A	3.4
Design Discharge (cfs)	28-55	N/A	15
Water Surface Slope	0.020	N/A	0.016
Sinuosity	1.06	1.2-1.5	1.2
Width/Depth Ratio	4.7	10-14	16.3
Bank Height Ratio	3.4	1.0-1.1	1.0
Entrenchment Ratio	1.8	2.2+	2.2+
d16 / d35 / d50 / d84 / d95 / dip / disp (mm)	0.16/0.28/0.33/0.47/1.0/-0.12/1.7	Silt/Sand	Silt/Sand

Table 11. Morphological Essential Parameters for UTWB-3

Parameter	Existing Condition	Reference Condition	Proposed
Valley Width (ft)	100-180	N/A	100-180
Contributing Drainage Area (acres)	163.0	Variable	163.0
Channel/Reach Classification	G5	C5	C5
Design Discharge Width (ft)	7.4-9.1	N/A	12.0
Design Discharge Depth (ft)	0.9-1.2	N/A	0.8
Design Discharge Area (ft^2)	8.5-9.2	N/A	9.0
Design Discharge Velocity (ft/s)	4.1-4.6	N/A	3.9
Design Discharge (cfs)	35-43	N/A	35
Water Surface Slope	0.0121	N/A	0.013
Sinuosity	1.07	1.2-1.5	1.3
Width/Depth Ratio	6.0-9.7	10-14	16.0
Bank Height Ratio	4.7-5.0	1.0-1.1	1.0
Entrenchment Ratio	1.3-1.7	2.2+	2.2+
d16 / d35 / d50 / d84 / d95 / dip / disp (mm)	0.16/0.3/0.39/1.3/8.8/0.07/2.9	Silt/Sand	Silt/Sand

Table 12. Morphological Essential Parameters for UT1

Parameter	Existing Condition	Reference Condition	Proposed
Valley Width (ft)	25-35	N/A	25-35
Contributing Drainage Area (acres)	4.0	Variable	4.1
Channel/Reach Classification	G5	C5	C5
Design Discharge Width (ft)	2.2-2.8	N/A	5.5
Design Discharge Depth (ft)	0.4-0.5	N/A	0.3
Design Discharge Area (ft^2)	0.9-1.3	N/A	1.9
Design Discharge Velocity (ft/s)	5.1-5.7	N/A	3
Design Discharge (cfs)	5-8	N/A	5
Water Surface Slope	0.062	N/A	0.015
Sinuosity	1.02	1.2-1.5	1.1
Width/Depth Ratio	5.4-6.1	10-14	16.1
Bank Height Ratio	3.4-4.4	1.0-1.1	1.0
Entrenchment Ratio	1.5-2.4	2.2+	2.2+
d16 / d35 / d50 / d84 / d95 / dip / disp (mm)	N/A	Sand	Silt/Sand

Table 13. Morphological Essential Parameters for UT2

Parameter	Existing Condition	Reference Condition	Proposed
Valley Width (ft)	110-200	N/A	110-200
Contributing Drainage Area (acres)	75.1	Variable	74.8
Channel/Reach Classification	G5	C5	C5
Design Discharge Width (ft)	4.9-5.3	N/A	9.3
Design Discharge Depth (ft)	0.4-0.5	N/A	0.6
Design Discharge Area (ft^2)	1.8-2.4	N/A	5.5
Design Discharge Velocity (ft/s)	4.6-5.2	N/A	3.9
Design Discharge (cfs)	9-13	N/A	22
Water Surface Slope	0.047	N/A	0.017
Sinuosity	1	1.2-1.5	1.1
Width/Depth Ratio	11.6-13.1	10-14	15.6
Bank Height Ratio	9.6-11.3	1.0-1.1	1.0
Entrenchment Ratio	1.3	2.2+	2.2+
d16 / d35 / d50 / d84 / d95 / dip / disp (mm)	N/A	Sand	Silt/Sand

6.7 Planting

Plantings of 450 stems per acre (8 feet x 12 feet spacing) will be installed to achieve a mature survivability of two hundred ten (210) stems per acre after seven years. The planting plan is shown in the attached project plan sheets (Section 12.1). Woody vegetation planting will be conducted during dormancy. Existing, undisturbed forested areas should not be planted. Species planted may consist of the following, and any substitutions from the planting plan will be taken from the following list.

Riparian Planting - 11.6 acres

Common Name	Scientific Name	Wetland Status (Eastern Mts & Piedmont)
Alder	*Alnus serrulata*	FACW
River Birch	*Betula nigra*	FACW
American Hornbeam	*Carpinus caroliniana*	FAC
Flowering Dogwood	*Cornus florida*	FACU
Green Ash	*Fraxinus pennsylvanica*	FACW
American Witch Hazel	*Hamamelis virginiana*	FACU
Tulip Poplar	*Liriodendron tulipifera*	FACU
American Sycamore	*Platanus occidentalis*	FACW
White Oak	*Quercus alba*	FACU
Swamp Chestnut Oak	*Quercus michauxii*	FACW
Willow Oak	*Quercus phellos*	FAC
American Elm	*Ulmus americana*	FACW

6.8 Project Assets

The tables below outline the anticipated project assets that will be produced from the UTWB project.

Table 14. Project Asset Table

Project Component -or- Reach ID	Existing Footage/ Acreage	Stationing	Restoration Footage or Acreage	Creditable Footage or Acreage	Restoration Level	Approach Priority Level	Mitigation Ratio (X:1)	Mitigation Credits	Notes/Comments
UTWB-1	364	8+93-13+16	423	423	R	PI/PII	1:1	423.0	Priority II transition at top, then Priority I
UTWB-2	1,512	13+16-30+83	1,767	1,747	R	PI	1:1	1,747.0	Excludes 20' for piped bike path crossing (23+10-23+30)
UTWB-3	1,144	30+83-45+05	1,422	1,314	R	PI/PII	1:1	1,314.0	No credit for 108' of stream length in utility easement (34+98-36+02)
UT1-1	49	50+00-50+49	49	49	EII	N/A	2.5:1	19.6	
UT1-2	46	50+49-51+44	94	94	R	PI	1:1	94.0	
UT2-1	45	60+00-60+45	45	45	EI	N/A	1.5:1	30.0	
UT2-2	274	60+45-63+24	279	259	R	PI	1:1	259.0	Excludes 20' for piped bike path crossing (61+29-61+49)
TOTAL	**3,433**		**4,079**	**3,931**				**3,886.6**	

Table 15. Length and Summations by Mitigation Category

Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-riparian Wetland (acres)	Buffer (square feet)
		Riverine	Non-Riverine		
Restoration	3,985				
Enhancement					
Enhancement I	45				
Enhancement II	49				
Creation					
Preservation					
High Quality Preservation					

Table 16. Overall Assets Summary

UT West Branch Rocky River Restoration Site (Project ID - 92684)	
Overall Assets Summary	
Asset Category	**Overall Credits**
Stream	3,886.6
RP Wetland	
NR Wetland	
Buffer	

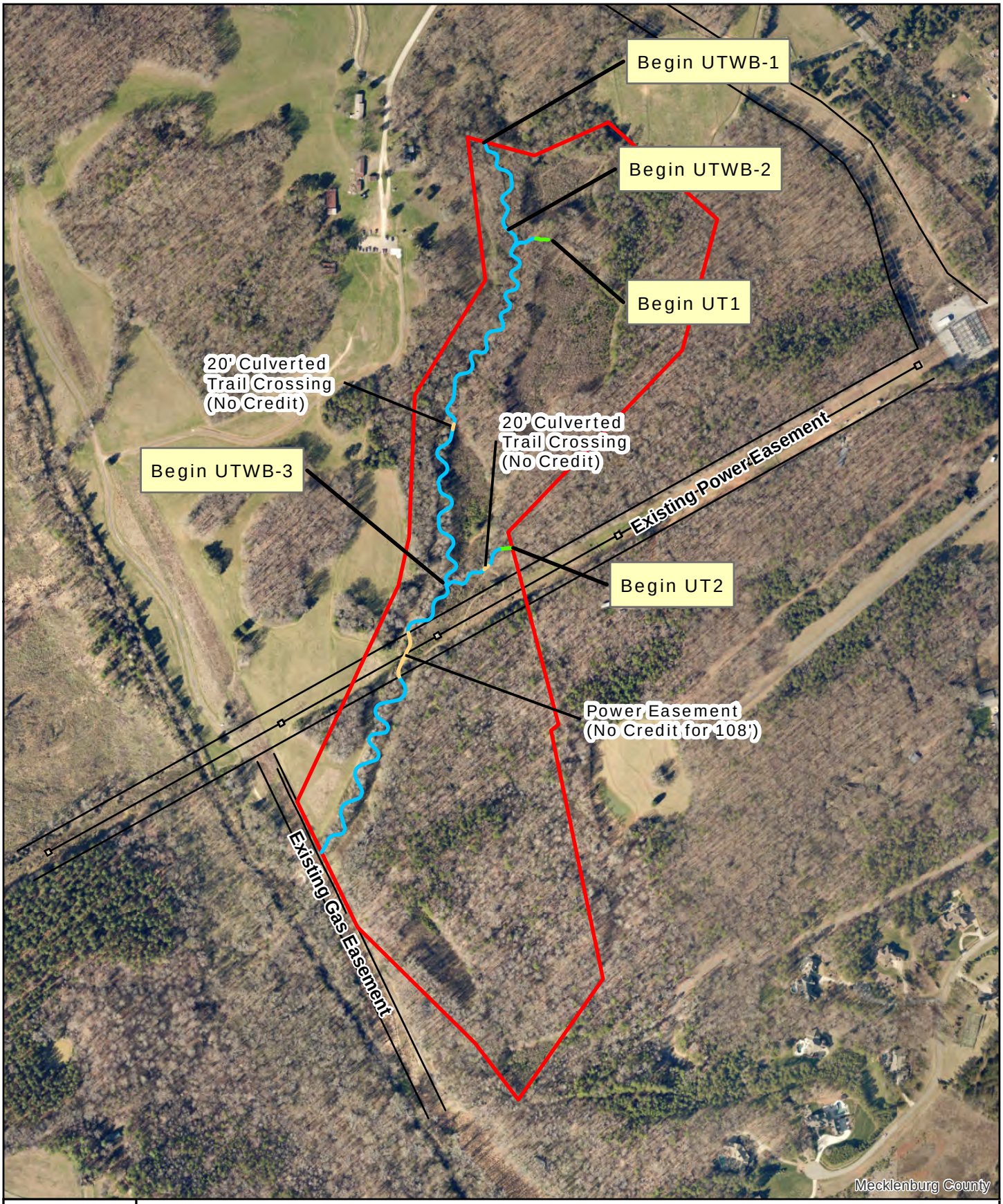

Figure 11. Project Asset Map, UT West Branch Rocky River, Mecklenburg County, NC

Project Easement
Existing Utilities
Restoration
Enhancement I
Enhancement II
No Credit

N

0 250 500 Feet

Image Source: Mecklenburg County 2018

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7.0 PERFORMANCE STANDARDS

Monitoring of the UT West Branch Site shall occur for a minimum of seven years following construction. The following performance standards for stream mitigation are based on the *Wilmington District Stream and Wetland Compensatory Mitigation Update* (NCIRT 2016) and will be used to judge site success.

Vegetation Performance
The site must achieve a woody stem density of 260 stems/acre after five years and 210 stems/acre after seven years to be considered successful. Trees in each plot must average 7 feet in height at Year 5 and 10 feet at Year 7. A single species may not account for more than 50% of the required number of stems within any plot. Volunteers must be present for a minimum of two growing seasons before being included performance standards in Year 5 and Year 7. If monitoring indicates that any of these standards are not being met, corrective actions will take place.

Stream Hydrologic Performance
During the monitoring period, a minimum of four bankfull events must be recorded within the seven-year monitoring period. These bankfull events must occur in separate monitoring years. Bankfull events will be verified using a minimum of one automatic stream monitoring gauge on UTWB to record daily stream depth readings. Any Q_{gs} flows at the project during the monitoring period will also be measured. In addition, continuous surface water flow must be documented for at least 30 consecutive days during the calendar year. Additional monitoring may be required if surface water flow cannot be documented due to abnormally dry conditions.

Stream Geomorphology Performance
The site's geomorphology will be monitored per the NRIRT 2016 monitoring guidelines. The bank height ratio (BHR) must not exceed 1.2 and the entrenchment ratio (ER) should be at least 2.2 for C channels. BHR and ER at any measured riffle cross-section should not change by more than 10% from the baseline condition during any given monitoring interval (e.g., no more than 10% between years 1 and 2, 2 and 3, 3 and 5, or 5 and 7). Adjustment and lateral movement following construction and as the channel settles over the monitoring period are to be expected. Geomorphological measurements of cross-sections will be used to determine if any adjustments that occur are out of the range typically expected for this type of stream.

8.0 MONITORING PLAN

Monitoring of UTWB shall consist of the collection and analysis of stream hydrology, stability, and vegetation survivability data to support the evaluation of the project in meeting established performance standards described above. The Proposed Monitoring Plan in Figure 12 shows the proposed locations of monitoring features described below.

Vegetation Monitoring
Vegetation monitoring will take place between July 1st and leaf drop. The success of the riparian buffer plantings will be evaluated using twelve 0.02-acre square or rectangular plots within the planted stream buffer. Six plots will be permanently installed, while the remainder will be randomly placed at the time of each monitoring visit.

In the permanent plots, the plant's height, species, location, and origin (planted versus volunteer) will be noted. In the random plots, species and height will be recorded. In all plots, exotic and invasive stems will also be tracked separately. Additionally, a photograph will be taken of each plot. Beginning at the end of the first growing season, the site's vegetation will be monitored in years 1, 2, 3, 5, and 7.

Stream Hydrologic Monitoring

Bankfull events on-site will be verified using an automatic stream monitoring gauge on UTWB-3 to record daily stream depth readings. The Q_{gs} flow for the bottom of this site is 44 cfs (based on 67% of a 2-year USSG regression flow of 66 cfs). The measured flows will also be compared to the Q_{gs} value as well as the bankfull discharge. Two other additional flow monitoring devices (either camera or gauge) will be installed on UT1 and UT2 to document the presence of flow.

Stream Geomorphology Monitoring

For stream monitoring, the purpose of monitoring is to evaluate the stability of the restored stream. Following the procedures established in the USDA Forest Service Manual, Stream Channel Reference Sites (Harrelson et al. 1994) and the methodologies utilized in the Rosgen stream assessment and classification system (1994 and 1996), data collected will consist of detailed dimension measurements, longitudinal profiles, and bed materials sampling.

Dimension

Ten permanent cross-sections (5 riffles and 5 pools) will be established along UTWB, one set of a riffle and pool on UTWB-1 and two sets on UTWB-2 and UTWB-3, respectively. Four permanent cross-sections (2 riffles and 2 pools) will also be established along UT1-2 and UT2-2. The extents of each cross-section will be recorded by either conventional survey or GPS. The cross-sectional surveys shall provide a detailed measurement of the stream and banks and will include points on the adjacent floodplain or valley, at the top of bank, bankfull, at all breaks in slope, the edge of water, and thalweg. Width/depth, bank height and entrenchment ratios, as well as bankfull cross-sectional area, width, max depth and mean depth will be calculated for each riffle cross-section based on the survey data. Width/depth ratios, bankfull cross-sectional area, width, max depth and mean depth will be calculated for each pool cross-section. Cross-section measurements will take place in Years 1, 2, 3, 5, and 7.

Profile

A detailed longitudinal profile will be conducted along the lengths of UTWB, UT1-2, and UT2-2 during the as-built survey. Measurements will include slopes (average, pool, and riffle) as well as calculations of pool-to-pool spacing. No additional profile measurements will be taken during the monitoring period unless deemed necessary due to concerns about bed elevation adjustments.

Visual Assessment

An annual site walk will be conducted at the end of each monitoring period to document any problem areas. Specific problem areas that could arise include excessive bank erosion, bed deposition or aggradation, problems with the installed structures, or sparse vegetative cover. The annual site walk will also check for any invasive plant species (see Section 12.10 for further detail on invasive management). The findings of the visual assessment as well as any recommended corrective actions for problem areas will be summarized in the monitoring reports by way of a Current Conditions Plan View (CCPV) figure.

Photograph reference points (PRPs) will be established to assist in characterizing the site and to allow qualitative evaluation of the site conditions. The location of each photo point will be marked in the monitoring plan and the bearing/orientation of the photograph will be documented to allow for repeated use.

Reporting

Annual monitoring data will be reported using the most current DMS monitoring template from June 2017. The monitoring report shall provide a project data chronology that will facilitate an understanding of project status and trends, population of DMS databases for analysis, research purposes, and assist in decision making regarding project close-out. The report will document the monitored components and include all collected data, analyses, and photographs. The first scheduled monitoring will be conducted during the first full growing season following project completion. The site will be monitored for performance standards for seven years after completion of construction. Full monitoring reports will be completed in Years 1, 2, 3, 5, and 7. Limited monitoring reports (CCPV, photos, stream gauge data, and site narrative) will be submitted in Years 4 and 6.

Table 17. Monitoring Requirements

UT West Branch Restoration Site				
Required	**Parameter**	**Quantity**	**Frequency**	**Notes**
Yes	Pattern and Profile	UTWB-1, UTWB-2, UTWB-3, UT1-2, UT2-2	Once, during as-built survey	Additional measurements in later years may be taken as necessary.
Yes	Stream Dimension	14 cross-sections (7 riffles, 7 pools)	Monitoring Years 1, 2, 3, 5, and 7	
Yes	Stream Hydrology	3 monitoring devices	Annual – throughout year	1 pressure transducer gauge on middle UTWB-3 and two other monitoring devices (gauge or camera) on UT-1 and UT-2.
Yes	Vegetation	12 vegetation monitoring plots	Monitoring Years 1, 2, 3, 5, and 7	6 permanently fixed, 6 randomly located each monitoring visit
Yes	Exotic and nuisance vegetation		Annual	Locations of invasive vegetation will be mapped*
Yes	Project boundary		Semi-annual	Locations of vegetation damage, boundary encroachments, etc. will be mapped

* See Section 12.10 for proposed invasive species management.

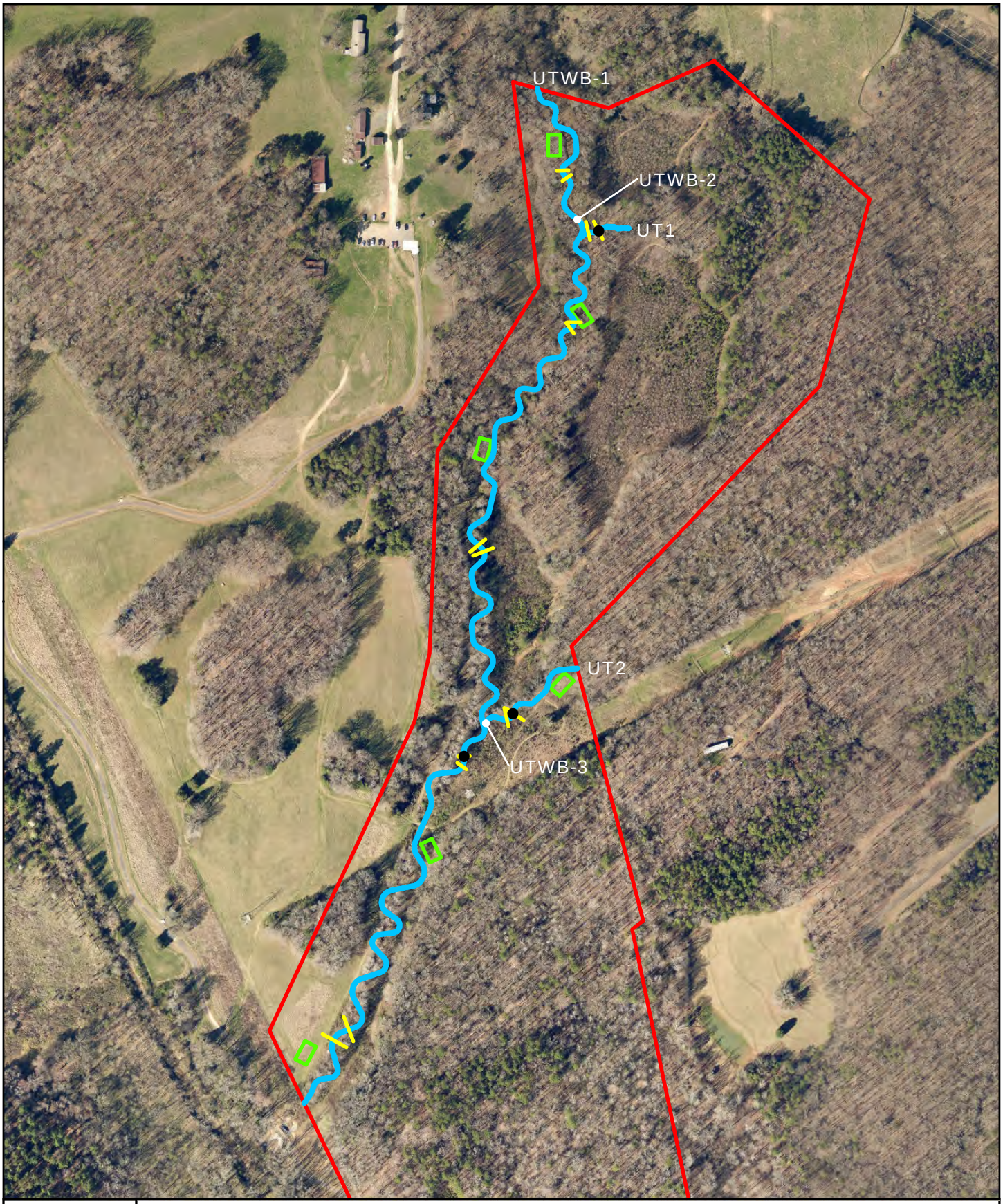

Figure 12. Proposed Monitoring Plan, UT West Branch Rocky River, Mecklenburg County, NC

Proposed Cross-Sections (14)
Proposed Thalweg
Proposed Permanent Vegetation Plots (6)
Project Easement
Proposed Flow Monitoring Device (Gauge or Camera)

N
0 175 350
Feet

Image Source: Mecklenburg County 2018

KCI ASSOCIATES OF NC

9.0 ADAPTIVE MANAGEMENT PLAN

In the event the mitigation site or a specific component of the mitigation site fails to achieve the necessary performance standards as specified in the mitigation plan, DMS shall notify the members of the IRT and work with the IRT to develop contingency plans and remedial actions.

10.0 LONG-TERM MANAGEMENT PLAN

The site will be transferred to the NCDEQ Stewardship Program. This party shall serve as conservation easement holder and long-term steward for the property and will conduct periodic inspection of the site to ensure that restrictions required in the conservation easement are upheld. Funding will be supplied by the responsible party on a yearly basis until such time an endowment is established. The NCDEQ Stewardship Program is developing an endowment system within the non-reverting, interest-bearing Conservation Lands Conservation Fund Account. The use of funds from the Endowment Account will be governed by North Carolina General Statue GS 113A-232(d)(3). Interest gained by the endowment fund may be used for the purpose of stewardship, monitoring, stewardship administration, and land transaction costs, if applicable. The Stewardship Program will periodically install signage as needed to identify boundary markings as needed. Any fencing or permanent crossings will be the responsibility the owner of the underlying fee to maintain.

11.0 REFERENCES CITED

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12.0 APPENDICES

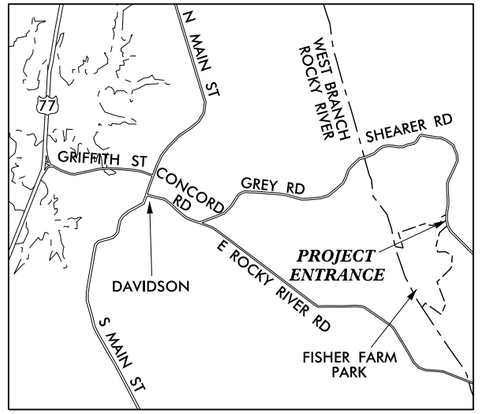
12.1 Plan Sheets

KCI JOB# : 16157593D

SCO #:

STATE	DMS PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
N.C.	92684	1	12

A	DRAFT PLANS	APRIL 2016
B	REVISED DRAFT PLANS	OCT 2017
C	SUBMITTED WITH FINAL MITIGATION PLAN	FEB 2018
D	REVISED BASED ON IRT COMMENTS	NOV 2018
REVISIONS		

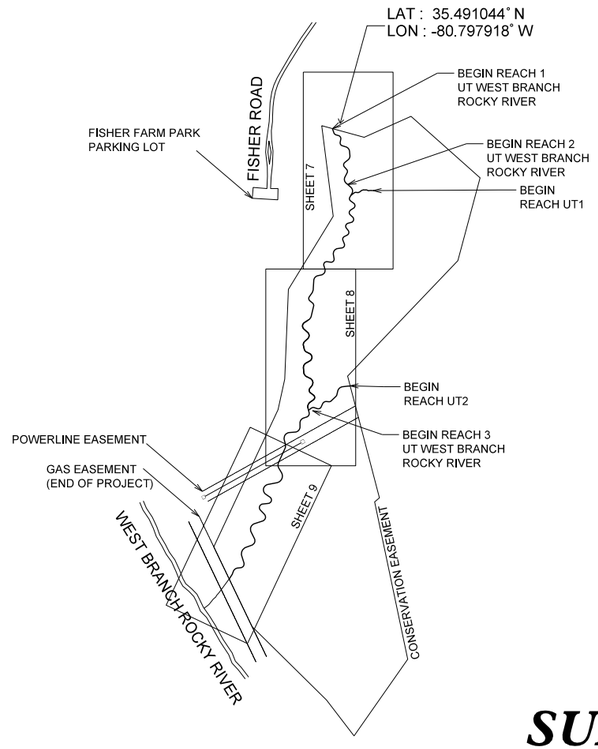


VICINITY MAP
NOT TO SCALE

NCDEQ DIVISION OF MITIGATION SERVICES

UT WEST BRANCH ROCKY RIVER STREAM RESTORATION SITE

MECKLENBURG COUNTY, NORTH CAROLINA



STREAM MITIGATION

NC GRID
NAD '83

INDEX OF SHEETS

SUBMITTED WITH MITIGATION PLAN NOT FOR CONSTRUCTION

DIRECTIONS TO SITE

Directions from Raleigh are as follows: Proceed west on I–40/I–85 S approximately 62 miles then continue onto I–85 S for approximately 64 miles. Take exit 68 for US–29 S/NC–3 N and travel for approximately 5 miles before taking a slight right onto N Ridge Avenue (NC–3 N). Follow NC–3 N approximately 10 miles then take a left onto Davidson Road. Proceed approximately 2 miles then turn right onto Shearer Road and travel approximately 2 miles before turning left onto Fisher Road. Parking for access to the project site is located at the end of Fisher Road at the Town of Davidson's Fisher Farm Park.

PROJECT DATA

	STREAM RESTORATION (1:1)	STREAM ENHANCEMENT I (1.5:1)	STREAM ENHANCEMENT II (2.5:1)	TOTAL
UTWB CREDITS	3,837 FT. 3,837 CR.	45 FT. 30.2 CR.	49 FT. 19.4 CR.	3,886.6

Prepared in the Office of:

KCI ASSOCIATES OF NC
ENGINEERS•PLANNERS•ECOLOGISTS
4505 FALLS OF NEUSE RD, SUITE 400
RALEIGH, NC 27609

Prepared for:

HARRY TSOMIDES
DMS PROJECT MANAGER

LIN XU
DMS REVIEW COORDINATOR

Prepared by:

KRISTIN E. KNIGHT, PE
PROJECT ENGINEER

PROJECT ENGINEER

P.E.
SIGNATURE:

GENERAL NOTES:

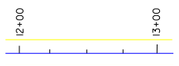
BEARINGS AND DISTANCES:
ALL BEARINGS ARE NAD 1983 GRID BEARINGS.
ALL DISTANCES AND COORDINATES SHOWN ARE HORIZONTAL (GROUND) VALUES.

UTILITY/SUBSURFACE PLANS:
NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. EXISTING UNDERGROUND UTILITIES HAVE NOT BEEN VERIFIED.
THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING A UTILITY LOCATOR AND ESTABLISHING THE EXACT LOCATION OF ANY
AND ALL EXISTING UTILITIES IN THE PROJECT REACH.

CONTROL POINTS

POINT	DESCRIPTION	NORTHING	EASTING	ELEV
4	nail	638703.97	1464885.17	721.51
5	nail	638580.48	1464818.92	714.10
6	nail	638418.53	1464889.39	708.52
7	nail	638147.94	1464925.14	701.43
8	nail	637984.26	1464935.24	697.99
9	rebar	637761.87	1464816.20	695.40
10	rebar	637616.59	1464714.22	690.37
11	REBAR set	637363.12	1464629.78	687.32
12	rebar	637100.88	1464657.00	681.05
13	rebar	636816.90	1464591.93	676.74
14	rebar	636541.91	1464440.18	676.31
800	alm-cap	638510.07	1464774.24	720.51
849	alm-cap	638477.18	1464894.35	709.90
950	alm-cap	638388.31	1464941.24	709.19
1271	alm-cap	638105.32	1464903.36	703.47
1445	alm-cap	637882.03	1464870.03	697.47
1457	alm-cap	637997.50	1464895.49	702.68
1529	nail10003	637975.94	1464796.18	720.49
1949	alm-cap	636966.63	1464777.57	682.98
10003	nail	637976.32	1464796.33	720.70
10004	nail	638135.25	1464644.49	750.83
10005	nail	636495.77	1464452.16	672.70
10006	nail	635840.14	1464159.77	662.66
10022	path-cl	635787.74	1464120.32	662.20
10261	rebar set	636108.67	1464281.21	668.35

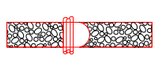
PROJECT LEGEND:

Proposed Thalweg w/Approximate Bankfull Limits ..... 

Proposed Step Pool ..... 

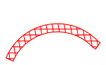
Proposed Alternating Rock Step Riffle w/Soil Lift ..... 

Proposed Constr. Riffle w/Soil Lift ..... 

Proposed Constr. Riffle w/Log Sill and Soil Lift ..... 

Proposed Channel Block ..... 

Existing Channel to be Filled ..... 

Proposed Toe Wood With Soil Lift ..... 

Existing Channel to be Filled ..... 

Existing Woods Line ..... 

Minor Contour Line .....

Major Contour Line .....

REVISIONS

SYM.	DESCRIPTION	DATE

DIVISION OF MITIGATION SERVICES

NC Environmental Quality

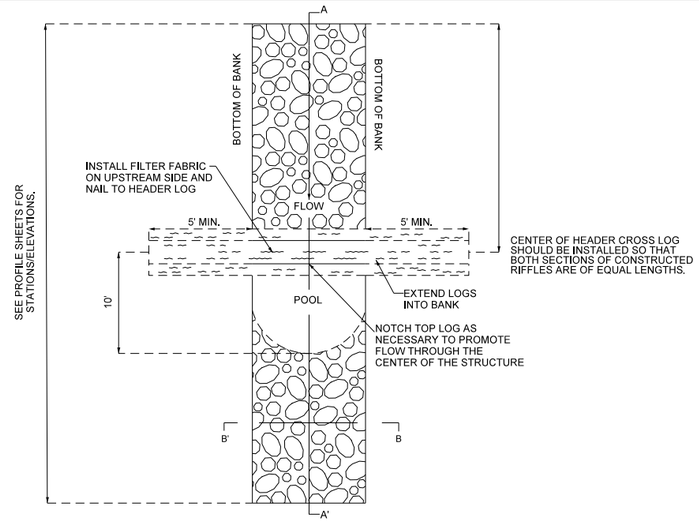
KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

UT TO WEST BRANCH
STREAM RESTORATION SITE

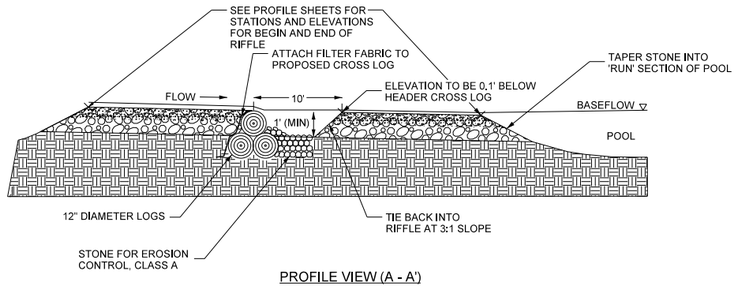
MECKLENBURG COUNTY, NORTH CAROLINA

DATE: NOV 2018
SCALE: N.T.S

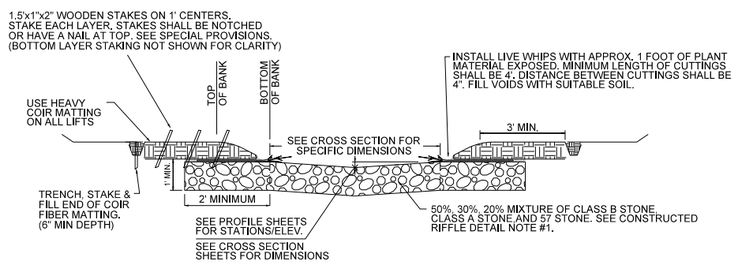
PROJECT LEGEND & NOTES



PLAN VIEW



PROFILE VIEW (A - A')



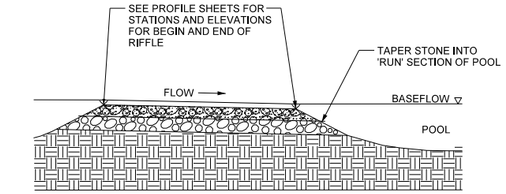
CROSS-SECTION VIEW (B - B')

CONSTRUCTED RIFFLE WITH LOG SILL AND SOIL LIFT

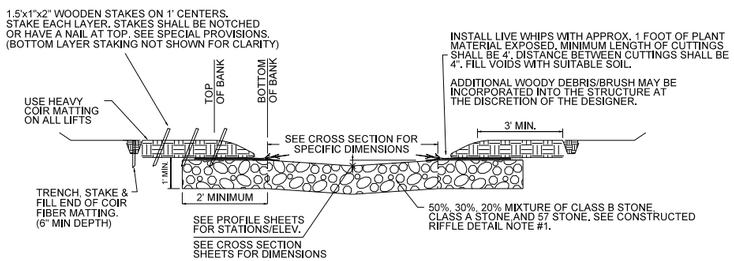
SCALE: NTS

NOTE:

1. BEGIN BY INSTALLING CLASS B STONE. THEN ADD A MIX OF 57 STONE AND CLASS A TO FILL IN VOIDS AND TO OBTAIN FINAL GRADE. FINISH BY WASHING IN NATURAL STREAM MATERIAL TO FILL ANY REMAINING VOIDS. DEPTH OF STONE SHOULD BE 1' MINIMUM.



SECTION (PROFILE VIEW)



CROSS-SECTION VIEW

CONSTRUCTED RIFFLE WITH SOIL LIFT

SCALE: NTS

NOTE:

1. BEGIN BY INSTALLING CLASS B STONE. THEN ADD A MIX OF 57 STONE AND CLASS A TO FILL IN VOIDS AND TO OBTAIN FINAL GRADE. FINISH BY WASHING IN NATURAL STREAM MATERIAL TO FILL ANY REMAINING VOIDS. DEPTH OF STONE SHOULD BE 1' MINIMUM.

REVISIONS

SYM.	DESCRIPTION	DATE

DIVISION OF MITIGATION SERVICES

NC Environmental Quality

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

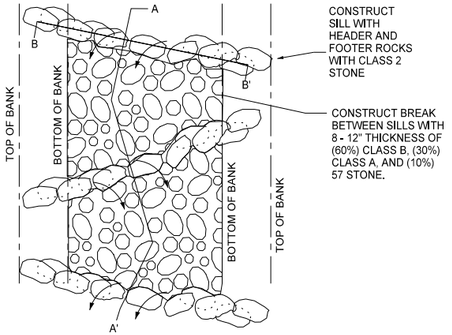
UT TO WEST BRANCH
STREAM RESTORATION SITE

MECKLENBURG COUNTY, NORTH CAROLINA

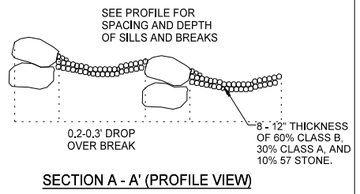
DATE: NOV 2018
SCALE: N.T.S.

DETAILS

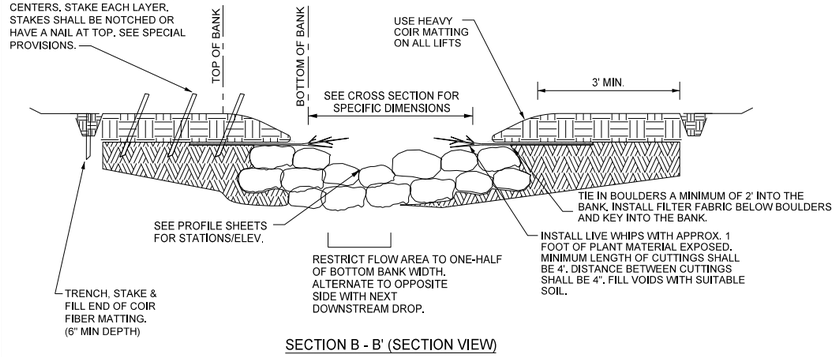
SHEET 3 OF 12



PLAN VIEW

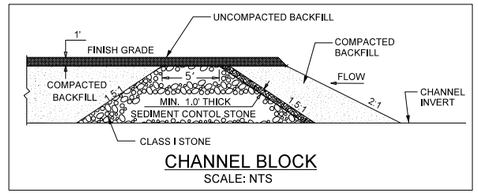


SECTION A - A' (PROFILE VIEW)



SECTION B - B' (SECTION VIEW)

ALTERNATING ROCK STEP RIFFLE
WITH SOIL LIFT



CHANNEL BLOCK
SCALE: NTS

NOTES:

-MATTING SHALL BE INSTALLED PRIOR TO THE INTRODUCTION OF WATER TO A STREAM SECTION.

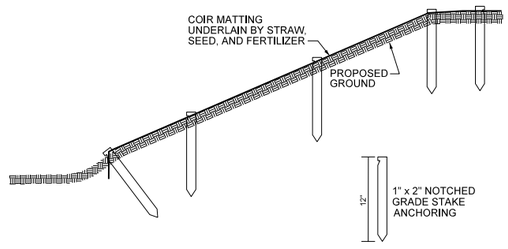
-ALL DISTURBED AREAS INSIDE FLOOD-PLAIN EXTENTS SHALL BE SEEDED DAILY.

-GROUND SHALL BE PREPARED AND SEED & FERTILIZER APPLIED ACCORDING TO PROJECT SPECIAL PROVISIONS.

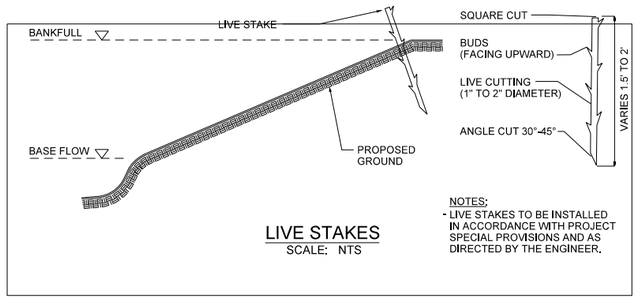
-MATTING SHALL BE INSTALLED ALONG THE OUTSIDE MEANDERS

-MATTING SHALL EXTEND FROM TOE OF SLOPE TO THE TOP OF BANK.

-MATTING SHALL BE APPLIED AND STAKED IN ACCORDANCE WITH PROJECT SPECIAL PROVISIONS.



COIR MATTING DETAIL
SCALE: NTS



LIVE STAKES
SCALE: NTS

NOTES:
- LIVE STAKES TO BE INSTALLED IN ACCORDANCE WITH PROJECT SPECIAL PROVISIONS AND AS DIRECTED BY THE ENGINEER.

REVISIONS

NO.	DESCRIPTION	DATE

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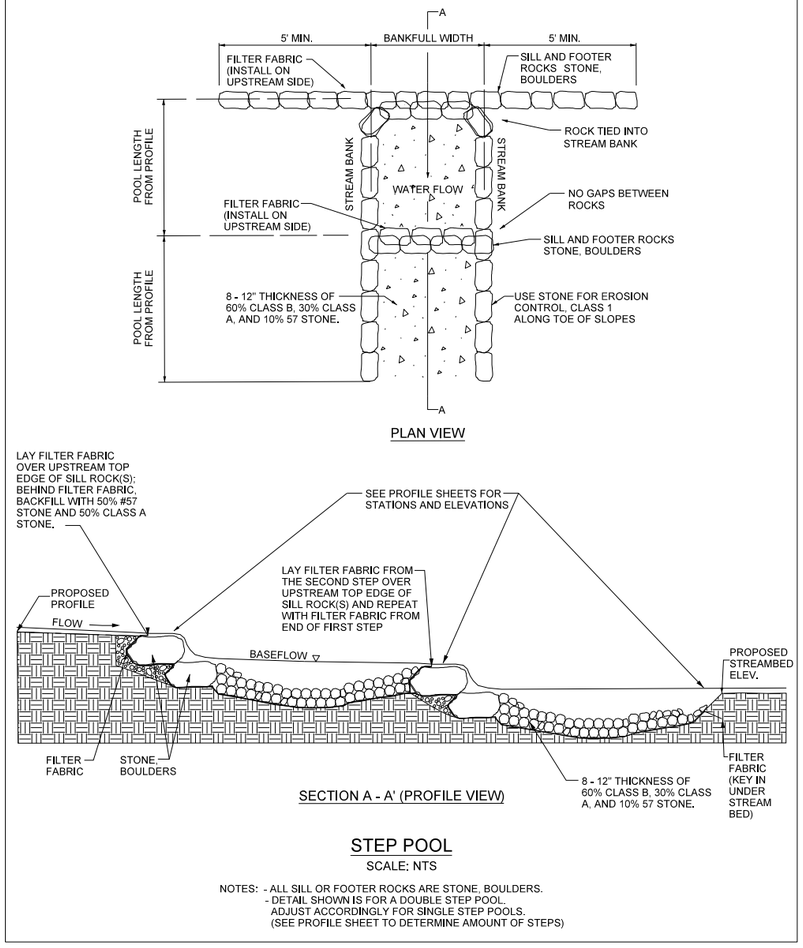
DETAILS

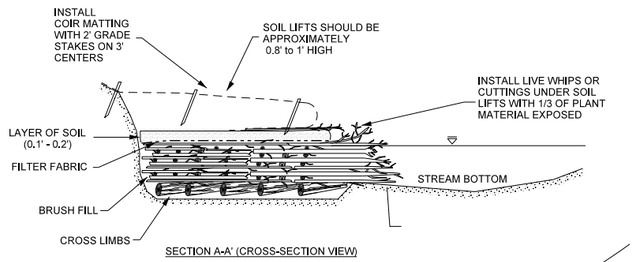
SHEET 4 OF 12



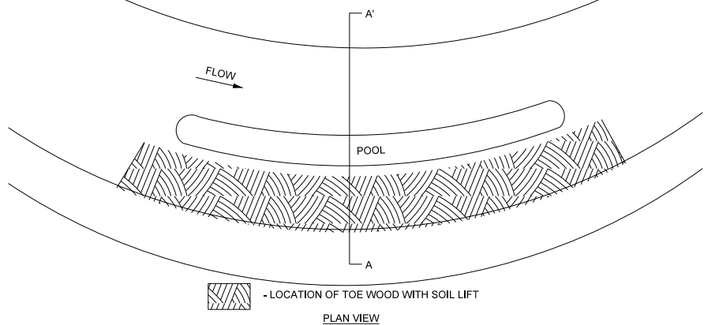
STEP POOL

SCALE: NTS

NOTES:
- ALL SILL OR FOOTER ROCKS ARE STONE, BOULDERS.
- DETAIL SHOWN IS FOR A DOUBLE STEP POOL. ADJUST ACCORDINGLY FOR SINGLE STEP POOLS. (SEE PROFILE SHEET TO DETERMINE AMOUNT OF STEPS)



SECTION A-A' (CROSS-SECTION VIEW)



PLAN VIEW

NOTES

STEP 1 - INSTALL 4" TO 10" CROSS LIMBS ANGLED 30 DEGREES UPSTREAM.

STEP 2 - FILL TOP OF CROSS LIMBS WITH BRUSH INSTALLED IN MULTIPLE DIRECTIONS.

STEP 3 - PLACE FILTER FABRIC OVER THE BRUSH AND ADD A LAYER OF SOIL ON TOP. SOIL LAYER IS APPROX 0.1' - 0.2' HIGH. THEN INSTALL SOIL LIFT.

TOE WOOD WITH SOIL LIFT

SCALE: NTS

REVISIONS

SYM.	DESCRIPTION	DATE

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NC Environmental Quality

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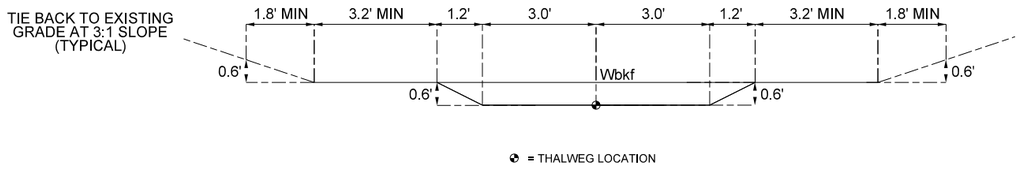
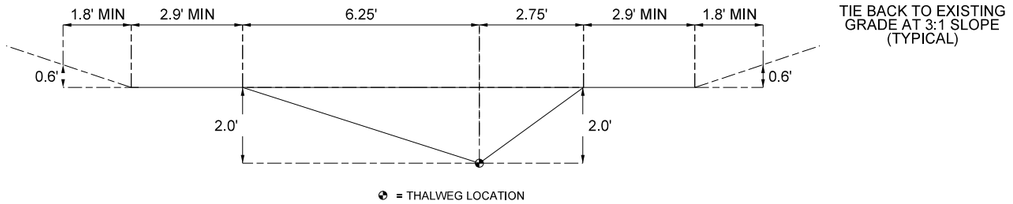
DETAILS

SHEET 5 OF 12

UTWB-1 STATION 8+93 TO STATION 13+16
UTWB-2 STATION 13+16 TO STATION 30+83
"C5" STREAM TYPE

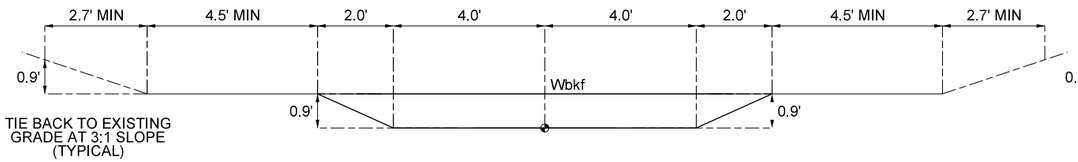


TYPICAL RIFFLE

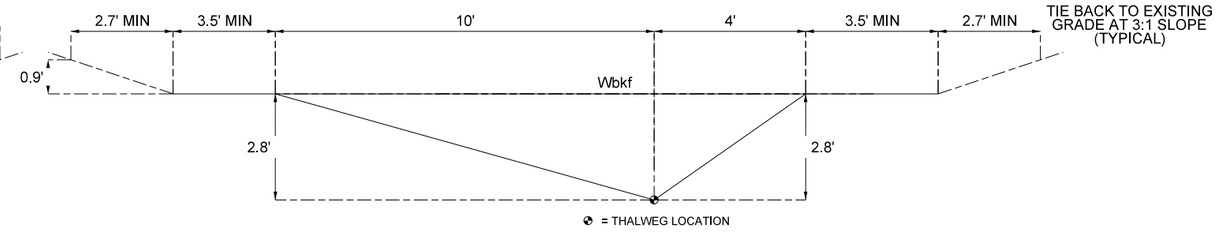


TYPICAL POOL - RIGHT MEANDER

UTWB-3
STATION 30+83 TO STATION 45+05
"C5" STREAM TYPE

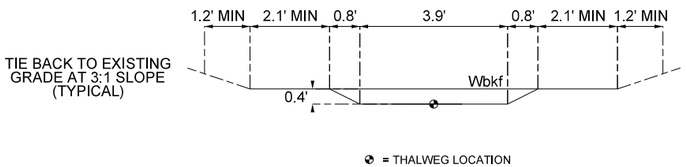


TYPICAL RIFFLE

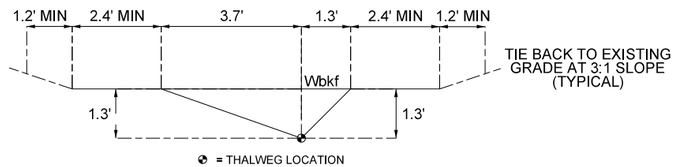


TYPICAL POOL - RIGHT MEANDER

UT1
STATION 50+00 TO STATION 51+43
"C5" STREAM TYPE

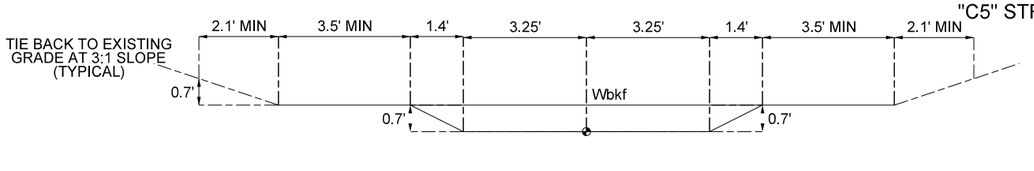


TYPICAL RIFFLE

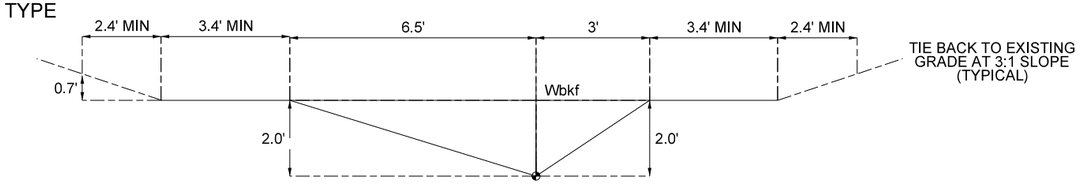


TYPICAL POOL - RIGHT MEANDER

UT2
STATION 60+00 TO STATION 63+24
"C5" STREAM TYPE



TYPICAL RIFFLE



TYPICAL POOL - RIGHT MEANDER

REVISIONS

SYM.	DESCRIPTION	DATE

DIVISION OF MITIGATION SERVICES

NC Environmental Quality

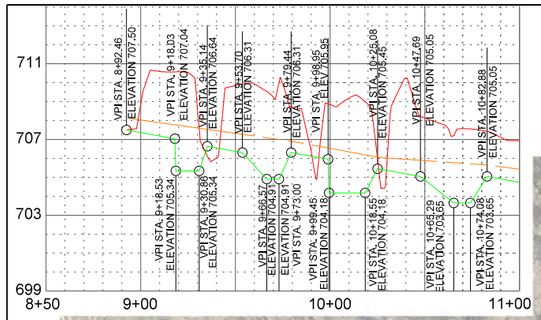
KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

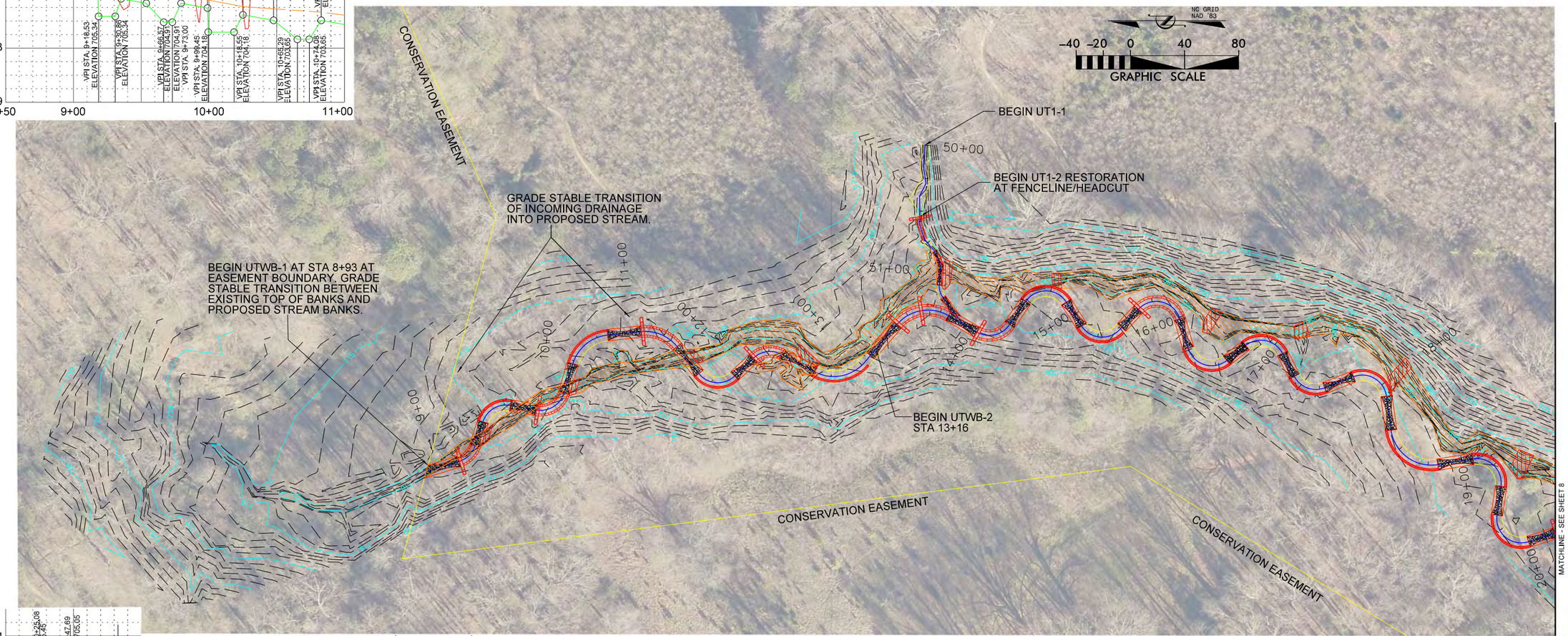
UT TO WEST BRANCH
STREAM RESTORATION SITE

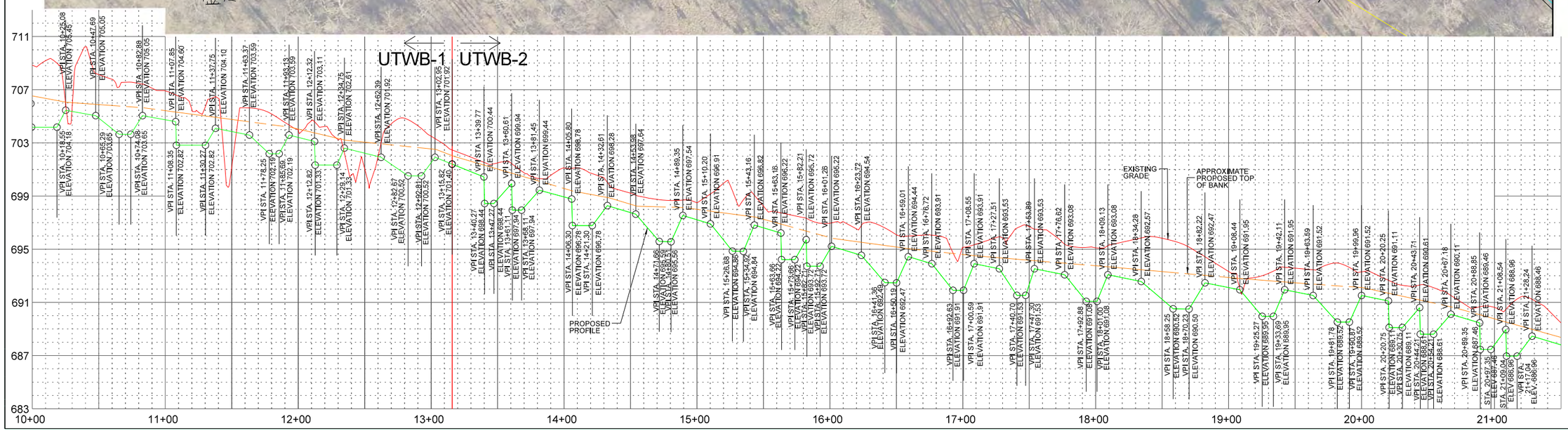
MECKLENBURG COUNTY, NORTH CAROLINA

DATE: NOV 2018
SCALE: 1"=40'

TYPICAL CROSS-SECTION







REVISIONS

SYM.	DESCRIPTION	DATE

DIVISION OF MITIGATION SERVICES

NC Environmental Quality

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

UT TO WEST BRANCH STREAM RESTORATION SITE

MECKLENBURG COUNTY, NORTH CAROLINA
UTWB-1 AND UTWB-2; UT1

DATE: NOV 2018
SCALE: GRAPHIC

PLAN AND PROFILE

SHEET 7 OF 12

NC GRID
NAD '83

–40 –20 0 40 80

GRAPHIC SCALE

START UT2

CONSERVATION EASEMENT

60+00

61+00

68' POWER EASEMENT

INSTALL 48" CMP EMBEDDED 1'

62+00

START UTWB-3

INSTALL 48" CMP EMBEDDED 1'

MATCHLINE - SEE SHEET 7

21+00

22+00

23+00

24+00

25+00

26+00

27+00

28+00

29+00

30+00

31+00

32+00

33+00

34+00

35+00

MATCHLINE - SEE SHEET 9

INSTALL TWO 48" CMP EMBEDDED 1'

CONSERVATION EASEMENT

20'-LONG 48" CMP CULVERT EMBEDDED 1' DEEP WITH MIN. 1' COVER
STA 23+09.68 INV. 684.38
TO STA 23+29.68 INV. 683.67

PROPOSED PROFILE

APPROXIMATE PROPOSED TOP OF BANK

UTWB-2 UTWB-3

691
687
683
679
675
671
667
663
659

22+00 23+00 24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00

REVISIONS

SYM.	DESCRIPTION	DATE

DIVISION OF MITIGATION SERVICES

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ENGINEERS • PLANNERS • SCIENTISTS
4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

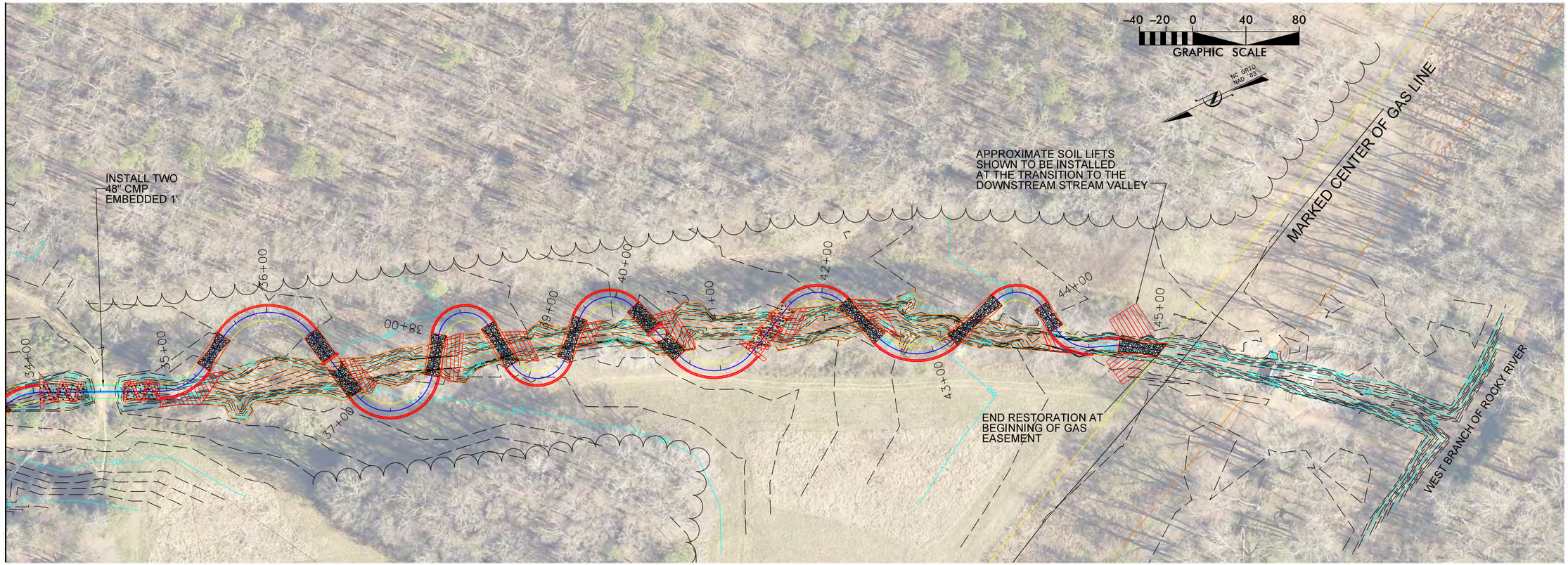
UT TO WEST BRANCH
STREAM RESTORATION SITE

MECKLENBURG COUNTY, NORTH CAROLINA
UTWB-2 AND UTWB-3; UT2

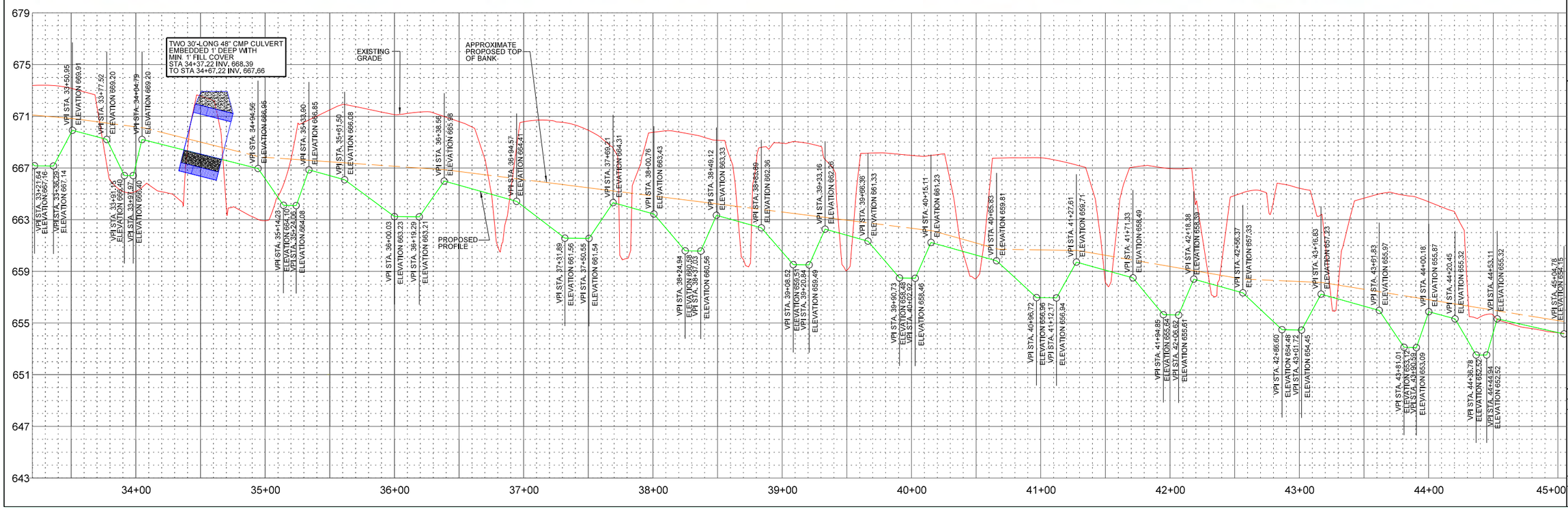
DATE: NOV 2018
SCALE: GRAPHIC

PLAN AND PROFILE

SHEET 8 OF 12



MATCHLINE - SEE SHEET 8



REVISIONS

SYM.	DESCRIPTION	DATE

DIVISION OF MITIGATION SERVICES

NC Environmental Quality

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4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

UT TO WEST BRANCH STREAM RESTORATION SITE

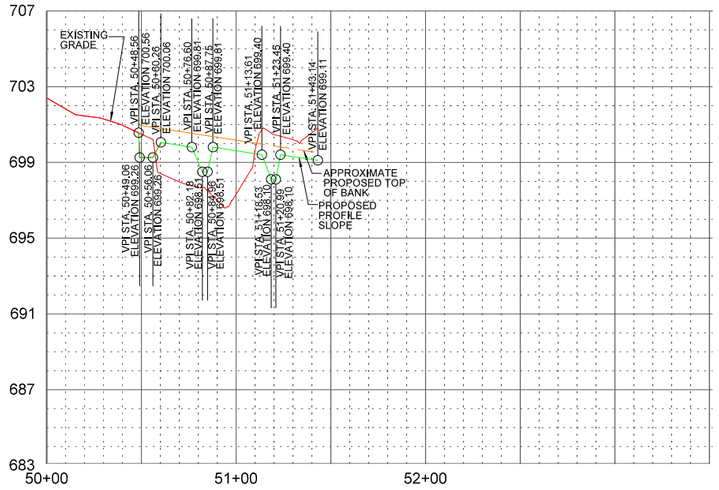
MECKLENBURG COUNTY, NORTH CAROLINA
UTWB-3

DATE: NOV 2018
SCALE: GRAPHIC

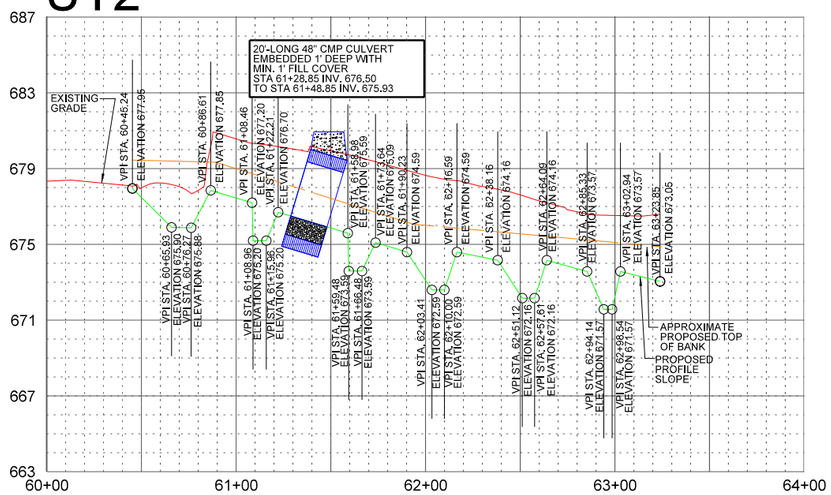
PLAN AND PROFILE

SHEET 9 OF 12

UT1



UT2



REVISIONS

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4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

UT TO WEST BRANCH
STREAM RESTORATION SITE

MECKLENBURG COUNTY, NORTH CAROLINA
UT1 AND UT2 PROFILES

DATE: NOV 2018
SCALE: SEE GRAPHIC

PLAN AND PROFILE

STREAM ZONE

STREAM ZONE
LIVE STAKES: 1.5' TO 2' LENGTHS, 1/2' TO 2" DIAMETER,
2 ROWS AT 3' CENTER SPACING, RANDOM SPECIES PLACEMENT

COMMON NAME	SCIENTIFIC NAME
SILKY DOGWOOD	CORNUS AMOMUM
BLACK WILLOW	SALIX NIGRA
SILKY WILLOW	SALIX SERICEA
COMMON ELDERBERRY	SAMBUCUS CANADENSIS

NOTE: NO SINGLE LIVE STAKING SPECIES SHALL COMPOSE MORE THAN 40% OF THE TOTAL NUMBER OF LIVE STAKES TO BE INSTALLED.

RIPARIAN ZONE

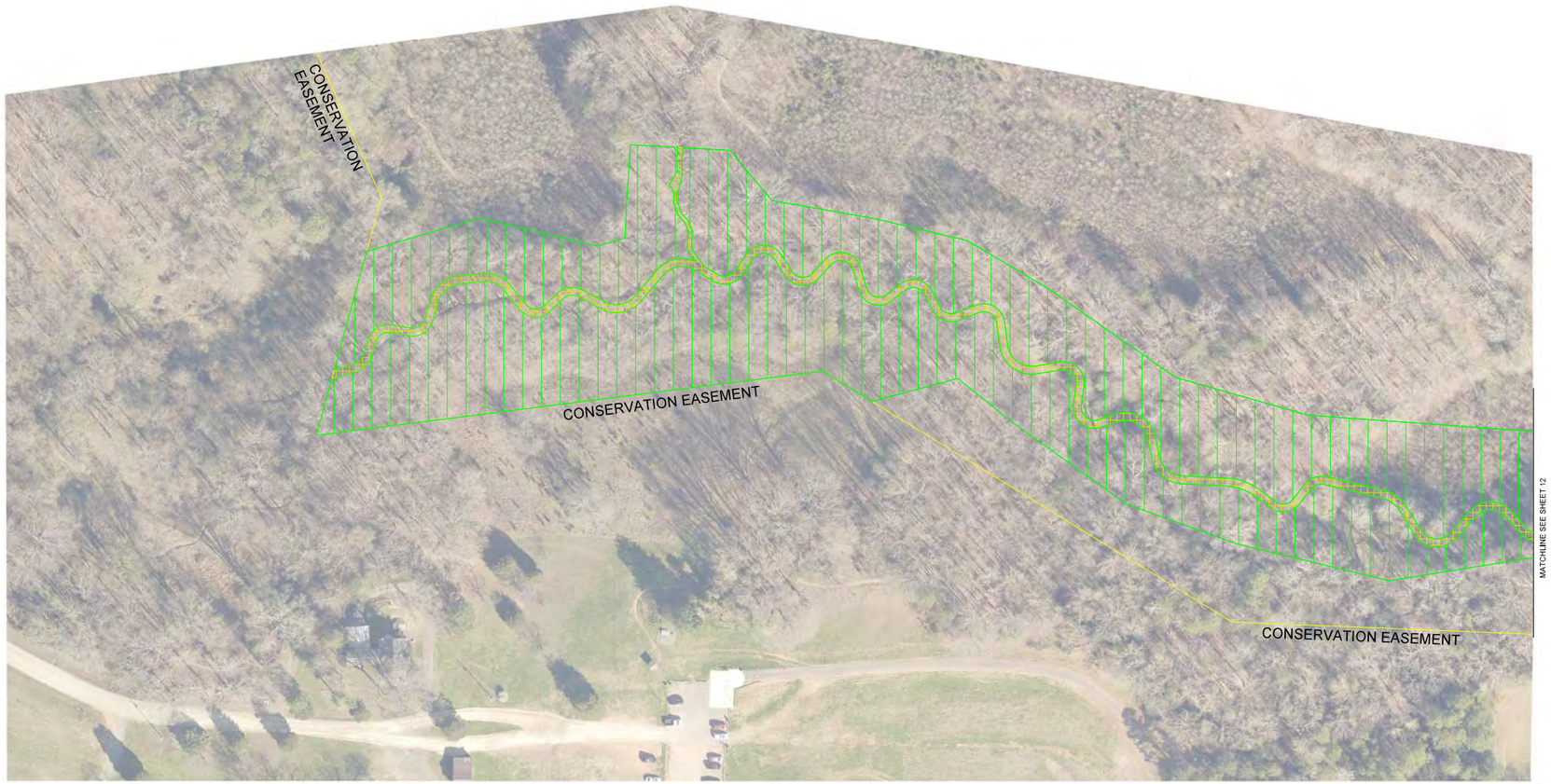
RIPARIAN PLANTING ZONE = 11.6 ACRES

12" - 18" BARE ROOT MATERIAL
450 STEMS/ACRE (8' X 12' SPACING), RANDOM SPECIES PLACEMENT
PERCENTAGES MAY BE ADJUSTED FOLLOWING APPROVAL BY THE DESIGNER. A MINIMUM OF SIX SPECIES FROM THE FOLLOWING LIST MUST BE USED.

COMMON NAME	SCIENTIFIC NAME	STATUS	% OF TOTAL	# OF PLANTS
ALDER	ALNUS SERRULATA	FACW	5.0%	265
RIVER BIRCH	BETULA NIGRA	FACW	9.0%	470
AMERICAN HORNBEAM	CARPINUS CAROLINIANA	FAC	9.0%	470
FLOWERING DOGWOOD	CORNUS FLORIDA	FACU	5.0%	265
GREEN ASH	FRAXINUS PENNSYLVANICA	FACW	9.0%	470
AMERICAN WITCH HAZEL	HAMAMELIS VIRGINIANA	FACU	5.0%	265
TULIP POPLAR	LIRIODENDRON TULIPIFERA	FACU	9.0%	470
AMERICAN SYCAMORE	PLATANUS OCCIDENTALIS	FACW	9.0%	470
WHITE OAK	QUERCUS ALBA	FACU	10.0%	520
SWAMP CHESTNUT OAK	QUERCUS MICHAUXII	FACW	10.0%	520
WILLOW OAK	QUERCUS PHELLOS	FAC	10.0%	520
AMERICAN ELM	ULMUS AMERICANA	FACW	10.0%	520
				5,225

NC GRID
NAD '83

–75′ –37.5′ 0′ 75′ 150′
GRAPHIC SCALE



REVISIONS

SYM.	DESCRIPTION	DATE

DIVISION OF MITIGATION SERVICES

NC Environmental Quality

KCI ASSOCIATES OF NC
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4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

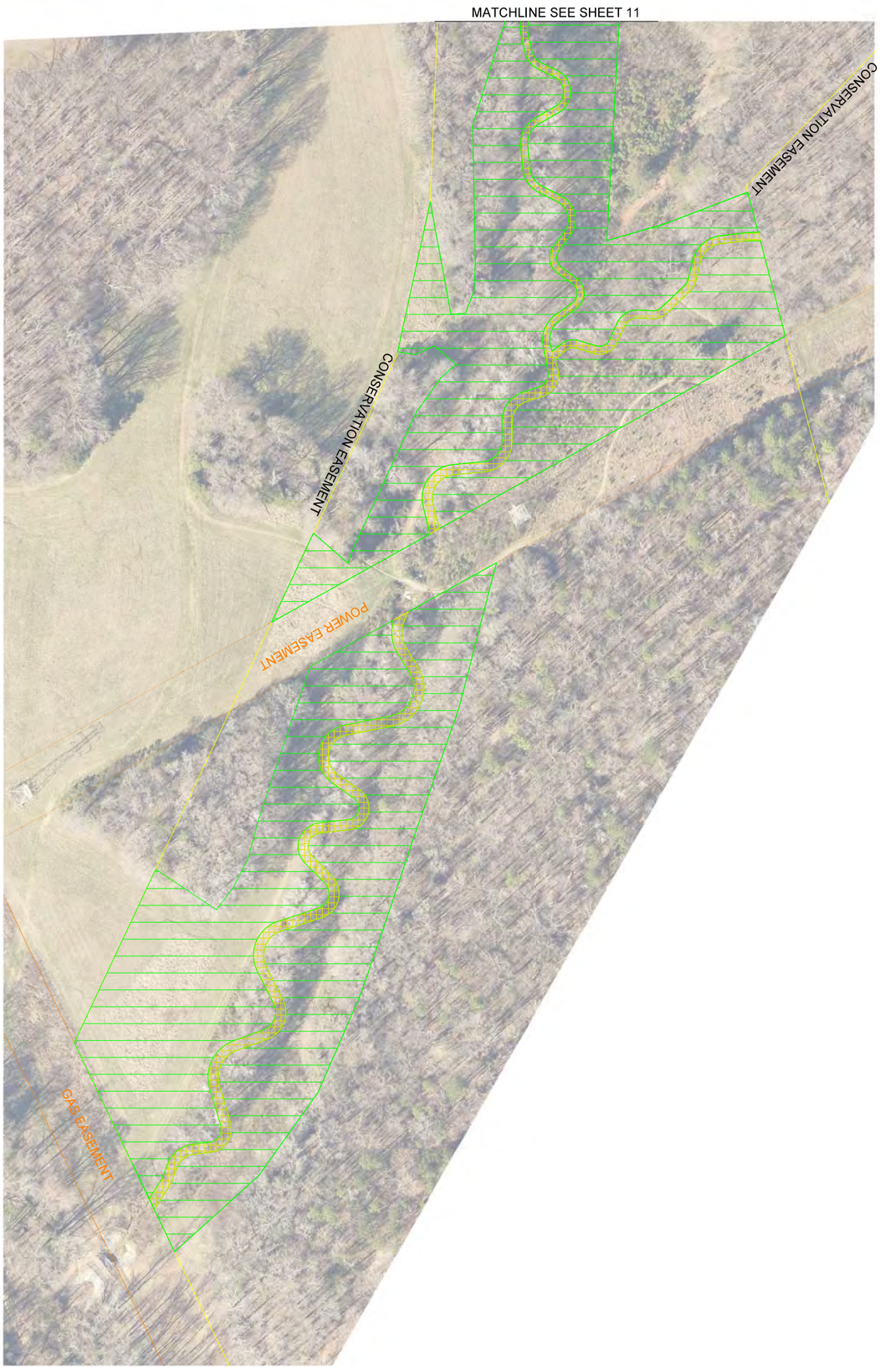
UT TO WEST BRANCH
STREAM RESTORATION SITE

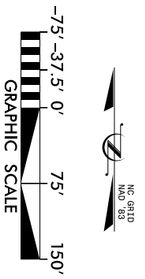
MECKLENBURG COUNTY, NORTH CAROLINA

DATE: NOV 2018
SCALE: GRAPHIC

PLANTING PLAN

SHEET 11 OF 12





SHEET 12 OF 12

PLANTING PLAN

DATE: NOV 2018
SCALE: GRAPHIC

UT TO WEST BRANCH
STREAM RESTORATION SITE

MECKLENBURG COUNTY, NORTH CAROLINA

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

NC Environmental Quality
DIVISION OF MITIGATION SERVICES

SYM.	DESCRIPTION	DATE

REVISIONS

12.2 Data Analysis/Supplemental Information and Maps

Soil Borings and Map
Existing Conditions Cross-Sections
Pebble Count Tables
Stream Morphological Tables
Existing Trail Map

KCI ASSOCIATES OF NORTH CAROLINA, PA

SOIL PROFILE DESCRIPTION

Client: KCI Associates of North Carolina, P.A. **Date:** February 5, 2016
Project: UT West Branch Rocky River **Project #:** 16157593D, Task SA
County: Mecklenburg **State:** NC
Location: Fisher Farm Park **Site/Lot:** Boring # 1
Soil Series: Cecil
Soil Classification: Fine, kaolinitic, thermic Typic Kanhapludults
AWT: 50" **SHWT:** >6.0' **Slope:** 0-2% **Aspect:**
Elevation: **Drainage:** Well Drained **Permeability:** Moderate
Vegetation: Between Riparian Forest and edge of clearing with grasses and Sweetgum saplings.
Borings terminated at 62 **Inches**

HORIZON	DEPTH (IN)	MATRIX	MOTTLES	TEXTURE	STRUCTURE	CONSISTENCE	BOUNDARY	NOTES
A1	0-5	7.5YR 4/4		l	1fgr	mvfr	cs	
E	5-10	5YR 4/6		sl	1fsbk	mfr	cs	
BA	10-20	5YR 4/4	5YR 3/3c2d	scl	1fsbk	mfr	gw	
Bt1	20-50	5YR 4/6	5YR 2.5/1c2d	scl-sc	2msbk	mfi	gw	
BC	50-62	5YR 4/6		sl	1fsbk	mfr		few fine mica flakes

COMMENTS:

DESCRIBED BY: SFS DATE: 2/5/2016

LICENSED SOIL SCIENTIST STEVEN F. STOKES 1087 STATE OF NORTH CAROLINA

KCI ASSOCIATES OF NORTH CAROLINA, PA

SOIL PROFILE DESCRIPTION

Client: KCI Associates of North Carolina, P.A. **Date:** February 5, 2016
Project: UT West Branch Rocky River **Project #:** 16157593D, Task SA
County: Mecklenburg **State:** NC
Location: Fisher Farm Park **Site/Lot:** Boring # 2
Soil Series: Monacan
Soil Classification: Fine-Loamy, mixed, active, thermic Fluvaquentic Eutrudepts
AWT: 30" **SHWT:** 0.5'-2.0' **Slope:** 0-1% **Aspect:**
Elevation: **Drainage:** Moderately Well to Somewhat Poorly **Permeability:** Moderate above the buried soil
Vegetation: Riparian Forest
Borings terminated at 54 **Inches**

HORIZON	DEPTH (IN)	MATRIX	MOTTLES	TEXTURE	STRUCTURE	CONSISTENCE	BOUNDARY	NOTES
A1	0-1	7.5YR 4/3		l	1fgr	mvfr	cs	
A2	1-8	7.5YR 4/4		l	1fsbk	mfr	cs	
Bw1	8-21	5YR 4/6	7.5YR 5/4f2d	l	1fsbk	mfr	cs	
			5YR 5/4c2f					
Bw2	21-23		5YR 6/3	s	sg	ml	cs	
			5YR 5/6					
Bw3	23-30	7.5YR 5/3	5YR 4/6c2d	cl	1msbk	mfr	gs	
			5YR 2.5/1c2d					
Bw4	30-40	7.5YR 5/2	5YR 4/6c2d	l	1msbk	mfr	gs	
2Bgb	40-48	10YR 4/2		l	1csbk	mfr	cs	buried surface with pine needles, leaves
								& charcoal
C	48-54	10YR 5/2		s	sg	ml		

COMMENTS:

DESCRIBED BY: SFS DATE: 2/5/2016

KCI ASSOCIATES OF NORTH CAROLINA, PA

SOIL PROFILE DESCRIPTION

Client: KCI Associates of North Carolina, P.A. **Date:** February 5, 2016
Project: UT West Branch Rocky River **Project #:** 16157593D, Task SA
County: Mecklenburg **State:** NC
Location: Fisher Farm Park **Site/Lot:** Boring # 3
Soil Series: Monacan
Soil Classification: Fine-Loamy, mixed, active, thermic Fluvaquentic Eutrudepts
AWT: 22" **SHWT:** 0.5'-2.0' **Slope:** 0-1% **Aspect:**
Elevation: **Drainage:** Moderately Well to Somewhat Poorly **Permeability:** Moderate
Vegetation: Riparian Forest
Borings terminated at 42 **Inches**

HORIZON	DEPTH (IN)	MATRIX	MOTTLES	TEXTURE	STRUCTURE	CONSISTENCE	BOUNDARY	NOTES
A1	0-7	7.5YR 5/3		l	1fgr	mvfr	cs	
A2	7-12	7.5YR 5/3	5YR 4/6c2d	l	1fgr	mvfr	cs	
			7.5YR 6/2f1f					
Bw1	12-21	10YR 5/2	5YR 4/6c2d	cl	1fsbk	gw	cs	
Bw2	21-27	7.5YR 5/1	5YR 4/6c2d	sl	1fsbk	mfr	gs	
			7.5YR 4/6					
C1	27-36		6N	sc	massive	mfi	gw	thick sand lenses
			5YR 4/6					
C2	36-42	6N	5YR 4/6c2p	sc-c	massive	mfi		

COMMENTS:

DESCRIBED BY: SFS DATE: 2/5/2016

LICENSED SOIL SCIENTIST STEVEN F. STOKES 1087 STATE OF NORTH CAROLINA

KCI
ASSOCIATES OF
NORTH CAROLINA, PA

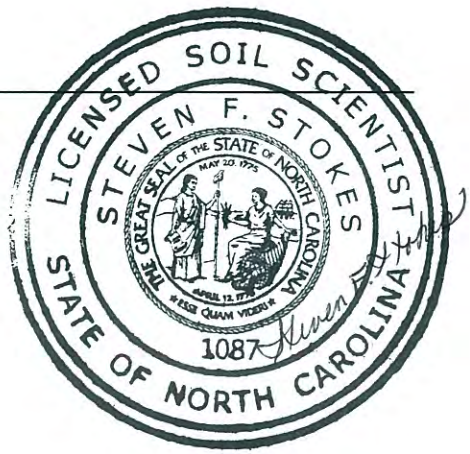
SOIL PROFILE DESCRIPTION

Client: KCI Associates of North Carolina, P.A. **Date:** February 5, 2016
Project: UT West Branch Rocky River **Project #:** 16157593D, Task SA
County: Mecklenburg **State:** NC
Location: Fisher Farm Park **Site/Lot:** Boring # 4
Soil Series: Monacan
Soil Classification: Fine-Loamy, mixed, active, thermic Fluvaquentic Eutrudepts
AWT: >60" **SHWT:** 0.5'-2.0' **Slope:** 0-1% **Aspect:**
Elevation: **Drainage:** Moderately Well to Somewhat Poorly **Permeability:** Moderate
Vegetation: Riparian Forest
Borings terminated at 60 **Inches**

HORIZON	DEPTH (IN)	MATRIX	MOTTLES	TEXTURE	STRUCTURE	CONSISTENCE	BOUNDARY	NOTES
A1	0-6	7.5YR 4/3		l	1fgr	mvfr	cs	
A2	6-10	7.5YR 4/4		l	1fsbk	mvfr	cs	
Bw1	10-14	5YR 4/6		sl	1msbk	mfr	cs	
Bw2	14-20	5YR 5/6		s	sg	ml	cs	coarse sandy lenses
Bw3	20-23	5YR 4/6		sil	1msbk	mfr	cs	
Bw4	23-37	5YR 4/4	5YR 2.5/1f1f	sl	1fsbk	mfr	cs	
Bw5	37-42	5YR 4/6	7.5YR 4/3c2d	ls	1csbk	ml	cs	sand lenses
Bw6	42-44	7.5YR 4/3	5YR 4/6c2d	scl-cl	1csbk	mfi	cs	
C1	44-48	7.5 YR 4/3	5YR 4/6c2d	ls	massive	mfr	cs	clay lenses-7.5YR 4/3
								sand-5YR 4/6
C2	48-60	10YR 5/2	5YR 4/6f1p	scl-sc	massive	mfi		

COMMENTS:

DESCRIBED BY: SFS DATE: 2/5/2016



KCI ASSOCIATES OF NORTH CAROLINA, PA

SOIL PROFILE DESCRIPTION

Client: KCI Associates of North Carolina, P.A. **Date:** February 5, 2016
Project: UT West Branch Rocky River **Project #:** 16157593D, Task SA
County: Mecklenburg **State:** NC
Location: Fisher Farm Park **Site/Lot:** Boring # 5
Soil Series: Monacan
Soil Classification: Fine-Loamy, mixed, active, thermic Fluvaquentic Eutrudepts
AWT: >62" **SHWT:** 0.5'-2.0' **Slope:** 0-1% **Aspect:**
Elevation: **Drainage:** Moderately Well to Somewhat Poorly **Permeability:** Moderate
Vegetation: Riparian Forest
Borings terminated at 62 **Inches**

HORIZON	DEPTH (IN)	MATRIX	MOTTLES	TEXTURE	STRUCTURE	CONSISTENCE	BOUNDARY	NOTES
A1	0-7	7.5YR 4/4		sl	1fgr	mfr	cs	
A2	7-12	5YR 4/4		l	1fsbk	mfr	cs	
Bw1	12-16	5YR 4/4	5YR 2.5/1	l	1fsbk	mfr	cs	
Bw2	16-20	5YR 4/4	7.5YR 6/6c2d	scl	1fsbk	mfr	cs	coarse sandy lenses
			5YR 2.5/1					
Bw3	20-34	5YR 4/6	2.5YR 4/6c2d	l-cl	1fsbk	mfr	gw	
			7.5YR 6/6c2d					
Bw4	34-45	7.5YR 4/4	7.5YR 4/6c2d	sl	1msbk	mfr	gs	
			5YR 4/4c2d					
Bw5	45-52	7.5YR 4/4	7.5YR 5/2c2d	l	1msbk	mfr	gw	
			5YR 4/4c2d					
Bw6	52-62	7.5YR 5/2	7.5YR 4/4c2d	cl	1msbk	mfr		sandy lenses

COMMENTS:

DESCRIBED BY: SFS DATE: 2/5/2016

KCI ASSOCIATES OF NORTH CAROLINA, PA

SOIL PROFILE DESCRIPTION

Client: KCI Associates of North Carolina, P.A. **Date:** June 8, 2018
Project: UT West Branch Rocky River **Project #:** 16157593D, Task SA
County: Mecklenburg **State:** NC
Location: Fisher Farm Park **Site/Lot:** Boring#1
Soil Series: Monacan Variant
Soil Classification: Fine-loamy, mixed, active, thermic Fluvaquentic Eutrudepts
AWT: 26" **SHWT:** 0-12" **Slope:** 0-1% **Aspect:**
Elevation: **Drainage:** Poorly Drained **Permeability:** Moderate
Vegetation: Privet, Red Maple, Green Ash
Borings terminated at 50 **Inches**

HORIZON	DEPTH (IN)	MATRIX	MOTTLES	TEXTURE	STRUCTURE	CONSISTENCE	BOUNDARY	NOTES
A1	0-8	7.5YR 5/3	2.5YR 4/4m2p	sl	1msbk	mfr	cs	2.5YR 4/4-30%
			5YR 5/4c2d					5YR 5/4-20%
Bw1	8-18	10YR 5/2	5YR 5/4m2p	sl	1msbk	mfr	cs	Redox pore spaces & concentrations
			5YR 2.5/1c1p					Mn masses 20%
Bw2	18-21	10YR 5/2	5YR 4/4m2p	sil	1msbk	mfr	cs	undecomposed leaf litter
Bw3	21-24	5YR 5/4	5YR 5/1c1p	sl	1csbk	mfr	cs	5YR 5/4- 20%
Bw4	24-28	10YR 5/2	5YR 5/4m2p	sil	1msbk	mfr	cs	twigs, leaf litter, redox 20%
								Redox pore spaces & concentrations
Bw5	28-36	5YR 4/4	2.5YR 4/4	sl	1csbk	mfr	aw	Redox concentrations 10%
Bw6	36-48	10YR 4/2		sil	1msbk	mfr	aw	
C1	48-50	7.5YR 4/2		sand	sg	ml		

COMMENTS:
Monacan variant is a hydric soil.
The Monacan variant is a poorly drained soil found on nearly level floodplains of the Piedmont.
The Monacan soils formed in recent alluvial sediments.
This Monacan soil has slow runoff and moderate permeability.
Meets F12: Iron-Manganese Masses.

DESCRIBED BY: SFS DATE: 6/8/2018

KCI ASSOCIATES OF NORTH CAROLINA, PA

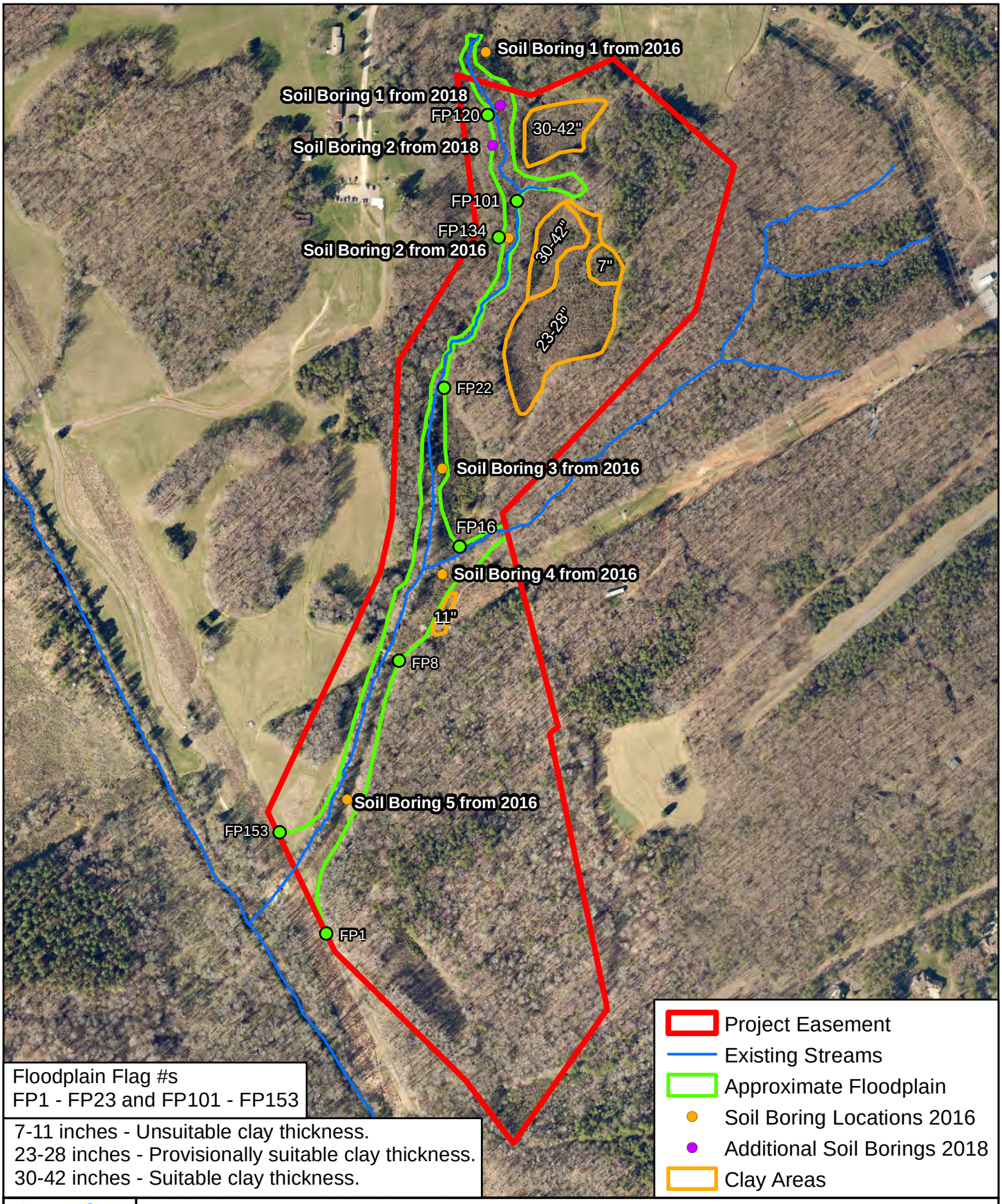
SOIL PROFILE DESCRIPTION

Client: KCI Associates of North Carolina, P.A. **Date:** June 8, 2018
Project: UT West Branch Rocky River **Project #:** 16157593D, Task SA
County: Mecklenburg **State:** NC
Location: Fisher Farm Park **Site/Lot:** Boring#2
Soil Series: Monacan Variant
Soil Classification: Fine-loamy, mixed, active, thermic Fluvaquentic Eutrudepts
AWT: 23" **SHWT:** 0-12" **Slope:** 0-1% **Aspect:**
Elevation: **Drainage:** Poorly Drained **Permeability:** Moderate
Vegetation: Microstegium, Red Maple, Sweetgum
Borings terminated at 50 **Inches**

HORIZON	DEPTH (IN)	MATRIX	MOTTLES	TEXTURE	STRUCTURE	CONSISTENCE	BOUNDARY	NOTES
A1	0-3	10YR 5/2	5YR 4/4c1p	sil	0vcpl	mfr	as	Redox-pore spaces & concentrations
								5YR 4/4-30%
A2	3-10	10YR 5/2	5YR 4/4c1p	sl	1fsbk	mfr	cs	Redox-root channels, ps and conc.30%
			5YR 2.5/1c1p					Mn masses 5-10%
Bw1	10-19	10YR 5/2	5YR 4/4c1p	sl	1msbk	mfr	cs	Redox-ps & conc. 10%
			7.5YR 4/4c2d					Redox-ps & conc. 20%
								undecomposed leaf litter 20%
Bw2	19-26	10YR 5/2	5YR 4/4c1p	sil	1msbk	mfr	cs	undecomposed leaf litter
Bw3	26-36	10YR 5/1		vfsl	1csbk	mfr	cw	
C1	36-40	10YR 4/2		ls	sg	ml	aw	*saturated*
C2	40-50	10YR 4/2		sl	massive	mfr		undecomposed twigs and leaves

COMMENTS:
Monacan variant is a hydric soil.
The Monacan variant is a poorly drained soil found on nearly level floodplains of the Piedmont.
The Monacan soils formed in recent alluvial sediments.
This Monacan soil has slow runoff and moderate permeability.
Soil caving in after 50".
Meets Indicator F8: Redox Depressions
Meets F12: Iron-Manganese Masses.

DESCRIBED BY: SFS DATE: 6/8/2018


Soil Boring 1 from 2016
Soil Boring 1 from 2018
FP120
30-42"
Soil Boring 2 from 2018
FP101
FP134
Soil Boring 2 from 2016
30-42"
7"
23-28"
FP22
Soil Boring 3 from 2016
FP16
Soil Boring 4 from 2016
11"
FP8
Soil Boring 5 from 2016
FP153
FP1
Project Easement
Existing Streams
Approximate Floodplain
Soil Boring Locations 2016
Additional Soil Borings 2018
Clay Areas
Floodplain Flag #s
FP1 - FP23 and FP101 - FP153
7-11 inches - Unsuitable clay thickness.
23-28 inches - Provisionally suitable clay thickness.
30-42 inches - Suitable clay thickness.
KCI ASSOCIATES OF NC
Soil Borings Map, UT West Branch Rocky River, Mecklenburg County, NC
N
0
275
550
Feet
Image Source:
Mecklenburg County 2018 Aerial

Survey Information Elevation BS FS

Survey Date: 11/15/2013

Benchmark ID:

Height of Instrument:

Survey Organization: ICA

Survey Personnel: Ryan, Chris, Katie

Survey Conditions: Overcast 45 degrees F

Project Phase: Existing Cond

Note: XS 1 on UTWBRR-1

					Bkf Hydraulic Geom		
TOB	**BKF**	**STA**	**FS**	**EL**	**Depth**	**Width**	**Area**
		0.00	5.585	96.55	0.00	0.0	0.00
		24.00	5.55	96.47	0.00	0.0	0.00
		28.40	5.66	95.55	0.00	0.0	0.00
		29.20	5.95	95.48	0.00	0.0	0.00
		30.20	6.65	95.80	0.00	0.0	0.00
LTOB		38.30	7.63	96.50	0.00	0.0	0.00
		38.80	8.1	94.86	0.00	0.0	0.00
		39.80	8.17	94.18	0.00	0.0	0.00
		40.40	8.31	93.64	0.00	0.0	0.00
	LBKF	41.10	8.17	92.10	0.00	0.7	0.00
Left bench		42.00	8.31	91.50	0.60	0.9	0.27
		42.50	8.51	91.20	0.90	0.5	0.37
LEW		42.60	8.8	90.62	1.48	0.1	0.12
TW		43.20	8.86	90.64	1.46	0.6	0.88
REW		43.40	9.6	90.64	1.46	0.2	0.29
Right bench		43.90	9.81	91.36	0.74	0.5	0.55
		44.20	10.08	91.70	0.40	0.3	0.17
	RBKF	44.90	10.34	92.60	0.00	0.0	0.00
		47.00	10.45	94.80	0.00	0.0	0.00
RTOB		48.30	10.54	96.60	0.00	0.0	0.00
		53.60	10.43	97.55	0.00	0.0	0.00
		57.00	10.5	95.15	0.00	0.0	0.00
		63.00	10.49	97.30	0.00	0.0	0.00
		76.00	10.61	98.95	0.00	0.0	0.00
				0.00	0.00	0.0	0.00

Survey Information Elevation BS FS

Survey Date: 11/15/2013

Benchmark ID:

Height of Instrument:

Survey Organization: ICA

Survey Personnel: Ryan, Chris, Katie

Survey Conditions: Overcast 45 degrees F

Project Phase: Existing Cond

Note: XS 2 on UTWBRR-1

					Bkf Hydraulic Geom		
TOB	**BKF**	**STA**	**FS**	**EL**	**Depth**	**Width**	**Area**
		2.00		95.70	0.00	0.0	0.00
		10.50		94.80	0.00	0.0	0.00
		19.20		94.60	0.00	0.0	0.00
		21.50		93.90	0.00	0.0	0.00
		23.00		92.58	0.00	0.0	0.00
		23.60		92.15	0.00	0.0	0.00
		25.90		92.12	0.00	0.0	0.00
		26.70		92.70	0.00	0.0	0.00
		28.00		94.35	0.00	0.0	0.00
		29.70		94.42	0.00	0.0	0.00
LTOB		33.30		93.50	0.00	0.0	0.00
		34.20		88.50	0.91	0.9	0.41
LEW		36.00		88.38	1.03	1.8	1.75
TW		37.50		88.22	1.19	1.5	1.67
REW		39.30		88.46	0.95	1.8	1.93
Right Bench	LBKF	39.60		89.41	0.00	0.3	0.14
RTOB		41.10		93.90	0.00	0.0	0.00
		47.10		93.49	0.00	0.0	0.00
		48.80		93.30	0.00	0.0	0.00
		50.20		93.60	0.00	0.0	0.00
		66.00		94.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00

Survey Information | **Elevation** | **BS** | **FS**

Survey Date: 11/15/2013
Benchmark ID:
Height of Instrument:
Survey Organization: ICA
Survey Personnel: Ryan, Chris, Katie
Survey Conditions: Overcast 45 degrees F
Project Phase: Existing Cond
Note: XS 3 on UTWBRR-2

					Bkf Hydraulic Geom		
TOB	**BKF**	**STA**	**FS**	**EL**	**Depth**	**Width**	**Area**
		0.00		95.10	0.00	0.0	0.00
		9.00		93.70	0.00	0.0	0.00
		14.70		93.15	0.00	0.0	0.00
LTOB		16.40		92.72	0.00	0.0	0.00
		18.20		91.42	0.00	0.0	0.00
		18.70		90.85	0.00	0.0	0.00
		20.00		89.85	0.00	0.0	0.00
		21.10		87.38	1.50	1.1	0.83
TW		21.80		87.25	1.63	0.7	1.10
REOW		22.90		87.36	1.52	1.1	1.73
		23.30		87.48	1.40	0.4	0.58
Right Bench		23.80		87.90	0.98	0.5	0.59
	BKF	25.40		88.88	0.00	1.6	0.78
RTOB		29.00		92.80	0.00	0.0	0.00
		32.00		93.38	0.00	0.0	0.00
		43.00		92.35	0.00	0.0	0.00
		43.80		90.75	0.00	0.0	0.00
		45.60		90.20	0.00	0.0	0.00
		48.80		92.80	0.00	0.0	0.00
		70.00		93.70	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00

Survey Information | **Elevation** | **BS** | **FS**

Survey Date: 11/15/2013
Benchmark ID:
Height of Instrument:
Survey Organization: ICA
Survey Personnel: Ryan, Chris, Katie
Survey Conditions: Overcast 45 degrees F
Project Phase: Existing Cond
Note: XS 4 on UTWBRR-2

					Bkf Hydraulic Geom		
TOB	**BKF**	**STA**	**FS**	**EL**	**Depth**	**Width**	**Area**
LTOB		0.00		94.36	0.00	0.0	0.00
		2.80		90.12	0.00	0.0	0.00
		8.20		87.49	0.00	0.0	0.00
	BKF	8.70		86.89	0.00	0.5	0.00
Left toe of slope		9.30		86.45	0.44	0.6	0.13
TW		9.60		85.63	1.26	0.3	0.26
Right toe of slope		11.80		85.25	1.64	2.2	3.19
		14.10		85.23	1.66	2.3	3.80
		14.40		85.79	1.10	0.3	0.41
back of bench		15.90		86.30	0.59	1.5	1.27
		17.70		89.12	0.00	0.0	0.00
RTOB		19.80		93.02	0.00	0.0	0.00
		37.00		95.30	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00

Survey Information | | **Elevation** | **BS** | **FS**

Survey Date:	11/15/2013			
Benchmark ID:				
Height of Instrument:				
Survey Organization:	ICA			
Survey Personnel:	Ryan, Chris, Katie			
Survey Conditions:	Overcast 45 degrees F			
Project Phase:	Existing Cond			
Note:	XS 5 on UTWBRR-3			

					Bkf Hydraulic Geom		
TOB	**BKF**	**STA**	**FS**	**EL**	**Depth**	**Width**	**Area**
LTOB		0.00		94.41	0.00	0.0	0.00
		5.40		89.45	0.00	0.0	0.00
		10.60		86.62	0.00	0.0	0.00
	LBKF	11.00		86.48	0.00	0.4	0.00
Left toe of slope		11.20		84.98	1.50	0.2	0.15
TW		13.40		84.85	1.63	2.2	3.44
Right toe of slope		15.40		84.88	1.60	2.0	3.23
	RBKF	16.00		85.58	0.90	0.6	0.75
Back of bench		17.30		85.59	0.89	1.3	1.16
		20.70		88.25	0.00	0.0	0.00
RTOB		23.60		93.01	0.00	0.0	0.00
		41.00		94.21	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00

Survey Information | | **Elevation** | **BS** | **FS**

Survey Date:	11/15/2013			
Benchmark ID:				
Height of Instrument:				
Survey Organization:	ICA			
Survey Personnel:	Ryan, Chris, Katie			
Survey Conditions:	Overcast 45 degrees F			
Project Phase:	Existing Cond			
Note:	XS 6 on UTWBRR-3			

					Bkf Hydraulic Geom		
TOB	**BKF**	**STA**	**FS**	**EL**	**Depth**	**Width**	**Area**
LTOB		5.60		93.84	0.00	0.0	0.00
		8.90		88.04	0.00	0.0	0.00
	BKF	10.20		86.02	0.00	1.3	0.00
Left toe of slope		10.60		84.58	1.44	0.4	0.29
TW		12.20		84.49	1.53	1.6	2.38
Right toe of slope		14.10		84.53	1.49	1.9	2.87
		15.60		85.34	0.68	1.5	1.63
Bench		18.00		85.72	0.30	2.4	1.18
Back of bench		21.00		86.41	0.00	0.0	0.00
		21.70		89.00	0.00	0.0	0.00
		24.00		90.32	0.00	0.0	0.00
RTOB		26.50		92.00	0.00	0.0	0.00
		46.50		94.30	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00

Survey Information | Elevation | BS | FS

Survey Date: 11/15/2013
Benchmark ID:
Height of Instrument:
Survey Organization: ICA
Survey Personnel: Ryan, Chris, Katie
Survey Conditions: Overcast 45 degrees F
Project Phase: Existing Cond
Note: XS 7 on UT1

					Bkf Hydraulic Geom		
TOB	**BKF**	**STA**	**FS**	**EL**	**Depth**	**Width**	**Area**
		0.00		707.82	0.00	0.0	0.00
		3.99		706.71	0.00	0.0	0.00
		6.87		705.47	0.00	0.0	0.00
		14.17		702.03	0.00	0.0	0.00
		18.07		699.22	0.00	0.0	0.00
		18.91		698.32	0.42	0.8	0.18
		20.00		698.05	0.69	1.1	0.60
		20.72		698.20	0.54	0.7	0.44
	BKF	21.36		698.74	0.00	0.6	0.17
TOB		23.63		701.07	0.00	0.0	0.00
		24.14		701.22	0.00	0.0	0.00
		28.53		701.25	0.00	0.0	0.00
		40.00		701.93	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00

Survey Information | Elevation | BS | FS

Survey Date: 11/15/2013
Benchmark ID:
Height of Instrument:
Survey Organization: ICA
Survey Personnel: Ryan, Chris, Katie
Survey Conditions: Overcast 45 degrees F
Project Phase: Existing Cond
Note: XS 8 on UT1

					Bkf Hydraulic Geom		
TOB	**BKF**	**STA**	**FS**	**EL**	**Depth**	**Width**	**Area**
		0.00		708.04	0.00	0.0	0.00
		3.57		707.11	0.00	0.0	0.00
		7.46		705.74	0.00	0.0	0.00
		14.19		702.74	0.00	0.0	0.00
		17.65		699.06	0.00	0.0	0.00
		19.08		698.00	0.30	1.4	0.21
		20.04		697.71	0.59	1.0	0.43
		20.60		697.65	0.65	0.6	0.35
TOB		21.69		699.87	0.00	0.0	0.00
		23.32		700.37	0.00	0.0	0.00
		25.76		700.79	0.00	0.0	0.00
		29.67		700.60	0.00	0.0	0.00
		33.47		700.65	0.00	0.0	0.00
		36.27		700.59	0.00	0.0	0.00
		40.00		700.79	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00

Survey Information | Elevation | BS | FS

Survey Date: 11/15/2013
Benchmark ID:
Height of Instrument:
Survey Organization: ICA
Survey Personnel: Ryan, Chris, Katie
Survey Conditions: Overcast 45 degrees F
Project Phase: Existing Cond
Note: XS 9 on UT2

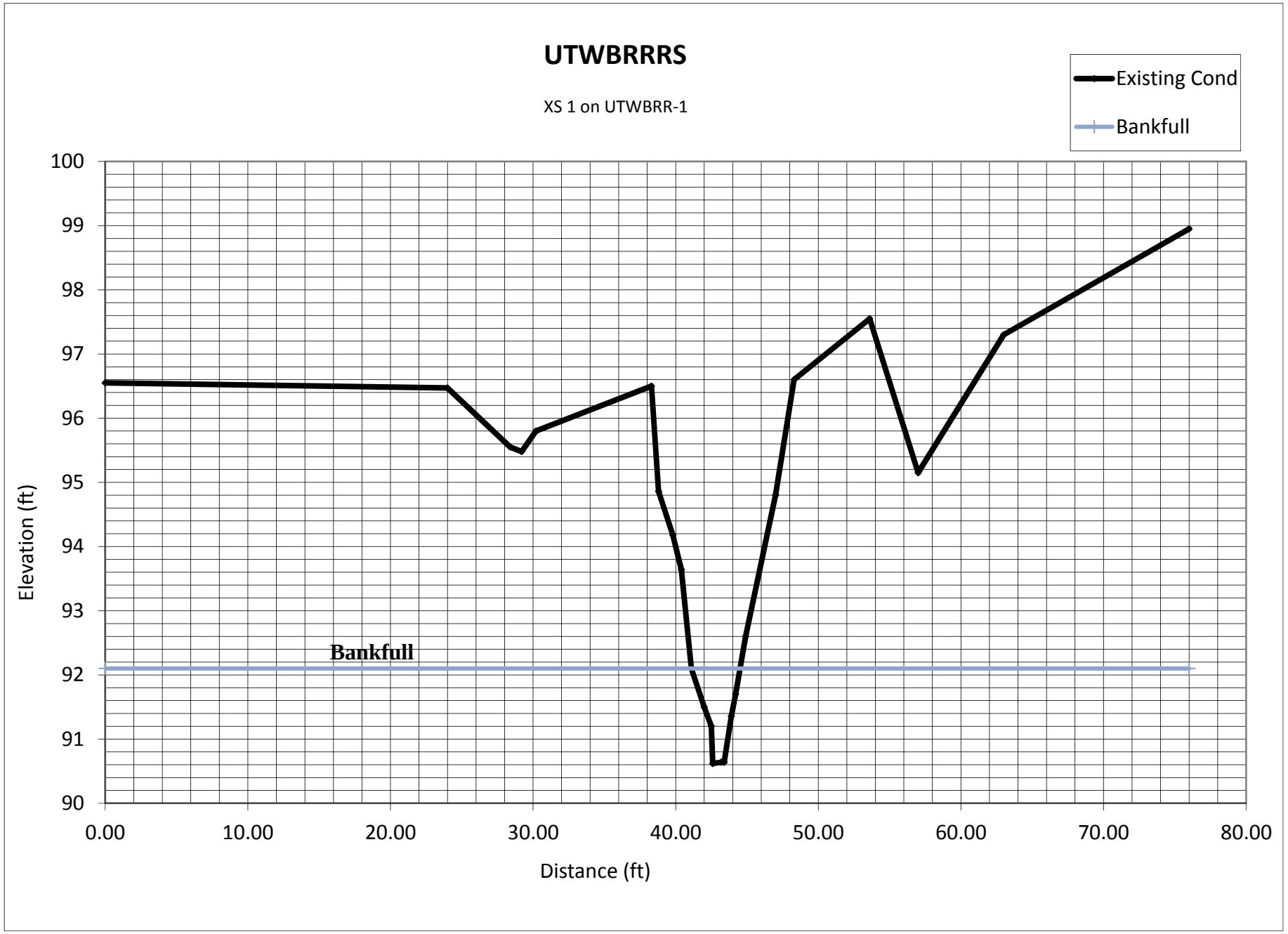
					Bkf Hydraulic Geom		
TOB	**BKF**	**STA**	**FS**	**EL**	**Depth**	**Width**	**Area**
		0.00		676.50	0.00	0.0	0.00
		0.46		676.50	0.00	0.0	0.00
TOB		1.61		676.02	0.00	0.0	0.00
		4.03		671.75	0.00	0.0	0.00
		7.47		668.68	0.32	3.4	0.56
		8.41		668.49	0.51	0.9	0.39
		9.53		668.31	0.69	1.1	0.67
		10.19		668.61	0.39	0.7	0.36
	BKF	12.02		669.00	0.00	1.8	0.36
		14.98		673.03	0.00	0.0	0.00
		17.26		676.70	0.00	0.0	0.00
		17.74		676.95	0.00	0.0	0.00
		20.00		676.96	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00

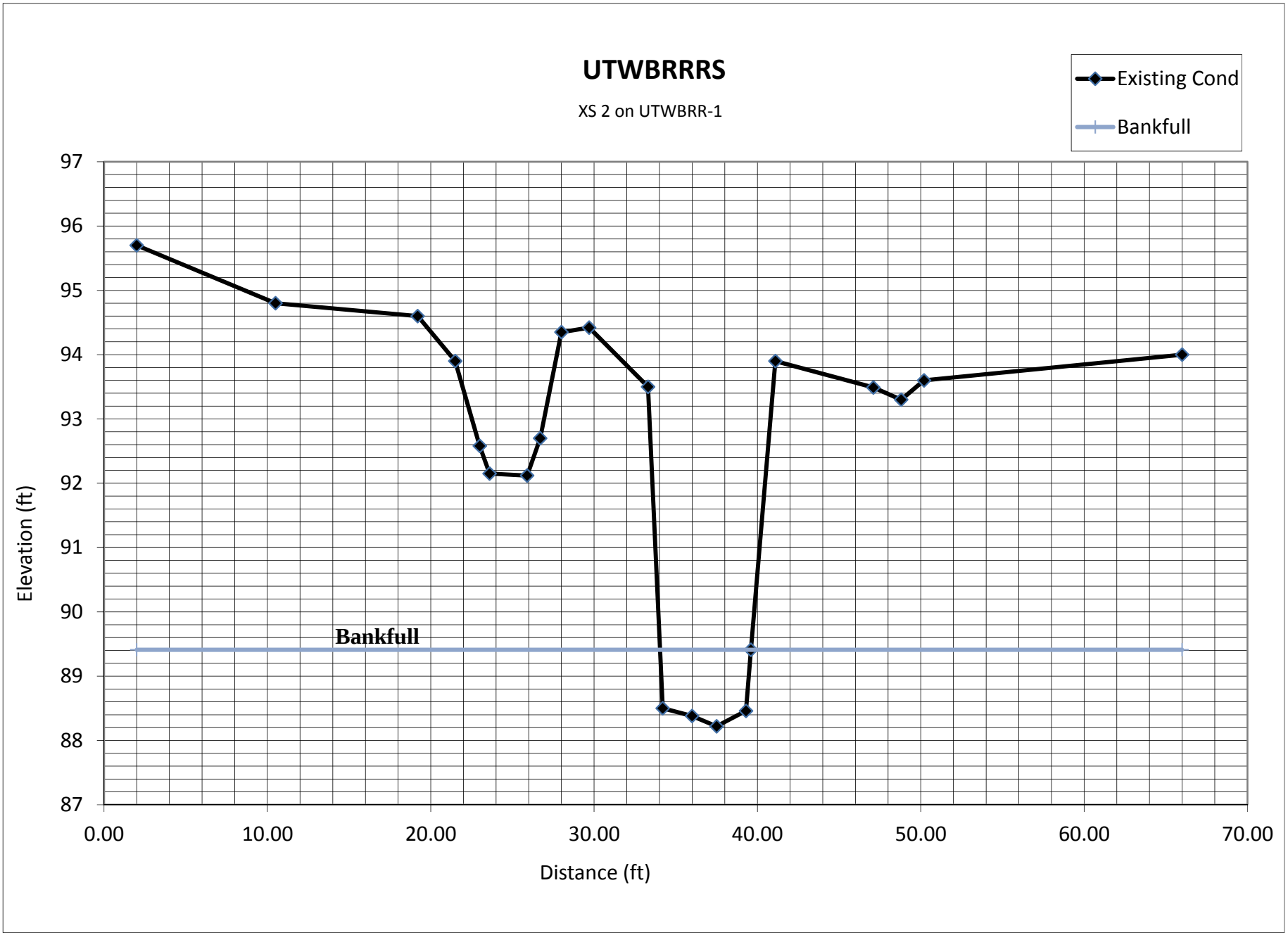
Survey Information | Elevation | BS | FS

Survey Date: 11/15/2013
Benchmark ID:
Height of Instrument:
Survey Organization: ICA
Survey Personnel: Ryan, Chris, Katie
Survey Conditions: Overcast 45 degrees F
Project Phase: Existing Cond
Note: XS 10 on UT2

					Bkf Hydraulic Geom		
TOB	**BKF**	**STA**	**FS**	**EL**	**Depth**	**Width**	**Area**
		0.00		676.48	0.00	0.0	0.00
		0.57		676.48	0.00	0.0	0.00
TOB		2.19		675.80	0.00	0.0	0.00
		5.60		669.80	0.00	0.0	0.00
		7.02		668.53	0.34	1.4	0.24
		7.41		668.45	0.42	0.4	0.15
		9.81		668.06	0.80	2.4	1.47
		11.25		668.72	0.14	1.4	0.68
	BKF	11.94		668.86	0.00	0.7	0.05
		16.29		674.78	0.00	0.0	0.00
		17.33		676.46	0.00	0.0	0.00
		17.62		676.60	0.00	0.0	0.00
		20.00		676.61	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00
				0.00	0.00	0.0	0.00

XS	Feature	Wfpa	LBKF	RBKF	ELbkf	Wbkf	Dbkf	W/D	Abkf	Dmax	ER	BHR
1	Typical	5.4	41.1	44.9	92.1	3.4	0.8	4.3	2.7	1.5	1.6	3.9
2	Typical	6.2	34.0	39.6	89.4	5.6	1.0	5.6	5.6	1.2	1.1	4.7
3	Typical	9.2	20.4	25.4	88.9	5.0	1.1	4.7	5.3	1.6	1.8	3.4
4	Typical	11.3	8.7	16.3	86.9	7.6	1.2	6.3	9.2	1.7	1.5	4.7
5	Typical	12.7	11.0	18.4	86.5	7.4	1.2	6.0	9.2	1.6	1.7	5.0
6	Typical	12.1	10.2	19.3	86.0	9.1	0.9	9.7	8.5	1.5	1.3	5.0
7	Typical	4.3	18.6	21.4	698.7	2.8	0.5	6.2	1.3	0.7	1.5	4.3
8	Typical	3.4	18.5	20.7	698.3	2.2	0.4	5.4	0.9	0.6	1.5	3.4
9	Typical	6.2	7.1	12.0	669.0	4.9	0.4	13.1	1.8	0.7	1.3	11.3
10	Typical	6.8	6.6	11.9	668.9	5.3	0.5	11.6	2.4	0.8	1.3	9.6


UTWBRRRS
XS 1 on UTWBRR-1
Existing Cond
Bankfull
Elevation (ft)
100
99
98
97
96
95
94
93
92
91
90
Bankfull
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
Distance (ft)


UTWBRRRS
XS 2 on UTWBRR-1
Existing Cond
Bankfull
Elevation (ft)
97
96
95
94
93
92
91
90
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Bankfull
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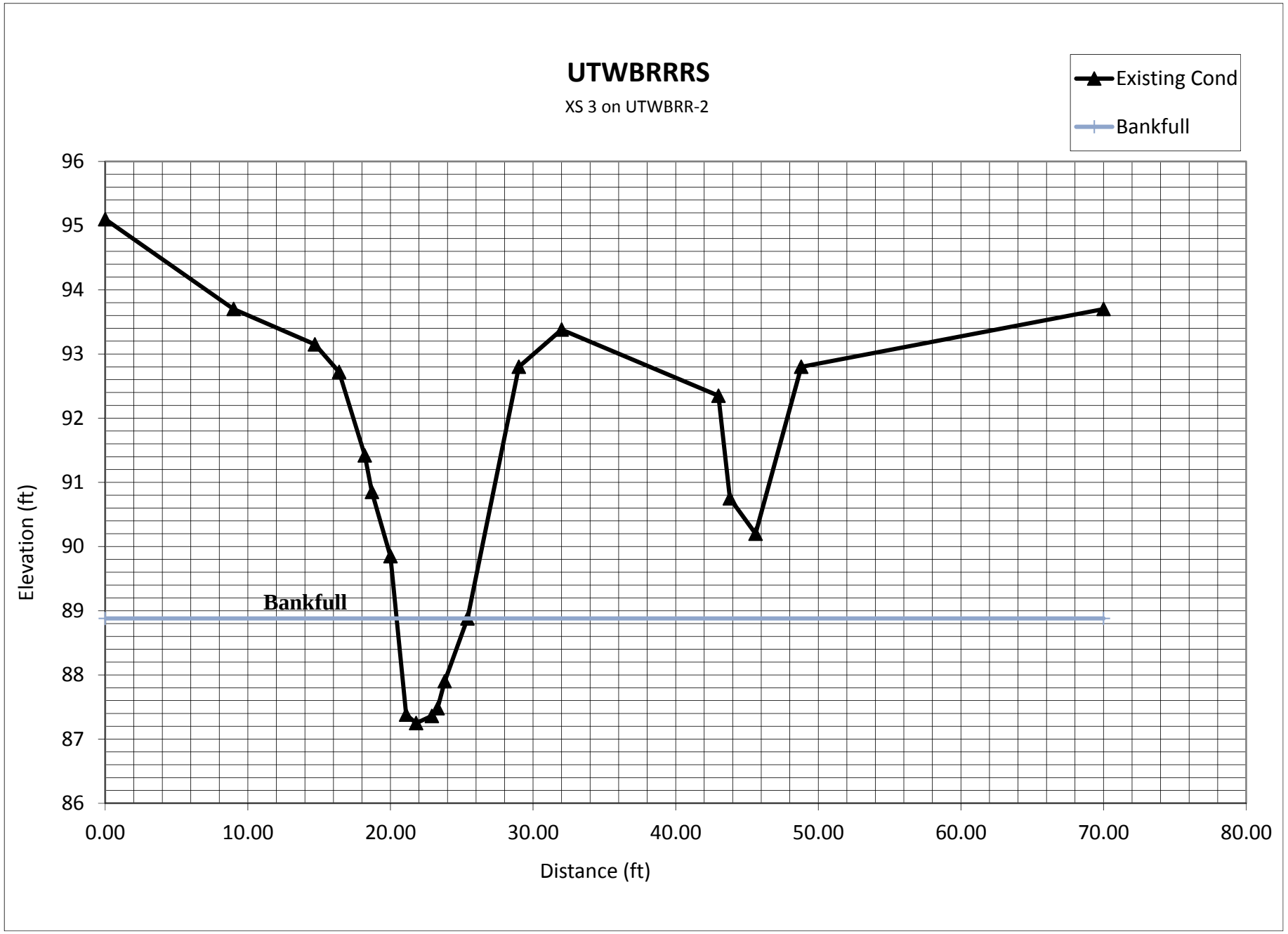
40.00
50.00
60.00
70.00
Distance (ft)


UTWBRRRS
XS 3 on UTWBRR-2
Existing Cond
Bankfull
Elevation (ft)
96
95
94
93
92
91
90
89
88
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86
Bankfull
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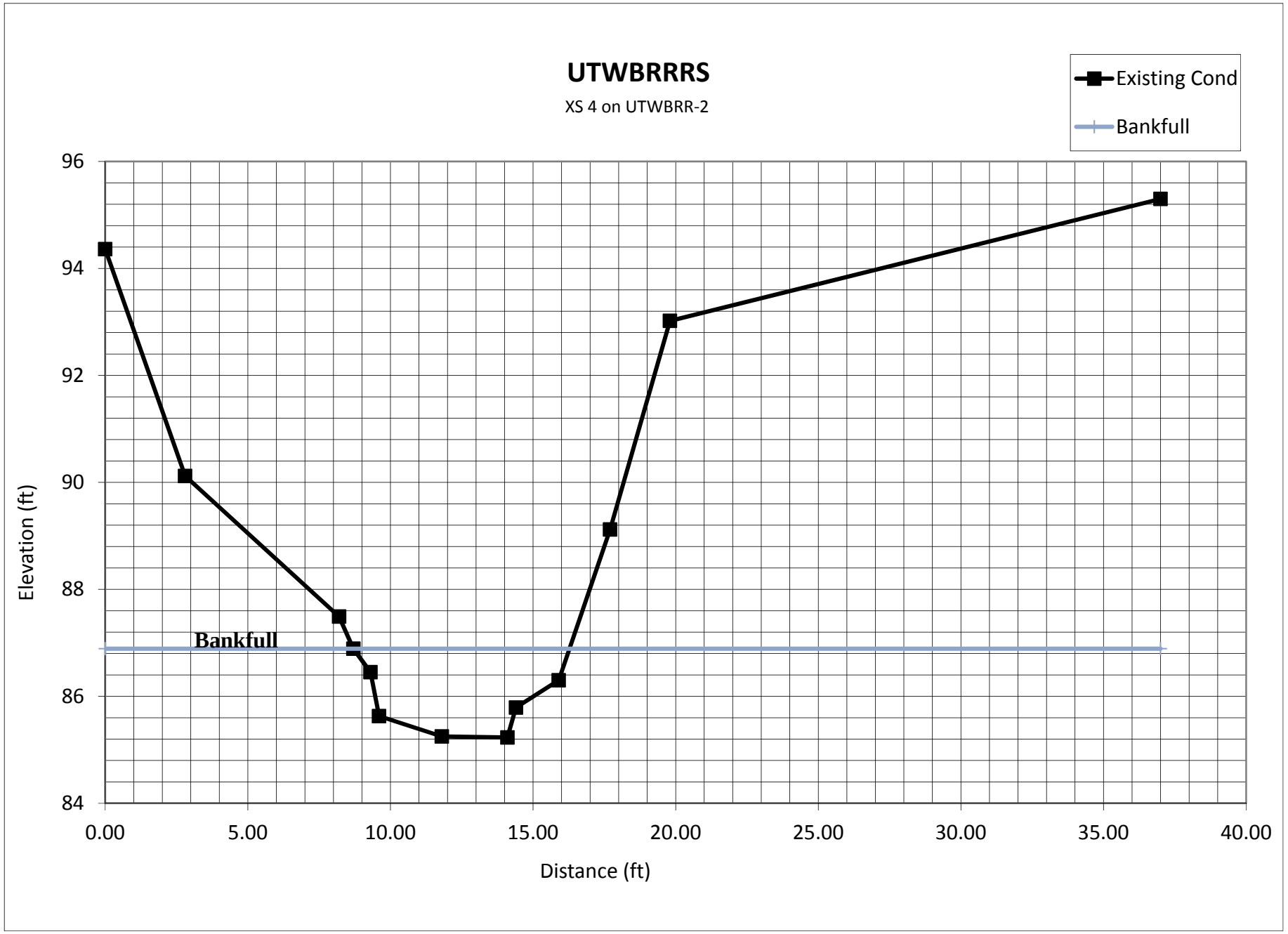
50.00
60.00
70.00
80.00
Distance (ft)


UTWBRRRS
XS 4 on UTWBRR-2
Existing Cond
Bankfull
96
94
92
90
88
86
84
Elevation (ft)
Bankfull
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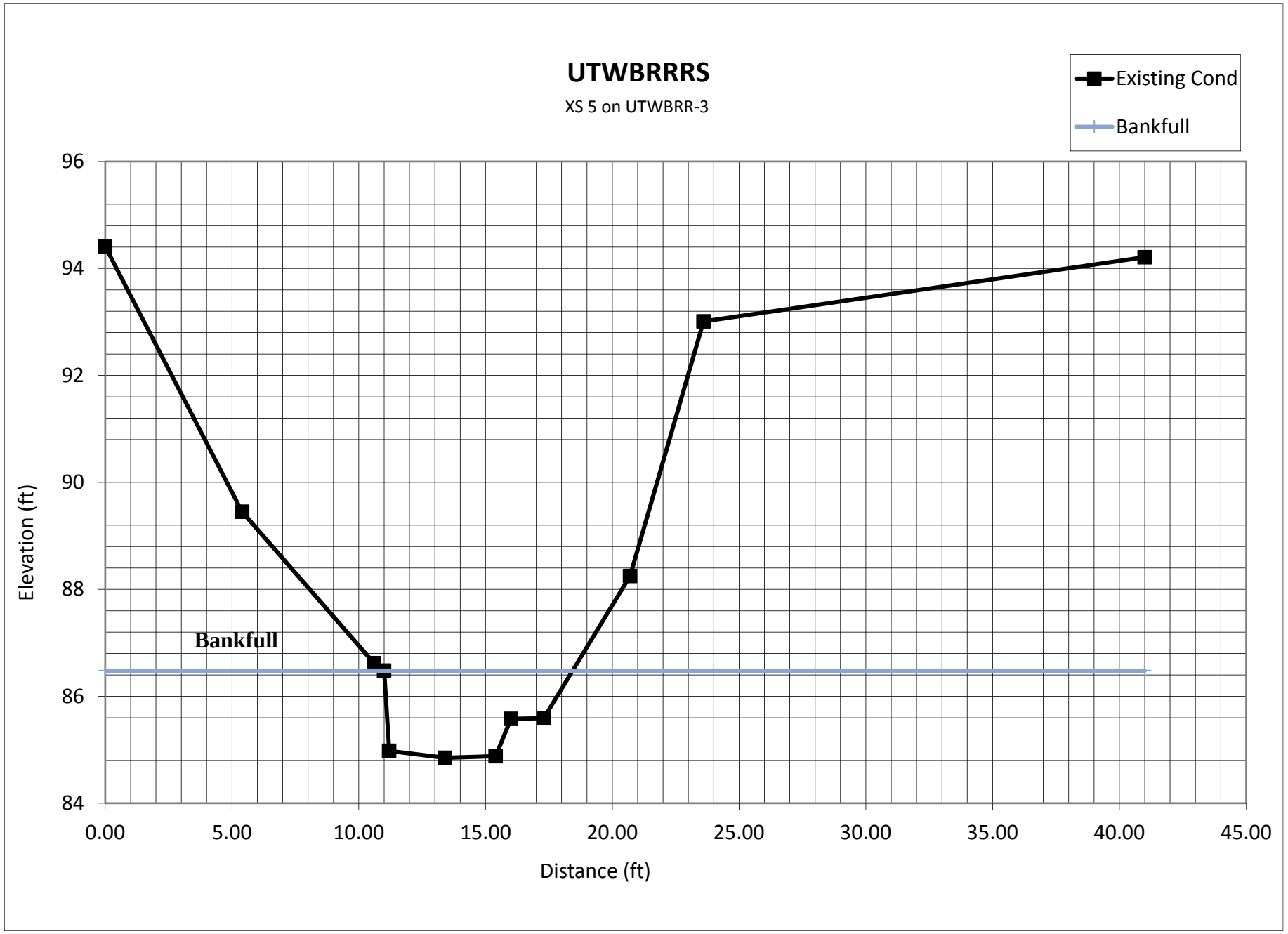
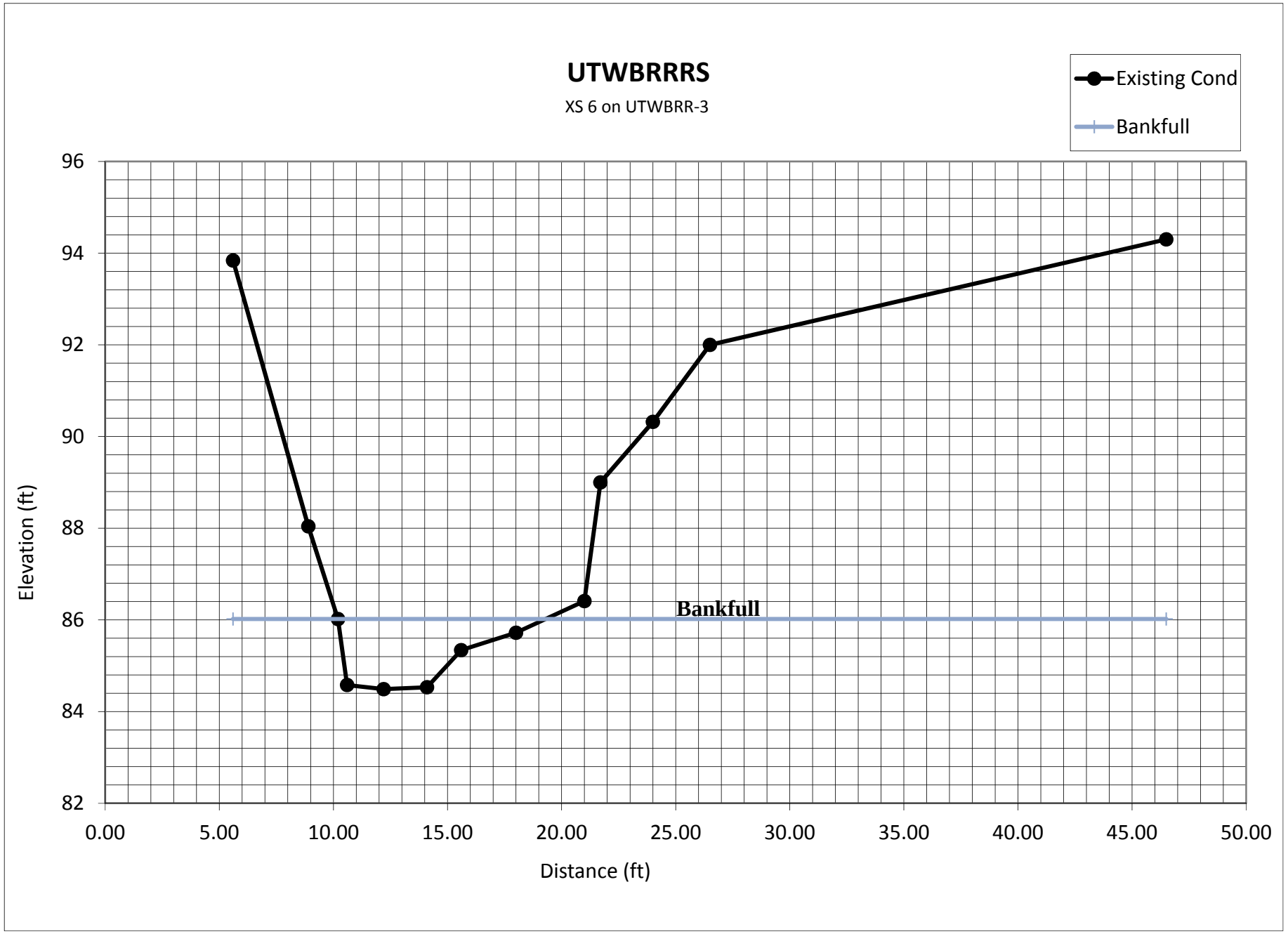
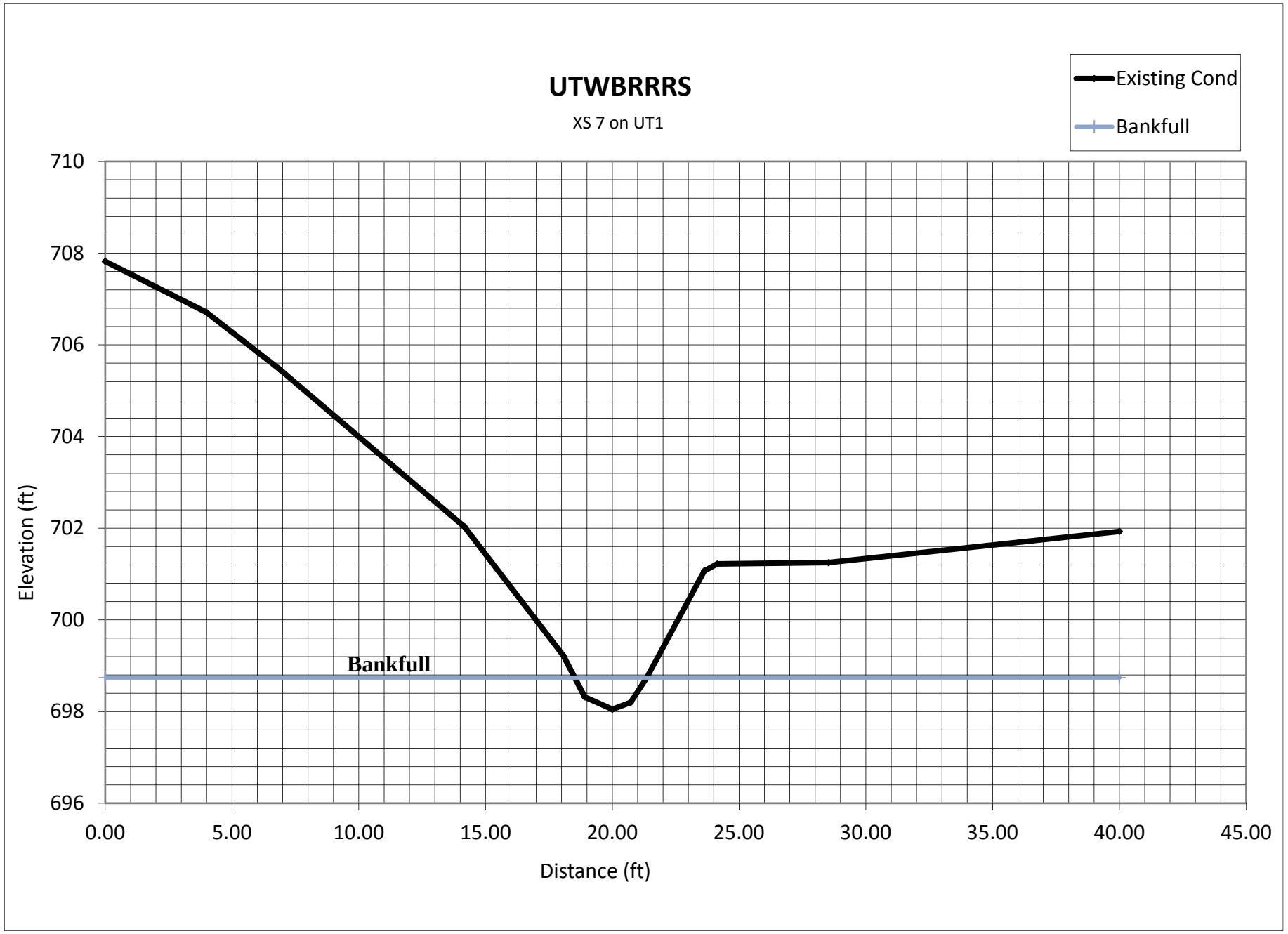
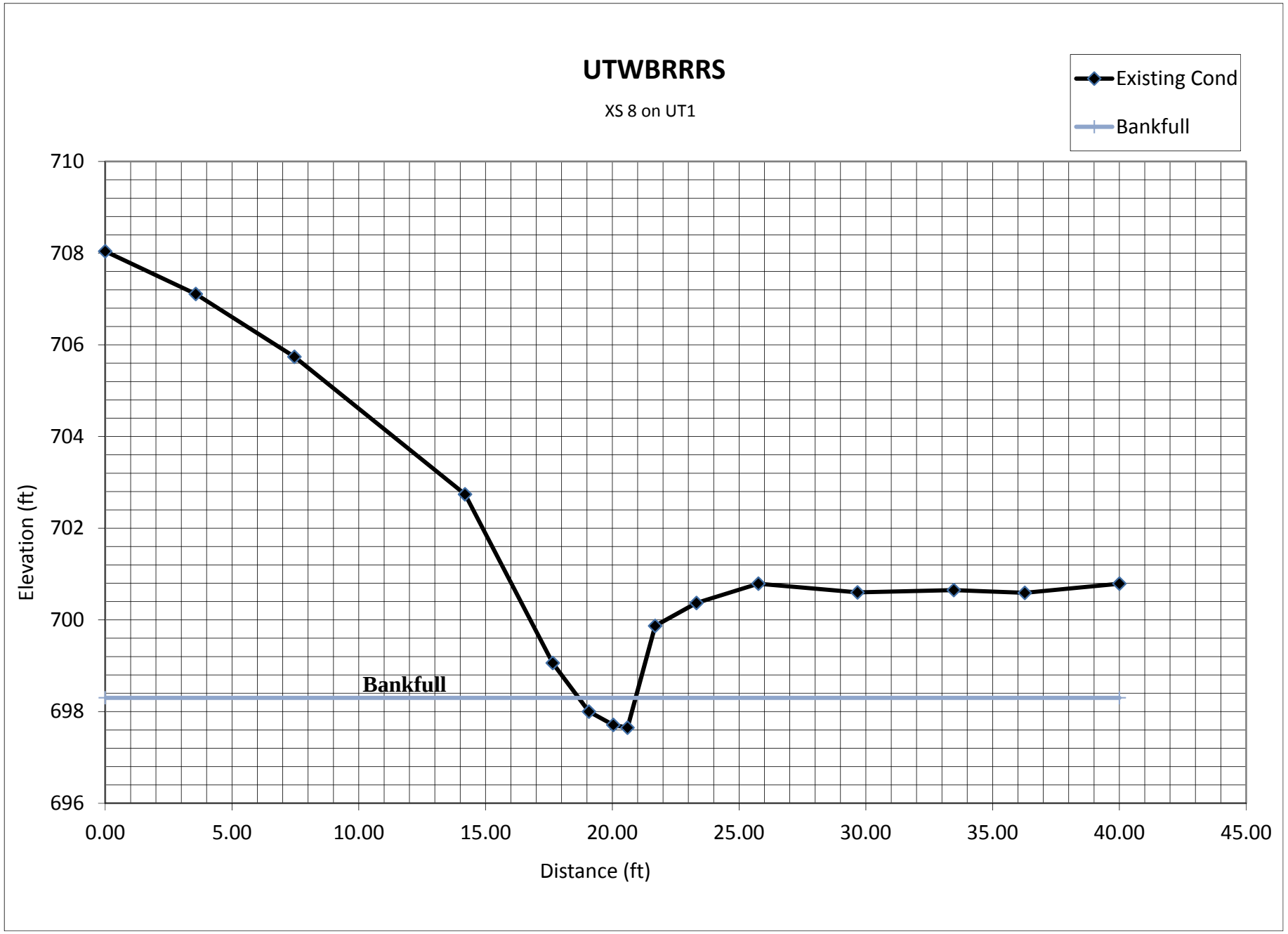
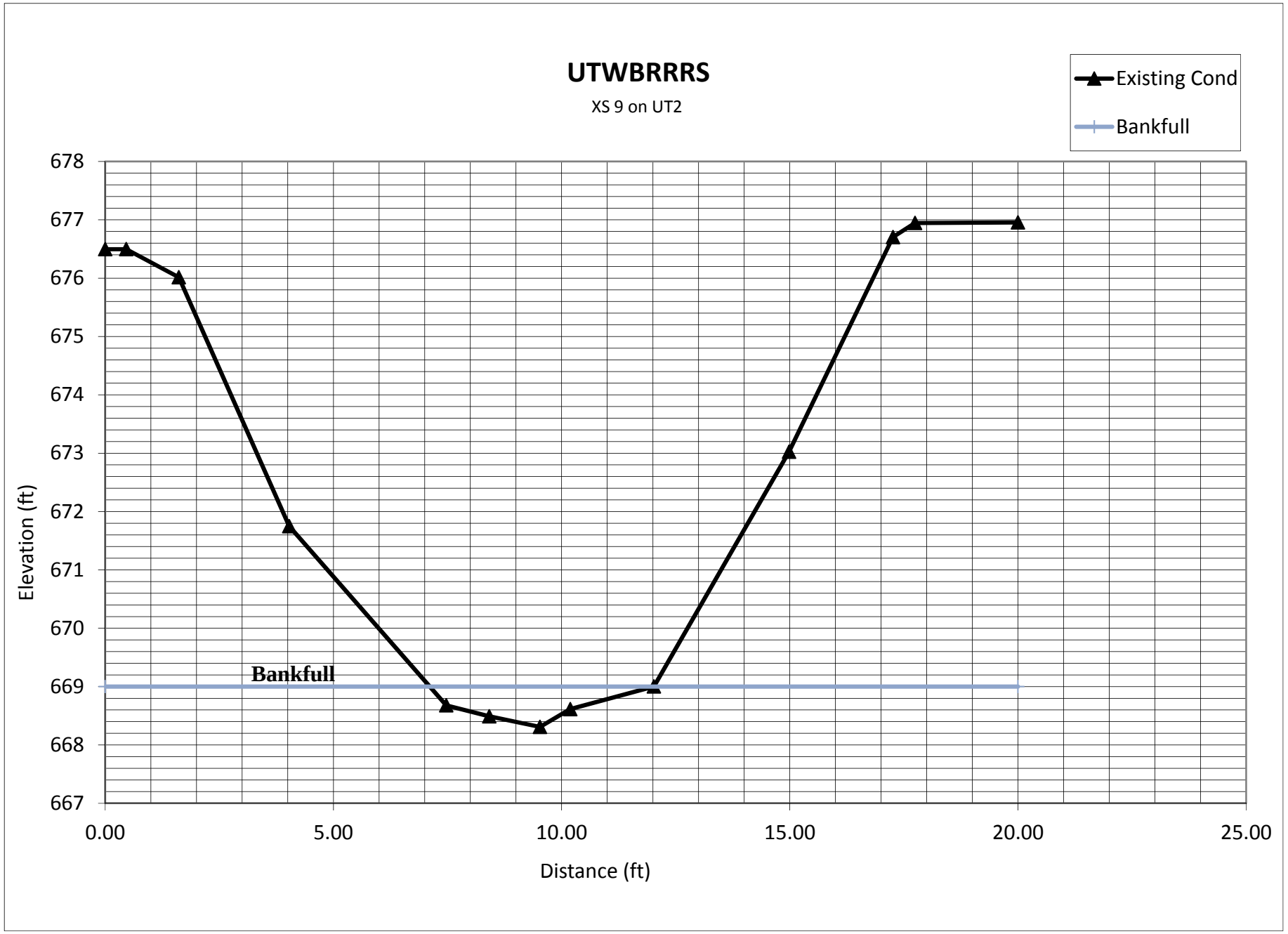
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
Distance (ft)

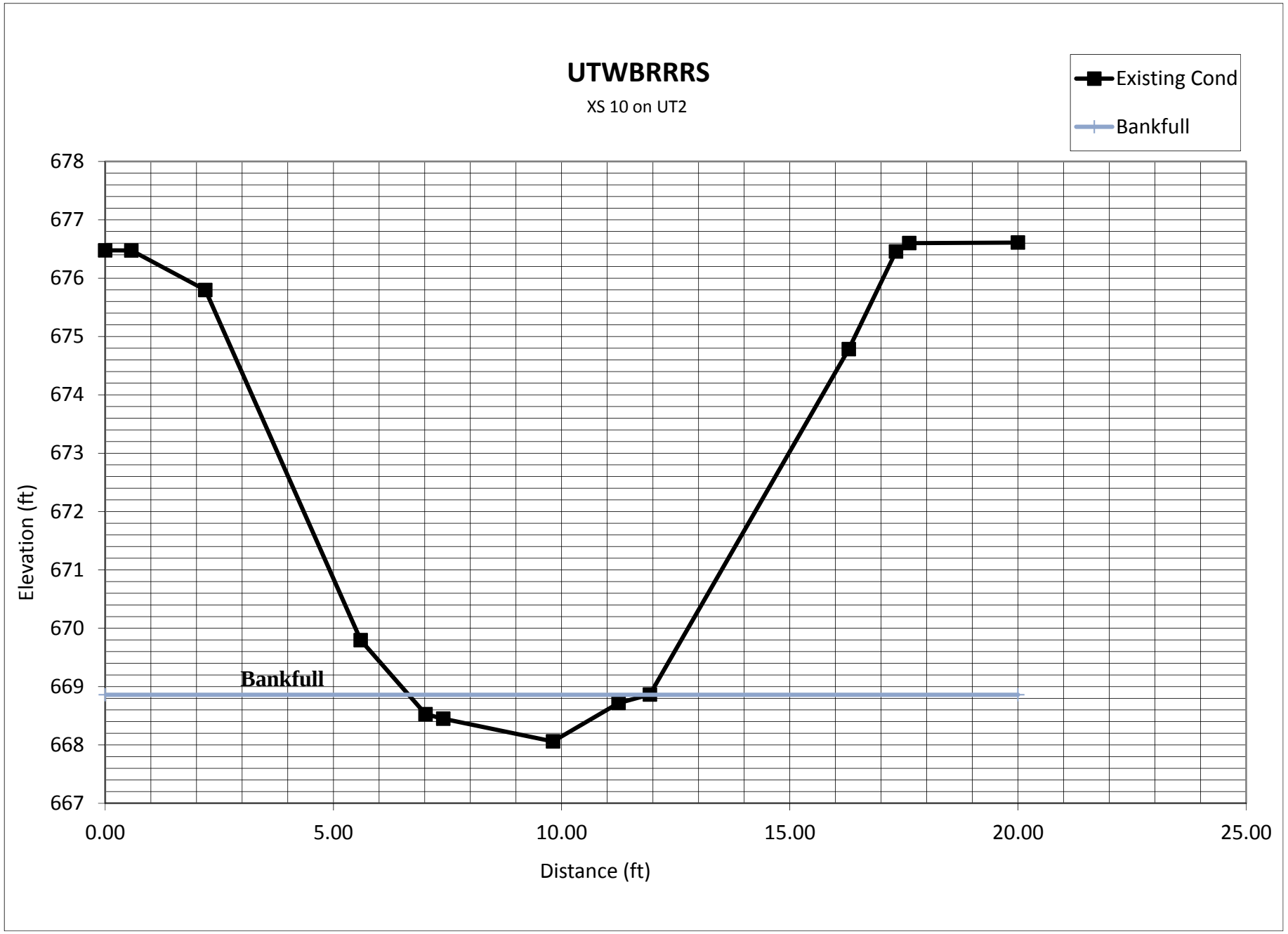

UTWBRRRS
XS 5 on UTWBRR-3
Existing Cond
Bankfull
Elevation (ft)
96
94
92
90
88
86
84
Bankfull
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
Distance (ft)


UTWBRRRS
XS 6 on UTWBRR-3
Existing Cond
Bankfull
Bankfull
Elevation (ft)
Distance (ft)
96
94
92
90
88
86
84
82
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00


UTWBRRRS
XS 7 on UT1
Existing Cond
Bankfull
710
708
706
704
702
700
698
696
Elevation (ft)
Bankfull
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
Distance (ft)


UTWBRRRS
XS 8 on UT1
Existing Cond
Bankfull
710
708
706
704
702
700
698
696
Elevation (ft)
Bankfull
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
Distance (ft)


UTWBRRRS
XS 9 on UT2
Existing Cond
Bankfull
678
677
676
675
674
673
672
671
670
669
668
667
Elevation (ft)
Bankfull
0.00
5.00
10.00
15.00
20.00
25.00
Distance (ft)


UTWBRRRS
XS 10 on UT2
Existing Cond
Bankfull
678
677
676
675
674
673
672
671
670
669
668
667
Elevation (ft)
Bankfull
0.00
5.00
10.00
15.00
20.00
25.00
Distance (ft)

The data entry table is set up for 1/2 phi-size intervals. If you have phi-size interval data, leave the intervening intervals blank.

Project and Reach Information

Project Name:	UTWBRRRS
Project ID:	92684
Reach ID:	UTWBRR-1
Reach Type:	G5

Class Name	Particle Size Class (mm)	Count	Cumulative %
Sand	<2	101	100
VF Gravel	2 - 2.8	0	100
VF Gravel	2.8 - 4	0	100
Fine Gravel	4 - 5.6	0	100
Fine Gravel	5.6 - 8	0	100
Med. Gravel	8 - 11.3	0	100
Med. Gravel	11.3 - 16	0	100
Coarse Gravel	16 - 22.6	0	100
Coarse Gravel	22.6 - 32	0	100
VC Gravel	32 - 45.3	0	100
VC Gravel	45.3 - 64	0	100
Sm. Cobble	64 - 90.5	0	100
Sm. Cobble	90.5 - 128	0	100
Lg. Cobble	128 - 181	0	100
Lg. Cobble	181 - 256	0	100
Sm. Boulder	256 - 362	0	100
Sm. Boulder	362 - 512	0	100
Med. Boulder	512 - 1024	0	100
Lg. Boulder	1024 - 2048	0	100
VL Boulder	2048 - 4096	0	100
Bedrock	>4096	0	100
	Totals	101	

The data entry table is set up for 1/2 phi-size intervals. If you have phi-size interval data, leave the intervening intervals blank.

Project and Reach Information

Project Name:	UTWBRRRS
Project ID:	92684
Reach ID:	UTWBRR-2
Reach Type:	G5

Class Name	Particle Size Class (mm)	Count	Cumulative %	
Sand	<2		98	98.0
VF Gravel	2 - 2.8		1	99.0
VF Gravel	2.8 - 4		0	99.0
Fine Gravel	4 - 5.6		0	99.0
Fine Gravel	5.6 - 8		0	99.0
Med. Gravel	8 - 11.3		0	99.0
Med. Gravel	11.3 - 16		1	100
Coarse Gravel	16 - 22.6		0	100
Coarse Gravel	22.6 - 32		0	100
VC Gravel	32 - 45.3		0	100
VC Gravel	45.3 - 64		0	100
Sm. Cobble	64 - 90.5		0	100
Sm. Cobble	90.5 - 128		0	100
Lg. Cobble	128 - 181		0	100
Lg. Cobble	181 - 256		0	100
Sm. Boulder	256 - 362		0	100
Sm. Boulder	362 - 512		0	100
Med. Boulder	512 - 1024		0	100
Lg. Boulder	1024 - 2048		0	100
VL Boulder	2048 - 4096		0	100
Bedrock	>4096		0	100
	Totals		100	

The data entry table is set up for 1/2 phi-size intervals. If you have phi-size interval data, leave the intervening intervals blank.

Project and Reach Information

Project Name:	UTWBRRRS
Project ID:	92684
Reach ID:	UTWBRR-3
Reach Type:	G5

Class Name	Particle Size Class (mm)	Count	Cumulative %	
Sand	<2	92		89.32
VF Gravel	2 - 2.8	2		91.26
VF Gravel	2.8 - 4	1		92.23
Fine Gravel	4 - 5.6	1		93.20
Fine Gravel	5.6 - 8	1		94.17
Med. Gravel	8 - 11.3	3		97.09
Med. Gravel	11.3 - 16	1		98.06
Coarse Gravel	16 - 22.6	0		98.06
Coarse Gravel	22.6 - 32	2		100
VC Gravel	32 - 45.3	0		100
VC Gravel	45.3 - 64	0		100
Sm. Cobble	64 - 90.5	0		100
Sm. Cobble	90.5 - 128	0		100
Lg. Cobble	128 - 181	0		100
Lg. Cobble	181 - 256	0		100
Sm. Boulder	256 - 362	0		100
Sm. Boulder	362 - 512	0		100
Med. Boulder	512 - 1024	0		100
Lg. Boulder	1024 - 2048	0		100
VL Boulder	2048 - 4096	0		100
Bedrock	>4096	0		100
	Totals	103		

Morphological Criteria for UTWB

Variables		Existing			Reference Value Typical C5**	Proposed		
		UTWB-1	UTWB-2	UTWB-3		UTWB-1	UTWB-2	UTWB-3
Rosgen Stream Type		G5	G5	G5	C5	C5	C5	C5
Drainage Area (mi^2)		0.06	0.09	0.25	N/A	0.06	0.09	0.25
Bankfull Width (W_{bkf}) (ft)		3.4-5.6	5.0	7.4-9.1	N/A	8.4	8.4	12.0
Bankfull Mean Depth (d_{bkf}) (ft)		0.8-1.0	1.1	0.9-1.2	N/A	0.5	0.5	0.8
Bankfull Cross Sectional Area (A_{bkf}) (ft^2)		2.7-5.6	5.3	8.5-9.2	N/A	4.3	4.3	9.0
Width/depth Ratio (W_{bkf}/d_{bkf})		4.3-5.6	4.7	6.0-9.7	10-14	16.3	16.3	16.0
Maximum Depth (d_{mbkf}) (ft)		1.2-1.5	1.6	1.5-1.7	N/A	0.6	0.6	0.9
Width of flood prone area (W_{fpa}) (ft)		5.4-6.2	9.2	11.3-12.7	N/A	18.5+	18.5+	26.4+
Entrenchment Ratio (ER)		1.1-1.6	1.8	1.3-1.7	2.2+	2.2+	2.2+	2.2+
Sinuosity (stream length/valley length) (K)		1.00	1.06	1.07	1.2-1.5	1.2	1.2	1.3
Dimension	Mean Pool Depth (ft)	*	*	*	N/A	1.0	1.0	1.4
	Max Pool Depth (ft)	*	*	*	N/A	2.0	2.0	2.8
	Riffle Depth (ft)	1.4	1.6	1.6	N/A	0.5	0.5	0.8
	Pool Width (ft)	*	*	*	N/A	10.0	10.0	17.0
	Riffle Width (ft)	4.5	5	8.03	N/A	8.4	8.4	12.0
	Pool XS Area (sf)	*	*	*	N/A	10.0	10.0	23.8
	Riffle XS Area (sf)	4.15	5.3	8.97	N/A	4.3	4.3	9.0
	Mean pool depth/mean riffle depth	*	*	*	N/A	2.0	2.0	1.8
	Pool width/riffle width	*	*	*	1.0-1.7	1.2	1.2	1.4
	Pool area/riffle area	*	*	*	N/A	2.3	2.3	2.6
	Max pool depth/d_{bkf}	*	*	*	N/A	4.0	4.0	3.5
	Bank Height Ratio	4.0-4.8	3.4	4.7-5.0	1.0-1.1	1.0	1.0	1.0
	Mean Bankfull Velocity (V) (fps)	4.3-5.4	5.2-6.0	4.1-4.6	3.5-5.0	3.4	3.4	3.9
	Bankfull Discharge (Q) (cfs)	12-30	28-55	35-43	N/A	15	15	35
Pattern	Meander length (L_m) (ft)	*	*	*	N/A	72-93	77-162	108-195
	Radius of curvature (R_c) (ft)	*	*	*	N/A	18-30	18-36	20-40
	Belt width (W_{blt}) (ft)	*	*	*	N/A	35-43	41-63	36-93
	Meander width ratio (W_{blt}/W_{bkf})	*	*	*	3-8	4.2-5.1	4.9-7.5	3.0-7.8
	Radius of curvature/bankfull width	*	*	*	2-3	2.1-3.6	2.1-4.3	1.7-3.3
	Meander length/bankfull width	*	*	*	7-14	8.6-11.1	9.2-16.5	9.0-16.3
Profile	Valley slope	0.035	0.025	0.011	0.002-0.01	0.02	0.02	0.01
	Average water surface slope	0.0360	0.0195	0.0121	N/A	0.014	0.016	0.013
	Riffle slope	0.006-0.008	0.006-0.009	0.004-0.01	N/A	0.02-0.04	0.02-0.05	0.025-0.03
	Pool slope	*	*	*	N/A	0-0.003	0-0.003	0-0.003
	Pool to pool spacing	*	*	*	N/A	40-67	38-92	55-133
	Pool length	*	*	*	N/A	15-25	10-26	14-39
	Riffle slope/avg water surface slope	0.17-0.23	0.32-1.74	0.33-0.79	1.1-1.2	1.4-2.9	1.3-3.1	1.9-2.3
	Pool slope/avg water surface slope	*	*	*	0-0.2	0-0.2	0-0.2	0-0.2
	Pool length/bankfull width	*	*	*	N/A	1.8-3.0	1.2-3.1	1.2-3.3
	Pool to pool spacing/bankfull width	*	*	*	3.0-7.0	4.8-8.0	4.5-11.0	4.6-11.0

*no data shown for pools in existing stream do to channelization / lack of bed diversity

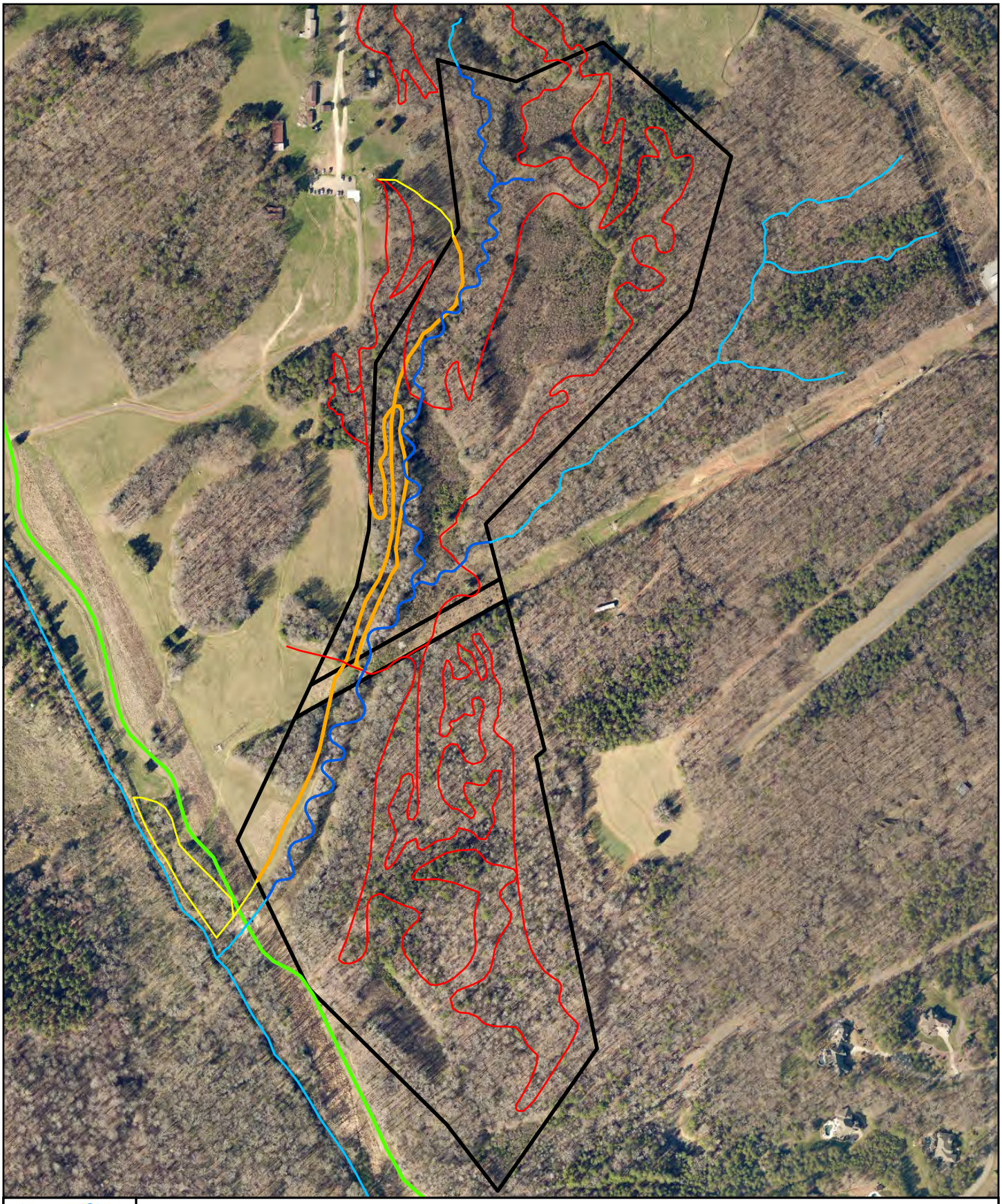
** from Harman and Starr 2011, Common Reference Reach Ratios for C, E, and B stream types.

Morphological Criteria for UT1 and UT2

Variables		Existing		Reference Value Typical C5**	Proposed	
		UT1	UT2		UT1-2	UT2-2
Rosgen Stream Type		G5	G5	C5	C5	C5
Drainage Area (mi^2)		0.01	0.1	N/A	0.01	0.1
Bankfull Width (W_{bkf}) (ft)		2.2-2.8	4.9-5.3	N/A	5.5	9.3
Bankfull Mean Depth (d_{bkf}) (ft)		0.4-0.5	0.4-0.5	N/A	0.3	0.6
Bankfull Cross Sectional Area (A_{bkf}) (ft^2)		0.9-1.3	1.8-2.4	N/A	1.9	5.5
Width/depth Ratio (W_{bkf}/d_{bkf})		5.4-6.1	11.6-13.1	10-14	16.1	15.6
Maximum Depth (d_{mbkf}) (ft)		0.6-0.7	0.7-0.8	N/A	0.4	0.7
Width of flood prone area (W_{fpa}) (ft)		5.4-6.1	6.2-6.8	N/A	12.1+	20.5+
Entrenchment Ratio (ER)		1.5-2.4	1.3	2.2+	2.2+	2.2+
Sinuosity (stream length/valley length) (K)		1.02	1.0	1.2-1.5	1.1	1.1
Dimension	Mean Pool Depth (ft)	*	*	N/A	0.6	1.0
	Max Pool Depth (ft)				1.3	2.0
	Riffle Depth (ft)	0.65	0.75	N/A	0.3	0.6
	Pool Width (ft)	*	*	N/A	5.0	9.5
	Riffle Width (ft)	2.5	5.1	N/A	5.5	9.3
	Pool XS Area (sf)	*	*	N/A	3.3	9.5
	Riffle XS Area (sf)	1.1	2.1	N/A	1.9	5.5
	Mean pool depth/mean riffle depth	*	*	N/A	2.0	1.7
	Pool width/riffle width	*	*	1.0-1.7	0.9	1.0
	Pool area/riffle area	*	*	N/A	1.7	1.7
	Max pool depth/d_{bkf}	*	*	N/A	4.3	3.3
	Bank Height Ratio	3.4-4.4	9.6-11.3	1.0-1.1	1.0	1.0
	Mean Bankfull Velocity (V) (fps)	5.1-5.7	4.6-5.2	3.5-5.0	2.5	3.9
	Bankfull Discharge (Q) (cfs)	5-8	9-13	N/A	5	22
Pattern	Meander length (L_m) (ft)	*	*	N/A	54-60	74-123
	Radius of curvature (R_c) (ft)	*	*	N/A	11-15	18-34
	Belt width (W_{blt}) (ft)	*	*	N/A	20-25	26-43
	Meander width ratio (W_{blt}/W_{bkf})	*	*	3-8	3.6-4.5	2.8-4.6
	Radius of curvature/bankfull width	*	*	2-3	2-2.7	1.9-3.7
	Meander length/bankfull width	*	*	7-14	9.8-10.9	8.0-13.2
Profile	Valley slope	0.064	0.047	0.002-0.01	0.030	0.030
	Average water surface slope	0.062	0.047	N/A	0.015	0.017
	Riffle slope	0.036	0.014	N/A	0.016	0.02-0.03
	Pool slope	*	*	N/A	0	0-0.002
	Pool to pool spacing	*	*	N/A	34-37	43-53
	Pool length	*	*	N/A	5-6	7-13
	Riffle slope/avg water surface slope	0.58	0.28-0.30	1.1-1.2	1.1	1.2-1.8
	Pool slope/avg water surface slope	*	*	0-0.2	0	0-0.1
	Pool length/bankfull width	*	*	N/A	1.1	0.8-1.4
	Pool to pool spacing/bankfull width	*	*	3.0-7.0	6.2-6.7	4.6-5.7

*No data shown for pools in existing stream do to channelization / lack of bed diversity

** from Harman and Starr 2011, Common Reference Reach Ratios for C, E, and B stream types.



Existing Trail Map at Fisher Farm Park & UT West Branch Rocky River Restoration Site

KCI ASSOCIATES OF NC

- Existing Bike Trails
- Existing Hiking Trails
- Trails to be abandoned following stream construction
- Greenway (Recently Constructed)
- Easement
- Proposed Project Streams
- Other Streams

N

0 212.5 425 Feet

Image Source:
Mecklenburg County 2018 Aerial

12.3 Project Meeting Notes

KCI ASSOCIATES OF NC

ISO 9001:2008 CERTIFIED

ENGINEERS • PLANNERS • SCIENTISTS • CONSTRUCTION MANAGERS

4505 Falls of Neuse Rd., Suite 400 • Raleigh, NC 27609 • Phone 919-783-9214 • Fax 919-783-9266

MEETING MINUTES

June 14, 2017, 10 AM

Location: UT West Branch Site, Fisher Farm Park, Davidson, NC

Attendees: Todd Tugwell, USACE Raleigh
David Shaeffer, USACE Charlotte
Mac Haupt, NCDWR
Kelly Phillips, NCDMS
Periann Russell, NCDMS
Harry Tsomides, NCDMS
Paul Wiesner, NCDMS
Adam Spiller, KCI
Kristin Knight-Meng, KCI

Subject: IRT Review of Concept Plan for UT West Branch Restoration Site
Yadkin River Basin - 03040105
Mecklenburg County, North Carolina
DMS Project #92684

- The meeting started by giving a brief history of the project, explaining that it has been reworked several times and that NCDMS wants the IRT's approval of the current concept plan before proceeding to the draft mitigation plan.

- NCDMS and KCI are proposing to restore this reach of an unnamed tributary to the West Branch of the Rocky River (UTWB) within Fisher Farm Park using an anabranched approach at the top of the site, which will then transition to a single-thread Priority 1 channel and then to a Priority 2 channel to tie out at the gas easement just upstream of the West Branch of the Rocky River.

- The attendees walked to the top of the UTWB reach where the current channel is proposed to be filled in and the valley reshaped as a "bowl" to allow natural flow paths to develop. After the bowl, there will be an anabranched reach installed, which was described as 3-5 channels spread across the valley with a large quantity of woody debris used. The proposed groundwater interceptors were also described. Kelly noted that the depth should be greater than 5' for full efficacy. This can be completed by using the equipment to dig the trenches and will not require people to enter the excavated trenches.

- There was a discussion about whether or not filling the existing channel would count as a stream impact. Todd and David suggested that a final jurisdictional determination would be needed to calculate the amount of impacts. They said that the side channels did not appear to be jurisdictional, but that the main channel would likely be. A discussion followed about how the potential loss of channel would be dealt with if the filled channel was counted as an impact. Approximately 300 lf of existing channel runs through the proposed anabranched reach. If there is not a net loss of linear footage on the project, it would be still be permittable within the NWP27 permit even if credit wasn't gained from the anabranched reach.

- Todd noted there may be some potential credit to be gained from the wider easement on the project; a buffer analysis will have to be done to calculate any additional credit from these areas.

- Todd and Mac indicated they are open to trying out the anabranched approach, but said that a site and design-specific set of success criteria for stream hydrology should be proposed. The group discussed using groundwater monitoring as a surrogate for stream hydrology. They would like to see some groundwater gauges close to the proposed groundwater interceptors and some further away. There was a discussion of calibrating the groundwater gauges to the lowest level of the channels throughout that reach. There was no clear consensus on the extent or duration that would be needed, however – that was left to be determined during the development of the mitigation plan. Todd did say that if the reach was determined not to be eligible for stream credit, that perhaps it could receive wetland credit instead (provided that jurisdictional hydrology was achieved – 7 and 9% hydroperiods were put forth as possibilities among the group).

- Approximately halfway down the site, the question was asked if many trees were going to come out. Due to the proposed Priority 1 restoration for the single-thread portions and the desire to use the full width of the valley, DMS and KCI indicated that a significant amount of trees will have to come out.

- Credit under the powerline easement was discussed and Todd stated that no credit would be given in this area.

- When discussing the mitigation plan, Mac stated that he would like to see watershed-wide sediment calculations due to the history of legacy sediments at the site, particularly for the anabranched section to compare existing and proposed conditions. What would the site continue to lose in sediment if the restoration project did not take place? Periann stated that she has done research in this area and could provide some guidance.

- Todd stated that he would require a 7-year monitoring plan for the site.

12.4 Site Protection Instrument

GPS Survey Metadata

(1) Class of Survey: "A"
(2) Positional Accuracy: Horizontal :
(3) Type of GPS field procedure: Static/OPUS (Online Position User Service)
(4) Date of survey: July 21, 2008
(5) Datum/Epoch: NAD 83 (CORS96)(Epoch:2002.0000)
(6) Published/Fixed-control used: CORS Network Stations
(7) Geoid Model: GEIOD03
(8) Combined Grid Factor: 0.99984822
(9) Units: U.S. Survey Feet

Shearer Road Line Table:

NUMBER	DIRECTION	DISTANCE
L1	S 06°34'09" W	77.55 FT
L2	S 01°43'42" W	65.00 FT
L3	S 01°41'33" E	57.55 FT
L4	S 04°17'16" E	60.11 FT
L5	S 06°46'48" E	60.89 FT
L6	S 10°25'02" E	61.42 FT
L7	S 13°38'07" E	58.52 FT
L8	S 16°43'48" E	64.03 FT

I, BEN MCCRARY, Review Officer of Mecklenburg County, certify that the map or plat to which this certification is affixed meets all statutory requirements for recording.

[signature] Review Officer — 12/4/13 Date

CERTIFICATE OF APPROVAL FOR RECORDING

I hereby certify that the subdivision plat shown hereon is exempt from the subdivision provisions of the Davidson Planning Ordinance, and is therefore exempt from its provisions. This plat has been found to comply with the zoning regulations of the Davidson Planning Ordinance, and has been approved by the Town of Davidson for recording in the Office of the Register of Deeds of Mecklenburg County.

12/4/13 Date — [signature] Planning Director, Davidson, North Carolina

I certify that this plat is not within a designated Public Water Supply Watershed.

12/4/13 Date — [signature] Watershed Administrator, Town of Davidson

CERTIFICATE OF OWNERSHIP AND DEDICATION

I hereby certify that I am the owner of the property shown and described hereon, which is located in the subdivision jurisdiction of the Town of Davidson and that I hereby adopt this plan of subdivision with my free consent, establish minimum building setback lines, preserve and protect all significant trees over 18 inches in diameter in the tree and root protection area, plant supplementary trees if required, and dedicate all streets, alleys, walks, parks, and other sites and easements, to public or private uses as noted. Furthermore, I hereby dedicate all sanitary sewer, storm sewer, and water lines that are located in public utility easements or rights-of-way to the Town of Davidson and the Charlotte-Mecklenburg Utility Department.

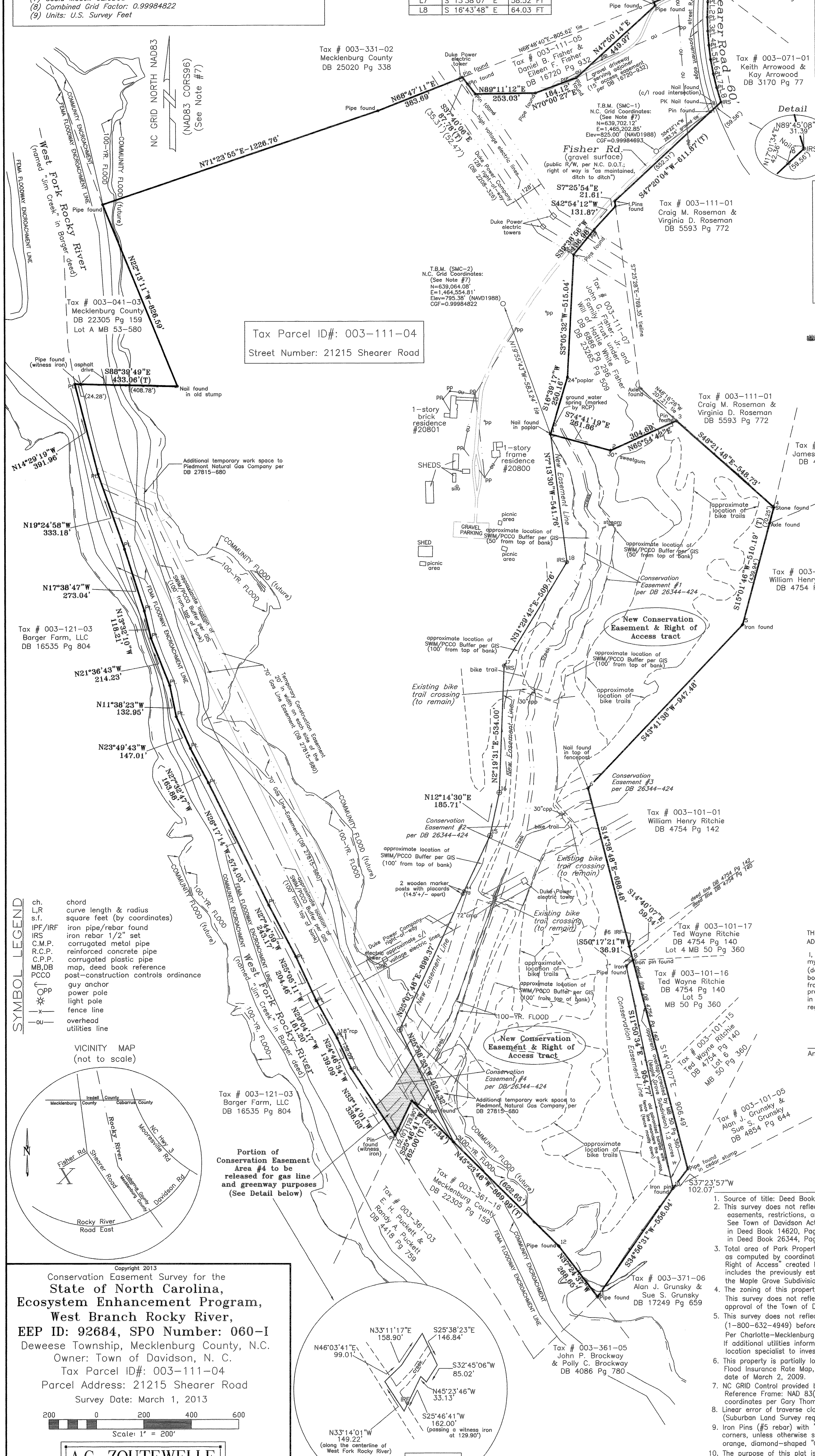
2-18-14 Date — [signature] Owner

Date — Owner

MAP BOOK 56 PAGE 557

2014073067

FILED FOR REGISTRATION JUN 27 2014 AT 3:02 pm J. DAVID GRANBERRY MECKLENBURG COUNTY, N.C. REGISTER OF DEEDS



SYMBOL LEGEND

ch.	chord
L,R	curve length & radius
s.f.	square feet (by coordinates)
IPF/IRF	iron pipe/rebar found
IRS	iron rebar 1/2" set
C.M.P.	corrugated metal pipe
R.C.P.	reinforced concrete pipe
C.P.P.	corrugated plastic pipe
MB,DB	map, deed book reference
PCCO	post-construction controls ordinance
←	guy anchor
○pp	power pole
☼	light pole
—x—	fence line
—ou—	overhead utilities line

VICINITY MAP (not to scale)

Conservation Easement Coordinate Table

Node ID	Northing (ft)	Easting (ft)
1	638515.77	1464753.61
2	638446.62	1465006.17
3	638570.98	1465284.32
4	638206.40	1465694.42
5	637713.66	1465562.12
6	637028.60	1464907.60
7	636362.49	1465081.68
8	636304.89	1465096.76
9	636281.31	1465068.37
10	635346.86	1465264.31
11	634891.05	1464945.84
12	635104.44	1464782.64
13	635541.67	1464339.33
14	636014.35	1464112.45
15	636828.60	1464494.39
16	637010.09	1464533.77
17	637543.65	1464555.43
18	637978.31	1464821.74
44 (post)	636596.59	1464385.59
45 (post)	636583.55	1464379.35

THIS PLAT CERTIFIED TO ONLY THE NORTH CAROLINA DEPARTMENT OF ADMINISTRATION, REAL PROPERTY DIVISION (STATE PROPERTY OFFICE):

I, Andrew G. Zoutewelle, certify that this plat was drawn under my supervision from an actual survey made under my supervision (deed descriptions recorded in the Deeds noted hereon); that the boundaries not surveyed are clearly indicated as dashed lines drawn from adjoining deed information as shown hereon; that the ratio of precision as calculated is greater than 1:11,400; that this plat was prepared in accordance with G.S. 47-30 as amended. Witness my original signature, registration number and seal this 15th day of November 2013.

[signature]
Andrew G. Zoutewelle, N.C. P.L.S.# L-3098

NORTH CAROLINA PROFESSIONAL SEAL L-3098 LAND SURVEYOR ANDREW G. ZOUTEWELLE

General Notes:

1. Source of title: Deed Book 14620, Page 750.
2. This survey does not reflect a complete title examination which may reveal additional easements, restrictions, and other matters of title. See Town of Davidson Active Recreation Conservation Easement (Fisher Property) recorded in Deed Book 14620, Page 756 and "Conservation Easement and Right of Access" recorded in Deed Book 26344, Page 424.
3. Total area of Park Property, including road rights-of-way and overlap area: 200.5382 acres, as computed by coordinates. The area within the "New Conservation Easement and Right of Access" created by this plat: 58.8629 acres (2,564,066 s.f.). [Note: This easement area includes the previously established Conservation Easements and excludes the overlap area of the the Maple Grove Subdivision.]
4. The zoning of this property, per GIS, is Town of Davidson "RPA" (Rural Planning Area). This survey does not reflect a zoning analysis. Any development of this parcel is subject to approval of the Town of Davidson.
5. This survey does not reflect complete utilities. Contact NC ONECALL Utility Location Service (1-800-632-4949) before any digging or design. Per Charlotte-Mecklenburg Utility Department, this site is not served by municipal water or sewer. If additional utilities information is required, the owner should contract with a private utility location specialist to investigate the areas of concern.
6. This property is partially located within a FEMA flood hazard district as per graphic scaling of FEMA Flood Insurance Rate Map, Community Panel No. 370158 4663K, which bears an effective date date of March 2, 2009. See approximate flood lines from FIRM shown hereon.
7. NC GRID Control provided by Survey and Mapping Control, 12727 Dorman Road, Pineville, N.C. Reference Frame: NAD 83(CORS96)(Epoch: 2002.0000) coordinates are consistent with NAD 83(NSRS2007) coordinates per Gary Thompson, North Carolina Geodetic Survey office, Phone: 1-919-733-3836.
8. Linear error of traverse closure 1: 11,400, which is within the precision level for a Suburban Land Survey (Suburban Land Survey requirement: 1: 7,500; Rural and Farmland Surveys: 1: 5,000.)
9. Iron Pins (#5 rebar) with "State of North Carolina Conservation Easement" discs set at all new easement corners, unless otherwise shown. New corners are also witnessed by 6" diameter wooden posts displaying orange, diamond-shaped "Conservation Area" placards.
10. The purpose of this plat is to: (1) describe the new expanded "Conservation Easement and Right of Access" area to be conveyed by the Town of Davidson to the State of North Carolina. This easement area encompasses those certain existing "Conservation Easement and Right of Access" areas described in Deed Book 26344 Page 424; and (2) describe the portion of Easement Area #4, Deed Book 26344 Page 424 that is to be released by the State of North Carolina to the Town of Davidson and/or Mecklenburg County for purposes of a gas line easement and a proposed Mecklenburg County greenway crossing.
11. Bike trails shown hereon are per a sketch provided by Town of Davidson. These were not field-located.

Conservation Easement Survey for the

State of North Carolina, Ecosystem Enhancement Program, West Branch Rocky River, EEP ID: 92684, SPO Number: 060-I

Deweese Township, Mecklenburg County, N.C.
Owner: Town of Davidson, N. C.
Tax Parcel ID#: 003-111-04
Parcel Address: 21215 Shearer Road
Survey Date: March 1, 2013

Scale: 1" = 200'

A.G. ZOUTEWELLE SURVEYORS
1418 East Fifth St. Charlotte, NC 28204
Phone: 704-372-9444 Fax: 704-372-9555
Firm Licensure Number: C-1054

EEP Easement
- Oct 2010

FOR REGISTRATION J. DAVID GRANBERRY
REGISTER OF DEEDS
MECKLENBURG COUNTY, NC
2011 MAR 10 08:44:40 AM
BK:26344 PG:424-437 FEE:$55.00

INSTRUMENT # 2011028897

2011028897

STATE OF NORTH CAROLINA

CONSERVATION EASEMENT AND RIGHT OF ACCESS

MECKLENBURG COUNTY
SPO File Number 060-I
Prepared by: Office of the Attorney General
Property Control Section
Return to: NC Department of Administration
State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321

THIS CONSERVATION EASEMENT DEED AND RIGHT OF ACCESS, pursuant to the provisions of N.C. General Statutes Chapter 121, Article 4 and made this 12th day of October, 2010, by the Town of Davidson, a North Carolina municipal corporation whose mailing address is Post Office Box 579, Davidson, NC, 28036, ("**Grantor**") to the State of North Carolina, ("**Grantee**"), whose mailing address is State of North Carolina, Department of Administration, State Property Office, 1321 Mail Service Center, Raleigh, NC 27699-1321. The designations Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter as required by context.

WITNESSETH:

Grantor has agreed to grant portions of the land areas that were included in a previous deed of a conservation easement as recorded in **Deed Book 14620 at Page 756 of the Mecklenburg County Registry** and subsequently removed via amendment as recorded in **Deed Book 25569 at Pages 627 - 631 of the Mecklenburg County Registry** (the "**Deed**"). **Grantor** now agrees removed areas as recorded in the **Deed** should be encumbered by this conservation easement and should be granted to the **Grantee.** To this end, the Grantor, individually and through its authorized representative signing below, grant to the **Grantee** all property interests in the easement area defined in the **Deed** recorded at **Deed Book 25569 at Pages 627 - 631 of the Mecklenburg County Registry**, that are hereafter included within the new conservation easement area defined in this deed.

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State of North Carolina has established the Ecosystem Enhancement Program (formerly known as the Wetlands Restoration Program) within the Department of Environment and Natural Resources for the purposes of acquiring, maintaining, restoring, enhancing, creating and preserving wetland and riparian resources that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; and

WHEREAS, The State of North Carolina is qualified to be the Grantee of a Conservation Easement pursuant to N.C. Gen. Stat. § 121-35; and

WHEREAS, the Ecosystem Enhancement Program in the Department of Environment and Natural Resources has approved acceptance of this instrument; and

WHEREAS, the Department of Environment and Natural Resources, the North Carolina Department of Transportation and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Agreement, (MOA) duly executed by all parties in Greensboro, NC on July 22, 2003. This MOA recognizes that the Ecosystem Enhancement Program is to provide for compensatory mitigation by effective protection of the land, water and natural resources of the State by restoring, enhancing and preserving ecosystem functions; and

WHEREAS, the acceptance of this instrument for and on behalf of the State of North Carolina was granted to the Department of Administration by resolution as approved by the Governor and Council of State adopted at a meeting held in the City of Raleigh, North Carolina, on the 5th day of June 2007; and

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in Deweese Township, Mecklenburg County, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately **200** acres and being conveyed to the Grantor by deed as recorded in **Deed Book 14620 at Page 750** of the Mecklenburg County Registry, North Carolina; and

WHEREAS, Grantor is willing to grant a Conservation Easement and Right of Access over the herein described areas of the Property, thereby restricting and limiting the use of the included areas of the Property to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept such Conservation Easement and Access Rights. This Conservation Easement shall be for the protection and benefit of the waters of the West Branch Rocky River.

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, **Grantor** unconditionally and irrevocably hereby grants, assigns and conveys unto **Grantee**, its successors and assigns, forever and in perpetuity, a Conservation Easement of the nature and character and to the extent hereinafter set forth, over a described area of the Property, referred to hereafter as the "**Easement Area**", for the benefit of the people of North Carolina, and being all of the tracts of land as identified as Area of Easement #1 (50' +/- each side) 3.0220 acres, Area of Easement #2 (50' +/- easement this side/100' +/- opposite side) 3.5792 acres, Area of

Easement #3 (50' +/- each side) 0.3208 acre, and Area of Easement #4 (50' each side) 2.9214 acres as shown on a plat of survey titled "Conservation Easement Survey for the State of North Carolina, Ecosystem Enhancement Program, West Branch Rocky River, EEP ID: 62684, SPO Number: 060-I" dated September 23, 2008, by A.G. Zoutewelle Surveyors, and **recorded in Map Book_____, Page _____,** Mecklenburg County Registry, said Easement Areas being more particularly described in Exhibit A.

The purposes of this Conservation Easement are to maintain, restore, enhance, create and preserve wetland and/or riparian resources in the Easement Area that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; to maintain permanently the Easement Area in its natural condition, consistent with these purposes; and to prevent any use of the Easement Area that will significantly impair or interfere with these purposes. To achieve these purposes, the following conditions and restrictions are set forth:

I. DURATION OF EASEMENT

Pursuant to law, including the above referenced statutes, this Conservation Easement and Right of Access shall be perpetual and it shall run with, and be a continuing restriction upon the use of, the Property, and it shall be enforceable by the Grantee against the Grantor and against Grantor's heirs, successors and assigns, personal representatives, agents, lessees, and licensees.

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITES

The Easement Area shall be restricted from any development or usage that would impair or interfere with the purposes of this Conservation Easement. Unless expressly reserved as a compatible use herein, any activity in, or use of, the Easement Area by the Grantor is prohibited as inconsistent with the purposes of this Conservation Easement. Any rights not expressly reserved hereunder by the Grantor have been acquired by the Grantee. The following specific uses are prohibited, restricted, or reserved as indicated:

A. Recreational Uses. Grantor expressly reserves the right to undeveloped recreational uses, including hiking, bird watching, and fishing, and access to the Easement Area for the purposes thereof. Usage of motorized vehicles in the Easement Area is prohibited, except as they are used exclusively for management, maintenance, or stewardship purposes, and on existing trails, paths or roads.

B. Educational Uses. The Grantor reserves the right to engage in and permit others to engage in educational uses in the Easement Area not inconsistent with this Conservation Easement, and the right of access to the Easement Area for such purposes including organized educational activities such as site visits and observations. Educational uses of the property shall not alter vegetation, hydrology or topography of the site.

C. Vegetative Cutting. Except as related to the removal of non-native plants, diseased or damaged trees, and vegetation that obstructs destabilizes or renders

unsafe the Easement Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Easement Area is prohibited.

D. Industrial, Residential and Commercial Uses. All are prohibited in the Easement Area.

E. Agricultural Use. All agricultural uses within the Easement Area including any use for cropland, waste lagoons, or pastureland are prohibited.

F. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Easement Area.

G. **Roads and Trails.** The construction of roads within the Easement Area is prohibited, with the exception of an access road for management purposes approved by the Grantee. The construction of trails, walkways and greenways shall be permitted within the Easement Area, however, trails shall not be permitted within 50 feet from the top of the restored stream bank, with the exception of one (1) approved creek crossing which must be located in conservation easement area #4 between points1532 and point 1533 on the southeastern boundary of the easement, crossing the stream and existing the easement #4 area between points 1535 and 1534 on the northwest boundary. Short sections of trail may be permitted within 50 feet of the restored top of bank only where no alternative alignment is practicable. All such exceptions must be pre-approved by the Grantee. Trail creek crossings must be approved by the Grantee in advance of construction and must be constructed perpendicular to the creek to the greatest extent practicable. Trail surfaces in the Easement Area may not exceed 10 feet in width and the total clearing limits for trail surfaces and mowed trail edges may not exceed 20 feet in width. Trail surfaces may be constructed of natural materials, stone, asphalt, concrete or boardwalk.

H. Signs. No signs shall be permitted in the Easement Area except interpretive signs describing restoration activities and the conservation values of the Easement Area, signs identifying the owner of the Property and the holder of the Conservation Easement, signs giving directions, or signs prescribing rules and regulations for the use of the Easement Area.

I. Dumping or Storing. Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances or machinery, or other material in the Easement Area is prohibited.

J. Grading, Mineral Use, Excavation, Dredging. There shall be no grading, filling, excavation, dredging, mining, or drilling; no removal of topsoil, sand, gravel, rock, peat, minerals, or other materials.

K. Water Quality and Drainage Patterns. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water. No altering or tampering with water control structures or devices, or disruption or alteration

of the restored, enhanced, or created drainage patterns. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Easement Area may temporarily be used for good cause shown as needed for the survival of livestock and agricultural production.

L. **Subdivision and Conveyance.** Grantor voluntarily agrees that no subdivision, partitioning, or dividing of the underlying fee that is subject to this Easement is allowed. Unless agreed to by the Grantee in writing, any future conveyance of the underlying fee for the Easement Area and the rights as conveyed herein shall be as a single block of property. Any future transfer of the fee simple shall be subject to this Conservation Easement. Any transfer of the fee is subject to the Grantee's right of ingress, egress, and regress over and across the Property to the Easement Area for the purposes set forth herein.

M. **Development Rights.** All development rights are removed from the Easement Area and shall not be transferred.

N. **Disturbance of Natural Features**. Any change, disturbance, alteration or impairment of the natural features of the Easement Area or any intentional introduction of non-native plants, trees and/or animal species by Grantor is prohibited.

The Grantor may request permission to vary from the above restrictions for good cause shown, provided that any such request is consistent with the purposes of this Conservation Easement. The Grantor shall not vary from the above restrictions without first obtaining written approval from the N.C. Ecosystem Enhancement Program, whose mailing address is 1652 Mail Services Center, Raleigh, NC 27699-1652.

III. GRANTEE RESERVED USES

A. **Right of Access, Construction, and Inspection.** The Grantee, its employees and agents, successors and assigns, receive a perpetual Right of Access to the Easement Area over the Property at reasonable times to undertake any activities to restore, construct, manage, maintain, enhance, and monitor the stream, wetland and any other riparian resources of the Easement Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights.

B. **Restoration Activities.** These activities include planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to direct in-stream, above ground, and subterraneous water flow.

C. **Right of Access, Construction, and Inspection.** The Grantee, its employees and agents, successors and assigns, receive a perpetual Right of Access to the Easement Area over the Property at reasonable times to undertake any activities to

restore, construct, manage, maintain, enhance, and monitor the stream, wetland and any other riparian resources of the Easement Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights.

IV. ENFORCEMENT AND REMEDIES

A. Enforcement. To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Easement Area that is inconsistent with the purposes of this Easement and to require the restoration of such areas or features of the Easement Area that may have been damaged by such activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, their successors or assigns, that comes to the attention of the Grantee, the Grantee shall, except as provided below, notify the Grantor, their successors or assigns in writing of such breach. The Grantor shall have ninety (90) days after receipt of such notice to correct the conditions constituting such breach. If the breach remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by appropriate legal proceedings including damages, injunctive and other relief. The Grantee shall also have the power and authority, consistent with its statutory authority: (a) to prevent any impairment of the Easement Area by acts which may be unlawful or in violation of this Conservation Easement; (b) to otherwise preserve or protect its interest in the Property; or (c) to seek damages from any appropriate person or entity. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive or other appropriate relief if the breach of the term of this Conservation Easement is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement. The Grantor and Grantee acknowledge that under such circumstances damage to the Grantee would be irreparable and remedies at law will be inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with this Conservation Easement.

B. Inspection. The Grantee, its employees and agents, successors and assigns, have the right, with reasonable notice, to enter the Easement Area over the Property at reasonable times for the purpose of inspection to determine whether the Grantor, their successors or assigns are complying with the terms, conditions and restrictions of this Conservation Easement.

C. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor, their successors or assigns, for any injury or change in the Easement Area caused by third parties, resulting from causes beyond the Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken in good faith by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to life, damage to property or harm to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against

Grantor, their successors or assigns, including, without limitation, any costs of restoration necessitated by Grantor's acts or omissions in violation of the terms of this Conservation Easement, shall be borne by Grantor.

E. No Waiver. Enforcement of this Easement shall be at the discretion of the Grantee and any forbearance, delay or omission by Grantee to exercise its rights hereunder in the event of any breach of any term set forth herein shall not be construed to be a waiver by Grantee.

V. MISCELLANEOUS

a. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings or agreements relating to the Conservation Easement. If any provision is found to be invalid, the remainder of the provisions of the Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

b. Any notices shall be sent by registered or certified mail, return receipt requested to the parties at their addresses shown herein or to other address(es) as either party establishes in writing upon notification to the other.

c. Grantor shall notify Grantee in writing of the name and address and any party to whom the Property or any part thereof is to be transferred at or prior to the time said transfer is made. Grantor further agrees to make any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed subject to the Conservation Easement herein created.

d. The Grantor and Grantee agree that the terms of this Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof.

e. This Conservation Easement and Right of Access may be amended, but only in writing signed by all parties hereto, and provided such amendment does not affect the qualification of this Conservation Easement or the status of the Grantee under any applicable laws, and is consistent with the purposes of the Conservation Easement. The U.S. Army Corps of Engineers must be notified 60 days in advance of any amendment to this Conservation Easement or transfer of property interest.

f. The parties recognize and agree that the benefits of this Conservation Easement are in gross and assignable provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns this Conservation Easement, the organization receiving the interest will be a qualified holder under N.C. Gen. Stat. § 121-34 et seq. and § 170(h) of the Internal Revenue Code, and the Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this document.

VI. QUIET ENJOYMENT

Grantor reserves all remaining rights accruing from ownership of the Property, including the right to engage in or permit or invite others to engage in only those uses of the Easement Area that are expressly reserved herein, not prohibited or restricted herein, and are not inconsistent with the purposes of this Conservation Easement. Without limiting the generality of the foregoing, the Grantor expressly reserves to the Grantor, and the Grantor's invitees and licensees, the right of access to the Easement Area, and the right of quiet enjoyment of the Easement Area.

TO HAVE AND TO HOLD the said rights and easements perpetually unto the State of North Carolina for the aforesaid purposes.

AND Grantor covenants that Grantor is seized of said premises in fee and has the right to convey the permanent Conservation Easement herein granted; that the same are free from encumbrances and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.

GRANTOR: TOWN OF DAVIDSON

_____(SEAL)
Leamon Brice, Town Manager

NORTH CAROLINA
COUNTY OF MECKLENBURG

I, Lillian Duer Smith, a Notary Public of Mecklenburg County, North Carolina, do hereby certify that Leamon Brice, personally appeared before me this day and acknowledged that he is Town Manager for the Town of Davidson, a municipal corporation of the State of North Carolina, and that by authority duly given and as an act of the Town of Davidson, the foregoing instrument was signed in its name.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 12th day of October, 2010.

_____
Notary Public

LILLIAN DUER SMITH NOTARY PUBLIC MECKLENBURG COUNTY, NC

THE TOWN OF DAVIDSON NORTH CAROLINA 1891

My commission expires:

April 1, 2015

"EXHIBIT A "
Legal Description for Conservation Easement
On Tax Parcel ID # 003-111-04
Deweese Township, Mecklenburg County
As shown in Mecklenburg County, North Carolina
Deed Book 14620, Page 750

Conservation Easement #1

BEING all that certain easement tract or parcel of land located within Deweese Township, Mecklenburg County, North Carolina, and being located within that certain tract of land described in a deed to the Town of Davidson as recorded in Deed Book 14620 Page 750 of the Mecklenburg County Registry, and being more particularly described as follows:

BEGINNING at a new rebar located on the common property line between the Town of Davidson as recorded in Deed Book 14620 Page 750 and John G. Fisher, Jr., Family Trust under will of Hattie White Fisher as recorded in Deed Book 6886 Page 296 and Deed Book 23265 Page 509 of the Mecklenburg County Registry, said new rebar being located the following eight (8) calls from an existing iron rod control point having North Carolina State Plane Coordinates of Northing=639,702.12 feet and Easting=1,465,202.85 feet (North American Datum of 1983, NSRS2007, having a combined grid factor of 0.99984693): (1) North 52-27-04 East 283.74 feet to an existing iron pin located on or within the westerly right-of-way of Shearer Road, (2) South 45-24-54 West 552.31 feet to an existing iron pin, (3) South 09-21-04 East 21.61 feet to an existing iron pin, (4) South 40-59-02 West 131.87 feet to an existing iron pin, (5) South 37-43-46 West 136.98 feet to an existing iron pin, (6) South 01-10-22 West 515.04 feet to a 24-inch poplar tree, (7) South 14-44-07 West 250.16 feet to a nail found in a poplar tree and (8) South 76-36-29 East 21.38 feet, and running thence from said POINT AND PLACE OF BEGINNING along the southerly boundary of the aforesaid John G. Fisher, Jr., Family Trust South 76-36-29 East 124.60 feet to a new rebar; thence along the following twenty-three (23) new lines: (1) South 29-44-40 East 100.35 feet to a new rebar, (2) South 15-02-55 East 91.26 feet to a new rebar, (3) South 02-31-48 West 83.34 feet to a new rebar, (4) South 36-51-27 East 119.21 feet to a new rebar, (5) South 04-28-03 West 129.26 feet to a new rebar, (6) South 12-57-01 West 131.68 feet to a new rebar, (7) South 25-22-21 West 160.59 feet to a new rebar, (8) South 19-52-53 West 126.23 feet to a new rebar, (9) South 55-04-34 West 89.76 feet to a new rebar, (10) South 15-22-04 West 132.10 feet to a new rebar, (11) North 72-11-04 West 113.94 feet crossing a stream to a new rebar, (12) North 13-32-14 East 129.63 feet to a new rebar, (13) North 39-28-01 East 114.89 feet to a new rebar, (14) North 24-10-40 East 102.34 feet to a new rebar, (15) North 33-48-14 East 138.68 feet to a new rebar, (16) North 10-33-53 East 118.26 feet to a new rebar, (17) North 02-19-29 East 108.07 feet to a new rebar, (18) North 40-28-31 West 85.77 feet to a new rebar, (19) North 00-48-23 West 104.15 feet to a new rebar, (20) North 13-33-28 West 82.06 feet to a new rebar, (21) North 31-05-36 West 92.82 feet to a new rebar, (22) North 30-16-08 West 70.34 feet to a new rebar and (23) North 58-00-35 East 20.21 feet to the point and place of BEGINNING, containing 3.0220 acres as shown on a survey prepared by Andrew G. Zoutewelle, North Carolina Professional Land Surveyor #L-3098, dated September 23, 2008.

Conservation Easement #2

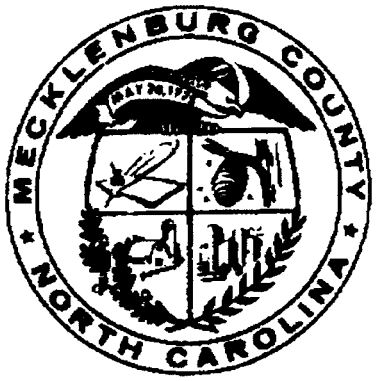
BEING all that certain easement tract or parcel of land located within Deweese Township, Mecklenburg County, North Carolina, and being located within that certain tract of land described in a deed to the Town of Davidson, N.C., as recorded in Deed Book 14620 Page 750 of the Mecklenburg County Registry, and being more particularly described as follows:

BEGINNING at a new rebar located within the aforesaid tract of land described in a deed to the Town of Davidson, N.C., as recorded in Deed Book 14620 Page 750 of the Mecklenburg County Registry, said new rebar being located the following twenty-one (21) calls from an existing iron rod control point having North Carolina State Plane Coordinates of Northing=639,702.12 feet and Easting=1,465,202.85 feet (North American Datum of 1983, NSRS2007, having a combined grid factor of 0.99984693): (1) North 52-27-04 East 283.74 feet to an existing iron pin located on or within the westerly right-of-way of Shearer Road, (2) South 45-24-54 West 552.31 feet to an existing iron pin, (3) South 09-21-04 East 21.61 feet to an existing iron pin, (4) South 40-59-02 West 131.87 feet to an existing iron pin, (5) South 37-43-46 West 136.98 feet to an existing iron pin, (6) South 01-10-22 West 515.04 feet to a 24-inch poplar tree, (7) South 14-44-07 West 250.16 feet to a nail found in a poplar tree, (8) South 76-36-29 East 21.38 feet to a new rebar, (9) South 76-36-29 East 124.60 feet to a new rebar, (10) South 29-44-40 East 100.35 feet to a new rebar, (11) South 15-02-55 East 91.26 feet to a new rebar, (12) South 02-31-48 West 83.34 feet to a new rebar, (13) South 36-51-27 East 119.21 feet to a new rebar, (14) South 04-28-03 West 129.26 feet to a new rebar, (15) South 12-57-01 West 131.68 feet to a new rebar, (16) South 25-22-21 West 160.59 feet to a new rebar, (17) South 19-52-53 West 126.23 feet to a new rebar, (18) South 55-04-34 West 89.76 feet to a new rebar, (19) South 15-22-04 West 132.10 feet to a new rebar, (20) North 72-11-04 West 113.94 feet crossing a stream to a new rebar and (21) South 19-29-06 West 30.44 feet, and running thence from said POINT AND PLACE OF BEGINNING the following thirteen (13) new calls: (1) South 73-24-21 East 167.99 feet crossing a stream to a new rebar, (2) South 09-31-13 West 97.77 feet to a new rebar, (3) South 09-39-59 East 89.87 feet to a new rebar, (4) South 05-34-18 East 95.97 feet to a new rebar, (5) South 05-34-18 West 151.93 feet to a new rebar, (6) South 39-49-03 East 113.65 feet crossing a stream to a new rebar, (7) South 55-47-47 West 98.68 feet to a new rebar, (8) South 20-24-07 West 297.54 feet to a new rebar, (9) North 74-02-13 West 183.34 feet crossing a stream to a new rebar, (10) North 20-43-39 East 341.04 feet to a new rebar, (11) North 03-10-55 East 257.89 feet to a new rebar, (12) North 10-25-37 West 119.96 feet to a new rebar and North 07-39-28 East 157.92 feet to the point and place of BEGINNING, containing 3.5792 acres as shown on a survey prepared by Andrew G. Zoutewelle, North Carolina Professional Land Surveyor #L-3098, dated September 23, 2008.

Conservation Easement #4

BEING all that certain easement tract or parcel of land located within Deweese Township, Mecklenburg County, North Carolina, and being located within that certain tract of land described in a deed to the Town of Davidson, N.C., as recorded in Deed Book 14620 Page 750 of the Mecklenburg County Registry, and being more particularly described as follows:

BEGINNING at a new rebar located within the aforesaid tract of land described in a deed to the Town of Davidson, N.C., as recorded in Deed Book 14620 Page 750 of the Mecklenburg County Registry, said new rebar being located the following twenty-six (26) calls from an existing iron rod control point having North Carolina State Plane Coordinates of Northing=639,702.12 feet and Easting=1,465,202.85 feet (North American Datum of 1983, NSRS2007, having a combined grid factor of 0.99984693): (1) North 52-27-04 East 283.74 feet to an existing iron pin located on or within the westerly right-of-way of Shearer Road, (2) South 45-24-54 West 552.31 feet to an existing iron pin, (3) South 09-21-04 East 21.61 feet to an existing iron pin, (4) South 40-59-02 West 131.87 feet to an existing iron pin, (5) South 37-43-46 West 136.98 feet to an existing iron pin, (6) South 01-10-22 West 515.04 feet to a 24-inch poplar tree, (7) South 14-44-07 West 250.16 feet to a nail found in a poplar tree, (8) South 76-36-29 East 21.38 feet to a new rebar, (9) South 76-36-29 East 124.60 feet to a new rebar, (10) South 29-44-40 East 100.35 feet to a new rebar, (11) South 15-02-55 East 91.26 feet to a new rebar, (12) South 02-31-48 West 83.34 feet to a new rebar, (13) South 36-51-27 East 119.21 feet to a new rebar, (14) South 04-28-03 West 129.26 feet to a new rebar, (15) South 12-57-01 West 131.68 feet to a new rebar, (16) South 25-22-21 West 160.59 feet to a new rebar, (17) South 19-52-53 West 126.23 feet to a new rebar, (18) South 55-04-34 West 89.76 feet to a new rebar, (19) South 15-22-04 West 132.10 feet to a new rebar, (20) North 72-11-04 West 113.94 feet crossing a stream to a new rebar, (21) South 19-29-06 West 30.44 feet to a new rebar, (22) South 07-39-28 West 157.92 feet to a new rebar, (23) South 10-25-37 East 119.96 feet to a new rebar, (24) South 03-10-55 West 257.89 feet to a new rebar, (25) South 20-43-39 West 341.04 feet to a new rebar and (26) South 26-51-41 West 34.71 feet, and running thence from said POINT AND PLACE OF BEGINNING the following five (5) new calls: (1) South 72-44-11 East 135.19 feet crossing a stream to a new rebar, (2) South 19-17-12 West 200.89 feet to a new rebar, (3) South 16-25-59 West 239.90 feet to a new rebar, (4) South 24-14-30 West 209.45 feet to a new rebar, (5) South 30-49-56 West 264.40 feet to a new rebar; thence along the northerly and westerly boundary lines of the property of Mecklenburg County as recorded in Deed Book 22305 Page 159 of the Mecklenburg County Registry the following two (2) calls: (1) North 47-18-55 West 33.13 feet to an existing iron pipe and (2) South 23-51-31 West (passing an existing iron pin at 129.90 feet) a total distance of 162.00 feet to a point in the centerline of the West Fork Rocky River; thence along the centerline of the said West Fork Rocky River North 35-09-10 West 149.22 feet to a point; thence along the following five (5) new calls: (1) North 44-08-31 East 99.01 feet to a new rebar, (2) North 31-16-07 East 256.66 feet to a new rebar, (3) North 24-55-54 East 187.01 feet to a new rebar, (4) North 15-38-12 East 223.59 feet to a new rebar and (5) North 16-31-04 East 215.09 feet to the point and place of BEGINNING, containing 2.9214 acres as shown on a survey prepared by Andrew G. Zoutewelle, North Carolina Professional Land Surveyor #L-3098, dated September 23, 2008.



J. DAVID GRANBERRY
REGISTER OF DEEDS, MECKLENBURG
COUNTY & COURTS OFFICE BUILDING
720 EAST FOURTH STREET
CHARLOTTE, NC 28202

PLEASE RETAIN YELLOW TRAILER PAGE

It is part of the recorded document, and must be submitted with original for re-recording and/or cancellation.

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Filed For Registration:	**03/10/2011 08:44:40 AM**
Book:	**RE 26344 Page: 424-437**
Document No.:	**2011028897**
	ESMT 14 PGS $55.00
Recorder:	**DIONNE TAYLOR**

2011028897

12.5 Credit Release Schedule

Stream Credit Release Schedule – 7 year Timeframe			
Monitoring Year	**Credit Release Activity**	**Interim Release**	**Total Released**
0	Initial Allocation – see requirements below	30%	30%
1	First year monitoring report demonstrates performance standards are being met	10%	40%
2	Second year monitoring report demonstrates performance standards are being met	10%	50%
3	Third year monitoring report demonstrates performance standards are being met	10%	60%
4	Fourth year monitoring report demonstrates performance standards are being met	5%	65% (75%*)
5	Fifth year monitoring report demonstrates performance standards are being met	10%	75% (85%*)
6	Sixth year monitoring report demonstrates performance standards are being met	5%	80% (90%*)
7	Seventh year monitoring report demonstrates performance standards are being met, and project has received close-out approval from IRT	10%	90% (100%*)

**See Subsequent Credit Releases description below*

Initial Allocation of Released Credits

The initial allocation of released credits, as specified in the mitigation plan can be released by the NCDMS without prior written approval of the DE upon satisfactory completion of the following activities:

a. Approval of the final Mitigation Plan
b. Recordation of the preservation mechanism, as well as a title opinion acceptable to the USACE covering the property
c. Completion of project construction (the initial physical and biological improvements to the mitigation site) pursuant to the mitigation plan; Per the NCDMS Instrument, construction means that a mitigation sit\e has been constructed in its entirety, to include planting, and an as-built report has been produced. As-built reports must be sealed by an engineer prior to project closeout, if appropriate but not prior to the initial allocation of released credits.
d. Receipt of necessary DA permit authorization or written DA approval for projects where DA permit issuance is not required

Subsequent Credit Releases

All subsequent credit releases must be approved by the DE, in consultation with the IRT, based on a determination that required performance standards have been achieved. For stream project with a 7-year monitoring period, a reserve of 10% of a site's total stream credits shall be released after four bank-full events have occurred, in separate years, provided the channel is stable and all other performance standards are met. In the event that less than four bankfull events occur during the monitoring period, release of these reserve credits shall be at the discretion of the IRT. As projects approach milestones associated with credit release, the NCDMS will submit a request for credit release to the DE along with documentation substantiating achievement of criteria required for release to occur. This documentation will be included with the annual monitoring report.

12.6 Financial Assurance

Pursuant to Section IV H and Appendix III of the Division of Mitigation Service's In-Lieu Fee Instrument dated July 28, 2010, the North Carolina Department of Environmental Quality (formerly NCDENR) has provided the U.S. Army Corps of Engineers Wilmington District with a formal commitment to fund projects to satisfy mitigation requirements assumed by DMS. This commitment provides financial assurance for all mitigation projects implemented by the program.

12.7 Maintenance Plan

The site will be monitored on a regular basis, with a physical inspection of the site conducted a minimum of once per year throughout the post-construction monitoring period until performance standards are met. These site inspections may identify site components and features that require routine maintenance. Routine maintenance should be expected most often in the first two years following site construction and may include the following. Maintenance needs or actions will be recorded in the annual monitoring reports. See the Section 12.10 for more information on invasive species.

Planned Maintenance

Component/Feature	Maintenance Through Project Close-Out
Stream	Routine channel maintenance and repair activities may include securing of loose coir matting and supplemental installations of live stakes and other target vegetation along the channel. Areas where stormwater and floodplain flows intercept the channel (such as the proposed water quality treatment areas) may also require maintenance to prevent bank failures, knick points, and erosion.
Vegetation	Vegetation shall be maintained to ensure the health and vigor of the targeted plant community. Any vegetation control requiring herbicide application will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations.
Site Boundary	Site boundaries shall be identified in the field to ensure clear distinction between the mitigation site and adjacent properties. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by site conditions and/or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as needed basis up until the project is closed out.
Beaver and Other Nuisance Fauna	The site will be monitored for the presence of beaver or other fauna that may impact the success of the project. Adaptive management approaches will be used to evaluate whether or not beaver or their structures or other animals should be controlled or managed at the site.

12.8 Stream and Wetland Delineation (Incl. Stream Identification Forms)

KCI ASSOCIATES OF NC

ISO 9001:2008 CERTIFIED

ENGINEERS • PLANNERS • SCIENTISTS • CONSTRUCTION MANAGERS

4505 Falls of Neuse Rd., Suite 400 • Raleigh, NC 27609 • Phone 919-783-9214 • Fax 919-783-9266

July 17, 2017

Mr. David L. Shaeffer
Charlotte Regulatory Field Office
US Army Corps of Engineers
8430 University Executive Park Drive, Suite 611
Charlotte, North Carolina 28262

Subject: Request for Preliminary Jurisdictional Determination
SAW-2017-00810 – UT to West Branch Rocky River Restoration Site
Mecklenburg County, North Carolina

Dear Mr. Shaeffer;

KCI has completed a delineation of streams and wetlands for the above referenced project. The attached information, including required forms, tables, and figures, is submitted for your review and determination of jurisdiction under the Clean Water Act (CWA).

Project Description & Methodology

As shown in Figure 1, the UT to West Branch Rocky River Restoration Site (UTWBRR) is located in Mecklenburg County, NC within the Yadkin River Basin (USGS HUC 03040105). The site is located in Fisher Farm Park in Davidson, NC and is owned by the Town of Davidson. The site is being developed as a stream restoration site for the North Carolina Division of Mitigation Services (DMS). The study area comprises approximately 59 acres. This delineation was performed on June 27, 2017 in compliance with methodology set forth in the U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual (USACE 1987) and subsequent guidance including the Eastern Mountains and Piedmont Regional Supplement. Streams were assessed for jurisdiction under the CWA using field indications of ordinary high water mark and the North Carolina Division of Water Quality (NCDWQ) Stream Identification Form, Version 4.11.

Wetlands were delineated using survey flagging at regular locations along the wetland-upland boundary. All boundaries either form complete polygons, tie to surface water features such as streams or ponds, or tie to the edge of the project area. Streams points were collected using sub-meter GPS technology at representative points to depict center lines. Wetland Determination Forms were completed for each type of wetland community encountered.

Delineation Results

Figure 2 is presented using the Cornelius US Geological Survey 1:24,000 Quadrangle Map. Figure 3 presents the results of the delineation, including streams and wetlands overlaid on 2015 Statewide Aerial Photographs.

Table 1 presents detailed information on each jurisdictional stream within the project area, including status (intermittent or perennial), length, width, NCDWQ Score, and latitude/longitude. Based on field data, approximately 3,441 linear feet of stream are present within the project area. Table 2 presents detailed information on each wetland feature including NC Wetland Assessment Method type, Hydrologic Class, Cowardin Class, size, representative wetland delineation form identification, and latitude/longitude. Based on field data, there are approximately 0.16 acres of wetlands present within the project area.

We respectfully request your review of this information, so that a preliminary jurisdictional determination under the CWA may be obtained. If you have any questions, need additional information, or would like to schedule a site visit, please contact me at your earliest convenience at (919) 278-2517 or joe.sullivan@kci.com.

Sincerely,

KCI Associates of North Carolina

Joseph Sullivan
Environmental Scientist

Attachments:

- Jurisdictional Determination (JD) Request Form
- Preliminary Jurisdictional Determination Form
- Table 1: Stream Summary Table
- Table 2: Wetland Summary Table
- Figure 1: Vicinity Map
- Figure 2: USGS Map
- Figure 3: Jurisdictional Features Map
- Stream and Wetland Data Forms
- Conservation Easement and Plat

A. PARCEL INFORMATION

Street Address: 21215 Shearer Rd
City, State: Davidson, NC
County: Mecklenburg
Directions: From Charlotte, take I-77 north for 15 miles to exit 25 for NC-73. Turn right onto NC-73 and continue 4 miles. Turn right onto June Washam Rd. Turn left onto Shearer Rd. Follow for 3 miles to Fisher Farm Park.

Parcel Index Number(s) (PIN): 00311104

B. REQUESTOR INFORMATION

Name: Joe Sullivan, KCI Technologies Inc.
Mailing Address: 4505 Falls of Neuse Rd Suite 400, Raleigh, NC 27609
Telephone Number: (919) 278-2533
Electronic Mail Address[1]: joe.sullivan@kci.com

Select one:

- ☐ I am the current property owner.
- ☑ I am an Authorized Agent or Environmental Consultant[2]
- ☐ Interested Buyer or Under Contract to Purchase
- ☐ Other, please explain.

C. PROPERTY OWNER INFORMATION

Name: Town of Davidson
Mailing Address: P.O. Box 579 Davidson, NC 28036

Telephone Number:
Electronic Mail Address[3]:

☑ Proof of Ownership Attached (e.g. a copy of Deed, County GIS/Parcel/Tax Record data)

[1] If available
[2] Must attach completed Agent Authorization Form
[3] If available

D. PROPERTY OWNER CERTIFICATION[4]

I, the undersigned, a duly authorized owner of record of the property/properties identified herein, do authorize representatives of the Wilmington District, U.S. Army Corps of Engineers (Corps) to enter upon the property herein described for the purpose of conducting on-site investigations and issuing a determination associated with Waters of the U.S. subject to Federal jurisdiction under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899.

See Conservation Easement
Property Owner (please print)

Date

Property Owner Signature

E. JURISDICTIONAL DETERMINATION TYPE

Select One:

☑ I am requesting that the Corps provide a preliminary JD for the property identified herein. This request does include a delineation.

☐ I am requesting that the Corps provide a preliminary JD for the property identified herein. This request does NOT include a delineation.

☐ I am requesting that the Corps investigate the property/project area for the presence or absence of WoUS[5] and provide an approved JD for the property identified herein. This request does NOT include a request for a verified delineation.

☐ I am requesting that the Corps delineate the boundaries of all WoUS on a property/project area and provide an approved JD (this may or may not include a survey plat).

☐ I am requesting that the Corps evaluate and approve a delineation of WoUS (conducted by others) on a property/project area and provide an approved JD (may or may not include a survey plat).

[4] For NCDOT requests following the current NCDOT/USACE protocols, skip to Part E.
[5] Waters of the United States

F. ALL REQUESTS

☑ Map of Property or Project Area (attached). This Map must clearly depict the boundaries of the area of evaluation.

☑ Size of Property or Project Area 59 acres

☑ I verify that the property (or project) boundaries have recently been surveyed and marked by a licensed land surveyor OR are otherwise clearly marked or distinguishable.

G. JD REQUESTS FROM CONSULTANTS OR AGENCIES

(1) Preliminary JD Requests:

☑ Completed and signed Preliminary Jurisdictional Determination Form[6].

☑ Project Coordinates: 35.4870 Latitude -80.7982 Longitude

Maps (no larger than 11x17) with Project Boundary Overlay:

☑ Large and small scale maps that depict, at minimum: streets, intersections, towns

☑ Aerial Photography of the project area

☑ USGS Topographic Map

☐ Soil Survey Map

☐ Other Maps, as appropriate (e.g. National Wetland Inventory Map, Proposed Site Plan, previous delineation maps, LIDAR maps, FEMA floodplain maps)

[6] See Appendix A of this Form. From Regulatory Guidance Letter No. 08-02, dated June 26, 2008

Delineation Information (when applicable)[7]:

Wetlands:

- [x] Wetland Data Sheets[8]
- [x] Upland Data Sheets
- [ ] Landscape Photos, if taken

Tributaries:

- [ ] USACE Assessment Forms
- [x] Other Assessment Forms (when appropriate)

- [ ] Field Sketch overlain on legible Map that includes:
  - All aquatic resources (for sites with multiple resources, label and identify)
  - Locations of wetland data points and/or tributary assessment reaches
  - Locations of photo stations
  - Approximate acreage/linear footage of aquatic resources

(2) Approved JDs including Verification of a Delineation:

- [ ] Project Coordinates: _____ Latitude _____ Longitude

Maps (no larger than 11x17) with Project Boundary Overlay:

- [ ] Large and small scale maps that depict, at minimum: streets, intersections, towns
- [ ] Aerial Photography of the project area
- [ ] USGS Topographic Map
- [ ] Soil Survey Map
- [ ] Other Maps, as appropriate (e.g. National Wetland Inventory Map, Proposed Site Plan, previous delineation maps)

[7] 1987 Manual Regional Supplements and Data forms can be found at:
http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/reg_supp.aspx
Wetland and Stream Assessment Methodologies can be found at:
http://portal.ncdenr.org/c/document_library/get_file?uuid=76f3c58b-dab8-4960-ba43-45b7faf06f4c&groupId=38364 and,
http://www.saw.usace.army.mil/Portals/59/docs/regulatory/publicnotices/2013/NCSAM_Draft_User_Manual_130318.pdf

[8] Delineation information must include, at minimum, one wetland data sheet for each wetland/community type.

Delineation Information (when applicable):

Wetlands:

☐ Wetland Data Sheets[9]

☐ Upland Data Sheets

Tributaries:

☐ USACE Assessment Forms

☐ Other Assessment Forms (when appropriate)

☐ Landscape Photos, if taken

☐ Field Sketch overlain on legible Map that includes:

- All aquatic resources (for sites with multiple resources, label and identify)
- Locations of wetland data points and/or tributary assessment reaches
- Locations of photo stations
- Approximate acreage/linear footage of aquatic resources

Supporting Jurisdictional Information (for Approved JDs only)

☐ Approved Jurisdictional Determination Form(s) (also known as "Rapanos Form(s)")

☐ Map(s) depicting the potential (or lack of potential) hydrologic connection(s), adjacency, etc. to navigable waters.

[9] Delineation information must include, at minimum, one wetland data sheet for each wetland/community type.

I. REQUESTS FOR CORPS APPROVAL OF SURVEY PLAT

Prior to final production of a Plat, the Wilmington District recommends that the Land Surveyor electronically submit a draft of a Survey Plat to the Corps project manager for review.

Due to storage limitations of our administrative records, the Corps requires that all hard-copy submittals include at least one original Plat (to scale) that is no larger than 11"x17" (the use of match lines for larger tracts acceptable). Additional copies of a plat, including those larger than 11"x17", may also be submitted for Corps signature as needed. The Corps also accepts electronic submittals of plats, such as those transmitted as a Portable Document Format (PDF) file. Upon verification, the Corps can electronically sign these plats and return them via e-mail to the requestor.

(1) PLATS SUBMITTED FOR APPROVAL

☐ Must be sealed and signed by a licensed professional land surveyor

☐ Must be to scale (all maps must include both a graphic scale and a verbal scale)

☐ Must be legible

☐ Must include a North Arrow, Scale(s), Title, Property Information

☐ Must include a legible WoUS Delineation Table of distances and bearings/metes and bounds/GPS coordinates of all surveyed delineation points

☐ Must clearly depict surveyed property or project boundaries

☐ Must clearly identify the known surveyed point(s) used as reference (e.g. property corner, USGS monument)

☐ When wetlands are depicted:

- Must include acreage (or square footage) of wetland polygons
- Must identify each wetland polygon using an alphanumeric system

☐ When tributaries are depicted:

- Must include either a surveyed, approximate centerline of tributary with approximate width of tributary OR surveyed Ordinary High Water Marks (OHWM) of tributary
- Must identify each tributary using an alphanumeric system
- Must include linear footage of tributaries and calculated area (using approximate widths or surveyed OHWM)
- Must include name of tributary (based on the most recent USGS topographic map) or, when no USGS name exists, identify as "unnamed tributary"

☐ all depicted WoUS (wetland polygons and tributary lines) must intersect or tie-to surveyed project/property boundaries

☐ Must include the location of wetland data points and/or tributary assessment reaches

☐ Must include, label accordingly, and depict acreage of all waters not currently subject to the requirements of the CWA (e.g. "isolated wetlands", "non-jurisdictional waters"). NOTE: An approved JD must be conducted in order to make an official Corps determination that a particular waterbody or wetland is <u>not</u> jurisdictional.

☐ Must include and survey all existing conveyances (pipes, culverts, etc.) that transport WoUS

(2) CERTIFICATION LANGUAGE

☐ When the entire actual Jurisdictional Boundary is depicted:

include the following Corps Certification language:

"This certifies that this copy of this plat accurately depicts the boundary of the jurisdiction of Section 404 of the Clean Water Act as determined by the undersigned on this date. Unless there is a change in the law or our published regulations, the determination of Section 404 jurisdiction may be relied upon for a period not to exceed five (5) years from this date. The undersigned completed this determination utilizing the appropriate Regional Supplement to the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual."

Regulatory Official: _____

Title: _____

Date: _____

USACE Action ID No.: _____

☐ When uplands may be present within a depicted Jurisdictional Boundary:

include the following Corps Certification language:

"This certifies that this copy of this plat identifies all areas of waters of the United States regulated pursuant to Section 404 of the Clean Water Act as determined by the undersigned on this date. Unless there is change in the law or our published regulations, this determination of Section 404 jurisdiction may be relied upon for a period not to exceed five years from this date. The undersigned completed this determination utilizing the appropriate Regional Supplement to the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual."

Regulatory Official: _____

Title: _____

Date: _____

USACE Action ID No.: _____

(3) GPS SURVEYS

For Surveys prepared using a Global Positioning System (GPS), the Survey must include all of the above, as well as:

☐ be at sub-meter accuracy at each survey point.

☐ include an accuracy verification:
One or more known points (property corner, monument) shall be located with the GPS and cross-referenced with the existing traditional property survey (metes and bounds).

☐ include a brief description of the GPS equipment utilized.

ATTACHMENT A

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD): _____

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:
Joe Sullivan, KCI Technologies Inc.
4505 Falls of Neuse Rd Suite 400, Raleigh, NC 27609

C. DISTRICT OFFICE, FILE NAME, AND NUMBER:

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:
21215 Shearer Rd, Davidson, North Carolina 28036

(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)

State: NC County/parish/borough: Mecklenburg City: Davidson

Center coordinates of site (lat/long in degree decimal format):
Lat. 35.4870 °N; Long. -80.7982 °W.

Universal Transverse Mercator: _____

Name of nearest waterbody: West Branch Rocky River

Identify (estimate) amount of waters in the review area:
Non-wetland waters:
3441 linear feet: 8 width (ft) and/or 0.77 acres.

Cowardin Class: Riverine

Stream Flow: Intermittent / Perennial

Wetlands: 0.16 acres.

Cowardin Class: Forested

Name of any water bodies on the site that have been identified as Section 10 waters:
Tidal: _____
Non-Tidal: _____

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date: _____

☐ Field Determination. Date(s): _____

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

☑ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Vicinity Map

☑ Data sheets prepared/submitted by or on behalf of the applicant/consultant.

- ☐ Office concurs with data sheets/delineation report.
- ☐ Office does not concur with data sheets/delineation report.

☐ Data sheets prepared by the Corps: _____

☐ Corps navigable waters' study: _____

☐ U.S. Geological Survey Hydrologic Atlas: _____

☐ USGS NHD data

☐ USGS 8 and 12 digit HUC maps

☑ U.S. Geological Survey map(s). Cite scale & quad name: 1:24K Cornelius

☐ USDA Natural Resources Conservation Service Soil Survey. Citation: _____

☐ National wetlands inventory map(s). Cite name: _____

☐ State/Local wetland inventory map(s): _____

☐ FEMA/FIRM maps: _____

☐ 100-year Floodplain Elevation is: _____ (National Geodectic Vertical Datum of 1929)

☑ Photographs: ☑ Aerial (Name & Date): 2015 NC Statewide Aerial Photographs or ☐ Other (Name & Date): _____

☐ Previous determination(s). File no. and date of response letter: _____

☐ Other information (please specify): _____

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

_____	Joseph Sullivan 6/27/17
Signature and date of Regulatory Project Manager (REQUIRED)	Signature and date of person requesting preliminary JD (REQUIRED, unless obtaining the signature is impracticable)

NORTH CAROLINA DIVISION OF MITIGATION SERVICES
LANDOWNER AUTHORIZATION FORM

PROPERTY LEGAL DESCRIPTION:

Deed Book: 14620 **Page:** 750 **County:** Mecklenburg

Parcel ID Number: 00311104

Street Address: 21051 Shearer Rd., Davidson, NC 28036

Property Owner (please print: Town of Davidson, NC

Property Owner (please print):

The undersigned, registered property owner(s) of the above property, do hereby authorize

Harry Tsomides **(Contractor/Agent/Project Manager)**[1] **of** NCDMS **(Name of Contractor/Agent Firm/Agency)**[2]

to take all actions necessary for the evaluation of the property as a potential stream, wetland and/or riparian buffer mitigation project, including conducting stream and/or wetland determinations and delineations, as well as issuance and acceptance of any required permit(s) or certification(s). I agree to allow regulatory agencies, including the US Army Corps of Engineers, to visit the property as part of these environmental reviews.

Property Owners(s) Address: (if different from above) Kathryn Spatz, Parks & Recreation Director
Town of Davidson, PO Box 579, Davidson, NC 28036

Property Owner Telephone Number: 704-940-9644

Property Owner Telephone Number:

We hereby certify the above information to be true and accurate to the best of our knowledge.

(Property Owner Authorized Signature) **(Date)** 3/1/17

(Property Owner Authorized Signature) **(Date)**

[1]Name of full delivery staff member (full-deliveries) or DMS project manager (design-bid-build).
[2]Name of company (full-deliveries) or NCDMS (design-bid-build).

Table 1.

Stream Name	Stream Status	Length (Feet)	Width (Feet)	NCDWQ Score	Latitude	Longitude
SA (UTWBRR)	Perennial	3,028	10	30	35.4910	-80.7980
SB (UT1)	Intermittent	94	4	27.5	35.4901	-80.7973
SC (UT2)	Perennial	319	5	30	35.4869	-80.7976

Table 2.

Wetland ID	NCWAM	Hydrologic Class	Cowardin Class	Size (Acres)	USACE Forms		Latitude	Longitude
					WET	UP		
WA	Basin	Non-Riparian	PFO	0.16	X	X	35.4817	-80.7979

X = Data Forms Completed
PFO = Palustrine Forested

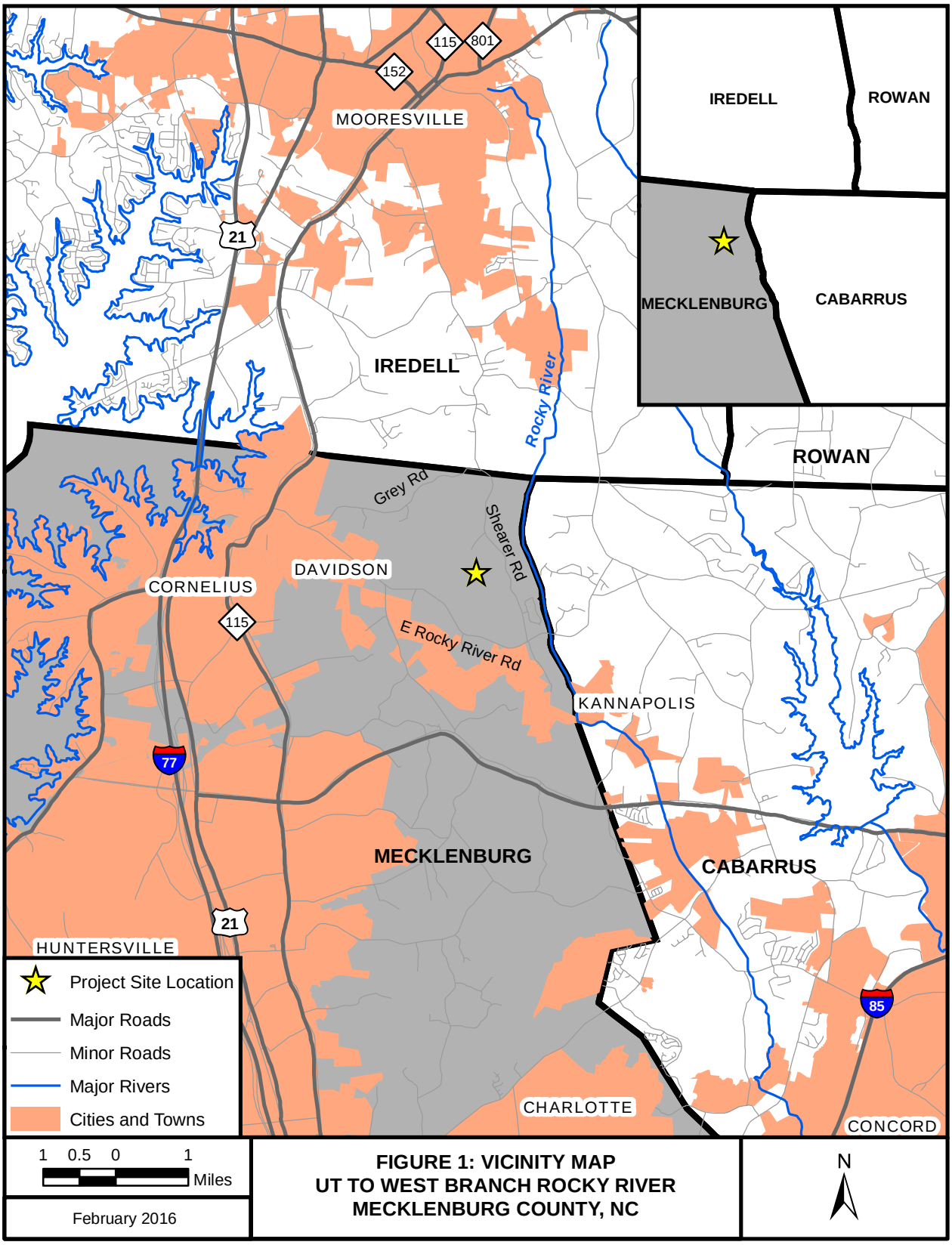

FIGURE 1: VICINITY MAP
UT TO WEST BRANCH ROCKY RIVER
MECKLENBURG COUNTY, NC

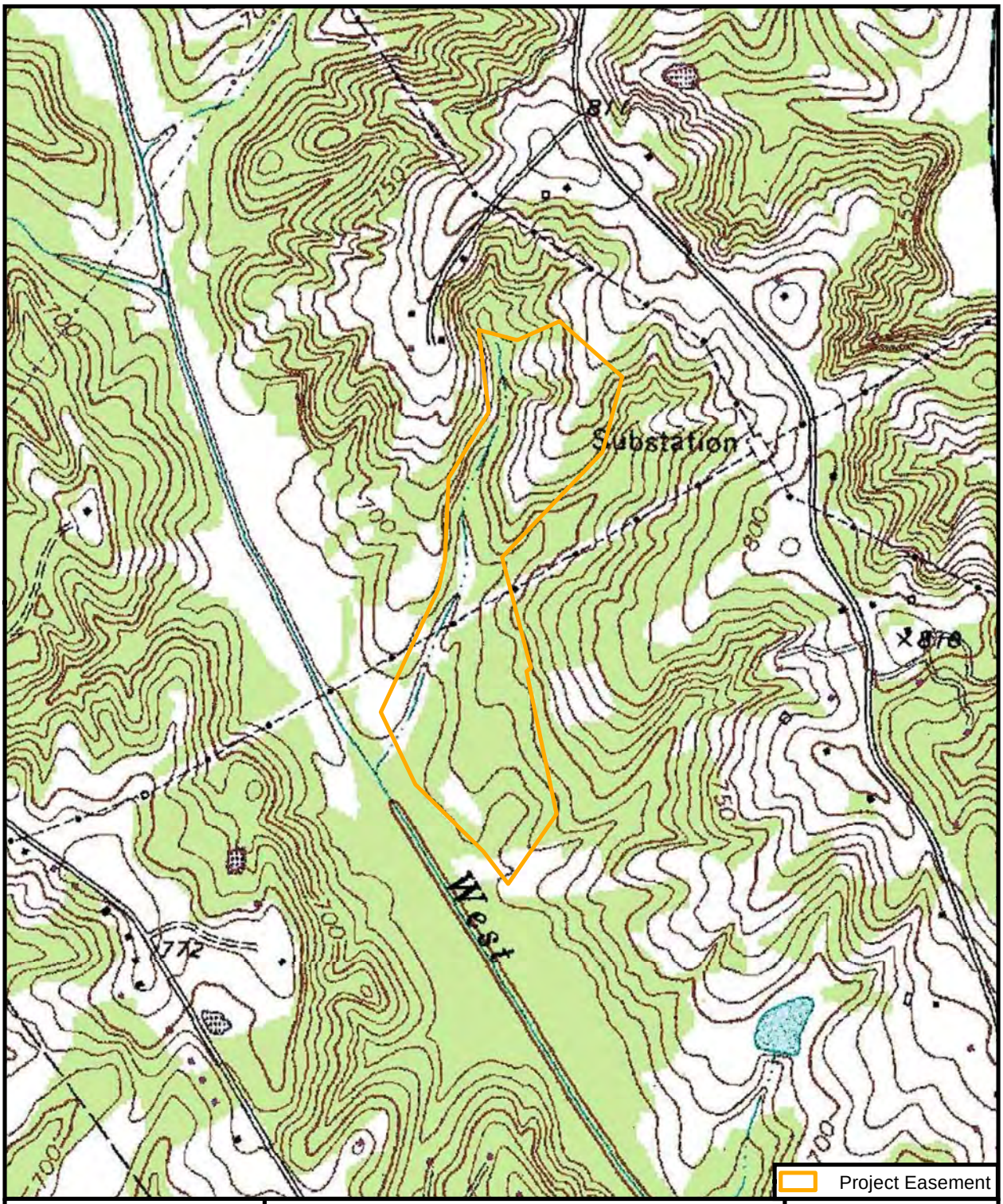

FIGURE 2: USGS MAP
UT TO WEST BRANCH ROCKY RIVER
MECKLENBURG COUNTY, NC

February 2016

Source: USGS DRG, Cornelius Quad (1993).

FIGURE 3: PROPOSED PROJECT AREA MAP
UT TO WEST BRANCH ROCKY RIVER
MECKLENBURG COUNTY, NC

July 2017

SA top

NC DWQ Stream Identification Form Version 4.11

Date: 6/23/17	**Project/Site:** UTWBRR	**Latitude:** 35.4910
Evaluator: J. Sullivan	**County:** Mecklenburg	**Longitude:** −80.7960
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 32	**Stream Determination (circle one)** Ephemeral Intermittent (Perennial)	**Other** *e.g. Quad Name:*

A. Geomorphology (Subtotal = 16)	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	1	2	(3)
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	(2)	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	(1)	2	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	0	1	(2)	3
9. Grade control	0	0.5	(1)	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	(No = 0)		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7.5)				
12. Presence of Baseflow	0	1	(2)	3
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	(1.5)	(1)	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		(Yes = 3)	

C. Biology (Subtotal = 8.5)				
18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macrobenthos (note diversity and abundance)	0	(1)	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	0	(0.5)	1	1.5
24. Amphibians	0	0.5	(1)	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 (Other = 0)			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: 5 juv salamanders, 3 Backswimmers, 1 crayfish

Sketch:

SB

NC DWQ Stream Identification Form Version 4.11

Date: 6/23/17	**Project/Site:** UTWB RR	**Latitude:** 35.4910
Evaluator: J. Sullivan	**County:** Mecklenburg	**Longitude:** -80.7973
Total Points: 27.5 *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30**	**Stream Determination (circle one)** Ephemeral (Intermittent) Perennial	**Other** *e.g. Quad Name:*

A. Geomorphology (Subtotal = 12.5)	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	1	(2)	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	(1)	2	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	(1)	2	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	0	(1)	2	3
9. Grade control	0	(0.5)	(1)	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	(No = 0)		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 8.5)				
12. Presence of Baseflow	0	(1)	2	3
13. Iron oxidizing bacteria	0	1	2	(3)
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	(0)	0.5	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		(Yes = 3)	

C. Biology (Subtotal = 6.5)				
18. Fibrous roots in streambed	3	(2)	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macrobenthos (note diversity and abundance)	0	(1)	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	0	(0.5)	1	1.5
24. Amphibians	(0)	0.5	1	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 (Other = 0)			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: 1 crayfish, 1 midge, 1 backswimmer.

Sketch:

SC

NC DWQ Stream Identification Form Version 4.11

Date: 6/23/17	Project/Site: UTWBRR	Latitude: 35.4869
Evaluator: J. Sullivan	County: Mecklenburg	Longitude: -80.7976
Total Points: 31 *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30**	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other *e.g. Quad Name:*

A. Geomorphology (Subtotal = 16.5)	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	1	(2)	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	(1)	2	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	(1)	2	3
6. Depositional bars or benches	0	(1)	(2)	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	0	(0.5)	1	1.5
9. Grade control	0	0.5	(1)	1.5
10. Natural valley	No = 0		Yes = 3	
11. Second or greater order channel				

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7.5)				
12. Presence of Baseflow	0	1	(2)	3
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	(1.5)	(1)	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 7)				
18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macrobenthos (note diversity and abundance)	0	(1)	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	(0)	0.5	1	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: Flood Cylinder

Sketch:

WAwet

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: UTWB RR City/County: Mecklenburg Sampling Date: 6/23/17

Applicant/Owner: KCT State: NC Sampling Point: WAwet

Investigator(s): J. Sullivan Section, Township, Range:

Landform (hillslope, terrace, etc.): Basin Local relief (concave, convex, none): concave Slope (%): 3%

Subregion (LRR or MLRA): P-136 Lat: 35.4817 Long: -80.7979 Datum: NAD83

Soil Map Unit Name: Helena sandy loam 2-8% slopes NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): –
Water Table Present?	Yes X	No ____	Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 6

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sampling Point: WAwet

VEGETATION (Four Strata) – Use scientific names of plants.

Tree Stratum (Plot size: Entire)	Absolute % Cover	Dominant Species?	Indicator Status
1. Liquidambar styraciflua	50	X	FAC
2. Fraxinus pennsylvanica	30	X	FACW
3. Acer negundo	20	X	FAC
4.			
5.			
6.			
7.			
	100 = Total Cover		
50% of total cover: 50	20% of total cover: 40		

Sapling/Shrub Stratum (Plot size: Entire)			
1. Asimina triloba	30	X	FAC
2. Arundinaria gigantea	30	X	FACW
3. Quercus phellos	10		FAC
4. Acer negundo	10		FAC
5. Lindera benzoin	5		FAC
6. Fraxinus pennsylvanica	~5		FACW
7.			
8.			
9.			
	90 = Total Cover		
50% of total cover: 45	20% of total cover: 18		

Herb Stratum (Plot size: Entire)			
1. Woodwardia areolata	5	X	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	5 = Total Cover		
50% of total cover: 2.5	20% of total cover: 1		

Woody Vine Stratum (Plot size: Entire)			
1. Smilax rotundifolia	5	X	FAC
2.			
3.			
4.			
5.			
	5 = Total Cover		
50% of total cover: 2.5	20% of total cover: 1		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Sampling Point: WA wet

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR4/2	100					SiL	
2-4	7.5YR4/2	70	7.5YR4/6	30			SiL	
4-12	7.5YR4/2	70	7.5YR4/6	30			L	Lots of mica
12-18+	7.5YR4/2	80	7.5YR4/6	20			C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

Closed Depression

WAup

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: UTWB RR City/County: Mecklenburg Sampling Date: 6/23/17

Applicant/Owner: KCT State: NC Sampling Point: WAup

Investigator(s): J. Sullivan Section, Township, Range: ____

Landform (hillslope, terrace, etc.): ____ Local relief (concave, convex, none): ____ Slope (%): 5%

Subregion (LRR or MLRA): P-136 Lat: 35.4815 Long: -80.7979 Datum: NAD83

Soil Map Unit Name: Helena sandy loam 2-8% slopes NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ **Iron Deposits (B5)**
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: WA up

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Liriodendron tulipifera	30	X	FACU
2. Acer negundo	20	X	FAC
3. Asimina triloba	20	X	FAC
4. Celtis laevigata	20	X	FACW
5.			
6.			
7.			
	90 = Total Cover		
50% of total cover: 45	20% of total cover: 18		

Sapling/Shrub Stratum (Plot size: 15)			
1. Asimina triloba	30	X	FAC
2. Lindera benzoin	10	X	FAC
3. Crataegus sp.	10	X	FAC
4.			
5.			
6.			
7.			
8.			
9.			
	50 = Total Cover		
50% of total cover: 25	20% of total cover: 10		

Herb Stratum (Plot size: 5)			
1. Microstegium vimineum	80	X	FAC
2. Hoca multiflora	10		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90 = Total Cover		
50% of total cover: 45	20% of total cover: 18		

Woody Vine Stratum (Plot size: 30)			
1. Parthenocissus quinquifolia	5	X	FACU
2.			
3.			
4.			
5.			
	5 = Total Cover		
50% of total cover: 2.5	20% of total cover: 1		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 78% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WA4P

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	7.5YR3/3	100					L	
2-10	7.5YR4/4	100					L	
10-18+	7.5YR4/6	100					L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

12.9 Jurisdictional Determination

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. **SAW-2017-00810** County: **Mecklenburg** U.S.G.S. Quad: **NC-Cornelius**

NOTIFICATION OF JURISDICTIONAL DETERMINATION

Property Owner:	**Town of Davidson** **Kathryn Spatz**
Address:	**P.O. Box 579** **Davidson, NC 28056**
Telephone Number:	**704-940-9644**
E-mail:	**kspatz@townofdavidson.org**

Size (acres)	**59.0**	Nearest Town	**Davidson**
Nearest Waterway	**West Branch Rocky River**	River Basin	**Upper Pee Dee**
USGS HUC	**03040105**	Coordinates	Latitude: **35.4870** Longitude: **-80.7982**

Location description: **The review area is located on the west side of Shearer Road, approximately 1.4 miles north of the intersection of Shearer Road and E. Rocky River Road. PIN: 00311104. Reference review area description shown in Jurisdictional Determination Review package entitled "Figure 3 Proposed Project Area Map" and Printed Date of July 2017.**

Indicate Which of the Following Apply:

A. Preliminary Determination

☒ There appear to be **waters including wetlands,** on the above described project area/property, that may be subject to Section 404 of the Clean Water Act (CWA)(33 USC § 1344) and/or Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403). The **waters including wetlands,** have been delineated, and the delineation has been verified by the Corps to be sufficiently accurate and reliable. The approximate boundaries of these waters are shown on the enclosed delineation map dated **7/3/2017**. Therefore this preliminary jurisdiction determination may be used in the permit evaluation process, including determining compensatory mitigation. For purposes of computation of impacts, compensatory mitigation requirements, and other resource protection measures, a permit decision made on the basis of a preliminary JD will treat all waters and wetlands that would be affected in any way by the permitted activity on the site as if they are jurisdictional waters of the U.S. This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331). However, you may request an approved JD, which is an appealable action, by contacting the Corps district for further instruction.

☐ There appear to be **waters including wetlands,** on the above described project area/property, that may be subject to Section 404 of the Clean Water Act (CWA)(33 USC § 1344) and/or Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403). However, since the **waters including wetlands,** have not been properly delineated, this preliminary jurisdiction determination may not be used in the permit evaluation process. Without a verified wetland delineation, this preliminary determination is merely an effective presumption of CWA/RHA jurisdiction over all of the **waters including wetlands,** at the project area, which is not sufficiently accurate and reliable to support an enforceable permit decision. We recommend that you have the **waters including wetlands,** on your project area/property delineated. As the Corps may not be able to accomplish this wetland delineation in a timely manner, you may wish to obtain a consultant to conduct a delineation that can be verified by the Corps.

B. Approved Determination

☐ There are Navigable Waters of the United States within the above described project area/property subject to the permit requirements of Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403) and Section 404 of the Clean Water Act (CWA)(33 USC § 1344). Unless there is a change in law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

☐ There are **waters including wetlands,** on the above described project area/property subject to the permit requirements of Section 404 of the Clean Water Act (CWA) (33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

☐ We recommend you have the **waters including wetlands,** on your project area/property delineated. As the Corps may not be able to accomplish this wetland delineation in a timely manner, you may wish to obtain a consultant to conduct a delineation that can be verified by the Corps.

SAW-2017-00810

☐ The **waters including wetlands,** on your project area/property have been delineated and the delineation has been verified by the Corps. The approximate boundaries of these waters are shown on the enclosed delineation map dated **MAP DATE**. If you wish to have the delineation surveyed, the Corps can review and verify the survey upon completion. Once verified, this survey will provide an accurate depiction of all areas subject to CWA and/or RHA jurisdiction on your property which, provided there is no change in the law or our published regulations, may be relied upon for a period not to exceed five years.

☐ The **waters including wetlands,** have been delineated and surveyed and are accurately depicted on the plat signed by the Corps Regulatory Official identified below on **SURVEY SIGNED DATE**. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

☐ There are no waters of the U.S., to include wetlands, present on the above described project area/property which are subject to the permit requirements of Section 404 of the Clean Water Act (33 USC 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

☐ The property is located in one of the 20 Coastal Counties subject to regulation under the Coastal Area Management Act (CAMA). You should contact the Division of Coastal Management in **Morehead City, NC, at (252) 808-2808** to determine their requirements.

Placement of dredged or fill material within waters of the US, including wetlands, without a Department of the Army permit may constitute a violation of Section 301 of the Clean Water Act (33 USC § 1311). Placement of dredged or fill material, construction or placement of structures, or work within navigable waters of the United States without a Department of the Army permit may constitute a violation of Sections 9 and/or 10 of the Rivers and Harbors Act (33 USC § 401 and/or 403). If you have any questions regarding this determination and/or the Corps regulatory program, please contact **David Shaeffer at 704-510-1437 or david.l.shaeffer@usace.army.mil**.

C. Basis For Determination: Basis For Determination: See the preliminary jurisdictional determination form dated 02/26/2018.

D. Remarks: None.

E. Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

F. Appeals Information **(This information applies only to approved jurisdictional determinations as indicated in B. above)**

This correspondence constitutes an approved jurisdictional determination for the above described site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and request for appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the following address:

US Army Corps of Engineers
South Atlantic Division
Attn: Jason Steele, Review Officer
60 Forsyth Street SW, Room 10M15
Atlanta, Georgia 30303-8801

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by **Not applicable**.
It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.

Corps Regulatory Official: RODEN REYNOLDS.BRYAN.KENNETH.1263385574 Digitally signed by RODEN REYNOLDS.BRYAN.KENNETH.1263385574 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=RODEN REYNOLDS.BRYAN.KENNETH.1263385574 Date: 2018.02.22 17:12:38 -05'00'

Date of JD: **02/26/2018** Expiration Date of JD: **Not applicable**

SAW-2017-00810

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete the Customer Satisfaction Survey located at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0

Copy furnished:

Agent:	**KCI Technologies, Inc.**
	Joe Sullivan
Address:	**4505 Falls of Neuse Road, Suite 400**
	Raleigh, NC 27609
Telephone Number:	**919-278-2533**
E-mail:	**joe.sullivan@kci.com**

SAW-2017-00810

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: **Town of Davidson, Kathryn Spatz**	File Number: **SAW-2017-00810**	Date: **02/26/2018**

Attached is:	See Section below
☐ INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
☐ PROFFERED PERMIT (Standard Permit or Letter of permission)	B
☐ PERMIT DENIAL	C
☐ APPROVED JURISDICTIONAL DETERMINATION	D
☒ PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at or http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits.aspx or the Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the district engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SAW-2017-00810

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT		
REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)		
ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.		
POINT OF CONTACT FOR QUESTIONS OR INFORMATION:		
If you have questions regarding this decision and/or the appeal process you may contact: **District Engineer, Wilmington Regulatory Division** **Attn: David Shaeffer** **Asheville Regulatory Office** **U.S Army Corps of Engineers** **151 Patton Avenue, Room 208** **Asheville, North Carolina 28801**	If you only have questions regarding the appeal process you may also contact: Mr. Jason Steele, Administrative Appeal Review Officer CESAD-PDO U.S. Army Corps of Engineers, South Atlantic Division 60 Forsyth Street, Room 10M15 Atlanta, Georgia 30303-8801 Phone: (404) 562-5137	
RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.		
_____ Signature of appellant or agent.	Date:	Telephone number:

For appeals on Initial Proffered Permits send this form to:

District Engineer, Wilmington Regulatory Division, **Attn: David Shaeffer , 69 Darlington Avenue, Wilmington, North Carolina 28403**

For Permit denials, Proffered Permits and Approved Jurisdictional Determinations send this form to:

Division Engineer, Commander, U.S. Army Engineer Division, South Atlantic, Attn: Mr. Jason Steele, Administrative Appeal Officer, CESAD-PDO, 60 Forsyth Street, Room 10M15, Atlanta, Georgia 30303-8801
Phone: (404) 562-5137

PRELIMINARY JURISDICTIONAL DETERMINATION (PJD) FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PJD: 02/26/2018

B. NAME AND ADDRESS OF PERSON REQUESTING PJD: Town of Davidson, Kathryn, Spatz, P.O. Box 579, Davidson, NC, 28056

C. DISTRICT OFFICE, FILE NAME, AND NUMBER: Wilmington District, UT to West Branch Rocky River, SAW-2017-00810

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION: The review area is located on the west side of Shearer Road, approximately 1.4 miles north of the intersection of Shearer Road and E. Rocky River Road. PIN: 00311104. Reference review area description shown in Jurisdictional Determination Review package entitled "Figure 3 Proposed Project Area Map" and Printed Date of July 2017.

(USE THE TABLE BELOW TO DOCUMENT MULTIPLE AQUATIC RESOURCES AND/OR AQUATIC RESOURCES AT DIFFERENT SITES)

State: NC County: Mecklenburg City: Davidson
Center coordinates of site (lat/long in degree decimal format): Latitude: 35.4870 Longitude: -80.7982

Universal Transverse Mercator:

Name of nearest waterbody: West Branch Rocky River

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date:
☒ Field Determination. Date(s): **06/23/2017**

TABLE OF AQUATIC RESOURCES IN REVIEW AREA WHICH "MAY BE" SUBJECT TO REGULATORY JURISDICTION.

Site Number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resources in review area (acreage and linear feet, if applicable	Type of aquatic resources (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject (i.e., Section 404 or Section 10/404)
Stream SA	35.4910	-80.7980	3,028 linear feet	Non-wetland	404
Stream SB	35.4901	-80.7973	94 linear feet	Non-wetland	404
Stream SC	35.4869	-80.7976	319 linear feet	Non-wetland	404
Wetland WA	35.4817	-80.7979	0.16 acres	Wetland	404

1) The Corps of Engineers believes that there may be jurisdictional aquatic resources in the review area, and the requestor of this PJD is hereby advised of his or her option to request and obtain an approved JD (AJD) for that review area based on an informed decision after having discussed the various types of JDs and their characteristics and circumstances when they may be appropriate.

2) In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre- construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an AJD for the activity, the permit applicant is hereby made aware that: (1) the permit applicant has elected to seek a permit authorization based on a PJD, which does not make an official determination of jurisdictional aquatic resources; (2) the applicant has the option to request an AJD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an AJD could possibly result in less compensatory mitigation being required or different special conditions; (3) the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) undertaking any activity in reliance upon the subject permit authorization without requesting an AJD constitutes the applicant's acceptance of the use of the PJD; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a PJD constitutes agreement that all aquatic resources in the review area affected in any way by that activity will be treated as jurisdictional, and waives any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an AJD or a PJD, the JD will be processed as soon as practicable. Further, an AJD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331. If, during an administrative appeal, it becomes appropriate to make an official determination whether geographic jurisdiction exists over aquatic resources in the review area, or to provide an official delineation of jurisdictional aquatic resources in the review area, the Corps will provide an AJD to accomplish that result, as soon as is practicable. This PJD finds that there *"may be"* waters of the U.S. and/or that there *"may be"* navigable waters of the U.S. on the subject review area, and identifies all aquatic features in the review area that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for PJD (check all that apply)

Checked items should be included in subject file. Appropriately reference sources below where indicated for all checked items:

☒ Maps, plans, plots or plat submitted by or on behalf of the PJD requestor:
Map: Figure 1 Vicinity Map Dated February 2016

☒ Data sheets prepared/submitted by or on behalf of the PJD requestor.

☒ Office concurs with data sheets/delineation report.

☐ Office does not concur with data sheets/delineation report. Rationale:_____

☐ Data sheets prepared by the Corps:_____

☐ Corps navigable waters' study:_____

☐ U.S. Geological Survey Hydrologic Atlas:_____

☐ USGS NHD data.

☐ USGS 8 and 12 digit HUC maps.

☒ U.S. Geological Survey map(s). Cite scale & quad name: Figure 2, 1:24,000 Cornelius Dated 1993

☐ Natural Resources Conservation Service Soil Survey. Citation:_____

☐ National wetlands inventory map(s). Cite name:_____

☐ State/local wetland inventory map(s):_____

☐ FEMA/FIRM maps:_____

☐ 100-year Floodplain Elevation is:_____ (National Geodetic Vertical Datum of 1929)

☐ Photographs: ☐ Aerial (Name & Date): _____

or ☐ Other (Name & Date):_____

☐ Previous determination(s). File no. and date of response letter:_____

☒ Other information (please specify): Figure 3 Proposed Project Area Map Dated July 2017 and NCDWQ Stream Identification Forms (Version 4.11) Dated 06/23/2017

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

RODEN REYNOLDS.BRYAN.KENNETH.1263385574

Digitally signed by RODEN REYNOLDS.BRYAN.KENNETH.1263385574
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=RODEN REYNOLDS.BRYAN.KENNETH.1263385574
Date: 2018.02.22 17:13:05 -05'00'

Signature and date of Regulatory staff member completing PJD
02/26/2018

Signature and date of person requesting PJD (REQUIRED, unless obtaining the signature is impracticable)[1]

[1] Districts may establish timeframes for requester to return signed PJD forms. If the requester does not respond within the established time frame, the district may presume concurrence and no additional follow up is necessary prior to finalizing an action.

FIGURE 3: PROPOSED PROJECT AREA MAP
UT TO WEST BRANCH ROCKY RIVER
MECKLENBURG COUNTY, NC

July 2017

12.10 Invasive Species

The site will be monitored for the presence of invasive species during both the visual assessments and vegetation plot monitoring events and will follow the guidance in the *Wilmington District Stream and Wetland Compensatory Mitigation Update* (NCIRT 2016) regarding invasive species. A list of non-native invasive species for North Carolina is found in the NC SAM User Manual Appendix I.

Per the NCIRT 2016 guidance, invasive species management should occur when the functional integrity of the vegetative community is impacted. One or more invasive species may present a threat to the site, but the desirable species may have the ability to survive or outcompete despite the competition. Once an invasive species is identified as impairing the site, physical and/or chemical removal and treatment should occur. Any control measures will be noted in the annual monitoring reports.

North Carolina Interagency Review Team. 2016. Wilmington District Stream and Wetland Compensatory Mitigation Update. Last accessed at: http://saw-reg.usace.army.mil/PN/2016/Wilmington-District-Mitigation-Update.pdf

N.C. Stream Functional Assessment Team. 2016. N.C. Stream Assessment Method (NC SAM) User Manual. https://ribits.usace.army.mil/ribits_apex/f?p=107:150:16800695257725::NO::P150_DOCUMENT_ID:36298

12.11 DMS Floodplain Requirements Checklist

EEP Floodplain Requirements Checklist

This form was developed by the National Flood Insurance program, NC Floodplain Mapping program and Ecosystem Enhancement Program to be filled for all EEP projects. The form is intended to summarize the floodplain requirements during the design phase of the projects. The form should be submitted to the Local Floodplain Administrator with three copies submitted to NFIP (attn. State NFIP Engineer), NC Floodplain Mapping Unit (attn. State NFIP Coordinator) and NC Ecosystem Enhancement Program.

Project Location

Name of project:	UT West Branch Rocky River Restoration Project
Name if stream or feature:	Unnamed Tributary to West Branch Rocky River
County:	Mecklenburg
Name of river basin:	Yadkin (03040105)
Is project urban or rural?	Rural
Name of Jurisdictional municipality/county:	Town of Davidson
DFIRM panel number for entire site:	3710466300K (Panel 4663)
Consultant name:	KCI Associates of NC, P.A.
Phone number:	919 783-9214
Address:	4505 Falls of Neuse Rd, Suite 400 Raleigh, NC 27609

Design Information

Provide a general description of project (one paragraph). Include project limits on a reference orthophotograph at a scale of 1" = 500".

Summarize stream reaches or wetland areas according to their restoration priority.

Reach	Length	Priority
UTWB-1	423	PI/PII (Restoration)
UTWB-2	1,747	PI (Restoration)
UTWB-3	1,314	PI/PII (Restoration)
UT1-1	49	N/A (Enhancement II)
UT1-2	94	PI (Restoration)
UT2-1	45	N/A (Enhancement I)
UT2-2	259	PI (Restoration)

Floodplain Information

Is project located in a Special Flood Hazard Area (SFHA)?

☐ Yes ☒ No

If project is located in a SFHA, check how it was determined:

☐ Redelineation

☐ Detailed Study

☐ Limited Detail Study

☐ Approximate Study

☐ Don't know

List flood zone designation:

Check if applies:

☐ AE Zone

- ☐ Floodway
- ☐ Non-Encroachment
- ☒ None

☐ A Zone

- ☐ Local Setbacks Required
- ☐ No Local Setbacks Required

If local setbacks are required, list how many feet:
Does proposed channel boundary encroach outside floodway/non-encroachment/setbacks? ☐ Yes ☒ No
Land Acquisition (Check) ☐ State owned (fee simple) ☑ Conservation easment (Design Bid Build) ☐ Conservation Easement (Full Delivery Project) Note: if the project property is state-owned, then all requirements should be addressed to the Department of Administration, State Construction Office (attn: Herbert Neily, (919) 807-4101)
Is community/county participating in the NFIP program? ☒ Yes ☐ No Note: if community is not participating, then all requirements should be addressed to NFIP (attn: State NFIP Engineer, (919) 715-8000)
Name of Local Floodplain Administrator: Phone Number:

Floodplain Requirements

This section to be filled by designer/applicant following verification with the LFPA

☑ No Action

☐ No Rise

☐ Letter of Map Revision

☐ Conditional Letter of Map Revision

☐ Other Requirements

List other requirements:

Comments:

Name: __Kristin Knight-Meng_____ Signature: Kristin Knight-Meng

Title: __Senior Project Engineer_____ Date:__11/28/2018_____

12.12 Approved FHWA Categorical Exclusion

note - EDR report and associated data have not been included in order to reduce bulk; these are part of prior approved deliverables and can be made available upon request.

Appendix A

Categorical Exclusion Form for Ecosystem Enhancement Program Projects
Version 1.4

Note: Only Appendix A should to be submitted (along with any supporting documentation) as the environmental document.

Part 1: General Project Information	
Project Name:	UT to West Branch Rocky River Stream Project
County Name:	Mecklenburg
EEP Number:	92684
Project Sponsor:	ICA Engineering
Project Contact Name:	Kathleen McKeithan
Project Contact Address:	5121 Kingdom Way, Raleigh, NC 27607
Project Contact E-mail:	kmckeithan@icaeng.com
EEP Project Manager:	Harry Tsomides

Project Description

Stream enhancement and restoration and wetland preservation for UT to West Branch Rocky River Stream Project.

For Official Use Only

Reviewed By:

04/07/2014
Date

Harry Tsomides
EEP Project Manager

Conditional Approved By:

4-16-14
Date

For Division Administrator
FHWA

☒ **Check this box if there are outstanding issues** ESA, BGPA, FPPA

Final Approval By:

3-3-16
Date

For Division Administrator
FHWA

Part 2: All Projects Regulation/Question	Response
Coastal Zone Management Act (CZMA)	
1. Is the project located in a CAMA county?	☐ Yes ☑ No
2. Does the project involve ground-disturbing activities within a CAMA Area of Environmental Concern (AEC)?	☐ Yes ☐ No ☑ N/A
3. Has a CAMA permit been secured?	☐ Yes ☐ No ☑ N/A
4. Has NCDCM agreed that the project is consistent with the NC Coastal Management Program?	☐ Yes ☐ No ☑ N/A
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)	
1. Is this a "full-delivery" project?	☐ Yes ☑ No
2. Has the zoning/land use of the subject property and adjacent properties ever been designated as commercial or industrial?	☐ Yes ☐ No ☑ N/A
3. As a result of a limited Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?	☐ Yes ☐ No ☑ N/A
4. As a result of a Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?	☐ Yes ☐ No ☑ N/A
5. As a result of a Phase II Site Assessment, are there known or potential hazardous waste sites within the project area?	☐ Yes ☐ No ☑ N/A
6. Is there an approved hazardous mitigation plan?	☐ Yes ☐ No ☑ N/A
National Historic Preservation Act (Section 106)	
1. Are there properties listed on, or eligible for listing on, the National Register of Historic Places in the project area?	☐ Yes ☑ No
2. Does the project affect such properties and does the SHPO/THPO concur?	☐ Yes ☐ No ☑ N/A
3. If the effects are adverse, have they been resolved?	☐ Yes ☐ No ☑ N/A
Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)	
1. Is this a "full-delivery" project?	☐ Yes ☑ No
2. Does the project require the acquisition of real estate?	☐ Yes ☐ No ☑ N/A
3. Was the property acquisition completed prior to the intent to use federal funds?	☐ Yes ☐ No ☑ N/A
4. Has the owner of the property been informed: * prior to making an offer that the agency does not have condemnation authority; and * what the fair market value is believed to be?	☐ Yes ☐ No ☑ N/A

Part 3: Ground-Disturbing Activities Regulation/Question	Response
American Indian Religious Freedom Act (AIRFA)	
1. Is the project located in a county claimed as "territory" by the Eastern Band of Cherokee Indians?	☐ Yes ☑ No
2. Is the site of religious importance to American Indians?	☐ Yes ☐ No ☑ N/A
3. Is the project listed on, or eligible for listing on, the National Register of Historic Places?	☐ Yes ☐ No ☑ N/A
4. Have the effects of the project on this site been considered?	☐ Yes ☐ No ☑ N/A
Antiquities Act (AA)	
1. Is the project located on Federal lands?	☐ Yes ☑ No
2. Will there be loss or destruction of historic or prehistoric ruins, monuments or objects of antiquity?	☐ Yes ☐ No ☑ N/A
3. Will a permit from the appropriate Federal agency be required?	☐ Yes ☐ No ☑ N/A
4. Has a permit been obtained?	☐ Yes ☐ No ☑ N/A
Archaeological Resources Protection Act (ARPA)	
1. Is the project located on federal or Indian lands (reservation)?	☐ Yes ☑ No
2. Will there be a loss or destruction of archaeological resources?	☐ Yes ☐ No ☑ N/A
3. Will a permit from the appropriate Federal agency be required?	☐ Yes ☐ No ☑ N/A
4. Has a permit been obtained?	☐ Yes ☐ No ☑ N/A
Endangered Species Act (ESA)	
1. Are federal Threatened and Endangered species and/or Designated Critical Habitat listed for the county?	☑ Yes ☐ No
2. Is Designated Critical Habitat or suitable habitat present for listed species?	☑ Yes ☐ No ☐ N/A
3. Are T&E species present or is the project being conducted in Designated Critical Habitat?	☐ Yes ☑ No ☐ N/A
4. Is the project "likely to adversely affect" the species and/or "likely to adversely modify" Designated Critical Habitat?	☐ Yes ☑ No ☐ N/A
5. Does the USFWS/NOAA-Fisheries concur in the effects determination?	☐ Yes ☐ No ☑ N/A
6. Has the USFWS/NOAA-Fisheries rendered a "jeopardy" determination?	☐ Yes ☐ No ☑ N/A

Executive Order 13007 (Indian Sacred Sites)	
1. Is the project located on Federal lands that are within a county claimed as "territory" by the EBCI?	☐ Yes ☑ No
2. Has the EBCI indicated that Indian sacred sites may be impacted by the proposed project?	☐ Yes ☐ No ☑ N/A
3. Have accommodations been made for access to and ceremonial use of Indian sacred sites?	☐ Yes ☐ No ☑ N/A
Farmland Protection Policy Act (FPPA)	
1. Will real estate be acquired?	☑ Yes ☐ No
2. Has NRCS determined that the project contains prime, unique, statewide or locally important farmland?	☑ Yes ☐ No ☐ N/A
3. Has the completed Form AD-1006 been submitted to NRCS?	☑ Yes ☐ No ☐ N/A
Fish and Wildlife Coordination Act (FWCA)	
1. Will the project impound, divert, channel deepen, or otherwise control/modify any water body?	☑ Yes ☐ No
2. Have the USFWS and the NCWRC been consulted?	☑ Yes ☐ No ☐ N/A
Land and Water Conservation Fund Act (Section 6(f))	
1. Will the project require the conversion of such property to a use other than public, outdoor recreation?	☐ Yes ☑ No
2. Has the NPS approved of the conversion?	☐ Yes ☐ No ☑ N/A
Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat)	
1. Is the project located in an estuarine system?	☐ Yes ☑ No
2. Is suitable habitat present for EFH-protected species?	☐ Yes ☐ No ☑ N/A
3. Is sufficient design information available to make a determination of the effect of the project on EFH?	☐ Yes ☐ No ☑ N/A
4. Will the project adversely affect EFH?	☐ Yes ☐ No ☑ N/A
5. Has consultation with NOAA-Fisheries occurred?	☐ Yes ☐ No ☑ N/A
Migratory Bird Treaty Act (MBTA)	
1. Does the USFWS have any recommendations with the project relative to the MBTA?	☐ Yes ☑ No
2. Have the USFWS recommendations been incorporated?	☐ Yes ☐ No ☑ N/A
Wilderness Act	
1. Is the project in a Wilderness area?	☐ Yes ☑ No
2. Has a special use permit and/or easement been obtained from the maintaining federal agency?	☐ Yes ☐ No ☑ N/A

ICA Engineering

April 1, 2014

Harry Tsomides
EEP Project Manager
5 Ravenscroft Drive, #102
Asheville, NC 28801

Subject: **UT to West Branch Rocky River Mitigation Design-Bid-Build Site**
NCDENR Contract #: D14007i
EEP Project #: 92684
Categorical Exclusion

Dear Mr. Tsomides,

Attached is the Categorical Exclusion, all supporting documentation and any relevant correspondence for the UT to West Branch Rocky River Mitigation Design-Bid-Build Site in Mecklenburg County, North Carolina. The purpose of Categorical Exclusion documentation is to assist the North Carolina Ecosystem Enhancement Program (EEP) in satisfying the Federal Highway Administration's (FHWA) obligation to ensure compliance with various federal environmental laws and regulations.

Correspondence between ICA Engineering and any federal, state or municipal agency is included within the supporting documentation of the Categorical Exclusion, with the intent of providing justification for satisfied compliance with each regulation. This includes correspondence and/or responses from: the US Fish and Wildlife Service; the North Carolina Wildlife Resources Commission; the North Carolina State Historic Preservation Office; and the Natural Resources Conservation Service.

Surveys for Threatened and Endangered species will be conducted during the flowering season for Michaux's sumac, Schweinitz's sunflower, and smooth coneflower. Results of each survey will be provided upon completion.

The Farmland Conversion Impact Rating form will be completed once ICA Engineering is provided feedback from the Natural Resources Conservation Service office.

The Environmental Data Recources (EDR) Report is included within the supporting documentation enclosed. The EDR revealed there is one occurrence in the Old Landfill Inventory (OLI) Database. The Davidson Sanitary Landfill is located within Fisher Farm Park; however the disposal sites are located outside of the Conservation Easement and drainage areas to the project tributaries. NCDENR's Site Summary Report for the Davidson Sanitary Landfill (NONCD0000184) has been included to supplement the EDR. The EDR Radius report covers the entire Conservation Easement.

Sincerely,
ICA Engineering

Kathleen M. McKeithan, PE, CPESC, CPSWQ, CFM

5121 Kingdom Way, Suite 100 • Raleigh, North Carolina 27607 • (919) 851-6066 • fax (919) 851-6846
e-mail: rsmith@flohut.com

ICA Engineering

October 29, 2014

Harry Tsomides
EEP Project Manager
5 Ravenscroft Drive, #102
Asheville, NC 28801

Subject: **UT to West Branch Rocky River Mitigation Design-Bid-Build Site**
NCDENR Contract #: D14007i
EEP Project #: 92684
Categorical Exclusion Outstanding Issues

Dear Mr. Tsomides,

The UT to West Branch Rocky River Mitigation Design-Bid-Build Site in Mecklenburg County, North Carolina has been conditionally approved dependent upon outstanding issues regarding Endangered Species Act (ESA), Bald and Golden Eagle Protection Act (BGPA), and Farmland Protection Policy Act (FPPA). The purpose of Categorical Exclusion documentation is to assist the North Carolina Ecosystem Enhancement Program (EEP) in satisfying the Federal Highway Administration's (FHWA) obligation to ensure compliance with various federal environmental laws and regulations.

Per the Categorical Exclusion, field surveys were conducted for three federally listed species. A survey was performed on June 17, 2014 for Michaux's sumac (*Rhus michauxii*) and smooth coneflower (*Echinacea laevigata*) and on September 23, 2014 for Schweinitz's sunflower (*Helianthus schweinitzii*) by Ben Furr. Mr. Furr graduated from North Carolina State University in 2003 with a BS in Natural Resources Ecosystem Assessment and has conducted surveys for Michaux's sumac, smooth coneflower, and Schweinitz's sunflower at numerous sites throughout the Piedmont of North Carolina. Mr. Furr's educational and professional background has concentrated on geomorphological analysis of stream channels, soils analysis, vegetative analyses, threatened and endangered species surveys, natural resources documentation, and permitting.

- Michaux's sumac (*Rhus michauxii*) - Michaux's sumac grows in sandy or rocky open woods in association with basic soils. This plant survives best in areas where some form of disturbance has provided an open area. Several populations in North Carolina are on highway rights-of way, roadsides, edges of artificially maintained clearings and areas managed with periodic fires. Flowering usually occurs from June to July; while the fruit, a red drupe, is produced through the months of August to October. Suitable habitat is present in the area maintained beneath the power lines and around the maintained fields, as well as edges along trails and edges between early successional forests and mature forests. Pedestrian surveys (required between June and October) were performed at the Site in all areas of suitable habitat on June 17, 2014. Michaux's sumac was not observed during field surveys. Biological conclusion: No effect.

- Schweinitz's sunflower (*Helianthus schweinitzii*) - Habitat for the Schweinitz's sunflower occurs in full to partial sun and is found in areas with poor soils, such as thin clays that vary from wet to dry. It is believed that this species once occurred in natural forest openings or grasslands. Many of the

5121 Kingdom Way, Suite 100 • Raleigh, North Carolina 27607 • (919) 851-6066 • fax (919) 851-6846
e-mail: rsmith@flohut.com

remaining populations occur along roadsides. The plant produces small yellow flowers from late August until frost. Suitable habitat is present in the area maintained beneath the power lines and around the maintained fields, as well as edges along trails and edges between early successional forests and mature forests. Pedestrian surveys (required between August and November) were performed at the Site in all areas of suitable habitat on September 23, 2014. Schweinitz's sunflower was not observed during field surveys. Biological conclusion: No effect.

- Smooth coneflower (*Echinacea laevigata*) - Habitat for the Smooth coneflower is typically found in open woods, glades, cedar barrens, roadsides, clearcuts, dry limestone bluffs, and power line rights-of-way, usually on magnesium and calcium rich soils associated with amphibolite, dolomite or limestone (in Virginia), gabbro (in North Carolina and Virginia), diabase (in North Carolina and South Carolina), and marble (in South Carolina and Georgia). Smooth coneflower occurs in plant communities that have been described as xeric hardpan forests, diabase glades or dolomite woodlands. Optimal sites are characterized by abundant sunlight and little competition in the herbaceous layer. Natural fires, as well as large herbivores, historically influenced the vegetation in this species' range. Many of the herbs associated with Smooth coneflower are also sun-loving species that depend on periodic disturbances to reduce the shade and competition of woody plants. Flowering occurs from late May through mid-July and fruits develop from late June to September. Suitable habitat is present in the area maintained beneath the power lines and around the maintained fields, as well as edges along trails and edges between early successional forests and mature forests. Pedestrian surveys (required between May and mid-July) were performed at the Site in all areas of suitable habitat on June 17, 2014. Smooth coneflower was not observed during field surveys. Biological conclusion: No effect.

The BGPA was listed as an outstanding issue on the conditionally signed Categorical Exclusion. Bald eagles typically nest near large bodies of water such as estuaries, large lakes, reservoirs, rivers and some seacoasts which provide the eagle with their main food source, fish. The Site does not provide suitable habitat for the bald eagle. The closest large body of water to the Site is Lake Norman, which is just over 3.5 miles away. . No nests have been observed onsite during multiple field surveys of the site (May 30, November 5 and December 11 of 2013 and June 17 and September 23 of 2014). No eagles have been observed in flight over the project area during site visits. Biological conclusion: No effect.

The FPPA was the final outstanding issued listed on the signed Categorical Exclusion. The United States Department of Agriculture's (USDA) response is attached for your review. The Federal agency involved (FHWA) in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office. Milton Cortés with the NRCS Raleigh office has been ICA's contact thus far for the FPPA documentation. The Federal agency (FHWA) providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA. Considering the subject tract of land has already been taken out of farmland production under its current recreational use, FPPA approval is not anticipated to be an issue.

Correspondence between ICA Engineering and any federal, state or municipal agency is included within the supporting documentation of the Categorical Exclusion, with the intent of providing justification for satisfied compliance with each regulation. This includes correspondence and/or responses from: the US Fish and Wildlife Service; the North Carolina Wildlife Resources Commission; the North Carolina State Historic Preservation Office; and the Natural Resources Conservation Service.

Sincerely,
ICA Engineering

Kathleen M. McKeithan, PE, CPESC, CPSWQ, CFM

Enclosure:
USDA Response Letter and Form
Conditionally Approved CE with Revised Part 2 and 3

ICA Engineering

January 14, 2014

Marella Buncick
US Fish and Wildlife Service
Asheville Field Office
160 Zillicoa Street
Asheville, NC 28801

Subject: **UT to West Branch Rocky River**
EEP stream and wetland mitigation project in Mecklenburg County

Dear Ms. Buncick,

The UT to West Branch Rocky River Site has been identified for the purpose of providing in-kind mitigation for unavoidable stream and wetland impacts. Several sections of channel have been identified as significantly degraded.

We have obtained an updated species list for Mecklenburg County from your web site (www.fws.gov/raleigh/species/cntylist/mecklenburg.html). The threatened or endangered species for this county are: Carolina heelsplitter, Michaux's sumac, Schweinitz's sunflower and Smooth coneflower. We are requesting that you please provide any known information for each species in the county.

Please provide comments on any possible issues that might emerge with respect to endangered species, migratory birds or other trust resources from the construction of a stream and wetland mitigation project on the subject property. A location map and an existing conditions map with the easement boundary are attached.

If we have not heard from you in 30 days we will assume that our species list is correct, that you do not have any comments regarding associated laws, and that you do not have any information relevant to this project at the current time. We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,
ICA Engineering

K McKeithan

Kathleen McKeithan, PE, CPESC, CPSWQ, CFM

cc:
Harry Tsomides
EEP Project Manager
5 Ravenscroft Drive, Suite 102
Asheville, NC 28801

From:	Hamstead, Byron
To:	Joe Sullivan
Subject:	Re: Northern Long-Eared Bat - UT to West Branch Rocky River DMS Stream and Wetland Mitigation Project
Date:	Tuesday, February 16, 2016 2:41:04 PM

Hi. Mr. Sullivan,

The U.S. Fish and Wildlife Service (Service) has reviewed the information provided in your letter sent via email on February 11, 2016. We submit the following comments in accordance with the provisions of the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661-667e); the National Environmental Policy Act (42 U.S.C. §4321 et seq.); and section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543) (Act).

Suitable roosting habitat for the federally threatened Northern long-eared bat (*Myotis septentrionalis*) may be present at the project. However, since the proposed project site is over 40 miles away from the nearest known occurrence for the species, the probability of “take” that could occur from this project is discountable. Therefore, we believe this project “may affect" but is "not likely to adversely affect” this species.

We recommend that the cutting moratorium of May 15 - August 15 be implemented into the plans if possible. Though the “not likely to adversely affect” determination is not dependent on this action, the cutting moratorium is a measure that can be implemented to further reduce the probability of “take” of this species.

You have determined that the proposed project will have "no effect" on any other federally protected species. Therefore, we believe the requirements under section 7 of the Act are fulfilled at this time. However, obligations under section 7 of the Act must be reconsidered if: (1) new information reveals impacts of these identified actions that may affect listed species or critical habitat in a manner not previously considered, (2) these actions are subsequently modified in a manner that was not considered in this review, or (3) a new species is listed or critical habitat is determined that may be affected by the identified actions.

The Service appreciates the opportunity to comment on this project. Please contact Mr. Byron Hamstead of our staff at 828/258-3939, Ext. 225, if you have any questions. In any future correspondence concerning this project, please reference our Log Number 4-2-16-181.

Regards,

Byron Hamstead

Byron Hamstead
Fish and Wildlife Biologist
USFWS Asheville Field Office
160 Zillicoa St., Suite B
Asheville, NC, 28801

828-258-3939 ext. 225

On Thu, Feb 11, 2016 at 11:53 AM, Joe Sullivan <Joe.Sullivan@kci.com> wrote:

> Mr. Hamstead,
>
> KCI is working in conjunction with DMS on the UT to West Branch Rocky River Stream and Wetland Mitigation Project. The site is located in Mecklenburg County, North Carolina. All federally listed threatened and endangered species were originally surveyed in 2014, if suitable habitat was present in the study area. At the time this included bald eagle, Carolina heelsplitter, Michaux's sumac, Schweinitz's sunflower and smooth coneflower. It was determined that the proposed project would have no effect on these species. Since the original survey was completed, the northern long-eared bat has been added to the list of threatened and endangered species. I have attached a letter requesting that you please provide any known information for northern long-eared bat in the county. If you would like a hard copy mailed to the USFWS Asheville Office, please let me know.
>
> Thanks,
>
> Joe Sullivan
>
> KCI Technologies
>
> Landmark Center II, ste. 220
>
> 4601 Six Forks Rd.
>
> Raleigh, NC 27609
>
> 919-278-2533 (office phone)
>
> 516-286-1080 (mobile phone)

USDA
United States Department of Agriculture
Natural Resources Conservation Service
4407 Bland Road, Suite 117
Raleigh, North Carolina 27609

Milton Cortés, Assistant State Soil Scientist
Telephone No.: (919) 873-2171
Fax No.: (919) 873-2157
E-mail: milton.cortes@nc.usda.gov

April 11, 2014

Katie McKeithan, PE, CPESC, CPSWQ, CFM
Project Engineer, Ecological Restoration
ICA Engineering, Inc.
5121 Kingdom Way, Suite 100
Raleigh, NC 27607

Ms. McKeithan;

The following information is in response to your review request in the UT to West Branch Rocky River Project, Mecklenburg Co. North Carolina

Projects are subject to Farmland Protection Policy Act (FPPA) requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a Federal agency or with assistance from a Federal agency.

For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land.

Farmland means prime or unique farmlands as defined in section 1540(c)(1) of the Act or farmland that is determined by the appropriate state or unit of local government agency or agencies with concurrence of the Secretary to be farmland of statewide of local importance.

"Farmland" does not include land already in or committed to urban development or water storage. Farmland ``already in" urban development or water storage includes all such land with a density of 30 structures per 40-acre area. Farmland already in urban development also includes lands identified as ``urbanized area" (UA) on the Census Bureau Map, or as urban area mapped with a ``tint overprint" on the USGS topographical maps, or as ``urban-built-up" on the USDA Important Farmland Maps. See over for more information.

The area in question meets one or more of the above criteria for Farmland. Farmland area will be affected or converted. Enclosed is the Farmland Conversion Impact Rating form AD1006 with PARTS II, IV and V completed by NRCS. The corresponding agency will need to complete the evaluation, according to the Code of Federal Regulation 7CFR 658, Farmland Protection Policy Act.

If you have any questions, please contact me at number above.

Sincerely,

Milton Cortes
Assistant State Soil Scientist

Projects and Activities Subject to FPPA

Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a Federal agency or with assistance from a Federal agency.

Assistance from a Federal agency includes:

- Acquiring or disposing of land.
- Providing financing or loans.
- Managing property.
- Providing technical assistance

Activities that may be subject to FPPA include:

- State highway construction projects, (through the Federal Highway Administration)
- Airport expansions
- Electric cooperative construction projects
- Railroad construction projects
- Telephone company construction projects
- Reservoir and hydroelectric projects
- Federal agency projects that convert farmland
- Other projects completed with Federal assistance.

Activities not subject to FPPA include:

- Federal permitting and licensing
- Projects planned and completed without the assistance of a Federal agency
- Projects on land already in urban development or used for water storage
- Construction within an existing right-of-way purchased on or before August 4, 1984
- Construction for national defense purposes
- Construction of on-farm structures needed for farm operations
- Surface mining, where restoration to agricultural use is planned
- Construction of new minor secondary structures such as a garage or storage shed.

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*		Date Of Land Evaluation Request 02/26/2014	
Name of Project UT to West Branch Rocky River		Federal Agency Involved	
Proposed Land Use Stream Mitigation		County and State Mecklenburg County and North Carolina	
PART II *(To be completed by NRCS)*		Date Request Received By NRCS 03/11/2014	Person Completing Form:
Does the site contain Prime, Unique, Statewide or Local Important Farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☑ NO ☐	Acres Irrigated None	Average Farm Size 85 acres
Major Crop(s) Corn	Farmable Land In Govt. Jurisdiction Acres: 239,409 68 %	Amount of Farmland As Defined in FPPA Acres: 221,41 acres 63 %	
Name of Land Evaluation System Used Mecklenburg, NC LESA	Name of State or Local Site Assessment System N/A	Date Land Evaluation Returned by NRCS 04/11/2014	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	60			
B. Total Acres To Be Converted Indirectly	-			
C. Total Acres In Site	60			
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	47			
B. Total Acres Statewide Important or Local Important Farmland	11			
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted	0.0262			
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value	57			
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)	61			

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	**Maximum Points**	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)				
2. Perimeter In Non-urban Use	(10)				
3. Percent Of Site Being Farmed	(20)				
4. Protection Provided By State and Local Government	(20)				
5. Distance From Urban Built-up Area	(15)				
6. Distance To Urban Support Services	(15)				
7. Size Of Present Farm Unit Compared To Average	(10)				
8. Creation Of Non-farmable Farmland	(10)				
9. Availability Of Farm Support Services	(5)				
10. On-Farm Investments	(20)				
11. Effects Of Conversion On Farm Support Services	(10)				
12. Compatibility With Existing Agricultural Use	(10)				
TOTAL SITE ASSESSMENT POINTS	160	0	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	61	0	0	0
Total Site Assessment *(From Part VI above or local site assessment)*	160	0	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	61	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ☐

Reason For Selection:

Name of Federal agency representative completing this form:	Date:

(See Instructions on reverse side)

Form AD-1006 (03-02)

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form. For Corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, http://fppa.nrcs.usda.gov/lesa/

Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s)of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. (NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/ndISAPI.dll/oip_public/USA_map, or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.)

Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. (When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.

Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.

Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.

Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.

Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.

2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160.
Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \times 160 = 144 \text{ points for Site A}$$

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.

ICA Engineering

January 14, 2014

Renee Gledhill-Earley
State Historic Preservation Office
4617 Mail Service Center
Raleigh, NC 27699-4617

Subject: **UT to West Branch Rocky River**
EEP stream and wetland mitigation project in Mecklenburg County

Dear Ms. Gledhill-Earley,

The Ecosystem Enhancement Program (EEP) requests review and comment on any possible issues that might emerge with respect to archaeological or cultural resources associated with a potential stream and wetland mitigation project. A location map and an existing conditions map with the easement boundary are attached.

The UT to West Branch Rocky River Site has been identified for the purpose of providing in-kind mitigation for unavoidable stream and wetland impacts. Several sections of channel have been identified as significantly degraded.

No architectural structures or archeological artifacts have been observed or noted during preliminary surveys of the site for restoration purposes. Enclosed are current photos of the site.

We ask that you review this site based on the attached information to determine the presence of any historic properties. We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,
ICA Engineering

Kathleen McKeithan, PE, CPESC, CPSWQ, CFM

cc:
Harry Tsomides
EEP Project Manager
5 Ravenscroft Drive, Suite 102
Asheville, NC 28801

North Carolina Department of Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Pat McCrory
Secretary Susan Kluttz

Office of Archives and History
Deputy Secretary Kevin Cherry

January 30, 2014

Kathleen McKeithan
ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607

Re: Unnamed Tributary to West Branch of the Rocky River Stream and Wetland Mitigation, Mecklenburg County, ER 14-0120

Dear Ms. McKeithan:

Thank you for your letter of January 14, 2014, concerning the above project.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or renee.gledhill-earley@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos

ICA Engineering

January 14, 2014

Shannon Deaton
North Carolina Wildlife Resource Commission
Division of Inland Fisheries
1721 Mail Service Center
Raleigh, NC 27699

Subject: **UT to West Branch Rocky River**
EEP stream and wetland mitigation project in Mecklenburg County

Dear Ms. Deaton,

The purpose of this letter is to request review and comment on any possible issues that might emerge with respect to fish and wildlife issues associated with a potential stream and wetland mitigation project. A location map and an existing conditions map with the easement boundary are attached.

The UT to West Branch Rocky River Site has been identified for the purpose of providing in-kind mitigation for unavoidable stream and wetland impacts. Several sections of channel have been identified as significantly degraded.

We thank you in advance for your timely response. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,
ICA Engineering

Kathleen McKeithan, PE, CPESC, CPSWQ, CFM

cc:
Harry Tsomides
EEP Project Manager
5 Ravenscroft Drive, Suite 102
Asheville, NC 28801

North Carolina Wildlife Resources Commission

Gordon Myers, Executive Director

3 February 2014

Kathleen McKeithan
ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607

Subject: UT to West Branch Rocky River Mitigation Site, Mecklenburg County

Dear Ms. McKeithan:

Biologists with the North Carolina Wildlife Resources Commission (NCWRC) have reviewed the subject information. Our comments are provided in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667e) and North Carolina General Statutes (G.S. 113-131 et seq.).

The proposed project would provide in-kind mitigation for unavoidable stream and wetland impacts. Several sections of channel have been identified as significantly degraded. The project site includes an unnamed tributary to West Branch Rocky River in the Yadkin-Pee Dee River basin.

Stream restoration projects often improve water quality and aquatic habitat. Establishing native, forested buffers in riparian areas will help protect water quality, improve aquatic and terrestrial habitats, and provide a travel corridor for wildlife species. Provided measures are taken to minimize erosion and sedimentation from construction/restoration activities, we do not anticipate the project to result in significant adverse impacts to aquatic and terrestrial wildlife resources.

Thank you for the opportunity to review this proposed project. If we can provide further assistance, please contact our office at (336) 449-7625 or sharj.bryant@ncwildlife.org.

Sincerely,

Shari L. Bryant
Piedmont Region Coordinator
Habitat Conservation Program

Mailing Address: Division of Inland Fisheries • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 707-0220 • **Fax:** (919) 707-0028